

10 Jan 94

**APPENDIX F**  
**SYSTEM SIMULATION  
COMPUTER RUNS**  
**Volume II**

**DISTRIBUTION STATEMENT E**  
Approved for public release;  
Distribution Unlimited

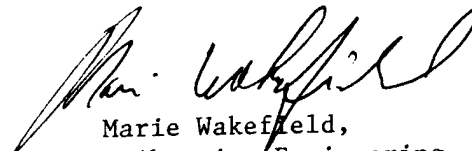


DEPARTMENT OF THE ARMY  
CONSTRUCTION ENGINEERING RESEARCH LABORATORIES, CORPS OF ENGINEERS  
P.O. BOX 9005  
CHAMPAIGN, ILLINOIS 61826-9005

REPLY TO  
ATTENTION OF: TR-I Library

17 Sep 1997

Based on SOW, these Energy Studies are unclassified/unlimited.  
Distribution A. Approved for public release.

  
Marie Wakefield,  
Librarian Engineering

*Building 034*

*Trace Input File*

19971017 185

933702

CONTENTS OF : E:\CB34.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 34

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/BASE BUILDING

13 20/1/1/DEN/165/1/1/0//10

14 20/2/1/UTILITY ROOM/125/1/1/0//10

15 20/3/2/BEDROOM NO. 2/170/1/1/0//10

16 20/4/2/KITCHEN/187/1/1/0//10

17 20/5/3/DINING ROOM/204/1/1/0//10

18 20/6/4/BATH/50/1/1/0//10

19 20/7/5/BEDROOM NO. 1/194/1/1/0//10

20 20/8/5/LIVING ROOM/189/1/1/0//10

21 20/9/6/VEST & CLOSET/41/1/1/0//10

22 21/M////CBLQTX//CBLQTX

23 22/M/1/YES////176

24 22/9/1/YES////176

25 24/1/1/10/9//177/120

26 24/1/2/14.5/9//177/210

27 24/2/1/12.5/9//177/210

28 24/2/2/10/9//177/300

29 24/3/1/17/9//177/120

30 24/4/1/12.5/9//177/300

31 24/5/1/13.5/9//177/300

32 24/6/1/5.5/9//177/120

33 24/7/1/18/9//177/120

34 24/7/2/4/9//177/30

35 24/8/1/14/9//177/300

36 24/8/2/13.5/9//177/30

37 24/9/1/9/9//177/30

38 25/1/1/3.5/2/1/.81/.64

39 25/1/2/4.5/2.25/2/.81/.64

40 25/2/2/9/1/1/.81/.64

41 25/3/1/5.5/2.25/1/.81/.64

42 25/4/1/3.3/2.3/1/.81/.64

43 25/5/1/5.5/2.25/2/.81/.64

44 25/6/1/3/2.25/1/.81/.64

45 25/7/1/5.5/2.25/1/.81/.64

46 25/8/1/5.5/2.25/1/.81/.64

47 25/8/2/5.5/1.5/2/.81/.64

48 25/9/1/13.5/1/1/.81/.64

49 26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF

50 27/M/442/SF-PERS/230/190/.5/WATT-SF/INCAND

51 29/1/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF

52 29/2/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF

53 29/3////////.28/CFM-SF

54 29/4////////.28/CFM-SF

55 29/5/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF

56 29/6////////.28/CFM-SF

57 29/7/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF

58 29/8/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF

**DTC QUALITY INSPECTED 2**

CONTENTS OF : E:\CB34.TM

| LINE # | -----                                                 |
|--------|-------------------------------------------------------|
| 59     | 29/9////////.28/CFM-SF                                |
| 60     | SYSTEM - 1                                            |
| 61     | 39/1/BASE BUILDING                                    |
| 62     | 40/1/PTAC                                             |
| 63     | 41/1/1/1/3/3/5/5                                      |
| 64     | 42/1/.25                                              |
| 65     | 45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF      |
| 66     | 40/2/RAD                                              |
| 67     | 41/2/1/6                                              |
| 68     | 45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF      |
| 69     | EQUIPMENT - 1                                         |
| 70     | 59/1/CARLISLE///BASE BUILDING                         |
| 71     | 60/1/1/PKPLANT/1/1                                    |
| 72     | 62/1/EQ1161/3                                         |
| 73     | 65/1/1//2/2                                           |
| 74     | 67/1/EQ2102/1                                         |
| 75     | 69/1/EQ4003                                           |
| 76     | LOAD - 2                                              |
| 77     | 19/2/WEATHERSTRIP & CAULKING                          |
| 78     | 20/1/1/DEN/165/1/1/0//10                              |
| 79     | 20/2/1/UTILITY ROOM/125/1/1/0//10                     |
| 80     | 20/3/2/BEDROOM NO. 2/170/1/1/0//10                    |
| 81     | 20/4/2/KITCHEN/187/1/1/0//10                          |
| 82     | 20/5/3/DINING ROOM/204/1/1/0//10                      |
| 83     | 20/6/4/BATH/50/1/1/0//10                              |
| 84     | 20/7/5/BEDROOM NO. 1/194/1/1/0//10                    |
| 85     | 20/8/5/LIVING ROOM/189/1/1/0//10                      |
| 86     | 20/9/6/VEST & CLOSET/41/1/1/0//10                     |
| 87     | 21/M////CBLQTX///CBLQTX                               |
| 88     | 22/M/1/YES////176                                     |
| 89     | 22/9/1/YES////176                                     |
| 90     | 24/1/1/10/9//177/120                                  |
| 91     | 24/1/2/14.5/9//177/210                                |
| 92     | 24/2/1/12.5/9//177/210                                |
| 93     | 24/2/2/10/9//177/300                                  |
| 94     | 24/3/1/17/9//177/120                                  |
| 95     | 24/4/1/12.5/9//177/300                                |
| 96     | 24/5/1/13.5/9//177/300                                |
| 97     | 24/6/1/5.5/9//177/120                                 |
| 98     | 24/7/1/18/9//177/120                                  |
| 99     | 24/7/2/4/9//177/30                                    |
| 100    | 24/8/1/14/9//177/300                                  |
| 101    | 24/8/2/13.5/9//177/30                                 |
| 102    | 24/9/1/9/9//177/30                                    |
| 103    | 25/1/1/3.5/2/1/.81/.64                                |
| 104    | 25/1/2/4.5/2.25/2/.81/.64                             |
| 105    | 25/2/2/9/1/1/.81/.64                                  |
| 106    | 25/3/1/5.5/2.25/1/.81/.64                             |
| 107    | 25/4/1/3.3/2.3/1/.81/.64                              |
| 108    | 25/5/1/5.5/2.25/2/.81/.64                             |
| 109    | 25/6/1/3/2.25/1/.81/.64                               |
| 110    | 25/7/1/5.5/2.25/1/.81/.64                             |
| 111    | 25/8/1/5.5/2.25/1/.81/.64                             |
| 112    | 25/8/2/5.5/1.5/2/.81/.64                              |
| 113    | 25/9/1/13.5/1/1/.81/.64                               |
| 114    | 26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF |
| 115    | 27/M/442/SF-PERS/230/190/.5/WATT-SF/INCAND            |
| 116    | 29/1/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF              |

CONTENTS OF : E:\CB34.TM

| LINE # | -----                                            |
|--------|--------------------------------------------------|
| 117    | 29/2/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF         |
| 118    | 29/3////////.23/CFM-SF                           |
| 119    | 29/4////////.23/CFM-SF                           |
| 120    | 29/5/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF         |
| 121    | 29/6////////.23/CFM-SF                           |
| 122    | 29/7/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF         |
| 123    | 29/8/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF         |
| 124    | 29/9////////.23/CFM-SF                           |
| 125    | SYSTEM - 2                                       |
| 126    | 39/2/WEATHERSTRIP & CAULKING                     |
| 127    | 40/1/PTAC                                        |
| 128    | 41/1/1/1/3/3/5/5                                 |
| 129    | 42/1/.25                                         |
| 130    | 45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF |
| 131    | 40/2/RAD                                         |
| 132    | 41/2/1/6                                         |
| 133    | 45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF |
| 134    | EQUIPMENT - 2                                    |
| 135    | 59/2/CARLISLE///WEATHERSTRIP & CAULKING          |
| 136    | 60/1/1/PKPLANT/1/1                               |
| 137    | 62/1/EQ1161/3                                    |
| 138    | 65/1/1//2/2                                      |
| 139    | 67/1/EQ2102/1                                    |
| 140    | 69/1/EQ4003                                      |

*Building 034*

*Trace Output File*

933702

```
*****  
*****  
**                                     **  
**          TRACE 600 ANALYSIS          **  
**                                     **  
**          by          **               **  
**                                     **  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 34

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 11:28: 8 1/10/94  
Dataset Name: CB34 .TM



AIRFLOW - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply Airflow (Cfm) | Room Exhaust Airflow (Cfm) |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------------|----------------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) |                             |                            |
| 1             | PTAC        | 99                    | 986                   | 986                   | 1,264                | 376                   | 0                           | 0                          |
| 2             | RAD         | 0                     | 0                     | 0                     | 0                    | 388                   | 0                           | 0                          |
| Totals        |             | 99                    | 986                   | 986                   | 1,264                | 764                   | 0                           | 0                          |

CAPACITY - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | PTAC        | 2.2                       | 0.0                       | 0.0                  | 0.0                  | 2.2                   | -30,553                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -30,553               |
| 2             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -42,933                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -42,933               |
| Totals        |             | 2.2                       | 0.0                       | 0.0                  | 0.0                  | 2.2                   | -73,485                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -73,485               |

The building peaked at hour 16 month 7 with a capacity of 2.2 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 BASE BUILDING

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | PTAC        | 10.00               | 1.12       | 449.1    | 399.3      | 30.05       | 1.12       | -34.84      | 877              |
| 2             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -32.40      | 1,325            |

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/17 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 89 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Glass Solar     | 5,165                   | 0                        | 0                      | 5,165            | 19.60            | 6,791                 | 39.11            | 0                 | 0                | 0.00             |
| Glass Cond      | 1,147                   | 0                        | 0                      | 1,147            | 4.35             | 885                   | 5.10             | -5,483            | -5,483           | 17.95            |
| Wall Cond       | 3,986                   | 0                        | 0                      | 3,986            | 15.12            | 4,702                 | 27.08            | -5,764            | -5,764           | 18.87            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Infiltration    | 10,279                  | 0                        | 0                      | 10,279           | 39.00            | 3,655                 | 21.05            | -19,306           | -19,306          | 63.19            |
| Sub Total==>    | 20,578                  | 0                        | 0                      | 20,578           | 78.07            | 16,032                | 92.33            | -30,553           | -30,553          | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Lights          | 1,193                   | 0                        | 0                      | 1,193            | 4.53             | 1,004                 | 5.78             | 0                 | 0                | 0.00             |
| People          | 744                     | 0                        | 0                      | 744              | 2.82             | 327                   | 1.88             | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total==>    | 1,937                   | 0                        | 0                      | 1,937            | 7.35             | 1,331                 | 7.67             | 0                 | 0                | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 3,632            | 13.78            | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 210              | 0.80             |                       | 0.00             |                   |                  | 0.00             |
| Ret. Fan Heat   |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                   |                  | 0.00             |
| Duct Heat Pkup  |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                   |                  | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                   |                  | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                   |                  | 0.00             |
| Grand Total==>  | 22,514                  | 0                        | 0                      | 26,357           | 100.00           | 17,363                | 100.00           | -30,553           | -30,553          | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS       |            |        |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Gross Total | Glass (sf) | (%)    |
| Main Clg | 2.2                   | 26.4            | 986              | 76.6              | 63.7  | 70.0   | 58.7             | 54.8  | 59.5   | Floor       | 877        |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Totals   | 2.2                   | 26.4            |                  |                   |       |        |                  |       |        | Roof        | 0          | 0      |
|          |                       |                 |                  |                   |       |        |                  |       |        | Wall        | 990        | 102 10 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm) |         | ENGINEERING CHECKS |        | TEMPERATURES (F) |           |
|----------|----------------|------------------|-----------|-----------|---------|----------------|---------|--------------------|--------|------------------|-----------|
|          |                |                  |           |           |         | Cooling        | Heating | Clg % OA           |        | Type             | Clg Htg   |
| Main Htg | -30.6          | 986              | 68.0      | 96.5      | Vent    | 99             | 0       | 10.0               | 1.12   | SADB             | 58.8 96.5 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 277            | 277     | Clg Cfm/Sqft       | 449.12 | Plenum           | 75.0 68.0 |
| Preheat  | -0.0           | 986              | 62.4      | 58.6      | Supply  | 986            | 986     | Clg Sqft/Ton       | 399.29 | Return           | 75.0 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0              | 0       | Clg Btuh/Sqft      | 30.05  | Ret/OA           | 76.5 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 986            | 986     | No. People         | 2      | Runarnd          | 75.0 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 99             | 0       | Htg % OA           | 0.0    | Fn MtrTD         | 0.0 0.0   |
| Total    | -30.6          |                  |           |           | Rm Exh  | 0              | 0       | Htg Cfm/Sqft       | 1.12   | Fn BldTD         | 0.0 0.0   |
|          |                |                  |           |           | Auxil   | 0              | 0       | Htg Btuh/Sqft      | -34.84 | Fn Frict         | 0.1 0.0   |

System 2 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percnt Of Tot (%) | * | Space Sensible (Btuh) | Percnt Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percnt Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|-------------------|---|-----------------------|-------------------|---|------------------------------|---------------------------|-------------------|
| Envelope Loads  |                         |                          |                        |                  |                   | * |                       |                   | * |                              |                           |                   |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Roof Cond       | 0                       | 0                        |                        | 0                | 0.00              | * | 0                     | 0.00              | * | -192                         | -192                      | 0.45              |
| Glass Solar     | 0                       | 0                        |                        | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Glass Cond      | 0                       | 0                        |                        | 0                | 0.00              | * | 0                     | 0.00              | * | -7,639                       | -7,639                    | 17.79             |
| Wall Cond       | 0                       | 0                        |                        | 0                | 0.00              | * | 0                     | 0.00              | * | -8,074                       | -8,074                    | 18.81             |
| Partition       | 0                       |                          |                        | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Infiltration    | 0                       |                          |                        | 0                | 0.00              | * | 0                     | 0.00              | * | -27,028                      | -27,028                   | 62.95             |
| Sub Total==>    | 0                       | 0                        |                        | 0                | 0.00              | * | 0                     | 0.00              | * | -42,933                      | -42,933                   | 100.00            |
| Internal Loads  |                         |                          |                        |                  |                   | * |                       |                   | * |                              |                           |                   |
| Lights          | 0                       | 0                        |                        | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| People          | 0                       |                          |                        | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Ceiling Load    | 0                       |                          |                        | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00              | * |                       | 0.00              | * |                              |                           | 0.00              |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00              | * |                       | 0.00              | * |                              |                           | 0.00              |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00              | * |                       | 0.00              | * |                              |                           | 0.00              |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00              | * | 0                     | 0.00              | * | 0                            | 0                         | 0.00              |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00              | * |                       | 0.00              | * |                              |                           | 0.00              |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00              | * |                       | 0.00              | * |                              |                           | 0.00              |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00              | * | 0                     | 0.00              | * | -42,933                      | -42,933                   | 100.00            |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Grains | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|--------|-------------|------------|--------|
| Main Clg | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | Floor       | 1,325      |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | Part        | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | ExFlr       | 0          |        |
| Totals   | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | Roof        | 41         | 0 0    |
|          |                       |                 |                  |                           |                          |        | Wall        | 1,386      | 142 10 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -42.9          | 0                | 0.0         | 0.0         | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00   | SADB     | -0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 0       | 388     | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0  | 68.0 |
| Preheat  | 0.0            | 0                | 0.0         | 0.0         | Supply  | 0       | 0       | Clg Sqft/Ton  | 0.00   | Return   | 0.0  | 68.0 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0  | 68.0 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 0       | 0       | No. People    | 0      | Runarnd  | 0.0  | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0  | 0.0  |
| Total    | -42.9          |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.00   | Fn BldTD | 0.0  | 0.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -32.40 | Fn Frict | 0.0  | 0.0  |

-----AIRFLOWS (cfm)-----

---ENGINEERING CHECKS---

---TEMPERATURES (F)---

BUILDING U-VALUES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

| Room<br>Number | Description   | Room U-Values<br>(Btu/hr/sqft/F) |       |                |                |       |                |                |       |       | Room<br>Mass<br>(lb/<br>sqft) | Room<br>Capac.<br>(Btu/<br>sqft/F) |
|----------------|---------------|----------------------------------|-------|----------------|----------------|-------|----------------|----------------|-------|-------|-------------------------------|------------------------------------|
|                |               | Part.                            | ExFlr | Summr<br>Skylt | Wintr<br>Skylt | Roof  | Summr<br>Windo | Wintr<br>Windo | Wall  | Ceil. |                               |                                    |
| 1              | DEN           | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.5                          | 4.92                               |
| 2              | UTILITY ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 13.3                          | 5.31                               |
| Zone           | 1 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 12.3                          | 5.09                               |
| 5              | DINING ROOM   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 8.3                           | 4.19                               |
| Zone           | 3 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 8.3                           | 4.19                               |
| 7              | BEDROOM NO. 1 | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.5                          | 4.69                               |
| 8              | LIVING ROOM   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.5                          | 4.90                               |
| Zone           | 5 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.0                          | 4.80                               |
| System         | 1 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.8                          | 4.75                               |
| 1              | DEN           | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.5                          | 4.92                               |
| 2              | UTILITY ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 13.3                          | 5.31                               |
| Zone           | 1 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 12.3                          | 5.09                               |
| 3              | BEDROOM NO. 2 | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.0                          | 4.56                               |
| 4              | KITCHEN       | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 8.7                           | 4.28                               |
| Zone           | 2 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 9.3                           | 4.41                               |
| 5              | DINING ROOM   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 8.3                           | 4.19                               |
| Zone           | 3 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 8.3                           | 4.19                               |
| 6              | BATH          | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.1                          | 4.59                               |
| Zone           | 4 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.1                          | 4.59                               |
| 7              | BEDROOM NO. 1 | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.5                          | 4.69                               |
| 8              | LIVING ROOM   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.5                          | 4.90                               |
| Zone           | 5 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.0                          | 4.80                               |
| 9              | VEST & CLOSET | 0.000                            | 0.000 | 0.000          | 0.000          | 0.073 | 0.810          | 0.837          | 0.101 | 0.000 | 19.5                          | 6.88                               |
| Zone           | 6 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.073 | 0.810          | 0.837          | 0.101 | 0.000 | 19.5                          | 6.88                               |
| System         | 2 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.073 | 0.810          | 0.837          | 0.101 | 0.000 | 10.6                          | 4.72                               |
| Building       |               | 0.000                            | 0.000 | 0.000          | 0.000          | 0.073 | 0.810          | 0.837          | 0.101 | 0.000 | 10.7                          | 4.73                               |

BUILDING AREAS - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description   | Number of<br>Duplicate |   | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|---------------|------------------------|---|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 1              | DEN           | 1                      | 1 | 165                                  | 165                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 27                       | 12                | 193                        |
| 2              | UTILITY ROOM  | 1                      | 1 | 125                                  | 125                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 9                        | 4                 | 193                        |
| Zone           | 1 Total/Ave.  |                        |   |                                      | 290                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 36                       | 9                 | 387                        |
| 5              | DINING ROOM   | 1                      | 1 | 204                                  | 204                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 20                | 97                         |
| Zone           | 3 Total/Ave.  |                        |   |                                      | 204                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 20                | 97                         |
| 7              | BEDROOM NO. 1 | 1                      | 1 | 194                                  | 194                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 12                       | 6                 | 186                        |
| 8              | LIVING ROOM   | 1                      | 1 | 189                                  | 189                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 29                       | 12                | 219                        |
| Zone           | 5 Total/Ave.  |                        |   |                                      | 383                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 41                       | 9                 | 404                        |
| System         | 1 Total/Ave.  |                        |   |                                      | 877                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 102                      | 10                | 888                        |
| 1              | DEN           | 1                      | 1 | 165                                  | 165                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 27                       | 12                | 193                        |
| 2              | UTILITY ROOM  | 1                      | 1 | 125                                  | 125                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 9                        | 4                 | 193                        |
| Zone           | 1 Total/Ave.  |                        |   |                                      | 290                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 36                       | 9                 | 387                        |
| 3              | BEDROOM NO. 2 | 1                      | 1 | 170                                  | 170                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 12                       | 8                 | 141                        |
| 4              | KITCHEN       | 1                      | 1 | 187                                  | 187                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 8                        | 7                 | 105                        |
| Zone           | 2 Total/Ave.  |                        |   |                                      | 357                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 8                 | 246                        |
| 5              | DINING ROOM   | 1                      | 1 | 204                                  | 204                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 20                | 97                         |
| Zone           | 3 Total/Ave.  |                        |   |                                      | 204                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 20                | 97                         |
| 6              | BATH          | 1                      | 1 | 50                                   | 50                               | 0                           | 0                                  | 0                          | 0                 | 0                          | 7                        | 14                | 43                         |
| Zone           | 4 Total/Ave.  |                        |   |                                      | 50                               | 0                           | 0                                  | 0                          | 0                 | 0                          | 7                        | 14                | 43                         |
| 7              | BEDROOM NO. 1 | 1                      | 1 | 194                                  | 194                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 12                       | 6                 | 186                        |
| 8              | LIVING ROOM   | 1                      | 1 | 189                                  | 189                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 29                       | 12                | 219                        |
| Zone           | 5 Total/Ave.  |                        |   |                                      | 383                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 41                       | 9                 | 404                        |
| 9              | VEST & CLOSET | 1                      | 1 | 41                                   | 41                               | 0                           | 0                                  | 0                          | 0                 | 41                         | 14                       | 17                | 68                         |
| Zone           | 6 Total/Ave.  |                        |   |                                      | 41                               | 0                           | 0                                  | 0                          | 0                 | 41                         | 14                       | 17                | 68                         |
| System         | 2 Total/Ave.  |                        |   |                                      | 1,325                            | 0                           | 0                                  | 0                          | 0                 | 41                         | 142                      | 10                | 1,244                      |
| Building       |               |                        |   |                                      | 2,202                            | 0                           | 0                                  | 0                          | 0                 | 41                         | 245                      | 10                | 2,131                      |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
 BASE BUILDING

----- A S H R A E   9 0   A N A L Y S I S -----

Overall Roof U-Value = 0.073 (Btu/Hr/Sq Ft/F)  
 Overall Wall U-Value = 0.174 (Btu/Hr/Sq Ft/F)  
 Overall Building U-Value = 0.173 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 5.54 (Btu/Hr/Sq Ft)  
 Wall Overall Thermal Transfer Value (OTTVw) = 14.04 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.1                    | 25           | 316   | -3,674                   | 14           | 670   | 49.3                      | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 0.2                    | 11           | 141   | -7,349                   | 13           | 634   | 98.6                      | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 0.3                    | 7            | 92    | -11,023                  | 16           | 804   | 148.0                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 0.4                    | 8            | 101   | -14,697                  | 20           | 964   | 197.3                     | 42           | 1,530 | 0.0                       | 0            | 0     |
| 20 - 25                   | 0.5                    | 4            | 56    | -18,371                  | 18           | 875   | 246.6                     | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 0.7                    | 10           | 120   | -22,046                  | 12           | 606   | 295.9                     | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 0.8                    | 3            | 42    | -25,720                  | 7            | 338   | 345.3                     | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 0.9                    | 7            | 88    | -29,394                  | 0            | 0     | 394.6                     | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 1.0                    | 8            | 103   | -33,068                  | 0            | 0     | 443.9                     | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 1.1                    | 5            | 65    | -36,743                  | 0            | 0     | 493.2                     | 21           | 765   | 0.0                       | 0            | 0     |
| 50 - 55                   | 1.2                    | 3            | 42    | -40,417                  | 0            | 0     | 542.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 1.3                    | 4            | 51    | -44,091                  | 0            | 0     | 591.9                     | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 1.4                    | 0            | 0     | -47,766                  | 0            | 0     | 641.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 1.5                    | 0            | 0     | -51,440                  | 0            | 0     | 690.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 1.6                    | 0            | 0     | -55,114                  | 0            | 0     | 739.8                     | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 1.8                    | 2            | 20    | -58,788                  | 0            | 0     | 789.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 1.9                    | 1            | 11    | -62,463                  | 0            | 0     | 838.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 2.0                    | 0            | 0     | -66,137                  | 0            | 0     | 887.8                     | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 2.1                    | 0            | 0     | -69,811                  | 0            | 0     | 937.1                     | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 2.2                    | 0            | 0     | -73,485                  | 0            | 0     | 986.4                     | 38           | 1,377 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,512 | 0                        | 0            | 3,869 | 0.0                       | 0            | 5,088 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | Zone Number                 |       |       |       |       |       |       |       |       |  |
|-----------------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
|                             | 1                           | 3     | 5     | 1     | 2     | 3     | 4     | 5     | 6     |  |
| Max. Temp.                  | 81.9                        | 79.0  | 83.1  | 105.4 | 105.8 | 107.5 | 110.1 | 102.6 | 104.1 |  |
| Mo./Hr.                     | 7 14                        | 7 14  | 7 14  | 8 20  | 8 21  | 7 22  | 8 18  | 7 21  | 7 19  |  |
| Day Type                    | 1                           | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |  |
|                             | ..... Number of Hours ..... |       |       |       |       |       |       |       |       |  |
| Above 100                   | 0                           | 0     | 0     | 256   | 1,206 | 1,030 | 1,500 | 120   | 0     |  |
| 95 - 100                    | 0                           | 0     | 0     | 1,117 | 1,249 | 950   | 1,040 | 919   | 208   |  |
| 90 - 95                     | 0                           | 0     | 0     | 1,107 | 387   | 493   | 644   | 1,057 | 687   |  |
| 85 - 90                     | 0                           | 0     | 0     | 722   | 402   | 706   | 398   | 733   | 922   |  |
| 80 - 85                     | 0                           | 0     | 0     | 470   | 428   | 493   | 90    | 808   | 796   |  |
| 75 - 80                     | 2,174                       | 2,817 | 2,319 | 0     | 0     | 0     | 0     | 35    | 704   |  |
| 70 - 75                     | 1,009                       | 855   | 1,002 | 217   | 51    | 109   | 304   | 0     | 300   |  |
| 65 - 70                     | 765                         | 102   | 351   | 4,871 | 5,037 | 4,979 | 4,784 | 5,088 | 5,143 |  |
| 60 - 65                     | 616                         | 911   | 528   | 0     | 0     | 0     | 0     | 0     | 0     |  |
| 55 - 60                     | 890                         | 563   | 889   | 0     | 0     | 0     | 0     | 0     | 0     |  |
| 50 - 55                     | 699                         | 769   | 623   | 0     | 0     | 0     | 0     | 0     | 0     |  |
| Below 50                    | 2,607                       | 2,743 | 3,048 | 0     | 0     | 0     | 0     | 0     | 0     |  |
| Min. Temp.                  | 31.4                        | 32.8  | 30.8  | 67.9  | 68.0  | 67.9  | 68.0  | 67.9  | 67.3  |  |
| Mo./Hr.                     | 2 9                         | 2 11  | 2 9   | 1 3   | 1 1   | 4 2   | 1 1   | 4 12  | 5 5   |  |
| Day Type                    | 4                           | 5     | 4     | 2     | 1     | 3     | 1     | 2     | 1     |  |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | HOT WTR            | HOT W DMND           |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 292               | 1               | 134                | 0                    |
| Feb   | 264               | 1               | 135                | 0                    |
| March | 299               | 1               | 88                 | 0                    |
| April | 281               | 1               | 39                 | 0                    |
| May   | 381               | 4               | 0                  | 0                    |
| June  | 622               | 5               | 0                  | 0                    |
| July  | 899               | 5               | 0                  | 0                    |
| Aug   | 630               | 5               | 0                  | 0                    |
| Sept  | 384               | 4               | 0                  | 0                    |
| Oct   | 295               | 1               | 27                 | 0                    |
| Nov   | 281               | 1               | 60                 | 0                    |
| Dec   | 288               | 1               | 110                | 0                    |
| Total | 4,917             | 5               | 592                | 0                    |

Building Energy Consumption = 34,528 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 58,742 (Btu/Sq Ft/Year)

Floor Area = 2,202 (Sq Ft)







UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
 BASE BUILDING

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        4.8    (kW)  
 Yearly Time of Peak 16 (hr)    7 (mo)

Hour 16    Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|------------------------|
| Cooling Equipment    |                        |                                    |                           |                        |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 3.6                       | 74.63                  |
| Sub Total            |                        |                                    | 3.6                       | 74.63                  |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Air Moving Equipment |                        |                                    |                           |                        |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.1                       | 2.62                   |
| Sub Total            |                        |                                    | 0.1                       | 2.62                   |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Miscellaneous        |                        |                                    |                           |                        |
|                      | Lights                 |                                    | 1.1                       | 22.75                  |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                   |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                   |
| Sub Total            |                        |                                    | 1.1                       | 22.75                  |
| Grand Total          |                        |                                    | 4.8                       | 100.00                 |

```
*****  
*****  
**  
**          TRACE    600    ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 34

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 11:42:18 1/10/94  
Dataset Name: CB34 .TM

AIRFLOW - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | PTAC        | 95                    | 954                   | 954                   | 1,181                | 323                   | 0             | 0             |
| 2             | RAD         | 0                     | 0                     | 0                     | 0                    | 319                   | 0             | 0             |
| Totals        |             | 95                    | 954                   | 954                   | 1,181                | 642                   | 0             | 0             |

CAPACITY - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          | Heating Totals (Btuh) |                      |                      |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|-----------------------|----------------------|----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) |                       | Opt. Capacity (Btuh) | Vent Capacity (Btuh) |
| 1             | PTAC        | 2.0                       | 0.0                       | 0.0                  | 0.0                  | 2.0                   | -27,105                   | 0                         | 0                       | 0                      | 0                        | 0                     | 0                    | -27,105              |
| 2             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -38,106                   | 0                         | 0                       | 0                      | 0                        | 0                     | 0                    | -38,106              |
| Totals        |             | 2.0                       | 0.0                       | 0.0                  | 0.0                  | 2.0                   | -65,212                   | 0                         | 0                       | 0                      | 0                        | 0                     | 0                    | -65,212              |

The building peaked at hour 16 month 7 with a capacity of 2.0 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | PTAC        | 10.00               | 1.09       | 466.1    | 428.6      | 28.00       | 1.09       | -30.91      | 877              |
| 2             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -28.76      | 1,325            |

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/17 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 89 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Glass Solar     | 5,165                   | 0                        | 0                      | 5,165            | 21.04            | * | 6,791                 | 40.64            | * | 0                 | 0                | 0.00             |
| Glass Cond      | 1,147                   | 0                        | 0                      | 1,147            | 4.67             | * | 885                   | 5.29             | * | -5,483            | -5,483           | 20.23            |
| Wall Cond       | 3,986                   | 0                        | 0                      | 3,986            | 16.23            | * | 4,702                 | 28.14            | * | -5,764            | -5,764           | 21.27            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 8,571                   | 0                        | 0                      | 8,571            | 34.91            | * | 3,002                 | 17.97            | * | -15,858           | -15,858          | 58.51            |
| Sub Total==>    | 18,870                  | 0                        | 0                      | 18,870           | 76.86            | * | 15,379                | 92.03            | * | -27,105           | -27,105          | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 1,193                   | 0                        | 0                      | 1,193            | 4.86             | * | 1,004                 | 6.01             | * | 0                 | 0                | 0.00             |
| People          | 744                     | 0                        | 0                      | 744              | 3.03             | * | 327                   | 1.96             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 1,937                   | 0                        | 0                      | 1,937            | 7.89             | * | 1,331                 | 7.97             | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 3,542            | 14.43            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 203              | 0.83             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Grand Total==>  | 20,807                  | 0                        | 0                      | 24,552           | 100.00           | * | 16,710                | 100.00           | * | -27,105           | -27,105          | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Grains | Gross Total Floor | AREAS Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|--------|-------------------|------------------|-----|
| Main Clg | 2.0                   | 24.6            | 954              | 76.6                      | 58.8                     | 69.4   | 877               |                  |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | 0                 |                  |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | 0                 | 0                | 0   |
| Totals   | 2.0                   | 24.6            |                  |                           |                          |        | 990               | 102              | 10  |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 10.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -27.1          | 954              | 68.0        | 94.1        | Vent    | 95      | 0       | Clg Cfm/Sqft  | 1.09   | SADB     | 58.9 | 94.1 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 228     | 228     | Clg Cfm/Ton   | 466.13 | Plenum   | 75.0 | 68.0 |
| Preheat  | -0.0           | 954              | 62.3        | 58.7        | Supply  | 954     | 954     | Clg Sqft/Ton  | 428.64 | Return   | 75.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 28.00  | Ret/OA   | 76.5 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 954     | 954     | No. People    | 2      | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 95      | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0  | 0.0  |
| Total    | -27.1          |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/SqFt  | 1.09   | Fn BldTD | 0.0  | 0.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/SqFt | -30.91 | Fn Frict | 0.1  | 0.0  |

System 2 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/0 \* Mo/Hr: 0/0 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 0/0/0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -192              | -192             | 0.50             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -7,639            | -7,639           | 20.05            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -8,074            | -8,074           | 21.19            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -22,202           | -22,202          | 58.26            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -38,106           | -38,106          | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Duct Heat Pkud  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -38,106           | -38,106          | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------------|------------|-----|
| Main Clg | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 1,325             |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |            |     |
| Totals   | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 1,386             | 142        | 10  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type Vent | Cooling | Heating | Clg % OA | Clg Cfm/Sqft | Clg Cfm/Ton | Clg Btuh/Sqft | No. People | Htg % OA | Htg Cfm/Sqft | Htg Btuh/Sqft | Type SADB | Clg | Htg  |
|----------|----------------|------------------|-------------|-------------|-----------|---------|---------|----------|--------------|-------------|---------------|------------|----------|--------------|---------------|-----------|-----|------|
| Main Htg | -38.1          | 0                | 0.0         | 0.0         | Infil     | 0       | 319     | 0.0      | 0.00         | 0.00        | 0.00          | 0          | 0.0      | 0            | -28.76        | 0.0       | 0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Supply    | 0       | 0       | 0.0      | 0.00         | 0.00        | 0.00          | 0          | 0.0      | 0            | 0.0           | 0.0       | 0.0 | 68.0 |
| Preheat  | 0.0            | 0                | 0.0         | 0.0         | Mincfm    | 0       | 0       | 0.0      | 0.00         | 0.00        | 0.00          | 0          | 0.0      | 0            | 0.0           | 0.0       | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Return    | 0       | 0       | 0.0      | 0.00         | 0.00        | 0.00          | 0          | 0.0      | 0            | 0.0           | 0.0       | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Exhaust   | 0       | 0       | 0.0      | 0.00         | 0.00        | 0.00          | 0          | 0.0      | 0            | 0.0           | 0.0       | 0.0 | 0.0  |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Rm Exh    | 0       | 0       | 0.0      | 0.00         | 0.00        | 0.00          | 0          | 0.0      | 0            | 0.0           | 0.0       | 0.0 | 0.0  |
| Total    | -38.1          |                  |             |             | Auxil     | 0       | 0       | 0.0      | 0.00         | 0.00        | 0.00          | 0          | 0.0      | 0            | 0.0           | 0.0       | 0.0 | 0.0  |

BUILDING U-VALUES - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G U - V A L U E S -----

| Room<br>Number | Description   | Room U-Values<br>(Btu/hr/sqft/F) |       |                |                |       |                |                |       |       | Room<br>Mass<br>(lb/<br>sqft) | Room<br>Capac.<br>(Btu/<br>sqft/F) |
|----------------|---------------|----------------------------------|-------|----------------|----------------|-------|----------------|----------------|-------|-------|-------------------------------|------------------------------------|
|                |               | Part.                            | ExFlr | Summr<br>Skylt | Wintr<br>Skylt | Roof  | Summr<br>Windo | Wintr<br>Windo | Wall  | Ceil. |                               |                                    |
| 1              | DEN           | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.5                          | 4.92                               |
| 2              | UTILITY ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 13.3                          | 5.31                               |
| Zone           | 1 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 12.3                          | 5.09                               |
| 5              | DINING ROOM   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 8.3                           | 4.19                               |
| Zone           | 3 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 8.3                           | 4.19                               |
| 7              | BEDROOM NO. 1 | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.5                          | 4.69                               |
| 8              | LIVING ROOM   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.5                          | 4.90                               |
| Zone           | 5 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.0                          | 4.80                               |
| System         | 1 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.8                          | 4.75                               |
| 1              | DEN           | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.5                          | 4.92                               |
| 2              | UTILITY ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 13.3                          | 5.31                               |
| Zone           | 1 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 12.3                          | 5.09                               |
| 3              | BEDROOM NO. 2 | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.0                          | 4.56                               |
| 4              | KITCHEN       | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 8.7                           | 4.28                               |
| Zone           | 2 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 9.3                           | 4.41                               |
| 5              | DINING ROOM   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 8.3                           | 4.19                               |
| Zone           | 3 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 8.3                           | 4.19                               |
| 6              | BATH          | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.1                          | 4.59                               |
| Zone           | 4 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.1                          | 4.59                               |
| 7              | BEDROOM NO. 1 | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 10.5                          | 4.69                               |
| 8              | LIVING ROOM   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.5                          | 4.90                               |
| Zone           | 5 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.101 | 0.000 | 11.0                          | 4.80                               |
| 9              | VEST & CLOSET | 0.000                            | 0.000 | 0.000          | 0.000          | 0.073 | 0.810          | 0.837          | 0.101 | 0.000 | 19.5                          | 6.88                               |
| Zone           | 6 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.073 | 0.810          | 0.837          | 0.101 | 0.000 | 19.5                          | 6.88                               |
| System         | 2 Total/Ave.  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.073 | 0.810          | 0.837          | 0.101 | 0.000 | 10.6                          | 4.72                               |
| Building       |               | 0.000                            | 0.000 | 0.000          | 0.000          | 0.073 | 0.810          | 0.837          | 0.101 | 0.000 | 10.7                          | 4.73                               |



BUILDING AREAS - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description   | Number of<br>Duplicate |   | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|---------------|------------------------|---|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 1              | DEN           | 1                      | 1 | 165                                  | 165                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 27                       | 12                | 193                        |
| 2              | UTILITY ROOM  | 1                      | 1 | 125                                  | 125                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 9                        | 4                 | 193                        |
| Zone           | 1 Total/Ave.  |                        |   |                                      | 290                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 36                       | 9                 | 387                        |
| 5              | DINING ROOM   | 1                      | 1 | 204                                  | 204                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 20                | 97                         |
| Zone           | 3 Total/Ave.  |                        |   |                                      | 204                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 20                | 97                         |
| 7              | BEDROOM NO. 1 | 1                      | 1 | 194                                  | 194                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 12                       | 6                 | 186                        |
| 8              | LIVING ROOM   | 1                      | 1 | 189                                  | 189                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 29                       | 12                | 219                        |
| Zone           | 5 Total/Ave.  |                        |   |                                      | 383                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 41                       | 9                 | 404                        |
| System         | 1 Total/Ave.  |                        |   |                                      | 877                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 102                      | 10                | 888                        |
| 1              | DEN           | 1                      | 1 | 165                                  | 165                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 27                       | 12                | 193                        |
| 2              | UTILITY ROOM  | 1                      | 1 | 125                                  | 125                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 9                        | 4                 | 193                        |
| Zone           | 1 Total/Ave.  |                        |   |                                      | 290                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 36                       | 9                 | 387                        |
| 3              | BEDROOM NO. 2 | 1                      | 1 | 170                                  | 170                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 12                       | 8                 | 141                        |
| 4              | KITCHEN       | 1                      | 1 | 187                                  | 187                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 8                        | 7                 | 105                        |
| Zone           | 2 Total/Ave.  |                        |   |                                      | 357                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 8                 | 246                        |
| 5              | DINING ROOM   | 1                      | 1 | 204                                  | 204                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 20                | 97                         |
| Zone           | 3 Total/Ave.  |                        |   |                                      | 204                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 20                | 97                         |
| 6              | BATH          | 1                      | 1 | 50                                   | 50                               | 0                           | 0                                  | 0                          | 0                 | 0                          | 7                        | 14                | 43                         |
| Zone           | 4 Total/Ave.  |                        |   |                                      | 50                               | 0                           | 0                                  | 0                          | 0                 | 0                          | 7                        | 14                | 43                         |
| 7              | BEDROOM NO. 1 | 1                      | 1 | 194                                  | 194                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 12                       | 6                 | 186                        |
| 8              | LIVING ROOM   | 1                      | 1 | 189                                  | 189                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 29                       | 12                | 219                        |
| Zone           | 5 Total/Ave.  |                        |   |                                      | 383                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 41                       | 9                 | 404                        |
| 9              | VEST & CLOSET | 1                      | 1 | 41                                   | 41                               | 0                           | 0                                  | 0                          | 0                 | 41                         | 14                       | 17                | 68                         |
| Zone           | 6 Total/Ave.  |                        |   |                                      | 41                               | 0                           | 0                                  | 0                          | 0                 | 41                         | 14                       | 17                | 68                         |
| System         | 2 Total/Ave.  |                        |   |                                      | 1,325                            | 0                           | 0                                  | 0                          | 0                 | 41                         | 142                      | 10                | 1,244                      |
| Building       |               |                        |   |                                      | 2,202                            | 0                           | 0                                  | 0                          | 0                 | 41                         | 245                      | 10                | 2,131                      |

ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- A S H R A E   9 0   A N A L Y S I S -----

Overall Roof U-Value = 0.073 (Btu/Hr/Sq Ft/F)  
 Overall Wall U-Value = 0.174 (Btu/Hr/Sq Ft/F)  
 Overall Building U-Value = 0.173 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 5.54 (Btu/Hr/Sq Ft)  
 Wall Overall Thermal Transfer Value (OTTVw) = 14.04 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.1                    | 22           | 289   | -3,261                   | 15           | 738   | 47.7                      | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 0.2                    | 15           | 207   | -6,521                   | 13           | 618   | 95.4                      | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 0.3                    | 11           | 142   | -9,782                   | 15           | 747   | 143.1                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 0.4                    | 3            | 39    | -13,042                  | 21           | 1,000 | 190.7                     | 42           | 1,530 | 0.0                       | 0            | 0     |
| 20 - 25                   | 0.5                    | 7            | 91    | -16,303                  | 17           | 814   | 238.4                     | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 0.6                    | 9            | 117   | -19,563                  | 12           | 588   | 286.1                     | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 0.7                    | 5            | 64    | -22,824                  | 7            | 338   | 333.8                     | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 0.8                    | 3            | 44    | -26,085                  | 0            | 0     | 381.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 0.9                    | 9            | 122   | -29,345                  | 0            | 0     | 429.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 1.0                    | 7            | 98    | -32,606                  | 0            | 0     | 476.9                     | 21           | 765   | 0.0                       | 0            | 0     |
| 50 - 55                   | 1.1                    | 1            | 11    | -35,866                  | 0            | 0     | 524.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 1.2                    | 3            | 42    | -39,127                  | 0            | 0     | 572.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 1.3                    | 3            | 40    | -42,388                  | 0            | 0     | 619.9                     | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 1.4                    | 0            | 0     | -45,648                  | 0            | 0     | 667.6                     | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 1.5                    | 0            | 0     | -48,909                  | 0            | 0     | 715.3                     | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 1.6                    | 1            | 20    | -52,169                  | 0            | 0     | 763.0                     | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 1.7                    | 1            | 11    | -55,430                  | 0            | 0     | 810.7                     | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 1.8                    | 0            | 0     | -58,690                  | 0            | 0     | 858.3                     | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 1.9                    | 0            | 0     | -61,951                  | 0            | 0     | 906.0                     | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 2.0                    | 0            | 0     | -65,212                  | 0            | 0     | 953.7                     | 38           | 1,377 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,423 | 0                        | 0            | 3,917 | 0.0                       | 0            | 5,088 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature Range (F) | Zone Number                 |       |       |       |       |       |       |       |       |   |
|-----------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|---|
|                       | 1                           | 3     | 5     | 1     | 2     | 3     | 4     | 5     | 6     |   |
| Max. Temp.            | 81.7                        | 78.9  | 83.1  | 105.4 | 105.8 | 107.5 | 110.1 | 102.6 | 104.1 |   |
| Mo./Hr.               | 7 14                        | 7 14  | 7 14  | 8 20  | 8 21  | 7 22  | 8 18  | 7 21  | 7 19  |   |
| Day Type              | 1                           | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1 |
|                       | ..... Number of Hours ..... |       |       |       |       |       |       |       |       |   |
| Above 100             | 0                           | 0     | 0     | 256   | 1,206 | 1,030 | 1,500 | 120   | 0     |   |
| 95 - 100              | 0                           | 0     | 0     | 1,117 | 1,249 | 950   | 1,040 | 919   | 208   |   |
| 90 - 95               | 0                           | 0     | 0     | 1,107 | 387   | 493   | 644   | 1,057 | 687   |   |
| 85 - 90               | 0                           | 0     | 0     | 722   | 402   | 728   | 398   | 733   | 922   |   |
| 80 - 85               | 0                           | 0     | 0     | 470   | 428   | 471   | 90    | 808   | 796   |   |
| 75 - 80               | 2,330                       | 2,953 | 2,457 | 0     | 0     | 0     | 0     | 35    | 704   |   |
| 70 - 75               | 895                         | 719   | 1,069 | 276   | 102   | 162   | 416   | 0     | 300   |   |
| 65 - 70               | 800                         | 221   | 163   | 4,812 | 4,986 | 4,926 | 4,672 | 5,088 | 5,143 |   |
| 60 - 65               | 741                         | 927   | 674   | 0     | 0     | 0     | 0     | 0     | 0     |   |
| 55 - 60               | 792                         | 527   | 816   | 0     | 0     | 0     | 0     | 0     | 0     |   |
| 50 - 55               | 662                         | 755   | 686   | 0     | 0     | 0     | 0     | 0     | 0     |   |
| Below 50              | 2,540                       | 2,658 | 2,895 | 0     | 0     | 0     | 0     | 0     | 0     |   |
| Min. Temp.            | 32.5                        | 33.5  | 31.5  | 67.9  | 67.9  | 67.9  | 67.9  | 67.9  | 67.3  |   |
| Mo./Hr.               | 2 9                         | 2 11  | 2 9   | 1 6   | 2 15  | 1 7   | 3 6   | 3 17  | 5 5   |   |
| Day Type              | 4                           | 4     | 4     | 2     | 2     | 2     | 3     | 2     | 1     |   |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | DEMAND          |                    | HOT, WTR             | HOT W DMND           |
|-------|-------------------|-----------------|-----------------|--------------------|----------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) | On Peak<br>(Thrm/hr) |
| Jan   | 292               | 1               | 1               | 118                | 0                    | 0                    |
| Feb   | 264               | 1               | 1               | 118                | 0                    | 0                    |
| March | 299               | 1               | 1               | 76                 | 0                    | 0                    |
| April | 281               | 1               | 1               | 31                 | 0                    | 0                    |
| May   | 397               | 4               | 4               | 0                  | 0                    | 0                    |
| June  | 625               | 4               | 4               | 0                  | 0                    | 0                    |
| July  | 892               | 5               | 5               | 0                  | 0                    | 0                    |
| Aug   | 631               | 4               | 4               | 0                  | 0                    | 0                    |
| Sept  | 384               | 4               | 4               | 0                  | 0                    | 0                    |
| Oct   | 295               | 1               | 1               | 22                 | 0                    | 0                    |
| Nov   | 281               | 1               | 1               | 52                 | 0                    | 0                    |
| Dec   | 288               | 1               | 1               | 98                 | 0                    | 0                    |
| Total | 4,930             | 5               | 5               | 515                | 0                    | 0                    |

Building Energy Consumption = 31,015 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 54,092 (Btu/Sq Ft/Year)

Floor Area = 2,202 (Sq Ft)





UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
WEATHERSTRIP & CAULKING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 4.6 (kW)  
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|-----------------------|---------------------------|------------------------|
|----------------------|------------------------|-----------------------|---------------------------|------------------------|

Cooling Equipment

|           |        |                            |     |       |
|-----------|--------|----------------------------|-----|-------|
| 1         | EQ1161 | AIR-CLD COND COMP <15 TONS | 3.4 | 73.44 |
| Sub Total |        |                            | 3.4 | 73.44 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Air Moving Equipment

|           |  |                                    |     |      |
|-----------|--|------------------------------------|-----|------|
| 1         |  | SUMMATION OF FAN ELECTRICAL DEMAND | 0.1 | 2.66 |
| Sub Total |  |                                    | 0.1 | 2.66 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Miscellaneous

|                |  |  |     |       |
|----------------|--|--|-----|-------|
| Lights         |  |  | 1.1 | 23.90 |
| Base Utilities |  |  | 0.0 | 0.00  |
| Misc Equipment |  |  | 0.0 | 0.00  |
| Sub Total      |  |  | 1.1 | 23.90 |

|             |  |  |     |        |
|-------------|--|--|-----|--------|
| Grand Total |  |  | 4.6 | 100.00 |
|-------------|--|--|-----|--------|

*Building 040*

*Trace Input File*

933702



CONTENTS OF : E:\CB40.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 40

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/BASE BUILDING

13 20/1/1/1ST FL APT'S/3791/1/3/.9/.45

14 20/2/2/2ND FL APT'S/4046/1/1/0

15 20/3/3/LAUNDRY ROOM/88/1/3/.9/.45

16 20/4/4/MECH ROOM/167/1/3/0

17 21/1////CBLQTX///CBLQTX

18 21/2////CBLQTX///CBLQTX

19 21/3////CBLQTX///CBLQTX

20 21/4////CBLQTX///CBLQTX

21 22/2/1/YES////151

22 22/4/1/YES////152

23 24/1/1/34/8//153/30

24 24/1/2/112/8//153/120

25 24/1/3/112/8//153/300

26 24/2/1/34/8.5//153/30

27 24/2/2/119/8.5//153/120

28 24/2/3/34/8.5//153/210

29 24/2/4/119/8.5//153/300

30 24/3/1/7/8//153/120

31 24/3/2/11/8//153/210

32 24/4/1/14/7.4//141/120

33 24/4/2/11/7.7//141/210

34 24/4/3/14/7.8//141/300

35 25/1/1/4.3/2.3/2/.7/.64

36 25/1/2/4.3/2.3/16/.7/.64

37 25/1/3/4.3/2.3/16/.7/.64

38 25/2/1/4.3/2.3/2/.7/.64

39 25/2/2/4.3/2.3/20/.7/.64

40 25/2/3/4.3/2.3/2/.7/.64

41 25/2/4/4.3/2.3/20/.7/.64

42 25/3/2/2.7/1.3/1/1.04/1

43 25/4/3/2.75/1.5/2/1.04/1

44 26/1/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF/OFF

45 26/2/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF/OFF

46 26/3/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/OFF/OFF

47 26/4/OFF/OFF/OFF//OFF/HTGONLY/HTGONLY/OFF/OFF/OFF

48 27/1/10/PEOPLE/230/190/.5/WATT-SF/INCAND

49 27/2/10/PEOPLE/230/190/.5/WATT-SF/INCAND

50 27/3/1/PEOPLE/315/325/1.5/WATT-SF

51 29/1/15/PCT-MCLG/15/PCT-MHTG/.33/CFM-SF/.33/CFM-SF

52 29/2/15/PCT-MCLG/15/PCT-MHTG/.33/CFM-SF/.33/CFM-SF

53 29/3////////.33/CFM-SF

54 29/4////////.33/CFM-SF

55 30/1/1.5/CFM-SF/1.5/CFM-SF

56 30/2/1.5/CFM-SF/1.5/CFM-SF

57 30/4/1.5/CFM-SF

58 SYSTEM - 1

CONTENTS OF : E:\CB40.TM

LINE # -----

59 39/1/BASE BUILDING

60 40/1/FC

61 41/1/1/2

62 42/1/.25/.25

63 45/1/CBLQCLG/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF

64 40/2/RAD

65 41/2/3/3

66 42/2

67 45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF

68 40/3/UH

69 41/3/4/4

70 42/3/.20

71 45/3/HTGONLY/OFF/OFF/OFF/OFF/HTGONLY/OFF/OFF/OFF/OFF

72 EQUIPMENT - 1

73 59/1/CARLISLE///BASE BUILDING

74 60/1/1/PKPLANT/1/1

75 62/1/EQ1161/36/7.267/MBH

76 65/1/1//1/3

77 67/1/EQ2102/1

78 69/1/EQ4371

79 69/3

80 LOAD - 2

81 19/2/WALL & ROOF INSULATION

82 20/1/1/1ST FL APT'S/3791/1/3/.9/.45

83 20/2/2/2ND FL APT'S/4046/1/1/0

84 20/3/3/LAUNDRY ROOM/88/1/3/.9/.45

85 20/4/4/MECH ROOM/167/1/3/0

86 21/1////CBLQTX///CBLQTX

87 21/2////CBLQTX///CBLQTX

88 21/3////CBLQTX///CBLQTX

89 21/4////CBLQTX///CBLQTX

90 22/2/1/YES////144

91 22/4/1/YES////152

92 24/1/1/34/8//143/30

93 24/1/2/112/8//143/120

94 24/1/3/112/8//143/300

95 24/2/1/34/8.5//143/30

96 24/2/2/119/8.5//143/120

97 24/2/3/34/8.5//143/210

98 24/2/4/119/8.5//143/300

99 24/3/1/7/8//143/120

100 24/3/2/11/8//143/210

101 24/4/1/14/7.4//141/120

102 24/4/2/11/7.7//141/210

103 24/4/3/14/7.8//141/300

104 25/1/1/4.3/2.3/2/.7/.64

105 25/1/2/4.3/2.3/16/.7/.64

106 25/1/3/4.3/2.3/16/.7/.64

107 25/2/1/4.3/2.3/2/.7/.64

108 25/2/2/4.3/2.3/20/.7/.64

109 25/2/3/4.3/2.3/2/.7/.64

110 25/2/4/4.3/2.3/20/.7/.64

111 25/3/2/2.7/1.3/1/1.04/1

112 25/4/3/2.75/1.5/2/1.04/1

113 26/1/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF/OFF

114 26/2/CBLQP/CBLQL/CBLQP//OFF/CBLQFAN/OFF/OFF/OFF/OFF

115 26/3/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/OFF/OFF

116 26/4/OFF/OFF/OFF//OFF/HTGONLY/HTGONLY/OFF/OFF/OFF

CONTENTS OF : E:\CB40.TM

| LINE # | -----                                                |
|--------|------------------------------------------------------|
| 117    | 27/1/10/PEOPLE/230/190/.5/WATT-SF/INCAND             |
| 118    | 27/2/10/PEOPLE/230/190/.5/WATT-SF/INCAND             |
| 119    | 27/3/1/PEOPLE/315/325/1.5/WATT-SF                    |
| 120    | 29/1/15/PCT-MCLG/15/PCT-MHTG/.27/CFM-SF/.27/CFM-SF   |
| 121    | 29/2/15/PCT-MCLG/15/PCT-MHTG/.27/CFM-SF/.27/CFM-SF   |
| 122    | 29/3////////.27/CFM-SF                               |
| 123    | 29/4////////.27/CFM-SF                               |
| 124    | 30/1/1.5/CFM-SF/1.5/CFM-SF                           |
| 125    | 30/2/1.5/CFM-SF/1.5/CFM-SF                           |
| 126    | 30/4/1.5/CFM-SF                                      |
| 127    | SYSTEM - 2                                           |
| 128    | 39/2/WALL & ROOF INSULATION                          |
| 129    | 40/1/FC                                              |
| 130    | 41/1/1/2                                             |
| 131    | 42/1/.25/.25                                         |
| 132    | 45/1/CBLQCLG/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF |
| 133    | 40/2/RAD                                             |
| 134    | 41/2/3/3                                             |
| 135    | 42/2                                                 |
| 136    | 45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF     |
| 137    | 40/3/UH                                              |
| 138    | 41/3/4/4                                             |
| 139    | 42/3/.20                                             |
| 140    | 45/3/HTGONLY/OFF/OFF/OFF/OFF/HTGONLY/OFF/OFF/OFF/OFF |
| 141    | EQUIPMENT - 2                                        |
| 142    | 59/2/CARLISLE///WALL & ROOF INSULATION               |
| 143    | 60/1/1/PKPLANT/1/1                                   |
| 144    | 62/1/EQ1161/36/7.267/MBH                             |
| 145    | 65/1/1//1/3                                          |
| 146    | 67/1/EQ2102/1                                        |
| 147    | 69/1/EQ4371                                          |
| 148    | 69/3                                                 |

*Building 040*

*Trace Output File*

933702

```
*****  
*****  
**  
**          TRACE 600 ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 40

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Reflectance: 0.20  
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:58:35 1/11/94  
Dataset Name: CB40 .TM

AIRFLOW - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | FC          | 1,763                 | 11,755                | 11,755                | 13,295               | 3,303                 | 0             | 0             |
| 2             | RAD         | 0                     | 0                     | 0                     | 0                    | 48                    | 0             | 0             |
| 3             | UH          | 0                     | 0                     | 268                   | 0                    | 98                    | 0             | 0             |
| Totals        |             | 1,763                 | 11,755                | 12,023                | 13,295               | 3,448                 | 0             | 0             |

CAPACITY - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | FC          | 16.1                      | 0.0                       | 0.0                  | 0.0                  | 16.1                  | -220,087                  | 0                         | -87,105                 | 0                      | 0                        | 0                    | 0                    | -220,087              |
| 2             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -5,535                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -5,535                |
| 3             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -16,600                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -16,600               |
| Totals        |             | 16.1                      | 0.0                       | 0.0                  | 0.0                  | 16.1                  | -242,222                  | 0                         | -87,105                 | 0                      | 0                        | 0                    | 0                    | -242,222              |

The building peaked at hour 16 month 7 with a capacity of 16.1 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 BASE BUILDING

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | FC          | 15.00               | 1.50       | 731.2    | 487.5      | 24.62       | 1.50       | -28.08      | 7,837            |
| 2             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -62.90      | 88               |
| 3             | Main           | UH          | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 1.60       | -99.40      | 167              |

System 1 Block FC - FAN COIL

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |          | Mo/Hr: 7/16              |         | Mo/Hr: 7/17 |          | Mo/Hr: 13/ 1 |            |           |         |
|--------------------|----------|--------------------------|---------|-------------|----------|--------------|------------|-----------|---------|
| Outside Air ==>    |          | OADB/WB/HR: 91/ 73/ 98.0 |         | OADB: 89    |          | OADB: 4      |            |           |         |
| Space              | Ret. Air | Ret. Air                 | Net     | Percent     | Space    | Percent      | Space Peak | Coil Peak | Percent |
| Sens.+Lat.         | Sensible | Latent                   | Total   | Of Tot      | Sensible | Of Tot       | Space Sens | Tot Sens  | Of Tot  |
| (Btuh)             | (Btuh)   | (Btuh)                   | (Btuh)  | (%)         | (Btuh)   | (%)          | (Btuh)     | (Btuh)    | (%)     |
| Envelope Loads     |          |                          |         |             |          |              |            |           |         |
| Skylite Solr       | 0        | 0                        | 0       | 0.00        | 0        | 0.00         | 0          | 0         | 0.00    |
| Skylite Cond       | 0        | 0                        | 0       | 0.00        | 0        | 0.00         | 0          | 0         | 0.00    |
| Roof Cond          | 18,445   | 0                        | 18,445  | 9.56        | 18,021   | 13.98        | -15,057    | -15,057   | 7.07    |
| Glass Solar        | 33,606   | 0                        | 33,606  | 17.42       | 36,692   | 28.47        | 0          | 0         | 0.00    |
| Glass Cond         | 7,482    | 0                        | 7,482   | 3.88        | 7,128    | 5.53         | -35,586    | -35,586   | 16.71   |
| Wall Cond          | 24,246   | 1,157                    | 25,402  | 13.17       | 26,129   | 20.27        | -52,571    | -55,157   | 25.89   |
| Partition          | 0        | 0                        | 0       | 0.00        | 0        | 0.00         | 0          | 0         | 0.00    |
| Exposed Floor      | 0        | 0                        | 0       | 0.00        | 0        | 0.00         | 0          | 0         | 0.00    |
| Infiltration       | 42,137   | 0                        | 42,137  | 21.84       | 23,789   | 18.46        | -107,216   | -107,216  | 50.33   |
| Sub Total==>       | 125,917  | 1,157                    | 127,073 | 65.87       | 111,758  | 86.71        | -210,430   | -213,016  | 100.00  |
| Internal Loads     |          |                          |         |             |          |              |            |           |         |
| Lights             | 10,699   | 0                        | 10,699  | 5.55        | 10,967   | 8.51         | 0          | 0         | 0.00    |
| People             | 7,388    | 0                        | 7,388   | 3.83        | 3,818    | 2.96         | 0          | 0         | 0.00    |
| Misc               | 0        | 0                        | 0       | 0.00        | 0        | 0.00         | 0          | 0         | 0.00    |
| Sub Total==>       | 18,087   | 0                        | 18,087  | 9.38        | 14,785   | 11.47        | 0          | 0         | 0.00    |
| Ceiling Load       | 2,702    | -2,702                   | 0       | 0.00        | 2,341    | 1.82         | -2,432     | 0         | 0.00    |
| Outside Air        | 0        | 0                        | 47,733  | 24.74       | 0        | 0.00         | 0          | 0         | 0.00    |
| Sup. Fan Heat      |          |                          | 2,508   | 1.30        |          | 0.00         |            |           | 0.00    |
| Ret. Fan Heat      |          | 0                        | 0       | 0.00        |          | 0.00         |            |           | 0.00    |
| Duct Heat Pkup     |          | 0                        | 0       | 0.00        |          | 0.00         |            |           | 0.00    |
| OV/UNDR Sizing     | 0        | 0                        | 0       | 0.00        | 0        | 0.00         | 0          | 0         | 0.00    |
| Exhaust Heat       |          | -2,489                   | -2,489  | -1.29       |          | 0.00         |            |           | 0.00    |
| Terminal Bypass    |          | 0                        | 0       | -0.00       |          | 0.00         |            |           | 0.00    |
| Grand Total==>     | 146,706  | -4,035                   | 192,912 | 100.00      | 128,884  | 100.00       | -212,862   | -213,016  | 100.00  |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       |       | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS |            |     |
|----------|----------------|-------|-------|------------|-------------------|-------|--------|------------------|-------|--------|-------|------------|-----|
|          | (Tons)         | (Mbh) | (Mbh) |            | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor | Glass (sf) | (%) |
| Main Clg | 16.1           | 192.9 | 155.0 | 11,755     | 78.5              | 67.4  | 85.4   | 64.8             | 62.5  | 83.4   | 7,837 |            |     |
| Aux Clg  | 0.0            | 0.0   | 0.0   | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0     |            |     |
| Opt Vent | 0.0            | 0.0   | 0.0   | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0     |            |     |
| Totals   | 16.1           | 192.9 |       |            |                   |       |        |                  |       |        | 4,046 | 0          | 0   |
|          |                |       |       |            |                   |       |        |                  |       |        | 4,665 | 771        | 17  |

-----HEATING COIL SELECTION-----

|          | Capacity |            |      |      | Type    |         | Cooling |          | Heating      |             | --ENGINEERING CHECKS-- |               | --TEMPERATURES (F)-- |          |              |               |          |      |      |
|----------|----------|------------|------|------|---------|---------|---------|----------|--------------|-------------|------------------------|---------------|----------------------|----------|--------------|---------------|----------|------|------|
|          | (Mbh)    | Coil Airfl | Ent  | Lvg  | Vent    | Cooling | Heating | Clg % OA | Clg Cfm/Sqft | Clg Cfm/Ton | Clg Sqft/Ton           | Clg Btuh/Sqft | No. People           | Htg % OA | Htg Cfm/Sqft | Htg Btuh/Sqft | Type     | Clg  | Htg  |
| Main Htg | -220.1   | 11,755     | 67.4 | 84.6 | Infil   | 1,539   | 1,539   | 15.0     | 1.50         | 731.25      | 487.50                 | 24.62         | 20                   | 0.0      | 1.50         | -28.08        | SADB     | 64.9 | 84.6 |
| Aux Htg  | 0.0      | 0          | 0.0  | 0.0  | Supply  | 11,755  | 11,755  |          |              |             |                        |               |                      |          |              |               | Plenum   | 76.3 | 66.8 |
| Preheat  | -87.1    | 11,755     | 57.9 | 64.7 | Mincfm  | 0       | 0       |          |              |             |                        |               |                      |          |              |               | Return   | 76.3 | 67.4 |
| Reheat   | 0.0      | 0          | 0.0  | 0.0  | Return  | 11,755  | 11,755  |          |              |             |                        |               |                      |          |              |               | Ret/OA   | 78.4 | 67.4 |
| Humidif  | 0.0      | 0          | 0.0  | 0.0  | Exhaust | 1,763   | 0       |          |              |             |                        |               |                      |          |              |               | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0      | 0          | 0.0  | 0.0  | Rm Exh  | 0       | 0       |          |              |             |                        |               |                      |          |              |               | Fn MtrTD | 0.0  | 0.0  |
| Total    | -220.1   |            |      |      | Auxil   | 0       | 0       |          |              |             |                        |               |                      |          |              |               | Fn BldTD | 0.0  | 0.0  |
|          |          |            |      |      |         |         |         |          |              |             |                        |               |                      |          |              |               | Fn Frict | 0.1  | 0.1  |

System 2 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/0 \* Mo/Hr: 0/0 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 0/0/0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Glass Solar     | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Glass Cond      | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -244              | -244             | 4.41             |
| Wall Cond       | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -1,808            | -1,982           | 35.80            |
| Partition       | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Infiltration    | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -3,310            | -3,310           | 59.79            |
| Sub Total=>     | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -5,362            | -5,535           | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Lights          | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| People          | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total=>     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -173              | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             |                       | 0.00             |                   | 0                | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             |                   | 0                | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             |                   | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                   | 0                | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                   | 0                | 0.00             |
| Grand Total=>   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -5,535            | -5,535           | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------------|------------|-----|
| Main Clg | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 88                |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 | 0          | 0   |
| Totals   | 0.0                   | 0.0             |                  |                           |                          | 144               | 4          | 2   |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -5.5           | 0                | 0.0         | 0.0         | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00   | SADB     | -0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 0       | 48      | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0  | 64.4 |
| Preheat  | 0.0            | 0                | 0.0         | 0.0         | Supply  | 0       | 0       | Clg Sqft/Ton  | 0.00   | Return   | 0.0  | 64.4 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0  | 64.4 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 0       | 0       | No. People    | 0      | Runarnd  | 0.0  | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0  | 0.0  |
| Total    | -5.5           |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.00   | Fn BldTD | 0.0  | 0.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -62.90 | Fn Frict | 0.0  | 0.0  |



System 3 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at time ==> Mo/Hr: 0/0 \* Mo/Hr: 0/0 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 0/0/0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -4,428                       | -4,428                    | 26.67            |
| Glass Solar     | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -573                         | -573                      | 3.45             |
| Wall Cond       | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -4,762                       | -4,762                    | 28.69            |
| Partition       | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | -6,837                       | -6,837                    | 41.19            |
| Sub Total==>    | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -16,600                      | -16,600                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Lights          | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| People          | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -16,600                      | -16,600                   | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total Floor | AREAS Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------------|------------------|-----|
| Main Clg | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 167               |                  |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |                  |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |                  |     |
| Totals   | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 167               | 0                | 0   |
|          |                       |                 |                  |                           |                          | 297               | 8                | 3   |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | AIRFLOWS (cfm) Cooling | Heating | ---ENGINEERING CHECKS--- Clg % OA | 0.0    | ---TEMPERATURES (F)--- Type | Clg | Htg   |
|----------|----------------|------------------|-------------|-------------|---------|------------------------|---------|-----------------------------------|--------|-----------------------------|-----|-------|
| Main Htg | -16.6          | 268              | 68.0        | 125.0       | Infil   | 0                      | 98      | Clg Cfm/Sqft                      | 0.00   | SADB                        | 0.0 | 125.0 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Supply  | 0                      | 268     | Clg Cfm/Ton                       | 0.00   | Plenum                      | 0.0 | 68.0  |
| Preheat  | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0                      | 0       | Clg Sqft/Ton                      | 0.00   | Return                      | 0.0 | 68.0  |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Return  | 0                      | 268     | Clg Btuh/Sqft                     | 0.00   | Ret/OA                      | 0.0 | 68.0  |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0                      | 0       | No. People                        | 0      | Runarnd                     | 0.0 | 68.0  |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Rm Exh  | 0                      | 0       | Htg % OA                          | 0.0    | Fn MtrTD                    | 0.0 | 0.0   |
| Total    | -16.6          |                  |             |             | Auxil   | 0                      | 0       | Htg Cfm/Sqft                      | 1.60   | Fn BldTD                    | 0.0 | 0.0   |
|          |                |                  |             |             |         |                        |         | Htg Btuh/Sqft                     | -99.40 | Fn Frict                    | 0.1 | 0.0   |

BUILDING U-VALUES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description  | Room U-Values<br>(Btu/hr/sqft/F) |       |             |             |       |             |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|--------------|----------------------------------|-------|-------------|-------------|-------|-------------|-------------|-------|-------|------------------------|-----------------------------|
|             |              | Part.                            | ExFlr | Summr Skylt | Wintr Skylt | Roof  | Summr Windo | Wintr Windo | Wall  | Ceil. |                        |                             |
| 1           | 1ST FL APT'S | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.700       | 0.720       | 0.222 | 0.549 | 41.5                   | 8.77                        |
| Zone        | 1 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.700       | 0.720       | 0.222 | 0.549 | 41.5                   | 8.77                        |
| 2           | 2ND FL APT'S | 0.000                            | 0.000 | 0.000       | 0.000       | 0.058 | 0.700       | 0.720       | 0.222 | 0.000 | 40.3                   | 12.01                       |
| Zone        | 2 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.058 | 0.700       | 0.720       | 0.222 | 0.000 | 40.3                   | 12.01                       |
| System      | 1 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.058 | 0.700       | 0.720       | 0.222 | 0.549 | 40.9                   | 10.44                       |
| 3           | LAUNDRY ROOM | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 1.040       | 1.086       | 0.222 | 0.549 | 95.3                   | 20.71                       |
| Zone        | 3 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 1.040       | 1.086       | 0.222 | 0.549 | 95.3                   | 20.71                       |
| System      | 2 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 1.040       | 1.086       | 0.222 | 0.549 | 95.3                   | 20.71                       |
| 4           | MECH ROOM    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.414 | 1.040       | 1.086       | 0.257 | 0.000 | 123.1                  | 27.06                       |
| Zone        | 4 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.414 | 1.040       | 1.086       | 0.257 | 0.000 | 123.1                  | 27.06                       |
| System      | 3 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.414 | 1.040       | 1.086       | 0.257 | 0.000 | 123.1                  | 27.06                       |
| Building    |              | 0.000                            | 0.000 | 0.000       | 0.000       | 0.072 | 0.705       | 0.726       | 0.224 | 0.549 | 43.2                   | 10.90                       |

BUILDING AREAS - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G A R E A S -----

| Room Number | Description  | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|--------------|---------------------|----|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
|             |              | Flr                 | Rm |                             |                         |                       |                           |                      |             |                      |                    |             |                      |
| 1           | 1ST FL APT'S | 1                   | 1  | 3,791                       | 3,791                   | 0                     | 0                         | 0                    | 0           | 0                    | 336                | 16          | 1,728                |
| Zone        | 1 Total/Ave. |                     |    |                             | 3,791                   | 0                     | 0                         | 0                    | 0           | 0                    | 336                | 16          | 1,728                |
| 2           | 2ND FL APT'S | 1                   | 1  | 4,046                       | 4,046                   | 0                     | 0                         | 0                    | 0           | 4,046                | 435                | 17          | 2,166                |
| Zone        | 2 Total/Ave. |                     |    |                             | 4,046                   | 0                     | 0                         | 0                    | 0           | 4,046                | 435                | 17          | 2,166                |
| System      | 1 Total/Ave. |                     |    |                             | 7,837                   | 0                     | 0                         | 0                    | 0           | 4,046                | 771                | 17          | 3,894                |
| 3           | LAUNDRY ROOM | 1                   | 1  | 88                          | 88                      | 0                     | 0                         | 0                    | 0           | 0                    | 4                  | 2           | 140                  |
| Zone        | 3 Total/Ave. |                     |    |                             | 88                      | 0                     | 0                         | 0                    | 0           | 0                    | 4                  | 2           | 140                  |
| System      | 2 Total/Ave. |                     |    |                             | 88                      | 0                     | 0                         | 0                    | 0           | 0                    | 4                  | 2           | 140                  |
| 4           | MECH ROOM    | 1                   | 1  | 167                         | 167                     | 0                     | 0                         | 0                    | 0           | 167                  | 8                  | 3           | 289                  |
| Zone        | 4 Total/Ave. |                     |    |                             | 167                     | 0                     | 0                         | 0                    | 0           | 167                  | 8                  | 3           | 289                  |
| System      | 3 Total/Ave. |                     |    |                             | 167                     | 0                     | 0                         | 0                    | 0           | 167                  | 8                  | 3           | 289                  |
| Building    |              |                     |    |                             | 8,092                   | 0                     | 0                         | 0                    | 0           | 4,213                | 783                | 15          | 4,323                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.072 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.298 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.196 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 4.77 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 20.63 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.8                    | 16           | 164   | -16,466                  | 5            | 252   | 601.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 1.6                    | 7            | 69    | -32,933                  | 5            | 254   | 1,202.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 2.4                    | 7            | 74    | -49,399                  | 15           | 682   | 1,803.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 3.2                    | 6            | 61    | -65,865                  | 34           | 1,582 | 2,404.6                   | 42           | 3,650 | 0.0                       | 0            | 0     |
| 20 - 25                   | 4.0                    | 7            | 72    | -82,332                  | 3            | 147   | 3,005.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 4.8                    | 18           | 190   | -98,798                  | 9            | 398   | 3,606.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 5.6                    | 10           | 104   | -115,264                 | 5            | 242   | 4,208.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 6.4                    | 16           | 166   | -131,731                 | 2            | 113   | 4,809.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 7.2                    | 5            | 53    | -148,197                 | 5            | 245   | 5,410.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 8.0                    | 2            | 20    | -164,663                 | 8            | 355   | 6,011.6                   | 21           | 1,825 | 0.0                       | 0            | 0     |
| 50 - 55                   | 8.8                    | 2            | 20    | -181,130                 | 1            | 39    | 6,612.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 9.6                    | 2            | 20    | -197,596                 | 1            | 29    | 7,213.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 10.4                   | 0            | 0     | -214,062                 | 1            | 31    | 7,815.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 11.3                   | 0            | 0     | -230,529                 | 6            | 255   | 8,416.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 12.1                   | 0            | 0     | -246,995                 | 0            | 0     | 9,017.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 12.9                   | 0            | 0     | -263,461                 | 0            | 0     | 9,618.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 13.7                   | 2            | 20    | -279,928                 | 0            | 0     | 10,219.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 14.5                   | 1            | 11    | -296,394                 | 0            | 0     | 10,820.8                  | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 15.3                   | 0            | 0     | -312,860                 | 0            | 0     | 11,422.0                  | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 16.1                   | 0            | 0     | -329,327                 | 0            | 0     | 12,023.1                  | 38           | 3,285 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,716 | 0                        | 0            | 4,136 | 0.0                       | 0            | 0     | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | ----- Zone Number ----- |   |   |   |
|-----------------------------|-------------------------|---|---|---|
|                             | 1                       | 2 | 3 | 4 |

|            |      |      |       |      |
|------------|------|------|-------|------|
| Max. Temp. | 80.1 | 80.4 | 103.8 | 96.5 |
| Mo./Hr.    | 7 14 | 7 14 | 8 23  | 7 21 |
| Day Type   | 1    | 1    | 1     | 1    |

|           | ..... Number of Hours ..... |       |       |       |
|-----------|-----------------------------|-------|-------|-------|
| Above 100 | 0                           | 0     | 918   | 0     |
| 95 - 100  | 0                           | 0     | 1,117 | 30    |
| 90 - 95   | 0                           | 0     | 893   | 864   |
| 85 - 90   | 0                           | 0     | 168   | 1,190 |
| 80 - 85   | 0                           | 0     | 576   | 597   |
| 75 - 80   | 2,893                       | 2,942 | 119   | 925   |
| 70 - 75   | 779                         | 730   | 363   | 66    |
| 65 - 70   | 4,893                       | 4,760 | 4,606 | 68    |
| 60 - 65   | 195                         | 328   | 0     | 630   |
| 55 - 60   | 0                           | 0     | 0     | 814   |
| 50 - 55   | 0                           | 0     | 0     | 543   |
| Below 50  | 0                           | 0     | 0     | 3,033 |

|            |      |      |      |      |
|------------|------|------|------|------|
| Min. Temp. | 63.9 | 63.4 | 67.9 | 31.7 |
| Mo./Hr.    | 2 15 | 2 15 | 3 24 | 2 10 |
| Day Type   | 2    | 3    | 1    | 5    |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | DEMAND          |                    | HOT WTR              | HOT W DMND           |
|-------|-------------------|-----------------|-----------------|--------------------|----------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) | On Peak<br>(Thrm/hr) |
| Jan   | 2,632             | 8               | 8               | 862                |                      | 2                    |
| Feb   | 2,378             | 8               | 8               | 819                |                      | 2                    |
| March | 2,659             | 8               | 8               | 555                |                      | 2                    |
| April | 2,541             | 8               | 8               | 212                |                      | 1                    |
| May   | 2,640             | 9               | 9               | 0                  |                      | 0                    |
| June  | 2,896             | 9               | 9               | 0                  |                      | 0                    |
| July  | 3,123             | 9               | 9               | 0                  |                      | 0                    |
| Aug   | 2,993             | 9               | 9               | 0                  |                      | 0                    |
| Sept  | 2,537             | 9               | 9               | 0                  |                      | 0                    |
| Oct   | 2,643             | 8               | 8               | 191                |                      | 1                    |
| Nov   | 2,543             | 8               | 8               | 418                |                      | 1                    |
| Dec   | 2,619             | 8               | 8               | 745                |                      | 2                    |
| Total | 32,204            | 9               | 9               | 3,801              |                      | 2                    |

Building Energy Consumption = 60,554 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 103,381 (Btu/Sq Ft/Year)

Floor Area = 8,092 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

| ----- E Q U I P M E N T   E N E R G Y   C O N S U M P T I O N ----- |               |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|---------------------------------------------------------------------|---------------|---------------------------------|----------------------------|------|------|------|------|------|------|------|------|------|------|--------|
| Ref<br>Num                                                          | Equip<br>Code | ----- Monthly Consumption ----- |                            |      |      |      |      |      |      |      |      |      |      | Total  |
|                                                                     |               | Jan                             | Feb                        | Mar  | Apr  | May  | June | July | Aug  | Sep  | Oct  | Nov  | Dec  |        |
| 0                                                                   | LIGHTS        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | ELEC          | 1072                            | 968                        | 1098 | 1033 | 1085 | 1060 | 1058 | 1098 | 1033 | 1085 | 1033 | 1058 | 12,683 |
|                                                                     | PK            | 4.1                             | 4.1                        | 4.1  | 4.1  | 4.1  | 4.1  | 4.1  | 4.1  | 4.1  | 4.1  | 4.1  | 4.1  | 4.1    |
| 1                                                                   | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                                                     | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 2                                                                   | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | GAS           | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                                                     | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 3                                                                   | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | OIL           | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                                                     | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 4                                                                   | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | P STEAM       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                                                     | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 5                                                                   | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | P HOTH2O      | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                                                     | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 6                                                                   | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | P CHILL       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                                                     | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 1                                                                   | EQ1161        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     |               |                                 | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 220  | 337  | 225  | 0    | 0    | 0    | 0    | 781    |
|                                                                     | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.7  | 0.8  | 0.8  | 0.8  | 0.8  | 0.0  | 0.0  | 0.0  | 0.8    |
| 1                                                                   | EQ5200        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     |               |                                 | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 22   | 34   | 22   | 0    | 0    | 0    | 0    | 79     |
|                                                                     | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.0  | 0.0  | 0.0  | 0.1    |
| 1                                                                   | EQ5303        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     |               |                                 | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 90   | 140  | 93   | 0    | 0    | 0    | 0    | 322    |
|                                                                     | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.0  | 0.0  | 0.0  | 0.3    |
| 1                                                                   | EQ4371        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     |               |                                 | FAN COIL SUPPLY FAN        |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | ELEC          | 1555                            | 1404                       | 1555 | 1504 | 1555 | 1504 | 1555 | 1555 | 1504 | 1555 | 1504 | 1555 | 18,304 |
|                                                                     | PK            | 3.7                             | 3.7                        | 3.7  | 3.7  | 3.7  | 3.7  | 3.7  | 3.7  | 3.7  | 3.7  | 3.7  | 3.7  | 3.7    |
| 1                                                                   | EQ2102        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     |               |                                 | PURCHASED DIST. HOT WATER  |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     | P HOTH2O      | 862                             | 819                        | 555  | 212  | 0    | 0    | 0    | 0    | 0    | 191  | 418  | 745  | 3,801  |
|                                                                     | PK            | 2.2                             | 2.2                        | 1.6  | 1.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 1.0  | 1.4  | 2.2  | 2.2    |
| 1                                                                   | EQ5020        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                                                     |               |                                 | HEAT WATER CIRC. PUMP C.V. |      |      |      |      |      |      |      |      |      |      |        |





UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
 BASE BUILDING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 9.0 (kW)  
 Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|-----------------------|---------------------------|--------------------------|
|----------------------|------------------------|-----------------------|---------------------------|--------------------------|

Cooling Equipment

|           |        |                            |     |       |
|-----------|--------|----------------------------|-----|-------|
| 1         | EQ1161 | AIR-CLD COND COMP <15 TONS | 1.2 | 13.53 |
| Sub Total |        |                            | 1.2 | 13.53 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Air Moving Equipment

|           |  |                                    |     |       |
|-----------|--|------------------------------------|-----|-------|
| 1         |  | SUMMATION OF FAN ELECTRICAL DEMAND | 3.7 | 41.37 |
| Sub Total |  |                                    | 3.7 | 41.37 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Miscellaneous

|           |  |                |     |       |
|-----------|--|----------------|-----|-------|
|           |  | Lights         | 4.1 | 45.10 |
|           |  | Base Utilities | 0.0 | 0.00  |
|           |  | Misc Equipment | 0.0 | 0.00  |
| Sub Total |  |                | 4.1 | 45.10 |

|             |  |  |     |        |
|-------------|--|--|-----|--------|
| Grand Total |  |  | 9.0 | 100.00 |
|-------------|--|--|-----|--------|

```
*****  
*****  
**                                     **  
**          TRACE 600 ANALYSIS          **  
**                                     **  
**          by          **               **  
**                                     **  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 40

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 15: 5:24 1/11/94  
Dataset Name: CB40 .TM

AIRFLOW - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | FC          | 1,763                 | 11,755                | 11,755                | 13,015               | 3,023                 | 0             | 0             |
| 2             | RAD         | 0                     | 0                     | 0                     | 0                    | 39                    | 0             | 0             |
| 3             | UH          | 0                     | 0                     | 248                   | 0                    | 80                    | 0             | 0             |
| Totals        |             | 1,763                 | 11,755                | 12,003                | 13,015               | 3,142                 | 0             | 0             |

CAPACITY - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | FC          | 12.2                      | 0.0                       | 0.0                  | 0.0                  | 12.2                  | -153,286                  | 0                         | -117,686                | 0                      | 0                        | 0                    | 0                    | -153,286              |
| 2             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -3,455                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -3,455                |
| 3             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -15,357                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -15,357               |
| Totals        |             | 12.2                      | 0.0                       | 0.0                  | 0.0                  | 12.2                  | -172,098                  | 0                         | -117,686                | 0                      | 0                        | 0                    | 0                    | -172,098              |

The building peaked at hour 16 month 7 with a capacity of 12.2 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling   |         |           |            | Heating   |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|-----------|---------|-----------|------------|-----------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft | Cfm/Ton | Sq Ft/Ton | Btuh/Sq Ft | Cfm/Sq Ft | Btuh/Sq Ft |                  |
| 1             | Main           | FC          | 15.00               | 1.50      | 961.7   | 641.1     | 18.72      | 1.50      | -19.56     | 7,837            |
| 2             | Main           | RAD         | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.00      | -39.26     | 88               |
| 3             | Main           | UH          | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 1.48      | -91.96     | 167              |

System 1 Block FC - FAN COIL

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/17 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 89 \* OADB: 4

|                 | Space<br>Sens.+Lat.<br>(Btuh) | Ret. Air<br>Sensible<br>(Btuh) | Ret. Air<br>Latent<br>(Btuh) | Net<br>Total<br>(Btuh) | Perct<br>Of Tot<br>(%) | * | Space<br>Sensible<br>(Btuh) | Perct<br>Of Tot<br>(%) | * | Space Peak<br>Space Sens<br>(Btuh) | Coil Peak<br>Tot Sens<br>(Btuh) | Perct<br>Of Tot<br>(%) |
|-----------------|-------------------------------|--------------------------------|------------------------------|------------------------|------------------------|---|-----------------------------|------------------------|---|------------------------------------|---------------------------------|------------------------|
| Envelope Loads  |                               |                                |                              |                        |                        | * |                             |                        | * |                                    |                                 |                        |
| Skylite Solr    | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Skylite Cond    | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Roof Cond       | 9,789                         | 0                              | 0                            | 9,789                  | 6.67                   | * | 10,710                      | 11.15                  | * | -10,529                            | -10,529                         | 7.12                   |
| Glass Solar     | 33,171                        | 0                              | 0                            | 33,171                 | 22.61                  | * | 36,692                      | 38.19                  | * | 0                                  | 0                               | 0.00                   |
| Glass Cond      | 7,452                         | 0                              | 0                            | 7,452                  | 5.08                   | * | 7,128                       | 7.42                   | * | -35,586                            | -35,586                         | 24.08                  |
| Wall Cond       | 5,614                         | 276                            | 0                            | 5,891                  | 4.02                   | * | 6,016                       | 6.26                   | * | -13,296                            | -13,955                         | 9.44                   |
| Partition       | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Exposed Floor   | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Infiltration    | 29,812                        | 0                              | 0                            | 29,812                 | 20.32                  | * | 19,463                      | 20.26                  | * | -87,722                            | -87,722                         | 59.36                  |
| Sub Total==>    | 85,839                        | 276                            | 0                            | 86,115                 | 58.71                  | * | 80,010                      | 83.28                  | * | -147,133                           | -147,792                        | 100.00                 |
| Internal Loads  |                               |                                |                              |                        |                        | * |                             |                        | * |                                    |                                 |                        |
| Lights          | 10,699                        | 0                              | 0                            | 10,699                 | 7.29                   | * | 10,967                      | 11.41                  | * | 0                                  | 0                               | 0.00                   |
| People          | 7,388                         | 0                              | 0                            | 7,388                  | 5.04                   | * | 3,818                       | 3.97                   | * | 0                                  | 0                               | 0.00                   |
| Misc            | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Sub Total==>    | 18,087                        | 0                              | 0                            | 18,087                 | 12.33                  | * | 14,785                      | 15.39                  | * | 0                                  | 0                               | 0.00                   |
| Ceiling Load    | 1,394                         | -1,394                         | 0                            | 0                      | 0.00                   | * | 1,280                       | 1.33                   | * | -1,549                             | 0                               | 0.00                   |
| Outside Air     | 0                             | 0                              | 0                            | 41,263                 | 28.13                  | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Sup. Fan Heat   | 0                             | 0                              | 0                            | 2,508                  | 1.71                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Ret. Fan Heat   | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Duct Heat Pkup  | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| OV/UNDR Sizing  | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Exhaust Heat    | 0                             | -1,284                         | 0                            | -1,284                 | -0.88                  | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Terminal Bypass | 0                             | 0                              | 0                            | 0                      | -0.00                  | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Grand Total==>  | 105,320                       | -2,402                         | 0                            | 146,688                | 100.00                 | * | 96,074                      | 100.00                 | * | -148,683                           | -147,792                        | 100.00                 |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|--------------------------|--------------------|---------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                          |                    |                     | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 12.2                     | 146.7              | 11,755              | 78.0              | 68.0  | 89.8   | 67.4             | 64.4  | 88.5   | 7,837       |            |     |
| Aux Clg  | 0.0                      | 0.0                | 0                   | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Opt Vent | 0.0                      | 0.0                | 0                   | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 12.2                     | 146.7              | 11,755              |                   |       |        |                  |       |        | 4,046       | 0          | 0   |
|          |                          |                    |                     |                   |       |        |                  |       |        | 4,665       | 771        | 17  |

-----HEATING COIL SELECTION-----

|          | Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)-- |      |  |
|----------|-------------------|---------------------|--------------|--------------|---------|---------|---------|------------------------|--------|----------|----------------------|------|--|
|          |                   |                     |              |              |         |         |         | Clg % OA               | 15.0   | Type     | Clg                  | Htg  |  |
| Main Htg | -153.3            | 11,755              | 67.6         | 79.6         | Vent    | 1,763   | 0       | Clg Cfm/Sqft           | 1.50   | SADB     | 67.5                 | 79.6 |  |
| Aux Htg  | 0.0               | 0                   | 0.0          | 0.0          | Infil   | 1,260   | 1,260   | Clg Cfm/Ton            | 961.67 | Plenum   | 75.7                 | 67.3 |  |
| Preheat  | -117.7            | 11,755              | 58.1         | 67.3         | Supply  | 11,755  | 11,755  | Clg Sqft/Ton           | 641.11 | Return   | 75.7                 | 67.6 |  |
| Reheat   | 0.0               | 0                   | 0.0          | 0.0          | Mincfm  | 0       | 0       | Clg Btuh/Sqft          | 18.72  | Ret/OA   | 77.9                 | 67.6 |  |
| Humidif  | 0.0               | 0                   | 0.0          | 0.0          | Return  | 11,755  | 11,755  | No. People             | 20     | Runarnd  | 75.0                 | 68.0 |  |
| Opt Vent | 0.0               | 0                   | 0.0          | 0.0          | Exhaust | 1,763   | 0       | Htg % OA               | 0.0    | Fn MtrTD | 0.0                  | 0.0  |  |
| Total    | -153.3            |                     |              |              | Rm Exh  | 0       | 0       | Htg Cfm/Sqft           | 1.50   | Fn BldTD | 0.0                  | 0.0  |  |
|          |                   |                     |              |              | Auxil   | 0       | 0       | Htg Btuh/Sqft          | -19.56 | Fn Frict | 0.1                  | 0.1  |  |

System 2 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -244                         | -244                      | 7.06             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -457                         | -503                      | 14.56            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -2,708                       | -2,708                    | 78.38            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -3,409                       | -3,455                    | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -46                          | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -3,455                       | -3,455                    | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains |                   |            |     |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 88                |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0                 |            |     |
| Totals   | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 144               | 4          | 2   |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)-- |      |  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------|----------------------|------|--|
|          |                |                  |           |           |         |         |         | Clg % OA               | 0.0    | Type     | Clg                  | Htg  |  |
| Main Htg | -3.5           | 0                | 0.0       | 0.0       | Vent    | 0       | 0       | Clg Cfm/Sqft           | 0.00   | SADB     | 0.0                  | 68.1 |  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 39      | Clg Cfm/Ton            | 0.00   | Plenum   | 0.0                  | 67.1 |  |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 0       | Clg Sqft/Ton           | 0.00   | Return   | 0.0                  | 67.1 |  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft          | 0.00   | Ret/OA   | 0.0                  | 67.1 |  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 0       | No. People             | 0      | Runarnd  | 0.0                  | 68.0 |  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD | 0.0                  | 0.0  |  |
| Total    | -3.5           | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg Cfm/SqFt           | 0.00   | Fn BldTD | 0.0                  | 0.0  |  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/SqFt          | -39.26 | Fn Frict | 0.0                  | 0.0  |  |

System 3 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -4,428                       | -4,428                    | 28.83              |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -573                         | -573                      | 3.73               |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -4,762                       | -4,762                    | 31.01              |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -5,594                       | -5,594                    | 36.43              |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -15,357                      | -15,357                   | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| People          | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -15,357                      | -15,357                   | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/HR (Deg F) | Entering WB/HR (Deg F) | Grains | Leaving DB/HR (Deg F) | Leaving WB/HR (Deg F) | Grains | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|------------------------|------------------------|--------|-----------------------|-----------------------|--------|-------------------|------------|-----|
| Main Clg | 0.0                   | 0.0             | 0.0              | 0.0                    | 0.0                    | 0.0    | 0.0                   | 0.0                   | 0.0    | Part              | 0          |     |
| Aux Clg  | 0.0                   | 0.0             | 0.0              | 0.0                    | 0.0                    | 0.0    | 0.0                   | 0.0                   | 0.0    | ExFlr             | 0          |     |
| Opt Vent | 0.0                   | 0.0             | 0.0              | 0.0                    | 0.0                    | 0.0    | 0.0                   | 0.0                   | 0.0    | Roof              | 167        | 0 0 |
| Totals   | 0.0                   | 0.0             | 0.0              |                        |                        |        |                       |                       |        | Wall              | 297        | 8 3 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg   |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|-----|-------|
| Main Htg | -15.4          | 248              | 68.0        | 125.0       | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 125.0 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 0       | 80      | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 68.0  |
| Preheat  | 0.0            | 0                | 0.0         | 0.0         | Supply  | 0       | 248     | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 68.0  |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 68.0  |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 0       | 248     | No. People    | 0      | Runarnd  | 0.0 | 68.0  |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0   |
| Total    | -15.4          |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.48   | Fn BldTD | 0.0 | 0.0   |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -91.96 | Fn Frict | 0.1 | 0.0   |

BUILDING U-VALUES - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description  | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |             |             |       |       | Room Mass (lb/sqft) | Room Capac. (Btu/sqft/F) |       |
|-------------|--------------|-------|-------|----------------------------------|-------------|-------------|-------------|-------|-------|---------------------|--------------------------|-------|
|             |              |       |       | Summr Skylt                      | Wintr Skylt | Summr Windo | Wintr Windo | Wall  | Ceil. |                     |                          |       |
| 1           | 1ST FL APT'S | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000       | 0.700       | 0.720 | 0.056 | 0.549               | 41.8                     | 8.83  |
| Zone        | 1 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000       | 0.700       | 0.720 | 0.056 | 0.549               | 41.8                     | 8.83  |
| 2           | 2ND FL APT'S | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.700       | 0.720 | 0.056 | 0.000               | 42.9                     | 12.53 |
| Zone        | 2 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.700       | 0.720 | 0.056 | 0.000               | 42.9                     | 12.53 |
| System      | 1 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.700       | 0.720 | 0.056 | 0.549               | 42.4                     | 10.74 |
| 3           | LAUNDRY ROOM | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000       | 1.040       | 1.086 | 0.056 | 0.549               | 96.4                     | 20.92 |
| Zone        | 3 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000       | 1.040       | 1.086 | 0.056 | 0.549               | 96.4                     | 20.92 |
| System      | 2 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000       | 1.040       | 1.086 | 0.056 | 0.549               | 96.4                     | 20.92 |
| 4           | MECH ROOM    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.414       | 1.040       | 1.086 | 0.257 | 0.000               | 123.1                    | 27.06 |
| Zone        | 4 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.414       | 1.040       | 1.086 | 0.257 | 0.000               | 123.1                    | 27.06 |
| System      | 3 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.414       | 1.040       | 1.086 | 0.257 | 0.000               | 123.1                    | 27.06 |
| Building    |              | 0.000 | 0.000 | 0.000                            | 0.000       | 0.055       | 0.705       | 0.726 | 0.069 | 0.549               | 44.6                     | 11.19 |

BUILDING AREAS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G A R E A S -----

| Room Number | Description  | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|--------------|---------------------|----|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
|             |              | Flr                 | Rm |                             |                         |                       |                           |                      |             |                      |                    |             |                      |
| 1           | 1ST FL APT'S | 1                   | 1  | 3,791                       | 3,791                   | 0                     | 0                         | 0                    | 0           | 0                    | 336                | 16          | 1,728                |
| Zone        | 1 Total/Ave. |                     |    |                             | 3,791                   | 0                     | 0                         | 0                    | 0           | 0                    | 336                | 16          | 1,728                |
| 2           | 2ND FL APT'S | 1                   | 1  | 4,046                       | 4,046                   | 0                     | 0                         | 0                    | 0           | 4,046                | 435                | 17          | 2,166                |
| Zone        | 2 Total/Ave. |                     |    |                             | 4,046                   | 0                     | 0                         | 0                    | 0           | 4,046                | 435                | 17          | 2,166                |
| System      | 1 Total/Ave. |                     |    |                             | 7,837                   | 0                     | 0                         | 0                    | 0           | 4,046                | 771                | 17          | 3,894                |
| 3           | LAUNDRY ROOM | 1                   | 1  | 88                          | 88                      | 0                     | 0                         | 0                    | 0           | 0                    | 4                  | 2           | 140                  |
| Zone        | 3 Total/Ave. |                     |    |                             | 88                      | 0                     | 0                         | 0                    | 0           | 0                    | 4                  | 2           | 140                  |
| System      | 2 Total/Ave. |                     |    |                             | 88                      | 0                     | 0                         | 0                    | 0           | 0                    | 4                  | 2           | 140                  |
| 4           | MECH ROOM    | 1                   | 1  | 167                         | 167                     | 0                     | 0                         | 0                    | 0           | 167                  | 8                  | 3           | 289                  |
| Zone        | 4 Total/Ave. |                     |    |                             | 167                     | 0                     | 0                         | 0                    | 0           | 167                  | 8                  | 3           | 289                  |
| System      | 3 Total/Ave. |                     |    |                             | 167                     | 0                     | 0                         | 0                    | 0           | 167                  | 8                  | 3           | 289                  |
| Building    |              |                     |    |                             | 8,092                   | 0                     | 0                         | 0                    | 0           | 4,213                | 783                | 15          | 4,323                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
WALL & ROOF INSULATION

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.055 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.167 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.117 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 16.32 (Btu/Hr/Sq Ft)



SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 0.6                    | 10        | 100   | -14,489                  | 7         | 331   | 600.2                     | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 1.2                    | 10        | 103   | -28,978                  | 7         | 334   | 1,200.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 1.8                    | 6         | 62    | -43,468                  | 37        | 1,667 | 1,800.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 2.4                    | 5         | 50    | -57,957                  | 9         | 411   | 2,400.6                   | 42        | 3,650 | 0.0                       | 0         | 0     |
| 20 - 25             | 3.1                    | 8         | 81    | -72,446                  | 6         | 265   | 3,000.8                   | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 3.7                    | 18        | 178   | -86,935                  | 9         | 421   | 3,600.9                   | 0         | 0     | 0.0                       | 0         | 0     |
| 30 - 35             | 4.3                    | 9         | 92    | -101,424                 | 4         | 178   | 4,201.1                   | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 4.9                    | 11        | 114   | -115,914                 | 2         | 102   | 4,801.2                   | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 5.5                    | 14        | 143   | -130,403                 | 8         | 374   | 5,401.4                   | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 6.1                    | 2         | 20    | -144,892                 | 2         | 101   | 6,001.5                   | 21        | 1,825 | 0.0                       | 0         | 0     |
| 50 - 55             | 6.7                    | 2         | 20    | -159,381                 | 6         | 276   | 6,601.7                   | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 7.3                    | 2         | 20    | -173,870                 | 0         | 0     | 7,201.8                   | 0         | 0     | 0.0                       | 0         | 0     |
| 60 - 65             | 7.9                    | 0         | 0     | -188,359                 | 0         | 0     | 7,802.0                   | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 8.6                    | 0         | 0     | -202,849                 | 0         | 0     | 8,402.2                   | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 9.2                    | 2         | 20    | -217,338                 | 0         | 0     | 9,002.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 75 - 80             | 9.8                    | 1         | 11    | -231,827                 | 0         | 0     | 9,602.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 10.4                   | 0         | 0     | -246,316                 | 0         | 0     | 10,202.6                  | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 11.0                   | 0         | 0     | -260,805                 | 0         | 0     | 10,802.8                  | 0         | 0     | 0.0                       | 0         | 0     |
| 90 - 95             | 11.6                   | 0         | 0     | -275,295                 | 0         | 0     | 11,402.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 12.2                   | 0         | 0     | -289,784                 | 0         | 0     | 12,003.1                  | 38        | 3,285 | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,746 | 0                        | 0         | 4,300 | 0.0                       | 0         | 0     | 0.0                       | 0         | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- BUILDING TEMPERATURE PROFILES -----

| Temperature<br>Range<br>(F) | ----- Zone Number -----     |       |       |       |
|-----------------------------|-----------------------------|-------|-------|-------|
|                             | 1                           | 2     | 3     | 4     |
| Max. Temp.                  | 79.6                        | 79.5  | 123.3 | 96.5  |
| Mo./Hr.                     | 7 14                        | 7 14  | 9 23  | 7 21  |
| Day Type                    | 1                           | 1     | 1     | 1     |
|                             | ..... Number of Hours ..... |       |       |       |
| Above 100                   | 0                           | 0     | 2,676 | 0     |
| 95 - 100                    | 0                           | 0     | 286   | 30    |
| 90 - 95                     | 0                           | 0     | 216   | 864   |
| 85 - 90                     | 0                           | 0     | 422   | 1,190 |
| 80 - 85                     | 0                           | 0     | 311   | 597   |
| 75 - 80                     | 2,989                       | 3,054 | 415   | 961   |
| 70 - 75                     | 683                         | 635   | 90    | 30    |
| 65 - 70                     | 5,088                       | 5,015 | 4,344 | 85    |
| 60 - 65                     | 0                           | 56    | 0     | 733   |
| 55 - 60                     | 0                           | 0     | 0     | 710   |
| 50 - 55                     | 0                           | 0     | 0     | 537   |
| Below 50                    | 0                           | 0     | 0     | 3,023 |
| Min. Temp.                  | 65.2                        | 64.7  | 67.9  | 32.1  |
| Mo./Hr.                     | 2 15                        | 2 15  | 3 23  | 2 10  |
| Day Type                    | 2                           | 3     | 1     | 5     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | DEMAND          |                   | HOT WTR              | HOT W DMND           |
|-------|-------------------|-----------------|-----------------|-------------------|----------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(kW) | On Peak<br>(Thrm) | On Peak<br>(Thrm/hr) | On Peak<br>(Thrm/hr) |
| Jan   | 2,631             | 8               |                 | 635               |                      | 2                    |
| Feb   | 2,377             | 8               |                 | 607               |                      | 2                    |
| March | 2,658             | 8               |                 | 405               |                      | 1                    |
| April | 2,540             | 8               |                 | 141               |                      | 1                    |
| May   | 2,640             | 8               |                 | 0                 |                      | 0                    |
| June  | 2,865             | 9               |                 | 0                 |                      | 0                    |
| July  | 3,120             | 9               |                 | 0                 |                      | 0                    |
| Aug   | 2,989             | 9               |                 | 0                 |                      | 0                    |
| Sept  | 2,537             | 9               |                 | 0                 |                      | 0                    |
| Oct   | 2,642             | 8               |                 | 105               |                      | 1                    |
| Nov   | 2,542             | 8               |                 | 297               |                      | 1                    |
| Dec   | 2,618             | 8               |                 | 543               |                      | 2                    |
| Total | 32,160            | 9               |                 | 2,732             |                      | 2                    |

Building Energy Consumption = 47,328 (Btu/Sq Ft/Year)  
Source Energy Consumption = 85,715 (Btu/Sq Ft/Year)

Floor Area = 8,092 (Sq Ft)





UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
WALL & ROOF INSULATION

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 9.0 (kW)  
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

| Eq. Ref. Num. | Equipment Code Name | Equipment Description | Utility Demand (kW) | Percent Of Tot (%) |
|---------------|---------------------|-----------------------|---------------------|--------------------|
|---------------|---------------------|-----------------------|---------------------|--------------------|

Cooling Equipment

|           |        |                            |     |       |
|-----------|--------|----------------------------|-----|-------|
| 1         | EQ1161 | AIR-CLD COND COMP <15 TONS | 1.2 | 13.53 |
| Sub Total |        |                            | 1.2 | 13.53 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Air Moving Equipment

|           |  |                                    |     |       |
|-----------|--|------------------------------------|-----|-------|
| 1         |  | SUMMATION OF FAN ELECTRICAL DEMAND | 3.7 | 41.37 |
| Sub Total |  |                                    | 3.7 | 41.37 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Miscellaneous

|                |  |  |     |       |
|----------------|--|--|-----|-------|
| Lights         |  |  | 4.1 | 45.10 |
| Base Utilities |  |  | 0.0 | 0.00  |
| Misc Equipment |  |  | 0.0 | 0.00  |
| Sub Total      |  |  | 4.1 | 45.10 |

|             |  |  |     |        |
|-------------|--|--|-----|--------|
| Grand Total |  |  | 9.0 | 100.00 |
|-------------|--|--|-----|--------|

*Building 045*

*Trace Input File*

933702

CONTENTS OF : E:\CB45.TM

LINE # -----  
 1 JOB - 1  
 2 01/ENERGY SAVINGS OPPORTUNITY STUDY  
 3 01/CARLISLE BARRACKS, PA  
 4 01/DEPARTMENT OF THE ARMY  
 5 01/BENATEC ASSOCIATES  
 6 01/BUILDING 45  
 7 08/CARLISLE  
 8 09/MAY/SEP////APR/OCT  
 9 10/CLTD-CLF  
 10 11///ZONE  
 11 LOAD - 1  
 12 19/1/BASE BUILDING  
 13 20/1/1/OFFICES/4954/1/1/0//9  
 14 20/2/2/CORRIDOR TOILETS/1132/1/1/0//9  
 15 20/3/3/WOMENS TOILET/108/1/1/0//9  
 16 21/M////CBADCTX//CBADHTX  
 17 22/1/1/YES////154  
 18 22/2/1/YES////154  
 19 22/3/1/YES////154  
 20 24/1/1/100/7.3//196/18  
 21 24/1/2/163/7.3//196/108  
 22 24/1/3/38/7.3//196/198  
 23 24/1/4/155/7.3//196/288  
 24 24/2/1/44/7.3//196/108  
 25 24/2/2/39/7.3//196/198  
 26 24/2/3/64/7.3//196/288  
 27 24/3/1/12/7.3//196/108  
 28 24/3/2/9/7.3//196/198  
 29 25/1/1/94.1/1/1/.55/.57  
 30 25/1/2/175/1/1/.55/.57  
 31 25/1/3/4.25/2.25/4/.55/.57  
 32 25/1/4/166/1/1/.55/.57  
 33 25/2/1/4.25/2.25/5/.55/.57  
 34 25/2/2/4.25/2.25/4/.55/.57  
 35 25/2/3/4.25/2.25/8/.55/.57  
 36 25/3/1/4.25/2.25/1/.55/.57  
 37 25/3/2/4.25/2.25/1/.55/.57  
 38 26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF  
 39 26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF/OFF  
 40 26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF  
 41 27/1/118/SF-PERS/255/255/1.67/WATT-SF  
 42 27/2/////1.3/WATT-SF  
 43 27/3/////1.3/WATT-SF  
 44 29/1/////0.36/CFM-SF/.36/CFM-SF  
 45 29/2/////0.36/CFM-SF  
 46 29/3/////0.36/CFM-SF/.36/CFM-SF  
 47 30/1/5519/CFM  
 48 SYSTEM - 1  
 49 39/1/BASE BUILDING  
 50 40/1/SZ  
 51 41/1/1/1  
 52 42/1/1  
 53 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF  
 54 40/2/PTAC  
 55 41/2/3/3  
 56 42/2/.25  
 57 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF  
 58 40/3/RAD



CONTENTS OF : E:\CB45.TM

| LINE # | -----                                                 |
|--------|-------------------------------------------------------|
| 59     | 41/3/1/3                                              |
| 60     | 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF      |
| 61     | EQUIPMENT - 1                                         |
| 62     | 59/1/CARLISLE///BASE BUILDING                         |
| 63     | 60/1/1/BLKPLANT/1/1                                   |
| 64     | 60/2/2/BLKPLANT/2/2                                   |
| 65     | 62/1/EQ1161/1                                         |
| 66     | 62/2/EQ1161/1                                         |
| 67     | 65/1/1//3/3                                           |
| 68     | 67/1/EQ2102/1                                         |
| 69     | 69/1/EQ4003                                           |
| 70     | 69/2/EQ4003                                           |
| 71     | LOAD - 2                                              |
| 72     | 19/2/WALL & ROOF INSULATION                           |
| 73     | 20/1/1/OFFICES/4954/1/1/0//9                          |
| 74     | 20/2/2/CORRIDOR TOILETS/1132/1/1/0//9                 |
| 75     | 20/3/3/WOMENS TOILET/108/1/1/0//9                     |
| 76     | 21/M///CBADCTX///CBADHTX                              |
| 77     | 22/1/1/YES////191                                     |
| 78     | 22/2/1/YES////191                                     |
| 79     | 22/3/1/YES////191                                     |
| 80     | 24/1/1/100/7.3//123/18                                |
| 81     | 24/1/2/163/7.3//123/108                               |
| 82     | 24/1/3/38/7.3//123/198                                |
| 83     | 24/1/4/155/7.3//123/288                               |
| 84     | 24/2/1/44/7.3//123/108                                |
| 85     | 24/2/2/39/7.3//123/198                                |
| 86     | 24/2/3/64/7.3//123/288                                |
| 87     | 24/3/1/12/7.3//123/108                                |
| 88     | 24/3/2/9/7.3//123/198                                 |
| 89     | 25/1/1/94.1/1/1/.55/.57                               |
| 90     | 25/1/2/175/1/1/.55/.57                                |
| 91     | 25/1/3/4.25/2.25/4/.55/.57                            |
| 92     | 25/1/4/166/1/1/.55/.57                                |
| 93     | 25/2/1/4.25/2.25/5/.55/.57                            |
| 94     | 25/2/2/4.25/2.25/4/.55/.57                            |
| 95     | 25/2/3/4.25/2.25/8/.55/.57                            |
| 96     | 25/3/1/4.25/2.25/1/.55/.57                            |
| 97     | 25/3/2/4.25/2.25/1/.55/.57                            |
| 98     | 26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF |
| 99     | 26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF     |
| 100    | 26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF |
| 101    | 27/1/118/SF-PERS/255/255/1.67/WATT-SF                 |
| 102    | 27/2/////1.3/WATT-SF                                  |
| 103    | 27/3/////1.3/WATT-SF                                  |
| 104    | 29/1/////0.30/CFM-SF/.30/CFM-SF                       |
| 105    | 29/2/////0.30/CFM-SF                                  |
| 106    | 29/3/////0.30/CFM-SF/.30/CFM-SF                       |
| 107    | 30/1/5519/CFM                                         |
| 108    | SYSTEM - 2                                            |
| 109    | 39/2/WALL & ROOF INSULATION                           |
| 110    | 40/1/SZ                                               |
| 111    | 41/1/1/1                                              |
| 112    | 42/1/1                                                |
| 113    | 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF      |
| 114    | 40/2/PTAC                                             |
| 115    | 41/2/3/3                                              |
| 116    | 42/2/.25                                              |

CONTENTS OF : E:\CB45.TM

LINE # -----

117 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

118 40/3/RAD

119 41/3/1/3

120 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF/OFF

121 EQUIPMENT - 2

122 59/2/CARLISLE///WALL & ROOF INSULATION

123 60/1/1/BLKPLANT/1/1

124 60/2/2/BLKPLANT/2/2

125 62/1/EQ1161/1

126 62/2/EQ1161/1

127 65/1/1//3/3

128 67/1/EQ2102/1

129 69/1/EQ4003

130 69/2/EQ4003

131 LOAD - 3

132 19/3/WEATHERSTRIP & CAULKING

133 20/1/1/OFFICES/4954/1/1/0//9

134 20/2/2/CORRIDOR TOILETS/1132/1/1/0//9

135 20/3/3/WOMENS TOILET/108/1/1/0//9

136 21/M///CBADCTX///CBADHTX

137 22/1/1/YES////154

138 22/2/1/YES////154

139 22/3/1/YES////154

140 24/1/1/100/7.3//196/18

141 24/1/2/163/7.3//196/108

142 24/1/3/38/7.3//196/198

143 24/1/4/155/7.3//196/288

144 24/2/1/44/7.3//196/108

145 24/2/2/39/7.3//196/198

146 24/2/3/64/7.3//196/288

147 24/3/1/12/7.3//196/108

148 24/3/2/9/7.3//196/198

149 25/1/1/94.1/1/1/.55/.57

150 25/1/2/175/1/1/.55/.57

151 25/1/3/4.25/2.25/4/.55/.57

152 25/1/4/166/1/1/.55/.57

153 25/2/1/4.25/2.25/5/.55/.57

154 25/2/2/4.25/2.25/4/.55/.57

155 25/2/3/4.25/2.25/8/.55/.57

156 25/3/1/4.25/2.25/1/.55/.57

157 25/3/2/4.25/2.25/1/.55/.57

158 26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

159 26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF

160 26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

161 27/1/118/SF-PERS/255/255/1.67/WATT-SF

162 27/2/////1.3/WATT-SF

163 27/3/////1.3/WATT-SF

164 29/1/////0.29/CFM-SF/.29/CFM-SF

165 29/2/////0.29/CFM-SF

166 29/3/////0.29/CFM-SF/.29/CFM-SF

167 30/1/5519/CFM

168 SYSTEM - 3

169 39/3/WEATHERSTRIP & CAULKING

170 40/1/SZ

171 41/1/1/1

172 42/1/1

173 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

174 40/2/PTAC

CONTENTS OF : E:\CB45.TM

LINE # -----

175 41/2/3/3

176 42/2/.25

177 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

178 40/3/RAD

179 41/3/1/3

180 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

181 EQUIPMENT - 3

182 59/3/CARLISLE///WEATHERSTRIP & CAULKING

183 60/1/1/BLKPLANT/1/1

184 60/2/2/BLKPLANT/2/2

185 62/1/EQ1161/1

186 62/2/EQ1161/1

187 65/1/1//3/3

188 67/1/EQ2102/1

189 69/1/EQ4003

190 69/2/EQ4003

191 LOAD - 4

192 19/4/REPLACE FLUORESCENT LAMPS

193 20/1/1/OFFICES/4954/1/1/0//9

194 20/2/2/CORRIDOR TOILETS/1132/1/1/0//9

195 20/3/3/WOMENS TOILET/108/1/1/0//9

196 21/M////CBADCTX///CBADHTX

197 22/1/1/YES////154

198 22/2/1/YES////154

199 22/3/1/YES////154

200 24/1/1/100/7.3//196/18

201 24/1/2/163/7.3//196/108

202 24/1/3/38/7.3//196/198

203 24/1/4/155/7.3//196/288

204 24/2/1/44/7.3//196/108

205 24/2/2/39/7.3//196/198

206 24/2/3/64/7.3//196/288

207 24/3/1/12/7.3//196/108

208 24/3/2/9/7.3//196/198

209 25/1/1/94.1/1/1/.55/.57

210 25/1/2/175/1/1/.55/.57

211 25/1/3/4.25/2.25/4/.55/.57

212 25/1/4/166/1/1/.55/.57

213 25/2/1/4.25/2.25/5/.55/.57

214 25/2/2/4.25/2.25/4/.55/.57

215 25/2/3/4.25/2.25/8/.55/.57

216 25/3/1/4.25/2.25/1/.55/.57

217 25/3/2/4.25/2.25/1/.55/.57

218 26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

219 26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF

220 26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

221 27/1/118/SF-PERS/255/255/1.46/WATT-SF

222 27/2/////1.14/WATT-SF

223 27/3/////0.80/WATT-SF

224 29/1/////0.36/CFM-SF/.36/CFM-SF

225 29/2/////0.36/CFM-SF

226 29/3/////0.36/CFM-SF/.36/CFM-SF

227 30/1/5519/CFM

228 SYSTEM - 4

229 39/4/REPLACE FLUORESCENT LAMPS

230 40/1/SZ

231 41/1/1/1

232 42/1/1

CONTENTS OF : E:\CB45.TM

| LINE # | -----                                            |
|--------|--------------------------------------------------|
| 233    | 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF |
| 234    | 40/2/PTAC                                        |
| 235    | 41/2/3/3                                         |
| 236    | 42/2/.25                                         |
| 237    | 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF |
| 238    | 40/3/RAD                                         |
| 239    | 41/3/1/3                                         |
| 240    | 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF |
| 241    | EQUIPMENT - 4                                    |
| 242    | 59/4/CARLISLE///REPLACE FLUORESCENT LAMPS        |
| 243    | 60/1/1/BLKPLANT/1/1                              |
| 244    | 60/2/2/BLKPLANT/2/2                              |
| 245    | 62/1/EQ1161/1                                    |
| 246    | 62/2/EQ1161/1                                    |
| 247    | 65/1/1//3/3                                      |
| 248    | 67/1/EQ2102/1                                    |
| 249    | 69/1/EQ4003                                      |
| 250    | 69/2/EQ4003                                      |

CONTENTS OF : E:\CB45B.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 45

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/REPLACE FLUORESCENT BALLASTS

13 20/1/1/OFFICES/4954/1/1/0//9

14 20/2/2/CORRIDOR TOILETS/1132/1/1/0//9

15 20/3/3/WOMENS TOILET/108/1/1/0//9

16 21/M////CBADCTX//CBADHTX

17 22/1/1/YES////154

18 22/2/1/YES////154

19 22/3/1/YES////154

20 24/1/1/100/7.3//196/18

21 24/1/2/163/7.3//196/108

22 24/1/3/38/7.3//196/198

23 24/1/4/155/7.3//196/288

24 24/2/1/44/7.3//196/108

25 24/2/2/39/7.3//196/198

26 24/2/3/64/7.3//196/288

27 24/3/1/12/7.3//196/108

28 24/3/2/9/7.3//196/198

29 25/1/1/94.1/1/1/.55/.57

30 25/1/2/175/1/1/.55/.57

31 25/1/3/4.25/2.25/4/.55/.57

32 25/1/4/166/1/1/.55/.57

33 25/2/1/4.25/2.25/5/.55/.57

34 25/2/2/4.25/2.25/4/.55/.57

35 25/2/3/4.25/2.25/8/.55/.57

36 25/3/1/4.25/2.25/1/.55/.57

37 25/3/2/4.25/2.25/1/.55/.57

38 26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

39 26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF

40 26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

41 27/1/118/SF-PERS/255/255/1.24/WATT-SF

42 27/2///// .97/WATT-SF

43 27/3///// .68/WATT-SF

44 29/1///// .36/CFM-SF/.36/CFM-SF

45 29/2///// .36/CFM-SF

46 29/3///// .36/CFM-SF/.36/CFM-SF

47 30/1/5519/CFM

48 SYSTEM - 1

49 39/1/REPLACE FLUORESCENT BALLAST

50 40/1/SZ

51 41/1/1/1

52 42/1/1

53 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

54 40/2/PTAC

55 41/2/3/3

56 42/2/.2

57 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

58 40/3/RAD

CONTENTS OF : E:\CB45B.TM

LINE # -----

59 41/3/1/3

60 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

61 EQUIPMENT - 1

62 59/1/CARLISLE///REPLACE FLUORESCENT BALLASTS

63 60/1/1/BLKPLANT/1/1

64 60/2/2/BLKPLANT/2/2

65 62/1/EQ1161/1

66 62/2/EQ1161/1

67 65/1/1//3/3

68 67/1/EQ2102/1

69 69/1/EQ4003

70 69/2/EQ4003

71 LOAD - 2

72 19/2/REPLACE FLUORESCENT FIXTURES

73 20/1/1/OFFICES/4954/1/1/0//9

74 20/2/2/CORRIDOR TOILETS/1132/1/1/0//9

75 20/3/3/WOMENS TOILET/108/1/1/0//9

76 21/M///CBADCTX///CBADHTX

77 22/1/1/YES///154

78 22/2/1/YES///154

79 22/3/1/YES///154

80 24/1/1/100/7.3//196/18

81 24/1/2/163/7.3//196/108

82 24/1/3/38/7.3//196/198

83 24/1/4/155/7.3//196/288

84 24/2/1/44/7.3//196/108

85 24/2/2/39/7.3//196/198

86 24/2/3/64/7.3//196/288

87 24/3/1/12/7.3//196/108

88 24/3/2/9/7.3//196/198

89 25/1/1/94.1/1/1/.55/.57

90 25/1/2/175/1/1/.55/.57

91 25/1/3/4.25/2.25/4/.55/.57

92 25/1/4/166/1/1/.55/.57

93 25/2/1/4.25/2.25/5/.55/.57

94 25/2/2/4.25/2.25/4/.55/.57

95 25/2/3/4.25/2.25/8/.55/.57

96 25/3/1/4.25/2.25/1/.55/.57

97 25/3/2/4.25/2.25/1/.55/.57

98 26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

99 26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF

100 26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

101 27/1/118/SF-PERS/255/255/1.03/WATT-SF

102 27/2/////0.81/WATT-SF

103 27/3/////0.56/WATT-SF

104 29/1/////0.36/CFM-SF/.36/CFM-SF

105 29/2/////0.36/CFM-SF

106 29/3/////0.36/CFM-SF/.36/CFM-SF

107 30/1/5519/CFM

108 SYSTEM - 2

109 39/2/REPLACE FLUORESCENT FIXTURES

110 40/1/SZ

111 41/1/1/1

112 42/1/1

113 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

114 40/2/PTAC

115 41/2/3/3

116 42/2/.2

CONTENTS OF : E:\CB45B.TM

LINE # -----

117 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

118 40/3/RAD

119 41/3/1/3

120 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

121 EQUIPMENT - 2

122 59/2/CARLISLE///REPLACE FLUORESCENT FIXTURES

123 60/1/1/BLKPLANT/1/1

124 60/2/2/BLKPLANT/2/2

125 62/1/EQ1161/1

126 62/2/EQ1161/1

127 65/1/1//3/3

128 67/1/EQ2102/1

129 69/1/EQ4003

130 69/2/EQ4003

131 LOAD - 3

132 19/3/COMBINED ECOS

133 20/1/1/OFFICES/4954/1/1/0//9

134 20/2/2/CORRIDOR TOILETS/1132/1/1/0//9

135 20/3/3/WOMENS TOILET/108/1/1/0//9

136 21/M///CBADCTX///CBADHTX

137 22/1/1/YES///191

138 22/2/1/YES///191

139 22/3/1/YES///191

140 24/1/1/100/7.3//123/18

141 24/1/2/163/7.3//123/108

142 24/1/3/38/7.3//123/198

143 24/1/4/155/7.3//123/288

144 24/2/1/44/7.3//123/108

145 24/2/2/39/7.3//123/198

146 24/2/3/64/7.3//123/288

147 24/3/1/12/7.3//123/108

148 24/3/2/9/7.3//123/198

149 25/1/1/94.1/1/1/.55/.57

150 25/1/2/175/1/1/.55/.57

151 25/1/3/4.25/2.25/4/.55/.57

152 25/1/4/166/1/1/.55/.57

153 25/2/1/4.25/2.25/5/.55/.57

154 25/2/2/4.25/2.25/4/.55/.57

155 25/2/3/4.25/2.25/8/.55/.57

156 25/3/1/4.25/2.25/1/.55/.57

157 25/3/2/4.25/2.25/1/.55/.57

158 26/1/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

159 26/2/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF

160 26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

161 27/1/118/SF-PERS/255/255/1.03/WATT-SF

162 27/2/////81/WATT-SF

163 27/3/////56/WATT-SF

164 29/1/////23/CFM-SF/.23/CFM-SF

165 29/2/////23/CFM-SF

166 29/3/////23/CFM-SF/.23/CFM-SF

167 30/1/5519/CFM

168 SYSTEM - 3

169 39/3/COMBINED ECOS

170 40/1/SZ

171 41/1/1/1

172 42/1/1

173 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

174 40/2/PTAC

CONTENTS OF : E:\CB45B.TM

| LINE # | -----                                            |
|--------|--------------------------------------------------|
| 175    | 41/2/3/3                                         |
| 176    | 42/2/.2                                          |
| 177    | 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF |
| 178    | 40/3/RAD                                         |
| 179    | 41/3/1/3                                         |
| 180    | 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF |
| 181    | EQUIPMENT - 3                                    |
| 182    | 59/3/CARLISLE///COMBINED ECOS                    |
| 183    | 60/1/1/BLKPLANT/1/1                              |
| 184    | 60/2/2/BLKPLANT/2/2                              |
| 185    | 62/1/EQ1161/1                                    |
| 186    | 62/2/EQ1161/1                                    |
| 187    | 65/1/1//3/3                                      |
| 188    | 67/1/EQ2102/1                                    |
| 189    | 69/1/EQ4003                                      |
| 190    | 69/2/EQ4003                                      |



*Building 045*

*Trace Output File*

933702

AIRFLOW - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | SZ          | 0                     | 5,519                 | 5,519                 | 6,717                | 1,198                 | 0             | 0             |
| 2             | PTAC        | 0                     | 194                   | 194                   | 249                  | 55                    | 0             | 0             |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 1,640                 | 0             | 0             |
| Totals        |             | 0                     | 5,713                 | 5,713                 | 6,966                | 2,893                 | 0             | 0             |

CAPACITY - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      | Cooling Totals (Tons) | Heating                   |                           |                         |                        |                          |                           | Heating Totals (Btuh) |          |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|---------------------------|-----------------------|----------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) |                       | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Vent Capacity (Btuh) |                       |          |
| 1             | SZ          | 13.3                      | 0.0                       | 0.0                  | 0.0                  | 13.3                  | -171,332                  | 0                         | 0                       | 0                      | 0                        | 0                         | 0                     | -171,332 |
| 2             | PTAC        | 0.5                       | 0.0                       | 0.0                  | 0.0                  | 0.5                   | -7,403                    | 0                         | 0                       | 0                      | 0                        | 0                         | 0                     | -7,403   |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -232,438                  | 0                         | 0                       | 0                      | 0                        | 0                         | 0                     | -232,438 |
| Totals        |             | 13.7                      | 0.0                       | 0.0                  | 0.0                  | 13.7                  | -411,173                  | 0                         | 0                       | 0                      | 0                        | 0                         | 0                     | -411,173 |

The building peaked at hour 16 month 7 with a capacity of 13.7 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 BASE BUILDING

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | SZ          | 0.00                | 1.11       | 415.9    | 373.4      | 32.14       | 1.11       | -34.58      | 4,954            |
| 2             | Main           | PTAC        | 0.00                | 1.80       | 416.4    | 231.9      | 51.75       | 1.80       | -68.55      | 108              |
| 3             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -37.53      | 6,194            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |          | Mo/Hr: 7/16              |         | *      | Mo/Hr: 7/16 |          | *      | Mo/Hr: 13/ 1 |            |           |        |
|--------------------|----------|--------------------------|---------|--------|-------------|----------|--------|--------------|------------|-----------|--------|
| Outside Air ==>    |          | OADB/WB/HR: 91/ 73/ 98.0 |         | *      | OADB: 91    |          | *      | OADB: 4      |            |           |        |
| Space              | Ret. Air | Ret. Air                 | Net     | Perct  | *           | Space    | Perct  | *            | Space Peak | Coil Peak | Perct  |
| Sens.+Lat.         | Sensible | Latent                   | Total   | Of Tot | *           | Sensible | Of Tot | *            | Space Sens | Tot Sens  | Of Tot |
| (Btuh)             | (Btuh)   | (Btuh)                   | (Btuh)  | (%)    | *           | (Btuh)   | (%)    | *            | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads     |          |                          |         |        |             |          |        |              |            |           |        |
| Skylite Solr       | 0        | 0                        | 0       | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00   |
| Skylite Cond       | 0        | 0                        | 0       | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00   |
| Roof Cond          | 22,074   | 0                        | 22,074  | 13.86  | *           | 22,074   | 18.58  | *            | -18,158    | -18,158   | 10.60  |
| Glass Solar        | 17,987   | 0                        | 17,987  | 11.30  | *           | 17,987   | 15.14  | *            | 0          | 0         | 0.00   |
| Glass Cond         | 3,619    | 0                        | 3,619   | 2.27   | *           | 3,619    | 3.05   | *            | -17,052    | -17,052   | 9.95   |
| Wall Cond          | 26,577   | 0                        | 26,577  | 16.69  | *           | 26,577   | 22.37  | *            | -52,660    | -52,660   | 30.74  |
| Partition          | 0        | 0                        | 0       | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00   |
| Exposed Floor      | 0        | 0                        | 0       | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00   |
| Infiltration       | 46,024   | 0                        | 46,024  | 28.90  | *           | 20,213   | 17.02  | *            | -83,461    | -83,461   | 48.71  |
| Sub Total==>       | 116,280  | 0                        | 116,280 | 73.03  | *           | 90,470   | 76.16  | *            | -171,332   | -171,332  | 100.00 |
| Internal Loads     |          |                          |         |        | *           |          |        | *            |            |           |        |
| Lights             | 24,283   | 0                        | 24,283  | 15.25  | *           | 24,283   | 20.44  | *            | 0          | 0         | 0.00   |
| People             | 20,341   | 0                        | 20,341  | 12.77  | *           | 9,635    | 8.11   | *            | 0          | 0         | 0.00   |
| Misc               | 0        | 0                        | 0       | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00   |
| Sub Total==>       | 44,624   | 0                        | 44,624  | 28.03  | *           | 33,918   | 28.55  | *            | 0          | 0         | 0.00   |
| Ceiling Load       | 0        | 0                        | 0       | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00   |
| Outside Air        | 0        | 0                        | 0       | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00   |
| Sup. Fan Heat      |          |                          | 3,925   | 2.46   | *           |          | 0.00   | *            |            |           | 0.00   |
| Ret. Fan Heat      |          | 0                        | 0       | 0.00   | *           |          | 0.00   | *            |            |           | 0.00   |
| Duct Heat Pkqp     |          | 0                        | 0       | 0.00   | *           |          | 0.00   | *            |            |           | 0.00   |
| OV/UNDR Sizing     | -5,604   |                          | -5,604  | -3.52  | *           | -5,604   | -4.72  | *            | 0          | 0         | 0.00   |
| Exhaust Heat       |          | 0                        | 0       | 0.00   | *           |          | 0.00   | *            |            |           | 0.00   |
| Terminal Bypass    |          | 0                        | 0       | 0.00   | *           |          | 0.00   | *            |            |           | 0.00   |
| Grand Total==>     | 155,300  | 0                        | 159,225 | 100.00 | *           | 118,784  | 100.00 | *            | -171,332   | -171,332  | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |       | Glass (sf) (%) |
|----------|--------------------------|--------------------|---------------------|-------------------|-------|--------|------------------|-------|--------|-------------|-------|----------------|
|          |                          |                    |                     | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part  |                |
| Main Clg | 13.3                     | 159.2              | 122.7               | 5,519             | 75.0  | 62.4   | 66.5             | 54.6  | 52.5   | 56.9        | 4,954 |                |
| Aux Clg  | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0     |                |
| Opt Vent | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0     |                |
| Totals   | 13.3                     | 159.2              |                     |                   |       |        |                  |       |        |             | 4,954 | 0 0            |
|          |                          |                    |                     |                   |       |        |                  |       |        |             | 3,329 | 473 14         |

-----HEATING COIL SELECTION-----

|          | Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F | Type    |  | Cooling |       | Heating  |     | ENGINEERING CHECKS |        | TEMPERATURES (F) |           |
|----------|-------------------|---------------------|--------------|--------------|---------|--|---------|-------|----------|-----|--------------------|--------|------------------|-----------|
|          |                   |                     |              |              | Vent    |  |         |       | Clg % OA | 0.0 | Type               | Clg    | Htg              |           |
| Main Htg | -171.3            | 5,519               | 68.0         | 96.5         | Infil   |  | 1,198   | 1,198 |          |     | Clg Cfm/Sqft       | 1.11   | SADB             | 55.2 96.5 |
| Aux Htg  | 0.0               | 0                   | 0.0          | 0.0          | Supply  |  | 5,519   | 5,519 |          |     | Clg Cfm/Ton        | 415.94 | Plenum           | 75.0 68.0 |
| Preheat  | -0.0              | 5,519               | 68.0         | 54.6         | Mincfm  |  | 0       | 0     |          |     | Clg Sqft/Ton       | 373.36 | Return           | 75.0 68.0 |
| Reheat   | 0.0               | 0                   | 0.0          | 0.0          | Return  |  | 5,519   | 5,519 |          |     | Clg Btuh/Sqft      | 32.14  | Ret/OA           | 75.0 68.0 |
| Humidif  | 0.0               | 0                   | 0.0          | 0.0          | Exhaust |  | 0       | 0     |          |     | No. People         | 42     | Runarnd          | 75.0 68.0 |
| Opt Vent | 0.0               | 0                   | 0.0          | 0.0          | Rm Exh  |  | 0       | 0     |          |     | Htg % OA           | 0.0    | Fn MtrTD         | 0.2 0.0   |
| Total    | -171.3            |                     |              |              | Auxil   |  | 0       | 0     |          |     | Htg Cfm/Sqft       | 1.11   | Fn BldTD         | 0.1 0.0   |
|          |                   |                     |              |              |         |  |         |       |          |     | Htg Btuh/Sqft      | -34.58 | Fn Frict         | 0.4 0.0   |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 416                     | 0                        | 0                      | 416              | 7.44               | 477                   | 11.23              | -396                         | -396                      | 5.35               |
| Glass Solar     | 784                     | 0                        | 0                      | 784              | 14.03              | 765                   | 18.01              | 0                            | 0                         | 0.00               |
| Glass Cond      | 136                     | 0                        | 0                      | 136              | 2.43               | 145                   | 3.42               | -689                         | -689                      | 9.31               |
| Wall Cond       | 1,450                   | 0                        | 0                      | 1,450            | 25.94              | 1,531                 | 36.05              | -2,474                       | -2,474                    | 33.43              |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 2,384                   | 0                        | 0                      | 2,384            | 42.65              | 931                   | 21.92              | -3,844                       | -3,844                    | 51.92              |
| Sub Total==>    | 5,169                   | 0                        | 0                      | 5,169            | 92.49              | 3,849                 | 90.63              | -7,403                       | -7,403                    | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 379                     | 0                        | 0                      | 379              | 6.77               | 398                   | 9.37               | 0                            | 0                         | 0.00               |
| People          | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 379                     | 0                        | 0                      | 379              | 6.77               | 398                   | 9.37               | 0                            | 0                         | 0.00               |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 41               | 0.74               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Grand Total==>  | 5,548                   | 0                        | 0                      | 5,589            | 100.00             | 4,247                 | 100.00             | -7,403                       | -7,403                    | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |      |      | Leaving DB/WB/HR |      |      | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|------|------|------------------|------|------|-------------------|------------|-----|
| Main Clg | 0.5                   | 5.6             | 194              | 75.1              | 62.5 | 66.5 | 54.8             | 52.5 | 56.8 | 108               |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | 0                 |            |     |
| Totals   | 0.5                   | 5.6             |                  |                   |      |      |                  |      |      | 153               | 19 12      |     |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |            |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------------------|------------|
| Main Htg | -7.4           | 194              | 68.0      | 103.1     | Infil   | 55      | 55      | Clg % OA               | 0.0    | Type                 | Clg Htg    |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 194     | 194     | Clg Cfm/Sqft           | 1.80   | SADB                 | 54.9 103.1 |
| Preheat  | -0.0           | 194              | 68.0      | 54.7      | Mincfm  | 0       | 0       | Clg Cfm/Ton            | 416.38 | Plenum               | 75.0 68.0  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 194     | 194     | Clg Sqft/Ton           | 231.88 | Return               | 75.0 68.0  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Clg Btuh/Sqft          | 51.75  | Ret/OA               | 75.0 68.0  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | No. People             | 0      | Runarnd              | 75.0 68.0  |
| Total    | -7.4           |                  |           |           | Auxil   | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.0 0.0    |
|          |                |                  |           |           |         |         |         | Htg Cfm/Sqft           | 1.80   | Fn BldTD             | 0.0 0.0    |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -68.55 | Fn Frict             | 0.1 0.0    |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/0 \* Mo/Hr: 0/0 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 0/0/0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -22,703                      | -22,703                   | 9.77             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -23,598                      | -23,598                   | 10.15            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -71,927                      | -71,927                   | 30.94            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -114,210                     | -114,210                  | 49.14            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -232,438                     | -232,438                  | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -232,438                     | -232,438                  | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total Floor | Glass (sf) (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------------|----------------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains |                   |                |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 6,194             |                |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0                 |                |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0                 |                |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | 6,194             | 0 0            |
|          |                       |                 |                  |                   |       |        |                  |       |        | 4,555             | 655 14         |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|-----|------|
| Main Htg | -232.4         | 0                | 0.0       | 0.0       | Infil   | 0       | 1,640   | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 0       | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 68.0 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | No. People    | 0      | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0  |
| Total    | -232.4         |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft  | 0.00   | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft | -37.53 | Fn Frict | 0.0 | 0.0  |

BUILDING U-VALUES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Room U-Values<br>(Btu/hr/sqft/F) |       |             |             |            |             |       |       |        | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|------------------|----------------------------------|-------|-------------|-------------|------------|-------------|-------|-------|--------|------------------------|-----------------------------|
|             |                  | Part.                            | ExFlr | Summr Skylt | Wintr Skylt | Summr Roof | Wintr Windo | Windo | Wall  | Ceill. |                        |                             |
| 1           | OFFICES          | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 30.5                   | 9.34                        |
| Zone        | 1 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 30.5                   | 9.34                        |
| System      | 1 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 30.5                   | 9.34                        |
| 3           | WOMENS TOILET    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 48.8                   | 12.99                       |
| Zone        | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 48.8                   | 12.99                       |
| System      | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 48.8                   | 12.99                       |
| 1           | OFFICES          | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 30.5                   | 9.34                        |
| Zone        | 1 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 30.5                   | 9.34                        |
| 2           | CORRIDOR TOILETS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 36.7                   | 10.59                       |
| Zone        | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 36.7                   | 10.59                       |
| 3           | WOMENS TOILET    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 48.8                   | 12.99                       |
| Zone        | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 48.8                   | 12.99                       |
| System      | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 32.0                   | 9.63                        |
| Building    |                  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000  | 31.5                   | 9.54                        |

BUILDING AREAS - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G A R E A S -----

| Room Number | Description      | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skil /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|---------------------|----|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|--------------|----------------------|--------------------|-------------|----------------------|
|             |                  | Flr                 | Rm |                             |                         |                       |                           |                      |              |                      |                    |             |                      |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0            | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0            | 4,954                | 473                | 14          | 2,855                |
| System      | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0            | 4,954                | 473                | 14          | 2,855                |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0            | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0            | 108                  | 19                 | 12          | 134                  |
| System      | 2 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0            | 108                  | 19                 | 12          | 134                  |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0            | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0            | 4,954                | 473                | 14          | 2,855                |
| 2           | CORRIDOR TOILETS | 1                   | 1  | 1,132                       | 1,132                   | 0                     | 0                         | 0                    | 0            | 1,132                | 163                | 15          | 911                  |
| Zone        | 2 Total/Ave.     |                     |    |                             | 1,132                   | 0                     | 0                         | 0                    | 0            | 1,132                | 163                | 15          | 911                  |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0            | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0            | 108                  | 19                 | 12          | 134                  |
| System      | 3 Total/Ave.     |                     |    |                             | 6,194                   | 0                     | 0                         | 0                    | 0            | 6,194                | 655                | 14          | 3,900                |
| Building    |                  |                     |    |                             | 11,256                  | 0                     | 0                         | 0                    | 0            | 11,256               | 1,148              | 14          | 6,890                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 3.49 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTvw) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 0.7                    | 6         | 45    | -20,559                  | 14        | 359   | 285.6                     | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 1.4                    | 5         | 41    | -41,117                  | 24        | 593   | 571.3                     | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 2.1                    | 3         | 22    | -61,676                  | 18        | 439   | 856.9                     | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 2.7                    | 0         | 0     | -82,235                  | 13        | 312   | 1,142.6                   | 0         | 0     | 0.0                       | 0         | 0     |
| 20 - 25             | 3.4                    | 6         | 45    | -102,793                 | 12        | 294   | 1,428.2                   | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 4.1                    | 10        | 79    | -123,352                 | 1         | 19    | 1,713.9                   | 0         | 0     | 0.0                       | 0         | 0     |
| 30 - 35             | 4.8                    | 8         | 64    | -143,911                 | 0         | 0     | 1,999.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 5.5                    | 3         | 26    | -164,469                 | 1         | 36    | 2,285.2                   | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 6.2                    | 12        | 92    | -185,028                 | 0         | 5     | 2,570.8                   | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 6.9                    | 3         | 23    | -205,587                 | 0         | 0     | 2,856.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 50 - 55             | 7.6                    | 12        | 90    | -226,145                 | 2         | 48    | 3,142.1                   | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 8.2                    | 3         | 26    | -246,704                 | 15        | 375   | 3,427.8                   | 0         | 0     | 0.0                       | 0         | 0     |
| 60 - 65             | 8.9                    | 9         | 68    | -267,263                 | 0         | 0     | 3,713.4                   | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 9.6                    | 0         | 0     | -287,821                 | 0         | 0     | 3,999.1                   | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 10.3                   | 8         | 59    | -308,380                 | 0         | 0     | 4,284.7                   | 0         | 0     | 0.0                       | 0         | 0     |
| 75 - 80             | 11.0                   | 5         | 40    | -328,939                 | 0         | 0     | 4,570.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 11.7                   | 0         | 0     | -349,497                 | 0         | 0     | 4,856.0                   | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 12.4                   | 2         | 18    | -370,056                 | 0         | 0     | 5,141.6                   | 0         | 0     | 0.0                       | 0         | 0     |
| 90 - 95             | 13.0                   | 2         | 15    | -390,615                 | 0         | 0     | 5,427.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 13.7                   | 3         | 25    | -411,173                 | 0         | 0     | 5,712.9                   | 100       | 1,070 | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,982 | 0                        | 0         | 6,280 | 0.0                       | 0         | 7,690 | 0.0                       | 0         | 8,760 |



BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 BASE BUILDING

----- BUILDING TEMPERATURE PROFILES -----

| Temperature<br>Range<br>(F) | Zone Number |      |       |       |       |
|-----------------------------|-------------|------|-------|-------|-------|
|                             | 1           | 3    | 1     | 2     | 3     |
| Max. Temp.                  | 87.9        | 88.6 | 106.6 | 103.9 | 102.5 |
| Mo./Hr.                     | 7 21        | 7 20 | 7 20  | 7 22  | 8 20  |
| Day Type                    | 4           | 4    | 2     | 1     | 1     |

| Temperature Range | Number of Hours |       |       |       |       |
|-------------------|-----------------|-------|-------|-------|-------|
|                   | 1               | 3     | 1     | 2     | 3     |
| Above 100         | 0               | 0     | 902   | 262   | 94    |
| 95 - 100          | 0               | 0     | 774   | 940   | 760   |
| 90 - 95           | 0               | 0     | 886   | 998   | 1,254 |
| 85 - 90           | 156             | 147   | 603   | 742   | 835   |
| 80 - 85           | 1,355           | 1,154 | 487   | 654   | 649   |
| 75 - 80           | 1,837           | 1,821 | 20    | 76    | 80    |
| 70 - 75           | 375             | 560   | 392   | 154   | 243   |
| 65 - 70           | 570             | 378   | 1,828 | 1,988 | 1,929 |
| 60 - 65           | 684             | 809   | 959   | 585   | 883   |
| 55 - 60           | 722             | 783   | 743   | 736   | 829   |
| 50 - 55           | 689             | 693   | 1,166 | 1,225 | 1,204 |
| Below 50          | 2,372           | 2,415 | 0     | 0     | 0     |

|            |      |      |      |      |      |
|------------|------|------|------|------|------|
| Min. Temp. | 32.7 | 33.1 | 54.9 | 55.0 | 54.9 |
| Mo./Hr.    | 2 10 | 2 10 | 12 2 | 1 7  | 2 20 |
| Day Type   | 4    | 4    | 4    | 1    | 3    |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | DEMAND             |                      | HOT WTR | HOT W DMND |
|-------|-------------------|-----------------|--------------------|----------------------|---------|------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) | On Peak | On Peak    |
| Jan   | 3,519             | 18              | 519                | 2                    |         |            |
| Feb   | 3,184             | 18              | 498                | 2                    |         |            |
| March | 3,853             | 18              | 260                | 2                    |         |            |
| April | 3,349             | 18              | 62                 | 2                    |         |            |
| May   | 4,636             | 40              | 0                  | 0                    |         |            |
| June  | 5,896             | 41              | 0                  | 0                    |         |            |
| July  | 6,468             | 42              | 0                  | 0                    |         |            |
| Aug   | 6,164             | 41              | 0                  | 0                    |         |            |
| Sept  | 4,211             | 40              | 0                  | 0                    |         |            |
| Oct   | 3,684             | 18              | 51                 | 2                    |         |            |
| Nov   | 3,350             | 18              | 185                | 2                    |         |            |
| Dec   | 3,351             | 18              | 422                | 2                    |         |            |
| Total | 51,666            | 42              | 1,998              | 2                    |         |            |

Building Energy Consumption = 33,415 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 70,668 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)





UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
 BASE BUILDING

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        42.0    (kW)  
 Yearly Time of Peak 15 (hr)    7 (mo)

Hour 15    Month 7

| Eq.<br>Ref.<br>Num.         | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|-----------------------------|------------------------|------------------------------------|---------------------------|------------------------|
| <b>Cooling Equipment</b>    |                        |                                    |                           |                        |
| 1                           | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 20.3                      | 48.47                  |
| 2                           | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 0.9                       | 2.25                   |
| Sub Total                   |                        |                                    | 21.3                      | 50.72                  |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                   |
| <b>Air Moving Equipment</b> |                        |                                    |                           |                        |
| 1                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 2.4                       | 5.63                   |
| 2                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.0                       | 0.06                   |
| Sub Total                   |                        |                                    | 2.4                       | 5.69                   |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                   |
| <b>Miscellaneous</b>        |                        |                                    |                           |                        |
|                             | Lights                 |                                    | 18.3                      | 43.59                  |
|                             | Base Utilities         |                                    | 0.0                       | 0.00                   |
|                             | Misc Equipment         |                                    | 0.0                       | 0.00                   |
| Sub Total                   |                        |                                    | 18.3                      | 43.59                  |
| Grand Total                 |                        |                                    | 42.0                      | 100.00                 |

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 45

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Reluctance: 0.20  
Winter Ground Reluctance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 12:54: 6 1/26/94  
Dataset Name: CB45 .TM

AIRFLOW - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | SZ          | 0                     | 5,519                 | 5,519                 | 6,518                | 999                   | 0                    | 0                     |
| 2             | PTAC        | 0                     | 96                    | 96                    | 142                  | 46                    | 0                    | 0                     |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 1,367                 | 0                    | 0                     |
| Totals        |             | 0                     | 5,615                 | 5,615                 | 6,659                | 2,411                 | 0                    | 0                     |

CAPACITY - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 9.4                       | 0.0                       | 0.0                  | 0.0                  | 9.4                   | -105,328                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -105,328              |
| 2             | PTAC        | 0.3                       | 0.0                       | 0.0                  | 0.0                  | 0.3                   | -4,559                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -4,559                |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -143,370                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -143,370              |
| Totals        |             | 9.7                       | 0.0                       | 0.0                  | 0.0                  | 9.7                   | -253,257                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -253,257              |

The building peaked at hour 16 month 7 with a capacity of 9.7 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | SZ          | 0.00                | 1.11       | 588.3    | 528.1      | 22.72       | 1.11       | -21.26      | 4,954            |
| 2             | Main           | PTAC        | 0.00                | 0.89       | 315.1    | 355.7      | 33.73       | 0.89       | -42.21      | 108              |
| 3             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -23.15      | 6,194            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |                         | Mo/Hr: 7/16              |                        | *                | Mo/Hr: 7/16      |   | *                     | Mo/Hr: 13/ 1     |   |                   |                  |                  |
|--------------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Outside Air ==>    |                         | OADB/WB/HR: 91/ 73/ 98.0 |                        | *                | OAE8: 91         |   | *                     | OADB: 4          |   |                   |                  |                  |
|                    | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
| Envelope Loads     |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Skylite Solr       | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond       | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond          | 8,689                   | 0                        |                        | 8,689            | 7.72             | * | 8,689                 | 10.21            | * | -8,464            | -8,464           | 8.04             |
| Glass Solar        | 17,987                  | 0                        |                        | 17,987           | 15.98            | * | 17,987                | 21.13            | * | 0                 | 0                | 0.00             |
| Glass Cond         | 3,619                   | 0                        |                        | 3,619            | 3.21             | * | 3,619                 | 4.25             | * | -17,052           | -17,052          | 16.19            |
| Wall Cond          | 4,072                   | 0                        |                        | 4,072            | 3.62             | * | 4,072                 | 4.78             | * | -10,261           | -10,261          | 9.74             |
| Partition          | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor      | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration       | 29,654                  |                          |                        | 29,654           | 26.34            | * | 16,844                | 19.79            | * | -69,551           | -69,551          | 66.03            |
| Sub Total==>       | 64,021                  | 0                        |                        | 64,021           | 56.87            | * | 51,211                | 60.16            | * | -105,328          | -105,328         | 100.00           |
| Internal Loads     |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights             | 24,283                  | 0                        |                        | 24,283           | 21.57            | * | 24,283                | 28.53            | * | 0                 | 0                | 0.00             |
| People             | 20,341                  |                          |                        | 20,341           | 18.07            | * | 9,635                 | 11.32            | * | 0                 | 0                | 0.00             |
| Misc               | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>       | 44,624                  | 0                        | 0                      | 44,624           | 39.64            | * | 33,918                | 39.84            | * | 0                 | 0                | 0.00             |
| Ceiling Load       | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Outside Air        | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat      |                         |                          |                        | 3,925            | 3.49             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Ret. Fan Heat      |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Duct Heat Loss     |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| OV/UNDR Sizing     | 0                       |                          |                        | 0                | -0.00            | * | 0                     | -0.00            | * | 0                 | 0                | 0.00             |
| Exhaust Heat       |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Terminal Bypass    |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Grand Total==>     | 108,645                 | 0                        | 0                      | 112,570          | 100.00           | * | 85,130                | 100.00           | * | -105,328          | -105,328         | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 9.4                   | 112.6           | 5,519            | 75.0              | 65.1  | 79.3   | 60.2             | 58.6  | 73.2   | 4,954       |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 9.4                   | 112.6           |                  |                   |       |        |                  |       |        | 3,329       | 473        | 14  |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    |
|----------|----------------|------------------|-----------|-----------|---------|
| Main Htg | -105.3         | 5,519            | 68.0      | 85.5      | Infil   |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  |
| Preheat  | -0.0           | 5,519            | 68.0      | 60.2      | Mincfm  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  |
| Total    | -105.3         |                  |           |           | Auxil   |

-----AIRFLOWS (cfm)-----

|  | Cooling | Heating |
|--|---------|---------|
|  | 0       | 0       |
|  | 999     | 999     |
|  | 5,519   | 5,519   |
|  | 0       | 0       |
|  | 5,519   | 5,519   |
|  | 0       | 0       |
|  | 0       | 0       |
|  | 0       | 0       |

-----ENGINEERING CHECKS-----

|  | Clg % OA | Clg Cfm/Sqft | Clg Cfm/Ton | Clg Btuh/Sqft | No. People | Htg % OA | Htg Cfm/Sqft | Htg Btuh/Sqft |
|--|----------|--------------|-------------|---------------|------------|----------|--------------|---------------|
|  | 0.0      | 1.11         | 588.33      | 22.72         | 42         | 0.0      | 1.11         | -21.26        |

-----TEMPERATURES (F)-----

|  | Type     | Clg  | Htg  |
|--|----------|------|------|
|  | SADB     | 60.8 | 85.5 |
|  | Plenum   | 75.0 | 68.0 |
|  | Return   | 75.0 | 68.0 |
|  | Ret/OA   | 75.0 | 68.0 |
|  | Runarnd  | 75.0 | 68.0 |
|  | Fn MtrTD | 0.2  | 0.0  |
|  | Fn BldTD | 0.1  | 0.0  |
|  | Fn Frict | 0.4  | 0.0  |



System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 134                     | 0                        | 0                      | 134              | 3.67             | * | 188                   | 7.50             | * | -185                         | -185                      | 4.05             |
| Glass Solar     | 784                     | 0                        | 0                      | 784              | 21.52            | * | 765                   | 30.49            | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 136                     | 0                        | 0                      | 136              | 3.72             | * | 145                   | 5.79             | * | -689                         | -689                      | 15.11            |
| Wall Cond       | 204                     | 0                        | 0                      | 204              | 5.60             | * | 237                   | 9.46             | * | -482                         | -482                      | 10.58            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 1,987                   | 0                        | 0                      | 1,987            | 54.53            | * | 776                   | 30.92            | * | -3,203                       | -3,203                    | 70.26            |
| Sub Total==>    | 3,244                   | 0                        | 0                      | 3,244            | 89.05            | * | 2,111                 | 84.15            | * | -4,559                       | -4,559                    | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 379                     | 0                        | 0                      | 379              | 10.39            | * | 398                   | 15.85            | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 379                     | 0                        | 0                      | 379              | 10.39            | * | 398                   | 15.85            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 20               | 0.56             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Duct Heat Pkqp  |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Grand Total==>  | 3,623                   | 0                        | 0                      | 3,643            | 100.00           | * | 2,509                 | 100.00           | * | -4,559                       | -4,559                    | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |      |      | Leaving DB/WB/HR |      |      | Gross Total Floor | Glass (sf) (%) |    |
|----------|-----------------------|-----------------|------------------|-------------------|------|------|------------------|------|------|-------------------|----------------|----|
| Main Clg | 0.3                   | 3.6             | 96               | 75.1              | 62.5 | 66.5 | 50.8             | 48.9 | 49.6 | 108               |                |    |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | 0                 |                |    |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | 0                 |                |    |
| Totals   | 0.3                   | 3.6             |                  |                   |      |      |                  |      |      | 153               | 19             | 12 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm) |         | ENGINEERING CHECKS-- |        |          | TEMPERATURES (F)-- |       |  |
|----------|----------------|------------------|-----------|-----------|---------|----------------|---------|----------------------|--------|----------|--------------------|-------|--|
| Main Htg | -4.6           | 96               | 68.0      | 111.8     | Infil   | Cooling        | Heating | Clg % OA             | 0.0    | Type     | Clg                | Htg   |  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0              | 0       | Clg Cfm/Sqft         | 0.89   | SADB     | 50.9               | 111.8 |  |
| Preheat  | -0.0           | 96               | 68.0      | 50.7      | Mincfm  | 46             | 46      | Clg Cfm/Ton          | 315.10 | Plenum   | 75.0               | 68.0  |  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 96             | 96      | Clg Sqft/Ton         | 355.72 | Return   | 75.0               | 68.0  |  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0              | 0       | Clg Btuh/Sqft        | 33.73  | Ret/OA   | 75.0               | 68.0  |  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0              | 0       | No. People           | 0      | Runarnd  | 75.0               | 68.0  |  |
| Total    | -4.6           |                  |           |           | Auxil   | 0              | 0       | Htg % OA             | 0.0    | Fn MtrTD | 0.0                | 0.0   |  |
|          |                |                  |           |           |         |                |         | Htg Cfm/Sqft         | 0.89   | Fn BldTD | 0.0                | 0.0   |  |
|          |                |                  |           |           |         |                |         | Htg Btuh/Sqft        | -42.21 | Fn Frict | 0.1                | 0.0   |  |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 0/0 \* Mo/Hr: 0/0 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 0/0/0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -10,582                      | -10,582                   | 7.38             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -23,598                      | -23,598                   | 16.46            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -14,016                      | -14,016                   | 9.78             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -95,175                      | -95,175                   | 66.38            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -143,370                     | -143,370                  | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -143,370                     | -143,370                  | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS             |            |        |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Gross Total Floor | Glass (sf) | (%)    |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part              | 0          |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr             | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof              | 6,194      | 0 0    |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall              | 4,555      | 655 14 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)-- |      |  |
|----------|----------------|------------------|-----------|-----------|---------|----------------|---------|------------------------|--------|----------|----------------------|------|--|
|          |                |                  |           |           | Vent    | Cooling        | Heating | Clg % OA               | 0.0    | Type     | Clg                  | Htg  |  |
| Main Htg | -143.4         | 0                | 0.0       | 0.0       | Infil   | 0              | 1,367   | Clg Cfm/Sqft           | 0.00   | SADB     | 0.0                  | 68.1 |  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0              | 0       | Clg Cfm/Ton            | 0.00   | Plenum   | 0.0                  | 68.0 |  |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0              | 0       | Clg Sqft/Ton           | 0.00   | Return   | 0.0                  | 68.0 |  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0              | 0       | Clg Btuh/Sqft          | 0.00   | Ret/OA   | 0.0                  | 68.0 |  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0              | 0       | No. People             | 0      | Runarnd  | 0.0                  | 68.0 |  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0              | 0       | Htg % OA               | 0.0    | Fn MtrTD | 0.0                  | 0.0  |  |
| Total    | -143.4         |                  |           |           | Auxil   | 0              | 0       | Htg Cfm/SqFt           | 0.00   | Fn BldTD | 0.0                  | 0.0  |  |
|          |                |                  |           |           |         |                |         | Htg Btuh/SqFt          | -23.15 | Fn Frict | 0.0                  | 0.0  |  |

BUILDING U-VALUES - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Room U-Values (Btu/hr/sqft/F) |       |             |             |            |             |             |       |       | Room Mass (lb/sqft) | Room Capac. (Btu/sqft/F) |
|-------------|------------------|-------------------------------|-------|-------------|-------------|------------|-------------|-------------|-------|-------|---------------------|--------------------------|
|             |                  | Part.                         | ExFlr | Summr Skylt | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wall  | Ceil. |                     |                          |
| 1           | OFFICES          | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 32.9                | 9.82                     |
| Zone 1      | Total/Ave.       | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 32.9                | 9.82                     |
| System 1    | Total/Ave.       | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 32.9                | 9.82                     |
| 3           | WOMENS TOILET    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 52.8                | 13.79                    |
| Zone 3      | Total/Ave.       | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 52.8                | 13.79                    |
| System 2    | Total/Ave.       | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 52.8                | 13.79                    |
| 1           | OFFICES          | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 32.9                | 9.82                     |
| Zone 1      | Total/Ave.       | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 32.9                | 9.82                     |
| 2           | CORRIDOR TOILETS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 39.7                | 11.18                    |
| Zone 2      | Total/Ave.       | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 39.7                | 11.18                    |
| 3           | WOMENS TOILET    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 52.8                | 13.79                    |
| Zone 3      | Total/Ave.       | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 52.8                | 13.79                    |
| System 3    | Total/Ave.       | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 34.5                | 10.14                    |
| Building    |                  | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000 | 34.0                | 10.03                    |

BUILDING AREAS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G A R E A S -----

| Room Number | Description      | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Sk1 /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|---------------------|----|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
|             |                  | Flr                 | Rm |                             |                         |                       |                           |                      |             |                      |                    |             |                      |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone 1      | Total/Ave.       |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| System 1    | Total/Ave.       |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone 3      | Total/Ave.       |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System 2    | Total/Ave.       |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone 1      | Total/Ave.       |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 2           | CORRIDOR TOILETS | 1                   | 1  | 1,132                       | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| Zone 2      | Total/Ave.       |                     |    |                             | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone 3      | Total/Ave.       |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System 3    | Total/Ave.       |                     |    |                             | 6,194                   | 0                     | 0                         | 0                    | 0           | 6,194                | 655                | 14          | 3,900                |
| Building    |                  |                     |    |                             | 11,256                  | 0                     | 0                         | 0                    | 0           | 11,256               | 1,148              | 14          | 6,890                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
WALL & ROOF INSULATION

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.127 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.068 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 1.33 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTvw) = 13.54 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.5                    | 4            | 34    | -12,663                  | 25           | 496   | 280.7                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 1.0                    | 0            | 0     | -25,326                  | 13           | 254   | 561.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 1.5                    | 3            | 30    | -37,989                  | 17           | 330   | 842.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 1.9                    | 2            | 20    | -50,651                  | 13           | 247   | 1,122.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 2.4                    | 7            | 61    | -63,314                  | 5            | 88    | 1,403.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 2.9                    | 9            | 81    | -75,977                  | 1            | 19    | 1,684.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 3.4                    | 7            | 62    | -88,640                  | 1            | 22    | 1,965.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 3.9                    | 9            | 81    | -101,303                 | 1            | 20    | 2,245.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 4.4                    | 4            | 34    | -113,966                 | 0            | 4     | 2,526.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 4.8                    | 13           | 118   | -126,629                 | 1            | 17    | 2,807.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 5.3                    | 5            | 42    | -139,292                 | 1            | 21    | 3,088.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 5.8                    | 4            | 38    | -151,954                 | 22           | 432   | 3,368.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 6.3                    | 3            | 27    | -164,617                 | 0            | 0     | 3,649.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 6.8                    | 8            | 68    | -177,280                 | 0            | 0     | 3,930.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 7.3                    | 2            | 20    | -189,943                 | 0            | 0     | 4,211.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 7.7                    | 5            | 44    | -202,606                 | 0            | 0     | 4,491.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 8.2                    | 4            | 35    | -215,269                 | 0            | 0     | 4,772.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 8.7                    | 0            | 4     | -227,932                 | 0            | 0     | 5,053.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 9.2                    | 0            | 0     | -240,595                 | 0            | 0     | 5,333.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 9.7                    | 10           | 87    | -253,257                 | 0            | 0     | 5,614.7                   | 100          | 1,070 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,874 | 0                        | 0            | 6,810 | 0.0                       | 0            | 7,690 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- BUILDING TEMPERATURE PROFILES -----

| Temperature<br>Range<br>(F) | Zone Number                 |       |       |       |       |
|-----------------------------|-----------------------------|-------|-------|-------|-------|
|                             | 1                           | 3     | 1     | 2     | 3     |
| Max. Temp.                  | 85.3                        | 85.4  | 118.2 | 110.3 | 108.0 |
| Mo./Hr.                     | 7 22                        | 7 20  | 8 19  | 8 21  | 8 21  |
| Day Type                    | 4                           | 4     | 2     | 1     | 1     |
|                             | ..... Number of Hours ..... |       |       |       |       |
| Above 100                   | 0                           | 0     | 2,812 | 2,054 | 1,926 |
| 95 - 100                    | 0                           | 0     | 116   | 765   | 846   |
| 90 - 95                     | 0                           | 0     | 168   | 129   | 156   |
| 85 - 90                     | 30                          | 30    | 396   | 348   | 146   |
| 80 - 85                     | 1,184                       | 944   | 520   | 376   | 418   |
| 75 - 80                     | 2,241                       | 2,145 | 92    | 85    | 265   |
| 70 - 75                     | 653                         | 621   | 424   | 371   | 350   |
| 65 - 70                     | 339                         | 439   | 2,018 | 1,922 | 1,950 |
| 60 - 65                     | 1,017                       | 865   | 884   | 1,104 | 1,040 |
| 55 - 60                     | 441                         | 659   | 562   | 737   | 751   |
| 50 - 55                     | 1,411                       | 733   | 768   | 869   | 912   |
| Below 50                    | 1,444                       | 2,324 | 0     | 0     | 0     |
| Min. Temp.                  | 35.2                        | 35.2  | 54.9  | 55.0  | 55.0  |
| Mo./Hr.                     | 2 8                         | 2 8   | 3 10  | 1 7   | 1 6   |
| Day Type                    | 5                           | 5     | 4     | 2     | 2     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | HOT WTR HOT W DMND |                      |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 3,518             | 18              | 287                | 1                    |
| Feb   | 3,183             | 18              | 281                | 1                    |
| March | 3,852             | 18              | 138                | 1                    |
| April | 3,349             | 18              | 27                 | 1                    |
| May   | 4,654             | 33              | 0                  | 0                    |
| June  | 5,652             | 35              | 0                  | 0                    |
| July  | 5,969             | 36              | 0                  | 0                    |
| Aug   | 5,952             | 35              | 0                  | 0                    |
| Sept  | 4,343             | 35              | 0                  | 0                    |
| Oct   | 3,684             | 18              | 16                 | 1                    |
| Nov   | 3,349             | 18              | 82                 | 1                    |
| Dec   | 3,350             | 18              | 222                | 1                    |
| Total | 50,854            | 36              | 1,053              | 1                    |

Building Energy Consumption = 24,779 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 58,743 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 WALL & ROOF INSULATION

| ----- EQUIPMENT ENERGY CONSUMPTION ----- |            |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|------------------------------------------|------------|---------------------------------|------|----------------------------|------|------|------|------|------|------|------|------|------|--------|
| Ref Num                                  | Equip Code | ----- Monthly Consumption ----- |      |                            |      |      |      |      |      |      |      |      |      | Total  |
|                                          |            | Jan                             | Feb  | Mar                        | Apr  | May  | June | July | Aug  | Sep  | Oct  | Nov  | Dec  |        |
| 0                                        | LIGHTS     |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 3516                            | 3181 | 3851                       | 3349 | 3684 | 3684 | 3349 | 3851 | 3349 | 3684 | 3349 | 3349 | 42,193 |
|                                          | PK         | 18.3                            | 18.3 | 18.3                       | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3 | 18.3   |
| 1                                        | MISC LD    |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0    | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 2                                        | MISC LD    |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          | GAS        | 0                               | 0    | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 3                                        | MISC LD    |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          | OIL        | 0                               | 0    | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 4                                        | MISC LD    |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          | P STEAM    | 0                               | 0    | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 5                                        | MISC LD    |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          | P HOTH2O   | 0                               | 0    | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 6                                        | MISC LD    |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          | P CHILL    | 0                               | 0    | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 1                                        | EQ1161     |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 |      | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0    | 0                          | 0    | 375  | 1207 | 1802 | 1286 | 427  | 0    | 0    | 0    | 5,098  |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 11.3 | 12.6 | 13.0 | 12.6 | 12.1 | 0.0  | 0.0  | 0.0  | 13.0   |
| 1                                        | EQ5200     |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 |      | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0    | 0                          | 0    | 38   | 107  | 175  | 116  | 43   | 0    | 0    | 0    | 478    |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 0.6  | 1.0  | 1.2  | 1.0  | 0.8  | 0.0  | 0.0  | 0.0  | 1.2    |
| 1                                        | EQ5303     |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 |      | CONTROLS                   |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0    | 0                          | 0    | 35   | 66   | 60   | 69   | 36   | 0    | 0    | 0    | 266    |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.0  | 0.0  | 0.0  | 0.3    |
| 2                                        | EQ1161     |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 |      | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0    | 0                          | 0    | 0    | 18   | 45   | 27   | 3    | 0    | 0    | 0    | 93     |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 0.0  | 0.4  | 0.4  | 0.4  | 0.4  | 0.0  | 0.0  | 0.0  | 0.4    |
| 2                                        | EQ5200     |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 |      | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0    | 0                          | 0    | 0    | 2    | 4    | 3    | 0    | 0    | 0    | 0    | 9      |
|                                          | PK         | 0.0                             | 0.0  | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 2                                        | EQ5303     |                                 |      |                            |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 |      | CONTROLS                   |      |      |      |      |      |      |      |      |      |        |





UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 35.9 (kW)  
 Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

| Eq.<br>Ref.<br>Num.         | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|-----------------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| <b>Cooling Equipment</b>    |                        |                                    |                           |                          |
| 1                           | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 14.5                      | 40.30                    |
| 2                           | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 0.8                       | 2.11                     |
| Sub Total                   |                        |                                    | 15.2                      | 42.41                    |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                     |
| <b>Air Moving Equipment</b> |                        |                                    |                           |                          |
| 1                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 2.4                       | 6.58                     |
| 2                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.0                       | 0.03                     |
| Sub Total                   |                        |                                    | 2.4                       | 6.61                     |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                     |
| <b>Miscellaneous</b>        |                        |                                    |                           |                          |
|                             | Lights                 |                                    | 18.3                      | 50.98                    |
|                             | Base Utilities         |                                    | 0.0                       | 0.00                     |
|                             | Misc Equipment         |                                    | 0.0                       | 0.00                     |
| Sub Total                   |                        |                                    | 18.3                      | 50.98                    |
| Grand Total                 |                        |                                    | 35.9                      | 100.00                   |

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 45

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 13: 5:27 1/26/94  
Dataset Name: CB45 .TM

AIRFLOW - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | SZ          | 0                     | 5,519                 | 5,519                 | 6,484                | 965                   | 0             | 0             |
| 2             | PTAC        | 0                     | 195                   | 195                   | 239                  | 44                    | 0             | 0             |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 1,321                 | 0             | 0             |
| Totals        |             | 0                     | 5,714                 | 5,714                 | 6,724                | 2,331                 | 0             | 0             |

CAPACITY - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      | Cooling Totals (Tons) | Heating                   |                           |                         |                        |                          |                      |                      |                       |          |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|----------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) |                       | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |          |
| 1             | SZ          | 12.5                      | 0.0                       | 0.0                  | 0.0                  | 12.5                  | -155,104                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | 0                     | -155,104 |
| 2             | PTAC        | 0.4                       | 0.0                       | 0.0                  | 0.0                  | 0.4                   | -6,656                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | 0                     | -6,656   |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -210,231                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | 0                     | -210,231 |
| Totals        |             | 12.9                      | 0.0                       | 0.0                  | 0.0                  | 12.9                  | -371,990                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | 0                     | -371,990 |

The building peaked at hour 16 month 7 with a capacity of 12.9 tons

ENGINEERING CHECKS - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling   |         |           |            | Heating   |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|-----------|---------|-----------|------------|-----------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft | Cfm/Ton | Sq Ft/Ton | Btuh/Sq Ft | Cfm/Sq Ft | Btuh/Sq Ft |                  |
| 1             | Main           | SZ          | 0.00                | 1.11      | 442.5   | 397.2     | 30.21      | 1.11      | -31.31     | 4,954            |
| 2             | Main           | PTAC        | 0.00                | 1.80      | 455.9   | 252.8     | 47.46      | 1.80      | -61.63     | 108              |
| 3             | Main           | RAD         | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.00      | -33.94     | 6,194            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|-------------------|------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                   |                  |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Roof Cond       | 22,074                  | 0                        | 0                      | 22,074           | 14.75              | 22,074                | 19.32              | -18,158           | -18,158          | 11.71              |
| Glass Solar     | 17,987                  | 0                        | 0                      | 17,987           | 12.02              | 17,987                | 15.74              | 0                 | 0                | 0.00               |
| Glass Cond      | 3,619                   | 0                        | 0                      | 3,619            | 2.42               | 3,619                 | 3.17               | -17,052           | -17,052          | 10.99              |
| Wall Cond       | 26,577                  | 0                        | 0                      | 26,577           | 17.76              | 26,577                | 23.26              | -52,660           | -52,660          | 33.95              |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Infiltration    | 37,075                  | 0                        | 0                      | 37,075           | 24.77              | 16,283                | 14.25              | -67,233           | -67,233          | 43.35              |
| Sub Total==>    | 107,331                 | 0                        | 0                      | 107,331          | 71.71              | 86,540                | 75.74              | -155,104          | -155,104         | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                   |                  |                    |
| Lights          | 24,283                  | 0                        | 0                      | 24,283           | 16.22              | 24,283                | 21.25              | 0                 | 0                | 0.00               |
| People          | 20,341                  | 0                        | 0                      | 20,341           | 13.59              | 9,635                 | 8.43               | 0                 | 0                | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Sub Total==>    | 44,624                  | 0                        | 0                      | 44,624           | 29.81              | 33,918                | 29.68              | 0                 | 0                | 0.00               |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Sup. Fan Heat   |                         |                          |                        | 3,925            | 2.62               |                       | 0.00               |                   |                  | 0.00               |
| Ret. Fan Heat   |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                   |                  | 0.00               |
| Duct Heat Pkup  |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                   |                  | 0.00               |
| OV/UNDR Sizing  | -6,197                  |                          |                        | -6,197           | -4.14              | -6,197                | -5.42              | 0                 | 0                | 0.00               |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                   |                  | 0.00               |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                   |                  | 0.00               |
| Grand Total==>  | 145,759                 | 0                        | 0                      | 149,683          | 100.00             | 114,261               | 100.00             | -155,104          | -155,104         | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |      |      | Leaving DB/WB/HR |      |      | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|------|------|------------------|------|------|-------------------|------------|-----|
| Main Clg | 12.5                  | 149.7           | 5,519            | 75.0              | 62.4 | 66.5 | 55.3             | 53.1 | 58.2 | 4,954             |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | 0                 |            |     |
| Totals   | 12.5                  | 149.7           |                  |                   |      |      |                  |      |      | 4,954             | 473        | 14  |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------------------|------|------|
| Main Htg | -155.1         | 5,519            | 68.0      | 93.8      | Infil   | 965     | 965     | Clg % OA               | 0.0    | Type                 | Clg  | Htg  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 5,519   | 5,519   | Clg Cfm/Sqft           | 1.11   | SADB                 | 56.0 | 93.8 |
| Preheat  | -0.0           | 5,519            | 68.0      | 55.3      | Mincfm  | 0       | 0       | Clg Cfm/Ton            | 442.45 | Plenum               | 75.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 5,519   | 5,519   | Clg Sqft/Ton           | 397.16 | Return               | 75.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Clg Btuh/Sqft          | 30.21  | Ret/OA               | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | No. People             | 42     | Runarnd              | 75.0 | 68.0 |
| Total    | -155.1         |                  |           |           | Auxil   | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.2  | 0.0  |
|          |                |                  |           |           |         |         |         | Htg Cfm/Sqft           | 1.11   | Fn BldTD             | 0.1  | 0.0  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -31.31 | Fn Frict             | 0.4  | 0.0  |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 416                     | 0                        | 0                      | 416              | 8.11             | * | 477                   | 11.73            | * | -396                         | -396                      | 5.95             |
| Glass Solar     | 784                     | 0                        | 0                      | 784              | 15.30            | * | 765                   | 18.82            | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 136                     | 0                        | 0                      | 136              | 2.65             | * | 145                   | 3.57             | * | -689                         | -689                      | 10.35            |
| Wall Cond       | 1,450                   | 0                        | 0                      | 1,450            | 28.29            | * | 1,531                 | 37.66            | * | -2,474                       | -2,474                    | 37.18            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 1,920                   | 0                        | 0                      | 1,920            | 37.46            | * | 750                   | 18.44            | * | -3,096                       | -3,096                    | 46.52            |
| Sub Total==>    | 4,706                   | 0                        | 0                      | 4,706            | 91.80            | * | 3,668                 | 90.22            | * | -6,656                       | -6,656                    | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 379                     | 0                        | 0                      | 379              | 7.39             | * | 398                   | 9.78             | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 379                     | 0                        | 0                      | 379              | 7.39             | * | 398                   | 9.78             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 42               | 0.81             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 5,084                   | 0                        | 0                      | 5,126            | 100.00           | * | 4,066                 | 100.00           | * | -6,656                       | -6,656                    | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)   |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | 108        |       |
| Main Clg | 0.4                   | 5.1             | 195              | 75.1              | 62.5  | 66.5   | 55.7             | 53.5  | 58.9   | Part        | 0          |       |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |       |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 108        | 0 0   |
| Totals   | 0.4                   | 5.1             |                  |                   |       |        |                  |       |        | Wall        | 153        | 19 12 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------------------|------|------|
|          |                |                  |           |           | Vent    | 0       | 0       | Clg % OA               | 0.0    | Type                 | Clg  | Htg  |
| Main Htg | -6.7           | 195              | 68.0      | 99.4      | Infil   | 44      | 44      | Clg Cfm/Sqft           | 1.80   | SADB                 | 55.8 | 99.4 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 195     | 195     | Clg Cfm/Ton            | 455.87 | Plenum               | 75.0 | 68.0 |
| Preheat  | -0.0           | 195              | 68.0      | 55.6      | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 252.84 | Return               | 75.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 195     | 195     | Clg Btuh/Sqft          | 47.46  | Ret/OA               | 75.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | No. People             | 0      | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.0  | 0.0  |
| Total    | -6.7           |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 1.80   | Fn BldTD             | 0.0  | 0.0  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -61.63 | Fn Frict             | 0.1  | 0.0  |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 0/ 0           |          | *      | Mo/Hr: 0/ 0 |   | *        | Mo/Hr: 13/ 1 |   |            |           |        |
|--------------------|------------|-----------------------|----------|--------|-------------|---|----------|--------------|---|------------|-----------|--------|
| Outside Air ==>    |            | OADB/WB/HR: 0/ 0/ 0.0 |          | *      | OADB: 0     |   | *        | OADB: 4      |   |            |           |        |
|                    | Space      | Ret. Air              | Ret. Air | Net    | Perct       | * | Space    | Perct        | * | Space Peak | Coil Peak | Perct  |
|                    | Sens.+Lat. | Sensible              | Latent   | Total  | Of Tot      | * | Sensible | Of Tot       | * | Space Sens | Tot Sens  | Of Tot |
|                    | (Btuh)     | (Btuh)                | (Btuh)   | (Btuh) | (%)         | * | (Btuh)   | (%)          | * | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads     |            |                       |          |        |             |   |          |              |   |            |           |        |
| Skylite Solr       | 0          | 0                     |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Skylite Cond       | 0          | 0                     |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Roof Cond          | 0          | 0                     |          | 0      | 0.00        | * | 0        | 0.00         | * | -22,703    | -22,703   | 10.80  |
| Glass Solar        | 0          | 0                     |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Glass Cond         | 0          | 0                     |          | 0      | 0.00        | * | 0        | 0.00         | * | -23,598    | -23,598   | 11.22  |
| Wall Cond          | 0          | 0                     |          | 0      | 0.00        | * | 0        | 0.00         | * | -71,927    | -71,927   | 34.21  |
| Partition          | 0          |                       |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Exposed Floor      | 0          |                       |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Infiltration       | 0          |                       |          | 0      | 0.00        | * | 0        | 0.00         | * | -92,002    | -92,002   | 43.76  |
| Sub Total==>       | 0          | 0                     |          | 0      | 0.00        | * | 0        | 0.00         | * | -210,231   | -210,231  | 100.00 |
| Internal Loads     |            |                       |          |        |             | * |          |              | * |            |           |        |
| Lights             | 0          | 0                     |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| People             | 0          |                       |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Misc               | 0          | 0                     | 0        | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Sub Total==>       | 0          | 0                     | 0        | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Ceiling Load       | 0          | 0                     |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Outside Air        | 0          | 0                     | 0        | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Sup. Fan Heat      |            |                       |          | 0      | 0.00        | * |          | 0.00         | * | 0          | 0         | 0.00   |
| Ret. Fan Heat      |            | 0                     |          | 0      | 0.00        | * |          | 0.00         | * | 0          | 0         | 0.00   |
| Duct Heat Pkup     |            | 0                     |          | 0      | 0.00        | * |          | 0.00         | * | 0          | 0         | 0.00   |
| OV/UNDR Sizing     | 0          |                       |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Exhaust Heat       |            | 0                     | 0        | 0      | 0.00        | * |          | 0.00         | * | 0          | 0         | 0.00   |
| Terminal Bypass    |            | 0                     | 0        | 0      | 0.00        | * |          | 0.00         | * | 0          | 0         | 0.00   |
| Grand Total==>     | 0          | 0                     | 0        | 0      | 0.00        | * | 0        | 0.00         | * | -210,231   | -210,231  | 100.00 |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 6,194      |        |
| Aux Clg  | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Opt Vent | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 6,194      | 0 0    |
| Totals   | 0.0            | 0.0       |            |                   |       |        |                  |       |        | Wall        | 4,555      | 655 14 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg  |
|----------|----------|------------|-------|-------|---------|---------|---------|---------------|--------|----------|-----|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 68.1 |
| Main Htg | -210.2   | 0          | 0.0   | 0.0   | Infil   | 0       | 1,321   | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 68.0 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 0       | 0       | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 68.0 |
| Preheat  | 0.0      | 0          | 0.0   | 0.0   | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 68.0 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 0       | 0       | No. People    | 0      | Runarnd  | 0.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.00   | Fn BldTD | 0.0 | 0.0  |
| Total    | -210.2   |            |       |       | Auxil   | 0       | 0       | Htg Btuh/Sqft | -33.94 | Fn Frict | 0.0 | 0.0  |

BUILDING U-VALUES - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |             |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |       |
|-------------|------------------|-------|-------|----------------------------------|-------------|-------------|-------------|-------|-------|------------------------|-----------------------------|-------|
|             |                  |       |       | Summr Skylt                      | Wintr Skylt | Summr Windo | Wintr Windo | Wall  | Ceil. |                        |                             |       |
| 1           | OFFICES          | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 30.5                        | 9.34  |
| Zone        | 1 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 30.5                        | 9.34  |
| System      | 1 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 30.5                        | 9.34  |
| 3           | WOMENS TOILET    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 48.8                        | 12.99 |
| Zone        | 3 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 48.8                        | 12.99 |
| System      | 2 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 48.8                        | 12.99 |
| 1           | OFFICES          | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 30.5                        | 9.34  |
| Zone        | 1 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 30.5                        | 9.34  |
| 2           | CORRIDOR TOILETS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 36.7                        | 10.59 |
| Zone        | 2 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 36.7                        | 10.59 |
| 3           | WOMENS TOILET    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 48.8                        | 12.99 |
| Zone        | 3 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 48.8                        | 12.99 |
| System      | 3 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 32.0                        | 9.63  |
| Building    |                  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.057       | 0.550       | 0.563 | 0.288 | 0.000                  | 31.5                        | 9.54  |

BUILDING AREAS - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G A R E A S -----

| Room Number | Description      | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|---------------------|----|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
|             |                  | Flr                 | Rm |                             |                         |                       |                           |                      |             |                      |                    |             |                      |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| System      | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System      | 2 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 2           | CORRIDOR TOILETS | 1                   | 1  | 1,132                       | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| Zone        | 2 Total/Ave.     |                     |    |                             | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System      | 3 Total/Ave.     |                     |    |                             | 6,194                   | 0                     | 0                         | 0                    | 0           | 6,194                | 655                | 14          | 3,900                |
| Building    |                  |                     |    |                             | 11,256                  | 0                     | 0                         | 0                    | 0           | 11,256               | 1,148              | 14          | 6,890                |



ASHRAE 90 ANALYSIS - ALTERNATIVE 3  
WEATHERSTRIP & CAULKING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.6                    | 3            | 22    | -18,599                  | 18           | 432   | 285.7                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 1.3                    | 3            | 27    | -37,199                  | 22           | 519   | 571.4                     | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 1.9                    | 5            | 41    | -55,798                  | 17           | 401   | 857.1                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 2.6                    | 5            | 40    | -74,398                  | 11           | 264   | 1,142.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 3.2                    | 5            | 39    | -92,997                  | 10           | 234   | 1,428.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 3.9                    | 5            | 44    | -111,597                 | 2            | 37    | 1,714.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 4.5                    | 13           | 108   | -130,196                 | 0            | 4     | 1,999.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 5.2                    | 4            | 34    | -148,796                 | 1            | 19    | 2,285.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 5.8                    | 7            | 58    | -167,395                 | 0            | 0     | 2,571.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 6.5                    | 9            | 76    | -185,995                 | 0            | 5     | 2,856.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 7.1                    | 5            | 46    | -204,594                 | 2            | 43    | 3,142.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 7.7                    | 5            | 43    | -223,194                 | 17           | 400   | 3,428.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 8.4                    | 8            | 71    | -241,793                 | 0            | 0     | 3,713.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 9.0                    | 3            | 23    | -260,393                 | 0            | 0     | 3,999.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 9.7                    | 2            | 20    | -278,992                 | 0            | 0     | 4,285.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 10.3                   | 7            | 60    | -297,592                 | 0            | 0     | 4,571.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 11.0                   | 0            | 0     | -316,191                 | 0            | 0     | 4,856.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 11.6                   | 1            | 9     | -334,791                 | 0            | 0     | 5,142.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 12.3                   | 2            | 19    | -353,390                 | 0            | 0     | 5,428.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 12.9                   | 7            | 58    | -371,990                 | 0            | 0     | 5,713.7                   | 100          | 1,070 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,922 | 0                        | 0            | 6,402 | 0.0                       | 0            | 7,690 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- BUILDING TEMPERATURE PROFILES -----

| Temperature Range (F) | Zone Number |      |       |       |       |
|-----------------------|-------------|------|-------|-------|-------|
|                       | 1           | 3    | 1     | 2     | 3     |
| Max. Temp.            | 88.4        | 89.2 | 106.6 | 103.9 | 102.5 |
| Mo./Hr.               | 7 21        | 7 20 | 7 20  | 7 22  | 8 20  |
| Day Type              | 4           | 4    | 2     | 1     | 1     |

|           | Number of Hours |       |       |       |       |
|-----------|-----------------|-------|-------|-------|-------|
| Above 100 | 0               | 0     | 902   | 262   | 94    |
| 95 - 100  | 0               | 0     | 774   | 940   | 760   |
| 90 - 95   | 0               | 0     | 904   | 998   | 1,254 |
| 85 - 90   | 188             | 168   | 603   | 742   | 835   |
| 80 - 85   | 1,455           | 1,253 | 469   | 654   | 653   |
| 75 - 80   | 1,754           | 1,809 | 20    | 76    | 76    |
| 70 - 75   | 479             | 493   | 536   | 226   | 298   |
| 65 - 70   | 525             | 535   | 1,770 | 1,977 | 1,991 |
| 60 - 65   | 759             | 876   | 977   | 1,000 | 917   |
| 55 - 60   | 607             | 742   | 734   | 758   | 776   |
| 50 - 55   | 701             | 681   | 1,071 | 1,127 | 1,106 |
| Below 50  | 2,292           | 2,203 | 0     | 0     | 0     |

|            |      |      |       |      |      |
|------------|------|------|-------|------|------|
| Min. Temp. | 33.5 | 34.1 | 54.9  | 54.9 | 54.9 |
| Mo./Hr.    | 2 11 | 2 10 | 12 21 | 3 7  | 1 4  |
| Day Type   | 4    | 4    | 3     | 4    | 2    |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3  
WEATHERSTRIP & CAULKING

----- M O N T H L Y   E N E R G Y   C O N S U M P T I O N -----

| Month | ELEC              |                 | DEMAND            |                      | HOT WTR | HOT W DMND |
|-------|-------------------|-----------------|-------------------|----------------------|---------|------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Thrm) | On Peak<br>(Thrm/hr) |         |            |
| Jan   | 3,519             | 18              | 461               | 2                    |         |            |
| Feb   | 3,184             | 18              | 436               | 2                    |         |            |
| March | 3,852             | 18              | 220               | 2                    |         |            |
| April | 3,349             | 18              | 42                | 2                    |         |            |
| May   | 4,779             | 39              | 0                 | 0                    |         |            |
| June  | 5,974             | 40              | 0                 | 0                    |         |            |
| July  | 6,440             | 41              | 0                 | 0                    |         |            |
| Aug   | 6,220             | 40              | 0                 | 0                    |         |            |
| Sept  | 4,312             | 39              | 0                 | 0                    |         |            |
| Oct   | 3,684             | 18              | 38                | 2                    |         |            |
| Nov   | 3,350             | 18              | 161               | 2                    |         |            |
| Dec   | 3,351             | 18              | 376               | 2                    |         |            |
| Total | 52,014            | 41              | 1,734             | 2                    |         |            |

Building Energy Consumption = 31,178 (Stu/Sq Ft/Year)  
Source Energy Consumption = 67,862 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)





UTILITY PEAK CHECKSUMS - ALTERNATIVE 3  
WEATHERSTRIP & CAULKING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 40.8 (kW)  
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

| Eq.<br>Ref.<br>Num.  | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| Cooling Equipment    |                        |                                    |                           |                          |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 19.2                      | 47.01                    |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 0.9                       | 2.23                     |
| Sub Total            |                        |                                    | 20.1                      | 49.25                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Air Moving Equipment |                        |                                    |                           |                          |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 2.4                       | 5.80                     |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.0                       | 0.06                     |
| Sub Total            |                        |                                    | 2.4                       | 5.86                     |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Miscellaneous        |                        |                                    |                           |                          |
|                      | Lights                 |                                    | 18.3                      | 44.89                    |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                     |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                     |
| Sub Total            |                        |                                    | 18.3                      | 44.89                    |
| Grand Total          |                        |                                    | 40.8                      | 100.00                   |

```
*****  
*****  
**                                                                 **  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**                                                                 **  
**          by              **                               **  
**                                                                 **  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 45

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (8tu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (8tu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (8tu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 13:16:58 1/26/94  
Dataset Name: CB45 .TM



AIRFLOW - ALTERNATIVE 4  
 REPLACE FLUORESCENT LAMPS

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | SZ          | 0                     | 5,519                 | 5,519                 | 6,717                | 1,198                 | 0             | 0             |
| 2             | PTAC        | 0                     | 184                   | 184                   | 239                  | 55                    | 0             | 0             |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 1,640                 | 0             | 0             |
| Totals        |             | 0                     | 5,703                 | 5,703                 | 6,956                | 2,893                 | 0             | 0             |

CAPACITY - ALTERNATIVE 4  
 REPLACE FLUORESCENT LAMPS

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 13.4                      | 0.0                       | 0.0                  | 0.0                  | 13.4                  | -171,332                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -171,332              |
| 2             | PTAC        | 0.5                       | 0.0                       | 0.0                  | 0.0                  | 0.5                   | -7,403                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -7,403                |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -232,438                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -232,438              |
| Totals        |             | 13.8                      | 0.0                       | 0.0                  | 0.0                  | 13.8                  | -411,173                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -411,173              |

The building peaked at hour 16 month 7 with a capacity of 13.8 tons

ENGINEERING CHECKS - ALTERNATIVE 4  
 REPLACE FLUORESCENT LAMPS

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling   |         |           |            | Heating   |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|-----------|---------|-----------|------------|-----------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft | Cfm/Ton | Sq Ft/Ton | Btuh/Sq Ft | Cfm/Sq Ft | Btuh/Sq Ft |                  |
| 1             | Main           | SZ          | 0.00                | 1.11      | 412.2   | 370.0     | 32.43      | 1.11      | -34.58     | 4,954            |
| 2             | Main           | PTAC        | 0.00                | 1.70      | 405.1   | 238.2     | 50.38      | 1.70      | -68.55     | 108              |
| 3             | Main           | RAD         | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.00      | -37.53     | 6,194            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 7/16              |          | *       | Mo/Hr: 7/16 |   | *        | Mo/Hr: 13/ 1 |   |            |           |        |
|--------------------|------------|--------------------------|----------|---------|-------------|---|----------|--------------|---|------------|-----------|--------|
| Outside Air ==>    |            | OADB/WB/HR: 91/ 73/ 98.0 |          | *       | OADB: 91    |   | *        | OADB: 4      |   |            |           |        |
|                    | Space      | Ret. Air                 | Ret. Air | Net     | Perct       | * | Space    | Perct        | * | Space Peak | Coil Peak | Perct  |
|                    | Sens.+Lat. | Sensible                 | Latent   | Total   | Of Tot      | * | Sensible | Of Tot       | * | Space Sens | Tot Sens  | Of Tot |
|                    | (Btuh)     | (Btuh)                   | (Btuh)   | (Btuh)  | (%)         | * | (Btuh)   | (%)          | * | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads     |            |                          |          |         |             | * |          |              | * |            |           |        |
| Skylite Solr       | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Skylite Cond       | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Roof Cond          | 22,074     | 0                        | 0        | 22,074  | 13.74       | * | 22,074   | 18.36        | * | -18,158    | -18,158   | 10.60  |
| Glass Solar        | 17,987     | 0                        | 0        | 17,987  | 11.20       | * | 17,987   | 14.96        | * | 0          | 0         | 0.00   |
| Glass Cond         | 3,619      | 0                        | 0        | 3,619   | 2.25        | * | 3,619    | 3.01         | * | -17,052    | -17,052   | 9.95   |
| Wall Cond          | 26,577     | 0                        | 0        | 26,577  | 16.54       | * | 26,577   | 22.11        | * | -52,660    | -52,660   | 30.74  |
| Partition          | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Exposed Floor      | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Infiltration       | 46,024     | 0                        | 0        | 46,024  | 28.65       | * | 20,213   | 16.81        | * | -83,461    | -83,461   | 48.71  |
| Sub Total==>       | 116,280    | 0                        | 0        | 116,280 | 72.38       | * | 90,470   | 75.26        | * | -171,332   | -171,332  | 100.00 |
| Internal Loads     |            |                          |          |         |             | * |          |              | * |            |           |        |
| Lights             | 21,230     | 0                        | 0        | 21,230  | 13.21       | * | 21,230   | 17.66        | * | 0          | 0         | 0.00   |
| People             | 20,341     | 0                        | 0        | 20,341  | 12.66       | * | 9,635    | 8.02         | * | 0          | 0         | 0.00   |
| Misc               | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Sub Total==>       | 41,570     | 0                        | 0        | 41,570  | 25.88       | * | 30,865   | 25.68        | * | 0          | 0         | 0.00   |
| Ceiling Load       | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Outside Air        | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Sup. Fan Heat      |            |                          |          | 3,925   | 2.44        | * |          | 0.00         | * |            |           | 0.00   |
| Ret. Fan Heat      |            | 0                        | 0        | 0       | 0.00        | * |          | 0.00         | * |            |           | 0.00   |
| Duct Heat Pkqp     |            | 0                        | 0        | 0       | 0.00        | * |          | 0.00         | * |            |           | 0.00   |
| OV/UNDR Sizing     | -1,124     |                          |          | -1,124  | -0.70       | * | -1,124   | -0.93        | * | 0          | 0         | 0.00   |
| Exhaust Heat       |            | 0                        | 0        | 0       | 0.00        | * |          | 0.00         | * |            |           | 0.00   |
| Terminal Bypass    |            | 0                        | 0        | 0       | 0.00        | * |          | 0.00         | * |            |           | 0.00   |
| Grand Total==>     | 156,727    | 0                        | 0        | 160,652 | 100.00      | * | 120,211  | 100.00       | * | -171,332   | -171,332  | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |       | Leaving DB/WB/HR |       |       | -----AREAS----- |             |            |        |
|----------|----------------|-----------|------------|-------------------|-------|-------|------------------|-------|-------|-----------------|-------------|------------|--------|
|          | (Tons)         | (Mbh)     | (Mbh)      | (cfm)             | Deg F | Deg F | Grains           | Deg F | Deg F | Grains          | Gross Total | Glass (sf) | (%)    |
| Main Clg | 13.4           | 160.7     | 124.1      | 5,519             | 75.0  | 62.4  | 66.5             | 54.3  | 52.4  | 56.9            | Floor       | 4,954      |        |
| Aux Clg  | 0.0            | 0.0       | 0.0        | 0                 | 0.0   | 0.0   | 0.0              | 0.0   | 0.0   | 0.0             | Part        | 0          |        |
| Opt Vent | 0.0            | 0.0       | 0.0        | 0                 | 0.0   | 0.0   | 0.0              | 0.0   | 0.0   | 0.0             | ExFlr       | 0          |        |
| Totals   | 13.4           | 160.7     |            |                   |       |       |                  |       |       |                 | Roof        | 4,954      | 0 0    |
|          |                |           |            |                   |       |       |                  |       |       |                 | Wall        | 3,329      | 473 14 |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------|------------|-------|-------|---------|---------|---------|------------------------|--------|----------------------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg % OA               | 0.0    | Type                 | Clg  | Htg  |
| Main Htg | -171.3   | 5,519      | 68.0  | 96.5  | Infil   | 1,198   | 1,198   | Clg Cfm/Sqft           | 1.11   | SADB                 | 55.0 | 96.5 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 5,519   | 5,519   | Clg Cfm/Ton            | 412.25 | Plenum               | 75.0 | 68.0 |
| Preheat  | -0.0     | 5,519      | 68.0  | 54.3  | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 370.04 | Return               | 75.0 | 68.0 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 5,519   | 5,519   | Clg Btuh/Sqft          | 32.43  | Ret/OA               | 75.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 0       | 0       | No. People             | 42     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.2  | 0.0  |
| Total    | -171.3   |            |       |       | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 1.11   | Fn BidTD             | 0.1  | 0.0  |
|          |          |            |       |       |         |         |         | Htg Btuh/Sqft          | -34.58 | Fn Frict             | 0.4  | 0.0  |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK                        |                          |                        |                  |                  | CLG SPACE PEAK        |                  |                   |                  |                  | HEATING COIL PEAK |                  |                  |
|------------------------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|------------------|-------------------|------------------|------------------|
| Peaked at Time ==> Mo/Hr: 7/14           |                          |                        |                  |                  | * Mo/Hr: 7/16 *       |                  |                   |                  |                  | * Mo/Hr: 13/ 1    |                  |                  |
| Outside Air ==> OADB/WB/HR: 91/ 74/105.0 |                          |                        |                  |                  | * OADB: 91 *          |                  |                   |                  |                  | * OADB: 4         |                  |                  |
| Space Sens.+Lat. (Btuh)                  | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) | Space Sens (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
| Envelope Loads                           |                          |                        |                  |                  |                       |                  |                   |                  |                  |                   |                  |                  |
| Skylite Solr                             | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond                             | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond                                | 416                      | 0                      | 416              | 7.64             | 477                   | 11.65            | -396              | -396             | 5.35             |                   |                  |                  |
| Glass Solar                              | 784                      | 0                      | 784              | 14.41            | 765                   | 18.69            | 0                 | 0                | 0.00             |                   |                  |                  |
| Glass Cond                               | 136                      | 0                      | 136              | 2.49             | 145                   | 3.55             | -689              | -689             | 9.31             |                   |                  |                  |
| Wall Cond                                | 1,450                    | 0                      | 1,450            | 26.65            | 1,531                 | 37.40            | -2,474            | -2,474           | 33.43            |                   |                  |                  |
| Partition                                | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Exposed Floor                            | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Infiltration                             | 2,384                    | 0                      | 2,384            | 43.81            | 931                   | 22.74            | -3,844            | -3,844           | 51.92            |                   |                  |                  |
| Sub Total==>                             | 5,169                    | 0                      | 5,169            | 95.00            | 3,849                 | 94.02            | -7,403            | -7,403           | 100.00           |                   |                  |                  |
| Internal Loads                           |                          |                        |                  |                  |                       |                  |                   |                  |                  |                   |                  |                  |
| Lights                                   | 233                      | 0                      | 233              | 4.28             | 245                   | 5.98             | 0                 | 0                | 0.00             |                   |                  |                  |
| People                                   | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Misc                                     | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Sub Total==>                             | 233                      | 0                      | 233              | 4.28             | 245                   | 5.98             | 0                 | 0                | 0.00             |                   |                  |                  |
| Ceiling Load                             | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Outside Air                              | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Sup. Fan Heat                            |                          |                        | 39               | 0.72             |                       | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Ret. Fan Heat                            |                          | 0                      | 0                | 0.00             |                       | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Duct Heat Pkub                           |                          | 0                      | 0                | 0.00             |                       | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| OV/UNDR Sizing                           | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Exhaust Heat                             |                          | 0                      | 0                | 0.00             |                       | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Terminal Bypass                          |                          | 0                      | 0                | 0.00             |                       | 0.00             | 0                 | 0                | 0.00             |                   |                  |                  |
| Grand Total==>                           | 5,402                    | 0                      | 5,441            | 100.00           | 4,094                 | 100.00           | -7,403            | -7,403           | 100.00           |                   |                  |                  |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |      | Glass (sf) (%) |    |
|----------|----------------|-------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------|----------------|----|
|          | (Tons)         | (Mbh) | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part |                |    |
| Main Clg | 0.5            | 5.4   | 4.0       | 184        | 75.1              | 62.5  | 66.5   | 54.4             | 52.2  | 56.2   | 108         | 0    |                |    |
| Aux Clg  | 0.0            | 0.0   | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0    |                |    |
| Opt Vent | 0.0            | 0.0   | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 108         | 0    | 0              | 0  |
| Totals   | 0.5            | 5.4   |           |            |                   |       |        |                  |       |        | 153         |      | 19             | 12 |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | -AIRFLOWS (cfm)- |         | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)-- |       |  |
|----------|----------|------------|-------|-------|---------|------------------|---------|------------------------|--------|----------|----------------------|-------|--|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    | Cooling          | Heating | Clg % OA               | 0.0    | Type     | Clg                  | Htg   |  |
| Main Htg | -7.4     | 184        | 68.0  | 105.0 | Infil   | 55               | 55      | Clg Cfm/Sqft           | 1.70   | SADB     | 54.5                 | 105.0 |  |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 184              | 184     | Clg Cfm/Ton            | 405.08 | Plenum   | 75.0                 | 68.0  |  |
| Preheat  | -0.0     | 184        | 68.0  | 54.3  | Mincfn  | 0                | 0       | Clg Sqft/Ton           | 238.18 | Return   | 75.0                 | 68.0  |  |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 184              | 184     | Clg Btuh/Sqft          | 50.38  | Ret/OA   | 75.0                 | 68.0  |  |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 0                | 0       | No. People             | 0      | Runarnd  | 75.0                 | 68.0  |  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0                | 0       | Htg % OA               | 0.0    | Fn MtrTD | 0.0                  | 0.0   |  |
| Total    | -7.4     |            |       |       | Auxil   | 0                | 0       | Htg Cfm/Sqft           | 1.70   | Fn BldTD | 0.0                  | 0.0   |  |
|          |          |            |       |       |         |                  |         | Htg Btuh/Sqft          | -68.55 | Fn Frict | 0.1                  | 0.0   |  |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | * | Space Sensible (Btuh) | Percent Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|---|-----------------------|--------------------|---|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    | * |                       |                    | * |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | -22,703                      | -22,703                   | 9.77               |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | -23,598                      | -23,598                   | 10.15              |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | -71,927                      | -71,927                   | 30.94              |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | -114,210                     | -114,210                  | 49.14              |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | -232,438                     | -232,438                  | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    | * |                       |                    | * |                              |                           |                    |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| People          | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00               | * |                       | 0.00               | * |                              | 0                         | 0.00               |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00               | * |                       | 0.00               | * |                              | 0                         | 0.00               |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00               | * |                       | 0.00               | * |                              | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00               | * |                       | 0.00               | * |                              | 0                         | 0.00               |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00               | * |                       | 0.00               | * |                              | 0                         | 0.00               |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | -232,438                     | -232,438                  | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 6,194      |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 6,194      | 0 0    |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall        | 4,555      | 655 14 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | -AIRFLOWS (cfm)- |         | --ENGINEERING CHECKS-- |      |      | --TEMPERATURES (F)-- |        |      |
|----------|----------------|------------------|-----------|-----------|---------|------------------|---------|------------------------|------|------|----------------------|--------|------|
|          |                |                  |           |           |         | Cooling          | Heating | Clg % OA               |      |      | Type                 | Clg    | Htg  |
| Main Htg | -232.4         | 0                | 0.0       | 0.0       | Infil   | 0                | 0       | 0.0                    | 0.00 | 0.00 | SADB                 | 0.0    | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0                | 1,640   | 0.0                    | 0.00 | 0.00 | Plenum               | 0.0    | 68.0 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0                | 0       | 0.0                    | 0.00 | 0.00 | Return               | 0.0    | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0                | 0       | 0.0                    | 0.00 | 0.00 | Ret/OA               | 0.0    | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0                | 0       | 0.0                    | 0.00 | 0.00 | No. People           | 0      | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0                | 0       | 0.0                    | 0.00 | 0.00 | Htg % OA             | 0.0    | 68.0 |
| Total    | -232.4         |                  |           |           | Auxil   | 0                | 0       | 0.0                    | 0.00 | 0.00 | Htg Cfm/Sqft         | -37.53 | 68.0 |
|          |                |                  |           |           |         |                  |         |                        |      |      | Htg Btuh/Sqft        |        | 68.0 |
|          |                |                  |           |           |         |                  |         |                        |      |      | Fn Frict             | 0.0    | 68.0 |

BUILDING U-VALUES - ALTERNATIVE 4  
 REPLACE FLUORESCENT LAMPS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Room U-Values<br>(Btu/hr/sqft/F) |       |             |             |            |             |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|------------------|----------------------------------|-------|-------------|-------------|------------|-------------|-------------|-------|-------|------------------------|-----------------------------|
|             |                  | Part.                            | ExFlr | Summr Skylt | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wall  | Ceil. |                        |                             |
| 1           | OFFICES          | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 30.5                   | 9.34                        |
| Zone        | 1 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 30.5                   | 9.34                        |
| System      | 1 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 30.5                   | 9.34                        |
| 3           | WOMENS TOILET    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 48.8                   | 12.99                       |
| Zone        | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 48.8                   | 12.99                       |
| System      | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 48.8                   | 12.99                       |
| 1           | OFFICES          | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 30.5                   | 9.34                        |
| Zone        | 1 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 30.5                   | 9.34                        |
| 2           | CORRIDOR TOILETS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 36.7                   | 10.59                       |
| Zone        | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 36.7                   | 10.59                       |
| 3           | WOMENS TOILET    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 48.8                   | 12.99                       |
| Zone        | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 48.8                   | 12.99                       |
| System      | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 32.0                   | 9.63                        |
| Building    |                  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563       | 0.288 | 0.000 | 31.5                   | 9.54                        |

BUILDING AREAS - ALTERNATIVE 4  
 REPLACE FLUORESCENT LAMPS

----- B U I L D I N G A R E A S -----

| Room Number | Description      | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skf /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|---------------------|----|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
|             |                  | Flr                 | Rm |                             |                         |                       |                           |                      |             |                      |                    |             |                      |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| System      | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System      | 2 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 2           | CORRIDOR TOILETS | 1                   | 1  | 1,132                       | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| Zone        | 2 Total/Ave.     |                     |    |                             | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System      | 3 Total/Ave.     |                     |    |                             | 6,194                   | 0                     | 0                         | 0                    | 0           | 6,194                | 655                | 14          | 3,900                |
| Building    |                  |                     |    |                             | 11,256                  | 0                     | 0                         | 0                    | 0           | 11,256               | 1,148              | 14          | 6,890                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 4  
REPLACE FLUORESCENT LAMPS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.49 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4  
 REPLACE FLUORESCENT LAMPS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.7                    | 6            | 45    | -20,559                  | 14           | 344   | 285.1                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 1.4                    | 3            | 23    | -41,117                  | 21           | 518   | 570.3                     | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 2.1                    | 3            | 26    | -61,676                  | 20           | 497   | 855.4                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 2.8                    | 2            | 16    | -82,235                  | 12           | 307   | 1,140.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 3.5                    | 8            | 64    | -102,793                 | 13           | 322   | 1,425.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 4.2                    | 11           | 85    | -123,352                 | 1            | 35    | 1,710.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 4.8                    | 6            | 45    | -143,911                 | 0            | 0     | 1,995.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 5.5                    | 4            | 34    | -164,469                 | 1            | 16    | 2,281.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 6.2                    | 11           | 86    | -185,028                 | 1            | 20    | 2,566.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 6.9                    | 3            | 22    | -205,587                 | 0            | 5     | 2,851.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 7.6                    | 9            | 67    | -226,145                 | 1            | 29    | 3,136.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 8.3                    | 9            | 67    | -246,704                 | 16           | 394   | 3,421.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 9.0                    | 3            | 23    | -267,263                 | 0            | 0     | 3,706.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 9.7                    | 5            | 39    | -287,821                 | 0            | 0     | 3,991.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 10.4                   | 5            | 40    | -308,380                 | 0            | 0     | 4,277.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 11.1                   | 3            | 20    | -328,939                 | 0            | 0     | 4,562.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 11.8                   | 4            | 33    | -349,497                 | 0            | 0     | 4,847.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 12.5                   | 0            | 0     | -370,056                 | 0            | 0     | 5,132.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 13.1                   | 0            | 0     | -390,615                 | 0            | 0     | 5,417.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 13.8                   | 3            | 25    | -411,173                 | 0            | 0     | 5,702.7                   | 100          | 1,070 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 8,000 | 0                        | 0            | 6,273 | 0.0                       | 0            | 7,690 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4  
 REPLACE FLUORESCENT LAMPS

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | ----- Zone Number ----- |      |       |       |       |
|-----------------------------|-------------------------|------|-------|-------|-------|
|                             | 1                       | 3    | 1     | 2     | 3     |
| Max. Temp.                  | 87.9                    | 88.6 | 105.7 | 103.4 | 101.3 |
| Mo./Hr.                     | 7 21                    | 7 20 | 7 22  | 7 22  | 8 20  |
| Day Type                    | 4                       | 4    | 1     | 1     | 1     |

|           | ..... Number of Hours ..... |       |       |       |       |
|-----------|-----------------------------|-------|-------|-------|-------|
| Above 100 | 0                           | 0     | 668   | 223   | 0     |
| 95 - 100  | 0                           | 0     | 895   | 900   | 694   |
| 90 - 95   | 0                           | 0     | 884   | 1,001 | 1,276 |
| 85 - 90   | 156                         | 147   | 656   | 766   | 803   |
| 80 - 85   | 1,309                       | 1,127 | 549   | 682   | 740   |
| 75 - 80   | 1,878                       | 1,605 | 20    | 100   | 159   |
| 70 - 75   | 363                         | 591   | 308   | 132   | 188   |
| 65 - 70   | 587                         | 348   | 1,867 | 2,010 | 1,940 |
| 60 - 65   | 575                         | 772   | 979   | 981   | 888   |
| 55 - 60   | 771                         | 807   | 764   | 736   | 852   |
| 50 - 55   | 686                         | 727   | 1,170 | 1,229 | 1,220 |
| Below 50  | 2,435                       | 2,436 | 0     | 0     | 0     |

|            |      |      |      |      |      |
|------------|------|------|------|------|------|
| Min. Temp. | 32.6 | 33.1 | 54.9 | 55.0 | 54.9 |
| Mo./Hr.    | 2 10 | 2 10 | 3 7  | 1 7  | 2 20 |
| Day Type   | 4    | 4    | 5    | 1    | 3    |



MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4  
REPLACE FLUORESCENT LAMPS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC     |         | DEMAND  |           | HOT WTR | HOT W DMND |
|-------|----------|---------|---------|-----------|---------|------------|
|       | Off Peak | On Peak | On Peak | On Peak   | On Peak | On Peak    |
|       | (kWh)    | (kW)    | (Therm) | (Thrm/hr) |         |            |
| Jan   | 3,064    | 16      | 527     | 2         |         |            |
| Feb   | 2,772    | 16      | 505     | 2         |         |            |
| March | 3,354    | 16      | 268     | 2         |         |            |
| April | 2,916    | 16      | 67      | 2         |         |            |
| May   | 4,092    | 37      | 0       | 0         |         |            |
| June  | 5,331    | 39      | 0       | 0         |         |            |
| July  | 5,961    | 40      | 0       | 0         |         |            |
| Aug   | 5,574    | 39      | 0       | 0         |         |            |
| Sept  | 3,707    | 38      | 0       | 0         |         |            |
| Oct   | 3,207    | 16      | 59      | 2         |         |            |
| Nov   | 2,916    | 16      | 191     | 2         |         |            |
| Dec   | 2,918    | 16      | 430     | 2         |         |            |
| Total | 45,813   | 40      | 2,046   | 2         |         |            |

Building Energy Consumption = 32,069 (Btu/Sq Ft/Year)  
Source Energy Consumption = 65,915 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)





UTILITY PEAK CHECKSUMS - ALTERNATIVE 4  
REPLACE FLUORESCENT LAMPS

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        39.7    (kW)  
Yearly Time of Peak 15 (hr)    7 (mo)

Hour 15    Month 7

| Eq.<br>Ref.<br>Num.  | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| Cooling Equipment    |                        |                                    |                           |                          |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 29.5                      | 51.56                    |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 0.9                       | 2.33                     |
| Sub Total            |                        |                                    | 21.4                      | 53.89                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Air Moving Equipment |                        |                                    |                           |                          |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 2.4                       | 5.95                     |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.0                       | 0.06                     |
| Sub Total            |                        |                                    | 2.4                       | 6.01                     |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Miscellaneous        |                        |                                    |                           |                          |
|                      | Lights                 |                                    | 15.9                      | 40.10                    |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                     |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                     |
| Sub Total            |                        |                                    | 15.9                      | 40.10                    |
| Grand Total          |                        |                                    | 39.7                      | 100.00                   |

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 45

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Reflectance: 0.20  
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (8tu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14: 9:28 1/26/94  
Dataset Name: CB45B .TM

AIRFLOW - ALTERNATIVE 1  
 REPLACE FLUORESCENT BALLASTS

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | SZ          | 0                     | 5,519                 | 5,519                 | 6,717                | 1,198                 | 0             | 0             |
| 2             | PTAC        | 0                     | 181                   | 181                   | 236                  | 55                    | 0             | 0             |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 1,640                 | 0             | 0             |
| Totals        |             | 0                     | 5,700                 | 5,700                 | 6,954                | 2,893                 | 0             | 0             |

CAPACITY - ALTERNATIVE 1  
 REPLACE FLUORESCENT BALLASTS

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 13.1                      | 0.0                       | 0.0                  | 0.0                  | 13.1                  | -171,332                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -171,332              |
| 2             | PTAC        | 0.4                       | 0.0                       | 0.0                  | 0.0                  | 0.4                   | -7,403                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -7,403                |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -232,438                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -232,438              |
| Totals        |             | 13.6                      | 0.0                       | 0.0                  | 0.0                  | 13.6                  | -411,173                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -411,173              |

The building peaked at hour 16 month 7 with a capacity of 13.6 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 REPLACE FLUORESCENT BALLASTS

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | SZ          | 0.00                | 1.11       | 420.4    | 377.4      | 31.80       | 1.11       | -34.58      | 4,954            |
| 2             | Main           | PTAC        | 0.00                | 1.68       | 402.7    | 240.3      | 49.93       | 1.68       | -68.55      | 108              |
| 3             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -37.53      | 6,194            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |                   | Mo/Hr: 7/16              |           | *            | Mo/Hr: 7/16 |                | *            | Mo/Hr: 13/1 |                       |                    |              |
|--------------------|-------------------|--------------------------|-----------|--------------|-------------|----------------|--------------|-------------|-----------------------|--------------------|--------------|
| Outside Air ==>    |                   | OADB/WB/HR: 91/ 73/ 98.0 |           | *            | OADB: 91    |                | *            | OADB: 4     |                       |                    |              |
| Space Sens.+Lat.   | Ret. Air Sensible | Ret. Air Latent          | Net Total | Perct Of Tot | *           | Space Sensible | Perct Of Tot | *           | Space Peak Space Sens | Coil Peak Tot Sens | Perct Of Tot |
| (Btuh)             | (Btuh)            | (Btuh)                   | (Btuh)    | (%)          | *           | (Btuh)         | (%)          | *           | (Btuh)                | (Btuh)             | (%)          |
| Envelope Loads     |                   |                          |           |              |             |                |              |             |                       |                    |              |
| Skylite Solr       | 0                 | 0                        | 0         | 0.00         | *           | 0              | 0.00         | *           | 0                     | 0                  | 0.00         |
| Skylite Cond       | 0                 | 0                        | 0         | 0.00         | *           | 0              | 0.00         | *           | 0                     | 0                  | 0.00         |
| Roof Cond          | 22,074            | 0                        | 22,074    | 14.01        | *           | 22,074         | 18.68        | *           | -18,158               | -18,158            | 10.60        |
| Glass Solar        | 17,987            | 0                        | 17,987    | 11.42        | *           | 17,987         | 15.23        | *           | 0                     | 0                  | 0.00         |
| Glass Cond         | 3,619             | 0                        | 3,619     | 2.30         | *           | 3,619          | 3.06         | *           | -17,052               | -17,052            | 9.95         |
| Wall Cond          | 26,577            | 0                        | 26,577    | 16.87        | *           | 26,577         | 22.50        | *           | -52,660               | -52,660            | 30.74        |
| Partition          | 0                 |                          | 0         | 0.00         | *           | 0              | 0.00         | *           | 0                     | 0                  | 0.00         |
| Exposed Floor      | 0                 |                          | 0         | 0.00         | *           | 0              | 0.00         | *           | 0                     | 0                  | 0.00         |
| Infiltration       | 44,969            |                          | 44,969    | 28.55        | *           | 20,213         | 17.11        | *           | -83,461               | -83,461            | 48.71        |
| Sub Total==>       | 115,226           | 0                        | 115,226   | 73.15        | *           | 90,470         | 76.58        | *           | -171,332              | -171,332           | 100.00       |
| Internal Loads     |                   |                          |           |              | *           |                |              | *           |                       |                    |              |
| Lights             | 18,031            | 0                        | 18,031    | 11.45        | *           | 18,031         | 15.26        | *           | 0                     | 0                  | 0.00         |
| People             | 20,341            |                          | 20,341    | 12.91        | *           | 9,635          | 8.16         | *           | 0                     | 0                  | 0.00         |
| Misc               | 0                 | 0                        | 0         | 0.00         | *           | 0              | 0.00         | *           | 0                     | 0                  | 0.00         |
| Sub Total==>       | 38,371            | 0                        | 38,371    | 24.36        | *           | 27,666         | 23.42        | *           | 0                     | 0                  | 0.00         |
| Ceiling Load       | 0                 |                          | 0         | 0.00         | *           | 0              | 0.00         | *           | 0                     | 0                  | 0.00         |
| Outside Air        | 0                 | 0                        | 0         | 0.00         | *           | 0              | 0.00         | *           | 0                     | 0                  | 0.00         |
| Sup. Fan Heat      |                   |                          | 3,925     | 2.49         | *           |                | 0.00         | *           |                       | 0                  | 0.00         |
| Ret. Fan Heat      |                   | 0                        | 0         | 0.00         | *           |                | 0.00         | *           |                       | 0                  | 0.00         |
| Duct Heat Pkub     |                   | 0                        | 0         | 0.00         | *           |                | 0.00         | *           |                       | 0                  | 0.00         |
| OV/UNDR Sizing     | 0                 |                          | 0         | 0.00         | *           | 0              | 0.00         | *           | 0                     | 0                  | 0.00         |
| Exhaust Heat       |                   | 0                        | 0         | 0.00         | *           |                | 0.00         | *           |                       | 0                  | 0.00         |
| Terminal Bypass    |                   | 0                        | 0         | 0.00         | *           |                | 0.00         | *           |                       | 0                  | 0.00         |
| Grand Total==>     | 153,597           | 0                        | 157,522   | 100.00       | *           | 118,136        | 100.00       | *           | -171,332              | -171,332           | 100.00       |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total Floor | Glass (sf) | (%)   |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------------|------------|-------|
|          | (Mbh)                 | (Mbh)           | (cfm)            | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Part              | Roof       | Wall  |
| Main Clg | 13.1                  | 157.5           | 5,519            | 75.0              | 62.7  | 67.8   | 54.7             | 52.9  | 58.5   | 0                 | 4,954      | 3,329 |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0                 | 0          | 0     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0                 | 0          | 0     |
| Totals   | 13.1                  | 157.5           |                  |                   |       |        |                  |       |        | 0                 | 4,954      | 473   |

-----HEATING COIL SELECTION-----

| Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type Vent | -----AIRFLOWS (cfm)----- |         | --ENGINEERING CHECKS-- |              |               | --TEMPERATURES (F)-- |          |          |      |      |
|----------------|------------------|-----------|-----------|-----------|--------------------------|---------|------------------------|--------------|---------------|----------------------|----------|----------|------|------|
| (Mbh)          | (cfm)            | Deg F     | Deg F     |           | Cooling                  | Heating | Clg % OA               | Clg Cfm/Sqft | Clg Btuh/Sqft | No. People           | Htg % OA | Type     | Clg  | Htg  |
| Main Htg       | -171.3           | 68.0      | 96.5      | Infil     | 1,198                    | 1,198   | 0                      | 1.11         | 420.44        | 42                   | 0.0      | SADB     | 55.3 | 96.5 |
| Aux Htg        | 0.0              | 0.0       | 0.0       | Supply    | 5,519                    | 5,519   | 0                      | 377.40       | 31.80         | 0                    | 0.0      | Plenum   | 75.0 | 68.0 |
| Preheat        | -0.0             | 68.0      | 54.7      | Mincfm    | 0                        | 0       | 0                      | 0            | 0             | 0                    | 0.0      | Return   | 75.0 | 68.0 |
| Reheat         | 0.0              | 0.0       | 0.0       | Return    | 5,519                    | 5,519   | 0                      | 0            | 0             | 0                    | 0.0      | Ret/OA   | 75.0 | 68.0 |
| Humidif        | 0.0              | 0.0       | 0.0       | Exhaust   | 0                        | 0       | 0                      | 0            | 0             | 0                    | 0.0      | Runarnd  | 75.0 | 68.0 |
| Opt Vent       | 0.0              | 0.0       | 0.0       | Rm Exh    | 0                        | 0       | 0                      | 1.11         | 0             | 0                    | 0.0      | Fn MtrTD | 0.2  | 0.0  |
| Total          | -171.3           |           |           | Auxil     | 0                        | 0       | 0                      | -34.58       | 0             | 0                    | 0.0      | Fn BldTD | 0.1  | 0.0  |
|                |                  |           |           |           |                          |         |                        |              |               |                      | 0.0      | Fn Frict | 0.4  | 0.0  |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 416                     | 0                        |                        | 416              | 7.71             | * | 477                   | 11.75            | * | -396              | -396             | 5.35             |
| Glass Solar     | 784                     | 0                        |                        | 784              | 14.54            | * | 765                   | 18.86            | * | 0                 | 0                | 0.00             |
| Glass Cond      | 136                     | 0                        |                        | 136              | 2.52             | * | 145                   | 3.58             | * | -689              | -689             | 9.31             |
| Wall Cond       | 1,450                   | 0                        |                        | 1,450            | 26.88            | * | 1,531                 | 37.74            | * | -2,474            | -2,474           | 33.43            |
| Partition       | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 2,384                   |                          |                        | 2,384            | 44.20            | * | 931                   | 22.94            | * | -3,844            | -3,844           | 51.92            |
| Sub Total==>    | 5,169                   | 0                        |                        | 5,169            | 95.85            | * | 3,849                 | 94.87            | * | -7,403            | -7,403           | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Lights          | 198                     | 0                        |                        | 198              | 3.67             | * | 208                   | 5.13             | * | 0                 | 0                | 0.00             |
| People          | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 198                     | 0                        | 0                      | 198              | 3.67             | * | 208                   | 5.13             | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Outside Air     | 0                       |                          | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 26               | 0.48             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Grand Total==>  | 5,367                   | 0                        | 0                      | 5,393            | 100.00           | * | 4,057                 | 100.00           | * | -7,403            | -7,403           | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |      |      | Leaving DB/WB/HR |      |      | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|------|------|------------------|------|------|-------------------|------------|-----|
| Main Clg | 0.4                   | 5.4             | 181              | 75.1              | 62.5 | 66.5 | 54.3             | 52.1 | 56.0 | 108               |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | 0                 |            |     |
| Totals   | 0.4                   | 5.4             |                  |                   |      |      |                  |      |      | 108               | 19         | 12  |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |            |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------------------|------------|
| Main Htg | -7.4           | 181              | 68.0      | 105.6     | Vent    | 0       | 0       | Clg % OA               | 0.0    | Type                 | Clg Htg    |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 55      | 55      | Clg Cfm/Sqft           | 1.68   | SADB                 | 54.4 105.6 |
| Preheat  | -0.0           | 181              | 68.0      | 54.3      | Supply  | 181     | 181     | Clg Cfm/Ton            | 402.68 | Plenum               | 75.0 68.0  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 240.31 | Return               | 75.0 68.0  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 181     | 181     | Clg Btuh/Sqft          | 49.93  | Ret/OA               | 75.0 68.0  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | No. People             | 0      | Runarnd              | 75.0 68.0  |
| Total    | -7.4           |                  |           |           | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.0 0.0    |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 1.68   | Fn BldTD             | 0.0 0.0    |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -68.55 | Fn Frict             | 0.1 0.0    |



System 3 Block RAD - RADIATION

| ***** COOLING COIL PEAK ***** |                         |                          |                        |                  | ***** CLG SPACE PEAK ***** |                       |                    |                   |                  | ***** HEATING COIL PEAK ***** |  |  |
|-------------------------------|-------------------------|--------------------------|------------------------|------------------|----------------------------|-----------------------|--------------------|-------------------|------------------|-------------------------------|--|--|
| Peaked at Time ==>            |                         |                          |                        |                  | Mo/Hr: 0/ 0                |                       |                    |                   |                  | Mo/Hr: 13/ 1                  |  |  |
| Outside Air ==>               |                         |                          |                        |                  | OADB/WB/HR: 0/ 0/ 0.0      |                       |                    |                   |                  | OADB: 4                       |  |  |
| Envelope Loads                | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%)         | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Percent Of Tot (%)            |  |  |
| Skylite Solr                  | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Skylite Cond                  | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Roof Cond                     | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | -22,703           | -22,703          | 9.77                          |  |  |
| Glass Solar                   | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Glass Cond                    | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | -23,598           | -23,598          | 10.15                         |  |  |
| Wall Cond                     | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | -71,927           | -71,927          | 30.94                         |  |  |
| Partition                     | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Exposed Floor                 | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Infiltration                  | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | -114,210          | -114,210         | 49.14                         |  |  |
| Sub Total==>                  | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | -232,438          | -232,438         | 100.00                        |  |  |
| Internal Loads                |                         |                          |                        |                  |                            |                       |                    |                   |                  |                               |  |  |
| Lights                        | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| People                        | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Misc                          | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Sub Total==>                  | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Ceiling Load                  | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Outside Air                   | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Sup. Fan Heat                 | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Ret. Fan Heat                 | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Duct Heat Pkup                | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| OV/UNDR Sizing                | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Exhaust Heat                  | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Terminal Bypass               | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | 0                 | 0                | 0.00                          |  |  |
| Grand Total==>                | 0                       | 0                        | 0                      | 0                | 0.00                       | 0                     | 0.00               | -232,438          | -232,438         | 100.00                        |  |  |

| -----COOLING COIL SELECTION----- |                       |                 |                  |                   |       |        |                  |       |        | -----AREAS----- |            |        |
|----------------------------------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-----------------|------------|--------|
|                                  | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total     | Glass (sf) | (%)    |
|                                  |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor           |            |        |
| Main Clg                         | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part            | 6,194      |        |
| Aux Clg                          | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr           | 0          |        |
| Opt Vent                         | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof            | 0          |        |
| Totals                           | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Wall            | 6,194      | 0 0    |
|                                  |                       |                 |                  |                   |       |        |                  |       |        |                 | 4,555      | 655 14 |

| -----HEATING COIL SELECTION----- |                  |           |           |      | -----AIRFLOWS (cfm)----- |         |          | -----ENGINEERING CHECKS----- |            |     | -----TEMPERATURES (F)----- |  |  |
|----------------------------------|------------------|-----------|-----------|------|--------------------------|---------|----------|------------------------------|------------|-----|----------------------------|--|--|
| Capacity (Mbh)                   | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type | Cooling                  | Heating | Clg % OA |                              | Type       | Clg | Htg                        |  |  |
| Main Htg                         | -232.4           | 0         | 0.0       | 0.0  | Infil                    | 0       | 0        | 0.00                         | SADB       | 0.0 | 68.1                       |  |  |
| Aux Htg                          | 0.0              | 0         | 0.0       | 0.0  | Supply                   | 0       | 1,640    | 0.00                         | Plenum     | 0.0 | 68.0                       |  |  |
| Preheat                          | 0.0              | 0         | 0.0       | 0.0  | Mincfm                   | 0       | 0        | 0.00                         | Return     | 0.0 | 68.0                       |  |  |
| Reheat                           | 0.0              | 0         | 0.0       | 0.0  | Return                   | 0       | 0        | 0.00                         | Ret/OA     | 0.0 | 68.0                       |  |  |
| Humidif                          | 0.0              | 0         | 0.0       | 0.0  | Exhaust                  | 0       | 0        | 0.00                         | No. People | 0   | 68.0                       |  |  |
| Opt Vent                         | 0.0              | 0         | 0.0       | 0.0  | Rm Exh                   | 0       | 0        | 0.00                         | Htg % OA   | 0.0 | 0.0                        |  |  |
| Total                            | -232.4           |           |           |      | Auxil                    | 0       | 0        | -37.53                       | Fn MtrTD   | 0.0 | 0.0                        |  |  |
|                                  |                  |           |           |      |                          |         |          |                              | Fn BldTD   | 0.0 | 0.0                        |  |  |
|                                  |                  |           |           |      |                          |         |          |                              | Fn Frict   | 0.0 | 0.0                        |  |  |

BUILDING U-VALUES - ALTERNATIVE 1  
 REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Room U-Values (Btu/hr/sqft/F) |       |             |             |       |             |             |       | Room Mass (lb/sqft) | Room Capac. (Btu/sqft/F) |       |
|-------------|------------------|-------------------------------|-------|-------------|-------------|-------|-------------|-------------|-------|---------------------|--------------------------|-------|
|             |                  | Part.                         | ExFlr | Summr Skylt | Wintr Skylt | Roof  | Summr Windo | Wintr Windo | Wall  |                     |                          | Ceil. |
| 1           | OFFICES          | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 30.5                     | 9.34  |
| Zone        | 1 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 30.5                     | 9.34  |
| System      | 1 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 30.5                     | 9.34  |
| 3           | WOMENS TOILET    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 48.8                     | 12.99 |
| Zone        | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 48.8                     | 12.99 |
| System      | 2 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 48.8                     | 12.99 |
| 1           | OFFICES          | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 30.5                     | 9.34  |
| Zone        | 1 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 30.5                     | 9.34  |
| 2           | CORRIDOR TOILETS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 36.7                     | 10.59 |
| Zone        | 2 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 36.7                     | 10.59 |
| 3           | WOMENS TOILET    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 48.8                     | 12.99 |
| Zone        | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 48.8                     | 12.99 |
| System      | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 32.0                     | 9.63  |
| Building    |                  | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057 | 0.550       | 0.563       | 0.288 | 0.000               | 31.5                     | 9.54  |

BUILDING AREAS - ALTERNATIVE 1  
 REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G A R E A S -----

| Room Number | Description      | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|---------------------|----|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
|             |                  | Flr                 | Rm |                             |                         |                       |                           |                      |             |                      |                    |             |                      |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| System      | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System      | 2 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 2           | CORRIDOR TOILETS | 1                   | 1  | 1,132                       | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| Zone        | 2 Total/Ave.     |                     |    |                             | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System      | 3 Total/Ave.     |                     |    |                             | 6,194                   | 0                     | 0                         | 0                    | 0           | 6,194                | 655                | 14          | 3,900                |
| Building    |                  |                     |    |                             | 11,256                  | 0                     | 0                         | 0                    | 0           | 11,256               | 1,148              | 14          | 6,890                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
REPLACE FLUORESCENT BALLASTS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 3.49 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTvw) = 21.38 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 REPLACE FLUORESCENT BALLAST

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.7                    | 3            | 23    | -20,559                  | 15           | 364   | 285.0                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 1.4                    | 6            | 45    | -41,117                  | 17           | 434   | 570.0                     | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 2.0                    | 3            | 22    | -61,676                  | 21           | 539   | 855.0                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 2.7                    | 6            | 45    | -82,235                  | 14           | 349   | 1,140.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 3.4                    | 2            | 15    | -102,793                 | 12           | 299   | 1,425.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 4.1                    | 13           | 90    | -123,352                 | 1            | 23    | 1,710.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 4.8                    | 3            | 22    | -143,911                 | 1            | 35    | 1,995.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 5.4                    | 8            | 55    | -164,469                 | 0            | 0     | 2,280.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 6.1                    | 9            | 65    | -185,028                 | 1            | 36    | 2,565.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 6.8                    | 3            | 22    | -205,587                 | 0            | 5     | 2,850.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 7.5                    | 12           | 89    | -226,145                 | 1            | 29    | 3,135.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 8.1                    | 6            | 45    | -246,704                 | 16           | 394   | 3,420.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 8.8                    | 6            | 42    | -267,263                 | 0            | 0     | 3,705.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 9.5                    | 3            | 20    | -287,821                 | 0            | 0     | 3,990.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 10.2                   | 8            | 60    | -308,380                 | 0            | 0     | 4,275.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 10.9                   | 0            | 0     | -328,939                 | 0            | 0     | 4,560.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 11.5                   | 5            | 33    | -349,497                 | 0            | 0     | 4,845.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 12.2                   | 0            | 0     | -370,056                 | 0            | 0     | 5,130.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 12.9                   | 0            | 0     | -390,615                 | 0            | 0     | 5,415.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 13.6                   | 3            | 25    | -411,173                 | 0            | 0     | 5,700.0                   | 100          | 1,070 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 8,042 | 0                        | 0            | 6,253 | 0.0                       | 0            | 7,690 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 REPLACE FLUORESCENT BALLAST

----- BUILDING TEMPERATURE PROFILES -----

| Temperature Range (F) | Zone Number |      |       |       |       |
|-----------------------|-------------|------|-------|-------|-------|
|                       | 1           | 3    | 1     | 2     | 3     |
| Max. Temp.            | 87.9        | 88.6 | 104.8 | 102.9 | 101.1 |
| Mo./Hr.               | 7 21        | 7 20 | 7 21  | 7 22  | 8 21  |
| Day Type              | 4           | 4    | 1     | 1     | 1     |

|           | Number of Hours |       |       |       |       |
|-----------|-----------------|-------|-------|-------|-------|
| Above 100 | 0               | 0     | 471   | 169   | 0     |
| 95 - 100  | 0               | 0     | 977   | 871   | 648   |
| 90 - 95   | 0               | 0     | 894   | 1,028 | 1,258 |
| 85 - 90   | 151             | 132   | 662   | 761   | 849   |
| 80 - 85   | 1,268           | 1,115 | 625   | 731   | 718   |
| 75 - 80   | 1,916           | 1,824 | 43    | 112   | 199   |
| 70 - 75   | 371             | 578   | 193   | 66    | 166   |
| 65 - 70   | 530             | 352   | 1,961 | 2,076 | 1,946 |
| 60 - 65   | 606             | 785   | 973   | 925   | 904   |
| 55 - 60   | 709             | 811   | 774   | 792   | 852   |
| 50 - 55   | 660             | 687   | 1,187 | 1,229 | 1,220 |
| Below 50  | 2,549           | 2,476 | 0     | 0     | 0     |

|            |      |      |      |      |      |
|------------|------|------|------|------|------|
| Min. Temp. | 32.5 | 33.1 | 54.9 | 55.0 | 54.9 |
| Mo./Hr.    | 2 10 | 2 10 | 12 2 | 1 7  | 2 20 |
| Day Type   | 4    | 4    | 4    | 1    | 3    |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
REPLACE FLUORESCENT BALLASTS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | DEMAND             |                      | HOT WTR | HOT W DMND |
|-------|-------------------|-----------------|--------------------|----------------------|---------|------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |         |            |
| Jan   | 2,603             | 14              | 534                | 2                    |         |            |
| Feb   | 2,355             | 14              | 512                | 2                    |         |            |
| March | 2,849             | 14              | 275                | 2                    |         |            |
| April | 2,477             | 14              | 73                 | 2                    |         |            |
| May   | 3,541             | 34              | 0                  | 0                    |         |            |
| June  | 4,749             | 36              | 0                  | 0                    |         |            |
| July  | 5,437             | 37              | 0                  | 0                    |         |            |
| Aug   | 4,965             | 36              | 0                  | 0                    |         |            |
| Sept  | 3,198             | 35              | 0                  | 0                    |         |            |
| Oct   | 2,724             | 14              | 67                 | 2                    |         |            |
| Nov   | 2,477             | 14              | 197                | 2                    |         |            |
| Dec   | 2,479             | 14              | 437                | 2                    |         |            |
| Total | 39,855            | 37              | 2,096              | 2                    |         |            |

Building Energy Consumption = 30,702 (Btu/Sq Ft/Year)  
Source Energy Consumption = 61,080 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 REPLACE FLUORESCENT BALLASTS

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref<br>Num | Equip<br>Code | Monthly Consumption |                            |      |      |      |      |      |      |      |      |      |      | Total  |
|------------|---------------|---------------------|----------------------------|------|------|------|------|------|------|------|------|------|------|--------|
|            |               | Jan                 | Feb                        | Mar  | Apr  | May  | June | July | Aug  | Sep  | Oct  | Nov  | Dec  |        |
| 0          | LIGHTS        |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 2600                | 2352                       | 2848 | 2476 | 2724 | 2724 | 2476 | 2848 | 2476 | 2724 | 2476 | 2476 | 31,199 |
|            | PK            | 13.5                | 13.5                       | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5   |
| 1          | MISC LD       |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 2          | MISC LD       |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | GAS           | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 3          | MISC LD       |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | OIL           | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 4          | MISC LD       |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | P STEAM       | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 5          | MISC LD       |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | P HOTH2O      | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 6          | MISC LD       |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | P CHILL       | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 1          | EQ1161        |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                     | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 0                   | 0                          | 0    | 0    | 250  | 1273 | 2102 | 1312 | 208  | 0    | 0    | 0    | 5,146  |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 16.8 | 17.6 | 18.2 | 17.6 | 17.0 | 0.0  | 0.0  | 0.0  | 18.2   |
| 1          | EQ5200        |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                     | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 0                   | 0                          | 0    | 0    | 26   | 117  | 203  | 123  | 22   | 0    | 0    | 0    | 491    |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.6  | 1.4  | 1.6  | 1.4  | 1.1  | 0.0  | 0.0  | 0.0  | 1.6    |
| 1          | EQ5303        |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                     | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 0                   | 0                          | 0    | 0    | 17   | 59   | 60   | 62   | 10   | 0    | 0    | 0    | 209    |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.0  | 0.0  | 0.0  | 0.3    |
| 2          | EQ1161        |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                     | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 0                   | 0                          | 0    | 0    | 0    | 19   | 55   | 29   | 2    | 0    | 0    | 0    | 105    |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.5  | 0.5  | 0.6  | 0.5  | 0.5  | 0.0  | 0.0  | 0.0  | 0.6    |
| 2          | EQ5200        |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                     | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 0                   | 0                          | 0    | 0    | 0    | 2    | 5    | 3    | 0    | 0    | 0    | 0    | 10     |
|            | PK            | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.1    |
| 2          | EQ5303        |                     |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                     | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |        |





UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
 REPLACE FLUORESCENT BALLASTS

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        36.9    (kW)  
 Yearly Time of Peak 15 (hr)    7 (mo)

Hour 15    Month 7

| Eqp.<br>Ref.<br>Num.        | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|-----------------------------|------------------------|------------------------------------|---------------------------|------------------------|
| <b>Cooling Equipment</b>    |                        |                                    |                           |                        |
| 1                           | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 20.1                      | 54.41                  |
| 2                           | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 0.9                       | 2.49                   |
| Sub Total                   |                        |                                    | 21.0                      | 56.90                  |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                   |
| <b>Air Moving Equipment</b> |                        |                                    |                           |                        |
| 1                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 2.4                       | 6.40                   |
| 2                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.0                       | 0.04                   |
| Sub Total                   |                        |                                    | 2.4                       | 6.44                   |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                   |
| <b>Miscellaneous</b>        |                        |                                    |                           |                        |
|                             | Lights                 |                                    | 13.5                      | 36.66                  |
|                             | Base Utilities         |                                    | 0.0                       | 0.00                   |
|                             | Misc Equipment         |                                    | 0.0                       | 0.00                   |
| Sub Total                   |                        |                                    | 13.5                      | 36.66                  |
| Grand Total                 |                        |                                    | 36.9                      | 100.00                 |

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 45

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Reflectance: 0.20  
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:20:59 1/26/94  
Dataset Name: CB458 .TM

AIRFLOW - ALTERNATIVE 2  
 REPLACE FLUORESCENT FIXTURES

----- S Y S T E M   S U M M A R Y -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | SZ          | 0                     | 5,519                 | 5,519                 | 6,717                | 1,198                 | 0             | 0             |
| 2             | PTAC        | 0                     | 179                   | 179                   | 234                  | 55                    | 0             | 0             |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 1,640                 | 0             | 0             |
| Totals        |             | 0                     | 5,698                 | 5,698                 | 6,951                | 2,893                 | 0             | 0             |

CAPACITY - ALTERNATIVE 2  
 REPLACE FLUORESCENT FIXTURES

----- S Y S T E M   S U M M A R Y -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling              |                      |                      |                      |                      | Heating               |                      |                      |                      |                         |                        |                          |                      |                      |                       |          |
|---------------|-------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|----------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|----------|
|               |             | Main Capacity (Tons) | Sys. Capacity (Tons) | Aux. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Capacity (Btuh) | Sys. Capacity (Btuh) | Aux. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |          |
| 1             | SZ          | 12.8                 | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 12.8                  | -171,332             | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | 0                     | -171,332 |
| 2             | PTAC        | 0.4                  | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 0.4                   | -7,403               | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | 0                     | -7,403   |
| 3             | RAD         | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 0.0                   | -232,438             | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | 0                     | -232,438 |
| Totals        |             | 13.2                 | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 13.2                  | -411,173             | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | 0                     | -411,173 |

The building peaked at hour 16 month 7 with a capacity of 13.2 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 REPLACE FLUORESCENT FIXTURES

----- E N G I N E E R I N G   C H E C K S -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling   |         |           |            | Heating   |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|-----------|---------|-----------|------------|-----------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft | Cfm/Ton | Sq Ft/Ton | Btuh/Sq Ft | Cfm/Sq Ft | Btuh/Sq Ft |                  |
| 1             | Main           | SZ          | 0.00                | 1.11      | 431.1   | 387.0     | 31.01      | 1.11      | -34.58     | 4,954            |
| 2             | Main           | PTAC        | 0.00                | 1.65      | 400.3   | 241.9     | 49.61      | 1.65      | -68.55     | 108              |
| 3             | Main           | RAD         | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.00      | -37.53     | 6,194            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 7/16              |          | *       | Mo/Hr: 7/16 |          | *      | Mo/Hr: 13/ 1 |           |        |
|--------------------|------------|--------------------------|----------|---------|-------------|----------|--------|--------------|-----------|--------|
| Outside Air ==>    |            | OADB/WB/HR: 91/ 73/ 98.0 |          | *       | OADB: 91    |          | *      | OADB: 4      |           |        |
|                    | Space      | Ret. Air                 | Ret. Air | Net     | Perct       | Space    | Perct  | Space Peak   | Coil Peak | Perct  |
|                    | Sens.+Lat. | Sensible                 | Latent   | Total   | Of Tot      | Sensible | Of Tot | Space Sens   | Tot Sens  | Of Tot |
|                    | (Btuh)     | (Btuh)                   | (Btuh)   | (Btuh)  | (%)         | (Btuh)   | (%)    | (Btuh)       | (Btuh)    | (%)    |
| Envelope Loads     |            |                          |          |         |             |          |        |              |           |        |
| Skylite Solr       | 0          | 0                        |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Skylite Cond       | 0          | 0                        |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Roof Cond          | 22,074     | 0                        |          | 22,074  | 14.37       | 22,074   | 19.18  | -18,158      | -18,158   | 10.60  |
| Glass Solar        | 17,987     | 0                        |          | 17,987  | 11.71       | 17,987   | 15.63  | 0            | 0         | 0.00   |
| Glass Cond         | 3,619      | 0                        |          | 3,619   | 2.36        | 3,619    | 3.14   | -17,052      | -17,052   | 9.95   |
| Wall Cond          | 26,577     | 0                        |          | 26,577  | 17.30       | 26,577   | 23.09  | -52,660      | -52,660   | 30.74  |
| Partition          | 0          |                          |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Exposed Floor      | 0          |                          |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Infiltration       | 44,113     |                          |          | 44,113  | 28.72       | 20,213   | 17.56  | -83,461      | -83,461   | 48.71  |
| Sub Total==>       | 114,370    | 0                        |          | 114,370 | 74.45       | 90,470   | 78.61  | -171,332     | -171,332  | 100.00 |
| Internal Loads     |            |                          |          |         |             |          |        |              |           |        |
| Lights             | 14,977     | 0                        |          | 14,977  | 9.75        | 14,977   | 13.01  | 0            | 0         | 0.00   |
| People             | 20,341     |                          |          | 20,341  | 13.24       | 9,635    | 8.37   | 0            | 0         | 0.00   |
| Misc               | 0          | 0                        | 0        | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Sub Total==>       | 35,318     | 0                        | 0        | 35,318  | 22.99       | 24,612   | 21.39  | 0            | 0         | 0.00   |
| Ceiling Load       | 0          |                          |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Outside Air        | 0          |                          | 0        | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Sup. Fan Heat      |            |                          |          | 3,925   | 2.55        |          | 0.00   |              | 0         | 0.00   |
| Ret. Fan Heat      |            | 0                        |          | 0       | 0.00        |          | 0.00   |              | 0         | 0.00   |
| Duct Heat Pkup     |            | 0                        |          | 0       | 0.00        |          | 0.00   |              | 0         | 0.00   |
| OV/UNDR Sizing     | 0          |                          |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Exhaust Heat       |            | 0                        | 0        | 0       | 0.00        |          | 0.00   |              | 0         | 0.00   |
| Terminal Bypass    |            | 0                        | 0        | 0       | 0.00        |          | 0.00   |              | 0         | 0.00   |
| Grand Total==>     | 149,688    | 0                        | 0        | 153,612 | 100.00      | 115,082  | 100.00 | -171,332     | -171,332  | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 12.8           | 153.6     | 119.0      | 75.0              | 62.9  | 68.9   | 55.2             | 53.5  | 59.8   | 4,954       |            |     |
| Aux Clg  | 0.0            | 0.0       | 0.0        | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Opt Vent | 0.0            | 0.0       | 0.0        | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 12.8           | 153.6     |            |                   |       |        |                  |       |        | 4,954       | 0          | 0   |
|          |                |           |            |                   |       |        |                  |       |        | 3,329       | 473        | 14  |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------|------------|-------|-------|---------|---------|---------|------------------------|--------|----------------------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg % OA               | 0.0    | Type                 | Clg  | Htg  |
| Main Htg | -171.3   | 5,519      | 68.0  | 96.5  | Infil   | 1,198   | 1,198   | Clg Cfm/Sqft           | 1.11   | SADB                 | 55.8 | 96.5 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 5,519   | 5,519   | Clg Cfm/Ton            | 431.14 | Plenum               | 75.0 | 68.0 |
| Preheat  | -0.0     | 5,519      | 68.0  | 55.2  | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 387.00 | Return               | 75.0 | 68.0 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 5,519   | 5,519   | Clg Btuh/Sqft          | 31.01  | Ret/OA               | 75.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 0       | 0       | No. People             | 42     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.2  | 0.0  |
| Total    | -171.3   |            |       |       | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 1.11   | Fn BldTD             | 0.1  | 0.0  |
|          |          |            |       |       |         |         |         | Htg Btuh/Sqft          | -34.58 | Fn Frict             | 0.4  | 0.0  |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK                        |                         |                          |                        |                  |                  | CLG SPACE PEAK        |                  |                   | HEATING COIL PEAK |                  |  |
|------------------------------------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|-------------------|------------------|--|
| Peaked at Time ==> Mo/Hr: 7/14           |                         |                          |                        |                  |                  | Mo/Hr: 7/16           |                  |                   | Mo/Hr: 13/ 1      |                  |  |
| Outside Air ==> OADB/WB/HR: 91/ 74/105.0 |                         |                          |                        |                  |                  | OADB: 91              |                  |                   | OADB: 4           |                  |  |
| Envelope Loads                           | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh)  | Perct Of Tot (%) |  |
| Skylite Solr                             | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             |  |
| Skylite Cond                             | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             |  |
| Roof Cond                                | 416                     | 0                        | 0                      | 416              | 7.76             | 477                   | 11.86            | -396              | -396              | 5.35             |  |
| Glass Solar                              | 784                     | 0                        | 0                      | 784              | 14.64            | 765                   | 19.03            | 0                 | 0                 | 0.00             |  |
| Glass Cond                               | 136                     | 0                        | 0                      | 136              | 2.53             | 145                   | 3.61             | -689              | -689              | 9.31             |  |
| Wall Cond                                | 1,450                   | 0                        | 0                      | 1,450            | 27.06            | 1,531                 | 38.08            | -2,474            | -2,474            | 33.43            |  |
| Partition                                | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             |  |
| Exposed Floor                            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             |  |
| Infiltration                             | 2,384                   | 0                        | 0                      | 2,384            | 44.49            | 931                   | 23.15            | -3,844            | -3,844            | 51.92            |  |
| Sub Total==>                             | 5,169                   | 0                        | 0                      | 5,169            | 96.48            | 3,849                 | 95.74            | -7,403            | -7,403            | 100.00           |  |
| Internal Loads                           |                         |                          |                        |                  |                  |                       |                  |                   |                   |                  |  |
| Lights                                   | 163                     | 0                        | 0                      | 163              | 3.04             | 171                   | 4.26             | 0                 | 0                 | 0.00             |  |
| People                                   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             |  |
| Misc                                     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             |  |
| Sub Total==>                             | 163                     | 0                        | 0                      | 163              | 3.04             | 171                   | 4.26             | 0                 | 0                 | 0.00             |  |
| Ceiling Load                             | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             |  |
| Outside Air                              | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             |  |
| Sup. Fan Heat                            |                         |                          |                        | 25               | 0.47             |                       | 0.00             |                   |                   | 0.00             |  |
| Ret. Fan Heat                            |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                   |                   | 0.00             |  |
| Duct Heat Pkcp                           |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                   |                   | 0.00             |  |
| OV/UNDR Sizing                           | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             |  |
| Exhaust Heat                             |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                   |                   | 0.00             |  |
| Terminal Bypass                          |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                   |                   | 0.00             |  |
| Grand Total==>                           | 5,332                   | 0                        | 0                      | 5,358            | 100.00           | 4,020                 | 100.00           | -7,403            | -7,403            | 100.00           |  |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS |            |     |
|----------|----------------|-------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------|------------|-----|
|          | (Tons)         | (Mbh) | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor | Glass (sf) | (%) |
| Main Clg | 0.4            | 5.4   | 3.9       | 179        | 75.1              | 62.5  | 66.5   | 54.3             | 52.1  | 55.9   | 108   |            |     |
| Aux Clg  | 0.0            | 0.0   | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0     |            |     |
| Opt Vent | 0.0            | 0.0   | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0     |            |     |
| Totals   | 0.4            | 5.4   |           |            |                   |       |        |                  |       |        | 108   | 0          | 0   |
|          |                |       |           |            |                   |       |        |                  |       |        | 153   | 19         | 12  |

-----HEATING COIL SELECTION-----

|          | Capacity |       | Coil Airfl |           | AIRFLOWS (cfm) |         | ENGINEERING CHECKS-- |               |        | TEMPERATURES (F)--- |      |       |
|----------|----------|-------|------------|-----------|----------------|---------|----------------------|---------------|--------|---------------------|------|-------|
|          | (Mbh)    | (cfm) | Ent Deg F  | Lvg Deg F | Type           | Cooling | Heating              | Clg % OA      |        | Type                | Clg  | Htg   |
| Main Htg | -7.4     | 179   | 68.0       | 106.1     | Vent           | 0       | 0                    | Clg % OA      | 0.0    | Type                | Clg  | Htg   |
| Aux Htg  | 0.0      | 0     | 0.0        | 0.0       | Infil          | 55      | 55                   | Clg Cfm/Sqft  | 1.65   | SADB                | 54.3 | 106.1 |
| Preheat  | -0.0     | 179   | 68.0       | 54.2      | Supply         | 179     | 179                  | Clg Cfm/Ton   | 400.27 | Plenum              | 75.0 | 68.0  |
| Reheat   | 0.0      | 0     | 0.0        | 0.0       | Mincfm         | 0       | 0                    | Clg Sqft/Ton  | 241.89 | Return              | 75.0 | 68.0  |
| Humidif  | 0.0      | 0     | 0.0        | 0.0       | Return         | 179     | 179                  | Clg 8tuh/Sqft | 49.61  | Ret/OA              | 75.0 | 68.0  |
| Opt Vent | 0.0      | 0     | 0.0        | 0.0       | Exhaust        | 0       | 0                    | No. People    | 0      | Runarnd             | 75.0 | 68.0  |
| Total    | -7.4     |       |            |           | Rm Exh         | 0       | 0                    | Htg % OA      | 0.0    | Fn MtrTD            | 0.0  | 0.0   |
|          |          |       |            |           | Auxil          | 0       | 0                    | Htg Cfm/Sqft  | 1.65   | Fn BldTD            | 0.0  | 0.0   |
|          |          |       |            |           |                |         |                      | Htg 8tuh/Sqft | -68.55 | Fn Frict            | 0.1  | 0.0   |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -22,703                      | -22,703                   | 9.77             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -23,598                      | -23,598                   | 10.15            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -71,927                      | -71,927                   | 30.94            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -114,210                     | -114,210                  | 49.14            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -232,438                     | -232,438                  | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -232,438                     | -232,438                  | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------------|------------|-----|
| Main Clg | 0.0                   | 0.0             | 0                | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | 6,194             |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                |                   |       |        |                  |       |        | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                |                   |       |        |                  |       |        | 0                 |            |     |
| Totals   | 0.0                   | 0.0             | 0                |                   |       |        |                  |       |        | 6,194             | 0          | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        | 4,555             | 655        | 14  |

-----AREAS-----

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |     |      |
|----------|----------------|------------------|-----------|-----------|---------|----------------|---------|------------------------|--------|----------------------|-----|------|
| Main Htg | -232.4         | 0                | 0.0       | 0.0       | Vent    | Cooling        | Heating | Clg % OA               | 0.0    | Type                 | Clg | Htg  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0              | 1,640   | Clg Cfm/Sqft           | 0.00   | SADB                 | 0.0 | 68.1 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0              | 0       | Clg Cfm/Ton            | 0.00   | Plenum               | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0              | 0       | Clg Sqft/Ton           | 0.00   | Return               | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0              | 0       | Clg Btuh/Sqft          | 0.00   | Ret/OA               | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0              | 0       | No. People             | 0      | Runarnd              | 0.0 | 68.0 |
| Total    | -232.4         | 0                | 0.0       | 0.0       | Rm Exh  | 0              | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.0 | 0.0  |
|          |                |                  |           |           | Auxil   | 0              | 0       | Htg Cfm/Sqft           | 0.00   | Fn BldTD             | 0.0 | 0.0  |
|          |                |                  |           |           |         |                |         | Htg Btuh/Sqft          | -37.53 | Fn Frict             | 0.0 | 0.0  |

BUILDING U-VALUES - ALTERNATIVE 2  
 REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Room U-Values (Btu/hr/sqft/F) |       |             |             |            |             |       |       |       | Room Mass (lb/sqft) | Room Capac. (Btu/sqft/F) |
|-------------|------------------|-------------------------------|-------|-------------|-------------|------------|-------------|-------|-------|-------|---------------------|--------------------------|
|             |                  | Part.                         | ExFlr | Summr Skylt | Wintr Skylt | Summr Roof | Wintr Windo | Windo | Wall  | Ceil. |                     |                          |
| 1           | OFFICES          | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 30.5                | 9.34                     |
| Zone        | 1 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 30.5                | 9.34                     |
| System      | 1 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 30.5                | 9.34                     |
| 3           | WOMENS TOILET    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 48.8                | 12.99                    |
| Zone        | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 48.8                | 12.99                    |
| System      | 2 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 48.8                | 12.99                    |
| 1           | OFFICES          | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 30.5                | 9.34                     |
| Zone        | 1 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 30.5                | 9.34                     |
| 2           | CORRIDOR TOILETS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 36.7                | 10.59                    |
| Zone        | 2 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 36.7                | 10.59                    |
| 3           | WOMENS TOILET    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 48.8                | 12.99                    |
| Zone        | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 48.8                | 12.99                    |
| System      | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 32.0                | 9.63                     |
| Building    |                  | 0.000                         | 0.000 | 0.000       | 0.000       | 0.057      | 0.550       | 0.563 | 0.288 | 0.000 | 31.5                | 9.54                     |

BUILDING AREAS - ALTERNATIVE 2  
 REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G A R E A S -----

| Room Number | Description      | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | SkI /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|---------------------|----|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
|             |                  | Flr                 | Rm |                             |                         |                       |                           |                      |             |                      |                    |             |                      |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| System      | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System      | 2 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 2           | CORRIDOR TOILETS | 1                   | 1  | 1,132                       | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| Zone        | 2 Total/Ave.     |                     |    |                             | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System      | 3 Total/Ave.     |                     |    |                             | 6,194                   | 0                     | 0                         | 0                    | 0           | 6,194                | 655                | 14          | 3,900                |
| Building    |                  |                     |    |                             | 11,256                  | 0                     | 0                         | 0                    | 0           | 11,256               | 1,148              | 14          | 6,890                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
REPLACE FLUORESCENT FIXTURES

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.057 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.326 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.169 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 3.49 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTvw) = 21.38 (Btu/Hr/Sq Ft)



SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 REPLACE FLUORESCENT FIXTURES

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.7                    | 6            | 41    | -20,559                  | 14           | 347   | 284.9                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 1.3                    | 3            | 22    | -41,117                  | 15           | 373   | 569.8                     | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 2.0                    | 0            | 0     | -61,676                  | 23           | 567   | 854.7                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 2.6                    | 7            | 45    | -82,235                  | 15           | 382   | 1,139.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 3.3                    | 8            | 53    | -102,793                 | 12           | 295   | 1,424.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 4.0                    | 10           | 68    | -123,352                 | 1            | 25    | 1,709.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 4.6                    | 3            | 22    | -143,911                 | 2            | 38    | 1,994.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 5.3                    | 11           | 76    | -164,469                 | 1            | 16    | 2,279.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 6.0                    | 4            | 28    | -185,028                 | 0            | 0     | 2,564.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 6.6                    | 9            | 65    | -205,587                 | 2            | 41    | 2,848.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 7.3                    | 7            | 46    | -226,145                 | 1            | 29    | 3,133.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 7.9                    | 10           | 68    | -246,704                 | 16           | 394   | 3,418.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 8.6                    | 3            | 19    | -267,263                 | 0            | 0     | 3,703.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 9.3                    | 6            | 40    | -287,821                 | 0            | 0     | 3,988.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 9.9                    | 6            | 40    | -308,380                 | 0            | 0     | 4,273.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 10.6                   | 3            | 18    | -328,939                 | 0            | 0     | 4,558.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 11.3                   | 2            | 15    | -349,497                 | 0            | 0     | 4,843.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 11.9                   | 0            | 0     | -370,056                 | 0            | 0     | 5,127.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 12.6                   | 0            | 0     | -390,615                 | 0            | 0     | 5,412.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 13.2                   | 4            | 25    | -411,173                 | 0            | 0     | 5,697.7                   | 100          | 1,070 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 8,069 | 0                        | 0            | 6,253 | 0.0                       | 0            | 7,690 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | ----- Zone Number ----- |      |       |       |       |
|-----------------------------|-------------------------|------|-------|-------|-------|
|                             | 1                       | 3    | 1     | 2     | 3     |
| Max. Temp.                  | 87.9                    | 88.6 | 104.0 | 102.4 | 100.8 |
| Mo./Hr.                     | 7 21                    | 7 20 | 7 22  | 7 22  | 8 21  |
| Day Type                    | 4                       | 4    | 1     | 1     | 1     |

|           | ..... Number of Hours ..... |       |       |       |       |
|-----------|-----------------------------|-------|-------|-------|-------|
| Above 100 | 0                           | 0     | 312   | 139   | 0     |
| 95 - 100  | 0                           | 0     | 1,065 | 767   | 593   |
| 90 - 95   | 0                           | 0     | 896   | 1,074 | 1,246 |
| 85 - 90   | 136                         | 132   | 630   | 800   | 903   |
| 80 - 85   | 1,247                       | 1,115 | 694   | 776   | 713   |
| 75 - 80   | 1,948                       | 1,824 | 75    | 116   | 217   |
| 70 - 75   | 358                         | 578   | 127   | 66    | 166   |
| 65 - 70   | 415                         | 347   | 2,006 | 2,057 | 1,930 |
| 60 - 65   | 720                         | 786   | 968   | 919   | 920   |
| 55 - 60   | 644                         | 799   | 795   | 817   | 852   |
| 50 - 55   | 689                         | 703   | 1,192 | 1,229 | 1,220 |
| Below 50  | 2,603                       | 2,476 | 0     | 0     | 0     |

|            |      |      |      |      |      |
|------------|------|------|------|------|------|
| Min. Temp. | 32.5 | 33.1 | 54.9 | 55.0 | 54.9 |
| Mo./Hr.    | 2 10 | 2 10 | 12 2 | 1 7  | 2 6  |
| Day Type   | 4    | 4    | 4    | 1    | 2    |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
 REPLACE FLUORESCENT FIXTURES

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | HOT WTR HOT W DMND |                      |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 2,163             | 11              | 542                | 2                    |
| Feb   | 1,957             | 11              | 519                | 2                    |
| March | 2,368             | 11              | 285                | 2                    |
| April | 2,058             | 11              | 78                 | 2                    |
| May   | 3,014             | 30              | 0                  | 0                    |
| June  | 4,204             | 33              | 0                  | 0                    |
| July  | 4,936             | 34              | 0                  | 0                    |
| Aug   | 4,389             | 33              | 0                  | 0                    |
| Sept  | 2,727             | 32              | 0                  | 0                    |
| Oct   | 2,264             | 11              | 74                 | 2                    |
| Nov   | 2,059             | 11              | 203                | 2                    |
| Dec   | 2,060             | 11              | 444                | 2                    |
| Total | 34,199            | 34              | 2,145              | 2                    |

Building Energy Consumption = 29,423 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 56,517 (Btu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 REPLACE FLUORESCENT FIXTURES

| ----- EQUIPMENT ENERGY CONSUMPTION ----- |            |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|------------------------------------------|------------|---------------------------------|----------------------------|------|------|------|------|------|------|------|------|------|------|--------|
| Ref Num                                  | Equip Code | ----- Monthly Consumption ----- |                            |      |      |      |      |      |      |      |      |      |      | Total  |
|                                          |            | Jan                             | Feb                        | Mar  | Apr  | May  | June | July | Aug  | Sep  | Oct  | Nov  | Dec  |        |
| 0                                        | LIGHTS     |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 2160                            | 1955                       | 2366 | 2057 | 2263 | 2263 | 2057 | 2366 | 2057 | 2263 | 2057 | 2057 | 25,924 |
|                                          | PK         | 11.2                            | 11.2                       | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2   |
| 1                                        | MISC LD    |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 2                                        | MISC LD    |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | GAS        | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 3                                        | MISC LD    |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | OIL        | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 4                                        | MISC LD    |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | P STEAM    | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 5                                        | MISC LD    |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | P HOTH2O   | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 6                                        | MISC LD    |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | P CHILL    | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 1                                        | EQ1161     |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0                          | 0    | 0    | 196  | 1196 | 2028 | 1226 | 161  | 0    | 0    | 0    | 4,807  |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 15.4 | 17.1 | 17.7 | 17.2 | 16.6 | 0.0  | 0.0  | 0.0  | 17.7   |
| 1                                        | EQ5200     |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0                          | 0    | 0    | 21   | 110  | 195  | 116  | 17   | 0    | 0    | 0    | 459    |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.6  | 1.3  | 1.6  | 1.3  | 1.0  | 0.0  | 0.0  | 0.0  | 1.6    |
| 1                                        | EQ5303     |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0                          | 0    | 0    | 11   | 59   | 60   | 62   | 10   | 0    | 0    | 0    | 202    |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.0  | 0.0  | 0.0  | 0.3    |
| 2                                        | EQ1161     |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0                          | 0    | 0    | 0    | 19   | 54   | 28   | 1    | 0    | 0    | 0    | 102    |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.5  | 0.5  | 0.6  | 0.5  | 0.5  | 0.0  | 0.0  | 0.0  | 0.6    |
| 2                                        | EQ5200     |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC       | 0                               | 0                          | 0    | 0    | 0    | 2    | 5    | 3    | 0    | 0    | 0    | 0    | 10     |
|                                          | PK         | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.1    |
| 2                                        | EQ5303     |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |            |                                 | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |        |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
REPLACE FLUORESCENT FIXTURES

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        34.1    (kW)  
Yearly Time of Peak 15 (hr)    7 (mo)

Hour 15    Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|-----------------------|---------------------------|------------------------|
|----------------------|------------------------|-----------------------|---------------------------|------------------------|

Cooling Equipment

|           |        |                            |      |       |
|-----------|--------|----------------------------|------|-------|
| 1         | EQ1161 | AIR-CLD CCND COMP <15 TONS | 19.6 | 57.40 |
| 2         | EQ1161 | AIR-CLD CCND COMP <15 TONS | 0.9  | 2.68  |
| Sub Total |        |                            | 20.5 | 60.08 |
| Sub Total |        |                            | 0.0  | 0.00  |

Air Moving Equipment

|           |                                    |  |     |      |
|-----------|------------------------------------|--|-----|------|
| 1         | SUMMATION OF FAN ELECTRICAL DEMAND |  | 2.4 | 6.92 |
| 2         | SUMMATION OF FAN ELECTRICAL DEMAND |  | 0.0 | 0.04 |
| Sub Total |                                    |  | 2.4 | 6.97 |
| Sub Total |                                    |  | 0.0 | 0.00 |

Miscellaneous

|                |      |        |
|----------------|------|--------|
| Lights         | 11.2 | 32.95  |
| Base Utilities | 0.0  | 0.00   |
| Misc Equipment | 0.0  | 0.00   |
| Sub Total      | 11.2 | 32.95  |
| Grand Total    | 34.1 | 100.00 |

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 45

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4.790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:32: 7 1/26/94  
Dataset Name: CB458 .TM

AIRFLOW - ALTERNATIVE 3  
 COMBINED ECOS

----- S Y S T E M S U M M A R Y -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | SZ          | 0                     | 5,519                 | 5,519                 | 6,285                | 766                   | 0             | 0             |
| 2             | PTAC        | 0                     | 84                    | 84                    | 120                  | 35                    | 0             | 0             |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 1,048                 | 0             | 0             |
| Totals        |             | 0                     | 5,603                 | 5,603                 | 6,404                | 1,849                 | 0             | 0             |

CAPACITY - ALTERNATIVE 3  
 COMBINED ECOS

----- S Y S T E M S U M M A R Y -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 7.9                       | 0.0                       | 0.0                  | 0.0                  | 7.9                   | -89,100                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -89,100               |
| 2             | PTAC        | 0.2                       | 0.0                       | 0.0                  | 0.0                  | 0.2                   | -3,811                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -3,811                |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -121,163                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -121,163              |
| Totals        |             | 8.1                       | 0.0                       | 0.0                  | 0.0                  | 8.1                   | -214,074                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -214,074              |

The building peaked at hour 16 month 7 with a capacity of 8.1 tons

ENGINEERING CHECKS - ALTERNATIVE 3  
 COMBINED ECOS

----- E N G I N E E R I N G C H E C K S -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | SZ          | 0.00                | 1.11       | 699.5    | 627.9      | 19.11       | 1.11       | -17.99      | 4,954            |
| 2             | Main           | PTAC        | 0.00                | 0.78       | 342.4    | 438.5      | 27.37       | 0.78       | -35.29      | 108              |
| 3             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -19.56      | 6,194            |



System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |                         | Mo/Hr: 7/16              |                        | * Mo/Hr: 7/16 *  |                  | * Mo/Hr: 13/ 1        |                  |                   |                  |                  |
|--------------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|------------------|
| Outside Air ==>    |                         | OADB/WB/HR: 91/ 73/ 98.0 |                        | * OADB: 91 *     |                  | * OADB: 4             |                  |                   |                  |                  |
|                    | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
| Envelope Loads     |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Skylite Solr       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond          | 8,689                   | 0                        | 0                      | 8,689            | 9.18             | 8,689                 | 12.09            | -8,464            | -8,464           | 9.50             |
| Glass Solar        | 17,987                  | 0                        | 0                      | 17,987           | 19.00            | 17,987                | 25.02            | 0                 | 0                | 0.00             |
| Glass Cond         | 3,619                   | 0                        | 0                      | 3,619            | 3.82             | 3,619                 | 5.03             | -17,052           | -17,052          | 19.14            |
| Wall Cond          | 4,072                   | 0                        | 0                      | 4,072            | 4.30             | 4,072                 | 5.66             | -10,261           | -10,261          | 11.52            |
| Partition          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exposed Floor      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Infiltration       | 21,073                  | 0                        | 0                      | 21,073           | 22.26            | 12,914                | 17.96            | -53,322           | -53,322          | 59.85            |
| Sub Total==>       | 55,440                  | 0                        | 0                      | 55,440           | 58.55            | 47,281                | 65.77            | -89,100           | -89,100          | 100.00           |
| Internal Loads     |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Lights             | 14,977                  | 0                        | 0                      | 14,977           | 15.82            | 14,977                | 20.83            | 0                 | 0                | 0.00             |
| People             | 20,341                  | 0                        | 0                      | 20,341           | 21.48            | 9,635                 | 13.40            | 0                 | 0                | 0.00             |
| Misc               | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total==>       | 35,318                  | 0                        | 0                      | 35,318           | 37.30            | 24,612                | 34.23            | 0                 | 0                | 0.00             |
| Ceiling Load       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Outside Air        | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sup. Fan Heat      | 0                       | 0                        | 0                      | 3,925            | 4.15             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Ret. Fan Heat      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Duct Heat Pkup     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| OV/UNDR Sizing     | 0                       | 0                        | 0                      | 0                | -0.00            | 0                     | -0.00            | 0                 | 0                | 0.00             |
| Exhaust Heat       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Terminal Bypass    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Grand Total==>     | 90,758                  | 0                        | 0                      | 94,682           | 100.00           | 71,893                | 100.00           | -89,100           | -89,100          | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 7.9                   | 94.7            | 5,519            | 75.0              | 65.7  | 82.4   | 62.4             | 60.4  | 77.6   | Part        | 4,954      |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 4,954      | 0 0    |
| Totals   | 7.9                   | 94.7            |                  |                   |       |        |                  |       |        | Wall        | 3,329      | 473 14 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------------|------------------|-----------|-----------|---------|----------------|---------|------------------------|--------|----------------------|------|------|
|          |                |                  |           |           |         | Cooling        | Heating | Clg % DA               | 0.0    | Type                 | Clg  | Htg  |
| Main Htg | -89.1          | 5,519            | 68.0      | 82.8      | Infil   | 766            | 766     | Clg Cfm/Sqft           | 1.11   | SADB                 | 63.0 | 82.8 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 5,519          | 5,519   | Clg Cfm/Ton            | 699.48 | Plenum               | 75.0 | 68.0 |
| Preheat  | -0.0           | 5,519            | 68.0      | 62.4      | Mincfm  | 0              | 0       | Clg Sqft/Ton           | 627.87 | Return               | 75.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 5,519          | 5,519   | Clg Btuh/Sqft          | 19.11  | Ret/OA               | 75.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0              | 0       | No. People             | 42     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0              | 0       | Htg % DA               | 0.0    | Fn MtrTD             | 0.2  | 0.0  |
| Total    | -89.1          |                  |           |           | Auxil   | 0              | 0       | Htg Cfm/SqFt           | 1.11   | Fn BldTD             | 0.1  | 0.0  |
|          |                |                  |           |           |         |                |         | Htg Btuh/SqFt          | -17.99 | Fn Frict             | 0.4  | 0.0  |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK                        |                         |                          |                        |                  |                  | CLG SPACE PEAK        |                  |                   |                  | HEATING COIL PEAK |  |  |
|------------------------------------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|-------------------|--|--|
| Peaked at Time ==> Mo/Hr: 7/14           |                         |                          |                        |                  |                  | Mo/Hr: 7/16           |                  |                   |                  | Mo/Hr: 13/ 1      |  |  |
| Outside Air ==> OADB/WB/HR: 91/ 74/105.0 |                         |                          |                        |                  |                  | OADB: 91              |                  |                   |                  | OADB: 4           |  |  |
| Envelope Loads                           | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%)  |  |  |
| Skylite Solr                             | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Skylite Cond                             | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Roof Cond                                | 134                     | 0                        | 0                      | 134              | 4.53             | 188                   | 8.96             | -185              | -185             | 4.84              |  |  |
| Glass Solar                              | 784                     | 0                        | 0                      | 784              | 26.53            | 765                   | 36.40            | 0                 | 0                | 0.00              |  |  |
| Glass Cond                               | 136                     | 0                        | 0                      | 136              | 4.59             | 145                   | 6.91             | -689              | -689             | 18.08             |  |  |
| Wall Cond                                | 204                     | 0                        | 0                      | 204              | 6.91             | 237                   | 11.29            | -482              | -482             | 12.65             |  |  |
| Partition                                | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Exposed Floor                            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Infiltration                             | 1,523                   | 0                        | 0                      | 1,523            | 51.53            | 595                   | 28.30            | -2,456            | -2,456           | 64.43             |  |  |
| Sub Total==>                             | 2,781                   | 0                        | 0                      | 2,781            | 94.08            | 1,930                 | 91.85            | -3,811            | -3,811           | 100.00            |  |  |
| Internal Loads                           |                         |                          |                        |                  |                  |                       |                  |                   |                  |                   |  |  |
| Lights                                   | 163                     | 0                        | 0                      | 163              | 5.52             | 171                   | 8.15             | 0                 | 0                | 0.00              |  |  |
| People                                   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Misc                                     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Sub Total==>                             | 163                     | 0                        | 0                      | 163              | 5.52             | 171                   | 8.15             | 0                 | 0                | 0.00              |  |  |
| Ceiling Load                             | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Outside Air                              | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Sup. Fan Heat                            |                         |                          |                        | 12               | 0.41             |                       |                  |                   |                  |                   |  |  |
| Ret. Fan Heat                            |                         | 0                        | 0                      | 0                | 0.00             |                       |                  |                   |                  |                   |  |  |
| Duct Heat Pkup                           |                         | 0                        | 0                      | 0                | 0.00             |                       |                  |                   |                  |                   |  |  |
| OV/UNDR Sizing                           | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Exhaust Heat                             |                         | 0                        | 0                      | 0                | 0.00             |                       |                  |                   |                  |                   |  |  |
| Terminal Bypass                          |                         | 0                        | 0                      | 0                | 0.00             |                       |                  |                   |                  |                   |  |  |
| Grand Total==>                           | 2,944                   | 0                        | 0                      | 2,956            | 100.00           | 2,102                 | 100.00           | -3,811            | -3,811           | 100.00            |  |  |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Capacity (Mbh) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |      | Glass (sf) (%) |
|----------|-----------------------|----------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------|----------------|
|          |                       |                |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part |                |
| Main Clg | 0.2                   | 3.0            | 2.0             | 84               | 75.1              | 62.5  | 66.5   | 52.0             | 50.1  | 52.0   | 108         | 0    |                |
| Aux Clg  | 0.0                   | 0.0            | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0    |                |
| Opt Vent | 0.0                   | 0.0            | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0    |                |
| Totals   | 0.2                   | 3.0            |                 |                  |                   |       |        |                  |       |        | 108         | 0    |                |
|          |                       |                |                 |                  |                   |       |        |                  |       |        | 153         | 19   |                |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |              | --TEMPERATURES (F)-- |      |       |
|----------|----------------|------------------|-----------|-----------|---------|----------------|---------|------------------------|--------------|----------------------|------|-------|
|          |                |                  |           |           |         | Cooling        | Heating | Clg % DA               | Clg Cfm/Sqft | Type                 | Clg  | Htg   |
| Main Htg | -3.8           | 84               | 68.0      | 109.5     | Infil   | 35             | 35      | 0.0                    | 0.78         | SADB                 | 52.1 | 109.5 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 84             | 84      | 0.78                   | 342.40       | Plenum               | 75.0 | 68.0  |
| Preheat  | -0.0           | 84               | 68.0      | 52.0      | Mincfm  | 0              | 0       | 342.40                 | 438.45       | Return               | 75.0 | 68.0  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 84             | 84      | 438.45                 | 27.37        | Ret/OA               | 75.0 | 68.0  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0              | 0       | 27.37                  | 0            | Runarnd              | 75.0 | 68.0  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0              | 0       | 0                      | 0            | Fn MtrTD             | 0.0  | 0.0   |
| Total    | -3.8           |                  |           |           | Auxil   | 0              | 0       | 0                      | 0            | Fn BldTD             | 0.0  | 0.0   |
|          |                |                  |           |           |         |                |         |                        |              | Fn Frict             | 0.1  | 0.0   |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/0 \* Mo/Hr: 0/0 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 0/0/0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|-------------------|------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                   |                  |                    |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Roof Cond       | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | -10,582           | -10,582          | 8.73               |
| Glass Solar     | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Glass Cond      | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | -23,598           | -23,598          | 19.48              |
| Wall Cond       | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | -14,016           | -14,016          | 11.57              |
| Partition       | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Infiltration    | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | -72,967           | -72,967          | 60.22              |
| Sub Total==>    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | -121,163          | -121,163         | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                   |                  |                    |
| Lights          | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| People          | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00               |                       | 0.00               |                   | 0                | 0.00               |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00               |                       | 0.00               |                   | 0                | 0.00               |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00               |                       | 0.00               |                   | 0                | 0.00               |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                   | 0                | 0.00               |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                   | 0                | 0.00               |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -121,163          | -121,163         | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------------|------------|-----|
| Main Clg | 0.0                   | 0.0             | 0                | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | 6,194             |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                |                   |       |        |                  |       |        | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                |                   |       |        |                  |       |        | 0                 |            |     |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | 6,194             | 0          | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        | 4,555             | 655        | 14  |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    |
|----------|----------------|------------------|-----------|-----------|---------|
| Main Htg | -121.2         | 0                | 0.0       | 0.0       | Infil   |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Mincfm  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  |
| Total    | -121.2         |                  |           |           | Auxil   |

-----AIRFLOWS (cfm)-----

|  | Cooling | Heating |
|--|---------|---------|
|  | 0       | 0       |
|  | 0       | 1,048   |
|  | 0       | 0       |
|  | 0       | 0       |
|  | 0       | 0       |
|  | 0       | 0       |
|  | 0       | 0       |
|  | 0       | 0       |

-----ENGINEERING CHECKS-----

|               | Value  |
|---------------|--------|
| Clg % OA      | 0.0    |
| Clg Cfm/Sqft  | 0.00   |
| Clg Cfm/Ton   | 0.00   |
| Clg Sqft/Ton  | 0.00   |
| Clg Btuh/Sqft | 0.00   |
| No. People    | 0      |
| Htg % OA      | 0.0    |
| Htg Cfm/Sqft  | 0.00   |
| Htg Btuh/Sqft | -19.56 |

-----TEMPERATURES (F)-----

| Type     | Clg | Htg  |
|----------|-----|------|
| SADB     | 0.0 | 68.1 |
| Plenum   | 0.0 | 68.0 |
| Return   | 0.0 | 68.0 |
| Ret/OA   | 0.0 | 68.0 |
| Runarnd  | 0.0 | 68.0 |
| Fn MtrTD | 0.0 | 0.0  |
| Fn BldTD | 0.0 | 0.0  |
| Fn Frict | 0.0 | 0.0  |

BUILDING U-VALUES - ALTERNATIVE 3  
 COMBINED ECOS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Room U-Values (Btu/hr/sqft/F) |       |             |             |            |             |             |       |        | Room Mass (lb/sqft) | Room Capac. (Btu/sqft/F) |
|-------------|------------------|-------------------------------|-------|-------------|-------------|------------|-------------|-------------|-------|--------|---------------------|--------------------------|
|             |                  | Part.                         | ExFlr | Summr Skylt | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wall  | Ceill. |                     |                          |
| 1           | OFFICES          | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 32.9                | 9.82                     |
| Zone        | 1 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 32.9                | 9.82                     |
| System      | 1 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 32.9                | 9.82                     |
| 3           | WOMENS TOILET    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 52.8                | 13.79                    |
| Zone        | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 52.8                | 13.79                    |
| System      | 2 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 52.8                | 13.79                    |
| 1           | OFFICES          | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 32.9                | 9.82                     |
| Zone        | 1 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 32.9                | 9.82                     |
| 2           | CORRIDOR TOILETS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 39.7                | 11.18                    |
| Zone        | 2 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 39.7                | 11.18                    |
| 3           | WOMENS TOILET    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 52.8                | 13.79                    |
| Zone        | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 52.8                | 13.79                    |
| System      | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 34.5                | 10.14                    |
| Building    |                  | 0.000                         | 0.000 | 0.000       | 0.000       | 0.027      | 0.550       | 0.563       | 0.056 | 0.000  | 34.0                | 10.03                    |

BUILDING AREAS - ALTERNATIVE 3  
 COMBINED ECOS

----- B U I L D I N G A R E A S -----

| Room Number | Description      | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|---------------------|----|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
|             |                  | Flr                 | Rm |                             |                         |                       |                           |                      |             |                      |                    |             |                      |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| System      | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System      | 2 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| 1           | OFFICES          | 1                   | 1  | 4,954                       | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| Zone        | 1 Total/Ave.     |                     |    |                             | 4,954                   | 0                     | 0                         | 0                    | 0           | 4,954                | 473                | 14          | 2,855                |
| 2           | CORRIDOR TOILETS | 1                   | 1  | 1,132                       | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| Zone        | 2 Total/Ave.     |                     |    |                             | 1,132                   | 0                     | 0                         | 0                    | 0           | 1,132                | 163                | 15          | 911                  |
| 3           | WOMENS TOILET    | 1                   | 1  | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| Zone        | 3 Total/Ave.     |                     |    |                             | 108                     | 0                     | 0                         | 0                    | 0           | 108                  | 19                 | 12          | 134                  |
| System      | 3 Total/Ave.     |                     |    |                             | 6,194                   | 0                     | 0                         | 0                    | 0           | 6,194                | 655                | 14          | 3,900                |
| Building    |                  |                     |    |                             | 11,256                  | 0                     | 0                         | 0                    | 0           | 11,256               | 1,148              | 14          | 6,890                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 3  
COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.127 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.068 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 1.33 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTvw) = 13.54 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3  
 COMBINED ECOS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.4                    | 0            | 4     | -10,704                  | 22           | 406   | 280.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 0.8                    | 2            | 16    | -21,407                  | 17           | 321   | 560.3                     | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 1.2                    | 0            | 0     | -32,111                  | 14           | 268   | 840.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 1.6                    | 7            | 59    | -42,815                  | 10           | 189   | 1,120.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 2.0                    | 3            | 22    | -53,519                  | 5            | 98    | 1,400.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 2.4                    | 5            | 41    | -64,222                  | 1            | 17    | 1,681.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 2.8                    | 13           | 105   | -74,926                  | 1            | 17    | 1,961.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 3.3                    | 5            | 39    | -85,630                  | 1            | 22    | 2,241.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 3.7                    | 12           | 101   | -96,333                  | 2            | 36    | 2,521.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 4.1                    | 5            | 43    | -107,037                 | 0            | 7     | 2,801.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 4.5                    | 6            | 52    | -117,741                 | 0            | 9     | 3,081.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 4.9                    | 7            | 56    | -128,444                 | 26           | 479   | 3,362.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 5.3                    | 6            | 49    | -139,148                 | 0            | 0     | 3,642.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 5.7                    | 6            | 50    | -149,852                 | 0            | 0     | 3,922.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 6.1                    | 2            | 15    | -160,556                 | 0            | 0     | 4,202.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 6.5                    | 7            | 60    | -171,259                 | 0            | 0     | 4,482.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 6.9                    | 0            | 0     | -181,963                 | 0            | 0     | 4,762.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 7.3                    | 0            | 0     | -192,667                 | 0            | 0     | 5,043.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 7.7                    | 1            | 5     | -203,370                 | 0            | 0     | 5,323.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 8.1                    | 14           | 115   | -214,074                 | 0            | 0     | 5,603.3                   | 100          | 1,070 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,928 | 0                        | 0            | 6,891 | 0.0                       | 0            | 7,690 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3  
 COMBINED ECOS

----- BUILDING TEMPERATURE PROFILES -----

| Temperature Range (F) | Zone Number |      |       |       |       |
|-----------------------|-------------|------|-------|-------|-------|
|                       | 1           | 3    | 1     | 2     | 3     |
| Max. Temp.            | 85.7        | 86.0 | 112.5 | 107.3 | 104.5 |
| Mo./Hr.               | 7 21        | 7 21 | 8 21  | 8 21  | 8 21  |
| Day Type              | 4           | 4    | 1     | 1     | 1     |

|           | Number of Hours |       |       |       |       |
|-----------|-----------------|-------|-------|-------|-------|
| Above 100 | 0               | 0     | 2,355 | 1,532 | 1,129 |
| 95 - 100  | 0               | 0     | 533   | 1,098 | 966   |
| 90 - 95   | 0               | 0     | 72    | 298   | 833   |
| 85 - 90   | 57              | 58    | 442   | 128   | 40    |
| 80 - 85   | 1,153           | 878   | 508   | 490   | 452   |
| 75 - 80   | 2,350           | 2,192 | 198   | 262   | 371   |
| 70 - 75   | 548             | 748   | 404   | 344   | 325   |
| 65 - 70   | 291             | 390   | 2,093 | 2,023 | 2,081 |
| 60 - 65   | 1,106           | 851   | 922   | 1,141 | 1,080 |
| 55 - 60   | 303             | 656   | 550   | 703   | 732   |
| 50 - 55   | 1,451           | 739   | 683   | 741   | 751   |
| Below 50  | 1,501           | 2,248 | 0     | 0     | 0     |

|            |      |      |      |      |      |
|------------|------|------|------|------|------|
| Min. Temp. | 36.1 | 36.3 | 54.9 | 55.0 | 55.0 |
| Mo./Hr.    | 2 8  | 2 9  | 12 6 | 1 9  | 1 8  |
| Day Type   | 5    | 5    | 4    | 3    | 3    |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3  
COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | DEMAND             |                      | HOT WTR | HOT W DMND |
|-------|-------------------|-----------------|--------------------|----------------------|---------|------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |         |            |
| Jan   | 2,162             | 11              | 254                | 1                    |         |            |
| Feb   | 1,956             | 11              | 242                | 1                    |         |            |
| March | 2,367             | 11              | 120                | 1                    |         |            |
| April | 2,058             | 11              | 22                 | 1                    |         |            |
| May   | 3,055             | 24              | 0                  | 0                    |         |            |
| June  | 4,055             | 26              | 0                  | 0                    |         |            |
| July  | 4,412             | 26              | 0                  | 0                    |         |            |
| Aug   | 4,255             | 26              | 0                  | 0                    |         |            |
| Sept  | 2,961             | 25              | 0                  | 0                    |         |            |
| Oct   | 2,263             | 11              | 13                 | 1                    |         |            |
| Nov   | 2,058             | 11              | 76                 | 1                    |         |            |
| Dec   | 2,059             | 11              | 199                | 1                    |         |            |
| Total | 33,661            | 26              | 926                | 1                    |         |            |

Building Energy Consumption = 18,433 (8tu/Sq Ft/year)  
Source Energy Consumption = 41,592 (8tu/Sq Ft/Year)

Floor Area = 11,256 (Sq Ft)



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
 COMBINED ECOS

| ----- EQUIPMENT ENERGY CONSUMPTION ----- |               |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|------------------------------------------|---------------|---------------------------------|----------------------------|------|------|------|------|------|------|------|------|------|------|--------|
| Ref<br>Num                               | Equip<br>Code | ----- Monthly Consumption ----- |                            |      |      |      |      |      |      |      |      |      |      | Total  |
|                                          |               | Jan                             | Feb                        | Mar  | Apr  | May  | June | July | Aug  | Sep  | Oct  | Nov  | Dec  |        |
| 0                                        | LIGHTS        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 2160                            | 1955                       | 2366 | 2057 | 2263 | 2263 | 2057 | 2366 | 2057 | 2263 | 2057 | 2057 | 25,924 |
|                                          | PK            | 11.2                            | 11.2                       | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2 | 11.2   |
| 1                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 2                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | GAS           | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 3                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | OIL           | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 4                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | P STEAM       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 5                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | P HOTH2O      | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 6                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | P CHILL       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 1                                        | EQ1161        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 0                               | 0                          | 0    | 0    | 228  | 1049 | 1567 | 1102 | 347  | 0    | 0    | 0    | 4,293  |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 9.5  | 10.6 | 10.9 | 10.6 | 10.2 | 0.0  | 0.0  | 0.0  | 10.9   |
| 1                                        | EQ5200        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 0                               | 0                          | 0    | 0    | 24   | 92   | 152  | 98   | 34   | 0    | 0    | 0    | 400    |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.5  | 0.9  | 1.0  | 0.9  | 0.7  | 0.0  | 0.0  | 0.0  | 1.0    |
| 1                                        | EQ5303        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 0                               | 0                          | 0    | 0    | 19   | 66   | 60   | 69   | 36   | 0    | 0    | 0    | 250    |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.0  | 0.0  | 0.0  | 0.3    |
| 2                                        | EQ1161        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 16   | 38   | 23   | 3    | 0    | 0    | 0    | 79     |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.3  | 0.3  | 0.3  | 0.3  | 0.0  | 0.0  | 0.0  | 0.3    |
| 2                                        | EQ5200        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 1    | 4    | 2    | 0    | 0    | 0    | 0    | 8      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 2                                        | EQ5303        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |        |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 3  
COMBINED ECOS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 26.5 (kW)  
Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

| Eq.<br>Ref.<br>Num.  | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|------------------------|
| Cooling Equipment    |                        |                                    |                           |                        |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 12.2                      | 46.10                  |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 0.7                       | 2.53                   |
| Sub Total            |                        |                                    | 12.9                      | 48.63                  |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Air Moving Equipment |                        |                                    |                           |                        |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 2.4                       | 8.91                   |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.0                       | 0.03                   |
| Sub Total            |                        |                                    | 2.4                       | 8.94                   |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Miscellaneous        |                        |                                    |                           |                        |
|                      | Lights                 |                                    | 11.2                      | 42.43                  |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                   |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                   |
| Sub Total            |                        |                                    | 11.2                      | 42.43                  |
| Grand Total          |                        |                                    | 26.5                      | 100.00                 |

*Building 046*

*Trace Input File*

933702

## CONTENTS OF : E:\CB46.TM

LINE # -----  
1 JOB - 1  
2 01/ENERGY SAVINGS OPPORTUNITY STUDY  
3 01/CARLISLE BARRACKS, PA  
4 01/DEPARTMENT OF THE ARMY  
5 01/BENATEC ASSOCIATES  
6 01/BUILDING 46  
7 08/CARLISLE  
8 09/MAY/SEP////APR/OCT  
9 10/CLTD-CLF  
10 11///ZONE  
11 LOAD - 1  
12 19/1/BASE BUILDING  
13 20/1/1/1ST FL OFFICES/8053/1/2/2//11  
14 20/2/2/LIQUOR STORE/1127/1/2/2//11  
15 20/3/3/LIQUOR STORAGE/901/1/2/2//11  
16 20/4/4/LIBRARY/3692/1/2/2//11  
17 20/5/5/GAME ROOM/4154/1/2/2//11  
18 20/6/6/2ND FL OFFICES/1139/1/2/2//11  
19 20/7/7/2ND FL OFFICE/248/1/2/2//11  
20 20/8/8/2ND FL TOILETS/582/1/2/2//11  
21 21/M////CBADCTX///CBADHTX  
22 22/4/1/YES////186  
23 22/5/1/YES////186  
24 22/6/1/YES////186  
25 22/7/1/YES////186  
26 22/8/1/YES////186  
27 24/1/1/105/8.5//170/35  
28 24/1/2/32/8.5//170/125  
29 24/1/3/73/8.5//170/215  
30 24/1/4/90/8.5//170/305  
31 24/2/1/17/8.5//170/35  
32 24/2/2/53/8.5//170/125  
33 24/2/3/17/8.5//170/215  
34 24/3/1/16/8.5//170/215  
35 24/4/1/32/8.5//170/125  
36 24/4/2/73/8.5//170/215  
37 24/4/3/49/8.5//170/305  
38 24/5/1/55/8.5//170/305  
39 24/5/2/73/8.5//170/35  
40 24/5/3/31/8.5//170/125  
41 24/6/1/33/8.5//170/35  
42 24/6/2/37/8.5//170/125  
43 24/7/1/16/8.5//170/125  
44 24/7/2/16/8.5//170/215  
45 24/8/1/16/8.5//170/215  
46 24/8/2/17/8.5//170/305  
47 25/1/1/6/4/8/.81/.64  
48 25/1/2/6/4/7/.81/.64  
49 25/1/3/6/4/6/.81/.64  
50 25/1/4/6/4/5/.81/.64  
51 25/3/1/6/4/1/.81/.64  
52 25/4/1/6/4/4/.81/.64  
53 25/4/2/6/4/10/.81/.64  
54 25/4/3/6/4/10/.81/.64  
55 25/5/1/6/4/10/.81/.64  
56 25/5/2/6/4/10/.81/.64  
57 25/5/3/6/4/4/.81/.64  
58 25/6/1/6/4/4/.81/.64

CONTENTS OF : E:\CB46.TM

| LINE # | -----                                                         |
|--------|---------------------------------------------------------------|
| 59     | 25/6/2/6/4/4/.81/.64                                          |
| 60     | 25/7/1/6/4/2/.81/.64                                          |
| 61     | 25/7/2/6/4/2/.81/.64                                          |
| 62     | 25/8/1/6/4/2/.81/.64                                          |
| 63     | 25/8/2/6/4/2/.81/.64                                          |
| 64     | 26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF     |
| 65     | 26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF     |
| 66     | 26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF/OFF     |
| 67     | 26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF |
| 68     | 26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF |
| 69     | 26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF |
| 70     | 26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF/OFF     |
| 71     | 26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF                 |
| 72     | 27/M/280/SF-PERS/285/290/2.4/WATT-SF                          |
| 73     | 29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF            |
| 74     | 29/2///// .66/CFM-SF/.66/CFM-SF                               |
| 75     | 29/3///// .66/CFM-SF                                          |
| 76     | 29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF                      |
| 77     | 29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF                      |
| 78     | 29/6///// .66/CFM-SF/.66/CFM-SF                               |
| 79     | 29/7///// .66/CFM-SF/.66/CFM-SF                               |
| 80     | 29/8///// .66/CFM-SF                                          |
| 81     | 30/1                                                          |
| 82     | 30/2/1400/CFM/1500/CFM                                        |
| 83     | 30/3///750/CFM                                                |
| 84     | 30/4/4950/CFM                                                 |
| 85     | 30/5/3830/CFM                                                 |
| 86     | SYSTEM - 1                                                    |
| 87     | 39/1/BASE BUILDING                                            |
| 88     | 40/1/SZ                                                       |
| 89     | 41/1/1/2/4/5                                                  |
| 90     | 42/1/1.1/1.1                                                  |
| 91     | 45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF          |
| 92     | 40/2/PTAC                                                     |
| 93     | 41/2/6/7                                                      |
| 94     | 42/2/.2                                                       |
| 95     | 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF              |
| 96     | 40/3/RAD                                                      |
| 97     | 41/3/7/8                                                      |
| 98     | 42/3                                                          |
| 99     | 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF              |
| 100    | 40/4/UH                                                       |
| 101    | 41/4/3/6                                                      |
| 102    | 42/4//.2                                                      |
| 103    | 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF              |
| 104    | EQUIPMENT - 1                                                 |
| 105    | 59/1/CARLISLE///BASE BUILDING                                 |
| 106    | 60/1/1/PKPLANT/1/1                                            |
| 107    | 60/2/2/PKPLANT/2/2                                            |
| 108    | 62/1/EQ1161/4                                                 |
| 109    | 62/2/EQ1161/5                                                 |
| 110    | 65/1/1//1/1/3/4                                               |
| 111    | 67/1/EQ2102/1                                                 |
| 112    | 69/1/EQ4003                                                   |
| 113    | 69/2/EQ4003                                                   |
| 114    | 69/3                                                          |
| 115    | 69/4//EQ4381                                                  |
| 116    | LOAD - 2                                                      |

CONTENTS OF : E:\CB46.TM

| LINE # | -----                                                           |
|--------|-----------------------------------------------------------------|
| 117    | 19/2/WALL & ROOF INSULATION                                     |
| 118    | 20/1/1/1ST FL OFFICES/8053/1/2/2//11                            |
| 119    | 20/2/2/LIQUOR STORE/1127/1/2/2//11                              |
| 120    | 20/3/3/LIQUOR STORAGE/901/1/2/2//11                             |
| 121    | 20/4/4/LIBRARY/3692/1/2/2//11                                   |
| 122    | 20/5/5/GAME ROOM/4154/1/2/2//11                                 |
| 123    | 20/6/6/2ND FL OFFICES/1139/1/2/2//11                            |
| 124    | 20/7/7/2ND FL OFFICE/248/1/2/2//11                              |
| 125    | 20/8/8/2ND FL TOILETS/582/1/2/2//11                             |
| 126    | 21/M////CBADCTX//CBADHTX                                        |
| 127    | 22/4/1/YES////185                                               |
| 128    | 22/5/1/YES////185                                               |
| 129    | 22/6/1/YES////185                                               |
| 130    | 22/7/1/YES////185                                               |
| 131    | 22/8/1/YES////185                                               |
| 132    | 24/1/1/105/8.5//183/35                                          |
| 133    | 24/1/2/32/8.5//183/125                                          |
| 134    | 24/1/3/73/8.5//183/215                                          |
| 135    | 24/1/4/90/8.5//183/305                                          |
| 136    | 24/2/1/17/8.5//183/35                                           |
| 137    | 24/2/2/53/8.5//183/125                                          |
| 138    | 24/2/3/17/8.5//183/215                                          |
| 139    | 24/3/1/16/8.5//183/215                                          |
| 140    | 24/4/1/32/8.5//183/125                                          |
| 141    | 24/4/2/73/8.5//183/215                                          |
| 142    | 24/4/3/49/8.5//183/305                                          |
| 143    | 24/5/1/55/8.5//183/305                                          |
| 144    | 24/5/2/73/8.5//183/35                                           |
| 145    | 24/5/3/31/8.5//183/125                                          |
| 146    | 24/6/1/33/8.5//183/35                                           |
| 147    | 24/6/2/37/8.5//183/125                                          |
| 148    | 24/7/1/16/8.5//183/125                                          |
| 149    | 24/7/2/16/8.5//183/215                                          |
| 150    | 24/8/1/16/8.5//183/215                                          |
| 151    | 24/8/2/17/8.5//183/305                                          |
| 152    | 25/1/1/6/4/8/.81/.64                                            |
| 153    | 25/1/2/6/4/7/.81/.64                                            |
| 154    | 25/1/3/6/4/6/.81/.64                                            |
| 155    | 25/1/4/6/4/5/.81/.64                                            |
| 156    | 25/3/1/6/4/1/.81/.64                                            |
| 157    | 25/4/1/6/4/4/.81/.64                                            |
| 158    | 25/4/2/6/4/10/.81/.64                                           |
| 159    | 25/4/3/6/4/10/.81/.64                                           |
| 160    | 25/5/1/6/4/10/.81/.64                                           |
| 161    | 25/5/2/6/4/10/.81/.64                                           |
| 162    | 25/5/3/6/4/4/.81/.64                                            |
| 163    | 25/6/1/6/4/4/.81/.64                                            |
| 164    | 25/6/2/6/4/4/.81/.64                                            |
| 165    | 25/7/1/6/4/2/.81/.64                                            |
| 166    | 25/7/2/6/4/2/.81/.64                                            |
| 167    | 25/8/1/6/4/2/.81/.64                                            |
| 168    | 25/8/2/6/4/2/.81/.64                                            |
| 169    | 26/1/CBAPD&L/CBAPD&L/CBAPD&L//OFF/CBAPDFAN/OFF/OFF/OFF/OFF      |
| 170    | 26/2/CBAPD&L/CBAPD&L/CBAPD&L//OFF/CBAPDFAN/OFF/OFF/OFF/OFF      |
| 171    | 26/3/CBAPD&L/CBAPD&L/CBAPD&L//OFF/OFF/CBAPDHTG/OFF/OFF/OFF      |
| 172    | 26/4/CBAPD&L/CBAPD&L/CBAPD&L//OFF/CBAPDCLG/CBAPDHTG/OFF/OFF/OFF |
| 173    | 26/5/CBAPD&L/CBAPD&L/CBAPD&L//OFF/CBAPDCLG/CBAPDHTG/OFF/OFF/OFF |
| 174    | 26/6/CBAPD&L/CBAPD&L/CBAPD&L//OFF/CBAPDCLG/CBAPDHTG/OFF/OFF/OFF |

CONTENTS OF : E:\CB46.TM

| LINE # | -----                                                     |
|--------|-----------------------------------------------------------|
| 175    | 26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF/OFF |
| 176    | 26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF             |
| 177    | 27/M/280/SF-PERS/285/290/2.4/WATT-SF                      |
| 178    | 29/1/15/PCT-MCLG/15/PCT-MHTG/.51/CFM-SF/.51/CFM-SF        |
| 179    | 29/2/////51/CFM-SF/.51/CFM-SF                             |
| 180    | 29/3/////51/CFM-SF                                        |
| 181    | 29/4/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF                  |
| 182    | 29/5/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF                  |
| 183    | 29/6/////51/CFM-SF/.51/CFM-SF                             |
| 184    | 29/7/////51/CFM-SF/.51/CFM-SF                             |
| 185    | 29/8/////51/CFM-SF                                        |
| 186    | 30/1                                                      |
| 187    | 30/2/1400/CFM/1500/CFM                                    |
| 188    | 30/3///750/CFM                                            |
| 189    | 30/4/4950/CFM                                             |
| 190    | 30/5/3830/CFM                                             |
| 191    | SYSTEM - 2                                                |
| 192    | 39/2/WALL & ROOF INSULATION                               |
| 193    | 40/1/SZ                                                   |
| 194    | 41/1/1/2/4/5                                              |
| 195    | 42/1/1.1/1.1                                              |
| 196    | 45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF      |
| 197    | 40/2/PTAC                                                 |
| 198    | 41/2/6/7                                                  |
| 199    | 42/2/.2                                                   |
| 200    | 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF          |
| 201    | 40/3/RAD                                                  |
| 202    | 41/3/7/8                                                  |
| 203    | 42/3                                                      |
| 204    | 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF          |
| 205    | 40/4/UH                                                   |
| 206    | 41/4/3/6                                                  |
| 207    | 42/4//.2                                                  |
| 208    | 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF          |
| 209    | EQUIPMENT - 2                                             |
| 210    | 59/2/CARLISLE//WALL & ROOF INSULATION                     |
| 211    | 60/1/1/PKPLANT/1/1                                        |
| 212    | 60/2/2/PKPLANT/2/2                                        |
| 213    | 62/1/EQ1161/4                                             |
| 214    | 62/2/EQ1161/5                                             |
| 215    | 65/1/1//1/1/3/4                                           |
| 216    | 67/1/EQ2102/1                                             |
| 217    | 69/1/EQ4003                                               |
| 218    | 69/2/EQ4003                                               |
| 219    | 69/3                                                      |
| 220    | 69/4//EQ4381                                              |
| 221    | LOAD - 3                                                  |
| 222    | 19/3/REPLACE FLUORESCENT LAMPS                            |
| 223    | 20/1/1/1ST FL OFFICES/8053/1/2/2//11                      |
| 224    | 20/2/2/LIQUOR STORE/1127/1/2/2//11                        |
| 225    | 20/3/3/LIQUOR STORAGE/901/1/2/2//11                       |
| 226    | 20/4/4/LIBRARY/3692/1/2/2//11                             |
| 227    | 20/5/5/GAME ROOM/4154/1/2/2//11                           |
| 228    | 20/6/6/2ND FL OFFICES/1139/1/2/2//11                      |
| 229    | 20/7/7/2ND FL OFFICE/248/1/2/2//11                        |
| 230    | 20/8/8/2ND FL TOILETS/582/1/2/2//11                       |
| 231    | 21/M////CBADCTX//CBADHTX                                  |
| 232    | 22/4/1/YES////186                                         |



## CONTENTS OF : E:\CB46.TM

LINE # -----  
233 22/5/1/YES////186  
234 22/6/1/YES////186  
235 22/7/1/YES////186  
236 22/8/1/YES////186  
237 24/1/1/105/8.5//170/35  
238 24/1/2/32/8.5//170/125  
239 24/1/3/73/8.5//170/215  
240 24/1/4/90/8.5//170/305  
241 24/2/1/17/8.5//170/35  
242 24/2/2/53/8.5//170/125  
243 24/2/3/17/8.5//170/215  
244 24/3/1/16/8.5//170/215  
245 24/4/1/32/8.5//170/125  
246 24/4/2/73/8.5//170/215  
247 24/4/3/49/8.5//170/305  
248 24/5/1/55/8.5//170/305  
249 24/5/2/73/8.5//170/35  
250 24/5/3/31/8.5//170/125  
251 24/6/1/33/8.5//170/35  
252 24/6/2/37/8.5//170/125  
253 24/7/1/16/8.5//170/125  
254 24/7/2/16/8.5//170/215  
255 24/8/1/16/8.5//170/215  
256 24/8/2/17/8.5//170/305  
257 25/1/1/6/4/8/.81/.64  
258 25/1/2/6/4/7/.81/.64  
259 25/1/3/6/4/6/.81/.64  
260 25/1/4/6/4/5/.81/.64  
261 25/3/1/6/4/1/.81/.64  
262 25/4/1/6/4/4/.81/.64  
263 25/4/2/6/4/10/.81/.64  
264 25/4/3/6/4/10/.81/.64  
265 25/5/1/6/4/10/.81/.64  
266 25/5/2/6/4/10/.81/.64  
267 25/5/3/6/4/4/.81/.64  
268 25/6/1/6/4/4/.81/.64  
269 25/6/2/6/4/4/.81/.64  
270 25/7/1/6/4/2/.81/.64  
271 25/7/2/6/4/2/.81/.64  
272 25/8/1/6/4/2/.81/.64  
273 25/8/2/6/4/2/.81/.64  
274 26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF  
275 26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF  
276 26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF/OFF  
277 26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF  
278 26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF  
279 26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF  
280 26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF/OFF  
281 26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF  
282 27/M/280/SF-PERS/285/290/2.1/WATT-SF  
283 29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF  
284 29/2///// .66/CFM-SF/.66/CFM-SF  
285 29/3///// .66/CFM-SF  
286 29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF  
287 29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF  
288 29/6///// .66/CFM-SF/.66/CFM-SF  
289 29/7///// .66/CFM-SF/.66/CFM-SF  
290 29/8///// .66/CFM-SF

CONTENTS OF : E:\CB46.TM

LINE # -----

291 30/1

292 30/2/1400/CFM/1500/CFM

293 30/3///750/CFM

294 30/4/4950/CFM

295 30/5/3830/CFM

296 SYSTEM - 3

297 39/3/REPLACE FLUORESCENT LAMPS

298 40/1/SZ

299 41/1/1/2/4/5

300 42/1/1.1/1.1

301 45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

302 40/2/PTAC

303 41/2/6/7

304 42/2/.2

305 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

306 40/3/RAD

307 41/3/7/8

308 42/3

309 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

310 40/4/UH

311 41/4/3/6

312 42/4//.2

313 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

314 EQUIPMENT - 3

315 59/3/CARLISLE///REPLACE FLUORESCENT LAMPS

316 60/1/1/PKPLANT/1/1

317 60/2/2/PKPLANT/2/2

318 62/1/EQ1161/4

319 62/2/EQ1161/5

320 65/1/1//1/1/3/4

321 67/1/EQ2102/1

322 69/1/EQ4003

323 69/2/EQ4003

324 69/3

325 69/4//EQ4381

326 LOAD - 4

327 19/4/REPLACE FLUORESCENT BALLASTS

328 20/1/1/1ST FL OFFICES/8053/1/2/2//11

329 20/2/2/LIQUOR STORE/1127/1/2/2//11

330 20/3/3/LIQUOR STORAGE/901/1/2/2//11

331 20/4/4/LIBRARY/3692/1/2/2//11

332 20/5/5/GAME ROOM/4154/1/2/2//11

333 20/6/6/2ND FL OFFICES/1139/1/2/2//11

334 20/7/7/2ND FL OFFICE/248/1/2/2//11

335 20/8/8/2ND FL TOILETS/582/1/2/2//11

336 21/M///CBADCTX///CBADHTX

337 22/4/1/YES///186

338 22/5/1/YES///186

339 22/6/1/YES///186

340 22/7/1/YES///186

341 22/8/1/YES///186

342 24/1/1/105/8.5//170/35

343 24/1/2/32/8.5//170/125

344 24/1/3/73/8.5//170/215

345 24/1/4/90/8.5//170/305

346 24/2/1/17/8.5//170/35

347 24/2/2/53/8.5//170/125

348 24/2/3/17/8.5//170/215

CONTENTS OF : E:\CB46.TM

| LINE # | -----                                                         |
|--------|---------------------------------------------------------------|
| 349    | 24/3/1/16/8.5//170/215                                        |
| 350    | 24/4/1/32/8.5//170/125                                        |
| 351    | 24/4/2/73/8.5//170/215                                        |
| 352    | 24/4/3/49/8.5//170/305                                        |
| 353    | 24/5/1/55/8.5//170/305                                        |
| 354    | 24/5/2/73/8.5//170/35                                         |
| 355    | 24/5/3/31/8.5//170/125                                        |
| 356    | 24/6/1/33/8.5//170/35                                         |
| 357    | 24/6/2/37/8.5//170/125                                        |
| 358    | 24/7/1/16/8.5//170/125                                        |
| 359    | 24/7/2/16/8.5//170/215                                        |
| 360    | 24/8/1/16/8.5//170/215                                        |
| 361    | 24/8/2/17/8.5//170/305                                        |
| 362    | 25/1/1/6/4/8/.81/.64                                          |
| 363    | 25/1/2/6/4/7/.81/.64                                          |
| 364    | 25/1/3/6/4/6/.81/.64                                          |
| 365    | 25/1/4/6/4/5/.81/.64                                          |
| 366    | 25/3/1/6/4/1/.81/.64                                          |
| 367    | 25/4/1/6/4/4/.81/.64                                          |
| 368    | 25/4/2/6/4/10/.81/.64                                         |
| 369    | 25/4/3/6/4/10/.81/.64                                         |
| 370    | 25/5/1/6/4/10/.81/.64                                         |
| 371    | 25/5/2/6/4/10/.81/.64                                         |
| 372    | 25/5/3/6/4/4/.81/.64                                          |
| 373    | 25/6/1/6/4/4/.81/.64                                          |
| 374    | 25/6/2/6/4/4/.81/.64                                          |
| 375    | 25/7/1/6/4/2/.81/.64                                          |
| 376    | 25/7/2/6/4/2/.81/.64                                          |
| 377    | 25/8/1/6/4/2/.81/.64                                          |
| 378    | 25/8/2/6/4/2/.81/.64                                          |
| 379    | 26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF     |
| 380    | 26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF     |
| 381    | 26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF/OFF     |
| 382    | 26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF |
| 383    | 26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF |
| 384    | 26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF |
| 385    | 26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF/OFF     |
| 386    | 26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF                 |
| 387    | 27/M/280/SF-PERS/285/290/1.8/WATT-SF                          |
| 388    | 29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF            |
| 389    | 29/2///// .66/CFM-SF/.66/CFM-SF                               |
| 390    | 29/3///// .66/CFM-SF                                          |
| 391    | 29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF                      |
| 392    | 29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF                      |
| 393    | 29/6///// .66/CFM-SF/.66/CFM-SF                               |
| 394    | 29/7///// .66/CFM-SF/.66/CFM-SF                               |
| 395    | 29/8///// .66/CFM-SF                                          |
| 396    | 30/1                                                          |
| 397    | 30/2/1400/CFM/1500/CFM                                        |
| 398    | 30/3///750/CFM                                                |
| 399    | 30/4/4950/CFM                                                 |
| 400    | 30/5/3830/CFM                                                 |
| 401    | SYSTEM - 4                                                    |
| 402    | 39/4/REPLACE FLUORESCENT BALLASTS                             |
| 403    | 40/1/SZ                                                       |
| 404    | 41/1/1/2/4/5                                                  |
| 405    | 42/1/1.1/1.1                                                  |
| 406    | 45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF          |

CONTENTS OF : E:\CB46.TM

| LINE # | -----                                            |
|--------|--------------------------------------------------|
| 407    | 40/2/PTAC                                        |
| 408    | 41/2/6/7                                         |
| 409    | 42/2/.2                                          |
| 410    | 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF |
| 411    | 40/3/RAD                                         |
| 412    | 41/3/7/8                                         |
| 413    | 42/3                                             |
| 414    | 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF |
| 415    | 40/4/UH                                          |
| 416    | 41/4/3/6                                         |
| 417    | 42/4//.2                                         |
| 418    | 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF |
| 419    | EQUIPMENT - 4                                    |
| 420    | 59/4/CARLISLE///REPLACE FLUORESCENT BALLASTS     |
| 421    | 60/1/1/PKPLANT/1/1                               |
| 422    | 60/2/2/PKPLANT/2/2                               |
| 423    | 62/1/EQ1161/4                                    |
| 424    | 62/2/EQ1161/5                                    |
| 425    | 65/1/1//1/1/3/4                                  |
| 426    | 67/1/EQ2102/1                                    |
| 427    | 69/1/EQ4003                                      |
| 428    | 69/2/EQ4003                                      |
| 429    | 69/3                                             |
| 430    | 69/4//EQ4381                                     |

CONTENTS OF : E:\CB46B.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 46

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/REPLACE FLUORESCENT FIXTURES

13 20/1/1/1ST FL OFFICES/8053/1/2/2//11

14 20/2/2/LIQUOR STORE/1127/1/2/2//11

15 20/3/3/LIQUOR STORAGE/901/1/2/2//11

16 20/4/4/LIBRARY/3692/1/2/2//11

17 20/5/5/GAME ROOM/4154/1/2/2//11

18 20/6/6/2ND FL OFFICES/1139/1/2/2//11

19 20/7/7/2ND FL OFFICE/248/1/2/2//11

20 20/8/8/2ND FL TOILETS/582/1/2/2//11

21 21/M////CBADCTX//CBADHTX

22 22/4/1/YES////186

23 22/5/1/YES////186

24 22/6/1/YES////186

25 22/7/1/YES////186

26 22/8/1/YES////186

27 24/1/1/105/8.5//170/35

28 24/1/2/32/8.5//170/125

29 24/1/3/73/8.5//170/215

30 24/1/4/90/8.5//170/305

31 24/2/1/17/8.5//170/35

32 24/2/2/53/8.5//170/125

33 24/2/3/17/8.5//170/215

34 24/3/1/16/8.5//170/215

35 24/4/1/32/8.5//170/125

36 24/4/2/73/8.5//170/215

37 24/4/3/49/8.5//170/305

38 24/5/1/55/8.5//170/305

39 24/5/2/73/8.5//170/35

40 24/5/3/31/8.5//170/125

41 24/6/1/33/8.5//170/35

42 24/6/2/37/8.5//170/125

43 24/7/1/16/8.5//170/125

44 24/7/2/16/8.5//170/215

45 24/8/1/16/8.5//170/215

46 24/8/2/17/8.5//170/305

47 25/1/1/6/4/8/.81/.64

48 25/1/2/6/4/7/.81/.64

49 25/1/3/6/4/6/.81/.64

50 25/1/4/6/4/5/.81/.64

51 25/3/1/6/4/1/.81/.64

52 25/4/1/6/4/4/.81/.64

53 25/4/2/6/4/10/.81/.64

54 25/4/3/6/4/10/.81/.64

55 25/5/1/6/4/10/.81/.64

56 25/5/2/6/4/10/.81/.64

57 25/5/3/6/4/4/.81/.64

58 25/6/1/6/4/4/.81/.64

CONTENTS OF : E:\CB46B.TM

LINE # -----

59 25/6/2/6/4/4/.81/.64

60 25/7/1/6/4/2/.81/.64

61 25/7/2/6/4/2/.81/.64

62 25/8/1/6/4/2/.81/.64

63 25/8/2/6/4/2/.81/.64

64 26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF

65 26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF

66 26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF/OFF

67 26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF

68 26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF

69 26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF

70 26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF/OFF

71 26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF

72 27/M/280/SF-PERS/285/290/1.5/WATT-SF

73 29/1/15/PCT-MCLG/15/PCT-MHTG/.66/CFM-SF/.66/CFM-SF

74 29/2///// .66/CFM-SF/.66/CFM-SF

75 29/3///// .66/CFM-SF

76 29/4/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF

77 29/5/10/PCT-MCLG///.66/CFM-SF/.66/CFM-SF

78 29/6///// .66/CFM-SF/.66/CFM-SF

79 29/7///// .66/CFM-SF/.66/CFM-SF

80 29/8///// .66/CFM-SF

81 30/1

82 30/2/1400/CFM/1500/CFM

83 30/3///750/CFM

84 30/4/4950/CFM

85 30/5/3830/CFM

86 SYSTEM - 1

87 39/1/REPLACE FLUORESCENT FIXTURES

88 40/1/SZ

89 41/1/1/2/4/5

90 42/1/1.1/1.1

91 45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

92 40/2/PTAC

93 41/2/6/7

94 42/2/.2

95 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

96 40/3/RAD

97 41/3/7/8

98 42/3

99 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

100 40/4/UH

101 41/4/3/6

102 42/4//.2

103 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

104 EQUIPMENT - 1

105 59/1/CARLISLE///REPLACE FLUORESCENT FIXTURES

106 60/1/1/PKPLANT/1/1

107 60/2/2/PKPLANT/2/2

108 62/1/EQ1161/4

109 62/2/EQ1161/5

110 65/1/1//1/1/3/4

111 67/1/EQ2102/1

112 69/1/EQ4003

113 69/2/EQ4003

114 69/3

115 69/4//EQ4381

116 LOAD - 2

CONTENTS OF : E:\CB46B.TM

LINE # -----

117 19/2/COMBINED ECOS

118 20/1/1/1ST FL OFFICES/8053/1/2/2//11

119 20/2/2/LIQUOR STORE/1127/1/2/2//11

120 20/3/3/LIQUOR STORAGE/901/1/2/2//11

121 20/4/4/LIBRARY/3692/1/2/2//11

122 20/5/5/GAME ROOM/4154/1/2/2//11

123 20/6/6/2ND FL OFFICES/1139/1/2/2//11

124 20/7/7/2ND FL OFFICE/248/1/2/2//11

125 20/8/8/2ND FL TOILETS/582/1/2/2//11

126 21/M////CBADCTX//CBADHTX

127 22/4/1/YES////185

128 22/5/1/YES////185

129 22/6/1/YES////185

130 22/7/1/YES////185

131 22/8/1/YES////185

132 24/1/1/105/8.5//183/35

133 24/1/2/32/8.5//183/125

134 24/1/3/73/8.5//183/215

135 24/1/4/90/8.5//183/305

136 24/2/1/17/8.5//183/35

137 24/2/2/53/8.5//183/125

138 24/2/3/17/8.5//183/215

139 24/3/1/16/8.5//183/215

140 24/4/1/32/8.5//183/125

141 24/4/2/73/8.5//183/215

142 24/4/3/49/8.5//183/305

143 24/5/1/55/8.5//183/305

144 24/5/2/73/8.5//183/35

145 24/5/3/31/8.5//183/125

146 24/6/1/33/8.5//183/35

147 24/6/2/37/8.5//183/125

148 24/7/1/16/8.5//183/125

149 24/7/2/16/8.5//183/215

150 24/8/1/16/8.5//183/215

151 24/8/2/17/8.5//183/305

152 25/1/1/6/4/8/.81/.64

153 25/1/2/6/4/7/.81/.64

154 25/1/3/6/4/6/.81/.64

155 25/1/4/6/4/5/.81/.64

156 25/3/1/6/4/1/.81/.64

157 25/4/1/6/4/4/.81/.64

158 25/4/2/6/4/10/.81/.64

159 25/4/3/6/4/10/.81/.64

160 25/5/1/6/4/10/.81/.64

161 25/5/2/6/4/10/.81/.64

162 25/5/3/6/4/4/.81/.64

163 25/6/1/6/4/4/.81/.64

164 25/6/2/6/4/4/.81/.64

165 25/7/1/6/4/2/.81/.64

166 25/7/2/6/4/2/.81/.64

167 25/8/1/6/4/2/.81/.64

168 25/8/2/6/4/2/.81/.64

169 26/1/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF

170 26/2/CBADP&L/CBADP&L/CBADP&L//OFF/CBADFAN/OFF/OFF/OFF/OFF

171 26/3/CBADP&L/CBADP&L/CBADP&L//OFF/OFF/CBADHTG/OFF/OFF/OFF

172 26/4/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF

173 26/5/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF

174 26/6/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/CBADHTG/OFF/OFF/OFF

CONTENTS OF : E:\CB46B.TM

| LINE # | -----                                                     |
|--------|-----------------------------------------------------------|
| 175    | 26/7/CBADP&L/CBADP&L/CBADP&L//OFF/CBADCLG/OFF/OFF/OFF/OFF |
| 176    | 26/8/OFF/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF             |
| 177    | 27/M/280/SF-PERS/285/290/1.5/WATT-SF                      |
| 178    | 29/1/15/PCT-MCLG/15/PCT-MHTG/.51/CFM-SF/.51/CFM-SF        |
| 179    | 29/2/////51/CFM-SF/.51/CFM-SF                             |
| 180    | 29/3/////51/CFM-SF                                        |
| 181    | 29/4/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF                  |
| 182    | 29/5/10/PCT-MCLG///.51/CFM-SF/.51/CFM-SF                  |
| 183    | 29/6/////51/CFM-SF/.51/CFM-SF                             |
| 184    | 29/7/////51/CFM-SF/.51/CFM-SF                             |
| 185    | 29/8/////51/CFM-SF                                        |
| 186    | 30/1                                                      |
| 187    | 30/2/1400/CFM/1500/CFM                                    |
| 188    | 30/3///750/CFM                                            |
| 189    | 30/4/4950/CFM                                             |
| 190    | 30/5/3830/CFM                                             |
| 191    | SYSTEM - 2                                                |
| 192    | 39/2/COMBINED ECOS                                        |
| 193    | 40/1/SZ                                                   |
| 194    | 41/1/1/2/4/5                                              |
| 195    | 42/1/1.1/1.1                                              |
| 196    | 45/1/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF      |
| 197    | 40/2/PTAC                                                 |
| 198    | 41/2/6/7                                                  |
| 199    | 42/2/.2                                                   |
| 200    | 45/2/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF          |
| 201    | 40/3/RAD                                                  |
| 202    | 41/3/7/8                                                  |
| 203    | 42/3                                                      |
| 204    | 45/3/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF          |
| 205    | 40/4/UH                                                   |
| 206    | 41/4/3/6                                                  |
| 207    | 42/4//.2                                                  |
| 208    | 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF          |
| 209    | EQUIPMENT - 2                                             |
| 210    | 59/2/CARLISLE///COMBINED ECOS                             |
| 211    | 60/1/1/PKPLANT/1/1                                        |
| 212    | 60/2/2/PKPLANT/2/2                                        |
| 213    | 62/1/EQ1161/4                                             |
| 214    | 62/2/EQ1161/5                                             |
| 215    | 65/1/1//1/1/3/4                                           |
| 216    | 67/1/EQ2102/1                                             |
| 217    | 69/1/EQ4003                                               |
| 218    | 69/2/EQ4003                                               |
| 219    | 69/3                                                      |
| 220    | 69/4//EQ4381                                              |



*Building 046*

*Trace Output File*

933702

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 46

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 13:34:17 1/13/94  
Dataset Name: CB46 .TM

AIRFLOW - ALTERNATIVE 1  
 BASE BUILDING

----- S Y S T E M S U M M A R Y -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | SZ          | 1,847                 | 16,641                | 16,741                | 20,668               | 5,774                 | 0             | 0             |
| 2             | PTAC        | 0                     | 1,735                 | 1,735                 | 2,307                | 572                   | 0             | 0             |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 365                   | 0             | 0             |
| 4             | UH          | 0                     | 0                     | 6,035                 | 0                    | 2,238                 | 0             | 0             |
| Totals        |             | 1,847                 | 18,376                | 24,511                | 22,975               | 8,949                 | 0             | 0             |

CAPACITY - ALTERNATIVE 1  
 BASE BUILDING

----- S Y S T E M S U M M A R Y -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 50.2                      | 0.0                       | 0.0                  | 0.0                  | 50.2                  | -665,874                  | 0                         | -59,698                 | 0                      | 0                        | 0                    | 0                    | -665,874              |
| 2             | PTAC        | 6.3                       | 0.0                       | 0.0                  | 0.0                  | 6.3                   | -85,408                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -85,408               |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -49,312                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -49,312               |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -349,136                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -349,136              |
| Totals        |             | 56.5                      | 0.0                       | 0.0                  | 0.0                  | 56.5                  | -1,149,729                | 0                         | -59,698                 | 0                      | 0                        | 0                    | 0                    | -1,149,729            |

The building peaked at hour 16 month 7 with a capacity of 56.1 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 BASE BUILDING

----- E N G I N E E R I N G C H E C K S -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling   |         |           |            | Heating   |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|-----------|---------|-----------|------------|-----------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft | Cfm/Ton | Sq Ft/Ton | Btuh/Sq Ft | Cfm/Sq Ft | Btuh/Sq Ft |                  |
| 1             | Main           | SZ          | 11.10               | 0.98      | 331.3   | 339.0     | 35.40      | 0.98      | -39.11     | 17,026           |
| 2             | Main           | PTAC        | 0.00                | 1.25      | 277.2   | 221.6     | 54.15      | 1.25      | -61.58     | 1,387            |
| 3             | Main           | RAD         | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.00      | -59.41     | 830              |
| 4             | Main           | UH          | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.61      | -35.32     | 9,886            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> | Mo/Hr: 7/14              | *        | Mo/Hr: 7/16 | *       | Mo/Hr: 13/ 1 |          |        |            |           |        |
|--------------------|--------------------------|----------|-------------|---------|--------------|----------|--------|------------|-----------|--------|
| Outside Air ==>    | OADB/WB/HR: 91/ 74/105.0 | *        | OADB: 91    | *       | OADB: 4      |          |        |            |           |        |
|                    | Space                    | Ret. Air | Ret. Air    | Net     | Perct        | Space    | Perct  | Space Peak | Coil Peak | Perct  |
|                    | Sens.+Lat.               | Sensible | Latent      | Total   | Of Tot       | Sensible | Of Tot | Space Sens | Tot Sens  | Of Tot |
|                    | (Btuh)                   | (Btuh)   | (Btuh)      | (Btuh)  | (%)          | (Btuh)   | (%)    | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads     |                          |          |             |         |              |          |        |            |           |        |
| Skylite Solr       | 0                        | 0        |             | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Skylite Cond       | 0                        | 0        |             | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Roof Cond          | 0                        | 124,323  |             | 124,323 | 20.63        | 0        | 0.00   | 0          | -90,278   | 16.49  |
| Glass Solar        | 70,848                   | 0        |             | 70,848  | 11.75        | 73,968   | 21.71  | 0          | 0         | 0.00   |
| Glass Cond         | 19,448                   | 0        |             | 19,448  | 3.23         | 19,852   | 5.83   | -95,233    | -95,233   | 17.40  |
| Wall Cond          | 18,393                   | 3,709    |             | 22,102  | 3.67         | 19,556   | 5.74   | -67,914    | -88,336   | 16.14  |
| Partition          | 0                        |          |             | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Exposed Floor      | 0                        |          |             | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Infiltration       | 152,805                  |          |             | 152,805 | 25.35        | 66,238   | 19.44  | -273,498   | -273,498  | 49.97  |
| Sub Total==>       | 261,494                  | 128,032  |             | 389,526 | 64.63        | 179,614  | 52.72  | -436,645   | -547,345  | 100.00 |
| Internal Loads     |                          |          |             |         |              |          |        |            |           |        |
| Lights             | 113,020                  | 0        |             | 113,020 | 18.75        | 116,503  | 34.20  | 0          | 0         | 0.00   |
| People             | 32,428                   |          |             | 32,428  | 5.38         | 15,332   | 4.50   | 0          | 0         | 0.00   |
| Misc               | 0                        | 0        | 0           | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Sub Total==>       | 145,449                  | 0        | 0           | 145,449 | 24.13        | 131,835  | 38.70  | 0          | 0         | 0.00   |
| Ceiling Load       | 42,074                   | -42,074  |             | 0       | 0.00         | 31,886   | 9.36   | -29,366    | 0         | 0.00   |
| Outside Air        | 0                        | 0        | 0           | 73,703  | 12.23        | 0        | 0.00   | 0          | 0         | 0.00   |
| Sup. Fan Heat      |                          |          |             | 13,017  | 2.16         |          | 0.00   |            | 0         | 0.00   |
| Ret. Fan Heat      |                          | 0        |             | 0       | 0.00         |          | 0.00   |            | 0         | 0.00   |
| Duct Heat Pkup     |                          | 0        |             | 0       | 0.00         |          | 0.00   |            | 0         | 0.00   |
| OV/UNDR Sizing     | -2,662                   |          |             | -2,662  | -0.44        | -2,662   | -0.78  | 0          | 0         | -0.00  |
| Exhaust Heat       |                          | -16,318  | 0           | -16,318 | -2.71        |          | 0.00   |            | 0         | 0.00   |
| Terminal Bypass    |                          | 0        | 0           | 0       | 0.00         |          | 0.00   |            | 0         | 0.00   |
| Grand Total==>     | 446,355                  | 69,640   | 0           | 602,714 | 100.00       | 340,673  | 100.00 | -466,011   | -547,345  | 100.00 |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total | Glass (sf) | (%)      |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------|------------|----------|
| Main Clg | 50.2                  | 602.7           | 16,641           | 83.7                      | 55.5                     | Floor       | 17,026     |          |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | Part        | 0          |          |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | ExFlr       | 0          |          |
| Totals   | 50.2                  | 602.7           |                  |                           |                          | Roof        | 7,846      | 0 0      |
|          |                       |                 |                  |                           |                          | Wall        | 5,950      | 1,776 30 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 11.1   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -665.9         | 16,741           | 57.0        | 93.6        | Vent    | 1,847   | 0       | Clg Cfm/Sqft  | 0.98   | SADB     | 56.2 | 93.6 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 3,927   | 3,927   | Clg Cfm/Ton   | 331.31 | Plenum   | 82.8 | 58.6 |
| Preheat  | -59.7          | 16,641           | 52.2        | 55.5        | Supply  | 16,641  | 16,741  | Clg Sqft/Ton  | 338.99 | Return   | 82.9 | 58.2 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 35.40  | Ret/OA   | 83.7 | 58.2 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 16,641  | 16,741  | No. People    | 61     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 1,847   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.2  | 0.2  |
| Total    | -665.9         |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.98   | Fn BldTD | 0.1  | 0.1  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -39.11 | Fn Frict | 0.4  | 0.4  |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/15 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space<br>Sens.+Lat.<br>(Btuh) | Ret. Air<br>Sensible<br>(Btuh) | Ret. Air<br>Latent<br>(Btuh) | Net<br>Total<br>(Btuh) | Perct<br>Of Tot<br>(%) | * | Space<br>Sensible<br>(Btuh) | Perct<br>Of Tot<br>(%) | * | Space Peak<br>Space Sens<br>(Btuh) | Coil Peak<br>Tot Sens<br>(Btuh) | Perct<br>Of Tot<br>(%) |
|-----------------|-------------------------------|--------------------------------|------------------------------|------------------------|------------------------|---|-----------------------------|------------------------|---|------------------------------------|---------------------------------|------------------------|
| Envelope Loads  |                               |                                |                              |                        |                        | * |                             |                        | * |                                    |                                 |                        |
| Skylite Solr    | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Skylite Cond    | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Roof Cond       | 0                             | 21,360                         |                              | 21,360                 | 28.44                  | * | 0                           | 0.00                   | * | 0                                  | -17,749                         | 20.81                  |
| Glass Solar     | 11,232                        | 0                              |                              | 11,232                 | 14.95                  | * | 10,944                      | 26.48                  | * | 0                                  | 0                               | 0.00                   |
| Glass Cond      | 3,009                         | 0                              |                              | 3,009                  | 4.01                   | * | 3,180                       | 7.70                   | * | -15,443                            | -15,443                         | 18.11                  |
| Wall Cond       | 2,731                         | 564                            |                              | 3,295                  | 4.39                   | * | 2,977                       | 7.21                   | * | -9,254                             | -12,231                         | 14.34                  |
| Partition       | 0                             |                                |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Exposed Floor   | 0                             |                                |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Infiltration    | 24,717                        |                                |                              | 24,717                 | 32.91                  | * | 9,865                       | 23.87                  | * | -39,853                            | -39,853                         | 46.73                  |
| Sub Total==>    | 41,690                        | 21,923                         |                              | 63,613                 | 84.70                  | * | 26,967                      | 65.26                  | * | -64,550                            | -85,276                         | 100.00                 |
| Internal Loads  |                               |                                |                              |                        |                        | * |                             |                        | * |                                    |                                 |                        |
| Lights          | 8,687                         | 0                              |                              | 8,687                  | 11.57                  | * | 8,914                       | 21.57                  | * | 0                                  | 0                               | 0.00                   |
| People          | 2,558                         |                                |                              | 2,558                  | 3.41                   | * | 1,167                       | 2.82                   | * | 0                                  | 0                               | 0.00                   |
| Misc            | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Sub Total==>    | 11,246                        | 0                              | 0                            | 11,246                 | 14.97                  | * | 10,081                      | 24.40                  | * | 0                                  | 0                               | 0.00                   |
| Ceiling Load    | 3,880                         | -3,880                         |                              | 0                      | 0.00                   | * | 4,275                       | 10.35                  | * | -3,916                             | 0                               | 0.00                   |
| Outside Air     | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Sup. Fan Heat   |                               |                                |                              | 247                    | 0.33                   | * |                             | 0.00                   | * |                                    | 0                               | 0.00                   |
| Ret. Fan Heat   |                               | 0                              |                              | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    | 0                               | 0.00                   |
| Duct Heat Pkup  |                               | 0                              |                              | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    | 0                               | 0.00                   |
| OV/UNDR Sizing  | 0                             |                                |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Exhaust Heat    |                               | 0                              | 0                            | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    | 0                               | 0.00                   |
| Terminal Bypass |                               | 0                              | 0                            | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    | 0                               | 0.00                   |
| Grand Total==>  | 56,816                        | 18,043                         | 0                            | 75,106                 | 100.00                 | * | 41,323                      | 100.00                 | * | -68,466                            | -85,276                         | 100.00                 |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) (%) |       |        |
|----------|--------------------------|--------------------|---------------------|-------------------|-------|--------|------------------|-------|--------|-------------|----------------|-------|--------|
|          |                          |                    |                     | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part           | ExFlr |        |
| Main Clg | 6.3                      | 75.1               | 58.6                | 1,735             | 83.6  | 65.3   | 66.5             | 53.0  | 50.5   | 52.0        | 1,387          | 0     | 0      |
| Aux Clg  | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0              | 0     | 0      |
| Opt Vent | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0              | 0     | 0      |
| Totals   | 6.3                      | 75.1               |                     |                   |       |        |                  |       |        |             | 1,387          | 867   | 288 33 |

-----HEATING COIL SELECTION-----

|          | Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)-- |       |  |
|----------|-------------------|---------------------|--------------|--------------|---------|---------|---------|------------------------|--------|----------|----------------------|-------|--|
|          |                   |                     |              |              | Vent    | 0       | 0       | Clg % OA               | 0.0    | Type     | Clg                  | Htg   |  |
| Main Htg | -85.4             | 1,735               | 59.0         | 104.3        | Infil   | 572     | 572     | Clg Cfm/Sqft           | 1.25   | SADB     | 53.1                 | 104.3 |  |
| Aux Htg  | 0.0               | 0                   | 0.0          | 0.0          | Supply  | 1,735   | 1,735   | Clg Cfm/Ton            | 277.24 | Plenum   | 83.8                 | 59.1  |  |
| Preheat  | -0.0              | 1,735               | 59.0         | 53.0         | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 221.61 | Return   | 83.6                 | 59.0  |  |
| Reheat   | 0.0               | 0                   | 0.0          | 0.0          | Return  | 1,735   | 1,735   | Clg Btuh/Sqft          | 54.15  | Ret/OA   | 83.6                 | 59.0  |  |
| Humidif  | 0.0               | 0                   | 0.0          | 0.0          | Exhaust | 0       | 0       | No. People             | 5      | Runarnd  | 75.0                 | 68.0  |  |
| Opt Vent | 0.0               | 0                   | 0.0          | 0.0          | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD | 0.0                  | 0.0   |  |
| Total    | -85.4             |                     |              |              | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 1.25   | Fn BldTD | 0.0                  | 0.0   |  |
|          |                   |                     |              |              |         |         |         | Htg Btuh/Sqft          | -61.58 | Fn Frict | 0.1                  | 0.0   |  |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | -6,714                    | 13.61            |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -10,295                      | -10,295                   | 20.88            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -5,711                       | -6,907                    | 14.01            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -25,396                      | -25,396                   | 51.50            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -41,403                      | -49,312                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -7,805                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -49,208                      | -49,312                   | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 830        |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 830        | 0 0    |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall        | 553        | 192 35 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F |
|----------|----------------|------------------|-----------|-----------|
| Main Htg | -49.3          | 0                | 0.0       | 0.0       |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       |
| Total    | -49.3          |                  |           |           |

-----AIRFLOWS (cfm)-----

| Type    | Cooling | Heating |
|---------|---------|---------|
| Vent    | 0       | 0       |
| Infil   | 0       | 365     |
| Supply  | 0       | 0       |
| Mincfm  | 0       | 0       |
| Return  | 0       | 0       |
| Exhaust | 0       | 0       |
| Rm Exh  | 0       | 0       |
| Auxil   | 0       | 0       |

-----ENGINEERING CHECKS-----

| Clg % OA      | 0.0    |
|---------------|--------|
| Clg Cfm/Sqft  | 0.00   |
| Clg Cfm/Ton   | 0.00   |
| Clg Sqft/Ton  | 0.00   |
| Clg Btuh/Sqft | 0.00   |
| No. People    | 0      |
| Htg % OA      | 0.0    |
| Htg Cfm/Sqft  | 0.00   |
| Htg Btuh/Sqft | -59.41 |

-----TEMPERATURES (F)-----

| Type     | Clg | Htg  |
|----------|-----|------|
| SADB     | 0.0 | 68.1 |
| Plenum   | 0.0 | 38.8 |
| Return   | 0.0 | 39.0 |
| Ret/OA   | 0.0 | 39.0 |
| Runarnd  | 0.0 | 68.0 |
| Fn MtrTD | 0.0 | 0.0  |
| Fn BldTD | 0.0 | 0.0  |
| Fn Frict | 0.0 | 0.0  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | -74,057                   | 21.67            |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -73,355                      | -73,355                   | 21.47            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -30,899                      | -38,407                   | 11.24            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -155,894                     | -155,894                  | 45.62            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -260,148                     | -341,713                  | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -84,880                      | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -345,028                     | -341,713                  | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/HR (Deg F) | Entering WB/HR (Deg F) | Grains | Leaving DB/HR (Deg F) | Leaving WB/HR (Deg F) | Grains | Gross Total | Glass (sf) | (%)      |
|----------|-----------------------|-----------------|------------------|------------------------|------------------------|--------|-----------------------|-----------------------|--------|-------------|------------|----------|
| Main Clg | 0.0                   | 0.0             | 0.0              | 0.0                    | 0.0                    | 0.0    | 0.0                   | 0.0                   | 0.0    | Floor       | 9,886      |          |
| Aux Clg  | 0.0                   | 0.0             | 0.0              | 0.0                    | 0.0                    | 0.0    | 0.0                   | 0.0                   | 0.0    | Part        | 0          |          |
| Opt Vent | 0.0                   | 0.0             | 0.0              | 0.0                    | 0.0                    | 0.0    | 0.0                   | 0.0                   | 0.0    | ExFlr       | 0          |          |
| Totals   | 0.0                   | 0.0             | 0.0              | 0.0                    | 0.0                    | 0.0    | 0.0                   | 0.0                   | 0.0    | Roof        | 8,985      | 0 0      |
|          |                       |                 |                  |                        |                        |        |                       |                       |        | Wall        | 3,392      | 1,368 40 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg   |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|-----|-------|
| Main Htg | -349.1         | 6,035            | 67.4        | 120.5       | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 120.5 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 0       | 2,238   | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 39.6  |
| Preheat  | 0.0            | 0                | 0.0         | 0.0         | Supply  | 0       | 6,035   | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 68.0  |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 68.0  |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 0       | 6,035   | No. People    | 0      | Runarnd  | 0.0 | 68.0  |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0   |
| Total    | -349.1         |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.61   | Fn BldTD | 0.0 | 0.0   |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -35.32 | Fn Frict | 0.0 | 0.1   |

BUILDING U-VALUES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description    | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |            |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |       |
|-------------|----------------|-------|-------|----------------------------------|-------------|------------|-------------|-------|-------|------------------------|-----------------------------|-------|
|             |                |       |       | Summr Skylt                      | Wintr Skylt | Summr Roof | Wintr Windo | Wall  | Ceil. |                        |                             |       |
| 1           | 1ST FL OFFICES | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837 | 0.343 | 0.317                  | 45.0                        | 9.63  |
| Zone        | 1 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837 | 0.343 | 0.317                  | 45.0                        | 9.63  |
| 2           | LIQUOR STORE   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000 | 0.343 | 0.317                  | 100.3                       | 21.77 |
| Zone        | 2 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000 | 0.343 | 0.317                  | 100.3                       | 21.77 |
| 4           | LIBRARY        | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 46.8                        | 10.79 |
| Zone        | 4 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 46.8                        | 10.79 |
| 5           | GAME ROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 45.3                        | 10.44 |
| Zone        | 5 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 45.3                        | 10.44 |
| System      | 1 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 49.2                        | 10.88 |
| 6           | 2ND FL OFFICES | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 67.4                        | 15.31 |
| Zone        | 6 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 67.4                        | 15.31 |
| 7           | 2ND FL OFFICE  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 114.6                       | 25.67 |
| Zone        | 7 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 114.6                       | 25.67 |
| System      | 2 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 75.9                        | 17.16 |
| 7           | 2ND FL OFFICE  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 114.6                       | 25.67 |
| Zone        | 7 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 114.6                       | 25.67 |
| 8           | 2ND FL TOILETS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 62.6                        | 14.24 |
| Zone        | 8 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 62.6                        | 14.24 |
| System      | 3 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 78.1                        | 17.65 |
| 3           | LIQUOR STORAGE | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837 | 0.343 | 0.317                  | 29.8                        | 6.29  |
| Zone        | 3 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837 | 0.343 | 0.317                  | 29.8                        | 6.29  |
| 4           | LIBRARY        | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 46.8                        | 10.79 |
| Zone        | 4 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 46.8                        | 10.79 |
| 5           | GAME ROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 45.3                        | 10.44 |
| Zone        | 5 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 45.3                        | 10.44 |
| 6           | 2ND FL OFFICES | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 67.4                        | 15.31 |
| Zone        | 6 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 67.4                        | 15.31 |
| System      | 4 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 47.0                        | 10.75 |
| Building    |                | 0.000 | 0.000 | 0.000                            | 0.000       | 0.232      | 0.810       | 0.837 | 0.343 | 0.317                  | 50.5                        | 11.33 |



BUILDING AREAS - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G   A R E A S -----

| Room Number | Description    | Number of Duplicate |   | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|----------------|---------------------|---|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
| 1           | 1ST FL OFFICES | 1                   | 1 | 8,053                       | 8,053                   | 0                     | 0                         | 0                    | 0           | 0                    | 624                | 24          | 1,926                |
| Zone        | 1 Total/Ave.   |                     |   |                             | 8,053                   | 0                     | 0                         | 0                    | 0           | 0                    | 624                | 24          | 1,926                |
| 2           | LIQUOR STORE   | 1                   | 1 | 1,127                       | 1,127                   | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 739                  |
| Zone        | 2 Total/Ave.   |                     |   |                             | 1,127                   | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 739                  |
| 4           | LIBRARY        | 1                   | 1 | 3,692                       | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| Zone        | 4 Total/Ave.   |                     |   |                             | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| 5           | GAME ROOM      | 1                   | 1 | 4,154                       | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| Zone        | 5 Total/Ave.   |                     |   |                             | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| System      | 1 Total/Ave.   |                     |   |                             | 17,026                  | 0                     | 0                         | 0                    | 0           | 7,846                | 1,776              | 30          | 4,174                |
| 6           | 2ND FL OFFICES | 1                   | 1 | 1,139                       | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| Zone        | 6 Total/Ave.   |                     |   |                             | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| 7           | 2ND FL OFFICE  | 1                   | 1 | 248                         | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| Zone        | 7 Total/Ave.   |                     |   |                             | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| System      | 2 Total/Ave.   |                     |   |                             | 1,387                   | 0                     | 0                         | 0                    | 0           | 1,387                | 288                | 33          | 579                  |
| 7           | 2ND FL OFFICE  | 1                   | 1 | 248                         | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| Zone        | 7 Total/Ave.   |                     |   |                             | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| 8           | 2ND FL TOILETS | 1                   | 1 | 582                         | 582                     | 0                     | 0                         | 0                    | 0           | 582                  | 96                 | 34          | 184                  |
| Zone        | 8 Total/Ave.   |                     |   |                             | 582                     | 0                     | 0                         | 0                    | 0           | 582                  | 96                 | 34          | 184                  |
| System      | 3 Total/Ave.   |                     |   |                             | 830                     | 0                     | 0                         | 0                    | 0           | 830                  | 192                | 35          | 360                  |
| 3           | LIQUOR STORAGE | 1                   | 1 | 901                         | 901                     | 0                     | 0                         | 0                    | 0           | 0                    | 24                 | 18          | 112                  |
| Zone        | 3 Total/Ave.   |                     |   |                             | 901                     | 0                     | 0                         | 0                    | 0           | 0                    | 24                 | 18          | 112                  |
| 4           | LIBRARY        | 1                   | 1 | 3,692                       | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| Zone        | 4 Total/Ave.   |                     |   |                             | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| 5           | GAME ROOM      | 1                   | 1 | 4,154                       | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| Zone        | 5 Total/Ave.   |                     |   |                             | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| 6           | 2ND FL OFFICES | 1                   | 1 | 1,139                       | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| Zone        | 6 Total/Ave.   |                     |   |                             | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| System      | 4 Total/Ave.   |                     |   |                             | 9,886                   | 0                     | 0                         | 0                    | 0           | 8,985                | 1,368              | 40          | 2,023                |
| Building    |                |                     |   |                             | 29,129                  | 0                     | 0                         | 0                    | 0           | 19,048               | 3,624              | 34          | 7,137                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 33.33 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 2.8                    | 1            | 8     | -60,471                  | 26           | 594   | 1,225.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 5.6                    | 3            | 27    | -120,943                 | 30           | 680   | 2,451.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 8.5                    | 10           | 83    | -181,414                 | 17           | 376   | 3,676.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 11.3                   | 8            | 63    | -241,885                 | 2            | 56    | 4,902.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 14.1                   | 1            | 8     | -302,357                 | 1            | 23    | 6,127.8                   | 59           | 3,638 | 0.0                       | 0            | 0     |
| 25 - 30                   | 16.9                   | 16           | 128   | -362,828                 | 2            | 52    | 7,353.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 19.8                   | 2            | 18    | -423,300                 | 0            | 6     | 8,578.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 22.6                   | 7            | 54    | -483,771                 | 2            | 42    | 9,804.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 25.4                   | 7            | 60    | -544,242                 | 2            | 43    | 11,030.0                  | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 28.2                   | 6            | 46    | -604,714                 | 0            | 3     | 12,255.6                  | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 31.1                   | 8            | 63    | -665,185                 | 1            | 28    | 13,481.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 33.9                   | 8            | 67    | -725,656                 | 16           | 363   | 14,706.7                  | 24           | 1,450 | 0.0                       | 0            | 0     |
| 60 - 65                   | 36.7                   | 3            | 23    | -786,128                 | 0            | 0     | 15,932.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 39.5                   | 5            | 39    | -846,599                 | 0            | 0     | 17,157.8                  | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 42.4                   | 10           | 83    | -907,071                 | 0            | 0     | 18,383.4                  | 10           | 634   | 0.0                       | 0            | 0     |
| 75 - 80                   | 45.2                   | 2            | 15    | -967,542                 | 0            | 0     | 19,608.9                  | 7            | 436   | 0.0                       | 0            | 0     |
| 80 - 85                   | 48.0                   | 1            | 5     | -1,028,013               | 0            | 0     | 20,834.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 50.8                   | 2            | 20    | -1,088,485               | 0            | 0     | 22,060.0                  | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 53.7                   | 0            | 0     | -1,148,956               | 0            | 0     | 23,285.6                  | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 56.5                   | 0            | 0     | -1,209,427               | 0            | 0     | 24,511.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,950 | 0                        | 0            | 6,494 | 0.0                       | 0            | 2,602 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | Zone Number                               |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------|-------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                             | 1                                         | 2     | 4     | 5     | 6     | 7     | 7     | 8     | 3     | 4     | 5     | 6     |
| Max. Temp.                  | 83.5                                      | 81.1  | 89.9  | 89.0  | 87.3  | 87.5  | 104.5 | 104.9 | 132.3 | 110.0 | 109.1 | 105.1 |
| Mo./Hr.                     | 7 19                                      | 7 21  | 7 20  | 7 20  | 7 20  | 7 20  | 8 20  | 7 19  | 8 18  | 7 19  | 7 19  | 7 19  |
| Day Type                    | 4                                         | 4     | 4     | 4     | 4     | 4     | 1     | 2     | 2     | 2     | 2     | 2     |
|                             | ..... N u m b e r   o f   H o u r s ..... |       |       |       |       |       |       |       |       |       |       |       |
| Above 100                   | 0                                         | 0     | 0     | 0     | 0     | 0     | 620   | 749   | 2,960 | 1,340 | 1,147 | 769   |
| 95 - 100                    | 0                                         | 0     | 0     | 0     | 0     | 0     | 1,376 | 954   | 319   | 902   | 701   | 951   |
| 90 - 95                     | 0                                         | 0     | 0     | 0     | 0     | 0     | 746   | 874   | 403   | 663   | 845   | 860   |
| 85 - 90                     | 0                                         | 0     | 224   | 169   | 110   | 132   | 475   | 475   | 430   | 597   | 572   | 473   |
| 80 - 85                     | 903                                       | 274   | 1,483 | 1,312 | 1,020 | 1,079 | 455   | 620   | 315   | 170   | 351   | 619   |
| 75 - 80                     | 2,372                                     | 2,561 | 1,742 | 1,831 | 2,224 | 2,246 | 34    | 0     | 691   | 51    | 56    | 0     |
| 70 - 75                     | 910                                       | 888   | 584   | 411   | 352   | 385   | 431   | 388   | 1,277 | 699   | 488   | 168   |
| 65 - 70                     | 1,991                                     | 2,211 | 573   | 639   | 486   | 452   | 1,883 | 1,861 | 1,280 | 1,736 | 1,713 | 1,966 |
| 60 - 65                     | 984                                       | 1,240 | 732   | 575   | 704   | 990   | 1,017 | 1,069 | 366   | 941   | 922   | 1,067 |
| 55 - 60                     | 595                                       | 731   | 640   | 747   | 639   | 543   | 760   | 760   | 275   | 703   | 822   | 779   |
| 50 - 55                     | 391                                       | 332   | 912   | 658   | 778   | 826   | 963   | 1,010 | 444   | 958   | 1,143 | 1,108 |
| Below 50                    | 614                                       | 523   | 1,870 | 2,418 | 2,447 | 2,107 | 0     | 0     | 0     | 0     | 0     | 0     |
| Min. Temp.                  | 37.1                                      | 39.1  | 34.6  | 32.3  | 33.3  | 36.2  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  |
| Mo./Hr.                     | 2 7                                       | 2 7   | 2 10  | 2 10  | 2 8   | 2 10  | 1 6   | 1 6   | 1 2   | 1 6   | 1 5   | 1 5   |
| Day Type                    | 5                                         | 5     | 4     | 4     | 5     | 4     | 2     | 2     | 4     | 2     | 2     | 2     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | HOT WTR           | HOT W DMND           |
|-------|-------------------|-----------------|-------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Thrm) | On Peak<br>(Thrm/hr) |
| Jan   | 14,233            | 74              | 1,247             | 7                    |
| Feb   | 12,878            | 74              | 1,190             | 7                    |
| March | 15,582            | 74              | 644               | 7                    |
| April | 13,545            | 74              | 122               | 7                    |
| May   | 17,602            | 155             | 0                 | 0                    |
| June  | 22,034            | 160             | 0                 | 0                    |
| July  | 24,623            | 164             | 0                 | 0                    |
| Aug   | 23,101            | 160             | 0                 | 0                    |
| Sept  | 16,020            | 156             | 0                 | 0                    |
| Oct   | 14,898            | 74              | 96                | 7                    |
| Nov   | 13,548            | 74              | 433               | 7                    |
| Dec   | 13,555            | 74              | 1,000             | 7                    |
| Total | 201,620           | 164             | 4,731             | 7                    |

Building Energy Consumption = 39,866 (Btu/Sq Ft/Year)  
Source Energy Consumption = 92,535 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code                 | Monthly Consumption |       |       |       |       |       |       |       |       |       |       |       | Total   |
|---------|----------------------------|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|         |                            | Jan                 | Feb   | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0       | LIGHTS                     |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC                       | 13433               | 12154 | 14712 | 12793 | 14073 | 14073 | 12793 | 14712 | 12793 | 14073 | 12793 | 12793 | 161,198 |
|         | PK                         | 69.9                | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9    |
| 1       | MISC LD                    |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC                       | 0                   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2       | MISC LD                    |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | GAS                        | 0                   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3       | MISC LD                    |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | OIL                        | 0                   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4       | MISC LD                    |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | P STEAM                    | 0                   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5       | MISC LD                    |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | P HOTH2O                   | 0                   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6       | MISC LD                    |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | P CHILL                    | 0                   | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1       | EQ1161                     |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | AIR-CLD COND COMP <15 TONS |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC                       | 0                   | 0     | 0     | 0     | 1441  | 4989  | 8244  | 5249  | 1320  | 0     | 0     | 0     | 21,243  |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 64.7  | 67.3  | 69.6  | 67.5  | 65.0  | 0.0   | 0.0   | 0.0   | 69.6    |
| 1       | EQ5200                     |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | CONDENSER FANS             |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC                       | 0                   | 0     | 0     | 0     | 148   | 457   | 799   | 488   | 139   | 0     | 0     | 0     | 2,032   |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 3.9   | 5.3   | 6.2   | 5.2   | 3.9   | 0.0   | 0.0   | 0.0   | 6.2     |
| 1       | EQ5303                     |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | CONTROLS                   |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC                       | 0                   | 0     | 0     | 0     | 24    | 66    | 60    | 69    | 22    | 0     | 0     | 0     | 241     |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.3     |
| 2       | EQ1161                     |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | AIR-CLD COND COMP <15 TONS |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC                       | 0                   | 0     | 0     | 0     | 119   | 572   | 975   | 618   | 113   | 0     | 0     | 0     | 2,398   |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 8.0   | 8.4   | 8.7   | 8.4   | 8.1   | 0.0   | 0.0   | 0.0   | 8.7     |
| 2       | EQ5200                     |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | CONDENSER FANS             |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC                       | 0                   | 0     | 0     | 0     | 13    | 53    | 95    | 58    | 12    | 0     | 0     | 0     | 231     |
|         | PK                         | 0.0                 | 0.0   | 0.0   | 0.0   | 0.4   | 0.7   | 0.8   | 0.6   | 0.5   | 0.0   | 0.0   | 0.0   | 0.8     |
| 2       | EQ5303                     |                     |       |       |       |       |       |       |       |       |       |       |       |         |
|         | CONTROLS                   |                     |       |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
 BASE BUILDING

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        163.7    (kW)  
 Yearly Time of Peak 15 (hr)    7 (mo)

Hour 15    Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|------------------------|
| Cooling Equipment    |                        |                                    |                           |                        |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 76.1                      | 46.47                  |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 9.7                       | 5.95                   |
| Sub Total            |                        |                                    | 85.8                      | 52.42                  |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Air Moving Equipment |                        |                                    |                           |                        |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 7.8                       | 4.79                   |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.1                       | 0.09                   |
| Sub Total            |                        |                                    | 8.0                       | 4.88                   |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Miscellaneous        |                        |                                    |                           |                        |
|                      | Lights                 |                                    | 69.9                      | 42.71                  |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                   |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                   |
| Sub Total            |                        |                                    | 69.9                      | 42.71                  |
| Grand Total          |                        |                                    | 163.7                     | 100.00                 |



```
*****  
*****  
**  
**          T R A C E   6 0 0   A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 46

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14: 6:20 1/13/94  
Dataset Name: CB46 .TM

AIRFLOW - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- S Y S T E M   S U M M A R Y -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | SZ          | 1,684                 | 15,551                | 15,651                | 18,685               | 4,718                 | 0             | 0             |
| 2             | PTAC        | 0                     | 1,402                 | 1,402                 | 1,844                | 442                   | 0             | 0             |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 282                   | 0             | 0             |
| 4             | UH          | 0                     | 0                     | 4,192                 | 0                    | 1,730                 | 0             | 0             |
| Totals        |             | 1,684                 | 16,952                | 21,244                | 20,529               | 7,172                 | 0             | 0             |

CAPACITY - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- S Y S T E M   S U M M A R Y -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      | Cooling Totals (Tons) | Heating                   |                           |                         |                        |                          |                      | Heating Totals (Btuh) |                      |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|-----------------------|----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) |                       | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) |                       | Vent Capacity (Btuh) |
| 1             | SZ          | 37.4                      | 0.0                       | 0.0                  | 0.0                  | 37.4                  | -373,976                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                     | -373,976             |
| 2             | PTAC        | 4.1                       | 0.0                       | 0.0                  | 0.0                  | 4.1                   | -52,014                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                     | -52,014              |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -33,113                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                     | -33,113              |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -223,775                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                     | -223,775             |
| Totals        |             | 41.5                      | 0.0                       | 0.0                  | 0.0                  | 41.5                  | -682,878                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                     | -682,878             |

The building peaked at hour 16 month 7 with a capacity of 41.1 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- E N G I N E E R I N G   C H E C K S -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling   |         |           |            | Heating   |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|-----------|---------|-----------|------------|-----------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft | Cfm/Ton | Sq Ft/Ton | Btuh/Sq Ft | Cfm/Sq Ft | Btuh/Sq Ft |                  |
| 1             | Main           | SZ          | 10.83               | 0.91      | 415.3   | 454.7     | 26.39      | 0.92      | -21.96     | 17,026           |
| 2             | Main           | PTAC        | 0.00                | 1.01      | 344.2   | 340.6     | 35.23      | 1.01      | -37.50     | 1,387            |
| 3             | Main           | RAD         | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.00      | -39.90     | 830              |
| 4             | Main           | UH          | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.42      | -22.64     | 9,886            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space<br>Sens.+Lat.<br>(Btuh) | Ret. Air<br>Sensible<br>(Btuh) | Ret. Air<br>Latent<br>(Btuh) | Net<br>Total<br>(Btuh) | Perct<br>Of Tot<br>(%) | * | Space<br>Sensible<br>(Btuh) | Perct<br>Of Tot<br>(%) | * | Space Peak<br>Space Sens<br>(Btuh) | Coil Peak<br>Tot Sens<br>(Btuh) | Perct<br>Of Tot<br>(%) |
|-----------------|-------------------------------|--------------------------------|------------------------------|------------------------|------------------------|---|-----------------------------|------------------------|---|------------------------------------|---------------------------------|------------------------|
| Envelope Loads  |                               |                                |                              |                        |                        | * |                             |                        | * |                                    |                                 |                        |
| Skylite Solr    | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Skylite Cond    | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Roof Cond       | 0                             | 23,745                         | 0                            | 23,745                 | 5.28                   | * | 0                           | 0.00                   | * | 0                                  | -19,416                         | 5.69                   |
| Glass Solar     | 70,848                        | 0                              | 0                            | 70,848                 | 15.77                  | * | 73,968                      | 25.82                  | * | 0                                  | 0                               | 0.00                   |
| Glass Cond      | 19,448                        | 0                              | 0                            | 19,448                 | 4.33                   | * | 19,852                      | 6.93                   | * | -95,233                            | -95,233                         | 27.90                  |
| Wall Cond       | 3,242                         | 1,046                          | 0                            | 4,289                  | 0.95                   | * | 3,301                       | 1.15                   | * | -11,470                            | -15,344                         | 4.50                   |
| Partition       | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Exposed Floor   | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Infiltration    | 112,335                       | 0                              | 0                            | 112,335                | 25.00                  | * | 51,389                      | 17.94                  | * | -211,340                           | -211,340                        | 61.92                  |
| Sub Total==>    | 205,873                       | 24,791                         | 0                            | 230,664                | 51.33                  | * | 148,510                     | 51.85                  | * | -318,043                           | -341,332                        | 100.00                 |
| Internal Loads  |                               |                                |                              |                        |                        | * |                             |                        | * |                                    |                                 |                        |
| Lights          | 112,625                       | 0                              | 0                            | 112,625                | 25.06                  | * | 116,108                     | 40.54                  | * | 0                                  | 0                               | 0.00                   |
| People          | 32,391                        | 0                              | 0                            | 32,391                 | 7.21                   | * | 15,271                      | 5.33                   | * | 0                                  | 0                               | 0.00                   |
| Misc            | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Sub Total==>    | 145,016                       | 0                              | 0                            | 145,016                | 32.27                  | * | 131,380                     | 45.87                  | * | 0                                  | 0                               | 0.00                   |
| Ceiling Load    | 8,029                         | -8,029                         | 0                            | 0                      | 0.00                   | * | 6,537                       | 2.28                   | * | -5,836                             | 0                               | 0.00                   |
| Outside Air     | 0                             | 0                              | 0                            | 64,425                 | 14.34                  | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Sup. Fan Heat   | 0                             | 0                              | 0                            | 12,164                 | 2.71                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Ret. Fan Heat   | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Duct Heat Pkup  | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| OV/UNDR Sizing  | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Exhaust Heat    | 0                             | -2,905                         | 0                            | -2,905                 | -0.65                  | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Terminal Bypass | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Grand Total==>  | 358,918                       | 13,857                         | 0                            | 449,364                | 100.00                 | * | 286,427                     | 100.00                 | * | -323,878                           | -341,332                        | 100.00                 |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)      |
|----------|--------------------------|--------------------|---------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|----------|
|          |                          |                    |                     | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |          |
| Main Clg | 37.4                     | 449.4              | 334.6               | 15,551            | 78.0  | 65.4   | 75.9             | 57.4  | 56.0   | 66.7        | 17,026     |          |
| Aux Clg  | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0          |          |
| Opt Vent | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0          |          |
| Totals   | 37.4                     | 449.4              |                     |                   |       |        |                  |       |        |             | 7,846      | 0 0      |
|          |                          |                    |                     |                   |       |        |                  |       |        |             | 5,950      | 1,776 30 |

-----HEATING COIL SELECTION-----

|          | Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F |
|----------|-------------------|---------------------|--------------|--------------|
| Main Htg | -374.0            | 15,651              | 65.1         | 87.0         |
| Aux Htg  | 0.0               | 0                   | 0.0          | 0.0          |
| Preheat  | -0.0              | 15,551              | 58.8         | 57.4         |
| Reheat   | 0.0               | 0                   | 0.0          | 0.0          |
| Humidif  | 0.0               | 0                   | 0.0          | 0.0          |
| Opt Vent | 0.0               | 0                   | 0.0          | 0.0          |
| Total    | -374.0            |                     |              |              |

-----AIRFLOWS (cfm)-----

| Type    | Cooling | Heating |
|---------|---------|---------|
| Vent    | 1,684   | 0       |
| Infil   | 3,035   | 3,035   |
| Supply  | 15,551  | 15,651  |
| Mincfm  | 0       | 0       |
| Return  | 15,551  | 15,651  |
| Exhaust | 1,684   | 0       |
| Rm Exh  | 0       | 0       |
| Auxil   | 0       | 0       |

-----ENGINEERING CHECKS-----

| Clg % OA      | 10.8   |
|---------------|--------|
| Clg Cfm/Sqft  | 0.91   |
| Clg Cfm/Ton   | 415.27 |
| Clg Sqft/Ton  | 454.67 |
| Clg Btuh/Sqft | 26.39  |
| No. People    | 61     |
| Htg % OA      | 0.0    |
| Htg Cfm/Sqft  | 0.92   |
| Htg Btuh/Sqft | -21.96 |

-----TEMPERATURES (F)-----

| Type     | Clg  | Htg  |
|----------|------|------|
| SADB     | 58.1 | 87.0 |
| Plenum   | 76.5 | 65.7 |
| Return   | 76.5 | 65.4 |
| Ret/OA   | 78.0 | 65.4 |
| Runarnd  | 75.0 | 68.0 |
| Fn MtrTD | 0.2  | 0.1  |
| Fn BldTD | 0.1  | 0.1  |
| Fn Frict | 0.4  | 0.1  |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |                         | Mo/Hr: 7/14              |                        | *                | Mo/Hr: 7/15      |   | *                     | Mo/Hr: 13/ 1     |   |                              |                           |                  |
|--------------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Outside Air ==>    |                         | OADB/WB/HR: 91/ 74/105.0 |                        | *                | OADB: 91         |   | *                     | OADB: 4          |   |                              |                           |                  |
|                    | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
| Envelope Loads     |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond          | 0                       | 3,463                    | 0                      | 3,463            | 7.09             | * | 0                     | 0.00             | * | 0                            | -3,531                    | 6.80             |
| Glass Solar        | 11,232                  | 0                        | 0                      | 11,232           | 22.98            | * | 10,944                | 32.93            | * | 0                            | 0                         | 0.00             |
| Glass Cond         | 3,009                   | 0                        | 0                      | 3,009            | 6.16             | * | 3,180                 | 9.57             | * | -15,443                      | -15,443                   | 29.76            |
| Wall Cond          | 462                     | 158                      | 0                      | 620              | 1.27             | * | 483                   | 1.45             | * | -1,563                       | -2,128                    | 4.10             |
| Partition          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration       | 19,100                  | 0                        | 0                      | 19,100           | 39.08            | * | 7,623                 | 22.94            | * | -30,795                      | -30,795                   | 59.34            |
| Sub Total==>       | 33,803                  | 3,620                    | 0                      | 37,423           | 76.58            | * | 22,231                | 66.90            | * | -47,801                      | -51,898                   | 100.00           |
| Internal Loads     |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights             | 8,687                   | 0                        | 0                      | 8,687            | 17.78            | * | 8,914                 | 26.83            | * | 0                            | 0                         | 0.00             |
| People             | 2,558                   | 0                        | 0                      | 2,558            | 5.24             | * | 1,167                 | 3.51             | * | 0                            | 0                         | 0.00             |
| Misc               | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>       | 11,246                  | 0                        | 0                      | 11,246           | 23.01            | * | 10,081                | 30.34            | * | 0                            | 0                         | 0.00             |
| Ceiling Load       | 762                     | -762                     | 0                      | 0                | 0.00             | * | 917                   | 2.76             | * | -917                         | 0                         | 0.00             |
| Outside Air        | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat      | 0                       | 0                        | 0                      | 199              | 0.41             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat PkUp     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OY/UNDR Sizing     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>     | 45,811                  | 2,858                    | 0                      | 48,668           | 100.00           | * | 33,229                | 100.00           | * | -48,718                      | -51,898                   | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |      | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part |            |     |
| Main Clg | 4.1                   | 48.9            | 1,402            | 76.7              | 63.0  | 66.5   | 53.1             | 50.9  | 53.2   | 1,387       | 0    |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0    |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0    |            |     |
| Totals   | 4.1                   | 48.9            |                  |                   |       |        |                  |       |        | 1,387       | 0    | 0          | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        | 867         | 288  | 33         |     |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | ---ENGINEERING CHECKS--- |        | ---TEMPERATURES (F)--- |      |      |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|--------------------------|--------|------------------------|------|------|
|          |                |                  |           |           | Vent    |         |         | Clg % OA                 | 0.0    | Type                   | Clg  | Htg  |
| Main Htg | -52.0          | 1,402            | 65.8      | 99.9      | Infil   | 442     | 442     | Clg Cfm/Sqft             | 1.01   | SADB                   | 53.2 | 99.9 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 1,402   | 1,402   | Clg Cfm/Ton              | 344.18 | Plenum                 | 76.7 | 65.9 |
| Preheat  | -0.0           | 1,402            | 65.9      | 53.1      | Mincfm  | 0       | 0       | Clg Sqft/Ton             | 340.59 | Return                 | 76.7 | 65.9 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 1,402   | 1,402   | Clg Btuh/Sqft            | 35.23  | Ret/OA                 | 76.7 | 65.9 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | No. People               | 5      | Runarnd                | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg % OA                 | 0.0    | Fn MtrTD               | 0.0  | 0.0  |
| Total    | -52.0          |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft             | 1.01   | Fn BldTD               | 0.0  | 0.0  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft            | -37.50 | Fn Frict               | 0.1  | 0.0  |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | -1,904                    | 5.75             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -10,295                      | -10,295                   | 31.09            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -965                         | -1,289                    | 3.89             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -19,624                      | -19,624                   | 59.26            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -30,884                      | -33,113                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -2,221                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -33,105                      | -33,113                   | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 830        |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 830        | 0 0    |
| Totals   | 0.0                   | 0.0             | 0                |                   |       |        |                  |       |        | Wall        | 553        | 192 35 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |     |      |
|----------|----------------|------------------|-----------|-----------|---------|----------------|---------|------------------------|--------|----------------------|-----|------|
|          |                |                  |           |           | Vent    | Cooling        | Heating | Clg % OA               | 0.0    | Type                 | Clg | Htg  |
| Main Htg | -33.1          | 0                | 0.0       | 0.0       | Infil   | 0              | 282     | Clg Cfm/Sqft           | 0.00   | SADB                 | 0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0              | 0       | Clg Cfm/Ton            | 0.00   | Plenum               | 0.0 | 59.8 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0              | 0       | Clg Sqft/Ton           | 0.00   | Return               | 0.0 | 59.9 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0              | 0       | Clg Btuh/Sqft          | 0.00   | Ret/OA               | 0.0 | 59.9 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0              | 0       | No. People             | 0      | Runarnd              | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0              | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.0 | 0.0  |
| Total    | -33.1          |                  |           |           | Auxil   | 0              | 0       | Htg Cfm/SqFt           | 0.00   | Fn BldTD             | 0.0 | 0.0  |
|          |                |                  |           |           |         |                |         | Htg Btuh/SqFt          | -39.90 | Fn Frict             | 0.0 | 0.0  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | -20,721                   | 9.34             |
| Glass Solar     | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | -73,355                      | -73,355                   | 33.08            |
| Wall Cond       | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | -5,219                       | -7,222                    | 3.26             |
| Partition       | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | -120,464                     | -120,464                  | 54.32            |
| Sub Total==>    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | -199,037                     | -221,762                  | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | -22,976                      | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -222,013                     | -221,762                  | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)      |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|----------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |          |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 9,886      |          |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |          |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 8,985      | 0 0      |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall        | 3,392      | 1,368 40 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F |
|----------|----------------|------------------|-----------|-----------|
| Main Htg | -223.8         | 4,192            | 67.6      | 116.7     |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       |
| Total    | -223.8         |                  |           |           |

-----AIRFLOWS (cfm)-----

| Type    | Cooling | Heating |
|---------|---------|---------|
| Vent    | 0       | 0       |
| Infil   | 0       | 1,730   |
| Supply  | 0       | 4,192   |
| Mincfm  | 0       | 0       |
| Return  | 0       | 4,192   |
| Exhaust | 0       | 0       |
| Rm Exh  | 0       | 0       |
| Auxil   | 0       | 0       |

-----ENGINEERING CHECKS-----

| Clg % OA      | 0.0    |
|---------------|--------|
| Clg Cfm/Sqft  | 0.00   |
| Clg Cfm/Ton   | 0.00   |
| Clg Btuh/Sqft | 0.00   |
| No. People    | 0      |
| Htg % OA      | 0.0    |
| Htg Cfm/Sqft  | 0.42   |
| Htg Btuh/Sqft | -22.64 |

-----TEMPERATURES (F)-----

| Type     | Clg | Htg   |
|----------|-----|-------|
| SADB     | 0.0 | 116.7 |
| Plenum   | 0.0 | 60.1  |
| Return   | 0.0 | 68.0  |
| Ret/OA   | 0.0 | 68.0  |
| Runarnd  | 0.0 | 68.0  |
| Fn MtrTD | 0.0 | 0.0   |
| Fn BldTD | 0.0 | 0.0   |
| Fn Frict | 0.0 | 0.1   |

BUILDING U-VALUES - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G U - V A L U E S -----

| Room<br>Number | Description    | Room U-Values<br>(Btu/hr/sqft/F) |       |                |                |       |                |                |       |       | Room<br>Mass<br>(lb/<br>sqft) | Room<br>Capac.<br>(Btu/<br>sqft/F) |
|----------------|----------------|----------------------------------|-------|----------------|----------------|-------|----------------|----------------|-------|-------|-------------------------------|------------------------------------|
|                |                | Part.                            | ExFlr | Summr<br>Skylt | Wintr<br>Skylt | Roof  | Summr<br>Windo | Wintr<br>Windo | Wall  | Ceil. |                               |                                    |
| 1              | 1ST FL OFFICES | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.058 | 0.317 | 45.6                          | 9.75                               |
| Zone           | 1 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.058 | 0.317 | 45.6                          | 9.75                               |
| 2              | LIQUOR STORE   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.058 | 0.317 | 101.9                         | 22.09                              |
| Zone           | 2 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.058 | 0.317 | 101.9                         | 22.09                              |
| 4              | LIBRARY        | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 48.3                          | 11.08                              |
| Zone           | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 48.3                          | 11.08                              |
| 5              | GAME ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 46.7                          | 10.73                              |
| Zone           | 5 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 46.7                          | 10.73                              |
| System         | 1 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 50.2                          | 11.09                              |
| 6              | 2ND FL OFFICES | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 69.3                          | 15.68                              |
| Zone           | 6 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 69.3                          | 15.68                              |
| 7              | 2ND FL OFFICE  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 117.3                         | 26.22                              |
| Zone           | 7 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 117.3                         | 26.22                              |
| System         | 2 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 77.9                          | 17.56                              |
| 7              | 2ND FL OFFICE  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 117.3                         | 26.22                              |
| Zone           | 7 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 117.3                         | 26.22                              |
| 8              | 2ND FL TOILETS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 64.3                          | 14.59                              |
| Zone           | 8 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 64.3                          | 14.59                              |
| System         | 3 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 80.2                          | 18.06                              |
| 3              | LIQUOR STORAGE | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.058 | 0.317 | 30.1                          | 6.35                               |
| Zone           | 3 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.058 | 0.317 | 30.1                          | 6.35                               |
| 4              | LIBRARY        | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 48.3                          | 11.08                              |
| Zone           | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 48.3                          | 11.08                              |
| 5              | GAME ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 46.7                          | 10.73                              |
| Zone           | 5 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 46.7                          | 10.73                              |
| 6              | 2ND FL OFFICES | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 69.3                          | 15.68                              |
| Zone           | 6 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 69.3                          | 15.68                              |
| System         | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 48.4                          | 11.03                              |
| Building       |                | 0.000                            | 0.000 | 0.000          | 0.000          | 0.041 | 0.810          | 0.837          | 0.058 | 0.317 | 51.8                          | 11.58                              |

BUILDING AREAS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G   A R E A S -----

| Room Number | Description    | Number of Duplicate |   | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|----------------|---------------------|---|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
| 1           | 1ST FL OFFICES | 1                   | 1 | 8,053                       | 8,053                   | 0                     | 0                         | 0                    | 0           | 0                    | 624                | 24          | 1,926                |
| Zone        | 1 Total/Ave.   |                     |   |                             | 8,053                   | 0                     | 0                         | 0                    | 0           | 0                    | 624                | 24          | 1,926                |
| 2           | LIQUOR STORE   | 1                   | 1 | 1,127                       | 1,127                   | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 739                  |
| Zone        | 2 Total/Ave.   |                     |   |                             | 1,127                   | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 739                  |
| 4           | LIBRARY        | 1                   | 1 | 3,692                       | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| Zone        | 4 Total/Ave.   |                     |   |                             | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| 5           | GAME ROOM      | 1                   | 1 | 4,154                       | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| Zone        | 5 Total/Ave.   |                     |   |                             | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| System      | 1 Total/Ave.   |                     |   |                             | 17,026                  | 0                     | 0                         | 0                    | 0           | 7,846                | 1,776              | 30          | 4,174                |
| 6           | 2ND FL OFFICES | 1                   | 1 | 1,139                       | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| Zone        | 6 Total/Ave.   |                     |   |                             | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| 7           | 2ND FL OFFICE  | 1                   | 1 | 248                         | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| Zone        | 7 Total/Ave.   |                     |   |                             | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| System      | 2 Total/Ave.   |                     |   |                             | 1,387                   | 0                     | 0                         | 0                    | 0           | 1,387                | 288                | 33          | 579                  |
| 7           | 2ND FL OFFICE  | 1                   | 1 | 248                         | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| Zone        | 7 Total/Ave.   |                     |   |                             | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| 8           | 2ND FL TOILETS | 1                   | 1 | 582                         | 582                     | 0                     | 0                         | 0                    | 0           | 582                  | 96                 | 34          | 184                  |
| Zone        | 8 Total/Ave.   |                     |   |                             | 582                     | 0                     | 0                         | 0                    | 0           | 582                  | 96                 | 34          | 184                  |
| System      | 3 Total/Ave.   |                     |   |                             | 830                     | 0                     | 0                         | 0                    | 0           | 830                  | 192                | 35          | 360                  |
| 3           | LIQUOR STORAGE | 1                   | 1 | 901                         | 901                     | 0                     | 0                         | 0                    | 0           | 0                    | 24                 | 18          | 112                  |
| Zone        | 3 Total/Ave.   |                     |   |                             | 901                     | 0                     | 0                         | 0                    | 0           | 0                    | 24                 | 18          | 112                  |
| 4           | LIBRARY        | 1                   | 1 | 3,692                       | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| Zone        | 4 Total/Ave.   |                     |   |                             | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| 5           | GAME ROOM      | 1                   | 1 | 4,154                       | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| Zone        | 5 Total/Ave.   |                     |   |                             | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| 6           | 2ND FL OFFICES | 1                   | 1 | 1,139                       | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| Zone        | 6 Total/Ave.   |                     |   |                             | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| System      | 4 Total/Ave.   |                     |   |                             | 9,886                   | 0                     | 0                         | 0                    | 0           | 8,985                | 1,368              | 40          | 2,023                |
| Building    |                |                     |   |                             | 29,129                  | 0                     | 0                         | 0                    | 0           | 19,048               | 3,624              | 34          | 7,137                |



ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
WALL & ROOF INSULATION

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.311 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.139 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 32.24 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 2.1                    | 6            | 54    | -34,144                  | 27           | 468   | 1,062.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 4.2                    | 5            | 50    | -68,288                  | 23           | 410   | 2,124.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 6.2                    | 6            | 58    | -102,432                 | 17           | 307   | 3,186.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 8.3                    | 6            | 61    | -136,576                 | 1            | 10    | 4,248.8                   | 59           | 3,638 | 0.0                       | 0            | 0     |
| 20 - 25                   | 10.4                   | 5            | 48    | -170,720                 | 3            | 55    | 5,311.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 12.5                   | 8            | 75    | -204,863                 | 1            | 23    | 6,373.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 14.5                   | 10           | 99    | -239,007                 | 1            | 25    | 7,435.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 16.6                   | 4            | 36    | -273,151                 | 2            | 37    | 8,497.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 18.7                   | 7            | 64    | -307,295                 | 0            | 8     | 9,559.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 20.8                   | 10           | 94    | -341,439                 | 0            | 0     | 10,621.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 22.8                   | 2            | 18    | -375,583                 | 2            | 42    | 11,684.1                  | 24           | 1,450 | 0.0                       | 0            | 0     |
| 55 - 60                   | 24.9                   | 6            | 60    | -409,727                 | 2            | 42    | 12,746.3                  | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 27.0                   | 5            | 50    | -443,871                 | 19           | 338   | 13,808.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 29.1                   | 5            | 46    | -478,015                 | 0            | 0     | 14,870.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 31.1                   | 3            | 25    | -512,159                 | 0            | 0     | 15,932.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 33.2                   | 6            | 60    | -546,303                 | 0            | 0     | 16,995.1                  | 10           | 638   | 0.0                       | 0            | 0     |
| 80 - 85                   | 35.3                   | 4            | 37    | -580,447                 | 0            | 0     | 18,057.3                  | 7            | 432   | 0.0                       | 0            | 0     |
| 85 - 90                   | 37.4                   | 0            | 0     | -614,591                 | 0            | 0     | 19,119.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 39.4                   | 2            | 15    | -648,734                 | 0            | 0     | 20,181.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 41.5                   | 3            | 30    | -682,878                 | 0            | 0     | 21,243.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,780 | 0                        | 0            | 6,995 | 0.0                       | 0            | 2,602 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | Zone Number |      |      |      |      |      |       |       |       |       |       |       |
|-----------------------------|-------------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
|                             | 1           | 2    | 4    | 5    | 6    | 7    | 7     | 8     | 3     | 4     | 5     | 6     |
| Max. Temp.                  | 83.1        | 79.3 | 87.6 | 86.3 | 85.0 | 86.6 | 108.9 | 110.0 | 169.5 | 115.2 | 114.2 | 110.0 |
| Mo./Hr.                     | 7 19        | 7 23 | 7 21 | 7 21 | 7 20 | 7 20 | 8 20  | 8 21  | 9 19  | 7 20  | 7 20  | 8 19  |
| Day Type                    | 4           | 1    | 4    | 4    | 4    | 4    | 1     | 1     | 2     | 2     | 2     | 1     |

|            | Number of Hours |       |       |       |       |       |       |       |       |       |       |       |
|------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|            | 1               | 2     | 4     | 5     | 6     | 7     | 7     | 8     | 3     | 4     | 5     | 6     |
| Above 100  | 0               | 0     | 0     | 0     | 0     | 0     | 1,977 | 2,044 | 3,420 | 2,610 | 2,381 | 2,100 |
| 95 - 100   | 0               | 0     | 0     | 0     | 0     | 0     | 935   | 779   | 90    | 282   | 336   | 670   |
| 90 - 95    | 0               | 0     | 0     | 0     | 0     | 0     | 16    | 121   | 684   | 334   | 359   | 174   |
| 85 - 90    | 0               | 0     | 132   | 68    | 0     | 74    | 363   | 372   | 578   | 480   | 470   | 377   |
| 80 - 85    | 871             | 0     | 1,593 | 1,292 | 822   | 1,093 | 466   | 458   | 519   | 378   | 177   | 419   |
| 75 - 80    | 2,904           | 2,748 | 2,210 | 2,116 | 2,604 | 2,374 | 335   | 326   | 1,173 | 44    | 369   | 352   |
| 70 - 75    | 1,035           | 1,368 | 399   | 628   | 670   | 559   | 203   | 370   | 1,329 | 815   | 529   | 256   |
| 65 - 70    | 1,912           | 2,206 | 982   | 409   | 177   | 473   | 2,190 | 2,094 | 348   | 1,893 | 1,841 | 2,051 |
| 60 - 65    | 926             | 1,333 | 339   | 983   | 1,163 | 987   | 965   | 997   | 338   | 783   | 980   | 1,050 |
| 55 - 60    | 427             | 571   | 1,255 | 395   | 306   | 567   | 618   | 520   | 199   | 474   | 499   | 562   |
| 50 - 55    | 328             | 365   | 708   | 1,421 | 1,433 | 1,281 | 692   | 679   | 82    | 667   | 819   | 749   |
| Below 50   | 357             | 169   | 1,142 | 1,448 | 1,585 | 1,352 | 0     | 0     | 0     | 0     | 0     | 0     |
| Min. Temp. | 42.0            | 45.1  | 37.9  | 34.8  | 35.5  | 38.2  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  |
| Mo./Hr.    | 2 7             | 2 7   | 2 8   | 2 7   | 2 8   | 2 8   | 1 9   | 1 11  | 1 4   | 1 11  | 1 10  | 2 10  |
| Day Type   | 5               | 5     | 5     | 5     | 5     | 5     | 3     | 3     | 5     | 3     | 3     | 3     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | HOT WTR HOT W DMND |                      |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 14,119            | 73              | 700                | 4                    |
| Feb   | 12,774            | 73              | 689                | 4                    |
| March | 15,460            | 73              | 347                | 4                    |
| April | 13,441            | 73              | 65                 | 4                    |
| May   | 17,659            | 130             | 0                  | 0                    |
| June  | 21,053            | 138             | 0                  | 0                    |
| July  | 22,678            | 141             | 0                  | 0                    |
| Aug   | 22,284            | 138             | 0                  | 0                    |
| Sept  | 16,358            | 135             | 0                  | 0                    |
| Oct   | 14,785            | 73              | 42                 | 4                    |
| Nov   | 13,442            | 73              | 176                | 4                    |
| Dec   | 13,446            | 73              | 535                | 4                    |
| Total | 197,497           | 141             | 2,554              | 4                    |

Building Energy Consumption = 31,910 (Btu/Sq Ft/Year)  
Source Energy Consumption = 81,121 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | Monthly Consumption |                            |       |       |       |       |       |       |       |       |       |       | Total   |
|---------|------------|---------------------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|         |            | Jan                 | Feb                        | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0       | LIGHTS     |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 13433               | 12154                      | 14712 | 12793 | 14073 | 14073 | 12793 | 14712 | 12793 | 14073 | 12793 | 12793 | 161,198 |
|         | PK         | 69.9                | 69.9                       | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9  | 69.9    |
| 1       | MISC LD    |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2       | MISC LD    |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         | GAS        | 0                   | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3       | MISC LD    |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         | OIL        | 0                   | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4       | MISC LD    |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         | P STEAM    | 0                   | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5       | MISC LD    |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         | P HOTH2O   | 0                   | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6       | MISC LD    |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         | P CHILL    | 0                   | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1       | EQ1161     |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | AIR-CLD COND COMP <15 TONS |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                          | 0     | 0     | 1671  | 4323  | 6799  | 4733  | 1672  | 0     | 0     | 0     | 19,199  |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 48.3  | 50.2  | 51.9  | 50.3  | 48.4  | 0.0   | 0.0   | 0.0   | 51.9    |
| 1       | EQ5200     |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | CONDENSER FANS             |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                          | 0     | 0     | 157   | 386   | 658   | 428   | 167   | 0     | 0     | 0     | 1,795   |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 2.3   | 3.7   | 4.7   | 4.0   | 3.1   | 0.0   | 0.0   | 0.0   | 4.7     |
| 1       | EQ5303     |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | CONTROLS                   |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                          | 0     | 0     | 52    | 66    | 60    | 69    | 47    | 0     | 0     | 0     | 294     |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.3     |
| 2       | EQ1161     |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | AIR-CLD COND COMP <15 TONS |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                          | 0     | 0     | 41    | 460   | 746   | 514   | 141   | 0     | 0     | 0     | 1,902   |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 4.9   | 5.5   | 5.6   | 5.5   | 5.3   | 0.0   | 0.0   | 0.0   | 5.6     |
| 2       | EQ5200     |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | CONDENSER FANS             |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                          | 0     | 0     | 4     | 41    | 72    | 47    | 15    | 0     | 0     | 0     | 179     |
|         | PK         | 0.0                 | 0.0                        | 0.0   | 0.0   | 0.2   | 0.4   | 0.5   | 0.4   | 0.3   | 0.0   | 0.0   | 0.0   | 0.5     |
| 2       | EQ5303     |                     |                            |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | CONTROLS                   |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        140.6    (kW)  
 Yearly Time of Peak 15 (hr)    7 (mo)

Hour 15    Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|------------------------|
| Cooling Equipment    |                        |                                    |                           |                        |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 56.8                      | 40.39                  |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 6.4                       | 4.58                   |
| Sub Total            |                        |                                    | 63.2                      | 44.97                  |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Air Moving Equipment |                        |                                    |                           |                        |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 7.3                       | 5.21                   |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.1                       | 0.09                   |
| Sub Total            |                        |                                    | 7.4                       | 5.29                   |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Miscellaneous        |                        |                                    |                           |                        |
|                      | Lights                 |                                    | 69.9                      | 49.74                  |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                   |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                   |
| Sub Total            |                        |                                    | 69.9                      | 49.74                  |
| Grand Total          |                        |                                    | 140.6                     | 100.00                 |

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 46

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Reflectance: 0.20  
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:37:47 1/13/94  
Dataset Name: CB46 .TM



AIRFLOW - ALTERNATIVE 3  
 REPLACE FLUORESCENT LAMPS

----- S Y S T E M S U M M A R Y -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | SZ          | 1,788                 | 16,245                | 16,345                | 20,272               | 5,715                 | 0                    | 0                     |
| 2             | PTAC        | 0                     | 1,669                 | 1,669                 | 2,242                | 572                   | 0                    | 0                     |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 365                   | 0                    | 0                     |
| 4             | UH          | 0                     | 0                     | 6,035                 | 0                    | 2,238                 | 0                    | 0                     |
| Totals        |             | 1,788                 | 17,914                | 24,050                | 22,514               | 8,890                 | 0                    | 0                     |

CAPACITY - ALTERNATIVE 3  
 REPLACE FLUORESCENT LAMPS

----- S Y S T E M S U M M A R Y -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 48.8                      | 0.0                       | 0.0                  | 0.0                  | 48.8                  | -664,375                  | 0                         | -62,143                 | 0                      | 0                        | 0                    | 0                    | -664,375              |
| 2             | PTAC        | 6.2                       | 0.0                       | 0.0                  | 0.0                  | 6.2                   | -85,172                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -85,172               |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -49,312                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -49,312               |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -349,136                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -349,136              |
| Totals        |             | 55.0                      | 0.0                       | 0.0                  | 0.0                  | 55.0                  | -1,147,995                | 0                         | -62,143                 | 0                      | 0                        | 0                    | 0                    | -1,147,995            |

The building peaked at hour 16 month 7 with a capacity of 54.6 tons

ENGINEERING CHECKS - ALTERNATIVE 3  
 REPLACE FLUORESCENT LAMPS

----- E N G I N E E R I N G C H E C K S -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling   |         |           |            | Heating   |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|-----------|---------|-----------|------------|-----------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft | Cfm/Ton | Sq Ft/Ton | Btuh/Sq Ft | Cfm/Sq Ft | Btuh/Sq Ft |                  |
| 1             | Main           | SZ          | 11.00               | 0.95      | 332.7   | 348.7     | 34.42      | 0.96      | -39.02     | 17,026           |
| 2             | Main           | PTAC        | 0.00                | 1.20      | 271.0   | 225.1     | 53.30      | 1.20      | -61.41     | 1,387            |
| 3             | Main           | RAD         | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.00      | -59.41     | 830              |
| 4             | Main           | UH          | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.61      | -35.32     | 9,886            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 7/14              |          | *       | Mo/Hr: 7/16 |   | *        | Mo/Hr: 13/ 1 |   |            |           |        |
|--------------------|------------|--------------------------|----------|---------|-------------|---|----------|--------------|---|------------|-----------|--------|
| Outside Air ==>    |            | OADB/WB/HR: 91/ 74/105.0 |          | *       | OADB: 91    |   | *        | OADB: 4      |   |            |           |        |
|                    | Space      | Ret. Air                 | Ret. Air | Net     | Percnt      | * | Space    | Percnt       | * | Space Peak | Coil Peak | Percnt |
|                    | Sens.+Lat. | Sensible                 | Latent   | Total   | Of Tot      | * | Sensible | Of Tot       | * | Space Sens | Tot Sens  | Of Tot |
|                    | (Btuh)     | (Btuh)                   | (Btuh)   | (Btuh)  | (%)         | * | (Btuh)   | (%)          | * | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads     |            |                          |          |         |             |   |          |              |   |            |           |        |
| Skylite Solr       | 0          | 0                        |          | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Skylite Cond       | 0          | 0                        |          | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Roof Cond          | 0          | 124,323                  |          | 124,323 | 21.22       | * | 0        | 0.00         | * | 0          | -90,278   | 16.49  |
| Glass Solar        | 70,848     | 0                        |          | 70,848  | 12.09       | * | 73,968   | 22.41        | * | 0          | 0         | 0.00   |
| Glass Cond         | 19,448     | 0                        |          | 19,448  | 3.32        | * | 19,852   | 6.02         | * | -95,233    | -95,233   | 17.40  |
| Wall Cond          | 18,393     | 3,691                    |          | 22,084  | 3.77        | * | 19,556   | 5.93         | * | -67,914    | -88,321   | 16.14  |
| Partition          | 0          |                          |          | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Exposed Floor      | 0          |                          |          | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Infiltration       | 150,905    |                          |          | 150,905 | 25.75       | * | 66,238   | 20.07        | * | -273,498   | -273,498  | 49.97  |
| Sub Total==>       | 259,594    | 128,014                  |          | 387,608 | 66.15       | * | 179,614  | 54.43        | * | -436,645   | -547,330  | 100.00 |
| Internal Loads     |            |                          |          |         |             | * |          |              | * |            |           |        |
| Lights             | 98,893     | 0                        |          | 98,893  | 16.88       | * | 101,940  | 30.89        | * | 0          | 0         | 0.00   |
| People             | 32,428     |                          |          | 32,428  | 5.53        | * | 15,332   | 4.65         | * | 0          | 0         | 0.00   |
| Misc               | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Sub Total==>       | 131,321    | 0                        | 0        | 131,321 | 22.41       | * | 117,272  | 35.54        | * | 0          | 0         | 0.00   |
| Ceiling Load       | 42,371     | -42,371                  |          | 0       | 0.00        | * | 33,113   | 10.03        | * | -29,864    | 0         | 0.00   |
| Outside Air        | 0          | 0                        | 0        | 70,355  | 12.01       | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Sup. Fan Heat      |            |                          |          | 12,707  | 2.17        | * |          | 0.00         | * |            | 0         | 0.00   |
| Ret. Fan Heat      |            | 0                        |          | 0       | 0.00        | * |          | 0.00         | * |            | 0         | 0.00   |
| Duct Heat Pkup     |            | 0                        |          | 0       | 0.00        | * |          | 0.00         | * |            | 0         | 0.00   |
| OV/UNDR Sizing     | 0          |                          |          | 0       | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Exhaust Heat       |            | -16,041                  | 0        | -16,041 | -2.74       | * |          | 0.00         | * |            | 0         | 0.00   |
| Terminal Bypass    |            | 0                        | 0        | 0       | 0.00        | * |          | 0.00         | * |            | 0         | 0.00   |
| Grand Total==>     | 433,286    | 69,602                   | 0        | 585,950 | 100.00      | * | 329,998  | 100.00       | * | -466,510   | -547,330  | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |        | Glass (sf) | (%) |
|----------|--------------------------|--------------------|---------------------|-------------------|-------|--------|------------------|-------|--------|-------------|--------|------------|-----|
|          |                          |                    |                     | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part   |            |     |
| Main Clg | 48.8                     | 586.0              | 443.4               | 16,245            | 83.8  | 66.8   | 73.9             | 55.6  | 54.9   | 64.9        | 17,026 |            |     |
| Aux Clg  | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0      |            |     |
| Opt Vent | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0      |            |     |
| Totals   | 48.8                     | 586.0              |                     |                   |       |        |                  |       |        |             | 7,846  | 0          | 0   |
|          |                          |                    |                     |                   |       |        |                  |       |        |             | 5,950  | 1,776      | 30  |

-----HEATING COIL SELECTION-----

|          | Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|-------------------|---------------------|--------------|--------------|---------|----------------|---------|------------------------|--------|----------------------|------|------|
|          |                   |                     |              |              |         | Cooling        | Heating | Clg % OA               | 11.0   | Type                 | Clg  | Htg  |
| Main Htg | -664.4            | 16,345              | 56.9         | 94.2         | Vent    | 1,788          | 0       | Clg Cfm/Sqft           | 0.95   | SADB                 | 56.3 | 94.2 |
| Aux Htg  | 0.0               | 0                   | 0.0          | 0.0          | Infil   | 3,927          | 3,927   | Clg Cfm/Ton            | 332.69 | Plenum               | 82.9 | 58.6 |
| Preheat  | -62.1             | 16,245              | 52.1         | 55.6         | Supply  | 16,245         | 16,345  | Clg Sqft/Ton           | 348.68 | Return               | 83.0 | 58.0 |
| Reheat   | 0.0               | 0                   | 0.0          | 0.0          | Mincfm  | 0              | 0       | Clg Btuh/Sqft          | 34.42  | Ret/OA               | 83.8 | 58.0 |
| Humidif  | 0.0               | 0                   | 0.0          | 0.0          | Return  | 16,245         | 16,345  | No. People             | 61     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0               | 0                   | 0.0          | 0.0          | Exhaust | 1,788          | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.2  | 0.2  |
| Total    | -664.4            |                     |              |              | Rm Exh  | 0              | 0       | Htg Cfm/Sqft           | 0.96   | Fn BldTD             | 0.1  | 0.1  |
|          |                   |                     |              |              | Auxil   | 0              | 0       | Htg Btuh/Sqft          | -39.02 | Fn Frict             | 0.4  | 0.4  |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 7/14              |          | *      | Mo/Hr: 7/15 |   | *        | Mo/Hr: 13/ 1 |            |           |        |
|--------------------|------------|--------------------------|----------|--------|-------------|---|----------|--------------|------------|-----------|--------|
| Outside Air ==>    |            | OADB/WB/HR: 91/ 74/105.0 |          | *      | OADB: 91    |   | *        | OADB: 4      |            |           |        |
|                    | Space      | Ret. Air                 | Ret. Air | Net    | Perct       |   | Space    | Perct        | Space Peak | Coil Peak | Perct  |
|                    | Sens.+Lat. | Sensible                 | Latent   | Total  | Of Tot      |   | Sensible | Of Tot       | Space Sens | Tot Sens  | Of Tot |
|                    | (Btuh)     | (Btuh)                   | (Btuh)   | (Btuh) | (%)         |   | (Btuh)   | (%)          | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads     |            |                          |          |        |             |   |          |              |            |           |        |
| Skylite Solr       | 0          | 0                        |          | 0      | 0.00        | * | 0        | 0.00         | 0          | 0         | 0.00   |
| Skylite Cond       | 0          | 0                        |          | 0      | 0.00        | * | 0        | 0.00         | 0          | 0         | 0.00   |
| Roof Cond          | 0          | 21,292                   |          | 21,292 | 28.80       | * | 0        | 0.00         | 0          | -17,685   | 20.76  |
| Glass Solar        | 11,232     | 0                        |          | 11,232 | 15.19       | * | 10,944   | 27.14        | 0          | 0         | 0.00   |
| Glass Cond         | 3,009      | 0                        |          | 3,009  | 4.07        | * | 3,180    | 7.89         | -15,443    | -15,443   | 18.13  |
| Wall Cond          | 2,731      | 553                      |          | 3,285  | 4.44        | * | 2,977    | 7.38         | -9,254     | -12,222   | 14.34  |
| Partition          | 0          |                          |          | 0      | 0.00        | * | 0        | 0.00         | 0          | 0         | 0.00   |
| Exposed Floor      | 0          |                          |          | 0      | 0.00        | * | 0        | 0.00         | 0          | 0         | 0.00   |
| Infiltration       | 24,717     |                          |          | 24,717 | 33.43       | * | 9,865    | 24.46        | -39,853    | -39,853   | 46.77  |
| Sub Total==>       | 41,690     | 21,845                   |          | 63,535 | 85.94       | * | 26,967   | 66.87        | -64,550    | -85,203   | 100.00 |
| Internal Loads     |            |                          |          |        |             | * |          |              |            |           |        |
| Lights             | 7,601      | 0                        |          | 7,601  | 10.28       | * | 7,800    | 19.34        | 0          | 0         | 0.00   |
| People             | 2,558      |                          |          | 2,558  | 3.46        | * | 1,167    | 2.89         | 0          | 0         | 0.00   |
| Misc               | 0          | 0                        | 0        | 0      | 0.00        | * | 0        | 0.00         | 0          | 0         | 0.00   |
| Sub Total==>       | 10,160     | 0                        | 0        | 10,160 | 13.74       | * | 8,967    | 22.24        | 0          | 0         | 0.00   |
| Ceiling Load       | 3,973      | -3,973                   |          | 0      | 0.00        | * | 4,392    | 10.89        | -4,022     | 0         | 0.00   |
| Outside Air        | 0          | 0                        | 0        | 0      | 0.00        | * | 0        | 0.00         | 0          | 0         | 0.00   |
| Sup. Fan Heat      |            |                          |          | 237    | 0.32        | * |          | 0.00         |            | 0         | 0.00   |
| Ret. Fan Heat      |            | 0                        |          | 0      | 0.00        | * |          | 0.00         |            | 0         | 0.00   |
| Duct Heat Pkup     |            | 0                        |          | 0      | 0.00        | * |          | 0.00         |            | 0         | 0.00   |
| OV/UNDR Sizing     | 0          |                          |          | 0      | 0.00        | * | 0        | 0.00         | 0          | 0         | 0.00   |
| Exhaust Heat       |            | 0                        | 0        | 0      | 0.00        | * |          | 0.00         |            | 0         | 0.00   |
| Terminal Bypass    |            | 0                        | 0        | 0      | 0.00        | * |          | 0.00         |            | 0         | 0.00   |
| Grand Total==>     | 55,823     | 17,872                   | 0        | 73,932 | 100.00      | * | 40,326   | 100.00       | -68,572    | -85,203   | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |      | Glass (sf) | (%) |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------|------------|-----|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part |            |     |
| Main Clg | 6.2            | 73.9      | 57.4       | 83.8              | 65.4  | 66.5   | 52.7             | 50.2  | 51.3   | 1,387       | 0    |            |     |
| Aux Clg  | 0.0            | 0.0       | 0.0        | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0    |            |     |
| Opt Vent | 0.0            | 0.0       | 0.0        | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 1,387       | 0    | 0          | 0   |
| Totals   | 6.2            | 73.9      |            |                   |       |        |                  |       |        | 867         | 288  | 33         |     |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |       |
|----------|----------|------------|-------|-------|---------|---------|---------|------------------------|--------|----------------------|------|-------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg % OA               | 0.0    | Type                 | Clg  | Htg   |
| Main Htg | -85.2    | 1,669      | 58.9  | 105.7 | Infil   | 572     | 572     | Clg Cfm/Sqft           | 1.20   | SADB                 | 52.8 | 105.7 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 1,669   | 1,669   | Clg Cfm/Ton            | 270.97 | Plenum               | 84.0 | 58.9  |
| Preheat  | -0.0     | 1,669      | 58.9  | 52.7  | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 225.13 | Return               | 83.8 | 58.9  |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 1,669   | 1,669   | Clg Btuh/Sqft          | 53.30  | Ret/OA               | 83.8 | 58.9  |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 0       | 0       | No. People             | 5      | Runarnd              | 75.0 | 68.0  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.0  | 0.0   |
| Total    | -85.2    |            |       |       | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 1.20   | Fn BldTD             | 0.0  | 0.0   |
|          |          |            |       |       |         |         |         | Htg Btuh/Sqft          | -61.41 | Fn Frict             | 0.1  | 0.0   |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | -6,714                    | 13.61              |
| Glass Solar     | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Cond      | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | -10,295                      | -10,295                   | 20.88              |
| Wall Cond       | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | -5,711                       | -6,907                    | 14.01              |
| Partition       | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | -25,396                      | -25,396                   | 51.50              |
| Sub Total==>    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | -41,403                      | -49,312                   | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| People          | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ceiling Load    | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | -7,805                       | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -49,208                      | -49,312                   | 100.00             |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR Deg F | Entering DB/WB/HR Deg F | Entering DB/WB/HR Grains | Leaving DB/WB/HR Deg F | Leaving DB/WB/HR Deg F | Leaving DB/WB/HR Grains | Gross Total Floor | Glass (sf) Part | (%) ExFlr | Roof | Wall |
|----------|-----------------------|-----------------|------------------|-------------------------|-------------------------|--------------------------|------------------------|------------------------|-------------------------|-------------------|-----------------|-----------|------|------|
| Main Clg | 0.0                   | 0.0             | 0                | 0.0                     | 0.0                     | 0.0                      | 0.0                    | 0.0                    | 0.0                     | 830               | 0               |           | 830  |      |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                     | 0.0                     | 0.0                      | 0.0                    | 0.0                    | 0.0                     | 0                 | 0               |           | 0    |      |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                     | 0.0                     | 0.0                      | 0.0                    | 0.0                    | 0.0                     | 0                 | 0               |           | 0    |      |
| Totals   | 0.0                   | 0.0             | 0                | 0.0                     | 0.0                     | 0.0                      | 0.0                    | 0.0                    | 0.0                     | 830               | 192             | 0         | 830  | 553  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|-----|------|
| Main Htg | -49.3          | 0                | 0.0       | 0.0       | Infil   | 0       | 365     | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 0       | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 38.8 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 39.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 39.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | No. People    | 0      | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0  |
| Total    | -49.3          | 0                | 0.0       | 0.0       | Auxil   | 0       | 0       | Htg Cfm/Sqft  | 0.00   | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft | -59.41 | Fn Frict | 0.0 | 0.0  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==>      |                          | Mo/Hr: 0/ 0            |                  | *                | Mo/Hr: 0/ 0 |                       | *                | Mo/Hr: 13/ 1      |                  |                  |
|-------------------------|--------------------------|------------------------|------------------|------------------|-------------|-----------------------|------------------|-------------------|------------------|------------------|
| Outside Air ==>         |                          | OADB/WB/HR: 0/ 0/ 0.0  |                  | *                | OADB: 0     |                       | *                | OADB: 4           |                  |                  |
| Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | *           | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
| Envelope Loads          |                          |                        |                  |                  |             |                       |                  |                   |                  |                  |
| Skylite Solr            | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond            | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond               | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | -74,057          | 21.67            |
| Glass Solar             | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Glass Cond              | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | -73,355           | -73,355          | 21.47            |
| Wall Cond               | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | -30,899           | -38,407          | 11.24            |
| Partition               | 0                        |                        | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exposed Floor           | 0                        |                        | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Infiltration            | 0                        |                        | 0                | 0.00             | *           | 0                     | 0.00             | -155,894          | -155,894         | 45.62            |
| Sub Total==>            | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | -260,148          | -341,713         | 100.00           |
| Internal Loads          |                          |                        |                  |                  | *           |                       |                  |                   |                  |                  |
| Lights                  | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| People                  | 0                        |                        | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Misc                    | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total==>            | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Ceiling Load            | 0                        |                        | 0                | 0.00             | *           | 0                     | 0.00             | -84,880           | 0                | 0.00             |
| Outside Air             | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sup. Fan Heat           |                          |                        | 0                | 0.00             | *           |                       | 0.00             |                   | 0                | 0.00             |
| Ret. fan Heat           |                          | 0                      | 0                | 0.00             | *           |                       | 0.00             |                   | 0                | 0.00             |
| Duct Heat Pkup          |                          | 0                      | 0                | 0.00             | *           |                       | 0.00             |                   | 0                | 0.00             |
| OV/UNDR Sizing          | 0                        |                        | 0                | 0.00             | *           | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exhaust Heat            |                          | 0                      | 0                | 0.00             | *           |                       | 0.00             |                   | 0                | 0.00             |
| Terminal Bypass         |                          | 0                      | 0                | 0.00             | *           |                       | 0.00             |                   | 0                | 0.00             |
| Grand Total==>          | 0                        | 0                      | 0                | 0.00             | *           | 0                     | 0.00             | -345,028          | -341,713         | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)      |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|----------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |          |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 0          |          |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |          |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 8,985      | 0 0      |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall        | 3,392      | 1,368 40 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg   |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|-----|-------|
| Main Htg | -349.1         | 6,035            | 67.4      | 120.5     | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 120.5 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 2,238   | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 39.6  |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 6,035   | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 68.0  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 68.0  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 6,035   | No. People    | 0      | Runarnd  | 0.0 | 68.0  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0   |
| Total    | -349.1         |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.61   | Fn BldTD | 0.0 | 0.0   |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -35.32 | Fn Frict | 0.0 | 0.1   |

BUILDING U-VALUES - ALTERNATIVE 3  
 REPLACE FLUORESCENT LAMPS

----- B U I L D I N G U - V A L U E S -----

| Room<br>Number | Description    | Room U-Values<br>(Btu/hr/sqft/F) |       |                |                |       |                |                |       |       | Room<br>Mass<br>(lb/<br>sqft) | Room<br>Capac.<br>(Btu/<br>sqft/F) |
|----------------|----------------|----------------------------------|-------|----------------|----------------|-------|----------------|----------------|-------|-------|-------------------------------|------------------------------------|
|                |                | Part.                            | ExFlr | Summr<br>Skylt | Wintr<br>Skylt | Roof  | Summr<br>Windo | Wintr<br>Windo | Wall  | Ceil. |                               |                                    |
| 1              | 1ST FL OFFICES | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.343 | 0.317 | 45.0                          | 9.63                               |
| Zone           | 1 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.343 | 0.317 | 45.0                          | 9.63                               |
| 2              | LIQUOR STORE   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.343 | 0.317 | 100.3                         | 21.77                              |
| Zone           | 2 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.343 | 0.317 | 100.3                         | 21.77                              |
| 4              | LIBRARY        | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 46.8                          | 10.79                              |
| Zone           | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 46.8                          | 10.79                              |
| 5              | GAME ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 45.3                          | 10.44                              |
| Zone           | 5 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 45.3                          | 10.44                              |
| System         | 1 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 49.2                          | 10.88                              |
| 6              | 2ND FL OFFICES | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 67.4                          | 15.31                              |
| Zone           | 6 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 67.4                          | 15.31                              |
| 7              | 2ND FL OFFICE  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 114.6                         | 25.67                              |
| Zone           | 7 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 114.6                         | 25.67                              |
| System         | 2 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 75.9                          | 17.16                              |
| 7              | 2ND FL OFFICE  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 114.6                         | 25.67                              |
| Zone           | 7 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 114.6                         | 25.67                              |
| 8              | 2ND FL TOILETS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 62.6                          | 14.24                              |
| Zone           | 8 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 62.6                          | 14.24                              |
| System         | 3 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 78.1                          | 17.65                              |
| 3              | LIQUOR STORAGE | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.343 | 0.317 | 29.8                          | 6.29                               |
| Zone           | 3 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.343 | 0.317 | 29.8                          | 6.29                               |
| 4              | LIBRARY        | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 46.8                          | 10.79                              |
| Zone           | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 46.8                          | 10.79                              |
| 5              | GAME ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 45.3                          | 10.44                              |
| Zone           | 5 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 45.3                          | 10.44                              |
| 6              | 2ND FL OFFICES | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 67.4                          | 15.31                              |
| Zone           | 6 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 67.4                          | 15.31                              |
| System         | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 47.0                          | 10.75                              |
| Building       |                | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232 | 0.810          | 0.837          | 0.343 | 0.317 | 50.5                          | 11.33                              |

BUILDING AREAS - ALTERNATIVE 3  
 REPLACE FLUORESCENT LAMPS

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description    | Number of<br>Duplicate<br>Flr Rm |   | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|----------------|----------------------------------|---|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 1              | 1ST FL OFFICES | 1                                | 1 | 8,053                                | 8,053                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 624                      | 24                | 1,926                      |
| Zone           | 1 Total/Ave.   |                                  |   |                                      | 8,053                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 624                      | 24                | 1,926                      |
| 2              | LIQUOR STORE   | 1                                | 1 | 1,127                                | 1,127                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 739                        |
| Zone           | 2 Total/Ave.   |                                  |   |                                      | 1,127                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 739                        |
| 4              | LIBRARY        | 1                                | 1 | 3,692                                | 3,692                            | 0                           | 0                                  | 0                          | 0                 | 3,692                      | 576                      | 44                | 733                        |
| Zone           | 4 Total/Ave.   |                                  |   |                                      | 3,692                            | 0                           | 0                                  | 0                          | 0                 | 3,692                      | 576                      | 44                | 733                        |
| 5              | GAME ROOM      | 1                                | 1 | 4,154                                | 4,154                            | 0                           | 0                                  | 0                          | 0                 | 4,154                      | 576                      | 43                | 775                        |
| Zone           | 5 Total/Ave.   |                                  |   |                                      | 4,154                            | 0                           | 0                                  | 0                          | 0                 | 4,154                      | 576                      | 43                | 775                        |
| System         | 1 Total/Ave.   |                                  |   |                                      | 17,026                           | 0                           | 0                                  | 0                          | 0                 | 7,846                      | 1,776                    | 30                | 4,174                      |
| 6              | 2ND FL OFFICES | 1                                | 1 | 1,139                                | 1,139                            | 0                           | 0                                  | 0                          | 0                 | 1,139                      | 192                      | 32                | 403                        |
| Zone           | 6 Total/Ave.   |                                  |   |                                      | 1,139                            | 0                           | 0                                  | 0                          | 0                 | 1,139                      | 192                      | 32                | 403                        |
| 7              | 2ND FL OFFICE  | 1                                | 1 | 248                                  | 248                              | 0                           | 0                                  | 0                          | 0                 | 248                        | 96                       | 35                | 176                        |
| Zone           | 7 Total/Ave.   |                                  |   |                                      | 248                              | 0                           | 0                                  | 0                          | 0                 | 248                        | 96                       | 35                | 176                        |
| System         | 2 Total/Ave.   |                                  |   |                                      | 1,387                            | 0                           | 0                                  | 0                          | 0                 | 1,387                      | 288                      | 33                | 579                        |
| 7              | 2ND FL OFFICE  | 1                                | 1 | 248                                  | 248                              | 0                           | 0                                  | 0                          | 0                 | 248                        | 96                       | 35                | 176                        |
| Zone           | 7 Total/Ave.   |                                  |   |                                      | 248                              | 0                           | 0                                  | 0                          | 0                 | 248                        | 96                       | 35                | 176                        |
| 8              | 2ND FL TOILETS | 1                                | 1 | 582                                  | 582                              | 0                           | 0                                  | 0                          | 0                 | 582                        | 96                       | 34                | 184                        |
| Zone           | 8 Total/Ave.   |                                  |   |                                      | 582                              | 0                           | 0                                  | 0                          | 0                 | 582                        | 96                       | 34                | 184                        |
| System         | 3 Total/Ave.   |                                  |   |                                      | 830                              | 0                           | 0                                  | 0                          | 0                 | 830                        | 192                      | 35                | 360                        |
| 3              | LIQUOR STORAGE | 1                                | 1 | 901                                  | 901                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 24                       | 18                | 112                        |
| Zone           | 3 Total/Ave.   |                                  |   |                                      | 901                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 24                       | 18                | 112                        |
| 4              | LIBRARY        | 1                                | 1 | 3,692                                | 3,692                            | 0                           | 0                                  | 0                          | 0                 | 3,692                      | 576                      | 44                | 733                        |
| Zone           | 4 Total/Ave.   |                                  |   |                                      | 3,692                            | 0                           | 0                                  | 0                          | 0                 | 3,692                      | 576                      | 44                | 733                        |
| 5              | GAME ROOM      | 1                                | 1 | 4,154                                | 4,154                            | 0                           | 0                                  | 0                          | 0                 | 4,154                      | 576                      | 43                | 775                        |
| Zone           | 5 Total/Ave.   |                                  |   |                                      | 4,154                            | 0                           | 0                                  | 0                          | 0                 | 4,154                      | 576                      | 43                | 775                        |
| 6              | 2ND FL OFFICES | 1                                | 1 | 1,139                                | 1,139                            | 0                           | 0                                  | 0                          | 0                 | 1,139                      | 192                      | 32                | 403                        |
| Zone           | 6 Total/Ave.   |                                  |   |                                      | 1,139                            | 0                           | 0                                  | 0                          | 0                 | 1,139                      | 192                      | 32                | 403                        |
| System         | 4 Total/Ave.   |                                  |   |                                      | 9,886                            | 0                           | 0                                  | 0                          | 0                 | 8,985                      | 1,368                    | 40                | 2,023                      |
| Building       |                |                                  |   |                                      | 29,129                           | 0                           | 0                                  | 0                          | 0                 | 19,048                     | 3,624                    | 34                | 7,137                      |

ASHRAE 90 ANALYSIS - ALTERNATIVE 3  
REPLACE FLUORESCENT LAMPS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 33.33 (Btu/Hr/Sq Ft)



SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3  
 REPLACE FLUORESCENT LAMPS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 2.7                    | 5            | 39    | -60,507                  | 24           | 558   | 1,202.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 5.5                    | 11           | 89    | -121,014                 | 29           | 672   | 2,405.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 8.2                    | 0            | 0     | -181,521                 | 19           | 442   | 3,607.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 11.0                   | 7            | 53    | -242,027                 | 3            | 68    | 4,809.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 13.7                   | 5            | 42    | -302,534                 | 1            | 24    | 6,012.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 16.5                   | 11           | 86    | -363,041                 | 2            | 35    | 7,214.9                   | 59           | 3,638 | 0.0                       | 0            | 0     |
| 30 - 35                   | 19.2                   | 2            | 18    | -423,548                 | 1            | 23    | 8,417.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 22.0                   | 7            | 58    | -484,055                 | 0            | 7     | 9,619.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 24.7                   | 9            | 71    | -544,562                 | 2            | 42    | 10,822.3                  | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 27.5                   | 6            | 51    | -605,069                 | 2            | 42    | 12,024.8                  | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 30.2                   | 5            | 43    | -665,576                 | 10           | 229   | 13,227.3                  | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 33.0                   | 11           | 90    | -726,083                 | 7            | 162   | 14,429.8                  | 24           | 1,450 | 0.0                       | 0            | 0     |
| 60 - 65                   | 35.7                   | 2            | 19    | -786,589                 | 0            | 0     | 15,632.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 38.5                   | 5            | 38    | -847,096                 | 0            | 0     | 16,834.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 41.2                   | 8            | 65    | -907,603                 | 0            | 0     | 18,037.2                  | 17           | 1,070 | 0.0                       | 0            | 0     |
| 75 - 80                   | 44.0                   | 2            | 15    | -968,110                 | 0            | 0     | 19,239.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 46.7                   | 1            | 5     | -1,028,617               | 0            | 0     | 20,442.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 49.5                   | 2            | 20    | -1,089,124               | 0            | 0     | 21,644.6                  | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 52.2                   | 0            | 0     | -1,149,631               | 0            | 0     | 22,847.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 55.0                   | 0            | 0     | -1,210,138               | 0            | 0     | 24,049.6                  | 0            | 0     | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,958 | 0                        | 0            | 6,456 | 0.0                       | 0            | 2,602 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3  
 REPLACE FLUORESCENT LAMPS

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | Zone Number                               |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------|-------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                             | 1                                         | 2     | 4     | 5     | 6     | 7     | 7     | 8     | 3     | 4     | 5     | 6     |
| Max. Temp.                  | 83.5                                      | 81.1  | 89.9  | 88.9  | 87.3  | 87.5  | 104.0 | 103.9 | 127.7 | 108.8 | 107.8 | 104.1 |
| Mo./Hr.                     | 7 20                                      | 7 21  | 7 20  | 7 20  | 7 20  | 7 20  | 8 20  | 7 20  | 8 18  | 7 21  | 7 19  | 7 19  |
| Day Type                    | 4                                         | 4     | 4     | 4     | 4     | 4     | 1     | 2     | 2     | 1     | 2     | 2     |
|                             | ..... N u m b e r   o f   H o u r s ..... |       |       |       |       |       |       |       |       |       |       |       |
| Above 100                   | 0                                         | 0     | 0     | 0     | 0     | 0     | 543   | 558   | 2,928 | 1,241 | 1,005 | 549   |
| 95 - 100                    | 0                                         | 0     | 0     | 0     | 0     | 0     | 1,348 | 958   | 226   | 924   | 757   | 1,006 |
| 90 - 95                     | 0                                         | 0     | 0     | 0     | 0     | 0     | 824   | 1,008 | 305   | 657   | 804   | 991   |
| 85 - 90                     | 0                                         | 0     | 218   | 154   | 110   | 132   | 475   | 474   | 645   | 649   | 556   | 452   |
| 80 - 85                     | 820                                       | 274   | 1,443 | 1,305 | 993   | 1,070 | 482   | 674   | 48    | 201   | 480   | 674   |
| 75 - 80                     | 2,451                                     | 2,477 | 1,788 | 1,848 | 2,194 | 2,255 | 34    | 0     | 746   | 51    | 70    | 0     |
| 70 - 75                     | 773                                       | 938   | 482   | 399   | 409   | 317   | 353   | 238   | 1,088 | 661   | 388   | 84    |
| 65 - 70                     | 2,053                                     | 2,157 | 590   | 604   | 386   | 427   | 1,917 | 2,007 | 1,531 | 1,750 | 1,735 | 2,015 |
| 60 - 65                     | 1,019                                     | 1,325 | 759   | 544   | 779   | 1,060 | 1,061 | 1,051 | 489   | 924   | 987   | 1,102 |
| 55 - 60                     | 631                                       | 730   | 635   | 716   | 664   | 499   | 743   | 782   | 282   | 718   | 799   | 779   |
| 50 - 55                     | 377                                       | 336   | 823   | 655   | 660   | 885   | 980   | 1,010 | 472   | 984   | 1,179 | 1,108 |
| Below 50                    | 636                                       | 523   | 2,022 | 2,535 | 2,565 | 2,115 | 0     | 0     | 0     | 0     | 0     | 0     |
| Min. Temp.                  | 37.0                                      | 39.0  | 34.5  | 32.1  | 33.2  | 36.2  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  |
| Mo./Hr.                     | 2 7                                       | 2 7   | 2 10  | 2 8   | 2 8   | 2 9   | 1 5   | 1 6   | 1 1   | 1 6   | 1 4   | 1 5   |
| Day Type                    | 5                                         | 5     | 4     | 5     | 5     | 4     | 3     | 2     | 4     | 2     | 3     | 2     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3  
REPLACE FLUORESCENT LAMPS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | DEMAND            |                      | HOT WTR | HOT W DMND |
|-------|-------------------|-----------------|-------------------|----------------------|---------|------------|
|       | Off Peak<br>(kwh) | On Peak<br>(kW) | On Peak<br>(Thrm) | On Peak<br>(Thrm/hr) |         |            |
| Jan   | 12,515            | 65              | 1,276             | 7                    |         |            |
| Feb   | 11,323            | 65              | 1,217             | 7                    |         |            |
| March | 13,700            | 65              | 681               | 7                    |         |            |
| April | 11,909            | 65              | 143               | 7                    |         |            |
| May   | 15,523            | 144             | 0                 | 0                    |         |            |
| June  | 19,806            | 149             | 0                 | 0                    |         |            |
| July  | 22,550            | 152             | 0                 | 0                    |         |            |
| Aug   | 20,755            | 149             | 0                 | 0                    |         |            |
| Sept  | 14,080            | 145             | 0                 | 0                    |         |            |
| Oct   | 13,099            | 65              | 109               | 7                    |         |            |
| Nov   | 11,912            | 65              | 458               | 7                    |         |            |
| Dec   | 11,919            | 65              | 1,031             | 7                    |         |            |
| Total | 179,092           | 152             | 4,915             | 7                    |         |            |

Building Energy Consumption = 37,859 (Btu/Sq Ft/Year)  
Source Energy Consumption = 85,458 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
 REPLACE FLUORESCENT LAMPS

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | ----- Monthly Consumption ----- |       |                            |       |       |       |       |       |       |       |       |       | Total   |
|---------|------------|---------------------------------|-------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|         |            | Jan                             | Feb   | Mar                        | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0       | LIGHTS     |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 11754                           | 10635 | 12873                      | 11194 | 12314 | 12314 | 11194 | 12873 | 11194 | 12314 | 11194 | 11194 | 141,048 |
|         | PK         | 61.2                            | 61.2  | 61.2                       | 61.2  | 61.2  | 61.2  | 61.2  | 61.2  | 61.2  | 61.2  | 61.2  | 61.2  | 61.2    |
| 1       | MISC LD    |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2       | MISC LD    |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         | GAS        | 0                               | 0     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3       | MISC LD    |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         | OIL        | 0                               | 0     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4       | MISC LD    |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         | P STEAM    | 0                               | 0     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5       | MISC LD    |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         | P HOTH2O   | 0                               | 0     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6       | MISC LD    |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         | P CHILL    | 0                               | 0     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1       | EQ1161     |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 |       | AIR-CLD COND COMP <15 TONS |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0     | 0                          | 0     | 1209  | 4630  | 7873  | 4858  | 1063  | 0     | 0     | 0     | 19,633  |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 62.9  | 65.4  | 67.6  | 65.6  | 63.2  | 0.0   | 0.0   | 0.0   | 67.6    |
| 1       | EQ5200     |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 |       | CONDENSER FANS             |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0     | 0                          | 0     | 126   | 426   | 763   | 454   | 112   | 0     | 0     | 0     | 1,880   |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 3.3   | 5.1   | 6.0   | 5.0   | 3.7   | 0.0   | 0.0   | 0.0   | 6.0     |
| 1       | EQ5303     |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 |       | CONTROLS                   |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0     | 0                          | 0     | 24    | 66    | 60    | 69    | 22    | 0     | 0     | 0     | 241     |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 0.3   | 0.3   | 0.3   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.3     |
| 2       | EQ1161     |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 |       | AIR-CLD COND COMP <15 TONS |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0     | 0                          | 0     | 98    | 545   | 950   | 589   | 95    | 0     | 0     | 0     | 2,277   |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 7.9   | 8.3   | 8.5   | 8.3   | 8.0   | 0.0   | 0.0   | 0.0   | 8.5     |
| 2       | EQ5200     |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 |       | CONDENSER FANS             |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0     | 0                          | 0     | 10    | 51    | 92    | 56    | 10    | 0     | 0     | 0     | 219     |
|         | PK         | 0.0                             | 0.0   | 0.0                        | 0.0   | 0.3   | 0.6   | 0.8   | 0.6   | 0.5   | 0.0   | 0.0   | 0.0   | 0.8     |
| 2       | EQ5303     |                                 |       |                            |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 |       | CONTROLS                   |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 3  
REPLACE FLUORESCENT LAMPS

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        152.5    (kW)  
Yearly Time of Peak 15 (hr)    7 (mo)

Hour 15    Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| Cooling Equipment    |                        |                                    |                           |                          |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 73.9                      | 48.49                    |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 9.6                       | 6.29                     |
| Sub Total            |                        |                                    | 83.5                      | 54.77                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Air Moving Equipment |                        |                                    |                           |                          |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 7.6                       | 5.02                     |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.1                       | 0.09                     |
| Sub Total            |                        |                                    | 7.8                       | 5.11                     |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Miscellaneous        |                        |                                    |                           |                          |
|                      | Lights                 |                                    | 61.2                      | 40.12                    |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                     |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                     |
| Sub Total            |                        |                                    | 61.2                      | 40.12                    |
| Grand Total          |                        |                                    | 152.5                     | 100.00                   |

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 46

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 15: 9:10 1/13/94  
Dataset Name: CB46 .TM

AIRFLOW - ALTERNATIVE 4  
 REPLACE FLUORESCENT BALLASTS

----- S Y S T E M   S U M M A R Y -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply Airflow (Cfm) | Room Exhaust Airflow (Cfm) |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------------|----------------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) |                             |                            |
| 1             | SZ          | 1,731                 | 15,864                | 15,964                | 19,891               | 5,658                 | 0                           | 0                          |
| 2             | PTAC        | 0                     | 1,608                 | 1,608                 | 2,180                | 572                   | 0                           | 0                          |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 365                   | 0                           | 0                          |
| 4             | UH          | 0                     | 0                     | 6,035                 | 0                    | 2,238                 | 0                           | 0                          |
| Totals        |             | 1,731                 | 17,472                | 23,607                | 22,071               | 8,833                 | 0                           | 0                          |

CAPACITY - ALTERNATIVE 4  
 REPLACE FLUORESCENT BALLASTS

----- S Y S T E M   S U M M A R Y -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 47.2                      | 0.0                       | 0.0                  | 0.0                  | 47.2                  | -662,886                  | 0                         | -67,477                 | 0                      | 0                        | 0                    | 0                    | -662,886              |
| 2             | PTAC        | 6.1                       | 0.0                       | 0.0                  | 0.0                  | 6.1                   | -84,944                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -84,944               |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -49,312                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -49,312               |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -349,136                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -349,136              |
| Totals        |             | 53.2                      | 0.0                       | 0.0                  | 0.0                  | 53.2                  | -1,146,277                | 0                         | -67,477                 | 0                      | 0                        | 0                    | 0                    | -1,146,277            |

The building peaked at hour 16 month 7 with a capacity of 52.9 tons

ENGINEERING CHECKS - ALTERNATIVE 4  
 REPLACE FLUORESCENT BALLASTS

----- E N G I N E E R I N G   C H E C K S -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | SZ          | 10.91               | 0.93       | 336.3    | 360.9      | 33.25       | 0.94       | -38.93      | 17,026           |
| 2             | Main           | PTAC        | 0.00                | 1.16       | 265.2    | 228.8      | 52.45       | 1.16       | -61.24      | 1,387            |
| 3             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -59.41      | 830              |
| 4             | Main           | UH          | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.61       | -35.32      | 9,886            |



System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space<br>Sens.+Lat.<br>(Btuh) | Ret. Air<br>Sensible<br>(Btuh) | Ret. Air<br>Latent<br>(Btuh) | Net<br>Total<br>(Btuh) | Percnt<br>Of Tot<br>(%) | * | Space<br>Sensible<br>(Btuh) | Percnt<br>Of Tot<br>(%) | * | Space Peak<br>Space Sens<br>(Btuh) | Coil Peak<br>Tot Sens<br>(Btuh) | Percnt<br>Of Tot<br>(%) |
|-----------------|-------------------------------|--------------------------------|------------------------------|------------------------|-------------------------|---|-----------------------------|-------------------------|---|------------------------------------|---------------------------------|-------------------------|
| Envelope Loads  |                               |                                |                              |                        |                         | * |                             |                         | * |                                    |                                 |                         |
| Skylite Solr    | 0                             | 0                              |                              | 0                      | 0.00                    | * | 0                           | 0.00                    | * | 0                                  | 0                               | 0.00                    |
| Skylite Cond    | 0                             | 0                              |                              | 0                      | 0.00                    | * | 0                           | 0.00                    | * | 0                                  | 0                               | 0.00                    |
| Roof Cond       | 0                             | 124,323                        |                              | 124,323                | 21.96                   | * | 0                           | 0.00                    | * | 0                                  | -90,278                         | 16.49                   |
| Glass Solar     | 70,848                        | 0                              |                              | 70,848                 | 12.51                   | * | 73,968                      | 23.36                   | * | 0                                  | 0                               | 0.00                    |
| Glass Cond      | 19,448                        | 0                              |                              | 19,448                 | 3.44                    | * | 19,852                      | 6.27                    | * | -95,233                            | -95,233                         | 17.40                   |
| Wall Cond       | 18,393                        | 3,672                          |                              | 22,064                 | 3.90                    | * | 19,556                      | 6.17                    | * | -67,914                            | -88,307                         | 16.13                   |
| Partition       | 0                             |                                |                              | 0                      | 0.00                    | * | 0                           | 0.00                    | * | 0                                  | 0                               | 0.00                    |
| Exposed Floor   | 0                             |                                |                              | 0                      | 0.00                    | * | 0                           | 0.00                    | * | 0                                  | 0                               | 0.00                    |
| Infiltration    | 148,637                       |                                |                              | 148,637                | 26.25                   | * | 66,238                      | 20.91                   | * | -273,498                           | -273,498                        | 49.97                   |
| Sub Total==>    | 257,325                       | 127,995                        |                              | 385,320                | 68.06                   | * | 179,614                     | 56.71                   | * | -436,645                           | -547,316                        | 100.00                  |
| Internal Loads  |                               |                                |                              |                        |                         | * |                             |                         | * |                                    |                                 |                         |
| Lights          | 84,765                        | 0                              |                              | 84,765                 | 14.97                   | * | 87,377                      | 27.59                   | * | 0                                  | 0                               | 0.00                    |
| People          | 32,428                        |                                |                              | 32,428                 | 5.73                    | * | 15,332                      | 4.84                    | * | 0                                  | 0                               | 0.00                    |
| Misc            | 0                             | 0                              | 0                            | 0                      | 0.00                    | * | 0                           | 0.00                    | * | 0                                  | 0                               | 0.00                    |
| Sub Total==>    | 117,194                       | 0                              | 0                            | 117,194                | 20.70                   | * | 102,709                     | 32.43                   | * | 0                                  | 0                               | 0.00                    |
| Ceiling Load    | 42,679                        | -42,679                        |                              | 0                      | 0.00                    | * | 34,387                      | 10.86                   | * | -30,360                            | 0                               | 0.00                    |
| Outside Air     | 0                             | 0                              | 0                            | 66,988                 | 11.83                   | * | 0                           | 0.00                    | * | 0                                  | 0                               | 0.00                    |
| Sup. Fan Heat   |                               |                                |                              | 12,410                 | 2.19                    | * |                             | 0.00                    | * |                                    | 0                               | 0.00                    |
| Ret. Fan Heat   |                               | 0                              |                              | 0                      | 0.00                    | * |                             | 0.00                    | * |                                    | 0                               | 0.00                    |
| Duct Heat Pkup  |                               | 0                              |                              | 0                      | 0.00                    | * |                             | 0.00                    | * |                                    | 0                               | 0.00                    |
| OV/UNDR Sizing  | 0                             |                                |                              | 0                      | -0.00                   | * | 0                           | -0.00                   | * | 0                                  | 0                               | 0.00                    |
| Exhaust Heat    |                               | -15,769                        | 0                            | -15,769                | -2.79                   | * |                             | 0.00                    | * |                                    | 0                               | 0.00                    |
| Terminal Bypass |                               | 0                              | 0                            | 0                      | 0.00                    | * |                             | 0.00                    | * |                                    | 0                               | 0.00                    |
| Grand Total==>  | 417,198                       | 69,547                         | 0                            | 566,142                | 100.00                  | * | 316,709                     | 100.00                  | * | -467,005                           | -547,316                        | 100.00                  |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |        | Glass (sf) | (%)             |
|----------|--------------------------|--------------------|---------------------|-------------------|-------|--------|------------------|-------|--------|-------------|--------|------------|-----------------|
|          |                          |                    |                     | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part   |            |                 |
| Main Clg | 47.2                     | 566.1              | 428.3               | 15,864            | 83.8  | 67.0   | 74.8             | 55.9  | 55.3   | 65.8        | 17,026 | 0          |                 |
| Aux Clg  | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0      | 0          |                 |
| Opt Vent | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0      | 0          |                 |
| Totals   | 47.2                     | 566.1              |                     |                   |       |        |                  |       |        |             | 7,846  | 5,950      | 0 0<br>1,776 30 |

-----HEATING COIL SELECTION-----

|          | Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|-------------------|---------------------|--------------|--------------|---------|---------|---------|------------------------|--------|----------------------|------|------|
|          |                   |                     |              |              | Vent    |         |         | Clg % OA               | 10.9   | Type                 | Clg  | Htg  |
| Main Htg | -662.9            | 15,964              | 56.7         | 94.9         | Infil   | 1,731   | 0       | Clg Cfm/Sqft           | 0.93   | SADB                 | 56.7 | 94.9 |
| Aux Htg  | 0.0               | 0                   | 0.0          | 0.0          | Supply  | 3,927   | 3,927   | Clg Cfm/Ton            | 336.26 | Plenum               | 82.9 | 58.6 |
| Preheat  | -67.5             | 15,864              | 52.0         | 55.9         | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 360.88 | Return               | 83.0 | 57.9 |
| Reheat   | 0.0               | 0                   | 0.0          | 0.0          | Return  | 15,864  | 15,964  | Clg Btuh/Sqft          | 33.25  | Ret/OA               | 83.8 | 57.9 |
| Humidif  | 0.0               | 0                   | 0.0          | 0.0          | Exhaust | 1,731   | 0       | No. People             | 61     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0               | 0                   | 0.0          | 0.0          | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.2  | 0.2  |
| Total    | -662.9            |                     |              |              | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 0.94   | Fn BldTD             | 0.1  | 0.1  |
|          |                   |                     |              |              |         |         |         | Htg Btuh/Sqft          | -38.93 | Fn Frict             | 0.4  | 0.4  |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 7/14              |          | *      | Mo/Hr: 7/15 |   | *        | Mo/Hr: 13/ 1 |   |            |           |        |
|--------------------|------------|--------------------------|----------|--------|-------------|---|----------|--------------|---|------------|-----------|--------|
| Outside Air ==>    |            | OADB/WB/HR: 91/ 74/105.0 |          | *      | OADB: 91    |   | *        | OADB: 4      |   |            |           |        |
|                    | Space      | Ret. Air                 | Ret. Air | Net    | Perct       | * | Space    | Perct        | * | Space Peak | Coil Peak | Perct  |
|                    | Sens.+Lat. | Sensible                 | Latent   | Total  | Of Tot      | * | Sensible | Of Tot       | * | Space Sens | Tot Sens  | Of Tot |
|                    | (Btuh)     | (Btuh)                   | (Btuh)   | (Btuh) | (%)         | * | (Btuh)   | (%)          | * | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads     |            |                          |          |        |             |   |          |              |   |            |           |        |
| Skylite Solr       | 0          | 0                        |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Skylite Cond       | 0          | 0                        |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Roof Cond          | 0          | 21,218                   |          | 21,218 | 29.16       | * | 0        | 0.00         | * | 0          | -17,622   | 20.70  |
| Glass Solar        | 11,232     | 0                        |          | 11,232 | 15.44       | * | 10,944   | 27.83        | * | 0          | 0         | 0.00   |
| Glass Cond         | 3,009      | 0                        |          | 3,009  | 4.14        | * | 3,180    | 8.09         | * | -15,443    | -15,443   | 18.14  |
| Wall Cond          | 2,731      | 542                      |          | 3,274  | 4.50        | * | 2,977    | 7.57         | * | -9,254     | -12,213   | 14.35  |
| Partition          | 0          |                          |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Exposed Floor      | 0          |                          |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Infiltration       | 24,717     |                          |          | 24,717 | 33.97       | * | 9,865    | 25.09        | * | -39,853    | -39,853   | 46.81  |
| Sub Total==>       | 41,690     | 21,760                   |          | 63,450 | 87.21       | * | 26,967   | 68.57        | * | -64,550    | -85,131   | 100.00 |
| Internal Loads     |            |                          |          |        |             | * |          |              | * |            |           |        |
| Lights             | 6,515      | 0                        |          | 6,515  | 8.96        | * | 6,686    | 17.00        | * | 0          | 0         | 0.00   |
| People             | 2,558      |                          |          | 2,558  | 3.52        | * | 1,167    | 2.97         | * | 0          | 0         | 0.00   |
| Misc               | 0          | 0                        | 0        | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Sub Total==>       | 9,074      | 0                        | 0        | 9,074  | 12.47       | * | 7,853    | 19.97        | * | 0          | 0         | 0.00   |
| Ceiling Load       | 4,073      | -4,073                   |          | 0      | 0.00        | * | 4,507    | 11.46        | * | -4,128     | 0         | 0.00   |
| Outside Air        | 0          | 0                        | 0        | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Sup. Fan Heat      |            |                          |          | 229    | 0.31        | * |          | 0.00         | * |            | 0         | 0.00   |
| Ret. Fan Heat      |            | 0                        |          | 0      | 0.00        | * |          | 0.00         | * |            | 0         | 0.00   |
| Duct Heat Pkup     |            | 0                        |          | 0      | 0.00        | * |          | 0.00         | * |            | 0         | 0.00   |
| OV/UNDR Sizing     | 0          |                          |          | 0      | 0.00        | * | 0        | 0.00         | * | 0          | 0         | 0.00   |
| Exhaust Heat       |            | 0                        | 0        | 0      | 0.00        | * |          | 0.00         | * |            | 0         | 0.00   |
| Terminal Bypass    |            | 0                        | 0        | 0      | 0.00        | * |          | 0.00         | * |            | 0         | 0.00   |
| Grand Total==>     | 54,837     | 17,687                   | 0        | 72,753 | 100.00      | * | 39,327   | 100.00       | * | -68,678    | -85,131   | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total<br>Floor | Glass (sf) | (%) |
|----------|--------------------------|--------------------|---------------------|-------------------|-------|--------|------------------|-------|--------|----------------------|------------|-----|
|          |                          |                    |                     | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains |                      |            |     |
| Main Clg | 6.1                      | 72.8               | 1,608               | 84.0              | 65.4  | 66.5   | 52.4             | 49.9  | 50.7   | 1,387                |            |     |
| Aux Clg  | 0.0                      | 0.0                | 0                   | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0                    |            |     |
| Opt Vent | 0.0                      | 0.0                | 0                   | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0                    |            |     |
| Totals   | 6.1                      | 72.8               |                     |                   |       |        |                  |       |        | 1,387                | 0          | 0   |
|          |                          |                    |                     |                   |       |        |                  |       |        | 867                  | 288        | 33  |

-----HEATING COIL SELECTION-----

|          | Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F | Type<br>Vent | -----AIRFLOWS (cfm)----- |         | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)--- |       |  |
|----------|-------------------|---------------------|--------------|--------------|--------------|--------------------------|---------|------------------------|--------|----------|-----------------------|-------|--|
|          |                   |                     |              |              |              | Cooling                  | Heating | Clg % OA               | 0.0    | Type     | Clg                   | Htg   |  |
| Main Htg | -84.9             | 1,608               | 58.7         | 107.3        | Infil        | 572                      | 572     | Clg Cfm/Sqft           | 1.16   | SADB     | 52.5                  | 107.3 |  |
| Aux Htg  | 0.0               | 0                   | 0.0          | 0.0          | Supply       | 1,608                    | 1,608   | Clg Cfm/Ton            | 265.16 | Plenum   | 84.3                  | 58.7  |  |
| Preheat  | -0.0              | 1,608               | 58.7         | 52.4         | Mincfm       | 0                        | 0       | Clg Sqft/Ton           | 228.77 | Return   | 83.9                  | 58.7  |  |
| Reheat   | 0.0               | 0                   | 0.0          | 0.0          | Return       | 1,608                    | 1,608   | Clg Btuh/Sqft          | 52.45  | Ret/OA   | 83.9                  | 58.7  |  |
| Humidif  | 0.0               | 0                   | 0.0          | 0.0          | Exhaust      | 0                        | 0       | No. People             | 5      | Runarnd  | 75.0                  | 68.0  |  |
| Opt Vent | 0.0               | 0                   | 0.0          | 0.0          | Rm Exh       | 0                        | 0       | Htg % OA               | 0.0    | Fn MtrTD | 0.0                   | 0.0   |  |
| Total    | -84.9             |                     |              |              | Auxil        | 0                        | 0       | Htg Cfm/Sqft           | 1.16   | Fn BldTD | 0.0                   | 0.0   |  |
|          |                   |                     |              |              |              |                          |         | Htg Btuh/Sqft          | -61.24 | Fn Frict | 0.1                   | 0.0   |  |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | -6,714                    | 13.61            |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -10,295                      | -10,295                   | 20.88            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -5,711                       | -6,907                    | 14.01            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -25,396                      | -25,396                   | 51.50            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -41,403                      | -49,312                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -7,805                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -49,208                      | -49,312                   | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR Deg F | Entering DB/WB/HR Deg F | Entering DB/WB/HR Grains | Leaving DB/WB/HR Deg F | Leaving DB/WB/HR Deg F | Leaving DB/WB/HR Grains | Gross Total Floor | Glass (sf) Part | (%) ExFlr |
|----------|-----------------------|-----------------|------------------|-------------------------|-------------------------|--------------------------|------------------------|------------------------|-------------------------|-------------------|-----------------|-----------|
| Main Clg | 0.0                   | 0.0             | 0                | 0.0                     | 0.0                     | 0.0                      | 0.0                    | 0.0                    | 0.0                     | 830               | 0               | 0         |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                     | 0.0                     | 0.0                      | 0.0                    | 0.0                    | 0.0                     | 0                 | 0               | 0         |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                     | 0.0                     | 0.0                      | 0.0                    | 0.0                    | 0.0                     | 830               | 0               | 0         |
| Totals   | 0.0                   | 0.0             | 0                | 0.0                     | 0.0                     | 0.0                      | 0.0                    | 0.0                    | 0.0                     | 553               | 192             | 35        |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|-----|------|
| Main Htg | -49.3          | 0                | 0.0       | 0.0       | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 365     | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 38.8 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 0       | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 39.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 39.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 0       | No. People    | 0      | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0  |
| Total    | -49.3          | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.00   | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -59.41 | Fn Frict | 0.0 | 0.0  |

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space      | Ret. Air | Ret. Air | Net    | Perct  |   | Space    | Perct  | Space Peak | Coil Peak | Perct  |
|-----------------|------------|----------|----------|--------|--------|---|----------|--------|------------|-----------|--------|
|                 | Sens.+Lat. | Sensible | Latent   | Total  | Of Tot |   | Sensible | Of Tot | Space Sens | Tot Sens  | Of Tot |
|                 | (Btuh)     | (Btuh)   | (Btuh)   | (Btuh) | (%)    |   | (Btuh)   | (%)    | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads  |            |          |          |        |        |   |          |        |            |           |        |
| Skylite Solr    | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Skylite Cond    | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Roof Cond       | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | 0          | -74,057   | 21.67  |
| Glass Solar     | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Glass Cond      | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | -73,355    | -73,355   | 21.47  |
| Wall Cond       | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | -30,899    | -38,407   | 11.24  |
| Partition       | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Exposed Floor   | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Infiltration    | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | -155,894   | -155,894  | 45.62  |
| Sub Total==>    | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | -260,148   | -341,713  | 100.00 |
| Internal Loads  |            |          |          |        |        |   |          |        |            |           |        |
| Lights          | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| People          | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Misc            | 0          | 0        | 0        | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Sub Total==>    | 0          | 0        | 0        | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Ceiling Load    | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | -84,880    | 0         | 0.00   |
| Outside Air     | 0          | 0        | 0        | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Sup. Fan Heat   |            |          |          | 0      | 0.00   | * |          | 0.00   |            | 0         | 0.00   |
| Ret. Fan Heat   |            | 0        |          | 0      | 0.00   | * |          | 0.00   |            | 0         | 0.00   |
| Duct Heat Pkup  |            | 0        |          | 0      | 0.00   | * |          | 0.00   |            | 0         | 0.00   |
| OV/UNDR Sizing  | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Exhaust Heat    |            | 0        | 0        | 0      | 0.00   | * |          | 0.00   |            | 0         | 0.00   |
| Terminal Bypass |            | 0        | 0        | 0      | 0.00   | * |          | 0.00   |            | 0         | 0.00   |
| Grand Total==>  | 0          | 0        | 0        | 0      | 0.00   | * | 0        | 0.00   | -345,028   | -341,713  | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)      |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|----------|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |          |
| Main Clg | 0.0            | 0.0       | 0.0        | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 0          |          |
| Aux Clg  | 0.0            | 0.0       | 0.0        | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |          |
| Opt Vent | 0.0            | 0.0       | 0.0        | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 8,985      | 0 0      |
| Totals   | 0.0            | 0.0       |            |                   |       |        |                  |       |        | Wall        | 3,392      | 1,368 40 |

-----AREAS-----

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg   |
|----------|----------|------------|-------|-------|---------|---------|---------|---------------|--------|----------|-----|-------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 120.5 |
| Main Htg | -349.1   | 6,035      | 67.4  | 120.5 | Infil   | 0       | 2,238   | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 39.6  |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 0       | 6,035   | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 68.0  |
| Preheat  | 0.0      | 0          | 0.0   | 0.0   | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 68.0  |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 0       | 6,035   | No. People    | 0      | Runarnd  | 0.0 | 68.0  |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0   |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.61   | Fn BldTD | 0.0 | 0.0   |
| Total    | -349.1   |            |       |       | Auxil   | 0       | 0       | Htg Btuh/Sqft | -35.32 | Fn Frict | 0.0 | 0.1   |

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 4  
 REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description    | Room U-Values<br>(Btu/hr/sqft/F) |       |             |             |             |             |       |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|----------------|----------------------------------|-------|-------------|-------------|-------------|-------------|-------|-------|-------|------------------------|-----------------------------|
|             |                | Part.                            | ExFlr | Summr Skylt | Wintr Skylt | Summr Windo | Wintr Windo | Wall  | Ceil. |       |                        |                             |
| 1           | 1ST FL OFFICES | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000       | 0.810       | 0.837 | 0.343 | 0.317 | 45.0                   | 9.63                        |
| Zone        | 1 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000       | 0.810       | 0.837 | 0.343 | 0.317 | 45.0                   | 9.63                        |
| 2           | LIQUOR STORE   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000       | 0.000       | 0.000 | 0.343 | 0.317 | 100.3                  | 21.77                       |
| Zone        | 2 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000       | 0.000       | 0.000 | 0.343 | 0.317 | 100.3                  | 21.77                       |
| 4           | LIBRARY        | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 46.8                   | 10.79                       |
| Zone        | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 46.8                   | 10.79                       |
| 5           | GAME ROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 45.3                   | 10.44                       |
| Zone        | 5 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 45.3                   | 10.44                       |
| System      | 1 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 49.2                   | 10.88                       |
| 6           | 2ND FL OFFICES | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 67.4                   | 15.31                       |
| Zone        | 6 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 67.4                   | 15.31                       |
| 7           | 2ND FL OFFICE  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 114.6                  | 25.67                       |
| Zone        | 7 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 114.6                  | 25.67                       |
| System      | 2 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 75.9                   | 17.16                       |
| 7           | 2ND FL OFFICE  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 114.6                  | 25.67                       |
| Zone        | 7 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 114.6                  | 25.67                       |
| 8           | 2ND FL TOILETS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 62.6                   | 14.24                       |
| Zone        | 8 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 62.6                   | 14.24                       |
| System      | 3 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 78.1                   | 17.65                       |
| 3           | LIQUOR STORAGE | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000       | 0.810       | 0.837 | 0.343 | 0.317 | 29.8                   | 6.29                        |
| Zone        | 3 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000       | 0.810       | 0.837 | 0.343 | 0.317 | 29.8                   | 6.29                        |
| 4           | LIBRARY        | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 46.8                   | 10.79                       |
| Zone        | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 46.8                   | 10.79                       |
| 5           | GAME ROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 45.3                   | 10.44                       |
| Zone        | 5 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 45.3                   | 10.44                       |
| 6           | 2ND FL OFFICES | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 67.4                   | 15.31                       |
| Zone        | 6 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 67.4                   | 15.31                       |
| System      | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 47.0                   | 10.75                       |
| Building    |                | 0.000                            | 0.000 | 0.000       | 0.000       | 0.232       | 0.810       | 0.837 | 0.343 | 0.317 | 50.5                   | 11.33                       |

BUILDING AREAS - ALTERNATIVE 4  
 REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G   A R E A S -----

| Room Number | Description    | Number of Duplicate |   | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | SkI /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|----------------|---------------------|---|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
| 1           | 1ST FL OFFICES | 1                   | 1 | 8,053                       | 8,053                   | 0                     | 0                         | 0                    | 0           | 0                    | 624                | 24          | 1,926                |
| Zone        | 1 Total/Ave.   |                     |   |                             | 8,053                   | 0                     | 0                         | 0                    | 0           | 0                    | 624                | 24          | 1,926                |
| 2           | LIQUOR STORE   | 1                   | 1 | 1,127                       | 1,127                   | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 739                  |
| Zone        | 2 Total/Ave.   |                     |   |                             | 1,127                   | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 739                  |
| 4           | LIBRARY        | 1                   | 1 | 3,692                       | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| Zone        | 4 Total/Ave.   |                     |   |                             | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| 5           | GAME ROOM      | 1                   | 1 | 4,154                       | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| Zone        | 5 Total/Ave.   |                     |   |                             | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| System      | 1 Total/Ave.   |                     |   |                             | 17,026                  | 0                     | 0                         | 0                    | 0           | 7,846                | 1,776              | 30          | 4,174                |
| 6           | 2ND FL OFFICES | 1                   | 1 | 1,139                       | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| Zone        | 6 Total/Ave.   |                     |   |                             | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| 7           | 2ND FL OFFICE  | 1                   | 1 | 248                         | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| Zone        | 7 Total/Ave.   |                     |   |                             | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| System      | 2 Total/Ave.   |                     |   |                             | 1,387                   | 0                     | 0                         | 0                    | 0           | 1,387                | 288                | 33          | 579                  |
| 7           | 2ND FL OFFICE  | 1                   | 1 | 248                         | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| Zone        | 7 Total/Ave.   |                     |   |                             | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| 8           | 2ND FL TOILETS | 1                   | 1 | 582                         | 582                     | 0                     | 0                         | 0                    | 0           | 582                  | 96                 | 34          | 184                  |
| Zone        | 8 Total/Ave.   |                     |   |                             | 582                     | 0                     | 0                         | 0                    | 0           | 582                  | 96                 | 34          | 184                  |
| System      | 3 Total/Ave.   |                     |   |                             | 830                     | 0                     | 0                         | 0                    | 0           | 830                  | 192                | 35          | 360                  |
| 3           | LIQUOR STORAGE | 1                   | 1 | 901                         | 901                     | 0                     | 0                         | 0                    | 0           | 0                    | 24                 | 18          | 112                  |
| Zone        | 3 Total/Ave.   |                     |   |                             | 901                     | 0                     | 0                         | 0                    | 0           | 0                    | 24                 | 18          | 112                  |
| 4           | LIBRARY        | 1                   | 1 | 3,692                       | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| Zone        | 4 Total/Ave.   |                     |   |                             | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| 5           | GAME ROOM      | 1                   | 1 | 4,154                       | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| Zone        | 5 Total/Ave.   |                     |   |                             | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| 6           | 2ND FL OFFICES | 1                   | 1 | 1,139                       | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| Zone        | 6 Total/Ave.   |                     |   |                             | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| System      | 4 Total/Ave.   |                     |   |                             | 9,886                   | 0                     | 0                         | 0                    | 0           | 8,985                | 1,368              | 40          | 2,023                |
| Building    |                |                     |   |                             | 29,129                  | 0                     | 0                         | 0                    | 0           | 19,048               | 3,624              | 34          | 7,137                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 4  
REPLACE FLUORESCENT BALLASTS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 18.58 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTvw) = 33.33 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4  
 REPLACE FLUORESCENT BALLASTS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (8tuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 2.7                    | 8         | 64    | -60,688                  | 26        | 621   | 1,180.4                   | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 5.3                    | 7         | 52    | -121,375                 | 28        | 662   | 2,360.7                   | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 8.0                    | 1         | 4     | -182,063                 | 18        | 439   | 3,541.1                   | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 10.6                   | 10        | 79    | -242,751                 | 2         | 52    | 4,721.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 20 - 25             | 13.3                   | 7         | 53    | -303,439                 | 2         | 56    | 5,901.8                   | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 16.0                   | 5         | 41    | -364,126                 | 2         | 48    | 7,082.2                   | 59        | 3,638 | 0.0                       | 0         | 0     |
| 30 - 35             | 18.6                   | 7         | 56    | -424,814                 | 1         | 13    | 8,262.6                   | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 21.3                   | 9         | 68    | -485,502                 | 1         | 24    | 9,442.9                   | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 24.0                   | 4         | 32    | -546,190                 | 0         | 0     | 10,623.3                  | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 26.6                   | 11        | 85    | -606,878                 | 2         | 49    | 11,803.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 50 - 55             | 29.3                   | 3         | 22    | -667,565                 | 11        | 264   | 12,984.0                  | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 31.9                   | 11        | 87    | -728,253                 | 7         | 162   | 14,164.4                  | 24        | 1,450 | 0.0                       | 0         | 0     |
| 60 - 65             | 34.6                   | 0         | 0     | -788,941                 | 0         | 0     | 15,344.8                  | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 37.3                   | 5         | 38    | -849,629                 | 0         | 0     | 16,525.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 39.9                   | 8         | 65    | -910,316                 | 0         | 0     | 17,705.5                  | 17        | 1,070 | 0.0                       | 0         | 0     |
| 75 - 80             | 42.6                   | 2         | 15    | -971,004                 | 0         | 0     | 18,885.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 45.3                   | 1         | 5     | -1,031,692               | 0         | 0     | 20,066.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 47.9                   | 3         | 20    | -1,092,379               | 0         | 0     | 21,246.6                  | 0         | 0     | 0.0                       | 0         | 0     |
| 90 - 95             | 50.6                   | 0         | 0     | -1,153,067               | 0         | 0     | 22,427.0                  | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 53.2                   | 0         | 0     | -1,213,755               | 0         | 0     | 23,607.3                  | 0         | 0     | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,974 | 0                        | 0         | 6,370 | 0.0                       | 0         | 2,602 | 0.0                       | 0         | 8,760 |



BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4  
 REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | Zone Number                               |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------|-------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                             | 1                                         | 2     | 4     | 5     | 6     | 7     | 7     | 8     | 3     | 4     | 5     | 6     |
| Max. Temp.                  | 83.5                                      | 81.1  | 89.9  | 88.9  | 87.3  | 87.5  | 103.5 | 102.9 | 123.1 | 107.7 | 106.6 | 103.1 |
| Mo./Hr.                     | 7 20                                      | 7 22  | 7 20  | 7 20  | 7 20  | 7 20  | 8 20  | 7 20  | 8 18  | 7 21  | 7 20  | 7 19  |
| Day Type                    | 4                                         | 4     | 4     | 4     | 4     | 4     | 1     | 2     | 2     | 1     | 1     | 2     |
|                             | ..... N u m b e r   o f   H o u r s ..... |       |       |       |       |       |       |       |       |       |       |       |
| Above 100                   | 0                                         | 0     | 0     | 0     | 0     | 0     | 451   | 297   | 2,912 | 1,045 | 824   | 293   |
| 95 - 100                    | 0                                         | 0     | 0     | 0     | 0     | 0     | 1,278 | 1,075 | 44    | 1,004 | 870   | 1,116 |
| 90 - 95                     | 0                                         | 0     | 0     | 0     | 0     | 0     | 946   | 1,111 | 337   | 681   | 650   | 1,044 |
| 85 - 90                     | 0                                         | 0     | 203   | 154   | 110   | 132   | 470   | 460   | 807   | 613   | 664   | 466   |
| 80 - 85                     | 696                                       | 257   | 1,430 | 1,251 | 975   | 1,061 | 527   | 729   | 40    | 329   | 576   | 753   |
| 75 - 80                     | 2,561                                     | 2,375 | 1,812 | 1,858 | 2,212 | 2,228 | 17    | 0     | 495   | 34    | 88    | 0     |
| 70 - 75                     | 635                                       | 1,040 | 465   | 426   | 392   | 336   | 288   | 117   | 1,017 | 566   | 285   | 84    |
| 65 - 70                     | 2,074                                     | 2,165 | 553   | 575   | 399   | 444   | 1,976 | 2,032 | 1,781 | 1,797 | 1,793 | 1,986 |
| 60 - 65                     | 1,116                                     | 1,327 | 779   | 545   | 738   | 1,034 | 1,044 | 1,139 | 547   | 967   | 991   | 1,098 |
| 55 - 60                     | 658                                       | 734   | 624   | 672   | 706   | 493   | 779   | 769   | 282   | 740   | 836   | 812   |
| 50 - 55                     | 376                                       | 335   | 758   | 655   | 625   | 896   | 984   | 1,031 | 498   | 984   | 1,183 | 1,108 |
| Below 50                    | 644                                       | 527   | 2,136 | 2,624 | 2,603 | 2,136 | 0     | 0     | 0     | 0     | 0     | 0     |
| Min. Temp.                  | 36.9                                      | 39.0  | 34.4  | 32.0  | 33.0  | 36.1  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  |
| Mo./Hr.                     | 2 7                                       | 2 7   | 2 10  | 2 10  | 2 8   | 2 10  | 1 5   | 1 6   | 1 24  | 1 6   | 1 4   | 1 5   |
| Day Type                    | 5                                         | 5     | 4     | 4     | 5     | 4     | 2     | 2     | 3     | 2     | 2     | 2     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4  
 REPLACE FLUORESCENT BALLASTS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | HOT WTR            | HOT W DMND           |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 10,798            | 56              | 1,305              | 7                    |
| Feb   | 9,770             | 56              | 1,244              | 7                    |
| March | 11,821            | 56              | 719                | 7                    |
| April | 10,274            | 56              | 171                | 7                    |
| May   | 13,434            | 131             | 0                  | 0                    |
| June  | 17,572            | 137             | 0                  | 0                    |
| July  | 20,463            | 141             | 0                  | 0                    |
| Aug   | 18,401            | 138             | 0                  | 0                    |
| Sept  | 12,169            | 133             | 0                  | 0                    |
| Oct   | 11,301            | 56              | 122                | 7                    |
| Nov   | 10,277            | 56              | 484                | 7                    |
| Dec   | 10,284            | 56              | 1,061              | 7                    |
| Total | 156,565           | 141             | 5,105              | 7                    |

Building Energy Consumption = 35,871 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 78,407 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
 REPLACE FLUORESCENT BALLASTS

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref<br>Num | Equip<br>Code | ----- Monthly Consumption ----- |      |       |      |       |       |      |       |      |       |      |      | Total   |
|------------|---------------|---------------------------------|------|-------|------|-------|-------|------|-------|------|-------|------|------|---------|
|            |               | Jan                             | Feb  | Mar   | Apr  | May   | June  | July | Aug   | Sep  | Oct   | Nov  | Dec  |         |
| 0          | LIGHTS        |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | ELEC          | 10075                           | 9115 | 11034 | 9595 | 10555 | 10555 | 9595 | 11034 | 9595 | 10555 | 9595 | 9595 | 120,898 |
|            | PK            | 52.4                            | 52.4 | 52.4  | 52.4 | 52.4  | 52.4  | 52.4 | 52.4  | 52.4 | 52.4  | 52.4 | 52.4 | 52.4    |
| 1          | MISC LD       |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | ELEC          | 0                               | 0    | 0     | 0    | 0     | 0     | 0    | 0     | 0    | 0     | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0     |
| 2          | MISC LD       |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | GAS           | 0                               | 0    | 0     | 0    | 0     | 0     | 0    | 0     | 0    | 0     | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0     |
| 3          | MISC LD       |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | OIL           | 0                               | 0    | 0     | 0    | 0     | 0     | 0    | 0     | 0    | 0     | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0     |
| 4          | MISC LD       |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | P STEAM       | 0                               | 0    | 0     | 0    | 0     | 0     | 0    | 0     | 0    | 0     | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0     |
| 5          | MISC LD       |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | P HOTH2O      | 0                               | 0    | 0     | 0    | 0     | 0     | 0    | 0     | 0    | 0     | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0     |
| 6          | MISC LD       |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | P CHILL       | 0                               | 0    | 0     | 0    | 0     | 0     | 0    | 0     | 0    | 0     | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 0.0   | 0.0   | 0.0  | 0.0   | 0.0  | 0.0   | 0.0  | 0.0  | 0.0     |
| 1          | EQ1161        |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | ELEC          | 0                               | 0    | 0     | 0    | 972   | 4258  | 7488 | 4454  | 838  | 0     | 0    | 0    | 18,010  |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 60.8  | 63.2  | 65.4 | 63.4  | 61.0 | 0.0   | 0.0  | 0.0  | 65.4    |
| 1          | EQ5200        |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | ELEC          | 0                               | 0    | 0     | 0    | 102   | 393   | 725  | 419   | 88   | 0     | 0    | 0    | 1,728   |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 2.4   | 4.8   | 5.8  | 4.8   | 3.5  | 0.0   | 0.0  | 0.0  | 5.8     |
| 1          | EQ5303        |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | ELEC          | 0                               | 0    | 0     | 0    | 19    | 66    | 60   | 69    | 17   | 0     | 0    | 0    | 230     |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 0.3   | 0.3   | 0.3  | 0.3   | 0.3  | 0.0   | 0.0  | 0.0  | 0.3     |
| 2          | EQ1161        |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | ELEC          | 0                               | 0    | 0     | 0    | 77    | 517   | 923  | 559   | 76   | 0     | 0    | 0    | 2,152   |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 7.8   | 8.1   | 8.4  | 8.1   | 7.8  | 0.0   | 0.0  | 0.0  | 8.4     |
| 2          | EQ5200        |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | ELEC          | 0                               | 0    | 0     | 0    | 8     | 49    | 90   | 53    | 8    | 0     | 0    | 0    | 208     |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 0.2   | 0.6   | 0.7  | 0.6   | 0.5  | 0.0   | 0.0  | 0.0  | 0.7     |
| 2          | EQ5303        |                                 |      |       |      |       |       |      |       |      |       |      |      |         |
|            | ELEC          | 0                               | 0    | 0     | 0    | 8     | 49    | 90   | 53    | 8    | 0     | 0    | 0    | 208     |
|            | PK            | 0.0                             | 0.0  | 0.0   | 0.0  | 0.2   | 0.6   | 0.7  | 0.6   | 0.5  | 0.0   | 0.0  | 0.0  | 0.7     |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 4  
 REPLACE FLUORESCENT BALLASTS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 140.9 (kW)  
 Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

| Eq.<br>Ref.<br>Num.  | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|------------------------|
| Cooling Equipment    |                        |                                    |                           |                        |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 71.4                      | 50.70                  |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 9.4                       | 6.70                   |
| Sub Total            |                        |                                    | 80.9                      | 57.39                  |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Air Moving Equipment |                        |                                    |                           |                        |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 7.5                       | 5.30                   |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.1                       | 0.10                   |
| Sub Total            |                        |                                    | 7.6                       | 5.40                   |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Miscellaneous        |                        |                                    |                           |                        |
|                      | Lights                 |                                    | 52.4                      | 37.21                  |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                   |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                   |
| Sub Total            |                        |                                    | 52.4                      | 37.21                  |
| Grand Total          |                        |                                    | 140.9                     | 100.00                 |

```
*****  
*****  
**  
**          TRACE 600 ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 46

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 7:33:34 1/14/94  
Dataset Name: CB46B .TM

AIRFLOW - ALTERNATIVE 1  
 REPLACE FLUORESCENT FIXTURES

----- S Y S T E M S U M M A R Y -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | SZ          | 1,684                 | 15,553                | 15,653                | 19,580               | 5,611                 | 0                    | 0                     |
| 2             | PTAC        | 0                     | 1,544                 | 1,544                 | 2,116                | 572                   | 0                    | 0                     |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 365                   | 0                    | 0                     |
| 4             | UH          | 0                     | 0                     | 6,035                 | 0                    | 2,238                 | 0                    | 0                     |
| Totals        |             | 1,684                 | 17,097                | 23,232                | 21,696               | 8,786                 | 0                    | 0                     |

CAPACITY - ALTERNATIVE 1  
 REPLACE FLUORESCENT FIXTURES

----- S Y S T E M S U M M A R Y -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 45.5                      | 0.0                       | 0.0                  | 0.0                  | 45.5                  | -661,631                  | 0                         | -71,327                 | 0                      | 0                        | 0                    | 0                    | -661,631              |
| 2             | PTAC        | 6.0                       | 0.0                       | 0.0                  | 0.0                  | 6.0                   | -84,702                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -84,702               |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -49,312                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -49,312               |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -349,136                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -349,136              |
| Totals        |             | 51.4                      | 0.0                       | 0.0                  | 0.0                  | 51.4                  | -1,144,780                | 0                         | -71,327                 | 0                      | 0                        | 0                    | 0                    | -1,144,780            |

The building peaked at hour 16 month 7 with a capacity of 51.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 REPLACE FLUORESCENT FIXTURES

----- E N G I N E E R I N G C H E C K S -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling   |         |           |            | Heating   |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|-----------|---------|-----------|------------|-----------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft | Cfm/Ton | Sq Ft/Ton | Btuh/Sq Ft | Cfm/Sq Ft | Btuh/Sq Ft |                  |
| 1             | Main           | SZ          | 10.83               | 0.91      | 342.1   | 374.4     | 32.05      | 0.92      | -38.86     | 17,026           |
| 2             | Main           | PTAC        | 0.00                | 1.11      | 258.8   | 232.5     | 51.60      | 1.11      | -61.07     | 1,387            |
| 3             | Main           | RAD         | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.00      | -59.41     | 830              |
| 4             | Main           | UH          | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.61      | -35.32     | 9,886            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 7/14              |          | *       | Mo/Hr: 7/16 |          | *      | Mo/Hr: 13/ 1 |           |        |
|--------------------|------------|--------------------------|----------|---------|-------------|----------|--------|--------------|-----------|--------|
| Outside Air ==>    |            | OADB/WB/HR: 91/ 74/105.0 |          | *       | OADB: 91    |          | *      | OADB: 4      |           |        |
|                    | Space      | Ret. Air                 | Ret. Air | Net     | Perct       | Space    | Perct  | Space Peak   | Coil Peak | Perct  |
|                    | Sens.+Lat. | Sensible                 | Latent   | Total   | Of Tot      | Sensible | Of Tot | Space Sens   | Tot Sens  | Of Tot |
|                    | (Btuh)     | (Btuh)                   | (Btuh)   | (Btuh)  | (%)         | (Btuh)   | (%)    | (Btuh)       | (Btuh)    | (%)    |
| Envelope Loads     |            |                          |          |         |             |          |        |              |           |        |
| Skylite Solr       | 0          | 0                        |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Skylite Cond       | 0          | 0                        |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Roof Cond          | 0          | 121,793                  |          | 121,793 | 22.32       | 0        | 0.00   | 0            | -90,278   | 16.50  |
| Glass Solar        | 67,392     | 0                        |          | 67,392  | 12.35       | 73,968   | 24.15  | 0            | 0         | 0.00   |
| Glass Cond         | 19,075     | 0                        |          | 19,075  | 3.50        | 19,852   | 6.48   | -95,233      | -95,233   | 17.40  |
| Wall Cond          | 18,084     | 3,570                    |          | 21,654  | 3.97        | 19,556   | 6.38   | -67,914      | -88,294   | 16.13  |
| Partition          | 0          |                          |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Exposed Floor      | 0          |                          |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Infiltration       | 151,003    |                          |          | 151,003 | 27.67       | 66,238   | 21.62  | -273,498     | -273,498  | 49.97  |
| Sub Total==>       | 255,553    | 125,364                  |          | 380,916 | 69.81       | 179,614  | 58.64  | -436,645     | -547,303  | 100.00 |
| Internal Loads     |            |                          |          |         |             |          |        |              |           |        |
| Lights             | 69,574     | 0                        |          | 69,574  | 12.75       | 72,814   | 23.77  | 0            | 0         | 0.00   |
| People             | 32,175     |                          |          | 32,175  | 5.90        | 15,332   | 5.01   | 0            | 0         | 0.00   |
| Misc               | 0          | 0                        | 0        | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Sub Total==>       | 101,749    | 0                        | 0        | 101,749 | 18.65       | 88,146   | 28.78  | 0            | 0         | 0.00   |
| Ceiling Load       | 42,025     | -42,025                  |          | 0       | 0.00        | 38,561   | 12.59  | -30,777      | 0         | 0.00   |
| Outside Air        | 0          | 0                        | 0        | 66,046  | 12.10       | 0        | 0.00   | 0            | 0         | 0.00   |
| Sup. Fan Heat      |            |                          |          | 12,166  | 2.23        |          | 0.00   |              | 0         | 0.00   |
| Ret. Fan Heat      |            | 0                        |          | 0       | 0.00        |          | 0.00   |              | 0         | 0.00   |
| Duct Heat Pkup     |            | 0                        |          | 0       | 0.00        |          | 0.00   |              | 0         | 0.00   |
| OV/UNDR Sizing     | 0          |                          |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Exhaust Heat       |            | -15,241                  | 0        | -15,241 | -2.79       |          | 0.00   |              | 0         | 0.00   |
| Terminal Bypass    |            | 0                        | 0        | 0       | 0.00        |          | 0.00   |              | 0         | 0.00   |
| Grand Total==>     | 399,327    | 68,097                   | 0        | 545,636 | 100.00      | 306,321  | 100.00 | -467,422     | -547,303  | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |        | Glass (sf) | (&) |
|----------|--------------------------|--------------------|---------------------|-------------------|-------|--------|------------------|-------|--------|-------------|--------|------------|-----|
|          |                          |                    |                     | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part   |            |     |
| Main Clg | 45.5                     | 545.6              | 405.6               | 15,553            | 83.7  | 67.2   | 75.8             | 56.2  | 55.5   | 66.5        | 17,026 | 0          |     |
| Aux Clg  | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 0      | 0          |     |
| Opt Vent | 0.0                      | 0.0                | 0.0                 | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | 7,846  | 0          | 0   |
| Totals   | 45.5                     | 545.6              |                     |                   |       |        |                  |       |        |             | 5,950  | 1,776      | 30  |

-----HEATING COIL SELECTION-----

|          | Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|-------------------|---------------------|--------------|--------------|---------|----------------|---------|------------------------|--------|----------------------|------|------|
|          |                   |                     |              |              |         | Cooling        | Heating | Clg % OA               | 10.8   | Type                 | Clg  | Htg  |
| Main Htg | -661.6            | 15,653              | 56.6         | 95.4         | Vent    | 1,684          | 0       | Clg Cfm/Sqft           | 0.91   | SADB                 | 56.9 | 95.4 |
| Aux Htg  | 0.0               | 0                   | 0.0          | 0.0          | Infil   | 3,927          | 3,927   | Clg Cfm/Ton            | 342.06 | Plenum               | 82.8 | 58.5 |
| Preheat  | -71.3             | 15,553              | 52.0         | 56.2         | Supply  | 15,553         | 15,653  | Clg Sqft/Ton           | 374.45 | Return               | 83.0 | 57.8 |
| Reheat   | 0.0               | 0                   | 0.0          | 0.0          | Mincfm  | 0              | 0       | Clg Btuh/Sqft          | 32.05  | Ret/OA               | 83.7 | 57.8 |
| Humidif  | 0.0               | 0                   | 0.0          | 0.0          | Return  | 15,553         | 15,653  | No. People             | 61     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0               | 0                   | 0.0          | 0.0          | Exhaust | 1,684          | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.2  | 0.2  |
| Total    | -661.6            |                     |              |              | Rm Exh  | 0              | 0       | Htg Cfm/SqFt           | 0.92   | Fn BldTD             | 0.1  | 0.1  |
|          |                   |                     |              |              | Auxil   | 0              | 0       | Htg Btuh/SqFt          | -38.86 | Fn Frict             | 0.4  | 0.4  |



System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |          | Mo/Hr: 7/14              |        | *      | Mo/Hr: 7/15 |          | *      | Mo/Hr: 13/ 1 |            |           |         |        |
|--------------------|----------|--------------------------|--------|--------|-------------|----------|--------|--------------|------------|-----------|---------|--------|
| Outside Air ==>    |          | OADB/WB/HR: 91/ 74/105.0 |        | *      | OADB: 91    |          | *      | OADB: 4      |            |           |         |        |
| Space              | Ret. Air | Ret. Air                 | Net    | Perct  | *           | Space    | Perct  | *            | Space Peak | Coil Peak | Perct   |        |
| Sens.+Lat.         | Sensible | Latent                   | Total  | Of Tot | *           | Sensible | Of Tot | *            | Space Sens | Tot Sens  | Of Tot  |        |
| (Btuh)             | (Btuh)   | (Btuh)                   | (Btuh) | (%)    | *           | (Btuh)   | (%)    | *            | (Btuh)     | (Btuh)    | (%)     |        |
| Envelope Loads     |          |                          |        |        |             |          |        |              |            |           |         |        |
| Skylite Solr       | 0        | 0                        | 0      | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00    |        |
| Skylite Cond       | 0        | 0                        | 0      | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00    |        |
| Roof Cond          | 0        | 21,144                   | 21,144 | 29.54  | *           | 0        | 0.00   | *            | 0          | -17,552   | 20.64   |        |
| Glass Solar        | 11,232   | 0                        | 11,232 | 15.69  | *           | 10,944   | 28.55  | *            | 0          | 0         | 0.00    |        |
| Glass Cond         | 3,009    | 0                        | 3,009  | 4.20   | *           | 3,180    | 8.30   | *            | -15,443    | -15,443   | 18.16   |        |
| Wall Cond          | 2,731    | 531                      | 3,263  | 4.56   | *           | 2,977    | 7.77   | *            | -9,254     | -12,204   | 14.35   |        |
| Partition          | 0        |                          | 0      | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00    |        |
| Exposed Floor      | 0        |                          | 0      | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00    |        |
| Infiltration       | 24,717   |                          | 24,717 | 34.53  | *           | 9,865    | 25.74  | *            | -39,853    | -39,853   | 46.86   |        |
| Sub Total==>       | 41,690   | 21,675                   | 63,365 | 88.53  | *           | 26,967   | 70.35  | *            | -64,550    | -85,052   | 100.00  |        |
| Internal Loads     |          |                          |        |        | *           |          |        | *            |            |           |         |        |
| Lights             | 5,429    | 0                        | 5,429  | 7.59   | *           | 5,572    | 14.53  | *            | 0          | 0         | 0.00    |        |
| People             | 2,558    |                          | 2,558  | 3.57   | *           | 1,167    | 3.04   | *            | 0          | 0         | 0.00    |        |
| Misc               | 0        | 0                        | 0      | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00    |        |
| Sub Total==>       | 7,988    | 0                        | 7,988  | 11.16  | *           | 6,738    | 17.58  | *            | 0          | 0         | 0.00    |        |
| Ceiling Load       | 4,174    | -4,174                   | 0      | 0.00   | *           | 4,628    | 12.07  | *            | -4,243     | 0         | 0.00    |        |
| Outside Air        | 0        | 0                        | 0      | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00    |        |
| Sup. Fan Heat      |          |                          | 220    | 0.31   | *           |          | 0.00   | *            |            | 0         | 0.00    |        |
| Ret. Fan Heat      |          | 0                        | 0      | 0.00   | *           |          | 0.00   | *            |            | 0         | 0.00    |        |
| Duct Heat Pkcp     |          | 0                        | 0      | 0.00   | *           |          | 0.00   | *            |            | 0         | 0.00    |        |
| OV/UNDR Sizing     | 0        |                          | 0      | 0.00   | *           | 0        | 0.00   | *            | 0          | 0         | 0.00    |        |
| Exhaust Heat       |          | 0                        | 0      | 0.00   | *           |          | 0.00   | *            |            | 0         | 0.00    |        |
| Terminal Bypass    |          | 0                        | 0      | 0.00   | *           |          | 0.00   | *            |            | 0         | 0.00    |        |
| Grand Total==>     | 53,852   | 17,500                   | 0      | 71,572 | 100.00      | *        | 38,333 | 100.00       | *          | -68,793   | -85,052 | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |      | Glass (sf) | (%) |
|----------|----------------|-------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------|------------|-----|
|          | (Tons)         | (Mbh) | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part |            |     |
| Main Clg | 6.0            | 71.6  | 55.1      | 1,544      | 84.2              | 65.5  | 66.5   | 52.1             | 49.5  | 49.9   | 1,387       | 0    |            |     |
| Aux Clg  | 0.0            | 0.0   | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0    |            |     |
| Opt Vent | 0.0            | 0.0   | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 1,387       | 0    | 0          |     |
| Totals   | 6.0            | 71.6  |           |            |                   |       |        |                  |       |        | 867         | 288  | 33         |     |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg  | Htg  |
|----------|----------|------------|-------|-------|---------|---------|---------|---------------|--------|----------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg Cfm/Sqft  |        | SADB     |      |      |
| Main Htg | -84.7    | 1,544      | 58.5  | 109.0 | Infil   | 572     | 572     | Clg Cfm/Ton   | 258.81 | Plenum   | 84.5 | 58.4 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 1,544   | 1,544   | Clg Sqft/Ton  | 232.55 | Return   | 84.1 | 58.5 |
| Preheat  | -0.0     | 1,544      | 58.5  | 52.0  | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 51.60  | Ret/OA   | 84.1 | 58.5 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 1,544   | 1,544   | No. People    | 5      | Runarnd  | 75.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 0       | 0       | Htg % DA      | 0.0    | Fn MtrTD | 0.0  | 0.0  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.11   | Fn BldTD | 0.0  | 0.0  |
| Total    | -84.7    |            |       |       | Auxil   | 0       | 0       | Htg Btuh/Sqft | -61.07 | Fn Frict | 0.1  | 0.0  |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space      | Ret. Air | Ret. Air | Net    | Perct  |   | Space    | Perct  |   | Space Peak | Coil Peak | Perct  |
|-----------------|------------|----------|----------|--------|--------|---|----------|--------|---|------------|-----------|--------|
|                 | Sens.+Lat. | Sensible | Latent   | Total  | Of Tot |   | Sensible | Of Tot |   | Space Sens | Tot Sens  | Of Tot |
|                 | (Btuh)     | (Btuh)   | (Btuh)   | (Btuh) | (%)    | * | (Btuh)   | (%)    | * | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads  |            |          |          |        |        | * |          |        | * |            |           |        |
| Skylite Solr    | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| Skylite Cond    | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| Roof Cond       | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | * | 0          | -6,714    | 13.61  |
| Glass Solar     | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| Glass Cond      | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | * | -10,295    | -10,295   | 20.88  |
| Wall Cond       | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | * | -5,711     | -6,907    | 14.01  |
| Partition       | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| Exposed Floor   | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| Infiltration    | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | * | -25,396    | -25,396   | 51.50  |
| Sub Total==>    | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | * | -41,403    | -49,312   | 100.00 |
| Internal Loads  |            |          |          |        |        | * |          |        | * |            |           |        |
| Lights          | 0          | 0        |          | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| People          | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| Misc            | 0          | 0        | 0        | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| Sub Total==>    | 0          | 0        | 0        | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| Ceiling Load    | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | * | -7,805     | 0         | 0.00   |
| Outside Air     | 0          | 0        | 0        | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| Sup. Fan Heat   |            |          |          | 0      | 0.00   | * |          | 0.00   | * |            | 0         | 0.00   |
| Ret. Fan Heat   |            | 0        |          | 0      | 0.00   | * |          | 0.00   | * |            | 0         | 0.00   |
| Duct Heat Pkup  |            | 0        |          | 0      | 0.00   | * |          | 0.00   | * |            | 0         | 0.00   |
| OV/UNDR Sizing  | 0          |          |          | 0      | 0.00   | * | 0        | 0.00   | * | 0          | 0         | 0.00   |
| Exhaust Heat    |            | 0        | 0        | 0      | 0.00   | * |          | 0.00   | * |            | 0         | 0.00   |
| Terminal Bypass |            | 0        | 0        | 0      | 0.00   | * |          | 0.00   | * |            | 0         | 0.00   |
| Grand Total==>  | 0          | 0        | 0        | 0      | 0.00   | * | 0        | 0.00   | * | -49,208    | -49,312   | 100.00 |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 830        |        |
| Aux Clg  | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Opt Vent | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 830        | 0 0    |
| Totals   | 0.0            | 0.0       |            |                   |       |        |                  |       |        | Wall        | 553        | 192 35 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg  |
|----------|----------|------------|-------|-------|---------|---------|---------|---------------|--------|----------|-----|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 68.1 |
| Main Htg | -49.3    | 0          | 0.0   | 0.0   | Infil   | 0       | 365     | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 38.8 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 0       | 0       | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 39.0 |
| Preheat  | 0.0      | 0          | 0.0   | 0.0   | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 39.0 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 0       | 0       | No. People    | 0      | Runarnd  | 0.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.00   | Fn BldTD | 0.0 | 0.0  |
| Total    | -49.3    |            |       |       | Auxil   | 0       | 0       | Htg Btuh/Sqft | -59.41 | Fn Frict | 0.0 | 0.0  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space<br>Sens.+Lat.<br>(Btuh) | Ret. Air<br>Sensible<br>(Btuh) | Ret. Air<br>Latent<br>(Btuh) | Net<br>Total<br>(Btuh) | Perct<br>Of Tot<br>(%) | * | Space<br>Sensible<br>(Btuh) | Perct<br>Of Tot<br>(%) | * | Space Peak<br>Space Sens<br>(Btuh) | Coil Peak<br>Tot Sens<br>(Btuh) | Perct<br>Of Tot<br>(%) |
|-----------------|-------------------------------|--------------------------------|------------------------------|------------------------|------------------------|---|-----------------------------|------------------------|---|------------------------------------|---------------------------------|------------------------|
| Envelope Loads  |                               |                                |                              |                        |                        | * |                             | *                      |   |                                    |                                 |                        |
| Skylite Solr    | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Skylite Cond    | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Roof Cond       | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | -74,057                         | 21.67                  |
| Glass Solar     | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Glass Cond      | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | -73,355                            | -73,355                         | 21.47                  |
| Wall Cond       | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | -30,899                            | -38,407                         | 11.24                  |
| Partition       | 0                             |                                |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Exposed Floor   | 0                             |                                |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Infiltration    | 0                             |                                |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | -155,894                           | -155,894                        | 45.62                  |
| Sub Total==>    | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | -260,148                           | -341,713                        | 100.00                 |
| Internal Loads  |                               |                                |                              |                        |                        | * |                             | *                      |   |                                    |                                 |                        |
| Lights          | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| People          | 0                             |                                |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Misc            | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Sub Total==>    | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Ceiling Load    | 0                             | 0                              |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | -84,880                            | 0                               | 0.00                   |
| Outside Air     | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Sup. Fan Heat   |                               |                                |                              | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    | 0                               | 0.00                   |
| Ret. Fan Heat   |                               | 0                              |                              | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    | 0                               | 0.00                   |
| Duct Heat Pkup  |                               | 0                              |                              | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    | 0                               | 0.00                   |
| OV/UNDR Sizing  | 0                             |                                |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Exhaust Heat    |                               | 0                              | 0                            | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    | 0                               | 0.00                   |
| Terminal Bypass |                               | 0                              | 0                            | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    | 0                               | 0.00                   |
| Grand Total==>  | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | -345,028                           | -341,713                        | 100.00                 |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR<br>Deg F | Leaving DB/WB/HR<br>Deg F | Gross Total<br>Floor | Glass (sf) | (%)      |
|----------|--------------------------|--------------------|---------------------|----------------------------|---------------------------|----------------------|------------|----------|
| Main Clg | 0.0                      | 0.0                | 0                   | 0.0                        | 0.0                       | 9,886                |            |          |
| Aux Clg  | 0.0                      | 0.0                | 0                   | 0.0                        | 0.0                       | Part                 | 0          |          |
| Opt Vent | 0.0                      | 0.0                | 0                   | 0.0                        | 0.0                       | ExFlr                | 0          |          |
| Totals   | 0.0                      | 0.0                |                     |                            |                           | Roof                 | 8,985      | 0 0      |
|          |                          |                    |                     |                            |                           | Wall                 | 3,392      | 1,368 40 |

-----HEATING COIL SELECTION-----

| Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F | Type  | Cooling | Heating | Clg % OA | 0.0    | Type     | Clg | Htg   |
|-------------------|---------------------|--------------|--------------|-------|---------|---------|----------|--------|----------|-----|-------|
| Main Htg          | -349.1              | 6,035        | 67.4         | 120.5 | Vent    | 0       | 0        | 0.00   | SADB     | 0.0 | 120.5 |
| Aux Htg           | 0.0                 | 0            | 0.0          | 0.0   | Infil   | 0       | 2,238    | 0.00   | Plenum   | 0.0 | 39.6  |
| Preheat           | 0.0                 | 0            | 0.0          | 0.0   | Supply  | 0       | 6,035    | 0.00   | Return   | 0.0 | 68.0  |
| Reheat            | 0.0                 | 0            | 0.0          | 0.0   | MinCFM  | 0       | 0        | 0.00   | Ret/OA   | 0.0 | 68.0  |
| Humidif           | 0.0                 | 0            | 0.0          | 0.0   | Return  | 0       | 6,035    | 0      | Runarnd  | 0.0 | 68.0  |
| Opt Vent          | 0.0                 | 0            | 0.0          | 0.0   | Exhaust | 0       | 0        | 0.0    | Fn MtrTD | 0.0 | 0.0   |
| Total             | -349.1              |              |              |       | Rm Exh  | 0       | 0        | 0.61   | Fn BldTD | 0.0 | 0.0   |
|                   |                     |              |              |       | Auxil   | 0       | 0        | -35.32 | Fn Frict | 0.0 | 0.1   |

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

BUILDING U-VALUES - ALTERNATIVE 1  
 REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G U - V A L U E S -----

| Room<br>Number | Description    | Room U-Values<br>(Btu/hr/sqft/F) |       |                |                |               |                |                |       |       | Room<br>Mass<br>(lb/<br>sqft) | Room<br>Capac.<br>(Btu/<br>sqft/F) |
|----------------|----------------|----------------------------------|-------|----------------|----------------|---------------|----------------|----------------|-------|-------|-------------------------------|------------------------------------|
|                |                | Part.                            | ExFlr | Summr<br>Skylt | Wintr<br>Skylt | Summr<br>Roof | Wintr<br>Windo | Summr<br>Windo | Wall  | Ceil. |                               |                                    |
| 1              | 1ST FL OFFICES | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.810          | 0.837          | 0.343 | 0.317 | 45.0                          | 9.63                               |
| Zone           | 1 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.810          | 0.837          | 0.343 | 0.317 | 45.0                          | 9.63                               |
| 2              | LIQUOR STORE   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.000          | 0.000          | 0.343 | 0.317 | 100.3                         | 21.77                              |
| Zone           | 2 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.000          | 0.000          | 0.343 | 0.317 | 100.3                         | 21.77                              |
| 4              | LIBRARY        | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 46.8                          | 10.79                              |
| Zone           | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 46.8                          | 10.79                              |
| 5              | GAME ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 45.3                          | 10.44                              |
| Zone           | 5 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 45.3                          | 10.44                              |
| System         | 1 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 49.2                          | 10.88                              |
| 6              | 2ND FL OFFICES | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 67.4                          | 15.31                              |
| Zone           | 6 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 67.4                          | 15.31                              |
| 7              | 2ND FL OFFICE  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 114.6                         | 25.67                              |
| Zone           | 7 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 114.6                         | 25.67                              |
| System         | 2 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 75.9                          | 17.16                              |
| 7              | 2ND FL OFFICE  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 114.6                         | 25.67                              |
| Zone           | 7 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 114.6                         | 25.67                              |
| 8              | 2ND FL TOILETS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 62.6                          | 14.24                              |
| Zone           | 8 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 62.6                          | 14.24                              |
| System         | 3 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 78.1                          | 17.65                              |
| 3              | LIQUOR STORAGE | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.810          | 0.837          | 0.343 | 0.317 | 29.8                          | 6.29                               |
| Zone           | 3 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.810          | 0.837          | 0.343 | 0.317 | 29.8                          | 6.29                               |
| 4              | LIBRARY        | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 46.8                          | 10.79                              |
| Zone           | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 46.8                          | 10.79                              |
| 5              | GAME ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 45.3                          | 10.44                              |
| Zone           | 5 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 45.3                          | 10.44                              |
| 6              | 2ND FL OFFICES | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 67.4                          | 15.31                              |
| Zone           | 6 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 67.4                          | 15.31                              |
| System         | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 47.0                          | 10.75                              |
| Building       |                | 0.000                            | 0.000 | 0.000          | 0.000          | 0.232         | 0.810          | 0.837          | 0.343 | 0.317 | 50.5                          | 11.33                              |

BUILDING AREAS - ALTERNATIVE 1  
 REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G   A R E A S -----

| Room Number | Description    | Number of Duplicate | Flr Rm | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|----------------|---------------------|--------|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
| 1           | 1ST FL OFFICES | 1                   | 1      | 8,053                       | 8,053                   | 0                     | 0                         | 0                    | 0           | 0                    | 624                | 24          | 1,926                |
| Zone        | 1 Total/Ave.   |                     |        |                             | 8,053                   | 0                     | 0                         | 0                    | 0           | 0                    | 624                | 24          | 1,926                |
| 2           | LIQUOR STORE   | 1                   | 1      | 1,127                       | 1,127                   | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 739                  |
| Zone        | 2 Total/Ave.   |                     |        |                             | 1,127                   | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 739                  |
| 4           | LIBRARY        | 1                   | 1      | 3,692                       | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| Zone        | 4 Total/Ave.   |                     |        |                             | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| 5           | GAME ROOM      | 1                   | 1      | 4,154                       | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| Zone        | 5 Total/Ave.   |                     |        |                             | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| System      | 1 Total/Ave.   |                     |        |                             | 17,026                  | 0                     | 0                         | 0                    | 0           | 7,846                | 1,776              | 30          | 4,174                |
| 6           | 2ND FL OFFICES | 1                   | 1      | 1,139                       | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| Zone        | 6 Total/Ave.   |                     |        |                             | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| 7           | 2ND FL OFFICE  | 1                   | 1      | 248                         | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| Zone        | 7 Total/Ave.   |                     |        |                             | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| System      | 2 Total/Ave.   |                     |        |                             | 1,387                   | 0                     | 0                         | 0                    | 0           | 1,387                | 288                | 33          | 579                  |
| 7           | 2ND FL OFFICE  | 1                   | 1      | 248                         | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| Zone        | 7 Total/Ave.   |                     |        |                             | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| 8           | 2ND FL TOILETS | 1                   | 1      | 582                         | 582                     | 0                     | 0                         | 0                    | 0           | 582                  | 96                 | 34          | 184                  |
| Zone        | 8 Total/Ave.   |                     |        |                             | 582                     | 0                     | 0                         | 0                    | 0           | 582                  | 96                 | 34          | 184                  |
| System      | 3 Total/Ave.   |                     |        |                             | 830                     | 0                     | 0                         | 0                    | 0           | 830                  | 192                | 35          | 360                  |
| 3           | LIQUOR STORAGE | 1                   | 1      | 901                         | 901                     | 0                     | 0                         | 0                    | 0           | 0                    | 24                 | 18          | 112                  |
| Zone        | 3 Total/Ave.   |                     |        |                             | 901                     | 0                     | 0                         | 0                    | 0           | 0                    | 24                 | 18          | 112                  |
| 4           | LIBRARY        | 1                   | 1      | 3,692                       | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| Zone        | 4 Total/Ave.   |                     |        |                             | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| 5           | GAME ROOM      | 1                   | 1      | 4,154                       | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| Zone        | 5 Total/Ave.   |                     |        |                             | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| 6           | 2ND FL OFFICES | 1                   | 1      | 1,139                       | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| Zone        | 6 Total/Ave.   |                     |        |                             | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| System      | 4 Total/Ave.   |                     |        |                             | 9,886                   | 0                     | 0                         | 0                    | 0           | 8,985                | 1,368              | 40          | 2,023                |
| Building    |                |                     |        |                             | 29,129                  | 0                     | 0                         | 0                    | 0           | 19,048               | 3,624              | 34          | 7,137                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
REPLACE FLUORESCENT FIXTURES

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.232 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.500 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.329 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 18.58 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 33.33 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 REPLACE FLUORESCENT FIXTURES

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 2.6                    | 12        | 92    | -60,805                  | 24        | 593   | 1,161.6                   | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 5.1                    | 3         | 22    | -121,611                 | 28        | 671   | 2,323.2                   | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 7.7                    | 9         | 67    | -182,416                 | 19        | 473   | 3,484.9                   | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 10.3                   | 0         | 0     | -243,221                 | 2         | 58    | 4,646.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 20 - 25             | 12.9                   | 14        | 105   | -304,027                 | 2         | 40    | 5,808.1                   | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 15.4                   | 3         | 23    | -364,832                 | 3         | 64    | 6,969.7                   | 59        | 3,638 | 0.0                       | 0         | 0     |
| 30 - 35             | 18.0                   | 7         | 53    | -425,637                 | 1         | 32    | 8,131.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 20.6                   | 5         | 41    | -486,443                 | 0         | 3     | 9,292.9                   | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 23.1                   | 4         | 32    | -547,248                 | 1         | 21    | 10,454.6                  | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 25.7                   | 11        | 81    | -608,054                 | 1         | 30    | 11,616.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 50 - 55             | 28.3                   | 9         | 67    | -668,859                 | 11        | 279   | 12,777.8                  | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 30.9                   | 5         | 42    | -729,664                 | 7         | 166   | 13,939.4                  | 24        | 1,450 | 0.0                       | 0         | 0     |
| 60 - 65             | 33.4                   | 2         | 18    | -790,469                 | 0         | 0     | 15,101.0                  | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 36.0                   | 5         | 40    | -851,275                 | 0         | 0     | 16,262.6                  | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 38.6                   | 6         | 45    | -912,080                 | 0         | 0     | 17,424.3                  | 17        | 1,070 | 0.0                       | 0         | 0     |
| 75 - 80             | 41.1                   | 2         | 15    | -972,886                 | 0         | 0     | 18,585.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 43.7                   | 1         | 5     | -1,033,691               | 0         | 0     | 19,747.5                  | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 46.3                   | 3         | 20    | -1,094,496               | 0         | 0     | 20,909.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 90 - 95             | 48.9                   | 0         | 0     | -1,155,302               | 0         | 0     | 22,070.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 51.4                   | 0         | 0     | -1,216,107               | 0         | 0     | 23,232.3                  | 0         | 0     | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,992 | 0                        | 0         | 6,330 | 0.0                       | 0         | 2,602 | 0.0                       | 0         | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature Range (F) | Zone Number                 |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                       | 1                           | 2     | 4     | 5     | 6     | 7     | 7     | 8     | 3     | 4     | 5     | 6     |
| Max. Temp.            | 83.4                        | 81.1  | 89.8  | 88.9  | 87.2  | 87.5  | 103.0 | 102.0 | 118.6 | 106.7 | 105.5 | 102.1 |
| Mo./Hr.               | 7 20                        | 7 22  | 7 20  | 7 20  | 7 19  | 7 20  | 8 20  | 8 20  | 8 19  | 7 21  | 7 20  | 7 18  |
| Day Type              | 4                           | 4     | 4     | 4     | 4     | 4     | 1     | 1     | 2     | 1     | 1     | 2     |
|                       | ..... Number of Hours ..... |       |       |       |       |       |       |       |       |       |       |       |
| Above 100             | 0                           | 0     | 0     | 0     | 0     | 0     | 325   | 228   | 2,808 | 873   | 479   | 219   |
| 95 - 100              | 0                           | 0     | 0     | 0     | 0     | 0     | 1,196 | 1,065 | 120   | 1,024 | 1,061 | 1,111 |
| 90 - 95               | 0                           | 0     | 0     | 0     | 0     | 0     | 1,133 | 1,060 | 186   | 728   | 676   | 998   |
| 85 - 90               | 0                           | 0     | 199   | 154   | 110   | 132   | 408   | 517   | 668   | 624   | 701   | 473   |
| 80 - 85               | 585                         | 257   | 1,414 | 1,178 | 902   | 1,045 | 610   | 802   | 334   | 423   | 653   | 805   |
| 75 - 80               | 2,651                       | 2,370 | 1,812 | 1,906 | 2,225 | 2,217 | 17    | 0     | 80    | 17    | 102   | 66    |
| 70 - 75               | 504                         | 1,045 | 417   | 434   | 435   | 346   | 254   | 117   | 1,152 | 519   | 162   | 67    |
| 65 - 70               | 2,194                       | 2,130 | 550   | 455   | 416   | 435   | 1,980 | 2,013 | 1,960 | 1,744 | 1,900 | 2,003 |
| 60 - 65               | 1,098                       | 1,315 | 810   | 646   | 649   | 1,028 | 1,074 | 1,119 | 637   | 1,039 | 983   | 1,094 |
| 55 - 60               | 704                         | 769   | 607   | 641   | 760   | 525   | 779   | 785   | 287   | 764   | 860   | 812   |
| 50 - 55               | 380                         | 344   | 790   | 664   | 629   | 892   | 984   | 1,054 | 528   | 1,005 | 1,183 | 1,112 |
| Below 50              | 644                         | 530   | 2,161 | 2,682 | 2,634 | 2,140 | 0     | 0     | 0     | 0     | 0     | 0     |
| Min. Temp.            | 36.8                        | 38.9  | 34.2  | 31.9  | 32.9  | 36.0  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  |
| Mo./Hr.               | 2 7                         | 2 7   | 2 10  | 2 10  | 2 8   | 2 9   | 1 5   | 1 5   | 1 23  | 1 5   | 1 4   | 1 5   |
| Day Type              | 5                           | 5     | 4     | 4     | 5     | 5     | 2     | 2     | 3     | 2     | 2     | 2     |



MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
REPLACE FLUORESCENT FIXTURES

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | HOT WTR HOT W DMND |                      |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 9,089             | 47              | 1,335              | 7                    |
| Feb   | 8,223             | 47              | 1,271              | 7                    |
| March | 9,948             | 47              | 756                | 7                    |
| April | 8,646             | 47              | 192                | 7                    |
| May   | 11,302            | 116             | 0                  | 0                    |
| June  | 15,347            | 126             | 0                  | 0                    |
| July  | 18,390            | 129             | 0                  | 0                    |
| Aug   | 16,055            | 126             | 0                  | 0                    |
| Sept  | 10,281            | 122             | 0                  | 0                    |
| Oct   | 9,510             | 47              | 135                | 7                    |
| Nov   | 8,649             | 47              | 509                | 7                    |
| Dec   | 8,656             | 47              | 1,092              | 7                    |
| Total | 134,095           | 129             | 5,291              | 7                    |

Building Energy Consumption = 33,876 (Btu/Sq Ft/Year)  
Source Energy Consumption = 71,359 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 REPLACE FLUORESCENT FIXTURES

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | Monthly Consumption |                            |      |      |      |      |      |      |      |      |      |      | Total   |
|---------|------------|---------------------|----------------------------|------|------|------|------|------|------|------|------|------|------|---------|
|         |            | Jan                 | Feb                        | Mar  | Apr  | May  | June | July | Aug  | Sep  | Oct  | Nov  | Dec  |         |
| 0       | LIGHTS     |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         | ELEC       | 8396                | 7596                       | 9195 | 7996 | 8796 | 8796 | 7996 | 9195 | 7996 | 8796 | 7996 | 7996 | 100,748 |
|         | PK         | 43.7                | 43.7                       | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7    |
| 1       | MISC LD    |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         | ELEC       | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 2       | MISC LD    |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         | GAS        | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 3       | MISC LD    |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         | OIL        | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 4       | MISC LD    |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         | P STEAM    | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 5       | MISC LD    |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         | P HOTH2O   | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 6       | MISC LD    |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         | P CHILL    | 0                   | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 1       | EQ1161     |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         |            |                     | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |         |
|         | ELEC       | 0                   | 0                          | 0    | 0    | 695  | 3886 | 7111 | 4049 | 624  | 0    | 0    | 0    | 16,365  |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 58.6 | 60.9 | 63.0 | 61.1 | 58.8 | 0.0  | 0.0  | 0.0  | 63.0    |
| 1       | EQ5200     |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         |            |                     | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |         |
|         | ELEC       | 0                   | 0                          | 0    | 0    | 73   | 361  | 688  | 383  | 66   | 0    | 0    | 0    | 1,571   |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 2.4  | 4.6  | 5.6  | 4.6  | 3.4  | 0.0  | 0.0  | 0.0  | 5.6     |
| 1       | EQ5303     |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         |            |                     | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |         |
|         | ELEC       | 0                   | 0                          | 0    | 0    | 19   | 66   | 60   | 69   | 17   | 0    | 0    | 0    | 230     |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.0  | 0.0  | 0.0  | 0.3     |
| 2       | EQ1161     |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         |            |                     | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |         |
|         | ELEC       | 0                   | 0                          | 0    | 0    | 53   | 490  | 897  | 528  | 57   | 0    | 0    | 0    | 2,025   |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 7.2  | 8.0  | 8.3  | 8.0  | 7.7  | 0.0  | 0.0  | 0.0  | 8.3     |
| 2       | EQ5200     |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         |            |                     | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |         |
|         | ELEC       | 0                   | 0                          | 0    | 0    | 6    | 46   | 87   | 51   | 6    | 0    | 0    | 0    | 195     |
|         | PK         | 0.0                 | 0.0                        | 0.0  | 0.0  | 0.2  | 0.6  | 0.7  | 0.6  | 0.5  | 0.0  | 0.0  | 0.0  | 0.7     |
| 2       | EQ5303     |                     |                            |      |      |      |      |      |      |      |      |      |      |         |
|         |            |                     | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
 REPLACE FLUORESCENT FIXTURES

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value      129.3    (kW)  
 Yearly Time of Peak 15 (hr)    7 (mo)

Hour 15    Month 7

| Eq.<br>Ref.<br>Num.  | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| Cooling Equipment    |                        |                                    |                           |                          |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 68.9                      | 53.26                    |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 9.3                       | 7.18                     |
| Sub Total            |                        |                                    | 78.1                      | 60.44                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Air Moving Equipment |                        |                                    |                           |                          |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 7.3                       | 5.66                     |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.1                       | 0.10                     |
| Sub Total            |                        |                                    | 7.5                       | 5.77                     |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Miscellaneous        |                        |                                    |                           |                          |
|                      | Lights                 |                                    | 43.7                      | 33.80                    |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                     |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                     |
| Sub Total            |                        |                                    | 43.7                      | 33.80                    |
| Grand Total          |                        |                                    | 129.3                     | 100.00                   |

```
*****  
*****  
**  
**          T R A C E   6 0 0   A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 46

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Reflectance: 0.20  
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 8: 5:52 1/14/94  
Dataset Name: CB46B .TM

AIRFLOW - ALTERNATIVE 2  
 COMBINED ECOS

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | SZ          | 1,493                 | 14,281                | 14,381                | 17,415               | 4,528                 | 0             | 0             |
| 2             | PTAC        | 0                     | 1,326                 | 1,326                 | 1,769                | 442                   | 0             | 0             |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 282                   | 0             | 0             |
| 4             | UH          | 0                     | 0                     | 4,192                 | 0                    | 1,730                 | 0             | 0             |
| Totals        |             | 1,493                 | 15,607                | 19,899                | 19,184               | 6,981                 | 0             | 0             |

CAPACITY - ALTERNATIVE 2  
 COMBINED ECOS

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 32.4                      | 0.0                       | 0.0                  | 0.0                  | 32.4                  | -372,971                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -372,971              |
| 2             | PTAC        | 3.7                       | 0.0                       | 0.0                  | 0.0                  | 3.7                   | -51,958                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -51,958               |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -33,113                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -33,113               |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -223,775                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -223,775              |
| Totals        |             | 36.1                      | 0.0                       | 0.0                  | 0.0                  | 36.1                  | -681,816                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -681,816              |

The building peaked at hour 16 month 7 with a capacity of 35.4 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 COMBINED ECOS

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | SZ          | 10.46               | 0.84       | 440.5    | 525.2      | 22.85       | 0.84       | -21.91      | 17,026           |
| 2             | Main           | PTAC        | 0.00                | 0.96       | 357.1    | 373.3      | 32.14       | 0.96       | -37.46      | 1,387            |
| 3             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -39.90      | 830              |
| 4             | Main           | UH          | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.42       | -22.64      | 9,886            |

System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> | Mo/Hr: 7/14              | *        | Mo/Hr: 7/16 | *       | Mo/Hr: 13/ 1 |          |        |            |           |        |
|--------------------|--------------------------|----------|-------------|---------|--------------|----------|--------|------------|-----------|--------|
| Outside Air ==>    | OADB/WB/HR: 91/ 74/105.0 | *        | OADB: 91    | *       | OADB: 4      |          |        |            |           |        |
|                    | Space                    | Ret. Air | Ret. Air    | Net     | Percnt       | Space    | Percnt | Space Peak | Coil Peak | Percnt |
|                    | Sens.+Lat.               | Sensible | Latent      | Total   | Of Tot       | Sensible | Of Tot | Space Sens | Tot Sens  | Of Tot |
|                    | (Btuh)                   | (Btuh)   | (Btuh)      | (Btuh)  | (%)          | (Btuh)   | (%)    | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads     |                          |          |             |         |              |          |        |            |           |        |
| Skylite Solr       | 0                        | 0        |             | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Skylite Cond       | 0                        | 0        |             | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Roof Cond          | 0                        | 23,745   |             | 23,745  | 6.10         | 0        | 0.00   | 0          | -19,416   | 5.69   |
| Glass Solar        | 70,848                   | 0        |             | 70,848  | 18.21        | 73,968   | 30.44  | 0          | 0         | 0.00   |
| Glass Cond         | 19,448                   | 0        |             | 19,448  | 5.00         | 19,852   | 8.17   | -95,233    | -95,233   | 27.90  |
| Wall Cond          | 3,242                    | 1,044    |             | 4,287   | 1.10         | 3,301    | 1.36   | -11,470    | -15,342   | 4.49   |
| Partition          | 0                        |          |             | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Exposed Floor      | 0                        |          |             | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Infiltration       | 106,222                  |          |             | 106,222 | 27.31        | 51,389   | 21.15  | -211,340   | -211,340  | 61.92  |
| Sub Total==>       | 199,760                  | 24,789   |             | 224,549 | 57.72        | 148,510  | 61.12  | -318,043   | -341,330  | 100.00 |
| Internal Loads     |                          |          |             |         |              |          |        |            |           |        |
| Lights             | 70,391                   | 0        |             | 70,391  | 18.10        | 72,568   | 29.86  | 0          | 0         | 0.00   |
| People             | 32,391                   |          |             | 32,391  | 8.33         | 15,271   | 6.28   | 0          | 0         | 0.00   |
| Misc               | 0                        | 0        | 0           | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Sub Total==>       | 102,782                  | 0        | 0           | 102,782 | 26.42        | 87,839   | 36.15  | 0          | 0         | 0.00   |
| Ceiling Load       | 8,220                    | -8,220   |             | 0       | 0.00         | 6,644    | 2.73   | -6,212     | 0         | 0.00   |
| Outside Air        | 0                        | 0        | 0           | 53,222  | 13.68        | 0        | 0.00   | 0          | 0         | 0.00   |
| Sup. Fan Heat      |                          |          |             | 11,171  | 2.87         |          | 0.00   |            |           | 0.00   |
| Ret. Fan Heat      |                          | 0        |             | 0       | 0.00         |          | 0.00   |            |           | 0.00   |
| Duct Heat Pkup     |                          | 0        |             | 0       | 0.00         |          | 0.00   |            |           | 0.00   |
| OV/UNDR Sizing     | 0                        |          |             | 0       | 0.00         | 0        | 0.00   | 0          | 0         | 0.00   |
| Exhaust Heat       |                          | -2,720   | 0           | -2,720  | -0.70        |          | 0.00   |            |           | 0.00   |
| Terminal Bypass    |                          | 0        | 0           | 0       | 0.00         |          | 0.00   |            |           | 0.00   |
| Grand Total==>     | 310,762                  | 13,849   | 0           | 389,004 | 100.00       | 242,993  | 100.00 | -324,255   | -341,331  | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 32.4           | 389.0     | 14,281     | 78.0              | 66.1  | 79.5   | 58.6             | 57.5  | 70.7   | 17,026      |            |     |
| Aux Clg  | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Opt Vent | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 32.4           | 389.0     |            |                   |       |        |                  |       |        | 7,846       | 0 0        |     |
|          |                |           |            |                   |       |        |                  |       |        | 5,950       | 1,776 30   |     |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | Clg % OA      | 10.5   | Type     | Clg  | Htg  |
|----------|----------|------------|-------|-------|---------|---------|---------|---------------|--------|----------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg Cfm/Sqft  | 0.84   | SADB     | 59.4 | 88.7 |
| Main Htg | -373.0   | 14,381     | 64.9  | 88.7  | Infil   | 3,035   | 3,035   | Clg Cfm/Ton   | 440.54 | Plenum   | 76.5 | 65.7 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 14,281  | 14,381  | Clg Sqft/Ton  | 525.22 | Return   | 76.6 | 65.3 |
| Preheat  | -0.0     | 14,281     | 58.9  | 58.6  | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 22.85  | Ret/OA   | 78.0 | 65.3 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 14,281  | 14,381  | No. People    | 61     | Runarnd  | 75.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 1,493   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.2  | 0.2  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.84   | Fn BldTD | 0.1  | 0.1  |
| Total    | -373.0   |            |       |       | Auxil   | 0       | 0       | Htg Btuh/Sqft | -21.91 | Fn Frict | 0.4  | 0.4  |

System 2 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/15 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | * | Space Sensible (Btuh) | Percent Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|---|-----------------------|--------------------|---|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    | * |                       |                    | * |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 3,458                    | 0                      | 3,458            | 7.76               | * | 0                     | 0.00               | * | 0                            | -3,527                    | 6.80               |
| Glass Solar     | 11,232                  | 0                        | 0                      | 11,232           | 25.19              | * | 11,520                | 38.44              | * | 0                            | 0                         | 0.00               |
| Glass Cond      | 3,009                   | 0                        | 0                      | 3,009            | 6.75               | * | 3,056                 | 10.20              | * | -15,443                      | -15,443                   | 29.76              |
| Wall Cond       | 462                     | 157                      | 0                      | 619              | 1.39               | * | 469                   | 1.57               | * | -1,563                       | -2,128                    | 4.10               |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Infiltration    | 18,086                  | 0                        | 0                      | 18,086           | 40.57              | * | 7,458                 | 24.89              | * | -30,795                      | -30,795                   | 59.34              |
| Sub Total==>    | 32,789                  | 3,615                    | 0                      | 36,404           | 81.66              | * | 22,503                | 75.09              | * | -47,801                      | -51,893                   | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    | * |                       |                    | * |                              |                           |                    |
| Lights          | 5,429                   | 0                        | 0                      | 5,429            | 12.18              | * | 5,455                 | 18.20              | * | 0                            | 0                         | 0.00               |
| People          | 2,558                   | 0                        | 0                      | 2,558            | 5.74               | * | 1,132                 | 3.78               | * | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Sub Total==>    | 7,988                   | 0                        | 0                      | 7,988            | 17.92              | * | 6,587                 | 21.98              | * | 0                            | 0                         | 0.00               |
| Ceiling Load    | 796                     | -796                     | 0                      | 0                | 0.00               | * | 879                   | 2.93               | * | -955                         | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 189              | 0.42               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                            | 0                         | 0.00               |
| Grand Total==>  | 41,573                  | 2,819                    | 0                      | 44,581           | 100.00             | * | 29,969                | 100.00             | * | -48,757                      | -51,893                   | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 3.7                   | 44.6            | 1,326            | 76.8              | 63.8  | 70.2   | 54.2             | 52.4  | 57.2   | Part        | 1,387      |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 1,387      | 0 0    |
| Totals   | 3.7                   | 44.6            |                  |                   |       |        |                  |       |        | Wall        | 867        | 288 33 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |       |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------------------|------|-------|
|          |                |                  |           |           | Vent    |         |         | Clg % OA               | 0.0    | Type                 | Clg  | Htg   |
| Main Htg | -52.0          | 1,326            | 65.8      | 101.8     | Infil   | 442     | 442     | Clg Cfm/Sqft           | 0.96   | SADB                 | 54.2 | 101.8 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 1,326   | 1,326   | Clg Cfm/Ton            | 357.06 | Plenum               | 76.8 | 65.8  |
| Preheat  | -0.0           | 1,326            | 65.8      | 54.1      | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 373.35 | Return               | 76.8 | 65.8  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 1,326   | 1,326   | Clg Btuh/Sqft          | 32.14  | Ret/OA               | 76.8 | 65.8  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | No. People             | 5      | Runarnd              | 75.0 | 68.0  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.0  | 0.0   |
| Total    | -52.0          |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 0.96   | Fn BldTD             | 0.0  | 0.0   |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -37.46 | Fn Frict             | 0.1  | 0.0   |



System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | -1,904                    | 5.75             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -10,295                      | -10,295                   | 31.09            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -965                         | -1,289                    | 3.89             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -19,624                      | -19,624                   | 59.26            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -30,884                      | -33,113                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -2,221                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OY/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -33,105                      | -33,113                   | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 830        |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 830        | 0 0    |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall        | 553        | 192 35 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm) |         | ENGINEERING CHECKS |        |          | TEMPERATURES (F) |      |  |
|----------|----------------|------------------|-----------|-----------|---------|----------------|---------|--------------------|--------|----------|------------------|------|--|
|          |                |                  |           |           | Vent    | Cooling        | Heating | Clg % OA           |        | Type     | Clg              | Htg  |  |
| Main Htg | -33.1          | 0                | 0.0       | 0.0       | Infil   | 0              | 282     | 0.0                | 0.0    | SADB     | 0.0              | 68.1 |  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0              | 0       | 0.00               | 0.00   | Plenum   | 0.0              | 59.8 |  |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0              | 0       | 0.00               | 0.00   | Return   | 0.0              | 59.9 |  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0              | 0       | 0.00               | 0.00   | Ret/OA   | 0.0              | 59.9 |  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0              | 0       | No. People         | 0      | Runarnd  | 0.0              | 68.0 |  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0              | 0       | Htg % OA           | 0.0    | Fn MtrTD | 0.0              | 0.0  |  |
| Total    | -33.1          |                  |           |           | Auxil   | 0              | 0       | Htg Cfm/Sqft       | 0.00   | Fn BldTD | 0.0              | 0.0  |  |
|          |                |                  |           |           |         |                |         | Htg Btuh/Sqft      | -39.90 | Fn Frict | 0.0              | 0.0  |  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | -20,721                   | 9.34             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -73,355                      | -73,355                   | 33.08            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -5,219                       | -7,222                    | 3.26             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -120,464                     | -120,464                  | 54.32            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -199,037                     | -221,762                  | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -22,976                      | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ov/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -222,013                     | -221,762                  | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)      |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|----------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |          |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 9,886      |          |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |          |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 8,985      | 0 0      |
| Totals   | 0.0                   | 0.0             | 0                |                   |       |        |                  |       |        | Wall        | 3,392      | 1,368 40 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)-- |       |  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------|----------------------|-------|--|
|          |                |                  |           |           | Vent    |         |         | Clg % OA               |        | Type     | Clg                  | Htg   |  |
| Main Htg | -223.8         | 4,192            | 67.6      | 116.7     | Infil   | 0       | 1,730   | 0.0                    | 0.00   | SADB     | 0.0                  | 116.7 |  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 4,192   | 0.00                   | 0.00   | Plenum   | 0.0                  | 60.1  |  |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | 0.00                   | 0.00   | Return   | 0.0                  | 68.0  |  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 4,192   | 0.00                   | 0.00   | Ret/OA   | 0.0                  | 68.0  |  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | No. People             | 0      | Runarnd  | 0.0                  | 68.0  |  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD | 0.0                  | 0.0   |  |
| Total    | -223.8         |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 0.42   | Fn BldTD | 0.0                  | 0.0   |  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -22.64 | Fn Frict | 0.0                  | 0.1   |  |

BUILDING U-VALUES - ALTERNATIVE 2  
 COMBINED ECOS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description    | Room U-Values<br>(Btu/hr/sqft/F) |       |             |             |            |             |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|----------------|----------------------------------|-------|-------------|-------------|------------|-------------|-------------|-------|-------|------------------------|-----------------------------|
|             |                | Part.                            | ExFlr | Summr Skylt | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wall  | Ceil. |                        |                             |
| 1           | 1ST FL OFFICES | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.317 | 45.6                   | 9.75                        |
| Zone        | 1 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.317 | 45.6                   | 9.75                        |
| 2           | LIQUOR STORE   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.000       | 0.000       | 0.058 | 0.317 | 101.9                  | 22.09                       |
| Zone        | 2 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.000       | 0.000       | 0.058 | 0.317 | 101.9                  | 22.09                       |
| 4           | LIBRARY        | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 48.3                   | 11.08                       |
| Zone        | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 48.3                   | 11.08                       |
| 5           | GAME ROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 46.7                   | 10.73                       |
| Zone        | 5 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 46.7                   | 10.73                       |
| System      | 1 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 50.2                   | 11.09                       |
| 6           | 2ND FL OFFICES | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 69.3                   | 15.68                       |
| Zone        | 6 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 69.3                   | 15.68                       |
| 7           | 2ND FL OFFICE  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 117.3                  | 26.22                       |
| Zone        | 7 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 117.3                  | 26.22                       |
| System      | 2 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 77.9                   | 17.56                       |
| 7           | 2ND FL OFFICE  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 117.3                  | 26.22                       |
| Zone        | 7 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 117.3                  | 26.22                       |
| 8           | 2ND FL TOILETS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 64.3                   | 14.59                       |
| Zone        | 8 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 64.3                   | 14.59                       |
| System      | 3 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 80.2                   | 18.06                       |
| 3           | LIQUOR STORAGE | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.317 | 30.1                   | 6.35                        |
| Zone        | 3 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.317 | 30.1                   | 6.35                        |
| 4           | LIBRARY        | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 48.3                   | 11.08                       |
| Zone        | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 48.3                   | 11.08                       |
| 5           | GAME ROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 46.7                   | 10.73                       |
| Zone        | 5 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 46.7                   | 10.73                       |
| 6           | 2ND FL OFFICES | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 69.3                   | 15.68                       |
| Zone        | 6 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 69.3                   | 15.68                       |
| System      | 4 Total/Ave.   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 48.4                   | 11.03                       |
| Building    |                | 0.000                            | 0.000 | 0.000       | 0.000       | 0.041      | 0.810       | 0.837       | 0.058 | 0.317 | 51.8                   | 11.58                       |

BUILDING AREAS - ALTERNATIVE 2  
 COMBINED ECOS

----- B U I L D I N G   A R E A S -----

| Room Number | Description    | Number of Duplicate |   | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|----------------|---------------------|---|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
| 1           | 1ST FL OFFICES | 1                   | 1 | 8,053                       | 8,053                   | 0                     | 0                         | 0                    | 0           | 0                    | 624                | 24          | 1,926                |
| Zone        | 1 Total/Ave.   |                     |   |                             | 8,053                   | 0                     | 0                         | 0                    | 0           | 0                    | 624                | 24          | 1,926                |
| 2           | LIQUOR STORE   | 1                   | 1 | 1,127                       | 1,127                   | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 739                  |
| Zone        | 2 Total/Ave.   |                     |   |                             | 1,127                   | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 739                  |
| 4           | LIBRARY        | 1                   | 1 | 3,692                       | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| Zone        | 4 Total/Ave.   |                     |   |                             | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| 5           | GAME ROOM      | 1                   | 1 | 4,154                       | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| Zone        | 5 Total/Ave.   |                     |   |                             | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| System      | 1 Total/Ave.   |                     |   |                             | 17,026                  | 0                     | 0                         | 0                    | 0           | 7,846                | 1,776              | 30          | 4,174                |
| 6           | 2ND FL OFFICES | 1                   | 1 | 1,139                       | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| Zone        | 6 Total/Ave.   |                     |   |                             | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| 7           | 2ND FL OFFICE  | 1                   | 1 | 248                         | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| Zone        | 7 Total/Ave.   |                     |   |                             | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| System      | 2 Total/Ave.   |                     |   |                             | 1,387                   | 0                     | 0                         | 0                    | 0           | 1,387                | 288                | 33          | 579                  |
| 7           | 2ND FL OFFICE  | 1                   | 1 | 248                         | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| Zone        | 7 Total/Ave.   |                     |   |                             | 248                     | 0                     | 0                         | 0                    | 0           | 248                  | 96                 | 35          | 176                  |
| 8           | 2ND FL TOILETS | 1                   | 1 | 582                         | 582                     | 0                     | 0                         | 0                    | 0           | 582                  | 96                 | 34          | 184                  |
| Zone        | 8 Total/Ave.   |                     |   |                             | 582                     | 0                     | 0                         | 0                    | 0           | 582                  | 96                 | 34          | 184                  |
| System      | 3 Total/Ave.   |                     |   |                             | 830                     | 0                     | 0                         | 0                    | 0           | 830                  | 192                | 35          | 360                  |
| 3           | LIQUOR STORAGE | 1                   | 1 | 901                         | 901                     | 0                     | 0                         | 0                    | 0           | 0                    | 24                 | 18          | 112                  |
| Zone        | 3 Total/Ave.   |                     |   |                             | 901                     | 0                     | 0                         | 0                    | 0           | 0                    | 24                 | 18          | 112                  |
| 4           | LIBRARY        | 1                   | 1 | 3,692                       | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| Zone        | 4 Total/Ave.   |                     |   |                             | 3,692                   | 0                     | 0                         | 0                    | 0           | 3,692                | 576                | 44          | 733                  |
| 5           | GAME ROOM      | 1                   | 1 | 4,154                       | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| Zone        | 5 Total/Ave.   |                     |   |                             | 4,154                   | 0                     | 0                         | 0                    | 0           | 4,154                | 576                | 43          | 775                  |
| 6           | 2ND FL OFFICES | 1                   | 1 | 1,139                       | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| Zone        | 6 Total/Ave.   |                     |   |                             | 1,139                   | 0                     | 0                         | 0                    | 0           | 1,139                | 192                | 32          | 403                  |
| System      | 4 Total/Ave.   |                     |   |                             | 9,886                   | 0                     | 0                         | 0                    | 0           | 8,985                | 1,368              | 40          | 2,023                |
| Building    |                |                     |   |                             | 29,129                  | 0                     | 0                         | 0                    | 0           | 19,048               | 3,624              | 34          | 7,137                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.311 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.139 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 32.24 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 COMBINED ECOS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 1.8                    | 5            | 38    | -34,091                  | 22           | 432   | 994.9                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 3.6                    | 3            | 22    | -68,182                  | 25           | 481   | 1,989.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 5.4                    | 6            | 53    | -102,272                 | 18           | 343   | 2,984.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 7.2                    | 10           | 84    | -136,363                 | 1            | 15    | 3,979.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 9.0                    | 8            | 62    | -170,454                 | 2            | 43    | 4,974.7                   | 59           | 3,638 | 0.0                       | 0            | 0     |
| 25 - 30                   | 10.8                   | 8            | 66    | -204,545                 | 2            | 30    | 5,969.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 12.6                   | 4            | 36    | -238,636                 | 1            | 28    | 6,964.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 14.5                   | 5            | 38    | -272,727                 | 1            | 23    | 7,959.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 16.3                   | 7            | 54    | -306,817                 | 1            | 21    | 8,954.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 18.1                   | 6            | 46    | -340,908                 | 1            | 24    | 9,949.5                   | 24           | 1,450 | 0.0                       | 0            | 0     |
| 50 - 55                   | 19.9                   | 9            | 71    | -374,999                 | 1            | 23    | 10,944.4                  | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 21.7                   | 6            | 50    | -409,090                 | 2            | 46    | 11,939.4                  | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 23.5                   | 4            | 31    | -443,181                 | 22           | 434   | 12,934.3                  | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 25.3                   | 2            | 15    | -477,272                 | 0            | 0     | 13,929.3                  | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 27.1                   | 8            | 65    | -511,362                 | 0            | 0     | 14,924.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 28.9                   | 5            | 42    | -545,453                 | 0            | 0     | 15,919.2                  | 17           | 1,070 | 0.0                       | 0            | 0     |
| 80 - 85                   | 30.7                   | 0            | 0     | -579,544                 | 0            | 0     | 16,914.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 32.5                   | 0            | 0     | -613,635                 | 0            | 0     | 17,909.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 34.3                   | 2            | 20    | -647,726                 | 0            | 0     | 18,904.0                  | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 36.1                   | 3            | 25    | -681,817                 | 0            | 0     | 19,899.0                  | 0            | 0     | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,942 | 0                        | 0            | 6,817 | 0.0                       | 0            | 2,602 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 COMBINED ECOS

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | Zone Number                               |       |       |       |       |       |       |       |       |       |       |       |
|-----------------------------|-------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                             | 1                                         | 2     | 4     | 5     | 6     | 7     | 7     | 8     | 3     | 4     | 5     | 6     |
| Max. Temp.                  | 83.0                                      | 79.1  | 87.5  | 86.1  | 84.9  | 86.5  | 106.8 | 105.7 | 143.9 | 110.3 | 108.2 | 105.8 |
| Mo./Hr.                     | 7 21                                      | 7 23  | 7 21  | 7 20  | 7 20  | 7 20  | 8 20  | 8 21  | 9 19  | 8 21  | 7 20  | 8 19  |
| Day Type                    | 4                                         | 1     | 4     | 4     | 4     | 4     | 1     | 1     | 2     | 1     | 2     | 1     |
|                             | ..... N u m b e r   o f   H o u r s ..... |       |       |       |       |       |       |       |       |       |       |       |
| Above 100                   | 0                                         | 0     | 0     | 0     | 0     | 0     | 1,759 | 1,237 | 2,928 | 2,035 | 1,418 | 1,254 |
| 95 - 100                    | 0                                         | 0     | 0     | 0     | 0     | 0     | 825   | 993   | 44    | 730   | 1,146 | 1,072 |
| 90 - 95                     | 0                                         | 0     | 0     | 0     | 0     | 0     | 344   | 690   | 697   | 191   | 163   | 562   |
| 85 - 90                     | 0                                         | 0     | 126   | 63    | 0     | 69    | 141   | 44    | 347   | 467   | 521   | 84    |
| 80 - 85                     | 486                                       | 0     | 1,367 | 1,137 | 651   | 1,019 | 491   | 526   | 517   | 334   | 424   | 502   |
| 75 - 80                     | 2,911                                     | 2,682 | 2,150 | 2,222 | 2,496 | 2,312 | 520   | 573   | 552   | 339   | 85    | 419   |
| 70 - 75                     | 803                                       | 1,075 | 461   | 539   | 780   | 692   | 149   | 101   | 1,352 | 464   | 471   | 231   |
| 65 - 70                     | 2,159                                     | 2,294 | 612   | 195   | 254   | 281   | 2,173 | 2,203 | 1,462 | 2,037 | 1,907 | 2,011 |
| 60 - 65                     | 1,154                                     | 1,444 | 825   | 1,052 | 840   | 1,117 | 1,006 | 1,089 | 330   | 904   | 1,143 | 1,221 |
| 55 - 60                     | 536                                       | 670   | 559   | 418   | 650   | 422   | 660   | 616   | 320   | 566   | 640   | 646   |
| 50 - 55                     | 338                                       | 407   | 1,297 | 937   | 855   | 1,444 | 692   | 688   | 211   | 693   | 842   | 758   |
| Below 50                    | 373                                       | 188   | 1,363 | 2,197 | 2,234 | 1,404 | 0     | 0     | 0     | 0     | 0     | 0     |
| Min. Temp.                  | 41.6                                      | 44.3  | 37.1  | 33.8  | 34.8  | 37.8  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  | 54.9  |
| Mo./Hr.                     | 2 7                                       | 2 7   | 2 8   | 2 8   | 2 8   | 2 9   | 1 9   | 1 11  | 1 14  | 1 10  | 1 10  | 1 11  |
| Day Type                    | 5                                         | 5     | 5     | 5     | 5     | 5     | 3     | 3     | 4     | 3     | 3     | 3     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | HOT WTR            | HOT W DMND           |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 8,956             | 46              | 795                | 4                    |
| Feb   | 8,103             | 46              | 773                | 4                    |
| March | 9,805             | 46              | 452                | 4                    |
| April | 8,524             | 46              | 85                 | 4                    |
| May   | 11,007            | 92              | 0                  | 0                    |
| June  | 14,276            | 103             | 0                  | 0                    |
| July  | 16,380            | 106             | 0                  | 0                    |
| Aug   | 15,202            | 103             | 0                  | 0                    |
| Sept  | 10,451            | 101             | 0                  | 0                    |
| Oct   | 9,376             | 46              | 59                 | 4                    |
| Nov   | 8,525             | 46              | 259                | 4                    |
| Dec   | 8,529             | 46              | 628                | 4                    |
| Total | 129,136           | 106             | 3,052              | 4                    |

Building Energy Consumption = 25,607 (Btu/Sq Ft/Year)  
Source Energy Consumption = 59,365 (Btu/Sq Ft/Year)

Floor Area = 29,129 (Sq Ft)



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 COMBINED ECOS

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref<br>Num | Equip<br>Code | ----- Monthly Consumption ----- |                            |      |      |      |      |      |      |      |      |      |      | Total   |
|------------|---------------|---------------------------------|----------------------------|------|------|------|------|------|------|------|------|------|------|---------|
|            |               | Jan                             | Feb                        | Mar  | Apr  | May  | June | July | Aug  | Sep  | Oct  | Nov  | Dec  |         |
| 0          | LIGHTS        |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            | ELEC          | 8396                            | 7596                       | 9195 | 7996 | 8796 | 8796 | 7996 | 9195 | 7996 | 8796 | 7996 | 7996 | 100,748 |
|            | PK            | 43.7                            | 43.7                       | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7 | 43.7    |
| 1          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 2          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            | GAS           | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 3          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            | OIL           | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 4          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            | P STEAM       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 5          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            | P HOTH2O      | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 6          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            | P CHILL       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0       |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0     |
| 1          | EQ1161        |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            |               |                                 | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |         |
|            | ELEC          | 0                               | 0                          | 0    | 0    | 610  | 3151 | 5631 | 3519 | 855  | 0    | 0    | 0    | 13,767  |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 39.1 | 43.4 | 44.9 | 43.5 | 41.9 | 0.0  | 0.0  | 0.0  | 44.9    |
| 1          | EQ5200        |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            |               |                                 | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |         |
|            | ELEC          | 0                               | 0                          | 0    | 0    | 64   | 283  | 544  | 322  | 89   | 0    | 0    | 0    | 1,302   |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 1.6  | 3.1  | 4.0  | 3.4  | 2.5  | 0.0  | 0.0  | 0.0  | 4.0     |
| 1          | EQ5303        |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            |               |                                 | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |         |
|            | ELEC          | 0                               | 0                          | 0    | 0    | 23   | 66   | 60   | 69   | 26   | 0    | 0    | 0    | 244     |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.0  | 0.0  | 0.0  | 0.3     |
| 2          | EQ1161        |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            |               |                                 | AIR-CLD COND COMP <15 TONS |      |      |      |      |      |      |      |      |      |      |         |
|            | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 367  | 658  | 415  | 77   | 0    | 0    | 0    | 1,518   |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 5.0  | 5.1  | 5.0  | 4.8  | 0.0  | 0.0  | 0.0  | 5.1     |
| 2          | EQ5200        |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            |               |                                 | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |         |
|            | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 33   | 64   | 38   | 8    | 0    | 0    | 0    | 143     |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.4  | 0.5  | 0.4  | 0.3  | 0.0  | 0.0  | 0.0  | 0.5     |
| 2          | EQ5303        |                                 |                            |      |      |      |      |      |      |      |      |      |      |         |
|            |               |                                 | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
 COMBINED ECOS

----- U T I L I T Y P E A K C H E C K S U M S -----

Utility ELECTRIC DEMAND

Peak Value 105.6 (kW)  
 Yearly Time of Peak 15 (hr) 7 (mo)

Hour 15 Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| Cooling Equipment    |                        |                                    |                           |                          |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 49.2                      | 46.56                    |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 5.9                       | 5.58                     |
| Sub Total            |                        |                                    | 55.1                      | 52.15                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Air Moving Equipment |                        |                                    |                           |                          |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 6.7                       | 6.37                     |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.1                       | 0.11                     |
| Sub Total            |                        |                                    | 6.8                       | 6.47                     |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Miscellaneous        |                        |                                    |                           |                          |
|                      | Lights                 |                                    | 43.7                      | 41.38                    |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                     |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                     |
| Sub Total            |                        |                                    | 43.7                      | 41.38                    |
| Grand Total          |                        |                                    | 105.6                     | 100.00                   |

***Building 101***  
***(Typical for 102, 103, 104, 105, 106,***  
***107, 108, 109, 110, 111,***  
***112, 113, and 114)***

***Trace Input File***

CONTENTS OF : E:\CB101-14.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDINGS 101-114

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/BASE BUILDING

13 20/1/1/TV ROOM/160/1/1/0//9.5

14 20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5

15 20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5

16 20/4/1/TV ROOM/160/1/1/0//9.5

17 20/5/1/BEDROOM/156/1/1/0//9

18 20/6/1/BEDROOM/145/1/1/0//9

19 20/7/1/BEDROOM/156/1/1/0//9

20 20/8/1/BEDROOM/145/1/1/0//9

21 20/9/2/DINING ROOM/148/1/1/.75/.45/9.5

22 20/10/2/KITCHEN/108/1/1/.75/.45/9.5

23 20/11/2/KITCHEN/108/1/1/.75/.45/9.5

24 20/12/2/DINING ROOM/148/1/1/.75/.45/9.5

25 20/13/2/REAR FOYER/33/1/2/0//9.5

26 20/14/2/REAR FOYER/33/1/2/0//9.5

27 20/15/2/BEDROOM/80/1/1/0//9

28 20/16/2/BEDROOM/80/1/1/0//9

29 20/17/2/HALL/70/1/1/0//9

30 20/18/2/HALL/70/1/1/0//9

31 20/19/2/BATH/53/1/1/0//9

32 20/20/2/BATH/53/1/1/0//9

33 21/M////CBLQTX//CBLQTX

34 22/1/1/YES////171

35 22/4/1/YES////171

36 22/5/1/YES////171

37 22/6/1/YES////171

38 22/7/1/YES////171

39 22/8/1/YES////171

40 22/13/1/YES////171

41 22/14/1/YES////171

42 22/15/1/YES////171

43 22/16/1/YES////171

44 22/17/1/YES////171

45 22/18/1/YES////171

46 22/19/1/YES////171

47 22/20/1/YES////171

48 24/1/1/10/8.5//170/0

49 24/1/2/16/8.5//170/270

50 24/1/3/10/8.5//170/180

51 24/2/1/12/8.5//170/180

52 24/3/1/12/8.5//170/180

53 24/4/1/10/8.5//170/0

54 24/4/2/16/8.5//170/90

55 24/4/3/10/8.5//170/180

56 24/5/1/11/8.25//170/0

57 24/5/2/12/8.25//170/270

58 24/6/1/12/8.25//170/270

CONTENTS OF : E:\CB101-14.TM

| LINE # | -----                                                 |
|--------|-------------------------------------------------------|
| 59     | 24/6/2/12/8.25//170/180                               |
| 60     | 24/7/1/11/8.25//170/0                                 |
| 61     | 24/7/2/12/8.25//170/90                                |
| 62     | 24/8/1/12/8.25//170/90                                |
| 63     | 24/8/2/12/8.25//170/180                               |
| 64     | 24/9/1/11/8.5//170/0                                  |
| 65     | 24/9/2/11/8.5//170/270                                |
| 66     | 24/12/1/11/8.5//170/0                                 |
| 67     | 24/12/2/11/8.5//170/90                                |
| 68     | 24/13/1/5/8.5//170/270                                |
| 69     | 24/13/2/6/8.5//170/180                                |
| 70     | 24/14/1/5/8.5//170/90                                 |
| 71     | 24/14/2/8/8.5//170/180                                |
| 72     | 24/15/1/8/8.25//170/0                                 |
| 73     | 24/16/1/8/8.25//170/0                                 |
| 74     | 24/19/1/7/8.25//170/180                               |
| 75     | 24/20/1/7/8.25//170/180                               |
| 76     | 25/1/1/20/1/1/.81/.64                                 |
| 77     | 25/1/2/5/2.5/3/.81/.64                                |
| 78     | 25/1/3/20/1/1/.81/.64                                 |
| 79     | 25/2/1/20/1/1/.81/.64                                 |
| 80     | 25/3/1/20/1/1/.81/.64                                 |
| 81     | 25/4/1/20/1/1/.81/.64                                 |
| 82     | 25/4/2/5/2.5/1/.81/.64                                |
| 83     | 25/4/3/20/1/1/.81/.64                                 |
| 84     | 25/5/1/4/2.5/1/.81/.64                                |
| 85     | 25/5/2/4/2.5/1/.81/.64                                |
| 86     | 25/6/1/4/2.5/1/.81/.64                                |
| 87     | 25/6/2/4/2.5/1/.81/.64                                |
| 88     | 25/7/1/4/2.5/1/.81/.64                                |
| 89     | 25/7/2/4/2.5/1/.81/.64                                |
| 90     | 25/8/1/4/2.5/1/.81/.64                                |
| 91     | 25/8/2/4/2.5/1/.81/.64                                |
| 92     | 25/9/1/5/2.5/1/.81/.64                                |
| 93     | 25/9/2/5/2.5/1/.81/.64                                |
| 94     | 25/12/1/5/2.5/1/.81/.64                               |
| 95     | 25/12/2/5/2.5/1/.81/.64                               |
| 96     | 25/13/1/3.5/1/1/.81/.64                               |
| 97     | 25/13/2/5/2.5/1/.81/.64                               |
| 98     | 25/14/1/3.5/1/1/.81/.64                               |
| 99     | 25/14/2/5/2.5/1/.81/.64                               |
| 100    | 25/15/1/4/2.5/1/.81/.64                               |
| 101    | 25/16/1/4/2.5/1/.81/.64                               |
| 102    | 25/19/1/4/2.5/1/.81/.64                               |
| 103    | 25/20/1/4/2.5/1/.81/.64                               |
| 104    | 26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF |
| 105    | 27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND            |
| 106    | 29/1/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF              |
| 107    | 29/2/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF              |
| 108    | 29/3/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF              |
| 109    | 29/4/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF              |
| 110    | 29/5/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF              |
| 111    | 29/6/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF              |
| 112    | 29/7/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF              |
| 113    | 29/8/10/PCT-MCLG///.28/CFM-SF/.28/CFM-SF              |
| 114    | 29/9////////.28/CFM-SF                                |
| 115    | 29/10////////.28/CFM-SF                               |
| 116    | 29/11////////.28/CFM-SF                               |

CONTENTS OF : E:\CB101-14.TM

LINE # -----

117 29/12////////.28/CFM-SF

118 29/13////////.28/CFM-SF

119 29/14////////.28/CFM-SF

120 29/15////////.28/CFM-SF

121 29/16////////.28/CFM-SF

122 29/17////////.28/CFM-SF

123 29/18////////.28/CFM-SF

124 29/19////////.28/CFM-SF

125 29/20////////.28/CFM-SF

126 SYSTEM - 1

127 39/1/BASE BUILDING

128 40/1/PTAC

129 41/1/1/1

130 42/1/.25

131 45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

132 40/2/RAD

133 41/2/1/2

134 45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF

135 EQUIPMENT - 1

136 59/1/CARLISLE///BASE BUILDING

137 60/1/1/PKPLANT/1/1

138 62/1/EQ1161/6

139 65/1/1//2/2

140 67/1/EQ2102/1

141 69/1/EQ4003

142 LOAD - 2

143 19/2/WALL & ROOF INSULATION

144 20/1/1/TV ROOM/160/1/1/0//9.5

145 20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5

146 20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5

147 20/4/1/TV ROOM/160/1/1/0//9.5

148 20/5/1/BEDROOM/156/1/1/0//9

149 20/6/1/BEDROOM/145/1/1/0//9

150 20/7/1/BEDROOM/156/1/1/0//9

151 20/8/1/BEDROOM/145/1/1/0//9

152 20/9/2/DINING ROOM/148/1/1/.75/.45/9.5

153 20/10/2/KITCHEN/108/1/1/.75/.45/9.5

154 20/11/2/KITCHEN/108/1/1/.75/.45/9.5

155 20/12/2/DINING ROOM/148/1/1/.75/.45/9.5

156 20/13/2/REAR FOYER/33/1/2/0//9.5

157 20/14/2/REAR FOYER/33/1/2/0//9.5

158 20/15/2/BEDROOM/80/1/1/0//9

159 20/16/2/BEDROOM/80/1/1/0//9

160 20/17/2/HALL/70/1/1/0//9

161 20/18/2/HALL/70/1/1/0//9

162 20/19/2/BATH/53/1/1/0//9

163 20/20/2/BATH/53/1/1/0//9

164 21/M////CBLQTX//CBLQTX

165 22/1/1/YES////191

166 22/4/1/YES////191

167 22/5/1/YES////191

168 22/6/1/YES////191

169 22/7/1/YES////191

170 22/8/1/YES////191

171 22/13/1/YES////191

172 22/14/1/YES////191

173 22/15/1/YES////191

174 22/16/1/YES////191

## CONTENTS OF : E:\CB101-14.TM

| LINE # | -----                   |
|--------|-------------------------|
| 175    | 22/17/1/YES////191      |
| 176    | 22/18/1/YES////191      |
| 177    | 22/19/1/YES////191      |
| 178    | 22/20/1/YES////191      |
| 179    | 24/1/1/10/8.5//183/0    |
| 180    | 24/1/2/16/8.5//183/270  |
| 181    | 24/1/3/10/8.5//183/180  |
| 182    | 24/2/1/12/8.5//183/180  |
| 183    | 24/3/1/12/8.5//183/180  |
| 184    | 24/4/1/10/8.5//183/0    |
| 185    | 24/4/2/16/8.5//183/90   |
| 186    | 24/4/3/10/8.5//183/180  |
| 187    | 24/5/1/11/8.25//183/0   |
| 188    | 24/5/2/12/8.25//183/270 |
| 189    | 24/6/1/12/8.25//183/270 |
| 190    | 24/6/2/12/8.25//183/180 |
| 191    | 24/7/1/11/8.25//183/0   |
| 192    | 24/7/2/12/8.25//183/90  |
| 193    | 24/8/1/12/8.25//183/90  |
| 194    | 24/8/2/12/8.25//183/180 |
| 195    | 24/9/1/11/8.5//183/0    |
| 196    | 24/9/2/11/8.5//183/270  |
| 197    | 24/12/1/11/8.5//183/0   |
| 198    | 24/12/2/11/8.5//183/90  |
| 199    | 24/13/1/5/8.5//183/270  |
| 200    | 24/13/2/6/8.5//183/180  |
| 201    | 24/14/1/5/8.5//183/90   |
| 202    | 24/14/2/8/8.5//183/180  |
| 203    | 24/15/1/8/8.25//183/0   |
| 204    | 24/16/1/8/8.25//183/0   |
| 205    | 24/19/1/7/8.25//183/180 |
| 206    | 24/20/1/7/8.25//183/180 |
| 207    | 25/1/1/20/1/1/.81/.64   |
| 208    | 25/1/2/5/2.5/3/.81/.64  |
| 209    | 25/1/3/20/1/1/.81/.64   |
| 210    | 25/2/1/20/1/1/.81/.64   |
| 211    | 25/3/1/20/1/1/.81/.64   |
| 212    | 25/4/1/20/1/1/.81/.64   |
| 213    | 25/4/2/5/2.5/1/.81/.64  |
| 214    | 25/4/3/20/1/1/.81/.64   |
| 215    | 25/5/1/4/2.5/1/.81/.64  |
| 216    | 25/5/2/4/2.5/1/.81/.64  |
| 217    | 25/6/1/4/2.5/1/.81/.64  |
| 218    | 25/6/2/4/2.5/1/.81/.64  |
| 219    | 25/7/1/4/2.5/1/.81/.64  |
| 220    | 25/7/2/4/2.5/1/.81/.64  |
| 221    | 25/8/1/4/2.5/1/.81/.64  |
| 222    | 25/8/2/4/2.5/1/.81/.64  |
| 223    | 25/9/1/5/2.5/1/.81/.64  |
| 224    | 25/9/2/5/2.5/1/.81/.64  |
| 225    | 25/12/1/5/2.5/1/.81/.64 |
| 226    | 25/12/2/5/2.5/1/.81/.64 |
| 227    | 25/13/1/3.5/1/1/.81/.64 |
| 228    | 25/13/2/5/2.5/1/.81/.64 |
| 229    | 25/14/1/3.5/1/1/.81/.64 |
| 230    | 25/14/2/5/2.5/1/.81/.64 |
| 231    | 25/15/1/4/2.5/1/.81/.64 |
| 232    | 25/16/1/4/2.5/1/.81/.64 |



CONTENTS OF : E:\CB101-14.TM

LINE # -----

233 25/19/1/4/2.5/1/.81/.64

234 25/20/1/4/2.5/1/.81/.64

235 26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF

236 27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND

237 29/1/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF

238 29/2/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF

239 29/3/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF

240 29/4/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF

241 29/5/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF

242 29/6/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF

243 29/7/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF

244 29/8/10/PCT-MCLG///.23/CFM-SF/.23/CFM-SF

245 29/9////////.23/CFM-SF

246 29/10////////.23/CFM-SF

247 29/11////////.23/CFM-SF

248 29/12////////.23/CFM-SF

249 29/13////////.23/CFM-SF

250 29/14////////.23/CFM-SF

251 29/15////////.23/CFM-SF

252 29/16////////.23/CFM-SF

253 29/17////////.23/CFM-SF

254 29/18////////.23/CFM-SF

255 29/19////////.23/CFM-SF

256 29/20////////.23/CFM-SF

257 SYSTEM - 2

258 39/2/WALL & ROOF INSULATION

259 40/1/PTAC

260 41/1/1/1

261 42/1/.25

262 45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

263 40/2/RAD

264 41/2/1/2

265 45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF

266 EQUIPMENT - 2

267 59/2/CARLISLE///WALL & ROOF INSULATION

268 60/1/1/PKPLANT/1/1

269 62/1/EQ1161/6

270 65/1/1//2/2

271 67/1/EQ2102/1

272 69/1/EQ4003

273 LOAD - 3

274 19/3/WEATHERSTRIP & CAULKING

275 20/1/1/TV ROOM/160/1/1/0//9.5

276 20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5

277 20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5

278 20/4/1/TV ROOM/160/1/1/0//9.5

279 20/5/1/BEDROOM/156/1/1/0//9

280 20/6/1/BEDROOM/145/1/1/0//9

281 20/7/1/BEDROOM/156/1/1/0//9

282 20/8/1/BEDROOM/145/1/1/0//9

283 20/9/2/DINING ROOM/148/1/1/.75/.45/9.5

284 20/10/2/KITCHEN/108/1/1/.75/.45/9.5

285 20/11/2/KITCHEN/108/1/1/.75/.45/9.5

286 20/12/2/DINING ROOM/148/1/1/.75/.45/9.5

287 20/13/2/REAR FOYER/33/1/2/0//9.5

288 20/14/2/REAR FOYER/33/1/2/0//9.5

289 20/15/2/BEDROOM/80/1/1/0//9

290 20/16/2/BEDROOM/80/1/1/0//9

## CONTENTS OF : E:\CB101-14.TM

| LINE # | -----                    |
|--------|--------------------------|
| 291    | 20/17/2/HALL/70/1/1/0//9 |
| 292    | 20/18/2/HALL/70/1/1/0//9 |
| 293    | 20/19/2/BATH/53/1/1/0//9 |
| 294    | 20/20/2/BATH/53/1/1/0//9 |
| 295    | 21/M///CBLQTX///CBLQTX   |
| 296    | 22/1/1/YES////171        |
| 297    | 22/4/1/YES////171        |
| 298    | 22/5/1/YES////171        |
| 299    | 22/6/1/YES////171        |
| 300    | 22/7/1/YES////171        |
| 301    | 22/8/1/YES////171        |
| 302    | 22/13/1/YES////171       |
| 303    | 22/14/1/YES////171       |
| 304    | 22/15/1/YES////171       |
| 305    | 22/16/1/YES////171       |
| 306    | 22/17/1/YES////171       |
| 307    | 22/18/1/YES////171       |
| 308    | 22/19/1/YES////171       |
| 309    | 22/20/1/YES////171       |
| 310    | 24/1/1/10/8.5//170/0     |
| 311    | 24/1/2/16/8.5//170/270   |
| 312    | 24/1/3/10/8.5//170/180   |
| 313    | 24/2/1/12/8.5//170/180   |
| 314    | 24/3/1/12/8.5//170/180   |
| 315    | 24/4/1/10/8.5//170/0     |
| 316    | 24/4/2/16/8.5//170/90    |
| 317    | 24/4/3/10/8.5//170/180   |
| 318    | 24/5/1/11/8.25//170/0    |
| 319    | 24/5/2/12/8.25//170/270  |
| 320    | 24/6/1/12/8.25//170/270  |
| 321    | 24/6/2/12/8.25//170/180  |
| 322    | 24/7/1/11/8.25//170/0    |
| 323    | 24/7/2/12/8.25//170/90   |
| 324    | 24/8/1/12/8.25//170/90   |
| 325    | 24/8/2/12/8.25//170/180  |
| 326    | 24/9/1/11/8.5//170/0     |
| 327    | 24/9/2/11/8.5//170/270   |
| 328    | 24/12/1/11/8.5//170/0    |
| 329    | 24/12/2/11/8.5//170/90   |
| 330    | 24/13/1/5/8.5//170/270   |
| 331    | 24/13/2/6/8.5//170/180   |
| 332    | 24/14/1/5/8.5//170/90    |
| 333    | 24/14/2/8/8.5//170/180   |
| 334    | 24/15/1/8/8.25//170/0    |
| 335    | 24/16/1/8/8.25//170/0    |
| 336    | 24/19/1/7/8.25//170/180  |
| 337    | 24/20/1/7/8.25//170/180  |
| 338    | 25/1/1/20/1/1/.81/.64    |
| 339    | 25/1/2/5/2.5/3/.81/.64   |
| 340    | 25/1/3/20/1/1/.81/.64    |
| 341    | 25/2/1/20/1/1/.81/.64    |
| 342    | 25/3/1/20/1/1/.81/.64    |
| 343    | 25/4/1/20/1/1/.81/.64    |
| 344    | 25/4/2/5/2.5/1/.81/.64   |
| 345    | 25/4/3/20/1/1/.81/.64    |
| 346    | 25/5/1/4/2.5/1/.81/.64   |
| 347    | 25/5/2/4/2.5/1/.81/.64   |
| 348    | 25/6/1/4/2.5/1/.81/.64   |

CONTENTS OF : E:\CB101-14.TM

| LINE # | -----                                                 |
|--------|-------------------------------------------------------|
| 349    | 25/6/2/4/2.5/1/.81/.64                                |
| 350    | 25/7/1/4/2.5/1/.81/.64                                |
| 351    | 25/7/2/4/2.5/1/.81/.64                                |
| 352    | 25/8/1/4/2.5/1/.81/.64                                |
| 353    | 25/8/2/4/2.5/1/.81/.64                                |
| 354    | 25/9/1/5/2.5/1/.81/.64                                |
| 355    | 25/9/2/5/2.5/1/.81/.64                                |
| 356    | 25/12/1/5/2.5/1/.81/.64                               |
| 357    | 25/12/2/5/2.5/1/.81/.64                               |
| 358    | 25/13/1/3.5/1/1/.81/.64                               |
| 359    | 25/13/2/5/2.5/1/.81/.64                               |
| 360    | 25/14/1/3.5/1/1/.81/.64                               |
| 361    | 25/14/2/5/2.5/1/.81/.64                               |
| 362    | 25/15/1/4/2.5/1/.81/.64                               |
| 363    | 25/16/1/4/2.5/1/.81/.64                               |
| 364    | 25/19/1/4/2.5/1/.81/.64                               |
| 365    | 25/20/1/4/2.5/1/.81/.64                               |
| 366    | 26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF |
| 367    | 27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND            |
| 368    | 29/1/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF              |
| 369    | 29/2/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF              |
| 370    | 29/3/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF              |
| 371    | 29/4/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF              |
| 372    | 29/5/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF              |
| 373    | 29/6/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF              |
| 374    | 29/7/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF              |
| 375    | 29/8/10/PCT-MCLG///.26/CFM-SF/.26/CFM-SF              |
| 376    | 29/9////////.26/CFM-SF                                |
| 377    | 29/10////////.26/CFM-SF                               |
| 378    | 29/11////////.26/CFM-SF                               |
| 379    | 29/12////////.26/CFM-SF                               |
| 380    | 29/13////////.26/CFM-SF                               |
| 381    | 29/14////////.26/CFM-SF                               |
| 382    | 29/15////////.26/CFM-SF                               |
| 383    | 29/16////////.26/CFM-SF                               |
| 384    | 29/17////////.26/CFM-SF                               |
| 385    | 29/18////////.26/CFM-SF                               |
| 386    | 29/19////////.26/CFM-SF                               |
| 387    | 29/20////////.26/CFM-SF                               |
| 388    | SYSTEM - 3                                            |
| 389    | 39/3/WEATHERSTRIP & CAULKING                          |
| 390    | 40/1/PTAC                                             |
| 391    | 41/1/1/1                                              |
| 392    | 42/1/.25                                              |
| 393    | 45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF      |
| 394    | 40/2/RAD                                              |
| 395    | 41/2/1/2                                              |
| 396    | 45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF      |
| 397    | EQUIPMENT - 3                                         |
| 398    | 59/3/CARLISLE///WEATHERSTRIP & CAULKING               |
| 399    | 60/1/1/PKPLANT/1/1                                    |
| 400    | 62/1/EQ1161/6                                         |
| 401    | 65/1/1//2/2                                           |
| 402    | 67/1/EQ2102/1                                         |
| 403    | 69/1/EQ4003                                           |
| 404    | LOAD - 4                                              |
| 405    | 19/4/COMBINED ECOS                                    |
| 406    | 20/1/1/TV ROOM/160/1/1/0//9.5                         |

## CONTENTS OF : E:\CB101-14.TM

LINE # -----  
407 20/2/1/LIVING ROOM/280/1/1/.75/.45/9.5  
408 20/3/1/LIVING ROOM/280/1/1/.75/.45/9.5  
409 20/4/1/TV ROOM/160/1/1/0//9.5  
410 20/5/1/BEDROOM/156/1/1/0//9  
411 20/6/1/BEDROOM/145/1/1/0//9  
412 20/7/1/BEDROOM/156/1/1/0//9  
413 20/8/1/BEDROOM/145/1/1/0//9  
414 20/9/2/DINING ROOM/148/1/1/.75/.45/9.5  
415 20/10/2/KITCHEN/108/1/1/.75/.45/9.5  
416 20/11/2/KITCHEN/108/1/1/.75/.45/9.5  
417 20/12/2/DINING ROOM/148/1/1/.75/.45/9.5  
418 20/13/2/REAR FOYER/33/1/2/0//9.5  
419 20/14/2/REAR FOYER/33/1/2/0//9.5  
420 20/15/2/BEDROOM/80/1/1/0//9  
421 20/16/2/BEDROOM/80/1/1/0//9  
422 20/17/2/HALL/70/1/1/0//9  
423 20/18/2/HALL/70/1/1/0//9  
424 20/19/2/BATH/53/1/1/0//9  
425 20/20/2/BATH/53/1/1/0//9  
426 21/M///CBLQTX///CBLQTX  
427 22/1/1/YES///191  
428 22/4/1/YES///191  
429 22/5/1/YES///191  
430 22/6/1/YES///191  
431 22/7/1/YES///191  
432 22/8/1/YES///191  
433 22/13/1/YES///191  
434 22/14/1/YES///191  
435 22/15/1/YES///191  
436 22/16/1/YES///191  
437 22/17/1/YES///191  
438 22/18/1/YES///191  
439 22/19/1/YES///191  
440 22/20/1/YES///191  
441 24/1/1/10/8.5//183/0  
442 24/1/2/16/8.5//183/270  
443 24/1/3/10/8.5//183/180  
444 24/2/1/12/8.5//183/180  
445 24/3/1/12/8.5//183/180  
446 24/4/1/10/8.5//183/0  
447 24/4/2/16/8.5//183/90  
448 24/4/3/10/8.5//183/180  
449 24/5/1/11/8.25//183/0  
450 24/5/2/12/8.25//183/270  
451 24/6/1/12/8.25//183/270  
452 24/6/2/12/8.25//183/180  
453 24/7/1/11/8.25//183/0  
454 24/7/2/12/8.25//183/90  
455 24/8/1/12/8.25//183/90  
456 24/8/2/12/8.25//183/180  
457 24/9/1/11/8.5//183/0  
458 24/9/2/11/8.5//183/270  
459 24/12/1/11/8.5//183/0  
460 24/12/2/11/8.5//183/90  
461 24/13/1/5/8.5//183/270  
462 24/13/2/6/8.5//183/180  
463 24/14/1/5/8.5//183/90  
464 24/14/2/8/8.5//183/180

CONTENTS OF : E:\CB101-14.TM

LINE # -----

465 24/15/1/8/8.25//183/0

466 24/16/1/8/8.25//183/0

467 24/19/1/7/8.25//183/180

468 24/20/1/7/8.25//183/180

469 25/1/1/20/1/1/.81/.64

470 25/1/2/5/2.5/3/.81/.64

471 25/1/3/20/1/1/.81/.64

472 25/2/1/20/1/1/.81/.64

473 25/3/1/20/1/1/.81/.64

474 25/4/1/20/1/1/.81/.64

475 25/4/2/5/2.5/1/.81/.64

476 25/4/3/20/1/1/.81/.64

477 25/5/1/4/2.5/1/.81/.64

478 25/5/2/4/2.5/1/.81/.64

479 25/6/1/4/2.5/1/.81/.64

480 25/6/2/4/2.5/1/.81/.64

481 25/7/1/4/2.5/1/.81/.64

482 25/7/2/4/2.5/1/.81/.64

483 25/8/1/4/2.5/1/.81/.64

484 25/8/2/4/2.5/1/.81/.64

485 25/9/1/5/2.5/1/.81/.64

486 25/9/2/5/2.5/1/.81/.64

487 25/12/1/5/2.5/1/.81/.64

488 25/12/2/5/2.5/1/.81/.64

489 25/13/1/3.5/1/1/.81/.64

490 25/13/2/5/2.5/1/.81/.64

491 25/14/1/3.5/1/1/.81/.64

492 25/14/2/5/2.5/1/.81/.64

493 25/15/1/4/2.5/1/.81/.64

494 25/16/1/4/2.5/1/.81/.64

495 25/19/1/4/2.5/1/.81/.64

496 25/20/1/4/2.5/1/.81/.64

497 26/M/CBLQP/CBLQL/CBLQCLG//OFF/CBLQCLG/OFF/OFF/OFF/OFF

498 27/M/308/SF-PERS/230/190/.5/WATT-SF/INCAND

499 29/1/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF

500 29/2/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF

501 29/3/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF

502 29/4/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF

503 29/5/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF

504 29/6/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF

505 29/7/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF

506 29/8/10/PCT-MCLG///.19/CFM-SF/.19/CFM-SF

507 29/9////////.19/CFM-SF

508 29/10////////.19/CFM-SF

509 29/11////////.19/CFM-SF

510 29/12////////.19/CFM-SF

511 29/13////////.19/CFM-SF

512 29/14////////.19/CFM-SF

513 29/15////////.19/CFM-SF

514 29/16////////.19/CFM-SF

515 29/17////////.19/CFM-SF

516 29/18////////.19/CFM-SF

517 29/19////////.19/CFM-SF

518 29/20////////.19/CFM-SF

519 SYSTEM - 4

520 39/4/COMBINED ECOS

521 40/1/PTAC

522 41/1/1/1

CONTENTS OF : E:\CB101-14.TM

| LINE # | -----                                            |
|--------|--------------------------------------------------|
| 523    | 42/1/.25                                         |
| 524    | 45/1/CBLQCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF |
| 525    | 40/2/RAD                                         |
| 526    | 41/2/1/2                                         |
| 527    | 45/2/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF |
| 528    | EQUIPMENT - 4                                    |
| 529    | 59/4/CARLISLE///COMBINED ECOS                    |
| 530    | 60/1/1/PKPLANT/1/1                               |
| 531    | 62/1/EQ1161/6                                    |
| 532    | 65/1/1//2/2                                      |
| 533    | 67/1/EQ2102/1                                    |
| 534    | 69/1/EQ4003                                      |

***Building 101***  
***(Typical for 102, 103, 104, 105, 106,***  
***107, 108, 109, 110, 111,***  
***112, 113, and 114)***

***Trace Output File***

```
*****  
*****  
**  
**          T R A C E   6 0 0   A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDINGS 101-114

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 10: 3:20 1/ 7/94  
Dataset Name: CB101-14 .TM



AIRFLOW - ALTERNATIVE 1  
 BASE BUILDING

----- S Y S T E M S U M M A R Y -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply Airflow (Cfm) | Room Exhaust Airflow (Cfm) |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------------|----------------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) |                             |                            |
| 1             | PTAC        | 171                   | 1,708                 | 1,708                 | 2,154                | 616                   | 0                           | 0                          |
| 2             | RAD         | 0                     | 0                     | 0                     | 0                    | 677                   | 0                           | 0                          |
| Totals        |             | 171                   | 1,708                 | 1,708                 | 2,154                | 1,293                 | 0                           | 0                          |

CAPACITY - ALTERNATIVE 1  
 BASE BUILDING

----- S Y S T E M S U M M A R Y -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                           |                      |                       | Heating                   |                           |                         |                        |                          |                           |                       |
|---------------|-------------|---------------------------|---------------------------|---------------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|---------------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Sys. Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | PTAC        | 4.3                       | 0.0                       | 0.0                       | 0.0                  | 4.3                   | -77,491                   | 0                         | 0                       | 0                      | 0                        | 0                         | -77,491               |
| 2             | RAD         | 0.0                       | 0.0                       | 0.0                       | 0.0                  | 0.0                   | -117,101                  | 0                         | 0                       | 0                      | 0                        | 0                         | -117,101              |
| Totals        |             | 4.3                       | 0.0                       | 0.0                       | 0.0                  | 4.3                   | -194,592                  | 0                         | 0                       | 0                      | 0                        | 0                         | -194,592              |

The building peaked at hour 16 month 7 with a capacity of 4.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 BASE BUILDING

----- E N G I N E E R I N G C H E C K S -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | PTAC        | 10.00               | 1.15       | 394.9    | 342.6      | 35.03       | 1.15       | -52.29      | 1,482            |
| 2             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -47.49      | 2,466            |

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK                        |                         |                          |                        |                  | CLG SPACE PEAK   |                       |                  |                              |                           | HEATING COIL PEAK |  |  |
|------------------------------------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|-------------------|--|--|
| Peaked at Time ==> Mo/Hr: 7/16           |                         |                          |                        |                  | Mo/Hr: 7/16      |                       |                  |                              |                           | Mo/Hr: 13/ 1      |  |  |
| Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 |                         |                          |                        |                  | OADB: 91         |                       |                  |                              |                           | OADB: 4           |  |  |
|                                          | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%)  |  |  |
| Envelope Loads                           |                         |                          |                        |                  |                  |                       |                  |                              |                           |                   |  |  |
| Skylite Solr.                            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00              |  |  |
| Skylite Cond                             | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00              |  |  |
| Roof Cond                                | 4,039                   | 0                        | 0                      | 4,039            | 7.78             | 3,972                 | 11.04            | -3,410                       | -3,410                    | 4.41              |  |  |
| Glass Solar                              | 9,125                   | 0                        | 0                      | 9,125            | 17.58            | 11,195                | 31.10            | 0                            | 0                         | 0.00              |  |  |
| Glass Cond                               | 2,726                   | 0                        | 0                      | 2,726            | 5.25             | 2,404                 | 6.68             | -13,405                      | -13,405                   | 17.34             |  |  |
| Wall Cond                                | 8,040                   | 93                       | 0                      | 8,133            | 15.67            | 8,112                 | 22.54            | -29,086                      | -29,459                   | 38.11             |  |  |
| Partition                                | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00              |  |  |
| Exposed Floor                            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00              |  |  |
| Infiltration                             | 17,114                  | 0                        | 0                      | 17,114           | 32.97            | 6,782                 | 18.84            | -31,035                      | -31,035                   | 40.14             |  |  |
| Sub Total==>                             | 41,044                  | 93                       | 0                      | 41,138           | 79.25            | 32,465                | 90.20            | -76,937                      | -77,310                   | 100.00            |  |  |
| Internal Loads                           |                         |                          |                        |                  |                  |                       |                  |                              |                           |                   |  |  |
| Lights                                   | 2,070                   | 0                        | 0                      | 2,070            | 3.99             | 2,078                 | 5.77             | 0                            | 0                         | 0.00              |  |  |
| People                                   | 1,784                   | 0                        | 0                      | 1,784            | 3.44             | 884                   | 2.46             | 0                            | 0                         | 0.00              |  |  |
| Misc                                     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00              |  |  |
| Sub Total==>                             | 3,855                   | 0                        | 0                      | 3,855            | 7.43             | 2,962                 | 8.23             | 0                            | 0                         | 0.00              |  |  |
| Ceiling Load                             | 52                      | -52                      | 0                      | 0                | 0.00             | 565                   | 1.57             | -524                         | 0                         | 0.00              |  |  |
| Outside Air                              | 0                       | 0                        | 0                      | 6,560            | 12.64            | 0                     | 0.00             | 0                            | 0                         | 0.00              |  |  |
| Sup. Fan Heat                            |                         |                          |                        | 364              | 0.70             |                       |                  |                              |                           |                   |  |  |
| Ret. Fan Heat                            |                         | 0                        | 0                      | 0                | 0.00             |                       |                  |                              |                           |                   |  |  |
| Duct Heat Pkup                           |                         | 0                        | 0                      | 0                | 0.00             |                       |                  |                              |                           |                   |  |  |
| OV/UNDR Sizing                           | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00              |  |  |
| Exhaust Heat                             |                         | -7                       | 0                      | -7               | -0.01            |                       |                  |                              |                           |                   |  |  |
| Terminal Bypass                          |                         | 0                        | 0                      | 0                | 0.00             |                       |                  |                              |                           |                   |  |  |
| Grand Total==>                           | 44,951                  | 35                       | 0                      | 51,910           | 100.00           | 35,992                | 100.00           | -77,461                      | -77,310                   | 100.00            |  |  |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 4.3                   | 51.9            | 1,708            | 76.7              | 63.7  | 69.7   | 55.5             | 53.4  | 59.0   | 1,482       |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 4.3                   | 51.9            |                  |                   |       |        |                  |       |        | 922         | 0          | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        | 1,592       | 250        | 16  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 10.0   | Type     | Clg  | Htg   |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|------|-------|
| Main Htg | -77.5          | 1,708            | 68.0      | 109.7     | Vent    | 171     | 0       | Clg Cfm/Saft  | 1.15   | SADB     | 55.6 | 109.7 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 446     | 446     | Clg Cfm/Ton   | 394.87 | Plenum   | 75.2 | 67.2  |
| Preheat  | -0.0           | 1,708            | 61.4      | 55.4      | Supply  | 1,708   | 1,708   | Clg Saft/Ton  | 342.59 | Return   | 75.0 | 67.8  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 35.03  | Ret/OA   | 76.6 | 67.8  |
| Humidif. | 0.0            | 0                | 0.0       | 0.0       | Return  | 1,708   | 1,708   | No. People    | 5      | Runarnd  | 75.0 | 68.0  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 171     | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0  | 0.0   |
| Total    | -77.5          |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.15   | Fn BldTD | 0.0  | 0.0   |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -52.29 | Fn Frict | 0.1  | 0.0   |

System 2 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/0 \* Mo/Hr: 0/0 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 0/0/0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -5,156                       | -5,156                    | 4.40             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -19,947                      | -19,947                   | 17.03            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -43,846                      | -44,864                   | 38.31            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -47,134                      | -47,134                   | 40.25            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -116,082                     | -117,101                  | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -5,342                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             |                              | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -121,425                     | -117,101                  | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------|------------|--------|
| Main Clg | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | Floor       | 2,466      |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | Part        | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | ExFlr       | 0          |        |
| Totals   | 0.0                   | 0.0             |                  |                           |                          | Roof        | 1,394      | 0 0    |
|          |                       |                 |                  |                           |                          | Wall        | 2,417      | 372 15 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|-----|------|
| Main Htg | -117.1         | 0                | 0.0         | 0.0         | Infil   | 0       | 677     | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Supply  | 0       | 0       | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 66.3 |
| Preheat  | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Return  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0       | 0       | No. People    | 0      | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Rm Exh  | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0  |
| Total    | -117.1         |                  |             |             | Auxil   | 0       | 0       | Htg Cfm/Sqft  | 0.00   | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |             |             |         |         |         | Htg Btuh/Sqft | -47.49 | Fn Frict | 0.0 | 0.0  |

-----AIRFLOWS (cfm)-----

--ENGINEERING CHECKS--

--TEMPERATURES (F)--

BUILDING U-VALUES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

| Room<br>Number | Description  | Room U-Values<br>(Btu/hr/sqft/F) |       |                |                |               |                |                |       |       | Room<br>Mass<br>(lb/<br>sqft) | Room<br>Capac.<br>(Btu/<br>sqft/F) |
|----------------|--------------|----------------------------------|-------|----------------|----------------|---------------|----------------|----------------|-------|-------|-------------------------------|------------------------------------|
|                |              | Part.                            | ExFlr | Summr<br>Skylt | Wintr<br>Skylt | Summr<br>Roof | Wintr<br>Windo | Summr<br>Windo | Wall  | Ceil. |                               |                                    |
| 1              | TV ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 203.7                         | 47.66                              |
| 2              | LIVING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.810          | 0.837          | 0.343 | 0.549 | 45.0                          | 12.23                              |
| 3              | LIVING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.810          | 0.837          | 0.343 | 0.549 | 45.0                          | 12.23                              |
| 4              | TV ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 224.4                         | 52.22                              |
| 5              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 158.6                         | 37.76                              |
| 6              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 177.1                         | 41.83                              |
| 7              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 158.6                         | 37.76                              |
| 8              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 177.1                         | 41.83                              |
| Zone           | 1 Total/Ave. | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.549 | 131.3                         | 31.54                              |
| System         | 1 Total/Ave. | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.549 | 131.3                         | 31.54                              |
| 1              | TV ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 203.7                         | 47.66                              |
| 2              | LIVING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.810          | 0.837          | 0.343 | 0.549 | 45.0                          | 12.23                              |
| 3              | LIVING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.810          | 0.837          | 0.343 | 0.549 | 45.0                          | 12.23                              |
| 4              | TV ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 224.4                         | 52.22                              |
| 5              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 158.6                         | 37.76                              |
| 6              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 177.1                         | 41.83                              |
| 7              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 158.6                         | 37.76                              |
| 8              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 177.1                         | 41.83                              |
| Zone           | 1 Total/Ave. | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.549 | 131.3                         | 31.54                              |
| 9              | DINING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.810          | 0.837          | 0.343 | 0.549 | 151.3                         | 35.58                              |
| 10             | KITCHEN      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.000          | 0.000          | 0.000 | 0.549 | 6.2                           | 3.70                               |
| 11             | KITCHEN      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.000          | 0.000          | 0.000 | 0.549 | 6.2                           | 3.70                               |
| 12             | DINING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000         | 0.810          | 0.837          | 0.343 | 0.549 | 151.3                         | 35.58                              |
| 13             | REAR FOYER   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 332.9                         | 73.43                              |
| 14             | REAR FOYER   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 401.2                         | 88.44                              |
| 15             | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 107.2                         | 26.46                              |
| 16             | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 107.2                         | 26.46                              |
| 17             | HALL         | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.000          | 0.000          | 0.000 | 0.000 | 14.3                          | 6.08                               |
| 18             | HALL         | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.000          | 0.000          | 0.000 | 0.000 | 14.3                          | 6.08                               |
| 19             | BATH         | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 133.8                         | 32.31                              |
| 20             | BATH         | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.000 | 133.8                         | 32.31                              |
| Zone           | 2 Total/Ave. | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.549 | 105.4                         | 25.59                              |
| System         | 2 Total/Ave. | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.549 | 120.9                         | 29.17                              |
| Building       |              | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058         | 0.810          | 0.837          | 0.343 | 0.549 | 124.8                         | 30.06                              |

BUILDING AREAS - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G   A R E A S -----

| Room Number | Description  | Number of Duplicate |   | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Min /Wl (%) | Net Wall Area (sqft) |
|-------------|--------------|---------------------|---|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
| 1           | TV ROOM      | 1                   | 1 | 160                         | 160                     | 0                     | 0                         | 0                    | 0           | 160                  | 78                 | 25          | 228                  |
| 2           | LIVING ROOM  | 1                   | 1 | 280                         | 280                     | 0                     | 0                         | 0                    | 0           | 0                    | 20                 | 20          | 82                   |
| 3           | LIVING ROOM  | 1                   | 1 | 280                         | 280                     | 0                     | 0                         | 0                    | 0           | 0                    | 20                 | 20          | 82                   |
| 4           | TV ROOM      | 1                   | 1 | 160                         | 160                     | 0                     | 0                         | 0                    | 0           | 160                  | 53                 | 17          | 253                  |
| 5           | BEDROOM      | 1                   | 1 | 156                         | 156                     | 0                     | 0                         | 0                    | 0           | 156                  | 20                 | 11          | 170                  |
| 6           | BEDROOM      | 1                   | 1 | 145                         | 145                     | 0                     | 0                         | 0                    | 0           | 145                  | 20                 | 10          | 178                  |
| 7           | BEDROOM      | 1                   | 1 | 156                         | 156                     | 0                     | 0                         | 0                    | 0           | 156                  | 20                 | 11          | 170                  |
| 8           | BEDROOM      | 1                   | 1 | 145                         | 145                     | 0                     | 0                         | 0                    | 0           | 145                  | 20                 | 10          | 178                  |
| Zone        | 1 Total/Ave. |                     |   |                             | 1,482                   | 0                     | 0                         | 0                    | 0           | 922                  | 250                | 16          | 1,342                |
| System      | 1 Total/Ave. |                     |   |                             | 1,482                   | 0                     | 0                         | 0                    | 0           | 922                  | 250                | 16          | 1,342                |
| 1           | TV ROOM      | 1                   | 1 | 160                         | 160                     | 0                     | 0                         | 0                    | 0           | 160                  | 78                 | 25          | 228                  |
| 2           | LIVING ROOM  | 1                   | 1 | 280                         | 280                     | 0                     | 0                         | 0                    | 0           | 0                    | 20                 | 20          | 82                   |
| 3           | LIVING ROOM  | 1                   | 1 | 280                         | 280                     | 0                     | 0                         | 0                    | 0           | 0                    | 20                 | 20          | 82                   |
| 4           | TV ROOM      | 1                   | 1 | 160                         | 160                     | 0                     | 0                         | 0                    | 0           | 160                  | 53                 | 17          | 253                  |
| 5           | BEDROOM      | 1                   | 1 | 156                         | 156                     | 0                     | 0                         | 0                    | 0           | 156                  | 20                 | 11          | 170                  |
| 6           | BEDROOM      | 1                   | 1 | 145                         | 145                     | 0                     | 0                         | 0                    | 0           | 145                  | 20                 | 10          | 178                  |
| 7           | BEDROOM      | 1                   | 1 | 156                         | 156                     | 0                     | 0                         | 0                    | 0           | 156                  | 20                 | 11          | 170                  |
| 8           | BEDROOM      | 1                   | 1 | 145                         | 145                     | 0                     | 0                         | 0                    | 0           | 145                  | 20                 | 10          | 178                  |
| Zone        | 1 Total/Ave. |                     |   |                             | 1,482                   | 0                     | 0                         | 0                    | 0           | 922                  | 250                | 16          | 1,342                |
| 9           | DINING ROOM  | 1                   | 1 | 148                         | 148                     | 0                     | 0                         | 0                    | 0           | 0                    | 25                 | 13          | 162                  |
| 10          | KITCHEN      | 1                   | 1 | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 11          | KITCHEN      | 1                   | 1 | 108                         | 108                     | 0                     | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 12          | DINING ROOM  | 1                   | 1 | 148                         | 148                     | 0                     | 0                         | 0                    | 0           | 0                    | 25                 | 13          | 162                  |
| 13          | REAR FOYER   | 1                   | 1 | 33                          | 33                      | 0                     | 0                         | 0                    | 0           | 33                   | 16                 | 17          | 78                   |
| 14          | REAR FOYER   | 1                   | 1 | 33                          | 33                      | 0                     | 0                         | 0                    | 0           | 33                   | 16                 | 14          | 94                   |
| 15          | BEDROOM      | 1                   | 1 | 80                          | 80                      | 0                     | 0                         | 0                    | 0           | 80                   | 10                 | 15          | 56                   |
| 16          | BEDROOM      | 1                   | 1 | 80                          | 80                      | 0                     | 0                         | 0                    | 0           | 80                   | 10                 | 15          | 56                   |
| 17          | HALL         | 1                   | 1 | 70                          | 70                      | 0                     | 0                         | 0                    | 0           | 70                   | 0                  | 0           | 0                    |
| 18          | HALL         | 1                   | 1 | 70                          | 70                      | 0                     | 0                         | 0                    | 0           | 70                   | 0                  | 0           | 0                    |
| 19          | BATH         | 1                   | 1 | 53                          | 53                      | 0                     | 0                         | 0                    | 0           | 53                   | 10                 | 17          | 48                   |
| 20          | BATH         | 1                   | 1 | 53                          | 53                      | 0                     | 0                         | 0                    | 0           | 53                   | 10                 | 17          | 48                   |
| Zone        | 2 Total/Ave. |                     |   |                             | 984                     | 0                     | 0                         | 0                    | 0           | 472                  | 122                | 15          | 703                  |
| System      | 2 Total/Ave. |                     |   |                             | 2,466                   | 0                     | 0                         | 0                    | 0           | 1,394                | 372                | 15          | 2,045                |
| Building    |              |                     |   |                             | 3,948                   | 0                     | 0                         | 0                    | 0           | 2,316                | 622                | 16          | 3,387                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.058 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.416 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.285 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.58 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 16.39 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 0.2                    | 11        | 154   | -9,730                   | 8         | 375   | 85.4                      | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 0.4                    | 15        | 220   | -19,459                  | 13        | 614   | 170.8                     | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 0.6                    | 10        | 143   | -29,189                  | 16        | 747   | 256.2                     | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 0.9                    | 6         | 89    | -38,918                  | 20        | 898   | 341.6                     | 42        | 1,530 | 0.0                       | 0         | 0     |
| 20 - 25             | 1.1                    | 8         | 118   | -48,648                  | 22        | 993   | 427.0                     | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 1.3                    | 11        | 154   | -58,378                  | 18        | 830   | 512.4                     | 0         | 0     | 0.0                       | 0         | 0     |
| 30 - 35             | 1.5                    | 9         | 134   | -68,107                  | 2         | 94    | 597.8                     | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 1.7                    | 13        | 191   | -77,837                  | 0         | 0     | 683.3                     | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 1.9                    | 5         | 66    | -87,566                  | 0         | 0     | 768.7                     | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 2.2                    | 3         | 42    | -97,296                  | 0         | 0     | 854.1                     | 21        | 765   | 0.0                       | 0         | 0     |
| 50 - 55             | 2.4                    | 3         | 42    | -107,026                 | 0         | 0     | 939.5                     | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 2.6                    | 3         | 40    | -116,755                 | 0         | 0     | 1,024.9                   | 0         | 0     | 0.0                       | 0         | 0     |
| 60 - 65             | 2.8                    | 0         | 0     | -126,485                 | 0         | 0     | 1,110.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 3.0                    | 0         | 0     | -136,215                 | 0         | 0     | 1,195.7                   | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 3.2                    | 0         | 0     | -145,944                 | 0         | 0     | 1,281.1                   | 0         | 0     | 0.0                       | 0         | 0     |
| 75 - 80             | 3.5                    | 0         | 0     | -155,674                 | 0         | 0     | 1,366.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 3.7                    | 0         | 0     | -165,403                 | 0         | 0     | 1,451.9                   | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 3.9                    | 1         | 20    | -175,133                 | 0         | 0     | 1,537.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 90 - 95             | 4.1                    | 1         | 11    | -184,863                 | 0         | 0     | 1,622.7                   | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 4.3                    | 0         | 0     | -194,592                 | 0         | 0     | 1,708.1                   | 38        | 1,377 | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,336 | 0                        | 0         | 4,209 | 0.0                       | 0         | 5,088 | 0.0                       | 0         | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

Temperature ----- Zone Number -----  
 Range            1     1     2  
 (F)

Max. Temp.    79.2  92.9  91.8  
 Mo./Hr.       7 14  8 22  8 23  
 Day Type      1     1     1

..... Number of Hours .....

|           |       |       |       |
|-----------|-------|-------|-------|
| Above 100 | 0     | 0     | 0     |
| 95 - 100  | 0     | 0     | 0     |
| 90 - 95   | 0     | 1,164 | 589   |
| 85 - 90   | 0     | 1,000 | 1,332 |
| 80 - 85   | 0     | 764   | 1,007 |
| 75 - 80   | 2,898 | 578   | 472   |
| 70 - 75   | 837   | 590   | 688   |
| 65 - 70   | 471   | 4,664 | 4,672 |
| 60 - 65   | 354   | 0     | 0     |
| 55 - 60   | 1,362 | 0     | 0     |
| 50 - 55   | 478   | 0     | 0     |
| Below 50  | 2,360 | 0     | 0     |

Min. Temp.    37.6  67.9  68.0  
 Mo./Hr.       2 10  2 8  1 1  
 Day Type      5     2     1



MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | HOT WTR HOT W DMND |                      |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Thrm)  | On Peak<br>(Thrm/hr) |
| Jan   | 524               | 2               | 361                | 1                    |
| Feb   | 474               | 2               | 353                | 1                    |
| March | 537               | 2               | 231                | 0                    |
| April | 505               | 2               | 93                 | 0                    |
| May   | 621               | 2               | 0                  | 0                    |
| June  | 1,132             | 9               | 0                  | 0                    |
| July  | 2,019             | 9               | 0                  | 0                    |
| Aug   | 1,233             | 9               | 0                  | 0                    |
| Sept  | 592               | 8               | 0                  | 0                    |
| Oct   | 529               | 2               | 24                 | 0                    |
| Nov   | 505               | 2               | 157                | 0                    |
| Dec   | 518               | 2               | 305                | 1                    |
| Total | 9,190             | 9               | 1,525              | 1                    |

Building Energy Consumption = 46,563 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 75,327 (Btu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | ----- Monthly Consumption ----- |                            |     |     |     |      |      |     |     |     |     |     | Total |
|---------|------------|---------------------------------|----------------------------|-----|-----|-----|------|------|-----|-----|-----|-----|-----|-------|
|         |            | Jan                             | Feb                        | Mar | Apr | May | June | July | Aug | Sep | Oct | Nov | Dec |       |
| 0       | LIGHTS     |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 522                             | 472                        | 535 | 503 | 529 | 516  | 516  | 535 | 503 | 529 | 503 | 516 | 6,181 |
|         | PK         | 2.0                             | 2.0                        | 2.0 | 2.0 | 2.0 | 2.0  | 2.0  | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0   |
| 1       | MISC LD    |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 0                               | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                             | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 2       | MISC LD    |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | GAS        | 0                               | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                             | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 3       | MISC LD    |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | OIL        | 0                               | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                             | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 4       | MISC LD    |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | P STEAM    | 0                               | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                             | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 5       | MISC LD    |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | P HOTH2O   | 0                               | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                             | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 6       | MISC LD    |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | P CHILL    | 0                               | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                             | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 1       | EQ1161     |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                                 | AIR-CLD COND COMP <15 TONS |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 0                               | 0                          | 0   | 0   | 0   | 395  | 1086 | 451 | 0   | 0   | 0   | 0   | 1,932 |
|         | PK         | 0.0                             | 0.0                        | 0.0 | 0.0 | 0.0 | 5.8  | 6.0  | 5.8 | 5.6 | 0.0 | 0.0 | 0.0 | 6.0   |
| 1       | EQ5200     |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                                 | CONDENSER FANS             |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 0                               | 0                          | 0   | 0   | 0   | 41   | 108  | 46  | 0   | 0   | 0   | 0   | 195   |
|         | PK         | 0.0                             | 0.0                        | 0.0 | 0.0 | 0.0 | 0.4  | 0.6  | 0.6 | 0.3 | 0.0 | 0.0 | 0.0 | 0.6   |
| 1       | EQ5303     |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                                 | CONTROLS                   |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 0                               | 0                          | 0   | 0   | 0   | 91   | 217  | 109 | 0   | 0   | 0   | 0   | 417   |
|         | PK         | 0.0                             | 0.0                        | 0.0 | 0.0 | 0.0 | 0.3  | 0.3  | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.3   |
| 1       | EQ4003     |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                                 | FC CENTRIF. FAN C.V.       |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 0                               | 0                          | 0   | 0   | 92  | 89   | 92   | 92  | 89  | 0   | 0   | 0   | 453   |
|         | PK         | 0.0                             | 0.0                        | 0.0 | 0.0 | 0.2 | 0.2  | 0.2  | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.2   |
| 1       | EQ2102     |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                                 | PURCHASED DIST. HOT WATER  |     |     |     |      |      |     |     |     |     |     |       |
|         | P HOTH2O   | 361                             | 353                        | 231 | 93  | 0   | 0    | 0    | 0   | 0   | 24  | 157 | 305 | 1,525 |
|         | PK         | 0.6                             | 0.6                        | 0.4 | 0.3 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.2 | 0.3 | 0.5 | 0.6   |
| 1       | EQ5020     |                                 |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                                 | HEAT WATER CIRC. PUMP C.V. |     |     |     |      |      |     |     |     |     |     |       |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
BASE BUILDING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 9.0 (kW)  
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|-----------------------|---------------------------|--------------------------|
|----------------------|------------------------|-----------------------|---------------------------|--------------------------|

Cooling Equipment

|           |        |                            |     |       |
|-----------|--------|----------------------------|-----|-------|
| 1         | EQ1161 | AIR-CLD COND COMP <15 TONS | 6.8 | 75.71 |
| Sub Total |        |                            | 6.8 | 75.71 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Air Moving Equipment

|           |  |                                    |     |      |
|-----------|--|------------------------------------|-----|------|
| 1         |  | SUMMATION OF FAN ELECTRICAL DEMAND | 0.2 | 2.43 |
| Sub Total |  |                                    | 0.2 | 2.43 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Miscellaneous

|                |  |  |     |       |
|----------------|--|--|-----|-------|
| Lights         |  |  | 2.0 | 21.86 |
| Base Utilities |  |  | 0.0 | 0.00  |
| Misc Equipment |  |  | 0.0 | 0.00  |
| Sub Total      |  |  | 2.0 | 21.86 |

|             |  |  |     |        |
|-------------|--|--|-----|--------|
| Grand Total |  |  | 9.0 | 100.00 |
|-------------|--|--|-----|--------|

\*\*\*\*\*  
\*\*\*\*\*  
\*\*  
\*\*                    T R A C E    6 0 0    A N A L Y S I S                    \*\*  
\*\*  
\*\*                    by                    \*\*  
\*\*  
\*\*\*\*\*  
\*\*\*\*\*

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDINGS 101-114

Weather File Code:                    CARLISLE  
Location:                              ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude:                              40.2 (deg)  
Longitude:                             77.2 (deg)  
Time Zone:                             5  
Elevation:                             475 (ft)  
Barometric Pressure:                  29.2 (in. Hg)

Summer Clearness Number:            1.00  
Winter Clearness Number:            1.00  
Summer Design Dry Bulb:              92 (F)  
Summer Design Wet Bulb:              72 (F)  
Winter Design Dry Bulb:              4 (F)  
Summer Ground Relectance:           0.20  
Winter Ground Relectance:           0.20

Air Density:                          0.0742 (Lbm/cuft)  
Air Specific Heat:                    0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod:          1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor:                  4,790.2 (8tu-min./hr/cuft)  
Enthalpy Factor:                     4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May        To September  
System Simulation Period: January    To December  
Cooling Load Methodology:           CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:          10:22:58    1/ 7/94  
Dataset Name:                         CB101-14 .TM

AIRFLOW - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | PTAC        | 120                   | 1,199                 | 1,199                 | 1,565                | 486                   | 0                    | 0                     |
| 2             | RAD         | 0                     | 0                     | 0                     | 0                    | 556                   | 0                    | 0                     |
| Totals        |             | 120                   | 1,199                 | 1,199                 | 1,565                | 1,042                 | 0                    | 0                     |

CAPACITY - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                           |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|---------------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Sys. Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | PTAC        | 3.1                       | 0.0                       | 0.0                       | 0.0                  | 3.1                   | -45,492                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -45,492               |
| 2             | RAD         | 0.0                       | 0.0                       | 0.0                       | 0.0                  | 0.0                   | -68,640                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -68,640               |
| Totals        |             | 3.1                       | 0.0                       | 0.0                       | 0.0                  | 3.1                   | -114,133                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -114,133              |

The building peaked at hour 16 month 7 with a capacity of 3.1 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | PTAC        | 10.00               | 0.81       | 382.4    | 472.5      | 25.40       | 0.81       | -30.70      | 1,482            |
| 2             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -27.83      | 2,466            |

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 1,644                   | 0                        | 0                      | 1,644            | 4.37             | * | 1,695                 | 6.65             | * | -1,582                       | -1,582                    | 3.48             |
| Glass Solar     | 9,125                   | 0                        | 0                      | 9,125            | 24.24            | * | 11,195                | 43.93            | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 2,726                   | 0                        | 0                      | 2,726            | 7.24             | * | 2,404                 | 9.43             | * | -13,405                      | -13,405                   | 29.49            |
| Wall Cond       | 1,354                   | 16                       | 0                      | 1,369            | 3.64             | * | 1,341                 | 5.26             | * | -4,913                       | -4,976                    | 10.95            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 14,058                  | 0                        | 0                      | 14,058           | 37.35            | * | 5,571                 | 21.86            | * | -25,493                      | -25,493                   | 56.08            |
| Sub Total==>    | 28,907                  | 16                       | 0                      | 28,923           | 76.84            | * | 22,206                | 87.13            | * | -45,393                      | -45,457                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 2,070                   | 0                        | 0                      | 2,070            | 5.50             | * | 2,078                 | 8.15             | * | 0                            | 0                         | 0.00             |
| People          | 1,784                   | 0                        | 0                      | 1,784            | 4.74             | * | 884                   | 3.47             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 3,855                   | 0                        | 0                      | 3,855            | 10.24            | * | 2,962                 | 11.62            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 10                      | -10                      | 0                      | 0                | 0.00             | * | 318                   | 1.25             | * | -309                         | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 4,606            | 12.24            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 256              | 0.68             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Duct Heat Pkqp  |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | -1                       | 0                      | -1               | -0.00            | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Grand Total==>  | 32,771                  | 5                        | 0                      | 37,638           | 100.00           | * | 25,486                | 100.00           | * | -45,702                      | -45,457                   | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Grains | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|--------|-------------|------------|--------|
| Main Clg | 3.1                   | 37.6            | 1,199            | 76.6                      | 55.4                     | 71.0   | Floor       | 1,482      |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | Part        | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | ExFlr       | 0          |        |
| Totals   | 3.1                   | 37.6            |                  |                           |                          |        | Roof        | 922        | 0 0    |
|          |                       |                 |                  |                           |                          |        | Wall        | 1,592      | 250 16 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 10.0   | Type     | Clg  | Htg   |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|-------|
| Main Htg | -45.5          | 1,199            | 68.2        | 103.0       | Vent    | 120     | 0       | Clg Cfm/Sqft  | 0.81   | SADB     | 55.5 | 103.0 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 366     | 366     | Clg Cfm/Ton   | 382.39 | Plenum   | 75.0 | 67.8  |
| Preheat  | -0.0           | 1,199            | 61.6        | 55.3        | Supply  | 1,199   | 1,199   | Clg Sqft/Ton  | 472.50 | Return   | 75.0 | 68.0  |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 25.40  | Ret/OA   | 76.6 | 68.0  |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 1,199   | 1,199   | No. People    | 5      | Runarnd  | 75.0 | 68.0  |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 120     | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0  | 0.0   |
| Total    | -45.5          |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.81   | Fn BldTD | 0.0  | 0.0   |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -30.70 | Fn Frict | 0.1  | 0.0   |

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Stuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -2,392                       | -2,392                    | 3.48             |
| Glass Solar     | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -19,947                      | -19,947                   | 29.06            |
| Wall Cond       | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -7,405                       | -7,584                    | 11.05            |
| Partition       | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | -38,717                      | -38,717                   | 56.41            |
| Sub Total==>    | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | -68,461                      | -68,640                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Lights          | 0                       | 0                        |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| People          | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | -2,408                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             |                       | 0.00             | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             | 0                            | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -70,869                      | -68,640                   | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 2,466      |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 1,394      | 0 0    |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall        | 2,417      | 372 15 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|-----|------|
| Main Htg | -68.6          | 0                | 0.0       | 0.0       | Infil   | 0       | 556     | Clg Cfm/Sqft  | 0.00   | SADB     | 0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 0       | Clg Cfm/Ton   | 0.00   | Plenum   | 0.0 | 67.7 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Sqft/Ton  | 0.00   | Return   | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 0       | Clg Btuh/Sqft | 0.00   | Ret/OA   | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | No. People    | 0      | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.0 | 0.0  |
| Total    | -68.6          |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft  | 0.00   | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft | -27.83 | Fn Frict | 0.0 | 0.0  |



BUILDING U-VALUES - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description  | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |            |             |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|--------------|-------|-------|----------------------------------|-------------|------------|-------------|-------------|-------|-------|------------------------|-----------------------------|
|             |              |       |       | Summr Skylt                      | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wall  | Ceil. |                        |                             |
| 1           | TV ROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 208.2                  | 48.56                       |
| 2           | LIVING ROOM  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 45.7                   | 12.37                       |
| 3           | LIVING ROOM  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 45.7                   | 12.37                       |
| 4           | TV ROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 229.3                  | 53.18                       |
| 5           | BEDROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 162.3                  | 38.49                       |
| 6           | BEDROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 181.1                  | 42.62                       |
| 7           | BEDROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 162.3                  | 38.49                       |
| 8           | BEDROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 181.1                  | 42.62                       |
| Zone        | 1 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 134.1                  | 32.10                       |
| System      | 1 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 134.1                  | 32.10                       |
| 1           | TV ROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 208.2                  | 48.56                       |
| 2           | LIVING ROOM  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 45.7                   | 12.37                       |
| 3           | LIVING ROOM  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 45.7                   | 12.37                       |
| 4           | TV ROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 229.3                  | 53.18                       |
| 5           | BEDROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 162.3                  | 38.49                       |
| 6           | BEDROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 181.1                  | 42.62                       |
| 7           | BEDROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 162.3                  | 38.49                       |
| 8           | BEDROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 181.1                  | 42.62                       |
| Zone        | 1 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 134.1                  | 32.10                       |
| 9           | DINING ROOM  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 154.0                  | 36.11                       |
| 10          | KITCHEN      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.549 | 6.2                    | 3.70                        |
| 11          | KITCHEN      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.549 | 6.2                    | 3.70                        |
| 12          | DINING ROOM  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 154.0                  | 36.11                       |
| 13          | REAR FOYER   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 339.6                  | 74.77                       |
| 14          | REAR FOYER   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 409.2                  | 90.02                       |
| 15          | BEDROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 109.9                  | 27.00                       |
| 16          | BEDROOM      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 109.9                  | 27.00                       |
| 17          | HALL         | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.000       | 0.000       | 0.000 | 0.000 | 15.3                   | 6.28                        |
| 18          | HALL         | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.000       | 0.000       | 0.000 | 0.000 | 15.3                   | 6.28                        |
| 19          | BATH         | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 137.0                  | 32.95                       |
| 20          | BATH         | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 137.0                  | 32.95                       |
| Zone        | 2 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 107.6                  | 26.03                       |
| System      | 2 Total/Ave. | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 123.5                  | 29.68                       |
| Building    |              | 0.000 | 0.000 | 0.000                            | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 127.5                  | 30.59                       |

BUILDING AREAS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description  | Number of<br>Duplicate |    | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|--------------|------------------------|----|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
|                |              | Flr                    | Rm |                                      |                                  |                             |                                    |                            |                   |                            |                          |                   |                            |
| 1              | TV ROOM      | 1                      | 1  | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 78                       | 25                | 228                        |
| 2              | LIVING ROOM  | 1                      | 1  | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 3              | LIVING ROOM  | 1                      | 1  | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 4              | TV ROOM      | 1                      | 1  | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 53                       | 17                | 253                        |
| 5              | BEDROOM      | 1                      | 1  | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 6              | BEDROOM      | 1                      | 1  | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| 7              | BEDROOM      | 1                      | 1  | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 8              | BEDROOM      | 1                      | 1  | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| Zone           | 1 Total/Ave. |                        |    |                                      | 1,482                            | 0                           | 0                                  | 0                          | 0                 | 922                        | 250                      | 16                | 1,342                      |
| System         | 1 Total/Ave. |                        |    |                                      | 1,482                            | 0                           | 0                                  | 0                          | 0                 | 922                        | 250                      | 16                | 1,342                      |
| 1              | TV ROOM      | 1                      | 1  | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 78                       | 25                | 228                        |
| 2              | LIVING ROOM  | 1                      | 1  | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 3              | LIVING ROOM  | 1                      | 1  | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 4              | TV ROOM      | 1                      | 1  | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 53                       | 17                | 253                        |
| 5              | BEDROOM      | 1                      | 1  | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 6              | BEDROOM      | 1                      | 1  | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| 7              | BEDROOM      | 1                      | 1  | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 8              | BEDROOM      | 1                      | 1  | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| Zone           | 1 Total/Ave. |                        |    |                                      | 1,482                            | 0                           | 0                                  | 0                          | 0                 | 922                        | 250                      | 16                | 1,342                      |
| 9              | DINING ROOM  | 1                      | 1  | 148                                  | 148                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 13                | 162                        |
| 10             | KITCHEN      | 1                      | 1  | 108                                  | 108                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 11             | KITCHEN      | 1                      | 1  | 108                                  | 108                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 12             | DINING ROOM  | 1                      | 1  | 148                                  | 148                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 13                | 162                        |
| 13             | REAR FOYER   | 1                      | 1  | 33                                   | 33                               | 0                           | 0                                  | 0                          | 0                 | 33                         | 16                       | 17                | 78                         |
| 14             | REAR FOYER   | 1                      | 1  | 33                                   | 33                               | 0                           | 0                                  | 0                          | 0                 | 33                         | 16                       | 14                | 94                         |
| 15             | BEDROOM      | 1                      | 1  | 80                                   | 80                               | 0                           | 0                                  | 0                          | 0                 | 80                         | 10                       | 15                | 56                         |
| 16             | BEDROOM      | 1                      | 1  | 80                                   | 80                               | 0                           | 0                                  | 0                          | 0                 | 80                         | 10                       | 15                | 56                         |
| 17             | HALL         | 1                      | 1  | 70                                   | 70                               | 0                           | 0                                  | 0                          | 0                 | 70                         | 0                        | 0                 | 0                          |
| 18             | HALL         | 1                      | 1  | 70                                   | 70                               | 0                           | 0                                  | 0                          | 0                 | 70                         | 0                        | 0                 | 0                          |
| 19             | BATH         | 1                      | 1  | 53                                   | 53                               | 0                           | 0                                  | 0                          | 0                 | 53                         | 10                       | 17                | 48                         |
| 20             | BATH         | 1                      | 1  | 53                                   | 53                               | 0                           | 0                                  | 0                          | 0                 | 53                         | 10                       | 17                | 48                         |
| Zone           | 2 Total/Ave. |                        |    |                                      | 984                              | 0                           | 0                                  | 0                          | 0                 | 472                        | 122                      | 15                | 703                        |
| System         | 2 Total/Ave. |                        |    |                                      | 2,466                            | 0                           | 0                                  | 0                          | 0                 | 1,394                      | 372                      | 15                | 2,045                      |
| Building       |              |                        |    |                                      | 3,948                            | 0                           | 0                                  | 0                          | 0                 | 2,316                      | 622                      | 16                | 3,387                      |

ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
WALL & ROOF INSULATION

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.175 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.121 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.35 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 15.01 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 0.2                    | 13        | 140   | -5,707                   | 7         | 292   | 60.0                      | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 0.3                    | 8         | 84    | -11,413                  | 12        | 472   | 119.9                     | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 0.5                    | 7         | 81    | -17,120                  | 19        | 751   | 179.9                     | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 0.6                    | 4         | 41    | -22,827                  | 24        | 930   | 239.9                     | 42        | 1,530 | 0.0                       | 0         | 0     |
| 20 - 25             | 0.8                    | 7         | 79    | -28,533                  | 17        | 685   | 299.8                     | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 0.9                    | 17        | 188   | -34,240                  | 18        | 692   | 359.8                     | 0         | 0     | 0.0                       | 0         | 0     |
| 30 - 35             | 1.1                    | 5         | 58    | -39,946                  | 2         | 94    | 419.8                     | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 1.3                    | 6         | 72    | -45,653                  | 0         | 0     | 479.8                     | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 1.4                    | 8         | 94    | -51,360                  | 0         | 0     | 539.7                     | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 1.6                    | 13        | 143   | -57,066                  | 0         | 0     | 599.7                     | 21        | 765   | 0.0                       | 0         | 0     |
| 50 - 55             | 1.7                    | 5         | 54    | -62,773                  | 0         | 0     | 659.7                     | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 1.9                    | 0         | 0     | -68,480                  | 0         | 0     | 719.6                     | 0         | 0     | 0.0                       | 0         | 0     |
| 60 - 65             | 2.0                    | 5         | 51    | -74,186                  | 0         | 0     | 779.6                     | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 2.2                    | 0         | 0     | -79,893                  | 0         | 0     | 839.6                     | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 2.4                    | 0         | 0     | -85,599                  | 0         | 0     | 899.5                     | 0         | 0     | 0.0                       | 0         | 0     |
| 75 - 80             | 2.5                    | 0         | 0     | -91,306                  | 0         | 0     | 959.5                     | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 2.7                    | 0         | 0     | -97,013                  | 0         | 0     | 1,019.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 2.8                    | 0         | 0     | -102,719                 | 0         | 0     | 1,079.4                   | 0         | 0     | 0.0                       | 0         | 0     |
| 90 - 95             | 3.0                    | 0         | 0     | -108,426                 | 0         | 0     | 1,139.4                   | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 3.1                    | 3         | 31    | -114,133                 | 0         | 0     | 1,199.4                   | 38        | 1,377 | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,644 | 0                        | 0         | 4,844 | 0.0                       | 0         | 5,088 | 0.0                       | 0         | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

|             |                         |   |   |
|-------------|-------------------------|---|---|
| Temperature | ----- Zone Number ----- |   |   |
| Range       | 1                       | 1 | 2 |
| (F)         |                         |   |   |

|            |      |      |      |
|------------|------|------|------|
| Max. Temp. | 78.8 | 95.6 | 94.9 |
| Mo./Hr.    | 7 14 | 9 21 | 9 20 |
| Day Type   | 1    | 1    | 1    |

|           |                             |       |       |
|-----------|-----------------------------|-------|-------|
|           | ..... Number of Hours ..... |       |       |
| Above 100 | 0                           | 0     | 0     |
| 95 - 100  | 0                           | 307   | 0     |
| 90 - 95   | 0                           | 1,901 | 1,983 |
| 85 - 90   | 0                           | 221   | 370   |
| 80 - 85   | 0                           | 915   | 995   |
| 75 - 80   | 2,928                       | 379   | 378   |
| 70 - 75   | 771                         | 693   | 690   |
| 65 - 70   | 797                         | 4,344 | 4,344 |
| 60 - 65   | 612                         | 0     | 0     |
| 55 - 60   | 1,115                       | 0     | 0     |
| 50 - 55   | 731                         | 0     | 0     |
| Below 50  | 1,806                       | 0     | 0     |

|            |      |        |      |
|------------|------|--------|------|
| Min. Temp. | 40.5 | 68.0   | 67.9 |
| Mo./Hr.    | 2 11 | 1 1 11 | 6    |
| Day Type   | 5    | 1      | 2    |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | HOT WTR HOT W DMND |                      |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 523               | 2               | 193                | 0                    |
| Feb   | 473               | 2               | 194                | 0                    |
| March | 537               | 2               | 122                | 0                    |
| April | 504               | 2               | 38                 | 0                    |
| May   | 593               | 2               | 0                  | 0                    |
| June  | 979               | 7               | 0                  | 0                    |
| July  | 1,508             | 7               | 0                  | 0                    |
| Aug   | 1,066             | 7               | 0                  | 0                    |
| Sept  | 566               | 7               | 0                  | 0                    |
| Oct   | 529               | 2               | 0                  | 0                    |
| Nov   | 504               | 2               | 64                 | 0                    |
| Dec   | 517               | 2               | 158                | 0                    |
| Total | 8,300             | 7               | 769                | 0                    |

Building Energy Consumption = 26,662 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 47,509 (Btu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref<br>Num | Equip<br>Code | Monthly Consumption |                            |     |     |     |      |      |     |     |     |     |     | Total |
|------------|---------------|---------------------|----------------------------|-----|-----|-----|------|------|-----|-----|-----|-----|-----|-------|
|            |               | Jan                 | Feb                        | Mar | Apr | May | June | July | Aug | Sep | Oct | Nov | Dec |       |
| 0          | LIGHTS        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 522                 | 472                        | 535 | 503 | 529 | 516  | 516  | 535 | 503 | 529 | 503 | 516 | 6,181 |
|            | PK            | 2.0                 | 2.0                        | 2.0 | 2.0 | 2.0 | 2.0  | 2.0  | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0   |
| 1          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 2          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | GAS           | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 3          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | OIL           | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 4          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | P STEAM       | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 5          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | P HOTH2O      | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 6          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | P CHILL       | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 1          | EQ1161        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | AIR-CLD COND COMP <15 TONS |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 0                   | 0                          | 0   | 0   | 0   | 292  | 702  | 347 | 0   | 0   | 0   | 0   | 1,341 |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 4.0  | 4.3  | 4.2 | 4.1 | 0.0 | 0.0 | 0.0 | 4.3   |
| 1          | EQ5200        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | CONDENSER FANS             |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 0                   | 0                          | 0   | 0   | 0   | 30   | 71   | 36  | 0   | 0   | 0   | 0   | 137   |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.2  | 0.4  | 0.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.4   |
| 1          | EQ5303        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | CONTROLS                   |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 0                   | 0                          | 0   | 0   | 0   | 79   | 155  | 84  | 0   | 0   | 0   | 0   | 317   |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.3  | 0.3  | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.3   |
| 1          | EQ4003        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | FC CENTRIF. FAN C.V.       |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 0                   | 0                          | 0   | 0   | 64  | 62   | 64   | 64  | 62  | 0   | 0   | 0   | 318   |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.2 | 0.2  | 0.2  | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.2   |
| 1          | EQ2102        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | PURCHASED DIST. HOT WATER  |     |     |     |      |      |     |     |     |     |     |       |
|            | P HOTH2O      | 193                 | 194                        | 122 | 38  | 0   | 0    | 0    | 0   | 0   | 0   | 64  | 158 | 769   |
|            | PK            | 0.4                 | 0.4                        | 0.3 | 0.2 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 0.4   |
| 1          | EQ5020        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | HEAT WATER CIRC. PUMP C.V. |     |     |     |      |      |     |     |     |     |     |       |





UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
WALL & ROOF INSULATION

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 7.2 (kW)  
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|-----------------------|---------------------------|------------------------|
|----------------------|------------------------|-----------------------|---------------------------|------------------------|

Cooling Equipment

|           |        |                            |     |       |
|-----------|--------|----------------------------|-----|-------|
| 1         | EQ1161 | AIR-CLD COND COMP <15 TONS | 5.0 | 70.31 |
| Sub Total |        |                            | 5.0 | 70.31 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Air Moving Equipment

|           |  |                                    |     |      |
|-----------|--|------------------------------------|-----|------|
| 1         |  | SUMMATION OF FAN ELECTRICAL DEMAND | 0.2 | 2.15 |
| Sub Total |  |                                    | 0.2 | 2.15 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Miscellaneous

|                |  |  |     |       |
|----------------|--|--|-----|-------|
| Lights         |  |  | 2.0 | 27.54 |
| Base Utilities |  |  | 0.0 | 0.00  |
| Misc Equipment |  |  | 0.0 | 0.00  |
| Sub Total      |  |  | 2.0 | 27.54 |

|             |  |  |     |        |
|-------------|--|--|-----|--------|
| Grand Total |  |  | 7.2 | 100.00 |
|-------------|--|--|-----|--------|

```
*****  
*****  
**  
**          T R A C E   6 0 0   A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDINGS 101-114

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 10:42:17 1/ 7/94  
Dataset Name: CB101-14 .TM

AIRFLOW - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | PTAC        | 171                   | 1,709                 | 1,709                 | 2,123                | 585                   | 0                    | 0                     |
| 2             | RAD         | 0                     | 0                     | 0                     | 0                    | 628                   | 0                    | 0                     |
| Totals        |             | 171                   | 1,709                 | 1,709                 | 2,123                | 1,213                 | 0                    | 0                     |

CAPACITY - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | PTAC        | 4.2                       | 0.0                       | 0.0                  | 0.0                  | 4.2                   | -75,277                   | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -75,277               |
| 2             | RAD         | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -113,735                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -113,735              |
| Totals        |             | 4.2                       | 0.0                       | 0.0                  | 0.0                  | 4.2                   | -189,012                  | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -189,012              |

The building peaked at hour 15 month 7 with a capacity of 4.2 tons

ENGINEERING CHECKS - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | PTAC        | 10.00               | 1.15       | 404.6    | 350.8      | 34.21       | 1.15       | -50.79      | 1,482            |
| 2             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -46.12      | 2,466            |

System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK  |            |          |          |        | CLG SPACE PEAK           |   |          |        |   | HEATING COIL PEAK |           |        |              |  |  |
|--------------------|------------|----------|----------|--------|--------------------------|---|----------|--------|---|-------------------|-----------|--------|--------------|--|--|
| Peaked at Time ==> |            |          |          |        | Mo/Hr: 7/16              |   |          |        |   | Mo/Hr: 7/16       |           |        | Mo/Hr: 13/ 1 |  |  |
| Outside Air ==>    |            |          |          |        | OADB/WB/HR: 91/ 73/ 98.0 |   |          |        |   | OADB: 91          |           |        | OADB: 4      |  |  |
|                    | Space      | Ret. Air | Ret. Air | Net    | Percnt                   |   | Space    | Percnt |   | Space Peak        | Coil Peak | Percnt |              |  |  |
|                    | Sens.+Lat. | Sensible | Latent   | Total  | Of Tot                   |   | Sensible | Of Tot |   | Space Sens        | Tot Sens  | Of Tot |              |  |  |
|                    | (8tuh)     | (8tuh)   | (8tuh)   | (8tuh) | (%)                      |   | (8tuh)   | (%)    |   | (8tuh)            | (8tuh)    | (%)    |              |  |  |
| Envelope Loads     |            |          |          |        |                          |   |          |        |   |                   |           |        |              |  |  |
| Skylite Solr       | 0          | 0        |          | 0      | 0.00                     | * | 0        | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Skylite Cond       | 0          | 0        |          | 0      | 0.00                     | * | 0        | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Roof Cond          | 4.039      | 0        |          | 4,039  | 7.97                     | * | 3,972    | 11.19  | * | -3,410            | -3,410    | 4.54   |              |  |  |
| Glass Solar        | 9,125      | 0        |          | 9,125  | 18.00                    | * | 11,195   | 31.53  | * | 0                 | 0         | 0.00   |              |  |  |
| Glass Cond         | 2,726      | 0        |          | 2,726  | 5.38                     | * | 2,404    | 6.77   | * | -13,405           | -13,405   | 17.85  |              |  |  |
| Wall Cond          | 8.040      | 93       |          | 8,133  | 16.04                    | * | 8,112    | 22.85  | * | -29,086           | -29,459   | 39.23  |              |  |  |
| Partition          | 0          |          |          | 0      | 0.00                     | * | 0        | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Exposed Floor      | 0          |          |          | 0      | 0.00                     | * | 0        | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Infiltration       | 15.892     |          |          | 15,892 | 31.35                    | * | 6,297    | 17.73  | * | -28,819           | -28,819   | 38.38  |              |  |  |
| Sub Total==>       | 39.822     | 93       |          | 39.915 | 78.74                    | * | 31.981   | 90.06  | * | -74,720           | -75,093   | 100.00 |              |  |  |
| Internal Loads     |            |          |          |        |                          |   |          |        |   |                   |           |        |              |  |  |
| Lights             | 2.070      | 0        |          | 2.070  | 4.08                     | * | 2,078    | 5.85   | * | 0                 | 0         | 0.00   |              |  |  |
| People             | 1.784      |          |          | 1,784  | 3.52                     | * | 884      | 2.49   | * | 0                 | 0         | 0.00   |              |  |  |
| Misc               | 0          | 0        | 0        | 0      | 0.00                     | * | 0        | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Sub Total==>       | 3.855      | 0        | 0        | 3.855  | 7.60                     | * | 2,962    | 8.34   | * | 0                 | 0         | 0.00   |              |  |  |
| Ceiling Load       | 52         | -52      |          | 0      | 0.00                     | * | 568      | 1.60   | * | -523              | 0         | 0.00   |              |  |  |
| Outside Air        | 0          | 0        | 0        | 6,564  | 12.95                    | * | 0        | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Sup. Fan Heat      |            |          |          | 365    | 0.72                     | * |          | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Ret. Fan Heat      |            | 0        |          | 0      | 0.00                     | * |          | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Duct Heat PkUp     |            | 0        |          | 0      | 0.00                     | * |          | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| OV/UNDR Sizing     | 0          |          |          | 0      | 0.00                     | * | 0        | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Exhaust Heat       |            | -7       | 0        | -7     | -0.01                    | * |          | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Terminal Bypass    |            | 0        | 0        | 0      | 0.00                     | * |          | 0.00   | * | 0                 | 0         | 0.00   |              |  |  |
| Grand Total==>     | 43.729     | 34       | 0        | 50.692 | 100.00                   | * | 35,510   | 100.00 | * | -75,244           | -75,093   | 100.00 |              |  |  |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       |       | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS |            |     |
|----------|----------------|-------|-------|------------|-------------------|-------|--------|------------------|-------|--------|-------|------------|-----|
|          | (Tons)         | (Mbh) | (Mbh) |            | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor | Glass (sf) | (%) |
| Main Clg | 4.2            | 50.7  | 37.2  | 1,709      | 76.7              | 63.7  | 69.7   | 55.8             | 53.7  | 59.6   | 1,482 |            |     |
| Aux Clg  | 0.0            | 0.0   | 0.0   | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0     |            |     |
| Opt Vent | 0.0            | 0.0   | 0.0   | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0     |            |     |
| Totals   | 4.2            | 50.7  |       |            |                   |       |        |                  |       |        | 922   | 0          | 0   |
|          |                |       |       |            |                   |       |        |                  |       |        | 1,592 | 250        | 16  |

-----HEATING COIL SELECTION-----

|          | Capacity |            | Ent  | Lvg   | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |       |
|----------|----------|------------|------|-------|---------|----------------|---------|------------------------|--------|----------------------|------|-------|
|          | (Mbh)    | Coil Airfl |      |       |         | Cooling        | Heating | Clg % OA               | 10.0   | Type                 | Clg  | Htg   |
| Main Htg | -75.3    | 1,709      | 68.0 | 108.5 | Vent    | 171            | 0       | Clg Cfm/Sqft           | 1.15   | SADB                 | 55.9 | 108.5 |
| Aux Htg  | 0.0      | 0          | 0.0  | 0.0   | Infil   | 414            | 414     | Clg Cfm/Ton            | 404.62 | Plenum               | 75.2 | 67.2  |
| Preheat  | -0.0     | 1,709      | 61.4 | 55.7  | Supply  | 1,709          | 1,709   | Clg Sqft/Ton           | 350.82 | Return               | 75.0 | 67.8  |
| Reheat   | 0.0      | 0          | 0.0  | 0.0   | Mincfm  | 0              | 0       | Clg Btuh/Sqft          | 34.21  | Ret/OA               | 76.6 | 67.8  |
| Humidif  | 0.0      | 0          | 0.0  | 0.0   | Return  | 1,709          | 1,709   | No. People             | 5      | Runarnd              | 75.0 | 68.0  |
| Opt Vent | 0.0      | 0          | 0.0  | 0.0   | Exhaust | 171            | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.0  | 0.0   |
| Total    | -75.3    |            |      |       | Rm Exh  | 0              | 0       | Htg Cfm/Sqft           | 1.15   | Fn BldTD             | 0.0  | 0.0   |
|          |          |            |      |       | Auxil   | 0              | 0       | Htg Btuh/Sqft          | -50.79 | Fn Frict             | 0:1  | 0.0   |

System 2 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK  |                          |                          |                        |                  | CLG SPACE PEAK      |                       |                  |                   |                  | HEATING COIL PEAK |  |  |
|--------------------|--------------------------|--------------------------|------------------------|------------------|---------------------|-----------------------|------------------|-------------------|------------------|-------------------|--|--|
| Peaked at Time ==> |                          |                          |                        |                  | Mo/Hr: 0/0          |                       |                  |                   |                  | Mo/Hr: 13/1       |  |  |
| Outside Air ==>    |                          |                          |                        |                  | OADB/WB/HR: 0/0/0.0 |                       |                  |                   |                  | OADB: 4           |  |  |
| Envelope Loads     | Space Sens. #Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%)    | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%)  |  |  |
| Skylite Solr       | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Skylite Cond       | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Roof Cond          | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | -5,156            | -5,156           | 4.53              |  |  |
| Glass Solar        | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Glass Cond         | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | -19,947           | -19,947          | 17.54             |  |  |
| Wall Cond          | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | -43,846           | -44,864          | 39.45             |  |  |
| Partition          | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Exposed Floor      | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Infiltration       | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | -43,767           | -43,767          | 38.48             |  |  |
| Sub Total==>       | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | -112,716          | -113,734         | 100.00            |  |  |
| Internal Loads     |                          |                          |                        |                  |                     |                       |                  |                   |                  |                   |  |  |
| Lights             | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| People             | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Misc               | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Sub Total==>       | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Ceiling Load       | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | -5,342            | 0                | 0.00              |  |  |
| Outside Air        | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Sup. Fan Heat      | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Ret. Fan Heat      | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Duct Heat Pkup     | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| OV/UNDR Sizing     | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Exhaust Heat       | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Terminal Bypass    | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | 0                 | 0                | 0.00              |  |  |
| Grand Total==>     | 0                        | 0                        | 0                      | 0                | 0.00                | 0                     | 0.00             | -118,058          | -113,734         | 100.00            |  |  |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       |       | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS |            |        |
|----------|----------------|-------|-------|------------------|-------------------|-------|--------|------------------|-------|--------|-------|------------|--------|
|          | (Tons)         | (Mbh) | (Mbh) |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor | Glass (sf) | (%)    |
| Main Clg | 0.0            | 0.0   | 0.0   | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part  | 2,466      |        |
| Aux Clg  | 0.0            | 0.0   | 0.0   | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr | 0          |        |
| Opt Vent | 0.0            | 0.0   | 0.0   | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof  | 1,394      | 0 0    |
| Totals   | 0.0            | 0.0   | 0.0   | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Wall  | 2,417      | 372 15 |

-----HEATING COIL SELECTION-----

|          | Capacity |       | Ent Deg F | Lvg Deg F | AIRFLOWS (cfm) |         | ENGINEERING CHECKS |        |          | TEMPERATURES (F) |      |  |
|----------|----------|-------|-----------|-----------|----------------|---------|--------------------|--------|----------|------------------|------|--|
|          | (Mbh)    | (cfm) |           |           | Cooling        | Heating | Clg % OA           | 0.0    | Type     | Clg              | Htg  |  |
| Main Htg | -113.7   | 0     | 0.0       | 0.0       | 0              | 0       | Clg Cfm/Sqft       | 0.00   | SADB     | 0.0              | 68.1 |  |
| Aux Htg  | 0.0      | 0     | 0.0       | 0.0       | 0              | 628     | Clg Cfm/Ton        | 0.00   | Plenum   | 0.0              | 66.3 |  |
| Preheat  | 0.0      | 0     | 0.0       | 0.0       | 0              | 0       | Clg Sft/Ton        | 0.00   | Return   | 0.0              | 68.0 |  |
| Reheat   | 0.0      | 0     | 0.0       | 0.0       | 0              | 0       | Clg 8tuh/Sqft      | 0.00   | Ret/OA   | 0.0              | 68.0 |  |
| Humidif. | 0.0      | 0     | 0.0       | 0.0       | 0              | 0       | No. People         | 0      | Runarnd  | 0.0              | 68.0 |  |
| Opt Vent | 0.0      | 0     | 0.0       | 0.0       | 0              | 0       | Htg % OA           | 0.0    | Fn MtrTD | 0.0              | 0.0  |  |
| Total    | -113.7   | 0     | 0.0       | 0.0       | 0              | 0       | Htg Cfm/Sqft       | 0.00   | Fn BldTD | 0.0              | 0.0  |  |
|          |          |       |           |           | 0              | 0       | Htg 8tuh/Sqft      | -46.12 | Fn Frict | 0.0              | 0.0  |  |

BUILDING U-VALUES - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G U - V A L U E S -----

| Room<br>Number | Description  | Room U-Values<br>(Btu/hr/sqft/F) |       |                |                |       |                |                |       |        | Room<br>Mass<br>(lb/<br>sqft) | Room<br>Capac.<br>(Btu/<br>sqft/F) |
|----------------|--------------|----------------------------------|-------|----------------|----------------|-------|----------------|----------------|-------|--------|-------------------------------|------------------------------------|
|                |              | Part.                            | ExFlr | Summr<br>Skylt | Wintr<br>Skylt | Roof  | Summr<br>Windo | Wintr<br>Windo | Wall  | Ceill. |                               |                                    |
| 1              | TV ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 203.7                         | 47.66                              |
| 2              | LIVING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.343 | 0.549  | 45.0                          | 12.23                              |
| 3              | LIVING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.343 | 0.549  | 45.0                          | 12.23                              |
| 4              | TV ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 224.4                         | 52.22                              |
| 5              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 158.6                         | 37.76                              |
| 6              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 177.1                         | 41.83                              |
| 7              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 158.6                         | 37.76                              |
| 8              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 177.1                         | 41.83                              |
| Zone           | 1 Total/Ave. | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.549  | 131.3                         | 31.54                              |
| System         | 1 Total/Ave. | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.549  | 131.3                         | 31.54                              |
| 1              | TV ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 203.7                         | 47.66                              |
| 2              | LIVING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.343 | 0.549  | 45.0                          | 12.23                              |
| 3              | LIVING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.343 | 0.549  | 45.0                          | 12.23                              |
| 4              | TV ROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 224.4                         | 52.22                              |
| 5              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 158.6                         | 37.76                              |
| 6              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 177.1                         | 41.83                              |
| 7              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 158.6                         | 37.76                              |
| 8              | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 177.1                         | 41.83                              |
| Zone           | 1 Total/Ave. | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.549  | 131.3                         | 31.54                              |
| 9              | DINING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.343 | 0.549  | 151.3                         | 35.58                              |
| 10             | KITCHEN      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.549  | 6.2                           | 3.70                               |
| 11             | KITCHEN      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.549  | 6.2                           | 3.70                               |
| 12             | DINING ROOM  | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.343 | 0.549  | 151.3                         | 35.58                              |
| 13             | REAR FOYER   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 332.9                         | 73.43                              |
| 14             | REAR FOYER   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 401.2                         | 88.44                              |
| 15             | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 107.2                         | 26.46                              |
| 16             | BEDROOM      | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 107.2                         | 26.46                              |
| 17             | HALL         | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.000          | 0.000          | 0.000 | 0.000  | 14.3                          | 6.08                               |
| 18             | HALL         | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.000          | 0.000          | 0.000 | 0.000  | 14.3                          | 6.08                               |
| 19             | BATH         | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 133.8                         | 32.31                              |
| 20             | BATH         | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.000  | 133.8                         | 32.31                              |
| Zone           | 2 Total/Ave. | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.549  | 105.4                         | 25.59                              |
| System         | 2 Total/Ave. | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.549  | 120.9                         | 29.17                              |
| Building       |              | 0.000                            | 0.000 | 0.000          | 0.000          | 0.058 | 0.810          | 0.837          | 0.343 | 0.549  | 124.8                         | 30.06                              |

BUILDING AREAS - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description  | Number of<br>Duplicate |    | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|--------------|------------------------|----|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
|                |              | Flr                    | Rm |                                      |                                  |                             |                                    |                            |                   |                            |                          |                   |                            |
| 1              | TV ROOM      | 1                      | 1  | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 78                       | 25                | 228                        |
| 2              | LIVING ROOM  | 1                      | 1  | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 3              | LIVING ROOM  | 1                      | 1  | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 4              | TV ROOM      | 1                      | 1  | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 53                       | 17                | 253                        |
| 5              | BEDROOM      | 1                      | 1  | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 6              | BEDROOM      | 1                      | 1  | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| 7              | BEDROOM      | 1                      | 1  | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 8              | BEDROOM      | 1                      | 1  | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| Zone           | 1 Total/Ave. |                        |    |                                      | 1,482                            | 0                           | 0                                  | 0                          | 0                 | 922                        | 250                      | 16                | 1,342                      |
| System         | 1 Total/Ave. |                        |    |                                      | 1,482                            | 0                           | 0                                  | 0                          | 0                 | 922                        | 250                      | 16                | 1,342                      |
| 1              | TV ROOM      | 1                      | 1  | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 78                       | 25                | 228                        |
| 2              | LIVING ROOM  | 1                      | 1  | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 3              | LIVING ROOM  | 1                      | 1  | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 4              | TV ROOM      | 1                      | 1  | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 53                       | 17                | 253                        |
| 5              | BEDROOM      | 1                      | 1  | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 6              | BEDROOM      | 1                      | 1  | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| 7              | BEDROOM      | 1                      | 1  | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 8              | BEDROOM      | 1                      | 1  | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| Zone           | 1 Total/Ave. |                        |    |                                      | 1,482                            | 0                           | 0                                  | 0                          | 0                 | 922                        | 250                      | 16                | 1,342                      |
| 9              | DINING ROOM  | 1                      | 1  | 148                                  | 148                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 13                | 162                        |
| 10             | KITCHEN      | 1                      | 1  | 108                                  | 108                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 11             | KITCHEN      | 1                      | 1  | 108                                  | 108                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 12             | DINING ROOM  | 1                      | 1  | 148                                  | 148                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 13                | 162                        |
| 13             | REAR FOYER   | 1                      | 1  | 33                                   | 33                               | 0                           | 0                                  | 0                          | 0                 | 33                         | 16                       | 17                | 78                         |
| 14             | REAR FOYER   | 1                      | 1  | 33                                   | 33                               | 0                           | 0                                  | 0                          | 0                 | 33                         | 16                       | 14                | 94                         |
| 15             | BEDROOM      | 1                      | 1  | 80                                   | 80                               | 0                           | 0                                  | 0                          | 0                 | 80                         | 10                       | 15                | 56                         |
| 16             | BEDROOM      | 1                      | 1  | 80                                   | 80                               | 0                           | 0                                  | 0                          | 0                 | 80                         | 10                       | 15                | 56                         |
| 17             | HALL         | 1                      | 1  | 70                                   | 70                               | 0                           | 0                                  | 0                          | 0                 | 70                         | 0                        | 0                 | 0                          |
| 18             | HALL         | 1                      | 1  | 70                                   | 70                               | 0                           | 0                                  | 0                          | 0                 | 70                         | 0                        | 0                 | 0                          |
| 19             | BATH         | 1                      | 1  | 53                                   | 53                               | 0                           | 0                                  | 0                          | 0                 | 53                         | 10                       | 17                | 48                         |
| 20             | BATH         | 1                      | 1  | 53                                   | 53                               | 0                           | 0                                  | 0                          | 0                 | 53                         | 10                       | 17                | 48                         |
| Zone           | 2 Total/Ave. |                        |    |                                      | 984                              | 0                           | 0                                  | 0                          | 0                 | 472                        | 122                      | 15                | 703                        |
| System         | 2 Total/Ave. |                        |    |                                      | 2,466                            | 0                           | 0                                  | 0                          | 0                 | 1,394                      | 372                      | 15                | 2,045                      |
| Building       |              |                        |    |                                      | 3,948                            | 0                           | 0                                  | 0                          | 0                 | 2,316                      | 622                      | 16                | 3,387                      |

ASHRAE 90 ANALYSIS - ALTERNATIVE 3  
WEATHERSTRIP & CAULKING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.058 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.416 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.285 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.58 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 16.39 (Btu/Hr/Sq Ft)



SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.2                    | 8            | 112   | -9,451                   | 9            | 405   | 85.5                      | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 0.4                    | 13           | 190   | -18,901                  | 13           | 577   | 170.9                     | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 0.6                    | 13           | 185   | -28,352                  | 16           | 746   | 256.4                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 0.8                    | 5            | 69    | -37,802                  | 20           | 890   | 341.8                     | 42           | 1,530 | 0.0                       | 0            | 0     |
| 20 - 25                   | 1.1                    | 11           | 153   | -47,253                  | 22           | 993   | 427.3                     | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 1.3                    | 12           | 169   | -56,704                  | 19           | 858   | 512.8                     | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 1.5                    | 8            | 112   | -66,154                  | 1            | 66    | 598.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 1.7                    | 15           | 213   | -75,605                  | 0            | 0     | 683.7                     | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 1.9                    | 5            | 66    | -85,055                  | 0            | 0     | 769.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 2.1                    | 3            | 42    | -94,506                  | 0            | 0     | 854.6                     | 21           | 765   | 0.0                       | 0            | 0     |
| 50 - 55                   | 2.3                    | 3            | 42    | -103,957                 | 0            | 0     | 940.1                     | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 2.5                    | 3            | 40    | -113,407                 | 0            | 0     | 1,025.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 2.7                    | 0            | 0     | -122,858                 | 0            | 0     | 1,111.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 3.0                    | 0            | 0     | -132,308                 | 0            | 0     | 1,196.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 3.2                    | 0            | 0     | -141,759                 | 0            | 0     | 1,281.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 3.4                    | 0            | 0     | -151,210                 | 0            | 0     | 1,367.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 3.6                    | 0            | 0     | -160,660                 | 0            | 0     | 1,452.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 3.8                    | 1            | 20    | -170,111                 | 0            | 0     | 1,538.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 4.0                    | 1            | 11    | -179,561                 | 0            | 0     | 1,623.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 4.2                    | 0            | 0     | -189,012                 | 0            | 0     | 1,709.2                   | 38           | 1,377 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,336 | 0                        | 0            | 4,225 | 0.0                       | 0            | 5,088 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

|             |                         |   |   |
|-------------|-------------------------|---|---|
| Temperature | ----- Zone Number ----- |   |   |
| Range       | 1                       | 1 | 2 |
| (F)         |                         |   |   |

|            |      |      |      |
|------------|------|------|------|
| Max. Temp. | 79.2 | 92.9 | 91.8 |
| Mo./Hr.    | 7 14 | 8 22 | 8 23 |
| Day Type   | 1    | 1    | 1    |

|           |                             |       |       |
|-----------|-----------------------------|-------|-------|
|           | ..... Number of Hours ..... |       |       |
| Above 100 | 0                           | 0     | 0     |
| 95 - 100  | 0                           | 0     | 0     |
| 90 - 95   | 0                           | 1,164 | 589   |
| 85 - 90   | 0                           | 1,000 | 1,332 |
| 80 - 85   | 0                           | 764   | 1,007 |
| 75 - 80   | 2,924                       | 595   | 489   |
| 70 - 75   | 863                         | 577   | 675   |
| 65 - 70   | 459                         | 4,660 | 4,668 |
| 60 - 65   | 346                         | 0     | 0     |
| 55 - 60   | 1,359                       | 0     | 0     |
| 50 - 55   | 487                         | 0     | 0     |
| Below 50  | 2,322                       | 0     | 0     |

|            |      |       |      |
|------------|------|-------|------|
| Min. Temp. | 37.9 | 67.9  | 67.9 |
| Mo./Hr.    | 2 10 | 10 21 | 1 19 |
| Day Type   | 5    | 4     | 3    |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3  
WEATHERSTRIP & CAULKING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | DEMAND             |                      | HOT WTR | HOT W DMND |
|-------|-------------------|-----------------|--------------------|----------------------|---------|------------|
|       | Off Peak<br>(kwh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |         |            |
| Jan   | 524               | 2               | 350                | 1                    |         |            |
| Feb   | 474               | 2               | 341                | 1                    |         |            |
| March | 537               | 2               | 223                | 0                    |         |            |
| April | 505               | 2               | 87                 | 0                    |         |            |
| May   | 621               | 2               | 0                  | 0                    |         |            |
| June  | 1,150             | 8               | 0                  | 0                    |         |            |
| July  | 2,010             | 9               | 0                  | 0                    |         |            |
| Aug   | 1,243             | 9               | 0                  | 0                    |         |            |
| Sept  | 592               | 8               | 0                  | 0                    |         |            |
| Oct   | 529               | 2               | 22                 | 0                    |         |            |
| Nov   | 505               | 2               | 152                | 0                    |         |            |
| Dec   | 518               | 2               | 297                | 0                    |         |            |
| Total | 9,209             | 9               | 1,471              | 1                    |         |            |

Building Energy Consumption = 45,229 (8tu/Sq Ft/Year)  
Source Energy Consumption = 73,576 (8tu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref<br>Num | Equip<br>Code | Monthly Consumption |                            |     |     |     |      |      |     |     |     |     |     | Total |
|------------|---------------|---------------------|----------------------------|-----|-----|-----|------|------|-----|-----|-----|-----|-----|-------|
|            |               | Jan                 | Feb                        | Mar | Apr | May | June | July | Aug | Sep | Oct | Nov | Dec |       |
| 0          | LIGHTS        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 522                 | 472                        | 535 | 503 | 529 | 516  | 516  | 535 | 503 | 529 | 503 | 516 | 6,181 |
|            | PK            | 2.0                 | 2.0                        | 2.0 | 2.0 | 2.0 | 2.0  | 2.0  | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0   |
| 1          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 2          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | GAS           | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 3          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | OIL           | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 4          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | P STEAM       | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 5          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | P HOTH2O      | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 6          | MISC LD       |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            | P CHILL       | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 1          | EQ1161        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | AIR-CLD COND COMP <15 TONS |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 0                   | 0                          | 0   | 0   | 0   | 404  | 1078 | 458 | 0   | 0   | 0   | 0   | 1,940 |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 5.7  | 5.9  | 5.7 | 5.5 | 0.0 | 0.0 | 0.0 | 5.9   |
| 1          | EQ5200        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | CONDENSER FANS             |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 0                   | 0                          | 0   | 0   | 0   | 41   | 107  | 47  | 0   | 0   | 0   | 0   | 196   |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.4  | 0.6  | 0.6 | 0.3 | 0.0 | 0.0 | 0.0 | 0.6   |
| 1          | EQ5303        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | CONTROLS                   |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 0                   | 0                          | 0   | 0   | 0   | 99   | 217  | 112 | 0   | 0   | 0   | 0   | 427   |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.3  | 0.3  | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.3   |
| 1          | EQ4003        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | FC CENTRIF. FAN C.V.       |     |     |     |      |      |     |     |     |     |     |       |
|            | ELEC          | 0                   | 0                          | 0   | 0   | 92  | 89   | 92   | 92  | 89  | 0   | 0   | 0   | 453   |
|            | PK            | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.2 | 0.2  | 0.2  | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.2   |
| 1          | EQ2102        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | PURCHASED DIST. HOT WATER  |     |     |     |      |      |     |     |     |     |     |       |
|            | P HOTH2O      | 350                 | 341                        | 223 | 87  | 0   | 0    | 0    | 0   | 0   | 22  | 152 | 297 | 1,471 |
|            | PK            | 0.6                 | 0.6                        | 0.4 | 0.2 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.2 | 0.3 | 0.5 | 0.6   |
| 1          | EQ5020        |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|            |               |                     | HEAT WATER CIRC. PUMP C.V. |     |     |     |      |      |     |     |     |     |     |       |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 3  
WEATHERSTRIP & CAULKING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 8.9 (kW)  
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|-----------------------|---------------------------|------------------------|
|----------------------|------------------------|-----------------------|---------------------------|------------------------|

Cooling Equipment

|           |        |                            |     |       |
|-----------|--------|----------------------------|-----|-------|
| 1         | EQ1161 | AIR-CLD COND COMP <15 TONS | 6.7 | 75.29 |
| Sub Total |        |                            | 6.7 | 75.29 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Air Moving Equipment

|           |  |                                    |     |      |
|-----------|--|------------------------------------|-----|------|
| 1         |  | SUMMATION OF FAN ELECTRICAL DEMAND | 0.2 | 2.47 |
| Sub Total |  |                                    | 0.2 | 2.47 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Miscellaneous

|                |  |  |     |       |
|----------------|--|--|-----|-------|
| Lights         |  |  | 2.0 | 22.24 |
| Base Utilities |  |  | 0.0 | 0.00  |
| Misc Equipment |  |  | 0.0 | 0.00  |
| Sub Total      |  |  | 2.0 | 22.24 |

|             |  |  |     |        |
|-------------|--|--|-----|--------|
| Grand Total |  |  | 8.9 | 100.00 |
|-------------|--|--|-----|--------|

\*\*\*\*\*  
\*\*\*\*\*  
\*\*  
\*\*                    T R A C E    6 0 0    A N A L Y S I S                    \*\*  
\*\*  
\*\*                    by                    \*\*                    \*\*  
\*\*  
\*\*\*\*\*  
\*\*\*\*\*

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDINGS 101-114

Weather File Code:                    CARLISLE  
Location:                                ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude:                                40.2 (deg)  
Longitude:                               77.2 (deg)  
Time Zone:                                5  
Elevation:                                475 (ft)  
Barometric Pressure:                    29.2 (in. Hg)

Summer Clearness Number:              1.00  
Winter Clearness Number:               1.00  
Summer Design Dry Bulb:                92 (F)  
Summer Design Wet Bulb:                72 (F)  
Winter Design Dry Bulb:                4 (F)  
Summer Ground Relectance:              0.20  
Winter Ground Relectance:               0.20

Air Density:                            0.0742 (Lbm/cuft)  
Air Specific Heat:                      0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod:            1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor:                    4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor:                        4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May        To September  
System Simulation Period: January    To December  
Cooling Load Methodology:            CLTD/CLF (Transfer Function Method)

Time/Date Program was Run:            11: 2:22    1/ 7/94  
Dataset Name:                            CB101-14 .TM

AIRFLOW - ALTERNATIVE 4  
 COMBINED ECOS

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | PTAC        | 115                   | 1,148                 | 1,148                 | 1,451                | 417                   | 0             | 0             |
| 2             | RAD         | 0                     | 0                     | 0                     | 0                    | 459                   | 0             | 0             |
| Totals        |             | 115                   | 1,148                 | 1,148                 | 1,451                | 876                   | 0             | 0             |

CAPACITY - ALTERNATIVE 4  
 COMBINED ECOS

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling              |                      |                      |                      |                      | Heating               |                      |                      |                      |                         |                        |                          |                      |                      |                       |
|---------------|-------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|----------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Capacity (Tons) | Sys. Capacity (Tons) | Aux. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Capacity (Btuh) | Sys. Capacity (Btuh) | Aux. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | PTAC        | 2.9                  | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 2.9                   | -41,060              | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | -41,060               |
| 2             | RAD         | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 0.0                   | -61,907              | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | -61,907               |
| Totals        |             | 2.9                  | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 2.9                   | -102,967             | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | -102,967              |

The building peaked at hour 16 month 7 with a capacity of 2.9 tons

ENGINEERING CHECKS - ALTERNATIVE 4  
 COMBINED ECOS

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | PTAC        | 10.00               | 0.77       | 393.8    | 508.3      | 23.61       | 0.77       | -27.71      | 1,482            |
| 2             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -25.10      | 2,466            |



System 1 Peak PTAC - PACKAGED TERMINAL AIR COND.

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space<br>Sens.+Lat.<br>(Btuh) | Ret. Air<br>Sensible<br>(Btuh) | Ret. Air<br>Latent<br>(Btuh) | Net<br>Total<br>(Btuh) | Perct<br>Of Tot<br>(%) | * | Space<br>Sensible<br>(Btuh) | Perct<br>Of Tot<br>(%) | * | Space Peak<br>Space Sens<br>(Btuh) | Coil Peak<br>Tot Sens<br>(Btuh) | Perct<br>Of Tot<br>(%) |
|-----------------|-------------------------------|--------------------------------|------------------------------|------------------------|------------------------|---|-----------------------------|------------------------|---|------------------------------------|---------------------------------|------------------------|
| Envelope Loads  |                               |                                |                              |                        |                        | * |                             |                        | * |                                    |                                 |                        |
| Skylite Solr    | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Skylite Cond    | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Roof Cond       | 1,644                         | 0                              | 0                            | 1,644                  | 4.70                   | * | 1,695                       | 6.91                   | * | -1,582                             | -1,582                          | 3.86                   |
| Glass Solar     | 9,125                         | 0                              | 0                            | 9,125                  | 26.08                  | * | 11,195                      | 45.64                  | * | 0                                  | 0                               | 0.00                   |
| Glass Cond      | 2,726                         | 0                              | 0                            | 2,726                  | 7.79                   | * | 2,404                       | 9.80                   | * | -13,405                            | -13,405                         | 32.68                  |
| Wall Cond       | 1,354                         | 16                             | 0                            | 1,369                  | 3.91                   | * | 1,341                       | 5.47                   | * | -4,913                             | -4,976                          | 12.13                  |
| Partition       | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Exposed Floor   | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Infiltration    | 11,613                        | 0                              | 0                            | 11,613                 | 33.19                  | * | 4,602                       | 18.76                  | * | -21,060                            | -21,060                         | 51.34                  |
| Sub Total==>    | 26,462                        | 16                             | 0                            | 26,478                 | 75.68                  | * | 21,237                      | 86.57                  | * | -40,960                            | -41,023                         | 100.00                 |
| Internal Loads  |                               |                                |                              |                        |                        | * |                             |                        | * |                                    |                                 |                        |
| Lights          | 2,070                         | 0                              | 0                            | 2,070                  | 5.92                   | * | 2,078                       | 8.47                   | * | 0                                  | 0                               | 0.00                   |
| People          | 1,784                         | 0                              | 0                            | 1,784                  | 5.10                   | * | 884                         | 3.60                   | * | 0                                  | 0                               | 0.00                   |
| Misc            | 0                             | 0                              | 0                            | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Sub Total==>    | 3,855                         | 0                              | 0                            | 3,855                  | 11.02                  | * | 2,962                       | 12.07                  | * | 0                                  | 0                               | 0.00                   |
| Ceiling Load    | 10                            | -10                            | 0                            | 0                      | 0.00                   | * | 332                         | 1.35                   | * | -320                               | 0                               | 0.00                   |
| Outside Air     | 0                             | 0                              | 0                            | 4,410                  | 12.60                  | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Sup. Fan Heat   |                               |                                |                              | 245                    | 0.70                   | * |                             | 0.00                   | * |                                    |                                 | 0.00                   |
| Ret. Fan Heat   |                               | 0                              | 0                            | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    |                                 | 0.00                   |
| Duct Heat Pkup  |                               | 0                              | 0                            | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    |                                 | 0.00                   |
| OV/UNDR Sizing  | 0                             |                                |                              | 0                      | 0.00                   | * | 0                           | 0.00                   | * | 0                                  | 0                               | 0.00                   |
| Exhaust Heat    |                               | -1                             | 0                            | -1                     | -0.00                  | * |                             | 0.00                   | * |                                    |                                 | 0.00                   |
| Terminal Bypass |                               | 0                              | 0                            | 0                      | 0.00                   | * |                             | 0.00                   | * |                                    |                                 | 0.00                   |
| Grand Total==>  | 30,326                        | 5                              | 0                            | 34,986                 | 100.00                 | * | 24,532                      | 100.00                 | * | -41,279                            | -41,023                         | 100.00                 |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS       |            |        |
|----------|--------------------------|--------------------|---------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                          |                    |                     | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Gross Total | Glass (sf) | (%)    |
| Main Clg | 2.9                      | 35.0               | 1,148               | 76.6              | 63.7  | 69.7   | 55.3             | 53.4  | 59.2   | Floor       | 1,482      |        |
| Aux Clg  | 0.0                      | 0.0                | 0                   | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 0          |        |
| Opt Vent | 0.0                      | 0.0                | 0                   | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Totals   | 2.9                      | 35.0               |                     |                   |       |        |                  |       |        | Roof        | 922        | 0 0    |
|          |                          |                    |                     |                   |       |        |                  |       |        | Wall        | 1,592      | 250 16 |

-----HEATING COIL SELECTION-----

|          | Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)-- |       |  |
|----------|-------------------|---------------------|--------------|--------------|---------|----------------|---------|------------------------|--------|----------|----------------------|-------|--|
|          |                   |                     |              |              |         | Cooling        | Heating | Clg % OA               |        | Type     | Clg                  | Htg   |  |
| Main Htg | -41.1             | 1,148               | 68.2         | 101.0        | Vent    | 115            | 0       | 10.0                   | 0.77   | SADB     | 55.4                 | 101.0 |  |
| Aux Htg  | 0.0               | 0                   | 0.0          | 0.0          | Infil   | 302            | 302     | Clg Cfm/Sqft           | 393.83 | Plenum   | 75.0                 | 67.8  |  |
| Preheat  | -0.0              | 1,148               | 61.6         | 55.2         | Supply  | 1,148          | 1,148   | Clg Cfm/Ton            | 508.32 | Return   | 75.0                 | 68.0  |  |
| Reheat   | 0.0               | 0                   | 0.0          | 0.0          | Mincfm  | 0              | 0       | Clg Btuh/Sqft          | 23.61  | Ret/OA   | 76.6                 | 68.0  |  |
| Humidif  | 0.0               | 0                   | 0.0          | 0.0          | Return  | 1,148          | 1,148   | No. People             | 5      | Runarnd  | 75.0                 | 68.0  |  |
| Opt Vent | 0.0               | 0                   | 0.0          | 0.0          | Exhaust | 115            | 0       | Htg % OA               | 0.0    | Fn MtrTD | 0.0                  | 0.0   |  |
| Total    | -41.1             |                     |              |              | Rm Exh  | 0              | 0       | Htg Cfm/Sqft           | 0.77   | Fn BldTD | 0.0                  | 0.0   |  |
|          |                   |                     |              |              | Auxil   | 0              | 0       | Htg Btuh/Sqft          | -27.71 | Fn Frict | 0.1                  | 0.0   |  |

System 2 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -2,392                       | -2,392                    | 3.86             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -19,947                      | -19,947                   | 32.22            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -7,405                       | -7,584                    | 12.25            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -31,984                      | -31,984                   | 51.66            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -61,728                      | -61,907                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -2,408                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             |                       | 0.00             | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             |                       | 0.00             | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             | 0                            | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             |                       | 0.00             | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -64,136                      | -61,907                   | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Grains | Gross Total | Areas (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|--------|-------------|------------|--------|
| Main Clg | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | Floor       | 2,466      |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | Part        | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | ExFlr       | 0          |        |
| Totals   | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0.0    | Roof        | 1,394      | 0 0    |
|          |                       |                 |                  |                           |                          |        | Wall        | 2,417      | 372 15 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | ENGINEERING CHECKS   | TEMPERATURES (F) |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|----------------------|------------------|
| Main Htg | -61.9          | 0                | 0.0         | 0.0         | Vent    | 0       | 0       | Clg % OA 0.0         | Type Clg Htg     |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 0       | 459     | Clg Cfm/Sqft 0.00    | SADB 0.0 68.1    |
| Preheat  | 0.0            | 0                | 0.0         | 0.0         | Supply  | 0       | 0       | Clg Cfm/Ton 0.00     | Plenum 0.0 67.7  |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Sqft/Ton 0.00    | Return 0.0 68.0  |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 0       | 0       | Clg Btuh/Sqft 0.00   | Ret/OA 0.0 68.0  |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0       | 0       | No. People 0         | Runarnd 0.0 68.0 |
| Total    | -61.9          |                  |             |             | Rm Exh  | 0       | 0       | Htg % OA 0.0         | Fn MtrTD 0.0 0.0 |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Cfm/Sqft 0.00    | Fn BldTD 0.0 0.0 |
|          |                |                  |             |             |         |         |         | Htg Btuh/Sqft -25.10 | Fn Frict 0.0 0.0 |

BUILDING U-VALUES - ALTERNATIVE 4  
 COMBINED ECOS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description  | Room U-Values<br>(Btu/hr/sqft/F) |       |             |             |            |             |             |       |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|--------------|----------------------------------|-------|-------------|-------------|------------|-------------|-------------|-------|-------|-------|------------------------|-----------------------------|
|             |              | Part.                            | ExFlr | Summr Skylt | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wall  | Ceil. |       |                        |                             |
| 1           | TV ROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 208.2 | 48.56                  |                             |
| 2           | LIVING ROOM  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 45.7  | 12.37                  |                             |
| 3           | LIVING ROOM  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 45.7  | 12.37                  |                             |
| 4           | TV ROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 229.3 | 53.18                  |                             |
| 5           | BEDROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 162.3 | 38.49                  |                             |
| 6           | BEDROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 181.1 | 42.62                  |                             |
| 7           | BEDROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 162.3 | 38.49                  |                             |
| 8           | BEDROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 181.1 | 42.62                  |                             |
| Zone        | 1 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 134.1 | 32.10                  |                             |
| System      | 1 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 134.1 | 32.10                  |                             |
| 1           | TV ROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 208.2 | 48.56                  |                             |
| 2           | LIVING ROOM  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 45.7  | 12.37                  |                             |
| 3           | LIVING ROOM  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 45.7  | 12.37                  |                             |
| 4           | TV ROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 229.3 | 53.18                  |                             |
| 5           | BEDROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 162.3 | 38.49                  |                             |
| 6           | BEDROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 181.1 | 42.62                  |                             |
| 7           | BEDROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 162.3 | 38.49                  |                             |
| 8           | BEDROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 181.1 | 42.62                  |                             |
| Zone        | 1 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 134.1 | 32.10                  |                             |
| 9           | DINING ROOM  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 154.0 | 36.11                  |                             |
| 10          | KITCHEN      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.549 | 6.2   | 3.70                   |                             |
| 11          | KITCHEN      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.549 | 6.2   | 3.70                   |                             |
| 12          | DINING ROOM  | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000      | 0.810       | 0.837       | 0.058 | 0.549 | 154.0 | 36.11                  |                             |
| 13          | REAR FOYER   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 339.6 | 74.77                  |                             |
| 14          | REAR FOYER   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 409.2 | 90.02                  |                             |
| 15          | BEDROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 109.9 | 27.00                  |                             |
| 16          | BEDROOM      | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 109.9 | 27.00                  |                             |
| 17          | HALL         | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.000       | 0.000       | 0.000 | 0.000 | 15.3  | 6.28                   |                             |
| 18          | HALL         | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.000       | 0.000       | 0.000 | 0.000 | 15.3  | 6.28                   |                             |
| 19          | BATH         | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 137.0 | 32.95                  |                             |
| 20          | BATH         | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.000 | 137.0 | 32.95                  |                             |
| Zone        | 2 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 107.6 | 26.03                  |                             |
| System      | 2 Total/Ave. | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 123.5 | 29.68                  |                             |
| Building    |              | 0.000                            | 0.000 | 0.000       | 0.000       | 0.027      | 0.810       | 0.837       | 0.058 | 0.549 | 127.5 | 30.59                  |                             |

BUILDING AREAS - ALTERNATIVE 4  
 COMBINED ECOS

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description  | Number of<br>Duplicate |   | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|--------------|------------------------|---|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 1              | TV ROOM      | 1                      | 1 | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 78                       | 25                | 228                        |
| 2              | LIVING ROOM  | 1                      | 1 | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 3              | LIVING ROOM  | 1                      | 1 | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 4              | TV ROOM      | 1                      | 1 | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 53                       | 17                | 253                        |
| 5              | BEDROOM      | 1                      | 1 | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 6              | BEDROOM      | 1                      | 1 | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| 7              | BEDROOM      | 1                      | 1 | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 8              | BEDROOM      | 1                      | 1 | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| Zone           | 1 Total/Ave. |                        |   |                                      | 1,482                            | 0                           | 0                                  | 0                          | 0                 | 922                        | 250                      | 16                | 1,342                      |
| System         | 1 Total/Ave. |                        |   |                                      | 1,482                            | 0                           | 0                                  | 0                          | 0                 | 922                        | 250                      | 16                | 1,342                      |
| 1              | TV ROOM      | 1                      | 1 | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 78                       | 25                | 228                        |
| 2              | LIVING ROOM  | 1                      | 1 | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 3              | LIVING ROOM  | 1                      | 1 | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 20                       | 20                | 82                         |
| 4              | TV ROOM      | 1                      | 1 | 160                                  | 160                              | 0                           | 0                                  | 0                          | 0                 | 160                        | 53                       | 17                | 253                        |
| 5              | BEDROOM      | 1                      | 1 | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 6              | BEDROOM      | 1                      | 1 | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| 7              | BEDROOM      | 1                      | 1 | 156                                  | 156                              | 0                           | 0                                  | 0                          | 0                 | 156                        | 20                       | 11                | 170                        |
| 8              | BEDROOM      | 1                      | 1 | 145                                  | 145                              | 0                           | 0                                  | 0                          | 0                 | 145                        | 20                       | 10                | 178                        |
| Zone           | 1 Total/Ave. |                        |   |                                      | 1,482                            | 0                           | 0                                  | 0                          | 0                 | 922                        | 250                      | 16                | 1,342                      |
| 9              | DINING ROOM  | 1                      | 1 | 148                                  | 148                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 13                | 162                        |
| 10             | KITCHEN      | 1                      | 1 | 108                                  | 108                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 11             | KITCHEN      | 1                      | 1 | 108                                  | 108                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 12             | DINING ROOM  | 1                      | 1 | 148                                  | 148                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 25                       | 13                | 162                        |
| 13             | REAR FOYER   | 1                      | 1 | 33                                   | 33                               | 0                           | 0                                  | 0                          | 0                 | 33                         | 16                       | 17                | 78                         |
| 14             | REAR FOYER   | 1                      | 1 | 33                                   | 33                               | 0                           | 0                                  | 0                          | 0                 | 33                         | 16                       | 14                | 94                         |
| 15             | BEDROOM      | 1                      | 1 | 80                                   | 80                               | 0                           | 0                                  | 0                          | 0                 | 80                         | 10                       | 15                | 56                         |
| 16             | BEDROOM      | 1                      | 1 | 80                                   | 80                               | 0                           | 0                                  | 0                          | 0                 | 80                         | 10                       | 15                | 56                         |
| 17             | HALL         | 1                      | 1 | 70                                   | 70                               | 0                           | 0                                  | 0                          | 0                 | 70                         | 0                        | 0                 | 0                          |
| 18             | HALL         | 1                      | 1 | 70                                   | 70                               | 0                           | 0                                  | 0                          | 0                 | 70                         | 0                        | 0                 | 0                          |
| 19             | BATH         | 1                      | 1 | 53                                   | 53                               | 0                           | 0                                  | 0                          | 0                 | 53                         | 10                       | 17                | 48                         |
| 20             | BATH         | 1                      | 1 | 53                                   | 53                               | 0                           | 0                                  | 0                          | 0                 | 53                         | 10                       | 17                | 48                         |
| Zone           | 2 Total/Ave. |                        |   |                                      | 984                              | 0                           | 0                                  | 0                          | 0                 | 472                        | 122                      | 15                | 703                        |
| System         | 2 Total/Ave. |                        |   |                                      | 2,466                            | 0                           | 0                                  | 0                          | 0                 | 1,394                      | 372                      | 15                | 2,045                      |
| Building       |              |                        |   |                                      | 3,948                            | 0                           | 0                                  | 0                          | 0                 | 2,316                      | 622                      | 16                | 3,387                      |

ASHRAE 90 ANALYSIS - ALTERNATIVE 4  
COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.027 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.175 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.121 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 1.35 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 15.01 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4  
 COMBINED ECOS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.1                    | 9            | 112   | -5,148                   | 7            | 249   | 57.4                      | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 0.3                    | 7            | 94    | -10,297                  | 12           | 417   | 114.8                     | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 0.4                    | 11           | 136   | -15,445                  | 18           | 659   | 172.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 0.6                    | 5            | 69    | -20,593                  | 26           | 939   | 229.6                     | 41           | 1,519 | 0.0                       | 0            | 0     |
| 20 - 25                   | 0.7                    | 10           | 124   | -25,742                  | 17           | 622   | 287.1                     | 0            | 11    | 0.0                       | 0            | 0     |
| 25 - 30                   | 0.9                    | 16           | 203   | -30,890                  | 18           | 634   | 344.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 1.0                    | 4            | 53    | -36,039                  | 3            | 94    | 401.9                     | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 1.2                    | 5            | 62    | -41,187                  | 0            | 0     | 459.3                     | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 1.3                    | 6            | 74    | -46,335                  | 0            | 0     | 516.7                     | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 1.5                    | 12           | 147   | -51,484                  | 0            | 0     | 574.1                     | 21           | 765   | 0.0                       | 0            | 0     |
| 50 - 55                   | 1.6                    | 7            | 88    | -56,632                  | 0            | 0     | 631.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 1.7                    | 2            | 20    | -61,780                  | 0            | 0     | 688.9                     | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 1.9                    | 2            | 20    | -66,929                  | 0            | 0     | 746.3                     | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 2.0                    | 2            | 31    | -72,077                  | 0            | 0     | 803.8                     | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 2.2                    | 0            | 0     | -77,225                  | 0            | 0     | 861.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 2.3                    | 0            | 0     | -82,374                  | 0            | 0     | 918.6                     | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 2.5                    | 0            | 0     | -87,522                  | 0            | 0     | 976.0                     | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 2.6                    | 0            | 0     | -92,670                  | 0            | 0     | 1,033.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 2.8                    | 0            | 0     | -97,819                  | 0            | 0     | 1,090.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 2.9                    | 2            | 31    | -102,967                 | 0            | 0     | 1,148.2                   | 38           | 1,377 | 0.0                       | 0            | 0     |
| Hours Diff                | 0.0                    | 0            | 7,496 | 0                        | 0            | 5,146 | 0.0                       | 0            | 5,088 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4  
 COMBINED ECOS

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature Range (F) | ----- Zone Number -----     |       |       |
|-----------------------|-----------------------------|-------|-------|
|                       | 1                           | 1     | 2     |
| Max. Temp.            | 78.8                        | 95.6  | 94.9  |
| Mo./Hr.               | 7 14                        | 9 21  | 9 20  |
| Day Type              | 1                           | 1     | 1     |
|                       | ..... Number of Hours ..... |       |       |
| Above 100             | 0                           | 0     | 0     |
| 95 - 100              | 0                           | 311   | 0     |
| 90 - 95               | 0                           | 1,897 | 1,983 |
| 85 - 90               | 0                           | 301   | 438   |
| 80 - 85               | 0                           | 855   | 947   |
| 75 - 80               | 3,013                       | 449   | 443   |
| 70 - 75               | 790                         | 635   | 653   |
| 65 - 70               | 997                         | 4,312 | 4,296 |
| 60 - 65               | 472                         | 0     | 0     |
| 55 - 60               | 1,415                       | 0     | 0     |
| 50 - 55               | 519                         | 0     | 0     |
| Below 50              | 1,554                       | 0     | 0     |
| Min. Temp.            | 42.0                        | 67.9  | 68.0  |
| Mo./Hr.               | 2 10                        | 3 24  | 1 1   |
| Day Type              | 5                           | 1     | 1     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4  
 COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | HOT WTR HOT W DMND |                      |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 523               | 2               | 171                | 0                    |
| Feb   | 473               | 2               | 170                | 0                    |
| March | 536               | 2               | 105                | 0                    |
| April | 504               | 2               | 26                 | 0                    |
| May   | 591               | 2               | 0                  | 0                    |
| June  | 1,014             | 6               | 0                  | 0                    |
| July  | 1,511             | 7               | 0                  | 0                    |
| Aug   | 1,105             | 7               | 0                  | 0                    |
| Sept  | 602               | 6               | 0                  | 0                    |
| Oct   | 529               | 2               | 0                  | 0                    |
| Nov   | 504               | 2               | 36                 | 0                    |
| Dec   | 517               | 2               | 141                | 0                    |
| Total | 8,409             | 7               | 649                | 0                    |

Building Energy Consumption = 23,717 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 43,741 (Btu/Sq Ft/Year)

Floor Area = 3,948 (Sq Ft)



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
 COMBINED ECOS

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | Monthly Consumption |                            |     |     |     |      |      |     |     |     |     |     | Total |
|---------|------------|---------------------|----------------------------|-----|-----|-----|------|------|-----|-----|-----|-----|-----|-------|
|         |            | Jan                 | Feb                        | Mar | Apr | May | June | July | Aug | Sep | Oct | Nov | Dec |       |
| 0       | LIGHTS     |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 522                 | 472                        | 535 | 503 | 529 | 516  | 516  | 535 | 503 | 529 | 503 | 516 | 6,181 |
|         | PK         | 2.0                 | 2.0                        | 2.0 | 2.0 | 2.0 | 2.0  | 2.0  | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0   |
| 1       | MISC LD    |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 2       | MISC LD    |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | GAS        | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 3       | MISC LD    |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | OIL        | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 4       | MISC LD    |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | P STEAM    | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 5       | MISC LD    |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | P HOTH2O   | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 6       | MISC LD    |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         | P CHILL    | 0                   | 0                          | 0   | 0   | 0   | 0    | 0    | 0   | 0   | 0   | 0   | 0   | 0     |
|         | PK         | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0   |
| 1       | EQ1161     |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                     | AIR-CLD COND COMP <15 TONS |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 0                   | 0                          | 0   | 0   | 0   | 316  | 693  | 368 | 20  | 0   | 0   | 0   | 1,397 |
|         | PK         | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 3.7  | 4.0  | 3.9 | 3.8 | 0.0 | 0.0 | 0.0 | 4.0   |
| 1       | EQ5200     |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                     | CONDENSER FANS             |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 0                   | 0                          | 0   | 0   | 0   | 33   | 70   | 38  | 2   | 0   | 0   | 0   | 142   |
|         | PK         | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.2  | 0.4  | 0.4 | 0.3 | 0.0 | 0.0 | 0.0 | 0.4   |
| 1       | EQ5303     |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                     | CONTROLS                   |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 0                   | 0                          | 0   | 0   | 0   | 90   | 170  | 102 | 17  | 0   | 0   | 0   | 379   |
|         | PK         | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.0 | 0.3  | 0.3  | 0.3 | 0.3 | 0.0 | 0.0 | 0.0 | 0.3   |
| 1       | EQ4003     |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                     | FC CENTRIF. FAN C.V.       |     |     |     |      |      |     |     |     |     |     |       |
|         | ELEC       | 0                   | 0                          | 0   | 0   | 62  | 60   | 62   | 62  | 60  | 0   | 0   | 0   | 305   |
|         | PK         | 0.0                 | 0.0                        | 0.0 | 0.0 | 0.1 | 0.1  | 0.1  | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1   |
| 1       | EQ2102     |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                     | PURCHASED DIST. HOT WATER  |     |     |     |      |      |     |     |     |     |     |       |
|         | P HOTH2O   | 171                 | 170                        | 105 | 26  | 0   | 0    | 0    | 0   | 0   | 0   | 36  | 141 | 649   |
|         | PK         | 0.3                 | 0.3                        | 0.2 | 0.1 | 0.0 | 0.0  | 0.0  | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 0.3   |
| 1       | EQ5020     |                     |                            |     |     |     |      |      |     |     |     |     |     |       |
|         |            |                     | HEAT WATER CIRC. PUMP C.V. |     |     |     |      |      |     |     |     |     |     |       |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 4  
COMBINED ECOS

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value            6.8    (kW)  
Yearly Time of Peak 16 (hr)    7 (mo)

Hour 16    Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description | Utility<br>Demand<br>(kW) | Percnt<br>Of Tot<br>(%) |
|----------------------|------------------------|-----------------------|---------------------------|-------------------------|
|----------------------|------------------------|-----------------------|---------------------------|-------------------------|

Cooling Equipment

|           |        |                            |     |       |
|-----------|--------|----------------------------|-----|-------|
| 1         | EQ1161 | AIR-CLD COND COMP <15 TONS | 4.7 | 68.93 |
| Sub Total |        |                            | 4.7 | 68.93 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Air Moving Equipment

|           |  |                                    |     |      |
|-----------|--|------------------------------------|-----|------|
| 1         |  | SUMMATION OF FAN ELECTRICAL DEMAND | 0.1 | 2.16 |
| Sub Total |  |                                    | 0.1 | 2.16 |

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Miscellaneous

|                |  |  |     |       |
|----------------|--|--|-----|-------|
| Lights         |  |  | 2.0 | 28.91 |
| Base Utilities |  |  | 0.0 | 0.00  |
| Misc Equipment |  |  | 0.0 | 0.00  |
| Sub Total      |  |  | 2.0 | 28.91 |

|             |  |  |     |        |
|-------------|--|--|-----|--------|
| Grand Total |  |  | 6.8 | 100.00 |
|-------------|--|--|-----|--------|

*Building 116*

*Trace Input File*

933702

CONTENTS OF : E:\CB116.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 116

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/BASE BUILDING

13 20/1/1/1ST FL APART'S/27566/1//1

14 20/2/2/2ND FL APART'S/27566/1//1

15 20/3/3/POST NURSERY/2260/1//1

16 20/4/4/POST NURSERY/2849/1//1

17 20/5/5/BASEMENT/22457/1//1

18 21/1////CBLQTX///CBLQTX

19 21/2////CBLQTX///CBLQTX

20 21/3////CBADCTX///CBADHTX

21 21/4////CBADCTX///CBADHTX

22 21/5////CBADCTX///CBADHTX

23 22/2/1/YES////129

24 24/1/1/188/8//170/38

25 24/1/2/596/8//170/128

26 24/1/3/188/8//170/218

27 24/1/4/596/8//170/308

28 24/2/1/188/8//170/38

29 24/2/2/596/8//170/128

30 24/2/3/188/8//170/218

31 24/2/4/596/8//170/308

32 24/3/1/15/8//170/38

33 24/3/2/15/8//170/218

34 24/3/3/86/8//170/308

35 24/4/1/15/8//170/38

36 24/4/2/32/4//170/128

37 24/4/3/70/8//170/218

38 24/4/4/55/8//170/308

39 24/5/1/99/8//170/38

40 24/5/2/455/4//170/128

41 24/5/3/45/8//170/218

42 24/5/4/456/8//170/308

43 25/1/1/6/2.75/12/.52/.57

44 25/1/2/6/2.75/45/.52/.57

45 25/1/3/6/2.75/12/.52/.57

46 25/1/4/6/2.75/73/.52/.57

47 25/2/1/6/2.75/12/.52/.57

48 25/2/2/6/2.75/45/.52/.57

49 25/2/3/6/2.75/12/.52/.57

50 25/2/4/6/2.75/73/.52/.57

51 25/3/3/4.5/2.75/10/.52/.57

52 25/4/2/2.5/2.5/2/.52/.57

53 25/4/3/4.5/2.75/5/.52/.57

54 25/4/4/4.5/2.75/6/.52/.57

55 25/5/1/4.5/2.75/6/.52/.57

56 25/5/2/2.5/2.5/12/.52/.57

57 25/5/4/4.5/2.75/43/.52/.57

58 26/1/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/CBLQL/OFF

CONTENTS OF : E:\CB116.TM

LINE # -----

59 26/2/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/CBLQL/OFF

60 26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF

61 26/4/CBADP&L/CBADP&L/OFF//OFF/CBADFAN/OFF/OFF/OFF/OFF

62 26/5/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF

63 27/1/551/SF-PERS/230/190/.5/WATT-SF/INCAND

64 27/2/551/SF-PERS/230/190/.5/WATT-SF/INCAND

65 27/3/226/SF-PERS/315/325/1.5/WATT-SF

66 27/4/285/SF-PERS/255/255/1.5/WATT-SF

67 27/5/1123/SF-PERS/255/255/1.5/WATT-SF

68 29/1////////.43/CFM-SF

69 29/2////////.43/CFM-SF

70 29/3////////.43/CFM-SF/.43/CFM-SF

71 29/4////////.43/CFM-SF/.43/CFM-SF

72 29/5////////.43/CFM-SF

73 30/1/////////1200/CFM

74 30/2/////////1200/CFM

75 30/3/2500/CFM

76 30/4/2550/CFM/2550/CFM

77 31/4/1/32/4//147/SINE-FIT/80/50

78 31/5/1/455/4//147/SINE-FIT/80/50

79 SYSTEM - 1

80 39/1/BASE BUILDING

81 40/1/SZ

82 41/1/3/3

83 42/1/.36

84 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

85 40/2/SZ

86 41/2/4/4

87 42/2/.27

88 45/2/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

89 40/3/RAD

90 41/3/1/3/5/5

91 42/3////////.5

92 45/3/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF

93 EQUIPMENT - 1

94 59/1/CARLISLE///BASE BUILDING

95 60/1/1/PKPLANT/1/1

96 60/2/2/PKPLANT/2/2

97 62/1/EQ1161/1

98 62/2/EQ1161/2

99 65/1/1//2/3

100 67/1/EQ2102/1

101 69/1/EQ4003

102 69/2/EQ4003

103 69/3////////EQ4003

104 LOAD - 2

105 19/2/WEATHERSTRIP & CAULKING

106 20/1/1/1ST FL APART'S/27566/1//1

107 20/2/2/2ND FL APART'S/27566/1//1

108 20/3/3/POST NURSERY/2260/1//1

109 20/4/4/POST NURSERY/2849/1//1

110 20/5/5/BASEMENT/22457/1//1

111 21/1////CBLQTX///CBLQTX

112 21/2////CBLQTX///CBLQTX

113 21/3////CBADCTX///CBADHTX

114 21/4////CBADCTX///CBADHTX

115 21/5////CBADCTX///CBADHTX

116 22/2/1/YES////129

CONTENTS OF : E:\CB116.TM

| LINE # | -----                                                 |
|--------|-------------------------------------------------------|
| 117    | 24/1/1/188/8//170/38                                  |
| 118    | 24/1/2/596/8//170/128                                 |
| 119    | 24/1/3/188/8//170/218                                 |
| 120    | 24/1/4/596/8//170/308                                 |
| 121    | 24/2/1/188/8//170/38                                  |
| 122    | 24/2/2/596/8//170/128                                 |
| 123    | 24/2/3/188/8//170/218                                 |
| 124    | 24/2/4/596/8//170/308                                 |
| 125    | 24/3/1/15/8//170/38                                   |
| 126    | 24/3/2/15/8//170/218                                  |
| 127    | 24/3/3/86/8//170/308                                  |
| 128    | 24/4/1/15/8//170/38                                   |
| 129    | 24/4/2/32/4//170/128                                  |
| 130    | 24/4/3/70/8//170/218                                  |
| 131    | 24/4/4/55/8//170/308                                  |
| 132    | 24/5/1/99/8//170/38                                   |
| 133    | 24/5/2/455/4//170/128                                 |
| 134    | 24/5/3/45/8//170/218                                  |
| 135    | 24/5/4/456/8//170/308                                 |
| 136    | 25/1/1/6/2.75/12/.52/.57                              |
| 137    | 25/1/2/6/2.75/45/.52/.57                              |
| 138    | 25/1/3/6/2.75/12/.52/.57                              |
| 139    | 25/1/4/6/2.75/73/.52/.57                              |
| 140    | 25/2/1/6/2.75/12/.52/.57                              |
| 141    | 25/2/2/6/2.75/45/.52/.57                              |
| 142    | 25/2/3/6/2.75/12/.52/.57                              |
| 143    | 25/2/4/6/2.75/73/.52/.57                              |
| 144    | 25/3/3/4.5/2.75/10/.52/.57                            |
| 145    | 25/4/2/2.5/2.5/2/.52/.57                              |
| 146    | 25/4/3/4.5/2.75/5/.52/.57                             |
| 147    | 25/4/4/4.5/2.75/6/.52/.57                             |
| 148    | 25/5/1/4.5/2.75/6/.52/.57                             |
| 149    | 25/5/2/2.5/2.5/12/.52/.57                             |
| 150    | 25/5/4/4.5/2.75/43/.52/.57                            |
| 151    | 26/1/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/CBLQL/OFF       |
| 152    | 26/2/CBLQP/CBLQL/OFF//OFF/OFF/OFF/OFF/CBLQL/OFF       |
| 153    | 26/3/CBADP&L/CBADP&L/OFF//OFF/CBADCLG/OFF/OFF/OFF/OFF |
| 154    | 26/4/CBADP&L/CBADP&L/OFF//OFF/CBADFAN/OFF/OFF/OFF/OFF |
| 155    | 26/5/CBADP&L/CBADP&L/OFF//OFF/OFF/OFF/OFF/OFF/OFF     |
| 156    | 27/1/551/SF-PERS/230/190/.5/WATT-SF/INCAND            |
| 157    | 27/2/551/SF-PERS/230/190/.5/WATT-SF/INCAND            |
| 158    | 27/3/226/SF-PERS/315/325/1.5/WATT-SF                  |
| 159    | 27/4/285/SF-PERS/255/255/1.5/WATT-SF                  |
| 160    | 27/5/1123/SF-PERS/255/255/1.5/WATT-SF                 |
| 161    | 29/1////////.38/CFM-SF                                |
| 162    | 29/2////////.38/CFM-SF                                |
| 163    | 29/3////////.38/CFM-SF/.38/CFM-SF                     |
| 164    | 29/4////////.38/CFM-SF/.38/CFM-SF                     |
| 165    | 29/5////////.38/CFM-SF                                |
| 166    | 30/1/////////1200/CFM                                 |
| 167    | 30/2/////////1200/CFM                                 |
| 168    | 30/3/2500/CFM                                         |
| 169    | 30/4/2550/CFM/2550/CFM                                |
| 170    | 31/4/1/32/4//147/SINE-FIT/80/50                       |
| 171    | 31/5/1/455/4//147/SINE-FIT/80/50                      |
| 172    | SYSTEM - 2                                            |
| 173    | 39/2/WEATHERSTRIP & CAULKING                          |
| 174    | 40/1/SZ                                               |

CONTENTS OF : E:\CB116.TM

| LINE # | -----                                                |
|--------|------------------------------------------------------|
| 175    | 41/1/3/3                                             |
| 176    | 42/1/.36                                             |
| 177    | 45/1/CBADCLG/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF     |
| 178    | 40/2/SZ                                              |
| 179    | 41/2/4/4                                             |
| 180    | 42/2/.27                                             |
| 181    | 45/2/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF |
| 182    | 40/3/RAD                                             |
| 183    | 41/3/1/3/5/5                                         |
| 184    | 42/3////////.5                                       |
| 185    | 45/3/OFF/OFF/OFF/OFF/OFF/CBLQHTG/OFF/OFF/OFF/OFF     |
| 186    | EQUIPMENT - 2                                        |
| 187    | 59/2/CARLISLE///WEATHERSTRIP & CAULKING              |
| 188    | 60/1/1/PKPLANT/1/1                                   |
| 189    | 60/2/2/PKPLANT/2/2                                   |
| 190    | 62/1/EQ1161/1                                        |
| 191    | 62/2/EQ1161/2                                        |
| 192    | 65/1/1//2/3                                          |
| 193    | 67/1/EQ2102/1                                        |
| 194    | 69/1/EQ4003                                          |
| 195    | 69/2/EQ4003                                          |
| 196    | 69/3////////EQ4003                                   |



*Building 116*

*Trace Output File*

933702

```
*****  
*****  
**  
**          TRACE 600 ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 116

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9:53:30 1/21/94  
Dataset Name: CB116 .TM

AIRFLOW - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | SZ          | 0                     | 2,500                 | 2,500                 | 2,899                | 399                   | 0             | 0             |
| 2             | SZ          | 0                     | 2,550                 | 2,550                 | 3,087                | 537                   | 0             | 0             |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 14,033                | 0             | 0             |
| Totals        |             | 0                     | 5,050                 | 5,050                 | 5,986                | 14,969                | 0             | 0             |

CAPACITY - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling              |                      |                      |                      | Cooling Totals (Tons) | Heating              |                      |                      |                         |                        |                          |                      |                      |                       |
|---------------|-------------|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|----------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Capacity (Tons) | Sys. Capacity (Tons) | Aux. Capacity (Tons) | Opt. Capacity (Tons) |                       | Main Capacity (Btuh) | Sys. Capacity (Btuh) | Aux. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 2.9                  | 0.0                  | 0.0                  | 0.0                  | 2.9                   | -49,645              | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | -49,645               |
| 2             | SZ          | 3.8                  | 0.0                  | 0.0                  | 0.0                  | 3.8                   | -66,875              | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | -66,875               |
| 3             | RAD         | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 0.0                   | -1,921,006           | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | -1,921,006            |
| Totals        |             | 6.7                  | 0.0                  | 0.0                  | 0.0                  | 6.7                   | -2,037,526           | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | -2,037,526            |

The building peaked at hour 16 month 7 with a capacity of 6.7 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 BASE BUILDING

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling   |         |           |            | Heating   |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|-----------|---------|-----------|------------|-----------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft | Cfm/Ton | Sq Ft/Ton | Btuh/Sq Ft | Cfm/Sq Ft | Btuh/Sq Ft |                  |
| 1             | Main           | SZ          | 0.00                | 1.11      | 847.5   | 766.2     | 15.66      | 1.11      | -21.97     | 2,260            |
| 2             | Main           | SZ          | 0.00                | 0.90      | 678.0   | 757.5     | 15.84      | 0.90      | -23.47     | 2,849            |
| 3             | Main           | RAD         | 0.00                | 0.00      | 0.0     | 0.0       | 0.00       | 0.00      | -24.06     | 79,849           |



System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Glass Solar     | 5,945                   | 0                        | 0                      | 5,945            | 13.17            | 5,945                 | 16.57            | 0                 | 0                | 0.00             |
| Glass Cond      | 1,051                   | 0                        | 0                      | 1,051            | 2.33             | 1,051                 | 2.93             | -5,054            | -5,054           | 7.56             |
| Wall Cond       | 5,753                   | 728                      | 0                      | 6,481            | 14.36            | 5,753                 | 16.03            | -21,405           | -24,114          | 36.06            |
| Partition       | 92                      | 0                        | 0                      | 92               | 0.20             | 92                    | 0.26             | -331              | -331             | 0.50             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Infiltration    | 14,663                  | 0                        | 0                      | 14,663           | 32.49            | 9,052                 | 25.23            | -37,375           | -37,375          | 55.89            |
| Sub Total==>    | 27,504                  | 728                      | 0                      | 28,232           | 62.55            | 21,892                | 61.01            | -64,165           | -66,875          | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Lights          | 11,668                  | 0                        | 0                      | 11,668           | 25.85            | 11,668                | 32.52            | 0                 | 0                | 0.00             |
| People          | 4,690                   | 0                        | 0                      | 4,690            | 10.39            | 2,141                 | 5.97             | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total==>    | 16,359                  | 0                        | 0                      | 16,359           | 36.24            | 13,810                | 38.49            | 0                 | 0                | 0.00             |
| Ceiling Load    | 179                     | -179                     | 0                      | 0                | 0.00             | 179                   | 0.50             | -665              | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 544              | 1.21             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Grand Total==>  | 44,042                  | 549                      | 0                      | 45,135           | 100.00           | 35,881                | 100.00           | -64,830           | -66,875          | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       |                 | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS       |            |        |
|----------|----------------|-------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          | (Tons)         | (Mbh) | Sens Cap. (Mbh) |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Gross Total | Glass (sf) | (%)    |
| Main Clg | 3.8            | 45.1  | 37.0            | 2,550            | 75.2              | 65.8  | 82.7   | 61.9             | 60.4  | 78.2   | Floor       | 2,849      |        |
| Aux Clg  | 0.0            | 0.0   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 128        |        |
| Opt Vent | 0.0            | 0.0   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Totals   | 3.8            | 45.1  |                 |                  |                   |       |        |                  |       |        | Roof        | 0          | 0 0    |
|          |                |       |                 |                  |                   |       |        |                  |       |        | Wall        | 1,248      | 149 12 |

-----HEATING COIL SELECTION-----

|          | Capacity |                  |           |           | AIRFLOWS (cfm) |         |         | ENGINEERING CHECKS |        |          | TEMPERATURES (F) |      |  |
|----------|----------|------------------|-----------|-----------|----------------|---------|---------|--------------------|--------|----------|------------------|------|--|
|          | (Mbh)    | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type           | Cooling | Heating | Clg % OA           |        | Type     | Clg              | Htg  |  |
| Main Htg | -66.9    | 2,550            | 67.3      | 91.4      | Vent           | 0       | 0       | Clg Cfm/Sqft       | 0.0    | SADB     | 62.1             | 91.4 |  |
| Aux Htg  | 0.0      | 0                | 0.0       | 0.0       | Infil          | 537     | 537     | Clg Cfm/Ton        | 0.90   | Plenum   | 75.2             | 67.3 |  |
| Preheat  | -0.0     | 2,550            | 67.3      | 61.9      | Supply         | 2,550   | 2,550   | Clg Sqft/Ton       | 757.46 | Return   | 75.2             | 67.3 |  |
| Reheat   | 0.0      | 0                | 0.0       | 0.0       | Mincfm         | 0       | 0       | Clg Btuh/Sqft      | 15.84  | Ret/OA   | 75.2             | 67.3 |  |
| Humidif  | 0.0      | 0                | 0.0       | 0.0       | Return         | 2,550   | 2,550   | No. People         | 10     | Runarnd  | 75.0             | 68.0 |  |
| Opt Vent | 0.0      | 0                | 0.0       | 0.0       | Exhaust        | 0       | 0       | Htg % OA           | 0.0    | Fn MtrTD | 0.0              | 0.0  |  |
| Total    | -66.9    |                  |           |           | Rm Exh         | 0       | 0       | Htg Cfm/Sqft       | 0.90   | Fn BldTD | 0.0              | 0.0  |  |
|          |          |                  |           |           | Auxil          | 0       | 0       | Htg Btuh/Sqft      | -23.47 | Fn Frict | 0.1              | 0.0  |  |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | -170,485                  | 8.87             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -186,742                     | -186,742                  | 9.72             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -524,509                     | -581,696                  | 30.28            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -4,712                       | -4,712                    | 0.25             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -977,370                     | -977,370                  | 50.88            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -1,693,333                   | -1,921,006                | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -273,486                     | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -1,966,819                   | -1,921,006                | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       |                 | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS  |             |            |
|----------|----------------|-------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|--------|-------------|------------|
|          | (Tons)         | (Mbh) | Sens Cap. (Mbh) |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor  | Gross Total | Glass (sf) |
| Main Clg | 0.0            | 0.0   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 79,849 |             |            |
| Aux Clg  | 0.0            | 0.0   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 1,820  |             |            |
| Opt Vent | 0.0            | 0.0   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0      |             |            |
| Totals   | 0.0            | 0.0   |                 |                  |                   |       |        |                  |       |        | 27,566 | 0           | 0          |
|          |                |       |                 |                  |                   |       |        |                  |       |        | 32,636 | 5,491       | 17         |

-----HEATING COIL SELECTION-----

|          | Capacity |                  |           |           | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)-- |      |     |
|----------|----------|------------------|-----------|-----------|---------|----------------|---------|------------------------|--------|----------|----------------------|------|-----|
|          | (Mbh)    | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F |         | Cooling        | Heating | Clg % OA               |        |          | Type                 | Clg  | Htg |
| Main Htg | -1,921.0 | 0                | 0.0       | 0.0       | Infil   | 0              | 0       | Clg Cfm/Sqft           | 0.00   | SADB     | 0.0                  | 68.1 |     |
| Aux Htg  | 0.0      | 0                | 0.0       | 0.0       | Supply  | 0              | 14,033  | Clg Cfm/Ton            | 0.00   | Plenum   | 0.0                  | 56.2 |     |
| Preheat  | 0.0      | 0                | 0.0       | 0.0       | Mincfm  | 0              | 0       | Clg Sqft/Ton           | 0.00   | Return   | 0.0                  | 66.0 |     |
| Reheat   | 0.0      | 0                | 0.0       | 0.0       | Return  | 0              | 0       | Clg Btuh/Sqft          | 0.00   | Ret/OA   | 0.0                  | 66.0 |     |
| Humidif  | 0.0      | 0                | 0.0       | 0.0       | Exhaust | 0              | 0       | No. People             | 0      | Runarnd  | 0.0                  | 68.0 |     |
| Opt Vent | 0.0      | 0                | 0.0       | 0.0       | Rm Exh  | 0              | 0       | Htg % OA               | 0.0    | Fn MtrTD | 0.0                  | 0.0  |     |
| Total    | -1,921.0 |                  |           |           | Auxil   | 0              | 0       | Htg Cfm/Sqft           | 0.00   | Fn BldTD | 0.0                  | 0.0  |     |
|          |          |                  |           |           |         |                |         | Htg Btuh/Sqft          | -24.06 | Fn Frict | 0.0                  | 0.0  |     |

BUILDING U-VALUES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description    | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |       |             |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|----------------|-------|-------|----------------------------------|-------------|-------|-------------|-------------|-------|-------|------------------------|-----------------------------|
|             |                |       |       | Summr Skylt                      | Wintr Skylt | Roof  | Summr Windo | Wintr Windo | Wall  | Ceil. |                        |                             |
| 3           | POST NURSERY   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 60.5                   | 13.03                       |
| Zone        | 3 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 60.5                   | 13.03                       |
| System      | 1 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 60.5                   | 13.03                       |
| 4           | POST NURSERY   | 0.144 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 75.2                   | 16.49                       |
| Zone        | 4 Total/Ave.   | 0.144 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 75.2                   | 16.49                       |
| System      | 2 Total/Ave.   | 0.144 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 75.2                   | 16.49                       |
| 1           | 1ST FL APART'S | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 62.4                   | 13.44                       |
| Zone        | 1 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 62.4                   | 13.44                       |
| 2           | 2ND FL APART'S | 0.000 | 0.000 | 0.000                            | 0.000       | 0.146 | 0.520       | 0.531       | 0.343 | 0.317 | 81.2                   | 17.94                       |
| Zone        | 2 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.146 | 0.520       | 0.531       | 0.343 | 0.317 | 81.2                   | 17.94                       |
| 3           | POST NURSERY   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 60.5                   | 13.03                       |
| Zone        | 3 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 60.5                   | 13.03                       |
| 5           | BASEMENT       | 0.144 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 67.7                   | 15.04                       |
| Zone        | 5 Total/Ave.   | 0.144 | 0.000 | 0.000                            | 0.000       | 0.000 | 0.520       | 0.531       | 0.343 | 0.317 | 67.7                   | 15.04                       |
| System      | 3 Total/Ave.   | 0.144 | 0.000 | 0.000                            | 0.000       | 0.146 | 0.520       | 0.531       | 0.343 | 0.317 | 70.3                   | 15.43                       |
| Building    |                | 0.144 | 0.000 | 0.000                            | 0.000       | 0.146 | 0.520       | 0.531       | 0.343 | 0.317 | 70.2                   | 15.40                       |

BUILDING AREAS - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description    | Number of<br>Duplicate<br>Flr Rm | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|----------------|----------------------------------|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 3              | POST NURSERY   | 1                                | 1                                    | 2,260                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 124                      | 13                | 804                        |
| Zone           | 3 Total/Ave.   |                                  |                                      | 2,260                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 124                      | 13                | 804                        |
| System         | 1 Total/Ave.   |                                  |                                      | 2,260                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 124                      | 13                | 804                        |
| 4              | POST NURSERY   | 1                                | 1                                    | 2,849                            | 128                         | 0                                  | 0                          | 0                 | 0                          | 149                      | 12                | 1,099                      |
| Zone           | 4 Total/Ave.   |                                  |                                      | 2,849                            | 128                         | 0                                  | 0                          | 0                 | 0                          | 149                      | 12                | 1,099                      |
| System         | 2 Total/Ave.   |                                  |                                      | 2,849                            | 128                         | 0                                  | 0                          | 0                 | 0                          | 149                      | 12                | 1,099                      |
| 1              | 1ST FL APART'S | 1                                | 1                                    | 27,566                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 2,343                    | 19                | 10,201                     |
| Zone           | 1 Total/Ave.   |                                  |                                      | 27,566                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 2,343                    | 19                | 10,201                     |
| 2              | 2ND FL APART'S | 1                                | 1                                    | 27,566                           | 0                           | 0                                  | 0                          | 0                 | 27,566                     | 2,343                    | 19                | 10,201                     |
| Zone           | 2 Total/Ave.   |                                  |                                      | 27,566                           | 0                           | 0                                  | 0                          | 0                 | 27,566                     | 2,343                    | 19                | 10,201                     |
| 3              | POST NURSERY   | 1                                | 1                                    | 2,260                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 124                      | 13                | 804                        |
| Zone           | 3 Total/Ave.   |                                  |                                      | 2,260                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 124                      | 13                | 804                        |
| 5              | BASEMENT       | 1                                | 1                                    | 22,457                           | 1,820                       | 0                                  | 0                          | 0                 | 0                          | 681                      | 10                | 5,939                      |
| Zone           | 5 Total/Ave.   |                                  |                                      | 22,457                           | 1,820                       | 0                                  | 0                          | 0                 | 0                          | 681                      | 10                | 5,939                      |
| System         | 3 Total/Ave.   |                                  |                                      | 79,849                           | 1,820                       | 0                                  | 0                          | 0                 | 0                          | 5,491                    | 17                | 27,145                     |
| Building       |                |                                  |                                      | 84,958                           | 1,948                       | 0                                  | 0                          | 0                 | 27,566                     | 5,764                    | 17                | 29,048                     |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
 BASE BUILDING

----- A S H R A E   9 0   A N A L Y S I S -----

Overall Roof U-Value = 0.146 (Btu/Hr/Sq Ft/F)  
 Overall Wall U-Value = 0.372 (Btu/Hr/Sq Ft/F)  
 Overall Building U-Value = 0.272 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 10.03 (Btu/Hr/Sq Ft)  
 Wall Overall Thermal Transfer Value (OTTvw) = 15.06 (Btu/Hr/Sq Ft)



SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 0.3                    | 4         | 32    | -101,876                 | 7         | 290   | 252.5                     | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 0.7                    | 2         | 16    | -203,753                 | 9         | 405   | 505.0                     | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 1.0                    | 3         | 20    | -305,629                 | 11        | 505   | 757.5                     | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 1.3                    | 4         | 30    | -407,505                 | 10        | 430   | 1,010.0                   | 0         | 0     | 0.0                       | 0         | 0     |
| 20 - 25             | 1.7                    | 15        | 113   | -509,381                 | 12        | 554   | 1,262.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 2.0                    | 7         | 57    | -611,258                 | 13        | 575   | 1,515.0                   | 0         | 0     | 0.0                       | 0         | 0     |
| 30 - 35             | 2.3                    | 4         | 32    | -713,134                 | 10        | 462   | 1,767.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 2.7                    | 6         | 45    | -815,010                 | 10        | 464   | 2,020.0                   | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 3.0                    | 3         | 22    | -916,887                 | 4         | 177   | 2,272.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 3.4                    | 3         | 23    | -1,018,763               | 3         | 119   | 2,525.0                   | 0         | 0     | 0.0                       | 0         | 0     |
| 50 - 55             | 3.7                    | 6         | 45    | -1,120,639               | 4         | 176   | 2,777.5                   | 58        | 1,450 | 0.0                       | 0         | 0     |
| 55 - 60             | 4.0                    | 8         | 60    | -1,222,516               | 3         | 114   | 3,030.0                   | 0         | 0     | 0.0                       | 0         | 0     |
| 60 - 65             | 4.4                    | 1         | 4     | -1,324,392               | 4         | 175   | 3,282.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 4.7                    | 2         | 15    | -1,426,268               | 0         | 0     | 3,535.0                   | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 5.0                    | 5         | 35    | -1,528,145               | 0         | 0     | 3,787.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 75 - 80             | 5.4                    | 2         | 15    | -1,630,021               | 0         | 0     | 4,040.0                   | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 5.7                    | 0         | 0     | -1,731,897               | 0         | 0     | 4,292.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 6.0                    | 4         | 29    | -1,833,774               | 0         | 0     | 4,545.0                   | 0         | 0     | 0.0                       | 0         | 0     |
| 90 - 95             | 6.4                    | 1         | 4     | -1,935,650               | 0         | 0     | 4,797.5                   | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 6.7                    | 22        | 165   | -2,037,526               | 0         | 0     | 5,050.0                   | 42        | 1,070 | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,998 | 0                        | 0         | 4,314 | 0.0                       | 0         | 6,240 | 0.0                       | 0         | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 BASE BUILDING

----- BUILDING TEMPERATURE PROFILES -----

| Temperature Range (F) | Zone Number |      |      |      |       |      |
|-----------------------|-------------|------|------|------|-------|------|
|                       | 3           | 4    | 1    | 2    | 3     | 5    |
| Max. Temp.            | 82.6        | 82.3 | 98.7 | 98.1 | 100.6 | 98.3 |
| Mo./Hr.               | 7 1         | 7 24 | 8 23 | 8 23 | 8 20  | 8 16 |
| Day Type              | 5           | 4    | 1    | 1    | 1     | 2    |

| Temperature Range (F) | Number of Hours |       |       |       |       |       |
|-----------------------|-----------------|-------|-------|-------|-------|-------|
|                       | 3               | 4     | 1     | 2     | 3     | 5     |
| Above 100             | 0               | 0     | 0     | 0     | 396   | 0     |
| 95 - 100              | 0               | 0     | 1,304 | 1,216 | 912   | 842   |
| 90 - 95               | 0               | 0     | 837   | 590   | 1,280 | 1,190 |
| 85 - 90               | 0               | 0     | 787   | 966   | 308   | 896   |
| 80 - 85               | 575             | 403   | 232   | 352   | 330   | 173   |
| 75 - 80               | 2,339           | 2,673 | 580   | 582   | 531   | 861   |
| 70 - 75               | 860             | 1,032 | 352   | 374   | 351   | 269   |
| 65 - 70               | 366             | 2,262 | 4,668 | 4,680 | 2,057 | 2,370 |
| 60 - 65               | 483             | 1,238 | 0     | 0     | 1,264 | 1,194 |
| 55 - 60               | 1,031           | 509   | 0     | 0     | 556   | 541   |
| 50 - 55               | 661             | 360   | 0     | 0     | 775   | 424   |
| Below 50              | 2,445           | 283   | 0     | 0     | 0     | 0     |

| Min. Temp. | Zone Number |      |      |      |      |      |
|------------|-------------|------|------|------|------|------|
|            | 3           | 4    | 1    | 2    | 3    | 5    |
| Min. Temp. | 33.9        | 43.9 | 67.9 | 67.9 | 54.9 | 54.9 |
| Mo./Hr.    | 2 7         | 2 7  | 4 4  | 3 21 | 1 14 | 1 4  |
| Day Type   | 5           | 5    | 2    | 1    | 3    | 4    |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | HOT WTR            | HOT W DMND           |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 15,993            | 73              | 5,844              | 12                   |
| Feb   | 14,462            | 73              | 5,705              | 13                   |
| March | 17,001            | 73              | 3,559              | 10                   |
| April | 15,306            | 73              | 1,086              | 8                    |
| May   | 16,557            | 73              | 0                  | 0                    |
| June  | 17,402            | 83              | 0                  | 0                    |
| July  | 17,249            | 84              | 0                  | 0                    |
| Aug   | 18,140            | 83              | 0                  | 0                    |
| Sept  | 15,590            | 83              | 0                  | 0                    |
| Oct   | 16,473            | 73              | 398                | 5                    |
| Nov   | 15,315            | 73              | 2,554              | 9                    |
| Dec   | 15,490            | 73              | 4,846              | 12                   |
| Total | 194,976           | 84              | 23,992             | 13                   |

Building Energy Consumption = 36,073 (Btu/Sq Ft/Year)  
Source Energy Consumption = 61,154 (Btu/Sq Ft/Year)

Floor Area = 84,958 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

| ----- EQUIPMENT ENERGY CONSUMPTION ----- |            |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|------------------------------------------|------------|---------------------------------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| Ref Num                                  | Equip Code | ----- Monthly Consumption ----- |                            |       |       |       |       |       |       |       |       |       |       | Total   |
|                                          |            | Jan                             | Feb                        | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0                                        | LIGHTS     |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC       | 15891                           | 14369                      | 16891 | 15217 | 16391 | 16217 | 15390 | 16891 | 15217 | 16391 | 15217 | 15390 | 189,471 |
|                                          | PK         | 72.3                            | 72.3                       | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3    |
| 1                                        | MISC LD    |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC       | 0                               | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2                                        | MISC LD    |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          | GAS        | 0                               | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3                                        | MISC LD    |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          | OIL        | 0                               | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4                                        | MISC LD    |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          | P STEAM    | 0                               | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5                                        | MISC LD    |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          | P HOTH2O   | 0                               | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6                                        | MISC LD    |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          | P CHILL    | 0                               | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1                                        | EQ1161     |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          |            |                                 | AIR-CLD COND COMP <15 TONS |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC       | 0                               | 0                          | 0     | 0     | 0     | 370   | 630   | 358   | 51    | 0     | 0     | 0     | 1,410   |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 4.0   | 4.1   | 4.0   | 3.8   | 0.0   | 0.0   | 0.0   | 4.1     |
| 1                                        | EQ5200     |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          |            |                                 | CONDENSER FANS             |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC       | 0                               | 0                          | 0     | 0     | 0     | 31    | 62    | 31    | 5     | 0     | 0     | 0     | 130     |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 0.3   | 0.4   | 0.3   | 0.2   | 0.0   | 0.0   | 0.0   | 0.4     |
| 1                                        | EQ5303     |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          |            |                                 | CONTROLS                   |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC       | 0                               | 0                          | 0     | 0     | 0     | 66    | 60    | 69    | 14    | 0     | 0     | 0     | 209     |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 0.3   | 0.3   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.3     |
| 2                                        | EQ1161     |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          |            |                                 | AIR-CLD COND COMP <15 TONS |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC       | 0                               | 0                          | 0     | 0     | 0     | 447   | 816   | 504   | 107   | 0     | 0     | 0     | 1,874   |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 5.0   | 5.2   | 5.1   | 4.9   | 0.0   | 0.0   | 0.0   | 5.2     |
| 2                                        | EQ5200     |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          |            |                                 | CONDENSER FANS             |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC       | 0                               | 0                          | 0     | 0     | 0     | 38    | 80    | 43    | 11    | 0     | 0     | 0     | 171     |
|                                          | PK         | 0.0                             | 0.0                        | 0.0   | 0.0   | 0.0   | 0.4   | 0.5   | 0.4   | 0.3   | 0.0   | 0.0   | 0.0   | 0.5     |
| 2                                        | EQ5303-    |                                 |                            |       |       |       |       |       |       |       |       |       |       |         |
|                                          |            |                                 | CONTROLS                   |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
BASE BUILDING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 83.8 (kW)  
Yearly Time of Peak 16 (hr) 7 (mo)

Hour 16 Month 7

| Eq.<br>Ref.<br>Num.  | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| Cooling Equipment    |                        |                                    |                           |                          |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 4.7                       | 5.66                     |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 6.0                       | 7.12                     |
| Sub Total            |                        |                                    | 10.7                      | 12.78                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Air Moving Equipment |                        |                                    |                           |                          |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.4                       | 0.51                     |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.3                       | 0.39                     |
| Sub Total            |                        |                                    | 0.8                       | 0.90                     |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Miscellaneous        |                        |                                    |                           |                          |
|                      | Lights                 |                                    | 72.3                      | 86.32                    |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                     |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                     |
| Sub Total            |                        |                                    | 72.3                      | 86.32                    |
| Grand Total          |                        |                                    | 83.8                      | 100.00                   |

```
*****  
*****  
**  
**          TRACE  600  ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 116

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 10:15:27 1/21/94  
Dataset Name: CB116 .TM

AIRFLOW - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Main                  |                      |                       | Auxil. Supply Airflow (Cfm) | Room Exhaust Airflow (Cfm) |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|-----------------------------|----------------------------|
|               |             |                       |                       | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) |                             |                            |
| 1             | SZ          | 0                     | 2,500                 | 2,500                 | 2,853                | 353                   | 0                           | 0                          |
| 2             | SZ          | 0                     | 2,550                 | 2,550                 | 3,024                | 474                   | 0                           | 0                          |
| 3             | RAD         | 0                     | 0                     | 0                     | 0                    | 12,402                | 0                           | 0                          |
| Totals        |             | 0                     | 5,050                 | 5,050                 | 5,877                | 13,229                | 0                           | 0                          |

CAPACITY - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                           |                      |                       | Heating                   |                           |                         |                        |                          |                           |                       |
|---------------|-------------|---------------------------|---------------------------|---------------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|---------------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Sys. Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | SZ          | 2.9                       | 0.0                       | 0.0                       | 0.0                  | 2.9                   | -46,413                   | 0                         | 0                       | 0                      | 0                        | 0                         | -46,413               |
| 2             | SZ          | 3.6                       | 0.0                       | 0.0                       | 0.0                  | 3.6                   | -62,529                   | 0                         | 0                       | 0                      | 0                        | 0                         | -62,529               |
| 3             | RAD         | 0.0                       | 0.0                       | 0.0                       | 0.0                  | 0.0                   | -1,807,358                | 0                         | 0                       | 0                      | 0                        | 0                         | -1,807,358            |
| Totals        |             | 6.5                       | 0.0                       | 0.0                       | 0.0                  | 6.5                   | -1,916,300                | 0                         | 0                       | 0                      | 0                        | 0                         | -1,916,300            |

The building peaked at hour 16 month 7 with a capacity of 6.5 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | SZ          | 0.00                | 1.11       | 874.5    | 790.5      | 15.18       | 1.11       | -20.54      | 2,260            |
| 2             | Main           | SZ          | 0.00                | 0.90       | 702.2    | 784.6      | 15.30       | 0.90       | -21.95      | 2,849            |
| 3             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -22.63      | 79,849           |



System 1 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Glass Solar     | 4,331                   | 0                        | 0                      | 4,331            | 12.62            | * | 4,331                 | 15.82            | * | 0                 | 0                         | 0.00             |
| Glass Cond      | 882                     | 0                        | 0                      | 882              | 2.57             | * | 882                   | 3.22             | * | -4,208            | -4,208                    | 9.07             |
| Wall Cond       | 3,882                   | 502                      | 0                      | 4,384            | 12.78            | * | 3,882                 | 14.18            | * | -15,626           | -17,645                   | 38.02            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Infiltration    | 8,522                   | 0                        | 0                      | 8,522            | 24.84            | * | 5,948                 | 21.73            | * | -24,560           | -24,560                   | 52.92            |
| Sub Total==>    | 17,616                  | 502                      | 0                      | 18,118           | 52.81            | * | 15,043                | 54.95            | * | -44,394           | -46,413                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                           |                  |
| Lights          | 9,487                   | 0                        | 0                      | 9,487            | 27.65            | * | 9,487                 | 34.66            | * | 0                 | 0                         | 0.00             |
| People          | 5,990                   | 0                        | 0                      | 5,990            | 17.46            | * | 2,740                 | 10.01            | * | 0                 | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Sub Total==>    | 15,478                  | 0                        | 0                      | 15,478           | 45.12            | * | 12,228                | 44.67            | * | 0                 | 0                         | 0.00             |
| Ceiling Load    | 105                     | -105                     | 0                      | 0                | 0.00             | * | 105                   | 0.38             | * | -421              | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 711              | 2.07             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                         | 0.00             |
| Grand Total==>  | 33,199                  | 397                      | 0                      | 34,307           | 100.00           | * | 27,375                | 100.00           | * | -44,815           | -46,413                   | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total (Floor) | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|---------------------|------------|-----|
| Main Clg | 2.9                   | 34.3            | 2,500            | 75.1                      | 66.7                     | 2,260               |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                   |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                   |            |     |
| Totals   | 2.9                   | 34.3            |                  |                           |                          | 928                 | 124        | 13  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 0.0    | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -46.4          | 2,500            | 67.4        | 84.5        | Vent    | 0       | 0       | Clg Cfm/Sqft  | 1.11   | SADB     | 64.9 | 84.5 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 353     | 353     | Clg Cfm/Ton   | 874.45 | Plenum   | 75.1 | 67.4 |
| Preheat  | -0.0           | 2,500            | 67.4        | 64.7        | Supply  | 2,500   | 2,500   | Clg Sqft/Ton  | 790.50 | Return   | 75.1 | 67.4 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 15.18  | Ret/OA   | 75.1 | 67.4 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 2,500   | 2,500   | No. People    | 10     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0       | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.1  | 0.0  |
| Total    | -46.4          |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.11   | Fn BldTD | 0.0  | 0.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -20.54 | Fn Frict | 0.1  | 0.0  |

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |                         | Mo/Hr: 7/16              |                        | * Mo/Hr: 7/16 *  |                  | * Mo/Hr: 13/ 1        |                  |                   |                  |                  |
|--------------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|------------------|
| Outside Air ==>    |                         | OADB/WB/HR: 91/ 73/ 98.0 |                        | * OADB: 91 *     |                  | * OADB: 4             |                  |                   |                  |                  |
| Envelope Loads     | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
| Skylite Solr       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Glass Solar        | 5,945                   | 0                        | 0                      | 5,945            | 13.64            | 5,945                 | 17.07            | 0                 | 0                | 0.00             |
| Glass Cond         | 1,051                   | 0                        | 0                      | 1,051            | 2.41             | 1,051                 | 3.02             | -5,054            | -5,054           | 8.08             |
| Wall Cond          | 5,753                   | 728                      | 0                      | 6,481            | 14.87            | 5,753                 | 16.52            | -21,405           | -24,114          | 38.56            |
| Partition          | 92                      | 0                        | 0                      | 92               | 0.21             | 92                    | 0.26             | -331              | -331             | 0.53             |
| Exposed Floor      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Infiltration       | 13,104                  | 0                        | 0                      | 13,104           | 30.07            | 7,999                 | 22.97            | -33,029           | -33,029          | 52.82            |
| Sub Total==>       | 25,945                  | 728                      | 0                      | 26,673           | 61.21            | 20,840                | 59.84            | -59,819           | -62,529          | 100.00           |
| Internal Loads     |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Lights             | 11,668                  | 0                        | 0                      | 11,668           | 26.78            | 11,668                | 33.50            | 0                 | 0                | 0.00             |
| People             | 4,690                   | 0                        | 0                      | 4,690            | 10.76            | 2,141                 | 6.15             | 0                 | 0                | 0.00             |
| Misc               | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total==>       | 16,359                  | 0                        | 0                      | 16,359           | 37.54            | 13,810                | 39.65            | 0                 | 0                | 0.00             |
| Ceiling Load       | 179                     | -179                     | 0                      | 0                | 0.00             | 179                   | 0.51             | -665              | 0                | 0.00             |
| Outside Air        | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sup. Fan Heat      |                         |                          |                        | 544              | 1.25             |                       |                  |                   |                  |                  |
| Ret. Fan Heat      |                         |                          |                        | 0                | 0.00             |                       |                  |                   |                  |                  |
| Duct Heat Pkup     |                         |                          |                        | 0                | 0.00             |                       |                  |                   |                  |                  |
| OV/UNDR Sizing     | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | -0.00            |
| Exhaust Heat       |                         |                          |                        | 0                | 0.00             |                       |                  |                   |                  |                  |
| Terminal Bypass    |                         |                          |                        | 0                | 0.00             |                       |                  |                   |                  |                  |
| Grand Total==>     | 42,482                  | 549                      | 0                      | 43,576           | 100.00           | 34,828                | 100.00           | -60,484           | -62,529          | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       |                 | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |      | Glass (sf) | Area (%) |
|----------|----------------|-------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------|------------|----------|
|          | (Tons)         | (Mbh) | Sens Cap. (Mbh) |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part |            |          |
| Main Clg | 3.6            | 43.6  | 35.9            | 2,550            | 75.2              | 65.7  | 82.3   | 62.3             | 60.5  | 78.0   | 2,849       |      |            |          |
| Aux Clg  | 0.0            | 0.0   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 128         |      |            |          |
| Opt Vent | 0.0            | 0.0   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |      |            |          |
| Totals   | 3.6            | 43.6  |                 |                  |                   |       |        |                  |       |        | 1,248       | 149  | 12         |          |

-----HEATING COIL SELECTION-----

|          | Capacity |                  | Ent Deg F | Lvg Deg F | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |               | --TEMPERATURES (F)-- |          |      |      |
|----------|----------|------------------|-----------|-----------|----------------|---------|------------------------|---------------|----------------------|----------|------|------|
|          | (Mbh)    | Coil Airfl (cfm) |           |           | Type           | Cooling | Heating                | Clg % OA      |                      | Type     | Clg  | Htg  |
| Main Htg | -62.5    | 2,550            | 67.3      | 89.8      | Vent           | 0       | 0                      | Clg Cfm/Sqft  | 0.90                 | SADB     | 62.4 | 89.8 |
| Aux Htg  | 0.0      | 0                | 0.0       | 0.0       | Infil          | 474     | 474                    | Clg Cfm/Ton   | 702.23               | Plenum   | 75.2 | 67.3 |
| Preheat  | -0.0     | 2,550            | 67.3      | 62.3      | Supply         | 2,550   | 2,550                  | Clg Sqft/Ton  | 784.56               | Return   | 75.2 | 67.3 |
| Reheat   | 0.0      | 0                | 0.0       | 0.0       | MinCFM         | 0       | 0                      | Clg Btuh/Sqft | 15.30                | Ret/OA   | 75.2 | 67.3 |
| Humidif  | 0.0      | 0                | 0.0       | 0.0       | Return         | 2,550   | 2,550                  | No. People    | 10                   | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0      | 0                | 0.0       | 0.0       | Exhaust        | 0       | 0                      | Htg % OA      | 0.0                  | Fn MtrTD | 0.0  | 0.0  |
| Total    | -62.5    |                  |           |           | Rm Exh         | 0       | 0                      | Htg Cfm/Sqft  | 0.90                 | Fn BldTD | 0.0  | 0.0  |
|          |          |                  |           |           | Auxil          | 0       | 0                      | Htg Btuh/Sqft | -21.95               | Fn Frict | 0.1  | 0.0  |

System 3 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * | Space Sens        | Coil Peak        | Perct Of Tot     |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | -170,485         | 9.43             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -186,742          | -186,742         | 10.33            |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -524,509          | -581,696         | 32.18            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -4,712            | -4,712           | 0.26             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -863,723          | -863,723         | 47.79            |
| Sub.Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -1,579,686        | -1,807,358       | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub.Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -273,486          | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             | * |                       |                  | * | 0                 | 0                | 0.00             |
| Ret. Fan Heat   |                         |                          | 0                      | 0                | 0.00             | * |                       |                  | * | 0                 | 0                | 0.00             |
| Duct Heat Pkup  |                         | 0                        | 0                      | 0                | 0.00             | * |                       |                  | * | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             | * |                       |                  | * | 0                 | 0                | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       |                  | * | 0                 | 0                | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -1,853,171        | -1,807,358       | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F, Deg F, Grains) | Leaving DB/WB/HR (Deg F, Deg F, Grains) | Gross Total | AREAS Glass (sf) | (%)      |
|----------|-----------------------|-----------------|------------------|------------------------------------------|-----------------------------------------|-------------|------------------|----------|
| Main Clg | 0.0                   | 0.0             | 0                | 0.0 0.0 0.0                              | 0.0 0.0 0.0                             | Floor       | 79,849           |          |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0 0.0 0.0                              | 0.0 0.0 0.0                             | Part        | 1,820            |          |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0 0.0 0.0                              | 0.0 0.0 0.0                             | ExFlr       | 0                |          |
| Totals   | 0.0                   | 0.0             | 0                | 0.0 0.0 0.0                              | 0.0 0.0 0.0                             | Roof        | 27,566           | 0 0      |
|          |                       |                 |                  |                                          |                                         | Wall        | 32,636           | 5,491 17 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | AIRFLOWS (cfm) Cooling | Heating | ENGINEERING CHECKS-- Clg % OA | 0.0    | TEMPERATURES (F) Type | Clg | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|------------------------|---------|-------------------------------|--------|-----------------------|-----|------|
| Main Htg | -1,807.4       | 0                | 0.0         | 0.0         | Vent    | 0                      | 0       | Clg Cfm/Sqft                  | 0.00   | SADB                  | 0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 0                      | 12,402  | Clg Cfm/Ton                   | 0.00   | Plenum                | 0.0 | 56.2 |
| Preheat  | 0.0            | 0                | 0.0         | 0.0         | Supply  | 0                      | 0       | Clg Sqft/Ton                  | 0.00   | Return                | 0.0 | 66.0 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0                      | 0       | Clg Btuh/Sqft                 | 0.00   | Ret/OA                | 0.0 | 66.0 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 0                      | 0       | No. People                    | 0      | Runarnd               | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0                      | 0       | Htg % OA                      | 0.0    | Fn MtrTD              | 0.0 | 0.0  |
| Total    | -1,807.4       |                  |             |             | Rm Exh  | 0                      | 0       | Htg Cfm/Sqft                  | 0.00   | Fn BldTD              | 0.0 | 0.0  |
|          |                |                  |             |             | Auxil   | 0                      | 0       | Htg Btuh/Sqft                 | -22.63 | Fn Frict              | 0.0 | 0.0  |

BUILDING U-VALUES - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description    | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |            |             |             |            |             |             | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|----------------|-------|-------|----------------------------------|-------------|------------|-------------|-------------|------------|-------------|-------------|------------------------|-----------------------------|
|             |                |       |       | Summr Skylt                      | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wintr Wall | Summr Ceil. | Wintr Ceil. |                        |                             |
| 3           | POST NURSERY   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 60.5        | 13.03                  |                             |
| Zone        | 3 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 60.5        | 13.03                  |                             |
| System      | 1 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 60.5        | 13.03                  |                             |
| 4           | POST NURSERY   | 0.144 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 75.2        | 16.49                  |                             |
| Zone        | 4 Total/Ave.   | 0.144 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 75.2        | 16.49                  |                             |
| System      | 2 Total/Ave.   | 0.144 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 75.2        | 16.49                  |                             |
| 1           | 1ST FL APART'S | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 62.4        | 13.44                  |                             |
| Zone        | 1 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 62.4        | 13.44                  |                             |
| 2           | 2ND FL APART'S | 0.000 | 0.000 | 0.000                            | 0.000       | 0.146      | 0.520       | 0.531       | 0.343      | 0.317       | 81.2        | 17.94                  |                             |
| Zone        | 2 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.146      | 0.520       | 0.531       | 0.343      | 0.317       | 81.2        | 17.94                  |                             |
| 3           | POST NURSERY   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 60.5        | 13.03                  |                             |
| Zone        | 3 Total/Ave.   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 60.5        | 13.03                  |                             |
| 5           | BASEMENT       | 0.144 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 67.7        | 15.04                  |                             |
| Zone        | 5 Total/Ave.   | 0.144 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.520       | 0.531       | 0.343      | 0.317       | 67.7        | 15.04                  |                             |
| System      | 3 Total/Ave.   | 0.144 | 0.000 | 0.000                            | 0.000       | 0.146      | 0.520       | 0.531       | 0.343      | 0.317       | 70.3        | 15.43                  |                             |
| Building    |                | 0.144 | 0.000 | 0.000                            | 0.000       | 0.146      | 0.520       | 0.531       | 0.343      | 0.317       | 70.2        | 15.40                  |                             |

BUILDING AREAS - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G   A R E A S -----

| Room Number | Description    | Number of Duplicate |   | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|----------------|---------------------|---|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
| 3           | POST NURSERY   | 1                   | 1 | 2,260                       | 2,260                   | 0                     | 0                         | 0                    | 0           | 0                    | 124                | 13          | 804                  |
| Zone        | 3 Total/Ave.   |                     |   |                             | 2,260                   | 0                     | 0                         | 0                    | 0           | 0                    | 124                | 13          | 804                  |
| System      | 1 Total/Ave.   |                     |   |                             | 2,260                   | 0                     | 0                         | 0                    | 0           | 0                    | 124                | 13          | 804                  |
| 4           | POST NURSERY   | 1                   | 1 | 2,849                       | 2,849                   | 128                   | 0                         | 0                    | 0           | 0                    | 149                | 12          | 1,099                |
| Zone        | 4 Total/Ave.   |                     |   |                             | 2,849                   | 128                   | 0                         | 0                    | 0           | 0                    | 149                | 12          | 1,099                |
| System      | 2 Total/Ave.   |                     |   |                             | 2,849                   | 128                   | 0                         | 0                    | 0           | 0                    | 149                | 12          | 1,099                |
| 1           | 1ST FL APART'S | 1                   | 1 | 27,566                      | 27,566                  | 0                     | 0                         | 0                    | 0           | 0                    | 2,343              | 19          | 10,201               |
| Zone        | 1 Total/Ave.   |                     |   |                             | 27,566                  | 0                     | 0                         | 0                    | 0           | 0                    | 2,343              | 19          | 10,201               |
| 2           | 2ND FL APART'S | 1                   | 1 | 27,566                      | 27,566                  | 0                     | 0                         | 0                    | 0           | 27,566               | 2,343              | 19          | 10,201               |
| Zone        | 2 Total/Ave.   |                     |   |                             | 27,566                  | 0                     | 0                         | 0                    | 0           | 27,566               | 2,343              | 19          | 10,201               |
| 3           | POST NURSERY   | 1                   | 1 | 2,260                       | 2,260                   | 0                     | 0                         | 0                    | 0           | 0                    | 124                | 13          | 804                  |
| Zone        | 3 Total/Ave.   |                     |   |                             | 2,260                   | 0                     | 0                         | 0                    | 0           | 0                    | 124                | 13          | 804                  |
| 5           | BASEMENT       | 1                   | 1 | 22,457                      | 22,457                  | 1,820                 | 0                         | 0                    | 0           | 0                    | 681                | 10          | 5,939                |
| Zone        | 5 Total/Ave.   |                     |   |                             | 22,457                  | 1,820                 | 0                         | 0                    | 0           | 0                    | 681                | 10          | 5,939                |
| System      | 3 Total/Ave.   |                     |   |                             | 79,849                  | 1,820                 | 0                         | 0                    | 0           | 27,566               | 5,491              | 17          | 27,145               |
| Building    |                |                     |   |                             | 84,958                  | 1,948                 | 0                         | 0                    | 0           | 27,566               | 5,764              | 17          | 29,048               |

ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- A S H R A E   9 0   A N A L Y S I S -----

Overall Roof U-Value = 0.146 (Btu/Hr/Sq Ft/F)  
 Overall Wall U-Value = 0.372 (Btu/Hr/Sq Ft/F)  
 Overall Building U-Value = 0.272 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 10.03 (Btu/Hr/Sq Ft)  
 Wall Overall Thermal Transfer Value (OTTvw) = 15.06 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.3                    | 8            | 64    | -95,815                  | 6            | 271   | 252.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 0.6                    | 2            | 16    | -191,630                 | 8            | 364   | 505.0                     | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 1.0                    | 0            | 0     | -287,445                 | 12           | 535   | 757.5                     | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 1.3                    | 6            | 46    | -383,260                 | 10           | 450   | 1,010.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 1.6                    | 10           | 84    | -479,075                 | 13           | 556   | 1,262.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 1.9                    | 8            | 61    | -574,890                 | 12           | 520   | 1,515.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 2.3                    | 2            | 16    | -670,705                 | 11           | 485   | 1,767.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 2.6                    | 7            | 57    | -766,520                 | 11           | 461   | 2,020.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 2.9                    | 7            | 53    | -862,335                 | 4            | 160   | 2,272.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 3.2                    | 3            | 23    | -958,150                 | 3            | 117   | 2,525.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 3.6                    | 5            | 40    | -1,053,965               | 4            | 177   | 2,777.5                   | 58           | 1,450 | 0.0                       | 0            | 0     |
| 55 - 60                   | 3.9                    | 8            | 68    | -1,149,780               | 4            | 190   | 3,030.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 4.2                    | 0            | 0     | -1,245,596               | 2            | 95    | 3,282.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 4.5                    | 2            | 15    | -1,341,411               | 0            | 0     | 3,535.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 4.9                    | 4            | 34    | -1,437,226               | 0            | 0     | 3,787.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 5.2                    | 4            | 30    | -1,533,041               | 0            | 0     | 4,040.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 5.5                    | 0            | 0     | -1,628,856               | 0            | 0     | 4,292.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 5.8                    | 1            | 5     | -1,724,671               | 0            | 0     | 4,545.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 6.2                    | 1            | 5     | -1,820,486               | 0            | 0     | 4,797.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 6.5                    | 24           | 193   | -1,916,301               | 0            | 0     | 5,050.0                   | 42           | 1,070 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,950 | 0                        | 0            | 4,379 | 0.0                       | 0            | 6,240 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

----- BUILDING TEMPERATURE PROFILES -----

| Temperature Range (F) | ----- Zone Number -----     |       |       |       |       |       |
|-----------------------|-----------------------------|-------|-------|-------|-------|-------|
|                       | 3                           | 4     | 1     | 2     | 3     | 5     |
| Max. Temp.            | 82.8                        | 82.5  | 98.7  | 98.1  | 100.6 | 98.3  |
| Mo./Hr.               | 7 2                         | 7 2   | 8 23  | 8 23  | 8 20  | 8 16  |
| Day Type              | 5                           | 5     | 1     | 1     | 1     | 2     |
|                       | ..... Number of Hours ..... |       |       |       |       |       |
| Above 100             | 0                           | 0     | 0     | 0     | 396   | 0     |
| 95 - 100              | 0                           | 0     | 1,304 | 1,216 | 912   | 842   |
| 90 - 95               | 0                           | 0     | 837   | 590   | 1,280 | 1,190 |
| 85 - 90               | 0                           | 0     | 787   | 966   | 308   | 896   |
| 80 - 85               | 619                         | 421   | 232   | 357   | 374   | 326   |
| 75 - 80               | 2,333                       | 2,844 | 631   | 594   | 589   | 738   |
| 70 - 75               | 1,111                       | 855   | 313   | 365   | 257   | 264   |
| 65 - 70               | 101                         | 2,398 | 4,656 | 4,672 | 2,129 | 2,452 |
| 60 - 65               | 701                         | 1,122 | 0     | 0     | 1,309 | 1,125 |
| 55 - 60               | 826                         | 542   | 0     | 0     | 480   | 549   |
| 50 - 55               | 721                         | 345   | 0     | 0     | 726   | 378   |
| Below 50              | 2,348                       | 233   | 0     | 0     | 0     | 0     |
| Min. Temp.            | 34.4                        | 44.9  | 67.9  | 67.9  | 54.9  | 54.9  |
| Mo./Hr.               | 2 7                         | 2 7   | 1 7   | 1 19  | 1 15  | 2 3   |
| Day Type              | 5                           | 5     | 1     | 2     | 3     | 4     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
WEATHERSTRIP & CAULKING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | HOT WTR HOT W DMND |                      |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 15,991            | 73              | 5,469              | 12                   |
| Feb   | 14,460            | 73              | 5,318              | 12                   |
| March | 16,999            | 73              | 3,278              | 10                   |
| April | 15,303            | 73              | 927                | 8                    |
| May   | 16,557            | 73              | 0                  | 0                    |
| June  | 17,439            | 83              | 0                  | 0                    |
| July  | 17,239            | 83              | 0                  | 0                    |
| Aug   | 18,168            | 83              | 0                  | 0                    |
| Sept  | 15,645            | 82              | 0                  | 0                    |
| Oct   | 16,471            | 73              | 331                | 4                    |
| Nov   | 15,313            | 73              | 2,378              | 9                    |
| Dec   | 15,488            | 73              | 4,547              | 11                   |
| Total | 195,072           | 83              | 22,246             | 12                   |

Building Energy Consumption = 34,022 (Btu/Sq Ft/Year)  
Source Energy Consumption = 58,426 (Btu/Sq Ft/Year)

Floor Area = 84,958 (Sq Ft)



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 WEATHERSTRIP & CAULKING

| ----- EQUIPMENT ENERGY CONSUMPTION ----- |                            |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|------------------------------------------|----------------------------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| Ref Num                                  | Equip Code                 | ----- Monthly Consumption ----- |       |       |       |       |       |       |       |       |       |       |       | Total   |
|                                          |                            | Jan                             | Feb   | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0                                        | LIGHTS                     |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC                       | 15891                           | 14369 | 16891 | 15217 | 16391 | 16217 | 15390 | 16891 | 15217 | 16391 | 15217 | 15390 | 189,471 |
|                                          | PK                         | 72.3                            | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3  | 72.3    |
| 1                                        | MISC LD                    |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC                       | 0                               | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2                                        | MISC LD                    |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | GAS                        | 0                               | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3                                        | MISC LD                    |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | OIL                        | 0                               | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4                                        | MISC LD                    |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | P STEAM                    | 0                               | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5                                        | MISC LD                    |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | P HOTH2O                   | 0                               | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6                                        | MISC LD                    |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | P CHILL                    | 0                               | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1                                        | EQ1161                     |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | AIR-CLD COND COMP <15 TONS |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC                       | 0                               | 0     | 0     | 0     | 0     | 386   | 628   | 371   | 66    | 0     | 0     | 0     | 1,451   |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 3.8   | 4.0   | 3.8   | 3.7   | 0.0   | 0.0   | 0.0   | 4.0     |
| 1                                        | EQ5200                     |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | CONDENSER FANS             |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC                       | 0                               | 0     | 0     | 0     | 0     | 33    | 61    | 32    | 7     | 0     | 0     | 0     | 133     |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 0.3   | 0.4   | 0.3   | 0.2   | 0.0   | 0.0   | 0.0   | 0.4     |
| 1                                        | EQ5303                     |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | CONTROLS                   |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC                       | 0                               | 0     | 0     | 0     | 0     | 66    | 60    | 69    | 19    | 0     | 0     | 0     | 214     |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 0.3   | 0.3   | 0.3   | 0.3   | 0.0   | 0.0   | 0.0   | 0.3     |
| 2                                        | EQ1161                     |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | AIR-CLD COND COMP <15 TONS |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC                       | 0                               | 0     | 0     | 0     | 0     | 466   | 809   | 518   | 130   | 0     | 0     | 0     | 1,923   |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 4.9   | 5.0   | 4.9   | 4.7   | 0.0   | 0.0   | 0.0   | 5.0     |
| 2                                        | EQ5200                     |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | CONDENSER FANS             |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | ELEC                       | 0                               | 0     | 0     | 0     | 0     | 39    | 79    | 44    | 12    | 0     | 0     | 0     | 174     |
|                                          | PK                         | 0.0                             | 0.0   | 0.0   | 0.0   | 0.0   | 0.4   | 0.5   | 0.4   | 0.3   | 0.0   | 0.0   | 0.0   | 0.5     |
| 2                                        | EQ5303                     |                                 |       |       |       |       |       |       |       |       |       |       |       |         |
|                                          | CONTROLS                   |                                 |       |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
WEATHERSTRIP & CAULKING

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        83.4    (kW)  
Yearly Time of Peak 16 (hr)    7 (mo)

Hour 16    Month 7

| Eq.<br>Ref.<br>Num.  | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| Cooling Equipment    |                        |                                    |                           |                          |
| 1                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 4.6                       | 5.52                     |
| 2                    | EQ1161                 | AIR-CLD COND COMP <15 TONS         | 5.8                       | 6.91                     |
| Sub Total            |                        |                                    | 10.4                      | 12.43                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Air Moving Equipment |                        |                                    |                           |                          |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.4                       | 0.51                     |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 0.3                       | 0.39                     |
| Sub Total            |                        |                                    | 0.8                       | 0.91                     |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Miscellaneous        |                        |                                    |                           |                          |
|                      | Lights                 |                                    | 72.3                      | 86.67                    |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                     |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                     |
| Sub Total            |                        |                                    | 72.3                      | 86.67                    |
| Grand Total          |                        |                                    | 83.4                      | 100.00                   |

*Building 118*

*Trace Input File*

933702

CONTENTS OF : E:\CB118.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 118

7 08/CARLISLE

8 09/JUL/JUL/19///APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/BASE BUILDING

13 20/1/1/MANAGERS OFFICE/200/1/1/7/.39/17

14 20/2/1/LOBBY/214/1/1/3/.39/21

15 20/3/1/LOUNGE/114/1/1/7/.39/17

16 20/4/1/MENS TOILET/39/1/1/7/.39/17

17 20/5/1/WOMENS TOILET/41/1/1/7/.39/17

18 20/6/2/FOYER & HALLWAYS/329/1/1/5/.39/23.5

19 20/7/2/AUDITORIUM/2461/1/1/5/.39/25.5

20 20/8/3/STAGE/828/1/1/5/.39/23.5

21 21/M///CBTHTX///CBTHTX

22 22/1/1/NO/18.75/12//150/122/65

23 22/2/1/NO/14/10.5//150/122/65

24 22/2/2/NO/14/10.5//150/302/65

25 22/3/1/NO/10.7/12//150/302/65

26 22/4/1/NO/7.75/5.5//150/302/65

27 22/5/1/NO/7.75/5.8//150/302/65

28 22/6/1/NO/175/1//150/122/65

29 22/6/2/NO/175/1//150/302/65

30 22/7/1/NO/53.5/24//150/122/65

31 22/7/2/NO/53.5/24//150/302/65

32 22/8/1/NO/17/24//150/122/65

33 22/8/2/NO/17/24//150/302/65

34 24/1/1/18.75/9.5//169/122

35 24/1/2/10.75/9.5//169/212

36 24/2/1/15/17.5//169/212

37 24/3/1/10.75/9.5//169/212

38 24/3/2/10.75/9.5//169/302

39 24/4/1/7.75/9.5//169/302

40 24/6/1/7/18//170/122

41 24/6/2/150/1//170/212

42 24/6/3/7/18//170/302

43 24/7/1/53.5/20//170/122

44 24/7/2/53.5/20//170/302

45 24/8/1/17.5/18//169/302

46 24/8/2/46/18//169/32

47 24/8/3/17.5/18//169/122

48 25/1/1/3.5/2.5/2/.58/.57

49 25/2/1/109/1/1/.65/.88

50 25/3/2/3.5/2.5/1/.58/.57

51 25/4/1/3.5/2.5/1/.58/.57

52 26/M/CBTHP/CBTHL/CBTHFAN//OFF/CBTHFAN/OFF/OFF/OFF/OFF

53 27/1/2/PEOPLE/230/190/1.5/WATT-SF

54 27/2/////1.5/WATT-SF

55 27/3/////1.5/WATT-SF.

56 27/4/////1.5/WATT-SF

57 27/5/////1.5/WATT-SF

58 27/6/////1.5/WATT-SF

CONTENTS OF : E:\CB118.TM

LINE # -----

59 27/7/200/PEOPLE/210/140/0/WATT-SF

60 29/1////////.29/CFM-SF

61 29/2////////.29/CFM-SF

62 29/3////////.29/CFM-SF

63 29/4////////.29/CFM-SF

64 29/5////////.29/CFM-SF

65 29/6/10/PCT-MCLG/10/PCT-MHTG/.29/CFM-SF/.29/CFM-SF

66 29/7/10/PCT-MCLG/10/PCT-MHTG/.29/CFM-SF/.29/CFM-SF

67 29/8////////.29/CFM-SF

68 30/6/3.58/CFM-SF/3.58/CFM-SF

69 30/7/3.58/CFM-SF/3.58/CFM-SF

70 SYSTEM - 1

71 39/1/BASE BUILDING

72 40/1/RAD

73 41/1/1/1/3/3

74 42/1

75 44/1

76 45/1/OFF/OFF/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF

77 40/2/SZ

78 41/2/2/2

79 42/2/.5

80 44/2/DRY-BULB/65/100

81 45/2/CBTHCLG/AVAIL/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF

82 EQUIPMENT - 1

83 59/1/CARLISLE///BASE BUILDING

84 60/1/1/BLKPLANT/2/2

85 62/1/EQ1170L/1

86 65/1/1//1/2

87 67/1/EQ2102/1

88 69/1

89 69/2/EQ4003

90 LOAD - 2

91 19/2/WALL & ROOF INSULATION

92 20/1/1/MANAGERS OFFICE/200/1/1/7/.39/17

93 20/2/1/LOBBY/214/1/1/3/.39/21

94 20/3/1/LOUNGE/114/1/1/7/.39/17

95 20/4/1/MENS TOILET/39/1/1/7/.39/17

96 20/5/1/WOMENS TOILET/41/1/1/7/.39/17

97 20/6/2/FOYER & HALLWAYS/329/1/1/5/.39/23.5

98 20/7/2/AUDITORIUM/2461/1/1/5/.39/25.5

99 20/8/3/STAGE/828/1/1/5/.39/23.5

100 21/M////CBTHTX///CBTHTX

101 22/1/1/NO/18.75/12//185/122/65

102 22/2/1/NO/14/10.5//185/122/65

103 22/2/2/NO/14/10.5//185/302/65

104 22/3/1/NO/10.7/12//185/302/65

105 22/4/1/NO/7.75/5.5//185/302/65

106 22/5/1/NO/7.75/5.8//185/302/65

107 22/6/1/NO/175/1//185/122/65

108 22/6/2/NO/175/1//185/302/65

109 22/7/1/NO/53.5/24//185/122/65

110 22/7/2/NO/53.5/24//185/302/65

111 22/8/1/NO/17/24//185/122/65

112 22/8/2/NO/17/24//185/302/65

113 24/1/1/18.75/9.5//183/122

114 24/1/2/10.75/9.5//183/212

115 24/2/1/15/17.5//183/212

116 24/3/1/10.75/9.5//183/212

## CONTENTS OF : E:\CB118.TM

LINE # -----  
117 24/3/2/10.75/9.5//183/302  
118 24/4/1/7.75/9.5//183/302  
119 24/6/1/7/18//184/122  
120 24/6/2/150/1//184/212  
121 24/6/3/7/18//184/302  
122 24/7/1/53.5/20//184/122  
123 24/7/2/53.5/20//184/302  
124 24/8/1/17.5/18//183/302  
125 24/8/2/46/18//183/32  
126 24/8/3/17.5/18//183/122  
127 25/1/1/3.5/2.5/2/.58/.57  
128 25/2/1/109/1/1/.65/.88  
129 25/3/2/3.5/2.5/1/.58/.57  
130 25/4/1/3.5/2.5/1/.58/.57  
131 26/M/CBTHP/CBTHL/CBTHFAN//OFF/CBTHFAN/OFF/OFF/OFF/OFF  
132 27/1/2/PEOPLE/230/190/1.5/WATT-SF  
133 27/2/////1.5/WATT-SF  
134 27/3/////1.5/WATT-SF  
135 27/4/////1.5/WATT-SF  
136 27/5/////1.5/WATT-SF  
137 27/6/////1.5/WATT-SF  
138 27/7/200/PEOPLE/210/140/0/WATT-SF  
139 29/1////////.21/CFM-SF  
140 29/2////////.21/CFM-SF  
141 29/3////////.21/CFM-SF  
142 29/4////////.21/CFM-SF  
143 29/5////////.21/CFM-SF  
144 29/6/10/PCT-MCLG/10/PCT-MHTG/.21/CFM-SF/.21/CFM-SF  
145 29/7/10/PCT-MCLG/10/PCT-MHTG/.21/CFM-SF/.21/CFM-SF  
146 29/8////////.21/CFM-SF  
147 30/6/3.58/CFM-SF/3.58/CFM-SF  
148 30/7/3.58/CFM-SF/3.58/CFM-SF  
149 SYSTEM - 2  
150 39/2/WALL & ROOF INSULATION  
151 40/1/RAD  
152 41/1/1/1/3/3  
153 42/1  
154 44/1  
155 45/1/OFF/OFF/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF  
156 40/2/SZ  
157 41/2/2/2  
158 42/2/.5  
159 44/2/DRY-BULB/65/100  
160 45/2/CBTHCLG/AVAIL/OFF/OFF/OFF/CBTHHTG/OFF/OFF/OFF/OFF  
161 EQUIPMENT - 2  
162 59/2/CARLISLE///WALL & ROOF INSULATION  
163 60/1/1/BLKPLANT/2/2  
164 62/1/EQ1170L/1  
165 65/1/1//1/2  
166 67/1/EQ2102/1  
167 69/1  
168 69/2/EQ4003

*Building 118*

*Trace Output File*

933702



```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 118

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: July To July  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9:45:24 1/25/94  
Dataset Name: CB118 .TM

AIRFLOW - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | RAD         | 0                     | 0                     | 0                     | 0                    | 661                   | 0             | 0             |
| 2             | SZ          | 1,030                 | 10,301                | 10,301                | 11,039               | 10,301                | 0             | 0             |
| Totals        |             | 1,030                 | 10,301                | 10,301                | 11,039               | 10,962                | 0             | 0             |

CAPACITY - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling              |                      |                      |                      |                      | Heating               |                      |                      |                         |                        |                          |                      |                      |                       |
|---------------|-------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Capacity (Tons) | Sys. Capacity (Tons) | Aux. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Capacity (Btuh) | Aux. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | RAD         | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 0.0                  | -121,401              | 0                    | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | -121,401              |
| 2             | SZ          | 5.9                  | 0.0                  | 0.0                  | 0.0                  | 5.9                  | -180,542              | 0                    | -177,011             | 0                       | 0                      | 0                        | 0                    | 0                    | -180,542              |
| Totals        |             | 5.9                  | 0.0                  | 0.0                  | 0.0                  | 5.9                  | -301,943              | 0                    | -177,011             | 0                       | 0                      | 0                        | 0                    | 0                    | -301,943              |

The building peaked at hour 19 month 7 with a capacity of 5.9 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 BASE BUILDING

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -84.54      | 1,436            |
| 2             | Main           | SZ          | 10.00               | 3.69       | 1,733.6  | 469.5      | 25.56       | 3.69       | -64.71      | 2,790            |

System 1 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | -19,375                   | 15.96            |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -5,984                       | -5,984                    | 4.93             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -42,382                      | -50,019                   | 41.20            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -46,022                      | -46,022                   | 37.91            |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -94,388                      | -121,401                  | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -26,808                      | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Duct Heat Pkqp  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -121,197                     | -121,401                  | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS |            |       |       |     |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------|------------|-------|-------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor | Glass (sf) | (%)   |       |     |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0   | 0.0        | 0     | 0     | 0   |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0   | 0.0        | 0     | 0     | 0   |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0   | 0.0        | 0     | 0     | 0   |
| Totals   | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0   | 0.0        | 1,436 | 0     | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        |       |            | Part  | 0     | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        |       |            | ExFlr | 0     | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        |       |            | Roof  | 1,551 | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        |       |            | Wall  | 2,279 | 144 |
|          |                       |                 |                  |                   |       |        |                  |       |        |       |            |       |       | 6   |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |               |        | --TEMPERATURES (F)-- |     |      |
|----------|----------------|------------------|-----------|-----------|----------------|---------|------------------------|---------------|--------|----------------------|-----|------|
|          |                |                  |           |           | Type           | Cooling | Heating                | Clg % OA      | 0.0    | Type                 | Clg | Htg  |
| Main Htg | -121.4         | 0                | 0.0       | 0.0       | Vent           | 0       | 0                      | Clg Cfm/Sqft  | 0.00   | SADB                 | 0.0 | 68.1 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil          | 0       | 661                    | Clg Cfm/Ton   | 0.00   | Plenum               | 0.0 | 35.6 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply         | 0       | 0                      | Clg Sqft/Ton  | 0.00   | Return               | 0.0 | 36.5 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm         | 0       | 0                      | Clg Btuh/Sqft | 0.00   | Ret/OA               | 0.0 | 36.5 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return         | 0       | 0                      | No. People    | 0      | Runarnd              | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust        | 0       | 0                      | Htg % OA      | 0.0    | Fn MtrTD             | 0.0 | 0.0  |
| Total    | -121.4         | 0                | 0.0       | 0.0       | Rm Exh         | 0       | 0                      | Htg Cfm/Sqft  | 0.00   | Fn BldTD             | 0.0 | 0.0  |
|          |                |                  |           |           | Auxil          | 0       | 0                      | Htg Btuh/Sqft | -84.54 | Fn Frict             | 0.0 | 0.0  |

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK  |            |          |          |        |        | CLG SPACE PEAK           |          |        |   |            |           | HEATING COIL PEAK |  |  |         |  |  |
|--------------------|------------|----------|----------|--------|--------|--------------------------|----------|--------|---|------------|-----------|-------------------|--|--|---------|--|--|
| Peaked at Time ==> |            |          |          |        |        | Mo/Hr: 7/19              |          |        |   |            |           | Mo/Hr: 13/ 1      |  |  |         |  |  |
| Outside Air ==>    |            |          |          |        |        | OADB/WB/HR: 85/ 70/ 91.0 |          |        |   |            |           | OADB: 85          |  |  | OADB: 4 |  |  |
|                    | Space      | Ret. Air | Ret. Air | Net    | Perct  |                          | Space    | Perct  |   | Space Peak | Coil Peak | Perct             |  |  |         |  |  |
|                    | Sens.+Lat. | Sensible | Latent   | Total  | Of Tot |                          | Sensible | Of Tot |   | Space Sens | Tot Sens  | Of Tot            |  |  |         |  |  |
|                    | (Btuh)     | (Btuh)   | (Btuh)   | (Btuh) | (%)    |                          | (Btuh)   | (%)    |   | (Btuh)     | (Btuh)    | (%)               |  |  |         |  |  |
| Envelope Loads     |            |          |          |        |        |                          |          |        |   |            |           |                   |  |  |         |  |  |
| Skylite Solr       | 0          | 0        |          | 0      | 0.00   | *                        | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| Skylite Cond       | 0          | 0        |          | 0      | 0.00   | *                        | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| Roof Cond          | 0          | 39,494   |          | 39,494 | 55.39  | *                        | 0        | 0.00   | * | 0          | -67,000   | 37.35             |  |  |         |  |  |
| Glass Solar        | 0          | 0        |          | 0      | 0.00   | *                        | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| Glass Cond         | 0          | 0        |          | 0      | 0.00   | *                        | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| Wall Cond          | 16,350     | 3,459    |          | 19,810 | 27.78  | *                        | 16,350   | 52.41  | * | -44,736    | -54,771   | 30.53             |  |  |         |  |  |
| Partition          | 0          | 0        |          | 0      | 0.00   | *                        | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| Exposed Floor      | 0          | 0        |          | 0      | 0.00   | *                        | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| Infiltration       | 4,447      | 0        |          | 4,447  | 6.24   | *                        | 7,862    | 25.20  | * | -51,341    | -51,341   | 28.62             |  |  |         |  |  |
| Sub Total==>       | 20,797     | 42,954   |          | 63,751 | 89.40  | *                        | 24,212   | 77.61  | * | -96,077    | -173,113  | 96.51             |  |  |         |  |  |
| Internal Loads     |            |          |          |        |        |                          |          |        |   |            |           |                   |  |  |         |  |  |
| Lights             | 152        | 0        |          | 152    | 0.21   | *                        | 152      | 0.49   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| People             | 420        | 0        |          | 420    | 0.59   | *                        | 420      | 1.35   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| Misc               | 0          | 0        | 0        | 0      | 0.00   | *                        | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| Sub Total==>       | 572        | 0        | 0        | 572    | 0.80   | *                        | 572      | 1.83   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| Ceiling Load       | 5,430      | -5,430   |          | 0      | 0.00   | *                        | 5,464    | 17.51  | * | -9,558     | 0         | 0.00              |  |  |         |  |  |
| Outside Air        | 0          | 0        | 0        | 6,214  | 8.71   | *                        | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |         |  |  |
| Sup. Fan Heat      |            |          |          | 3,663  | 5.14   | *                        |          | 0.00   | * |            | 0         | 0.00              |  |  |         |  |  |
| Ret. Fan Heat      |            | 0        |          | 0      | 0.00   | *                        |          | 0.00   | * |            | 0         | 0.00              |  |  |         |  |  |
| Duct Heat Pkup     |            | 0        |          | 0      | 0.00   | *                        |          | 0.00   | * |            | 0         | 0.00              |  |  |         |  |  |
| OV/UNDR Sizing     | 949        |          |          | 949    | 1.33   | *                        | 949      | 3.04   | * | -6,269     | -6,269    | 3.49              |  |  |         |  |  |
| Exhaust Heat       |            | -3,841   | 0        | -3,841 | -5.39  | *                        |          | 0.00   | * |            | 0         | 0.00              |  |  |         |  |  |
| Terminal Bypass    |            | 0        | 0        | 0      | 0.00   | *                        |          | 0.00   | * |            | 0         | 0.00              |  |  |         |  |  |
| Grand Total==>     | 27,748     | 33,682   | 0        | 71,307 | 100.00 | *                        | 31,196   | 100.00 | * | -111,904   | -179,382  | 100.00            |  |  |         |  |  |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |       | Glass (sf) | (%) |
|----------|----------------|-------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|-------|------------|-----|
|          | (Tons)         | (Mbh) | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | 2,790 |            |     |
| Main Clg | 5.9            | 71.3  | 79.5      | 10,301     | 79.1              | 69.7  | 97.1   | 71.9             | 67.8  | 98.4   | Part        | 0     |            |     |
| Aux Clg  | 0.0            | 0.0   | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0     |            |     |
| Opt Vent | 0.0            | 0.0   | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 2,918 | 0          | 0   |
| Totals   | 5.9            | 71.3  |           |            |                   |       |        |                  |       |        | Wall        | 2,542 | 0          | 0   |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | -AIRFLOWS (cfm)- |         | --ENGINEERING CHECKS-- |         |          | --TEMPERATURES (F)-- |      |  |
|----------|----------|------------|-------|-------|---------|------------------|---------|------------------------|---------|----------|----------------------|------|--|
|          |          |            |       |       |         | Cooling          | Heating | Clg % OA               | 10.0    | Type     | Clg                  | Htg  |  |
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |                  |         | Clg Cfm/Sqft           | 3.69    | SADB     | 72.2                 | 78.0 |  |
| Main Htg | -180.5   | 10,301     | 61.9  | 78.0  | Infil   | 1,030            | 0       | Clg Cfm/Ton            | 1733.59 | Plenum   | 78.4                 | 61.9 |  |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 10,301           | 10,301  | Clg Sqft/Ton           | 469.52  | Return   | 78.4                 | 61.9 |  |
| Preheat  | -177.0   | 10,301     | 56.1  | 71.9  | Mincfm  | 0                | 0       | Clg Btuh/Sqft          | 25.56   | Ret/OA   | 79.1                 | 61.9 |  |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 10,301           | 10,301  | No. People             | 200     | Runarnd  | 75.0                 | 68.0 |  |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 1,030            | 0       | Htg % OA               | 0.0     | Fn MtrTD | 0.1                  | 0.0  |  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0                | 0       | Htg Cfm/Sqft           | 3.69    | Fn BldTD | 0.1                  | 0.0  |  |
| Total    | -180.5   |            |       |       | Auxil   | 0                | 0       | Htg Btuh/Sqft          | -64.71  | Fn Frict | 0.2                  | 0.0  |  |

BUILDING U-VALUES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |            |             |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|------------------|-------|-------|----------------------------------|-------------|------------|-------------|-------------|-------|-------|------------------------|-----------------------------|
|             |                  |       |       | Summr Skylt                      | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wall  | Ceil. |                        |                             |
| 1           | MANAGERS OFFICE  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.580       | 0.594       | 0.425 | 0.568 | 183.0                  | 43.33                       |
| 2           | LOBBY            | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.650       | 0.668       | 0.425 | 0.568 | 106.9                  | 26.72                       |
| 3           | LOUNGE           | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.580       | 0.594       | 0.425 | 0.568 | 235.2                  | 54.80                       |
| 4           | MENS TOILET      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.580       | 0.594       | 0.425 | 0.568 | 228.3                  | 53.27                       |
| 5           | WOMENS TOILET    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.000       | 0.000       | 0.000 | 0.568 | 12.1                   | 5.70                        |
| Zone 1      | Total/Ave.       | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.633       | 0.650       | 0.425 | 0.568 | 157.4                  | 37.74                       |
| 8           | STAGE            | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.000       | 0.000       | 0.425 | 0.568 | 240.4                  | 55.86                       |
| Zone 3      | Total/Ave.       | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.000       | 0.000       | 0.425 | 0.568 | 240.4                  | 55.86                       |
| System 1    | Total/Ave.       | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.633       | 0.650       | 0.425 | 0.568 | 205.3                  | 48.19                       |
| 6           | FOYER & HALLWAYS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.000       | 0.000       | 0.343 | 0.568 | 174.0                  | 41.23                       |
| 7           | AUDITORIUM       | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.000       | 0.000       | 0.343 | 0.568 | 127.1                  | 30.93                       |
| Zone 2      | Total/Ave.       | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.000       | 0.000       | 0.343 | 0.568 | 132.7                  | 32.14                       |
| System 2    | Total/Ave.       | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.000       | 0.000       | 0.343 | 0.568 | 132.7                  | 32.14                       |
| Building    |                  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.397      | 0.633       | 0.650       | 0.381 | 0.568 | 157.3                  | 37.59                       |

BUILDING AREAS - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G A R E A S -----

| Room Number | Description      | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed           |                      |             | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|---------------------|----|-----------------------------|-------------------------|-----------------------|-------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
|             |                  | Flr                 | Rm |                             |                         |                       | Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) |                      |                    |             |                      |
| 1           | MANAGERS OFFICE  | 1                   | 1  | 200                         | 200                     | 0                     | 0                 | 0                    | 0           | 225                  | 18                 | 6           | 263                  |
| 2           | LOBBY            | 1                   | 1  | 214                         | 214                     | 0                     | 0                 | 0                    | 0           | 294                  | 109                | 42          | 153                  |
| 3           | LOUNGE           | 1                   | 1  | 114                         | 114                     | 0                     | 0                 | 0                    | 0           | 128                  | 9                  | 4           | 195                  |
| 4           | MENS TOILET      | 1                   | 1  | 39                          | 39                      | 0                     | 0                 | 0                    | 0           | 43                   | 9                  | 12          | 65                   |
| 5           | WOMENS TOILET    | 1                   | 1  | 41                          | 41                      | 0                     | 0                 | 0                    | 0           | 45                   | 0                  | 0           | 0                    |
| Zone 1      | Total/Ave.       |                     |    |                             | 608                     | 0                     | 0                 | 0                    | 0           | 735                  | 144                | 18          | 677                  |
| 8           | STAGE            | 1                   | 1  | 828                         | 828                     | 0                     | 0                 | 0                    | 0           | 816                  | 0                  | 0           | 1,458                |
| Zone 3      | Total/Ave.       |                     |    |                             | 828                     | 0                     | 0                 | 0                    | 0           | 816                  | 0                  | 0           | 1,458                |
| System 1    | Total/Ave.       |                     |    |                             | 1,436                   | 0                     | 0                 | 0                    | 0           | 1,551                | 144                | 6           | 2,135                |
| 6           | FOYER & HALLWAYS | 1                   | 1  | 329                         | 329                     | 0                     | 0                 | 0                    | 0           | 350                  | 0                  | 0           | 402                  |
| 7           | AUDITORIUM       | 1                   | 1  | 2,461                       | 2,461                   | 0                     | 0                 | 0                    | 0           | 2,568                | 0                  | 0           | 2,140                |
| Zone 2      | Total/Ave.       |                     |    |                             | 2,790                   | 0                     | 0                 | 0                    | 0           | 2,918                | 0                  | 0           | 2,542                |
| System 2    | Total/Ave.       |                     |    |                             | 2,790                   | 0                     | 0                 | 0                    | 0           | 2,918                | 0                  | 0           | 2,542                |
| Building    |                  |                     |    |                             | 4,226                   | 0                     | 0                 | 0                    | 0           | 4,469                | 144                | 3           | 4,677                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.397 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.388 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.392 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 35.60 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTvw) = 5.59 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.3                    | 0            | 0     | -23,948                  | 0            | 0     | 515.1                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 0.6                    | 0            | 0     | -47,895                  | 0            | 18    | 1,030.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 0.9                    | 0            | 0     | -71,843                  | 0            | 3     | 1,545.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 1.2                    | 7            | 10    | -95,791                  | 0            | 14    | 2,060.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 1.5                    | 3            | 5     | -119,739                 | 3            | 98    | 2,575.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 1.8                    | 0            | 0     | -143,686                 | 3            | 111   | 3,090.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 2.1                    | 0            | 0     | -167,634                 | 9            | 347   | 3,605.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 2.4                    | 0            | 0     | -191,582                 | 15           | 532   | 4,120.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 2.7                    | 0            | 0     | -215,529                 | 31           | 1,131 | 4,635.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 3.0                    | 0            | 0     | -239,477                 | 14           | 516   | 5,150.7                   | 71           | 6,205 | 0.0                       | 0            | 0     |
| 50 - 55                   | 3.3                    | 0            | 0     | -263,425                 | 10           | 351   | 5,665.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 3.6                    | 0            | 0     | -287,373                 | 7            | 255   | 6,180.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 3.9                    | 0            | 0     | -311,320                 | 8            | 290   | 6,695.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 4.2                    | 0            | 0     | -335,268                 | 0            | 0     | 7,211.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 4.5                    | 0            | 0     | -359,216                 | 0            | 0     | 7,726.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 4.8                    | 0            | 0     | -383,163                 | 0            | 0     | 8,241.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 5.1                    | 0            | 0     | -407,111                 | 0            | 0     | 8,756.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 5.3                    | 0            | 0     | -431,059                 | 0            | 0     | 9,271.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 5.6                    | 0            | 0     | -455,006                 | 0            | 0     | 9,786.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 5.9                    | 90           | 135   | -478,954                 | 0            | 0     | 10,301.4                  | 29           | 2,555 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 8,610 | 0                        | 0            | 5,094 | 0.0                       | 0            | 0     | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 BASE BUILDING

----- BUILDING TEMPERATURE PROFILES -----

| Temperature Range (F) | Zone Number     |       |       |
|-----------------------|-----------------|-------|-------|
|                       | 1               | 3     | 2     |
| Max. Temp.            | 97.7            | 95.0  | 87.7  |
| Mo./Hr.               | 8 21            | 4 23  | 7 17  |
| Day Type              | 1               | 2     | 1     |
|                       | Number of Hours |       |       |
| Above 100             | 0               | 0     | 0     |
| 95 - 100              | 646             | 0     | 0     |
| 90 - 95               | 3,221           | 486   | 0     |
| 85 - 90               | 1,739           | 2,133 | 333   |
| 80 - 85               | 944             | 2,083 | 1,445 |
| 75 - 80               | 696             | 1,638 | 1,514 |
| 70 - 75               | 674             | 1,054 | 1,882 |
| 65 - 70               | 421             | 728   | 2,087 |
| 60 - 65               | 198             | 336   | 910   |
| 55 - 60               | 180             | 209   | 353   |
| 50 - 55               | 41              | 93    | 179   |
| Below 50              | 0               | 0     | 57    |
| Min. Temp.            | 53.6            | 51.5  | 48.3  |
| Mo./Hr.               | 2 24            | 2 24  | 2 24  |
| Day Type              | 4               | 4     | 4     |



MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | HOT WTR HOT W DMND |                      |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 1,167             | 4               | 1,325              | 3                    |
| Feb   | 1,055             | 4               | 1,200              | 3                    |
| March | 1,168             | 4               | 1,179              | 3                    |
| April | 1,129             | 4               | 804                | 2                    |
| May   | 1,184             | 9               | 0                  | 0                    |
| June  | 1,373             | 9               | 0                  | 0                    |
| July  | 1,506             | 9               | 0                  | 0                    |
| Aug   | 1,408             | 9               | 0                  | 0                    |
| Sept  | 1,124             | 9               | 0                  | 0                    |
| Oct   | 1,168             | 4               | 895                | 2                    |
| Nov   | 1,130             | 4               | 1,008              | 3                    |
| Dec   | 1,168             | 4               | 1,266              | 3                    |
| Total | 14,581            | 9               | 7,677              | 3                    |

Building Energy Consumption = 193,447 (Btu/Sq Ft/Year)  
Source Energy Consumption = 277,559 (Btu/Sq Ft/Year)

Floor Area = 4,226 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

| ----- EQUIPMENT ENERGY CONSUMPTION ----- |               |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|------------------------------------------|---------------|---------------------------------|----------------------------|------|------|------|------|------|------|------|------|------|------|--------|
| Ref<br>Num                               | Equip<br>Code | ----- Monthly Consumption ----- |                            |      |      |      |      |      |      |      |      |      |      | Total  |
|                                          |               | Jan                             | Feb                        | Mar  | Apr  | May  | June | July | Aug  | Sep  | Oct  | Nov  | Dec  |        |
| 0                                        | LIGHTS        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 102                             | 93                         | 103  | 99   | 103  | 100  | 102  | 103  | 99   | 103  | 99   | 102  | 1,207  |
|                                          | PK            | 1.4                             | 1.4                        | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4    |
| 1                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 2                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | GAS           | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 3                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | OIL           | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 4                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | P STEAM       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 5                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | P HOTH2O      | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 6                                        | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          | P CHILL       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 1                                        | EQ1170L       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | AIR-CLD COND COMP >20 TONS |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 0                               | 0                          | 0    | 0    | 16   | 208  | 289  | 206  | 0    | 0    | 0    | 0    | 720    |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 5.2  | 5.5  | 5.7  | 5.5  | 5.2  | 0.0  | 0.0  | 0.0  | 5.7    |
| 1                                        | EQ5200        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 0                               | 0                          | 0    | 0    | 2    | 28   | 39   | 28   | 0    | 0    | 0    | 0    | 97     |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.7  | 0.7  | 0.7  | 0.7  | 0.7  | 0.0  | 0.0  | 0.0  | 0.7    |
| 1                                        | EQ5313        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 0                               | 0                          | 0    | 0    | 5    | 12   | 16   | 12   | 0    | 0    | 0    | 0    | 45     |
|                                          | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.0  | 0.0  | 0.0  | 0.3    |
| 2                                        | EQ4003        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | FC CENTRIF. FAN C.V.       |      |      |      |      |      |      |      |      |      |      |        |
|                                          | ELEC          | 1059                            | 957                        | 1059 | 1025 | 1059 | 1025 | 1059 | 1059 | 1025 | 1059 | 1025 | 1059 | 12,472 |
|                                          | PK            | 2.2                             | 2.2                        | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2    |
| 1                                        | EQ2102        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | PURCHASED DIST. HOT WATER  |      |      |      |      |      |      |      |      |      |      |        |
|                                          | P HOTH2O      | 1325                            | 1200                       | 1179 | 804  | 0    | 0    | 0    | 0    | 0    | 895  | 1008 | 1266 | 7,677  |
|                                          | PK            | 3.0                             | 3.0                        | 2.5  | 2.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 2.0  | 2.6  | 3.0  | 3.0    |
| 1                                        | EQ5020        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|                                          |               |                                 | HEAT WATER CIRC. PUMP C.V. |      |      |      |      |      |      |      |      |      |      |        |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
BASE BUILDING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 9.0 (kW)  
Yearly Time of Peak 18 (hr) 7 (mo)

Hour 18 Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct.<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|-------------------------|
| Cooling Equipment    |                        |                                    |                           |                         |
| 1                    | EQ1170L                | AIR-CLD COND COMP >20 TONS         | 6.7                       | 74.06                   |
| Sub Total            |                        |                                    | 6.7                       | 74.06                   |
| Sub Total            |                        |                                    | 0.0                       | 0.00                    |
| Air Moving Equipment |                        |                                    |                           |                         |
| 2                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 2.2                       | 24.38                   |
| Sub Total            |                        |                                    | 2.2                       | 24.38                   |
| Sub Total            |                        |                                    | 0.0                       | 0.00                    |
| Miscellaneous        |                        |                                    |                           |                         |
|                      | Lights                 |                                    | 0.1                       | 1.55                    |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                    |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                    |
| Sub Total            |                        |                                    | 0.1                       | 1.55                    |
| Grand Total          |                        |                                    | 9.0                       | 100.00                  |

```
*****  
*****  
**  
**          TRACE  600  ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 118

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Reflectance: 0.20  
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0862 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: July To July  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9:53:53 1/25/94  
Dataset Name: CB118 .TM

AIRFLOW - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | RAD         | 0                     | 0                     | 0                     | 0                    | 479                   | 0             | 0             |
| 2             | SZ          | 1,040                 | 10,405                | 10,405                | 10,938               | 10,405                | 0             | 0             |
| Totals        |             | 1,040                 | 10,405                | 10,405                | 10,938               | 10,883                | 0             | 0             |

CAPACITY - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling              |                      |                      |                      |                       | Heating              |                      |                         |                        |                          |                      |                      |                       |
|---------------|-------------|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Capacity (Tons) | Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Capacity (Btuh) | Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | RAD         | 0.0                  | 0.0                  | 0.0                  | 0.0                  | 0.0                   | -50,656              | 0                    | 0                       | 0                      | 0                        | 0                    | 0                    | -50,656               |
| 2             | SZ          | 1.7                  | 0.0                  | 0.0                  | 0.0                  | 1.7                   | -50,697              | 0                    | -146,077                | 0                      | 0                        | 0                    | 0                    | -50,697               |
| Totals        |             | 1.7                  | 0.0                  | 0.0                  | 0.0                  | 1.7                   | -101,352             | 0                    | -146,077                | 0                      | 0                        | 0                    | 0                    | -101,352              |

The building peaked at hour 19 month 7 with a capacity of 1.7 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | Cooling    |          |            |             | Heating    |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|------------|----------|------------|-------------|------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft | Btuh/ Sq Ft |                  |
| 1             | Main           | RAD         | 0.00                | 0.00       | 0.0      | 0.0        | 0.00        | 0.00       | -35.28      | 1,436            |
| 2             | Main           | SZ          | 10.00               | 3.73       | 6,206.6  | 1,664.3    | 7.21        | 3.73       | -18.17      | 2,790            |

System 1 Block RAD - RADIATION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK  |                         |                          |                        |                  | CLG SPACE PEAK   |            |                       |                  |   | HEATING COIL PEAK |                  |                  |  |
|--------------------|-------------------------|--------------------------|------------------------|------------------|------------------|------------|-----------------------|------------------|---|-------------------|------------------|------------------|--|
| Peaked at Time ==> | Mo/Hr: 0/0              |                          |                        |                  | *                | Mo/Hr: 0/0 |                       |                  |   | *                 | Mo/Hr: 13/1      |                  |  |
| Outside Air ==>    | OADB/WB/HR: 0/0/0.0     |                          |                        |                  | *                | OADB: 0    |                       |                  |   | *                 | OADB: 4          |                  |  |
|                    | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | *          | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |  |
| Envelope Loads     |                         |                          |                        |                  |                  | *          |                       |                  | * |                   |                  |                  |  |
| Skylite Solr       | 0                       | 0                        |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| Skylite Cond       | 0                       | 0                        |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| Roof Cond          | 0                       | 0                        |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | -3,658           | 7.22             |  |
| Glass Solar        | 0                       | 0                        |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| Glass Cond         | 0                       | 0                        |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | -5,984            | -5,984           | 11.81            |  |
| Wall Cond          | 0                       | 0                        |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | -5,776            | -7,687           | 15.17            |  |
| Partition          | 0                       |                          |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| Exposed Floor      | 0                       |                          |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| Infiltration       | 0                       |                          |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | -33,326           | -33,326          | 65.79            |  |
| Sub Total==>       | 0                       | 0                        |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | -45,087           | -50,655          | 100.00           |  |
| Internal Loads     |                         |                          |                        |                  |                  | *          |                       |                  | * |                   |                  |                  |  |
| Lights             | 0                       | 0                        |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| People             | 0                       |                          |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| Misc               | 0                       | 0                        | 0                      | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| Sub Total==>       | 0                       | 0                        | 0                      | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| Ceiling Load       | 0                       |                          |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | -5,563            | 0                | 0.00             |  |
| Outside Air        | 0                       | 0                        | 0                      | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| Sup. Fan Heat      |                         |                          |                        | 0                | 0.00             | *          |                       | 0.00             | * |                   | 0                | 0.00             |  |
| Ret. Fan Heat      |                         | 0                        |                        | 0                | 0.00             | *          |                       | 0.00             | * |                   | 0                | 0.00             |  |
| Duct Heat Pkup     |                         | 0                        |                        | 0                | 0.00             | *          |                       | 0.00             | * |                   | 0                | 0.00             |  |
| OV/UNDR Sizing     | 0                       |                          |                        | 0                | 0.00             | *          | 0                     | 0.00             | * | 0                 | 0                | 0.00             |  |
| Exhaust Heat       |                         | 0                        | 0                      | 0                | 0.00             | *          |                       | 0.00             | * |                   | 0                | 0.00             |  |
| Terminal Bypass    |                         | 0                        | 0                      | 0                | 0.00             | *          |                       | 0.00             | * |                   | 0                | 0.00             |  |
| Grand Total==>     | 0                       | 0                        | 0                      | 0                | 0.00             | *          | 0                     | 0.00             | * | -50,650           | -50,655          | 100.00           |  |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       |       | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS |            |     |
|----------|----------------|-------|-------|------------------|-------------------|-------|--------|------------------|-------|--------|-------|------------|-----|
|          | (Tons)         | (Mbh) | (Mbh) |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor | Glass (sf) | (%) |
| Main Clg | 0.0            | 0.0   | 0.0   | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 1,436 |            |     |
| Aux Clg  | 0.0            | 0.0   | 0.0   | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0     |            |     |
| Opt Vent | 0.0            | 0.0   | 0.0   | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0     |            |     |
| Totals   | 0.0            | 0.0   |       |                  |                   |       |        |                  |       |        | 1,551 | 0          | 0   |
|          |                |       |       |                  |                   |       |        |                  |       |        | 2,279 | 144        | 6   |

-----HEATING COIL SELECTION-----

|          | Capacity |                  |           |           | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |               |        | --TEMPERATURES (F)-- |     |      |
|----------|----------|------------------|-----------|-----------|----------------|---------|------------------------|---------------|--------|----------------------|-----|------|
|          | (Mbh)    | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type           | Cooling | Heating                | Clg % OA      | 0.0    | Type                 | Clg | Htg  |
| Main Htg | -50.7    | 0                | 0.0       | 0.0       | Vent           | 0       | 0                      | Clg Cfm/Sqft  | 0.00   | SADB                 | 0.0 | 68.1 |
| Aux Htg  | 0.0      | 0                | 0.0       | 0.0       | Infil          | 0       | 479                    | Clg Cfm/Ton   | 0.00   | Plenum               | 0.0 | 61.3 |
| Preheat  | 0.0      | 0                | 0.0       | 0.0       | Supply         | 0       | 0                      | Clg Sqft/Ton  | 0.00   | Return               | 0.0 | 61.7 |
| Reheat   | 0.0      | 0                | 0.0       | 0.0       | Mincfm         | 0       | 0                      | Clg Btuh/Sqft | 0.00   | Ret/OA               | 0.0 | 61.7 |
| Humidif  | 0.0      | 0                | 0.0       | 0.0       | Return         | 0       | 0                      | No. People    | 0      | Runarnd              | 0.0 | 68.0 |
| Opt Vent | 0.0      | 0                | 0.0       | 0.0       | Exhaust        | 0       | 0                      | Htg % OA      | 0.0    | Fn MtrTD             | 0.0 | 0.0  |
| Total    | -50.7    |                  |           |           | Rm Exh         | 0       | 0                      | Htg Cfm/SqFt  | 0.00   | Fn BldTD             | 0.0 | 0.0  |
|          |          |                  |           |           | Auxil          | 0       | 0                      | Htg Btuh/SqFt | -35.28 | Fn Frict             | 0.0 | 0.0  |

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK  |                          |          |          |        |        | CLG SPACE PEAK |             |        | HEATING COIL PEAK |            |              |        |
|--------------------|--------------------------|----------|----------|--------|--------|----------------|-------------|--------|-------------------|------------|--------------|--------|
| Peaked at Time ==> | Mo/Hr: 7/19              |          |          |        |        | *              | Mo/Hr: 7/19 |        |                   | *          | Mo/Hr: 13/ 1 |        |
| Outside Air ==>    | OADB/WB/HR: 85/ 70/ 91.0 |          |          |        |        | *              | OADB: 85    |        |                   | *          | OADB: 4      |        |
|                    | Space                    | Ret. Air | Ret. Air | Net    | Perct  | *              | Space       | Perct  | *                 | Space Peak | Coil Peak    | Perct  |
|                    | Sens.+Lat.               | Sensible | Latent   | Total  | Of Tot | *              | Sensible    | Of Tot | *                 | Space Sens | Tot Sens     | Of Tot |
|                    | (Btuh)                   | (Btuh)   | (Btuh)   | (Btuh) | (%)    | *              | (Btuh)      | (%)    | *                 | (Btuh)     | (Btuh)       | (%)    |
| Envelope Loads     |                          |          |          |        |        |                |             |        |                   |            |              |        |
| Skylite Solr       | 0                        | 0        |          | 0      | 0.00   | *              | 0           | 0.00   | *                 | 0          | 0            | 0.00   |
| Skylite Cond       | 0                        | 0        |          | 0      | 0.00   | *              | 0           | 0.00   | *                 | 0          | 0            | 0.00   |
| Roof Cond          | 0                        | 7,347    |          | 7,347  | 36.52  | *              | 0           | 0.00   | *                 | 0          | -7,603       | 15.06  |
| Glass Solar        | 0                        | 0        |          | 0      | 0.00   | *              | 0           | 0.00   | *                 | 0          | 0            | 0.00   |
| Glass Cond         | 0                        | 0        |          | 0      | 0.00   | *              | 0           | 0.00   | *                 | 0          | 0            | 0.00   |
| Wall Cond          | 1,245                    | 300      |          | 1,544  | 7.68   | *              | 1,245       | 14.09  | *                 | -3,780     | -4,708       | 9.32   |
| Partition          | 0                        | 0        |          | 0      | 0.00   | *              | 0           | 0.00   | *                 | 0          | 0            | 0.00   |
| Exposed Floor      | 0                        | 0        |          | 0      | 0.00   | *              | 0           | 0.00   | *                 | 0          | 0            | 0.00   |
| Infiltration       | 2,473                    |          |          | 2,473  | 12.29  | *              | 5,693       | 64.43  | *                 | -37,178    | -37,178      | 73.63  |
| Sub Total==>       | 3,718                    | 7,647    |          | 11,365 | 56.50  | *              | 6,938       | 78.52  | *                 | -40,958    | -49,489      | 98.01  |
| Internal Loads     |                          |          |          |        |        |                |             |        |                   |            |              |        |
| Lights             | 152                      | 0        |          | 152    | 0.75   | *              | 152         | 1.72   | *                 | 0          | 0            | 0.00   |
| People             | 420                      |          |          | 420    | 2.09   | *              | 420         | 4.75   | *                 | 0          | 0            | 0.00   |
| Misc               | 0                        | 0        | 0        | 0      | 0.00   | *              | 0           | 0.00   | *                 | 0          | 0            | 0.00   |
| Sub Total==>       | 572                      | 0        | 0        | 572    | 2.84   | *              | 572         | 6.47   | *                 | 0          | 0            | 0.00   |
| Ceiling Load       | 971                      | -971     |          | 0      | 0.00   | *              | 973         | 11.01  | *                 | -1,048     | 0            | 0.00   |
| Outside Air        | 0                        | 0        | 0        | 4,821  | 23.96  | *              | 0           | 0.00   | *                 | 0          | 0            | 0.00   |
| Sup. Fan Heat      |                          |          |          | 3,699  | 18.39  | *              |             | 0.00   | *                 |            | 0            | 0.00   |
| Ret. Fan Heat      |                          | 0        |          | 0      | 0.00   | *              |             | 0.00   | *                 |            | 0            | 0.00   |
| Duct Heat Pkwo     |                          | 0        |          | 0      | 0.00   | *              |             | 0.00   | *                 |            | 0            | 0.00   |
| GV/UNDR Sizing     | 354                      |          |          | 354    | 1.76   | *              | 354         | 4.00   | *                 | -1,007     | -1,007       | 1.99   |
| Exhaust Heat       |                          | -694     | 0        | -694   | -3.45  | *              |             | 0.00   | *                 |            | 0            | 0.00   |
| Terminal Bypass    |                          | 0        | 0        | 0      | 0.00   | *              |             | 0.00   | *                 |            | 0            | 0.00   |
| Grand Total==>     | 5,614                    | 5,982    | 0        | 20,116 | 100.00 | *              | 8,836       | 100.00 | *                 | -43,013    | -50,496      | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity<br>(Tons) | Sens Cap.<br>(Mbh) | Coil Airfl<br>(cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS |            |     |
|----------|--------------------------|--------------------|---------------------|-------------------|-------|--------|------------------|-------|--------|-------|------------|-----|
|          |                          |                    |                     | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor | Glass (sf) | (%) |
| Main Clg | 1.7                      | 20.1               | 10,405              | 76.5              | 69.3  | 98.9   | 73.9             | 68.8  | 100.3  | 2,790 |            |     |
| Aux Clg  | 0.0                      | 0.0                | 0                   | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0     |            |     |
| Opt Vent | 0.0                      | 0.0                | 0                   | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0     |            |     |
| Totals   | 1.7                      | 20.1               |                     |                   |       |        |                  |       |        | 2,918 | 0          | 0   |
|          |                          |                    |                     |                   |       |        |                  |       |        | 2,542 | 0          | 0   |

-----HEATING COIL SELECTION-----

|          | Capacity<br>(Mbh) | Coil Airfl<br>(cfm) | Ent<br>Deg F | Lvg<br>Deg F | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |               |         | --TEMPERATURES (F)-- |      |      |
|----------|-------------------|---------------------|--------------|--------------|----------------|---------|------------------------|---------------|---------|----------------------|------|------|
|          |                   |                     |              |              | Type           | Cooling | Heating                | Clg % OA      | 10.0    | Type                 | Clg  | Htg  |
| Main Htg | -50.7             | 10,405              | 67.3         | 71.8         | Vent           | 1,040   | 0                      | Clg Cfm/Sqft  | 3.73    | SADB                 | 74.2 | 71.8 |
| Aux Htg  | 0.0               | 0                   | 0.0          | 0.0          | Infil          | 534     | 534                    | Clg Cfm/Ton   | 6206.58 | Plenum               | 75.6 | 67.3 |
| Preheat  | -146.1            | 10,405              | 61.0         | 73.9         | Supply         | 10,405  | 10,405                 | Clg Sqft/Ton  | 1664.31 | Return               | 75.6 | 67.3 |
| Reheat   | 0.0               | 0                   | 0.0          | 0.0          | Mincfm         | 0       | 0                      | Clg Btuh/Sqft | 7.21    | Ret/OA               | 76.5 | 67.3 |
| Humidif  | 0.0               | 0                   | 0.0          | 0.0          | Return         | 10,405  | 10,405                 | No. People    | 200     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0               | 0                   | 0.0          | 0.0          | Exhaust        | 1,040   | 0                      | Htg % OA      | 0.0     | Fn MtrTD             | 0.1  | 0.0  |
| Total    | -50.7             |                     |              |              | Rm Exh         | 0       | 0                      | Htg Cfm/Sqft  | 3.73    | Fn BldTD             | 0.1  | 0.0  |
|          |                   |                     |              |              | Auxil          | 0       | 0                      | Htg Btuh/Sqft | -18.17  | Fn Frict             | 0.2  | 0.0  |



BUILDING U-VALUES - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |             |             |       |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|------------------|-------|-------|----------------------------------|-------------|-------------|-------------|-------|-------|-------|------------------------|-----------------------------|
|             |                  |       |       | Summr Skylt                      | Wintr Skylt | Summr Windo | Wintr Windo | Wall  | Ceil. |       |                        |                             |
| 1           | MANAGERS OFFICE  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.580       | 0.594 | 0.058 | 0.568 | 192.8                  | 45.45                       |
| 2           | LOBBY            | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.650       | 0.668 | 0.058 | 0.568 | 114.3                  | 28.42                       |
| 3           | LOUNGE           | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.580       | 0.594 | 0.058 | 0.568 | 246.9                  | 57.33                       |
| 4           | MENS TOILET      | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.580       | 0.594 | 0.058 | 0.568 | 239.7                  | 55.72                       |
| 5           | WOMENS TOILET    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.000       | 0.000 | 0.000 | 0.568 | 15.1                   | 6.48                        |
| Zone        | 1 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.633       | 0.650 | 0.058 | 0.568 | 166.3                  | 39.72                       |
| 8           | STAGE            | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.000       | 0.000 | 0.058 | 0.568 | 252.0                  | 58.33                       |
| Zone        | 3 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.000       | 0.000 | 0.058 | 0.568 | 252.0                  | 58.33                       |
| System      | 1 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.633       | 0.650 | 0.058 | 0.568 | 215.7                  | 50.45                       |
| 6           | FOYER & HALLWAYS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.000       | 0.000 | 0.029 | 0.568 | 65.6                   | 16.54                       |
| 7           | AUDITORIUM       | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.000       | 0.000 | 0.029 | 0.568 | 50.8                   | 13.57                       |
| Zone        | 2 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.000       | 0.000 | 0.029 | 0.568 | 52.5                   | 13.92                       |
| System      | 2 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.000       | 0.000 | 0.029 | 0.568 | 52.5                   | 13.92                       |
| Building    |                  | 0.000 | 0.000 | 0.000                            | 0.000       | 0.041       | 0.633       | 0.650 | 0.042 | 0.568 | 108.0                  | 26.33                       |

BUILDING AREAS - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- B U I L D I N G A R E A S -----

| Room Number | Description      | Number of Duplicate |    | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skf /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|---------------------|----|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
|             |                  | Flr                 | Rm |                             |                         |                       |                           |                      |             |                      |                    |             |                      |
| 1           | MANAGERS OFFICE  | 1                   | 1  | 200                         | 200                     | 0                     | 0                         | 0                    | 0           | 225                  | 18                 | 6           | 263                  |
| 2           | LOBBY            | 1                   | 1  | 214                         | 214                     | 0                     | 0                         | 0                    | 0           | 294                  | 109                | 42          | 153                  |
| 3           | LOUNGE           | 1                   | 1  | 114                         | 114                     | 0                     | 0                         | 0                    | 0           | 128                  | 9                  | 4           | 195                  |
| 4           | MENS TOILET      | 1                   | 1  | 39                          | 39                      | 0                     | 0                         | 0                    | 0           | 43                   | 9                  | 12          | 65                   |
| 5           | WOMENS TOILET    | 1                   | 1  | 41                          | 41                      | 0                     | 0                         | 0                    | 0           | 45                   | 0                  | 0           | 0                    |
| Zone        | 1 Total/Ave.     |                     |    |                             | 608                     | 0                     | 0                         | 0                    | 0           | 735                  | 144                | 18          | 677                  |
| 8           | STAGE            | 1                   | 1  | 828                         | 828                     | 0                     | 0                         | 0                    | 0           | 816                  | 0                  | 0           | 1,458                |
| Zone        | 3 Total/Ave.     |                     |    |                             | 828                     | 0                     | 0                         | 0                    | 0           | 816                  | 0                  | 0           | 1,458                |
| System      | 1 Total/Ave.     |                     |    |                             | 1,436                   | 0                     | 0                         | 0                    | 0           | 1,551                | 144                | 6           | 2,135                |
| 6           | FOYER & HALLWAYS | 1                   | 1  | 329                         | 329                     | 0                     | 0                         | 0                    | 0           | 350                  | 0                  | 0           | 402                  |
| 7           | AUDITORIUM       | 1                   | 1  | 2,461                       | 2,461                   | 0                     | 0                         | 0                    | 0           | 2,568                | 0                  | 0           | 2,140                |
| Zone        | 2 Total/Ave.     |                     |    |                             | 2,790                   | 0                     | 0                         | 0                    | 0           | 2,918                | 0                  | 0           | 2,542                |
| System      | 2 Total/Ave.     |                     |    |                             | 2,790                   | 0                     | 0                         | 0                    | 0           | 2,918                | 0                  | 0           | 2,542                |
| Building    |                  |                     |    |                             | 4,226                   | 0                     | 0                         | 0                    | 0           | 4,469                | 144                | 3           | 4,677                |

ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
WALL & ROOF INSULATION

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.041 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.060 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.051 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 2.27 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 4.03 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 0.1                    | 0            | 0     | -12,371                  | 0            | 5     | 520.2                     | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 0.2                    | 0            | 0     | -24,743                  | 0            | 11    | 1,040.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 0.3                    | 0            | 0     | -37,114                  | 0            | 11    | 1,560.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 0.3                    | 0            | 0     | -49,486                  | 8            | 282   | 2,080.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 0.4                    | 0            | 0     | -61,857                  | 13           | 461   | 2,601.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 0.5                    | 0            | 0     | -74,229                  | 15           | 538   | 3,121.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 0.6                    | 0            | 0     | -86,600                  | 17           | 620   | 3,641.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 0.7                    | 0            | 0     | -98,972                  | 13           | 473   | 4,161.8                   | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 0.8                    | 0            | 0     | -111,343                 | 34           | 1,258 | 4,682.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 0.8                    | 0            | 0     | -123,715                 | 0            | 0     | 5,202.3                   | 71           | 6,205 | 0.0                       | 0            | 0     |
| 50 - 55                   | 0.9                    | 0            | 0     | -136,086                 | 0            | 0     | 5,722.5                   | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 1.0                    | 3            | 5     | -148,458                 | 0            | 0     | 6,242.7                   | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 1.1                    | 0            | 0     | -160,829                 | 0            | 0     | 6,763.0                   | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 1.2                    | 0            | 0     | -173,200                 | 0            | 0     | 7,283.2                   | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 1.3                    | 0            | 0     | -185,572                 | 0            | 0     | 7,803.4                   | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 1.3                    | 0            | 0     | -197,943                 | 0            | 0     | 8,323.6                   | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 1.4                    | 0            | 0     | -210,315                 | 0            | 0     | 8,843.9                   | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 1.5                    | 3            | 5     | -222,686                 | 0            | 0     | 9,364.1                   | 0            | 0     | 0.0                       | 0            | 0     |
| 90 - 95                   | 1.6                    | 0            | 0     | -235,058                 | 0            | 0     | 9,884.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 1.7                    | 94           | 150   | -247,429                 | 0            | 0     | 10,404.5                  | 29           | 2,555 | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 8,600 | 0                        | 0            | 5,101 | 0.0                       | 0            | 0     | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- BUILDING TEMPERATURE PROFILES -----

| Temperature Range (F) | Zone Number |   |   |
|-----------------------|-------------|---|---|
|                       | 1           | 3 | 2 |

|            |       |       |      |
|------------|-------|-------|------|
| Max. Temp. | 106.0 | 89.0  | 86.1 |
| Mo./Hr.    | 9 20  | 11 24 | 7 24 |
| Day Type   | 1     | 2     | 4    |

|           | Number of Hours |       |       |
|-----------|-----------------|-------|-------|
| Above 100 | 2,208           | 0     | 0     |
| 95 - 100  | 1,406           | 0     | 0     |
| 90 - 95   | 1,531           | 0     | 0     |
| 85 - 90   | 1,102           | 383   | 76    |
| 80 - 85   | 815             | 4,757 | 1,212 |
| 75 - 80   | 828             | 1,111 | 1,582 |
| 70 - 75   | 511             | 1,115 | 1,613 |
| 65 - 70   | 342             | 1,128 | 2,513 |
| 60 - 65   | 17              | 266   | 1,041 |
| 55 - 60   | 0               | 0     | 506   |
| 50 - 55   | 0               | 0     | 217   |
| Below 50  | 0               | 0     | 0     |

|            |      |      |      |
|------------|------|------|------|
| Min. Temp. | 64.3 | 61.0 | 50.1 |
| Mo./Hr.    | 1 11 | 2 24 | 2 18 |
| Day Type   | 1    | 4    | 4    |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              |                 | HOT WTR HOT W DMND |                      |
|-------|-------------------|-----------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | On Peak<br>(Thrm/hr) |
| Jan   | 1,175             | 4               | 518                | 1                    |
| Feb   | 1,062             | 4               | 478                | 1                    |
| March | 1,176             | 4               | 509                | 1                    |
| April | 1,137             | 4               | 331                | 1                    |
| May   | 1,190             | 4               | 0                  | 0                    |
| June  | 1,213             | 4               | 0                  | 0                    |
| July  | 1,281             | 4               | 0                  | 0                    |
| Aug   | 1,251             | 4               | 0                  | 0                    |
| Sept  | 1,159             | 4               | 0                  | 0                    |
| Oct   | 1,176             | 4               | 287                | 1                    |
| Nov   | 1,137             | 4               | 360                | 1                    |
| Dec   | 1,175             | 4               | 485                | 1                    |
| Total | 14,133            | 4               | 2,968              | 1                    |

Building Energy Consumption = 81,647 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 127,890 (Btu/Sq Ft/Year)

Floor Area = 4,226 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 WALL & ROOF INSULATION

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref<br>Num | Equip<br>Code | ----- Monthly Consumption ----- |                            |      |      |      |      |      |      |      |      |      |      | Total  |
|------------|---------------|---------------------------------|----------------------------|------|------|------|------|------|------|------|------|------|------|--------|
|            |               | Jan                             | Feb                        | Mar  | Apr  | May  | June | July | Aug  | Sep  | Oct  | Nov  | Dec  |        |
| 0          | LIGHTS        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 102                             | 93                         | 103  | 99   | 103  | 100  | 102  | 103  | 99   | 103  | 99   | 102  | 1,207  |
|            | PK            | 1.4                             | 1.4                        | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4    |
| 1          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 2          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | GAS           | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 3          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | OIL           | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 4          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | P STEAM       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 5          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | P HOTH2O      | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 6          | MISC LD       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            | P CHILL       | 0                               | 0                          | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0      |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0    |
| 1          | EQ1170L       |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                                 | AIR-CLD COND COMP >20 TONS |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 0                               | 0                          | 0    | 0    | 13   | 59   | 82   | 58   | 18   | 0    | 0    | 0    | 230    |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 1.4  | 1.5  | 1.6  | 1.5  | 1.5  | 0.0  | 0.0  | 0.0  | 1.6    |
| 1          | EQ5200        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                                 | CONDENSER FANS             |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 0                               | 0                          | 0    | 0    | 1    | 8    | 11   | 8    | 2    | 0    | 0    | 0    | 30     |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.1  | 0.2  | 0.2  | 0.2  | 0.2  | 0.0  | 0.0  | 0.0  | 0.2    |
| 1          | EQ5313        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                                 | CONTROLS                   |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 0                               | 0                          | 0    | 0    | 3    | 12   | 16   | 12   | 5    | 0    | 0    | 0    | 48     |
|            | PK            | 0.0                             | 0.0                        | 0.0  | 0.0  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.0  | 0.0  | 0.0  | 0.3    |
| 2          | EQ4003        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                                 | FC CENTRIF. FAN C.V.       |      |      |      |      |      |      |      |      |      |      |        |
|            | ELEC          | 1070                            | 966                        | 1070 | 1035 | 1070 | 1035 | 1070 | 1070 | 1035 | 1070 | 1035 | 1070 | 12,597 |
|            | PK            | 2.2                             | 2.2                        | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2  | 2.2    |
| 1          | EQ2102        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                                 | PURCHASED DIST. HOT WATER  |      |      |      |      |      |      |      |      |      |      |        |
|            | P HOTH2O      | 518                             | 478                        | 509  | 331  | 0    | 0    | 0    | 0    | 0    | 287  | 360  | 485  | 2,968  |
|            | PK            | 1.0                             | 1.0                        | 1.0  | 0.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.7  | 0.9  | 1.0  | 1.0    |
| 1          | EQ5020        |                                 |                            |      |      |      |      |      |      |      |      |      |      |        |
|            |               |                                 | HEAT WATER CIRC. PUMP C.V. |      |      |      |      |      |      |      |      |      |      |        |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
WALL & ROOF INSULATION

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 4.5 (kW)  
Yearly Time of Peak 18 (hr) 7 (mo)

Hour 18 Month 7

| Eq.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|---------------------|------------------------|-----------------------|---------------------------|------------------------|
|---------------------|------------------------|-----------------------|---------------------------|------------------------|

Cooling Equipment

|           |         |                            |     |       |
|-----------|---------|----------------------------|-----|-------|
| 1         | EQ1170L | AIR-CLD COND COMP >20 TONS | 2.1 | 47.07 |
| Sub Total |         |                            | 2.1 | 47.07 |
| Sub Total |         |                            | 0.0 | 0.00  |

Air Moving Equipment

|           |  |                                    |     |       |
|-----------|--|------------------------------------|-----|-------|
| 2         |  | SUMMATION OF FAN ELECTRICAL DEMAND | 2.2 | 49.79 |
| Sub Total |  |                                    | 2.2 | 49.79 |
| Sub Total |  |                                    | 0.0 | 0.00  |

Miscellaneous

|           |  |                |     |      |
|-----------|--|----------------|-----|------|
|           |  | Lights         | 0.1 | 3.14 |
|           |  | Base Utilities | 0.0 | 0.00 |
|           |  | Misc Equipment | 0.0 | 0.00 |
| Sub Total |  |                | 0.1 | 3.14 |

|             |  |  |     |        |
|-------------|--|--|-----|--------|
| Grand Total |  |  | 4.5 | 100.00 |
|-------------|--|--|-----|--------|



*Building 122*

*Trace Input File*

933702

## CONTENTS OF : C:\JOBS\CB122.TM

LINE # -----  
1 JOB - 1  
2 01/ENERGY SAVINGS OPPORTUNITY STUDY  
3 01/CARLISLE BARRACKS, PA  
4 01/DEPARTMENT OF THE ARMY  
5 01/BENATEC ASSOCIATES  
6 01/BUILDING 122  
7 08/CARLISLE  
8 09/MAY/SEP///APR/OCT  
9 10/CLTD-CLF  
10 11///ZONE  
11 LOAD - 1  
12 19/1/BASE BUILDING  
13 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10  
14 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11  
15 20/3/3/STAIRS/1/560/4/0//11  
16 20/4/4/BSMT E/1/12424/4/3.3//12.7  
17 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12  
18 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12  
19 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7  
20 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7  
21 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11  
22 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11  
23 20/11/11/TOILETS W ROOF/1/580/4/2//11  
24 20/12/12/STAIRS W ROOF/1/280/4/0//11  
25 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7  
26 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12  
27 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7  
28 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11  
29 21/M///CBADCTX///CBADHTX  
30 22/9/1/YES///14  
31 22/10/1/YES///14  
32 22/11/1/YES///14  
33 22/12/1/YES///14  
34 22/16/1/YES///14  
35 24/2/1/9/10.3//134/45  
36 24/2/2/10/10.3//134/315  
37 24/3/1/16/11//135/45  
38 24/3/2/48/11//135/135  
39 24/3/3/16/11//135/225  
40 24/5/1/108/11.3//134/45  
41 24/5/2/281/11.3//134/135  
42 24/5/3/93/11.3//134/225  
43 24/5/4/235/11.3//134/315  
44 24/6/1/9/11.3//134/45  
45 24/6/2/27/11.3//134/135  
46 24/6/3/22/11.3//134/225  
47 24/6/4/56/11.3//134/315  
48 24/7/1/135/10//134/45  
49 24/7/2/320/10//134/135  
50 24/7/3/135/10//134/225  
51 24/7/4/344/10//134/315  
52 24/8/1/8/10//134/135  
53 24/8/2/8/10//134/315  
54 24/9/1/135/10.3//134/45  
55 24/9/2/320/10.3//134/135  
56 24/9/3/135/10.3//134/225  
57 24/9/4/344/10.3//134/315  
58 24/10/1/8/10.3//134/135

CONTENTS OF : C:\JOBS\CB122.TM

| LINE # | -----                                                          |
|--------|----------------------------------------------------------------|
| 59     | 24/10/2/8/10.3//134/315                                        |
| 60     | 24/12/1/8/10.3//135/45                                         |
| 61     | 24/12/2/24/10.3//135/135                                       |
| 62     | 24/12/3/8/10.3//135/225                                        |
| 63     | 24/14/1/9/11.3//134/45                                         |
| 64     | 24/14/2/27/11.3//134/135                                       |
| 65     | 24/14/3/22/11.3//134/225                                       |
| 66     | 24/14/4/56/11.3//134/315                                       |
| 67     | 24/15/1/8/10//134/135                                          |
| 68     | 24/15/2/8/10//134/315                                          |
| 69     | 24/16/1/8/10.3//134/135                                        |
| 70     | 24/16/2/8/10.3//134/315                                        |
| 71     | 25/2/1/8.5/2.5/1/.81/.64                                       |
| 72     | 25/3/1/8.5/2.5/6/.81/.64                                       |
| 73     | 25/3/3/8.5/2.5/6/.81/.64                                       |
| 74     | 25/5/1/8.5/2.5/5/.81/.64                                       |
| 75     | 25/5/2/8.5/2.5/35/.81/.64                                      |
| 76     | 25/5/3/8.5/2.5/6/.81/.64                                       |
| 77     | 25/5/4/8.5/2.5/28/.81/.64                                      |
| 78     | 25/6/1/8.5/2.5/5/.81/.64                                       |
| 79     | 25/6/2/8.5/2.5/7/.81/.64                                       |
| 80     | 25/7/1/7/2.5/6/.81/.64                                         |
| 81     | 25/7/2/7/2.5/40/.81/.64                                        |
| 82     | 25/7/3/7/2.5/6/.81/.64                                         |
| 83     | 25/7/4/7/2.5/40/.81/.64                                        |
| 84     | 25/8/1/7/2.5/3/.81/.64                                         |
| 85     | 25/8/2/7/2.5/3/.81/.64                                         |
| 86     | 25/9/1/7/2.5/6/.81/.64                                         |
| 87     | 25/9/2/7/2.5/40/.81/.64                                        |
| 88     | 25/9/3/7/2.5/6/.81/.64                                         |
| 89     | 25/9/4/7/2.5/40/.81/.64                                        |
| 90     | 25/10/1/7/2.5/3/.81/.64                                        |
| 91     | 25/10/2/7/2.5/3/.81/.64                                        |
| 92     | 25/12/1/7/2.5/3/.81/.64                                        |
| 93     | 25/12/3/7/2.5/3/.81/.64                                        |
| 94     | 25/14/1/8.5/2.5/5/.81/.64                                      |
| 95     | 25/14/2/8.5/2.5/7/.81/.64                                      |
| 96     | 25/15/1/7/2.5/3/.81/.64                                        |
| 97     | 25/15/2/7/2.5/3/.81/.64                                        |
| 98     | 25/16/1/7/2.5/3/.81/.64                                        |
| 99     | 25/16/2/7/2.5/3/.81/.64                                        |
| 100    | 26/1/CBAP&L/CBAP&L/CBAPFAN/OFF/CBAPFAN/CBAPFAN/OFF/OFF/OFF/OFF |
| 101    | 26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAPFAN/OFF/OFF/OFF/CBAPFAN/OFF   |
| 102    | 26/3/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 103    | 26/4/CBAP&L/CBAP&L/CBAPFAN/OFF/CBAPFAN/CBAPFAN/OFF/OFF/OFF/OFF |
| 104    | 26/5/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 105    | 26/6/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 106    | 26/7/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 107    | 26/8/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 108    | 26/9/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 109    | 26/10/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF  |
| 110    | 26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAPFAN/OFF      |
| 111    | 26/12/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF  |
| 112    | 26/13/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF          |
| 113    | 26/14/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF  |
| 114    | 26/15/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF  |
| 115    | 26/16/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF  |
| 116    | 27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2                  |

CONTENTS OF : C:\JOBS\CB122.TM

LINE # -----

117 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0

118 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0

119 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

120 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

121 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

122 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

123 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

124 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

125 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

126 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

127 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

128 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

129 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

130 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

131 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

132 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

133 30/1/23725/CFM/23725/CFM

134 30/2/14660/CFM/14660/CFM/////14660/CFM

135 30/3/360/CFM/360/CFM

136 30/4/12450/CFM/12450/CFM

137 30/5/5505/CFM/5505/CFM

138 30/6/10028/CFM/10028/CFM

139 30/7/6535/CFM/6535/CFM

140 30/8/8914/CFM/8914/CFM

141 30/9/6855/CFM/6855/CFM

142 30/10/8914/CFM/8914/CFM

143 30/11/3070/CFM/3070/CFM/////3070/CFM

144 30/12/180/CFM/180/CFM

145 30/13/0/CFM/1835/CFM

146 30/14/10028/CFM/10028/CFM

147 30/15/8914/CFM/8914/CFM

148 30/16/8914/CFM/8914/CFM

149 31/1/1/535/10//135/SINE-FIT/80/50

150 31/1/2/656/12//135/SINE-FIT/80/50

151 31/4/1/279/12//135/SINE-FIT/80/50

152 31/13/1/136/12//135/SINE-FIT/80/50

153 SYSTEM - 1

154 39/1/BASE BUILDING

155 40/1/TRH/ROADK

156 41/1/1/1/4/4

157 42/1/3/3/.65

158 44/1

159 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

160 40/2/SZ

161 41/2/2/2/11/11

162 42/2////.75//.75

163 44/2

164 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

165 40/3/INDFP

166 41/3/3/3/5/5/7/7/9/9/12/12

167 42/3/8/8/1

168 44/3/DRY-BULB/65/100

169 45/3/CBADCLG/CBADCLG/OFF/CFM/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

170 40/4/UH

171 41/4/13/13

172 42/4/.20

173 44/4

174 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

CONTENTS OF : C:\JOBS\CB122.TM

LINE # -----

175 40/5/DD

176 41/5/6/6/8/8/10/10

177 42/5/8/8/1

178 44/5/DRY-BULB/65/100

179 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

180 40/6/DD

181 41/6/14/16

182 42/6/8/8/1

183 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

184 EQUIPMENT - 1

185 59/1/CARLISLE///BASE BUILDING

186 60/1/1/BLKPLANT/1/1/3/3/5/6

187 60/2/2/BLKPLANT/2/2

188 62/1/EQ1001S/2/306/TONS

189 62/2/EQ1000

190 63/1/30/HP/30/HP/////1

191 65/1/1/1/1/3/3/5/6

192 65/2/2/1/1/3/6

193 65/3/3/2/2

194 66/1/1

195 66/2/2/2

196 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW

197 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW

198 67/3/EQ2000

199 69/1/EQ4003//EQ4003

200 69/2/////EQ4003

201 69/3/EQ4003//EQ4003

202 69/4

203 69/5/EQ4003//EQ4003

204 69/6/EQ4003//EQ4003

205 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

206 LOAD - 2

207 19/2/DOUBLE GLAZED WINDOWS

208 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

209 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

210 20/3/3/STAIRS/1/560/4/0//11

211 20/4/4/BSMT E/1/12424/4/3.3//12.7

212 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

213 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

214 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

215 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

216 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

217 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11

218 20/11/11/TOILETS W ROOF/1/580/4/2//11

219 20/12/12/STAIRS W ROOF/1/280/4/0//11

220 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

221 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

222 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

223 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11

224 21/M///CBADCTX//CBADHTX

225 22/9/1/YES////14

226 22/10/1/YES////14

227 22/11/1/YES////14

228 22/12/1/YES////14

229 22/16/1/YES////14

230 24/2/1/9/10.3//134/45

231 24/2/2/10/10.3//134/315

232 24/3/1/16/11//135/45

| LINE # |                           |
|--------|---------------------------|
| 233    | 24/3/2/48/11//135/135     |
| 234    | 24/3/3/16/11//135/225     |
| 235    | 24/5/1/108/11.3//134/45   |
| 236    | 24/5/2/281/11.3//134/135  |
| 237    | 24/5/3/93/11.3//134/225   |
| 238    | 24/5/4/235/11.3//134/315  |
| 239    | 24/6/1/9/11.3//134/45     |
| 240    | 24/6/2/27/11.3//134/135   |
| 241    | 24/6/3/22/11.3//134/225   |
| 242    | 24/6/4/56/11.3//134/315   |
| 243    | 24/7/1/135/10//134/45     |
| 244    | 24/7/2/320/10//134/135    |
| 245    | 24/7/3/135/10//134/225    |
| 246    | 24/7/4/344/10//134/315    |
| 247    | 24/8/1/8/10//134/135      |
| 248    | 24/8/2/8/10//134/315      |
| 249    | 24/9/1/135/10.3//134/45   |
| 250    | 24/9/2/320/10.3//134/135  |
| 251    | 24/9/3/135/10.3//134/225  |
| 252    | 24/9/4/344/10.3//134/315  |
| 253    | 24/10/1/8/10.3//134/135   |
| 254    | 24/10/2/8/10.3//134/315   |
| 255    | 24/12/1/8/10.3//135/45    |
| 256    | 24/12/2/24/10.3//135/135  |
| 257    | 24/12/3/8/10.3//135/225   |
| 258    | 24/14/1/9/11.3//134/45    |
| 259    | 24/14/2/27/11.3//134/135  |
| 260    | 24/14/3/22/11.3//134/225  |
| 261    | 24/14/4/56/11.3//134/315  |
| 262    | 24/15/1/8/10//134/135     |
| 263    | 24/15/2/8/10//134/315     |
| 264    | 24/16/1/8/10.3//134/135   |
| 265    | 24/16/2/8/10.3//134/315   |
| 266    | 25/2/1/8.5/2.5/1/.55/.57  |
| 267    | 25/3/1/8.5/2.5/6/.55/.57  |
| 268    | 25/3/3/8.5/2.5/6/.55/.57  |
| 269    | 25/5/1/8.5/2.5/5/.55/.57  |
| 270    | 25/5/2/8.5/2.5/35/.55/.57 |
| 271    | 25/5/3/8.5/2.5/6/.55/.57  |
| 272    | 25/5/4/8.5/2.5/28/.55/.57 |
| 273    | 25/6/1/8.5/2.5/5/.55/.57  |
| 274    | 25/6/2/8.5/2.5/7/.55/.57  |
| 275    | 25/7/1/7/2.5/6/.55/.57    |
| 276    | 25/7/2/7/2.5/40/.55/.57   |
| 277    | 25/7/3/7/2.5/6/.55/.57    |
| 278    | 25/7/4/7/2.5/40/.55/.57   |
| 279    | 25/8/1/7/2.5/3/.55/.57    |
| 280    | 25/8/2/7/2.5/3/.55/.57    |
| 281    | 25/9/1/7/2.5/6/.55/.57    |
| 282    | 25/9/2/7/2.5/40/.55/.57   |
| 283    | 25/9/3/7/2.5/6/.55/.57    |
| 284    | 25/9/4/7/2.5/40/.55/.57   |
| 285    | 25/10/1/7/2.5/3/.55/.57   |
| 286    | 25/10/2/7/2.5/3/.55/.57   |
| 287    | 25/12/1/7/2.5/3/.55/.57   |
| 288    | 25/12/3/7/2.5/3/.55/.57   |
| 289    | 25/14/1/8.5/2.5/5/.55/.57 |
| 290    | 25/14/2/8.5/2.5/7/.55/.57 |

CONTENTS OF : C:\JOBS\C8122.TM

LINE # -----

291 25/15/1/7/2.5/3/.55/.57

292 25/15/2/7/2.5/3/.55/.57

293 25/16/1/7/2.5/3/.55/.57

294 25/16/2/7/2.5/3/.55/.57

295 26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF

296 26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF

297 26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

298 26/4/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF

299 26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

300 26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

301 26/7/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

302 26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

303 26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

304 26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

305 26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF

306 26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

307 26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF

308 26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

309 26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

310 26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

311 27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2

312 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0

313 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0

314 29/3/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF

315 29/4/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF

316 29/5/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF

317 29/6/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF/50/PCT-MCLG

318 29/7/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF

319 29/8/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF/50/PCT-MCLG

320 29/9/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF

321 29/10/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF/50/PCT-MCLG

322 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

323 29/12/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF

324 29/13/0/PCT-MCLG/0/PCT-MHTG/.53/CFM-SF/.53/CFM-SF

325 29/14/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF

326 29/15/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF

327 29/16/30/PCT-MCLG/30/PCT-MHTG/.53/CFM-SF/.53/CFM-SF

328 30/1/23725/CFM/23725/CFM

329 30/2/14600/CFM/14600/CFM/////14660/CFM

330 30/3/360/CFM/360/CFM

331 30/4/12450/CFM/12450/CFM

332 30/5/5505/CFM/5505/CFM

333 30/6/10028/CFM/10028/CFM

334 30/7/6535/CFM/6535/CFM

335 30/8/8914/CFM/8914/CFM

336 30/9/6855/CFM/6855/CFM

337 30/10/8914/CFM/8914/CFM

338 30/11/3070/CFM/3070/CFM/////3070/CFM

339 30/12/180/CFM/180/CFM

340 30/13/0/CFM/1835/CFM

341 30/14/10028/CFM/10028/CFM

342 30/15/8914/CFM/8914/CFM

343 30/16/8914/CFM/8914/CFM

344 31/1/1/535/10//135/SINE-FIT/80/50

345 31/1/2/656/12//135/SINE-FIT/80/50

346 31/4/1/279/12//135/SINE-FIT/80/50

347 31/13/1/136/12//135/SINE-FIT/80/50

348 SYSTEM - 2

CONTENTS OF : C:\JOBS\CB122.TM

LINE # -----

349 39/2/BOUBLE GLAZED WINDOWS

350 40/1/TRH/ROADK

351 41/1/1/1/4/4

352 42/1/3/3/.65

353 44/1

354 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

355 40/2/SZ

356 41/2/2/2/11/11

357 42/2/1/1/.75//.75

358 44/2

359 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

360 40/3/INDFP

361 41/3/3/3/5/5/7/7/9/9/12/12

362 42/3/8/8/1

363 44/3/DRY-BULB/65/100

364 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

365 40/4/UH

366 41/4/13/13

367 42/4/.20

368 44/4

369 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

370 40/5/DD

371 41/5/6/6/8/8/10/10

372 42/5/8/8/1

373 44/5/DRY-BULB/65/100

374 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

375 40/6/DD

376 41/6/14/16

377 42/6/8/8/1

378 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

379 EQUIPMENT - 2

380 59/2/CARLISLE///DOUBLE GLAZED WINDOWS

381 60/1/1/BLKPLANT/1/1/3/3/5/6

382 60/2/2/BLKPLANT/2/2

383 62/1/EQ1001S/2/306/TONS

384 62/2/EQ1000

385 63/1/30/HP/30/HP/////1

386 65/1/1/1/1/3/3/5/6

387 65/2/2/1/1/3/6

388 65/3/3/2/2

389 66/1/1

390 66/2/2/2

391 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW

392 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW

393 67/3/EQ2000

394 69/1/EQ4003//EQ4003

395 69/2/////EQ4003

396 69/3/EQ4003//EQ4003

397 69/4

398 69/5/EQ4003//EQ4003

399 69/6/EQ4003//EQ4003

400 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

401 LOAD - 3

402 19/3/WEATHERSTRIP & CAULKING

403 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

404 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

405 20/3/3/STAIRS/1/560/4/0//11

406 20/4/4/BSMT E/1/12424/4/3.3//12.7



CONTENTS OF : C:\JOBS\CB122.TM

LINE # -----

407 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

408 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

409 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

410 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

411 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

412 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11

413 20/11/11/TOILETS W ROOF/1/580/4/2//11

414 20/12/12/STAIRS W ROOF/1/280/4/0//11

415 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

416 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

417 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

418 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11

419 21/M///CBADCTX///CBADHTX

420 22/9/1/YES////14

421 22/10/1/YES////14

422 22/11/1/YES////14

423 22/12/1/YES////14

424 22/16/1/YES////14

425 24/2/1/9/10.3//134/45

426 24/2/2/10/10.3//134/315

427 24/3/1/16/11//135/45

428 24/3/2/48/11//135/135

429 24/3/3/16/11//135/225

430 24/5/1/108/11.3//134/45

431 24/5/2/281/11.3//134/135

432 24/5/3/93/11.3//134/225

433 24/5/4/235/11.3//134/315

434 24/6/1/9/11.3//134/45

435 24/6/2/27/11.3//134/135

436 24/6/3/22/11.3//134/225

437 24/6/4/56/11.3//134/315

438 24/7/1/135/10//134/45

439 24/7/2/320/10//134/135

440 24/7/3/135/10//134/225

441 24/7/4/344/10//134/315

442 24/8/1/8/10//134/135

443 24/8/2/8/10//134/315

444 24/9/1/135/10.3//134/45

445 24/9/2/320/10.3//134/135

446 24/9/3/135/10.3//134/225

447 24/9/4/344/10.3//134/315

448 24/10/1/8/10.3//134/135

449 24/10/2/8/10.3//134/315

450 24/12/1/8/10.3//135/45

451 24/12/2/24/10.3//135/135

452 24/12/3/8/10.3//135/225

453 24/14/1/9/11.3//134/45

454 24/14/2/27/11.3//134/135

455 24/14/3/22/11.3//134/225

456 24/14/4/56/11.3//134/315

457 24/15/1/8/10//134/135

458 24/15/2/8/10//134/315

459 24/16/1/8/10.3//134/135

460 24/16/2/8/10.3//134/315

461 25/2/1/8.5/2.5/1/.81/.64

462 25/3/1/8.5/2.5/6/.81/.64

463 25/3/3/8.5/2.5/6/.81/.64

464 25/5/1/8.5/2.5/5/.81/.64

CONTENTS OF : C:\JOBS\CB122.TM

| LINE # |                                                                 |
|--------|-----------------------------------------------------------------|
| 465    | 25/5/2/8.5/2.5/35/.81/.64                                       |
| 466    | 25/5/3/8.5/2.5/6/.81/.64                                        |
| 467    | 25/5/4/8.5/2.5/28/.81/.64                                       |
| 468    | 25/6/1/8.5/2.5/5/.81/.64                                        |
| 469    | 25/6/2/8.5/2.5/7/.81/.64                                        |
| 470    | 25/7/1/7/2.5/6/.81/.64                                          |
| 471    | 25/7/2/7/2.5/40/.81/.64                                         |
| 472    | 25/7/3/7/2.5/6/.81/.64                                          |
| 473    | 25/7/4/7/2.5/40/.81/.64                                         |
| 474    | 25/8/1/7/2.5/3/.81/.64                                          |
| 475    | 25/8/2/7/2.5/3/.81/.64                                          |
| 476    | 25/9/1/7/2.5/6/.81/.64                                          |
| 477    | 25/9/2/7/2.5/40/.81/.64                                         |
| 478    | 25/9/3/7/2.5/6/.81/.64                                          |
| 479    | 25/9/4/7/2.5/40/.81/.64                                         |
| 480    | 25/10/1/7/2.5/3/.81/.64                                         |
| 481    | 25/10/2/7/2.5/3/.81/.64                                         |
| 482    | 25/12/1/7/2.5/3/.81/.64                                         |
| 483    | 25/12/3/7/2.5/3/.81/.64                                         |
| 484    | 25/14/1/8.5/2.5/5/.81/.64                                       |
| 485    | 25/14/2/8.5/2.5/7/.81/.64                                       |
| 486    | 25/15/1/7/2.5/3/.81/.64                                         |
| 487    | 25/15/2/7/2.5/3/.81/.64                                         |
| 488    | 25/16/1/7/2.5/3/.81/.64                                         |
| 489    | 25/16/2/7/2.5/3/.81/.64                                         |
| 490    | 26/1/CBAP&L/CBAP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF  |
| 491    | 26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF    |
| 492    | 26/3/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF    |
| 493    | 26/4/CBAP&L/CBAP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF  |
| 494    | 26/5/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF    |
| 495    | 26/6/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF    |
| 496    | 26/7/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF    |
| 497    | 26/8/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF    |
| 498    | 26/9/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF    |
| 499    | 26/10/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 500    | 26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF       |
| 501    | 26/12/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 502    | 26/13/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF           |
| 503    | 26/14/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 504    | 26/15/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 505    | 26/16/CBAP&L/CBAP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 506    | 27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2                   |
| 507    | 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0                               |
| 508    | 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0                                 |
| 509    | 29/3/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF              |
| 510    | 29/4/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF              |
| 511    | 29/5/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF              |
| 512    | 29/6/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF/50/PCT-MCLG  |
| 513    | 29/7/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF              |
| 514    | 29/8/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF/50/PCT-MCLG  |
| 515    | 29/9/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF              |
| 516    | 29/10/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF/50/PCT-MCLG |
| 517    | 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF                   |
| 518    | 29/12/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF             |
| 519    | 29/13/0/PCT-MCLG/0/PCT-MHTG/.54/CFM-SF/.54/CFM-SF               |
| 520    | 29/14/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF             |
| 521    | 29/15/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF             |
| 522    | 29/16/30/PCT-MCLG/30/PCT-MHTG/.54/CFM-SF/.54/CFM-SF             |

CONTENTS OF : C:\JOBS\CB122.TM

LINE # -----

523 30/1/23725/CFM/23725/CFM

524 30/2/14660/CFM/14660/CFM/////14660/CFM

525 30/3/360/CFM/360/CFM

526 30/4/12450/CFM/12450/CFM

527 30/5/5505/CFM/5505/CFM

528 30/6/10028/CFM/10028/CFM

529 30/7/6535/CFM/6535/CFM

530 30/8/8924/CFM/8924/CFM

531 30/9/6855/CFM/6855/CFM

532 30/10/8924/CFM/8924/CFM

533 30/11/3070/CFM/3070/CFM/////3070/CFM

534 30/12/180/CFM/180/CFM

535 30/13/0/CFM/1835/CFM

536 30/14/10028/CFM/10028/CFM

537 30/15/8914/CFM/8914/CFM

538 30/16/8914/CFM/8914/CFM

539 31/1/1/535/10//135/SINE-FIT/80/50

540 31/1/2/656/12//135/SINE-FIT/80/50

541 31/4/1/279/12//135/SINE-FIT/80/50

542 31/13/1/136/12//135/SINE-FIT/80/50

543 SYSTEM - 3

544 39/3/WEATHERSTRIP & CAULKING

545 40/1/TRH/ROADK

546 41/1/1/1/4/4

547 42/1/3/3/.65

548 44/1

549 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

550 40/2/SZ

551 41/2/2/2/11/11

552 42/2////.75//.75

553 44/2

554 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

555 40/3/INDFP

556 41/3/3/3/5/5/7/7/9/9/12/12

557 42/3/8/8/1

558 44/3/DRY-BULB/65/100

559 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

560 40/4/UH

561 41/4/13/13

562 42/4/.20

563 44/4

564 45/4/OFF/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

565 40/5/DD

566 41/5/6/6/8/8/10/10

567 42/5/8/8/1

568 44/5/DRY-BULB/65/100

569 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

570 40/6/DD

571 41/6/14/16

572 42/6/8/8/1

573 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

574 EQUIPMENT - 3

575 59/3/CARLISLE///WEATHERSTRIP & CAULKING

576 60/1/1/BLKPLANT/1/1/3/3/5/6

577 60/2/2/BLKPLANT/2/2

578 62/1/EQ1001S/2/306/TONS

579 62/2/EQ1000

580 63/1/30/HP/30/HP/////1

CONTENTS OF : C:\JOBS\CB122.TM

LINE # -----

581 65/1/1/1/1/3/3/5/6

582 65/2/2/1/1/1/3/6

583 65/3/3/2/2

584 66/1/1

585 66/2/2/2

586 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW

587 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW

588 67/3/EQ2000

589 69/1/EQ4003//EQ4003

590 69/2/////EQ4003

591 69/3/EQ4003//EQ4003

592 69/4

593 69/5/EQ4003//EQ4003

594 69/6/EQ4003//EQ4003

595 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

596 LOAD - 4

597 19/4/LOW E GLASS

598 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

599 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

600 20/3/3/STAIRS/1/560/4/0//11

601 20/4/4/BSMT E/1/12424/4/3.3//12.7

602 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

603 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

604 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

605 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

606 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

607 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11

608 20/11/11/TOILETS W ROOF/1/580/4/2//11

609 20/12/12/STAIRS W ROOF/1/280/4/0//11

610 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

611 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

612 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

613 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11

614 21/M///CBADCTX///CBADHTX

615 22/9/1/YES////14

616 22/10/1/YES////14

617 22/11/1/YES////14

618 22/12/1/YES////14

619 22/16/1/YES////14

620 24/2/1/9/10.3//134/45

621 24/2/2/10/10.3//134/315

622 24/3/1/16/11//135/45

623 24/3/2/48/11//135/135

624 24/3/3/16/11//135/225

625 24/5/1/108/11.3//134/45

626 24/5/2/281/11.3//134/135

627 24/5/3/93/11.3//134/225

628 24/5/4/235/11.3//134/315

629 24/6/1/9/11.3//134/45

630 24/6/2/27/11.3//134/135

631 24/6/3/22/11.3//134/225

632 24/6/4/56/11.3//134/315

633 24/7/1/135/10//134/45

634 24/7/2/320/10//134/135

635 24/7/3/135/10//134/225

636 24/7/4/344/10//134/315

637 24/8/1/8/10//134/135

638 24/8/2/8/10//134/315

CONTENTS OF : C:\JOBS\CB122.TM

| LINE # |                                                             |
|--------|-------------------------------------------------------------|
| 639    | 24/9/1/135/10.3//134/45                                     |
| 640    | 24/9/2/320/10.3//134/135                                    |
| 641    | 24/9/3/135/10.3//134/225                                    |
| 642    | 24/9/4/344/10.3//134/315                                    |
| 643    | 24/10/1/8/10.3//134/135                                     |
| 644    | 24/10/2/8/10.3//134/315                                     |
| 645    | 24/12/1/8/10.3//135/45                                      |
| 646    | 24/12/2/24/10.3//135/135                                    |
| 647    | 24/12/3/8/10.3//135/225                                     |
| 648    | 24/14/1/9/11.3//134/45                                      |
| 649    | 24/14/2/27/11.3//134/135                                    |
| 650    | 24/14/3/22/11.3//134/225                                    |
| 651    | 24/14/4/56/11.3//134/315                                    |
| 652    | 24/15/1/8/10//134/135                                       |
| 653    | 24/15/2/8/10//134/315                                       |
| 654    | 24/16/1/8/10.3//134/135                                     |
| 655    | 24/16/2/8/10.3//134/315                                     |
| 656    | 25/2/1/8.5/2.5/1/.81/.29                                    |
| 657    | 25/3/1/8.5/2.5/6/.81/.29                                    |
| 658    | 25/3/3/8.5/2.5/6/.81/.29                                    |
| 659    | 25/5/1/8.5/2.5/5/.81/.29                                    |
| 660    | 25/5/2/8.5/2.5/35/.81/.29                                   |
| 661    | 25/5/3/8.5/2.5/6/.81/.29                                    |
| 662    | 25/5/4/8.5/2.5/28/.81/.29                                   |
| 663    | 25/6/1/8.5/2.5/5/.81/.29                                    |
| 664    | 25/6/2/8.5/2.5/7/.81/.29                                    |
| 665    | 25/7/1/7/2.5/6/.81/.29                                      |
| 666    | 25/7/2/7/2.5/40/.81/.29                                     |
| 667    | 25/7/3/7/2.5/6/.81/.29                                      |
| 668    | 25/7/4/7/2.5/40/.81/.29                                     |
| 669    | 25/8/1/7/2.5/3/.81/.29                                      |
| 670    | 25/8/2/7/2.5/3/.81/.29                                      |
| 671    | 25/9/1/7/2.5/6/.81/.29                                      |
| 672    | 25/9/2/7/2.5/40/.81/.29                                     |
| 673    | 25/9/3/7/2.5/6/.81/.29                                      |
| 674    | 25/9/4/7/2.5/40/.81/.29                                     |
| 675    | 25/10/1/7/2.5/3/.81/.29                                     |
| 676    | 25/10/2/7/2.5/3/.81/.29                                     |
| 677    | 25/12/1/7/2.5/3/.81/.29                                     |
| 678    | 25/12/3/7/2.5/3/.81/.29                                     |
| 679    | 25/14/1/8.5/2.5/5/.81/.29                                   |
| 680    | 25/14/2/8.5/2.5/7/.81/.29                                   |
| 681    | 25/15/1/7/2.5/3/.81/.29                                     |
| 682    | 25/15/2/7/2.5/3/.81/.29                                     |
| 683    | 25/16/1/7/2.5/3/.81/.29                                     |
| 684    | 25/16/2/7/2.5/3/.81/.29                                     |
| 685    | 26/1/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF |
| 686    | 26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAP&L/OFF/OFF/OFF/CBAP&L/OFF  |
| 687    | 26/3/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 688    | 26/4/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF |
| 689    | 26/5/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 690    | 26/6/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 691    | 26/7/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 692    | 26/8/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 693    | 26/9/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 694    | 26/10/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF |
| 695    | 26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAP&L/OFF    |
| 696    | 26/12/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF |

CONTENTS OF : C:\JOBS\CB122.TM

LINE # -----

697 26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF

698 26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

699 26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

700 26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

701 27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2

702 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0

703 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0

704 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

705 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

706 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

707 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

708 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

709 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

710 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

711 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

712 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

713 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

714 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

715 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

716 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

717 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

718 30/1/23725/CFM/23725/CFM

719 30/2/14660/CFM/14660/CFM/////14660/CFM

720 30/3/360/CFM/360/CFM

721 30/4/12450/CFM/12450/CFM

722 30/5/5505/CFM/5505/CFM

723 30/6/10028/CFM/10028/CFM

724 30/7/6535/CFM/6535/CFM

725 30/8/8914/CFM/8914/CFM

726 30/9/6855/CFM/6855/CFM

727 30/10/8914/CFM/8914/CFM

728 30/11/3070/CFM/3070/CFM/////3070/CFM

729 30/12/180/CFM/180/CFM

730 30/13/0/CFM/1835/CFM

731 30/14/10028/CFM/10028/CFM

732 30/15/8914/CFM/8914/CFM

733 30/16/8914/CFM/8914/CFM

734 31/1/1/535/10//135/SINE-FIT/80/50

735 31/1/2/656/12//135/SINE-FIT/80/50

736 31/4/1/279/12//135/SINE-FIT/80/50

737 31/13/1/136/12//135/SINE-FIT/80/50

738 SYSTEM - 4

739 39/4/LOW E GLASS

740 40/1/TRH/ROADK

741 41/1/1/1/4/4

742 42/1/3/3/.65

743 44/1

744 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

745 40/2/SZ

746 41/2/2/2/11/11

747 42/2///.75//.75

748 44/2

749 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

750 40/3/INDFP

751 41/3/3/3/5/5/7/7/9/9/12/12

752 42/3/8/8/1

753 44/3/DRY-BULB/65/100

754 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

CONTENTS OF : C:\JOBS\CB122.TM

LINE # -----

755 40/4/UH

756 41/4/13/13

757 42/4/.20

758 44/4

759 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

760 40/5/DD

761 41/5/6/6/8/8/10/10

762 42/5/8/8/1

763 44/5/DRY-BULB/65/100

764 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

765 40/6/DD

766 41/6/14/16

767 42/6/8/8/1

768 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

769 EQUIPMENT - 4

770 59/4/CARLISLE///LOW E GLASS

771 60/1/1/BLKPLANT/1/1/3/3/5/6

772 60/2/2/BLKPLANT/2/2

773 62/1/EQ1001S/2/306/TONS

774 62/2/EQ1000

775 63/1/30/HP/30/HP/////1

776 65/1/1/1/1/3/3/5/6

777 65/2/2/1/1/3/6

778 65/3/3/2/2

779 66/1/1

780 66/2/2/2

781 67/1/EQ2101/1/30/HP/11874/M3H/2156/KW

782 67/2/EQ2101/1/25/HP/2620/M2H/2300/KW

783 67/3/EQ2000

784 69/1/EQ4003//EQ4003

785 69/2/////EQ4003

786 69/3/EQ4003//EQ4003

787 69/4

788 69/5/EQ4003//EQ4003

789 69/6/EQ4003//EQ4003

790 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

CONTENTS OF : C:\JOBS\CB122B.TM

|        |                                            |
|--------|--------------------------------------------|
| LINE # | -----                                      |
| 1      | JOB - 1                                    |
| 2      | 01/ENERGY SAVINGS OPPORTUNITY STUDY        |
| 3      | 01/CARLISLE BARRACKS, PA                   |
| 4      | 01/DEPARTMENT OF THE ARMY                  |
| 5      | 01/BENATEC ASSOCIATES                      |
| 6      | 01/BUILDING 122                            |
| 7      | 08/CARLISLE                                |
| 8      | 09/MAY/SEP////APR/OCT                      |
| 9      | 10/CLTD-CLF                                |
| 10     | 11///ZONE                                  |
| 11     | LOAD - 1                                   |
| 12     | 19/1/REPLACE FLUORESCENT LAMPS             |
| 13     | 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10    |
| 14     | 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11     |
| 15     | 20/3/3/STAIRS/1/560/4/0//11                |
| 16     | 20/4/4/BSMT E/1/12424/4/3.3//12.7          |
| 17     | 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12    |
| 18     | 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12   |
| 19     | 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7  |
| 20     | 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7   |
| 21     | 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11    |
| 22     | 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11   |
| 23     | 20/11/11/TOILETS W ROOF/1/580/4/2//11      |
| 24     | 20/12/12/STAIRS W ROOF/1/280/4/0//11       |
| 25     | 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7   |
| 26     | 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12 |
| 27     | 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7 |
| 28     | 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11   |
| 29     | 21/M///CBADCTX///CBADHTX                   |
| 30     | 22/9/1/YES////14                           |
| 31     | 22/10/1/YES////14                          |
| 32     | 22/11/1/YES////14                          |
| 33     | 22/12/1/YES////14                          |
| 34     | 22/16/1/YES////14                          |
| 35     | 24/2/1/9/10.3//134/45                      |
| 36     | 24/2/2/10/10.3//134/315                    |
| 37     | 24/3/1/16/11//135/45                       |
| 38     | 24/3/2/48/11//135/135                      |
| 39     | 24/3/3/16/11//135/225                      |
| 40     | 24/5/1/108/11.3//134/45                    |
| 41     | 24/5/2/281/11.3//134/135                   |
| 42     | 24/5/3/93/11.3//134/225                    |
| 43     | 24/5/4/235/11.3//134/315                   |
| 44     | 24/6/1/9/11.3//134/45                      |
| 45     | 24/6/2/27/11.3//134/135                    |
| 46     | 24/6/3/22/11.3//134/225                    |
| 47     | 24/6/4/56/11.3//134/315                    |
| 48     | 24/7/1/135/10//134/45                      |
| 49     | 24/7/2/320/10//134/135                     |
| 50     | 24/7/3/135/10//134/225                     |
| 51     | 24/7/4/344/10//134/315                     |
| 52     | 24/8/1/8/10//134/135                       |
| 53     | 24/8/2/8/10//134/315                       |
| 54     | 24/9/1/135/10.3//134/45                    |
| 55     | 24/9/2/320/10.3//134/135                   |
| 56     | 24/9/3/135/10.3//134/225                   |
| 57     | 24/9/4/344/10.3//134/315                   |
| 58     | 24/10/1/8/10.3//134/135                    |



| LINE # | -----                                                       |
|--------|-------------------------------------------------------------|
| 59     | 24/10/2/8/10.3//134/315                                     |
| 60     | 24/12/1/8/10.3//135/45                                      |
| 61     | 24/12/2/24/10.3//135/135                                    |
| 62     | 24/12/3/8/10.3//135/225                                     |
| 63     | 24/14/1/9/11.3//134/45                                      |
| 64     | 24/14/2/27/11.3//134/135                                    |
| 65     | 24/14/3/22/11.3//134/225                                    |
| 66     | 24/14/4/56/11.3//134/315                                    |
| 67     | 24/15/1/8/10//134/135                                       |
| 68     | 24/15/2/8/10//134/315                                       |
| 69     | 24/16/1/8/10.3//134/135                                     |
| 70     | 24/16/2/8/10.3//134/315                                     |
| 71     | 25/2/1/8.5/2.5/1/.81/.64                                    |
| 72     | 25/3/1/8.5/2.5/6/.81/.64                                    |
| 73     | 25/3/3/8.5/2.5/6/.81/.64                                    |
| 74     | 25/5/1/8.5/2.5/5/.81/.64                                    |
| 75     | 25/5/2/8.5/2.5/35/.81/.64                                   |
| 76     | 25/5/3/8.5/2.5/6/.81/.64                                    |
| 77     | 25/5/4/8.5/2.5/28/.81/.64                                   |
| 78     | 25/6/1/8.5/2.5/5/.81/.64                                    |
| 79     | 25/6/2/8.5/2.5/7/.81/.64                                    |
| 80     | 25/7/1/7/2.5/6/.81/.64                                      |
| 81     | 25/7/2/7/2.5/40/.81/.64                                     |
| 82     | 25/7/3/7/2.5/6/.81/.64                                      |
| 83     | 25/7/4/7/2.5/40/.81/.64                                     |
| 84     | 25/8/1/7/2.5/3/.81/.64                                      |
| 85     | 25/8/2/7/2.5/3/.81/.64                                      |
| 86     | 25/9/1/7/2.5/6/.81/.64                                      |
| 87     | 25/9/2/7/2.5/40/.81/.64                                     |
| 88     | 25/9/3/7/2.5/6/.81/.64                                      |
| 89     | 25/9/4/7/2.5/40/.81/.64                                     |
| 90     | 25/10/1/7/2.5/3/.81/.64                                     |
| 91     | 25/10/2/7/2.5/3/.81/.64                                     |
| 92     | 25/12/1/7/2.5/3/.81/.64                                     |
| 93     | 25/12/3/7/2.5/3/.81/.64                                     |
| 94     | 25/14/1/8.5/2.5/5/.81/.64                                   |
| 95     | 25/14/2/8.5/2.5/7/.81/.64                                   |
| 96     | 25/15/1/7/2.5/3/.81/.64                                     |
| 97     | 25/15/2/7/2.5/3/.81/.64                                     |
| 98     | 25/16/1/7/2.5/3/.81/.64                                     |
| 99     | 25/16/2/7/2.5/3/.81/.64                                     |
| 100    | 26/1/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF |
| 101    | 26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAP&L/OFF/OFF/OFF/CBAP&L/OFF  |
| 102    | 26/3/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 103    | 26/4/CBAP&L/CBAP&L/CBAP&L/OFF/CBAP&L/CBAP&L/OFF/OFF/OFF/OFF |
| 104    | 26/5/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 105    | 26/6/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 106    | 26/7/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 107    | 26/8/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 108    | 26/9/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF  |
| 109    | 26/10/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF |
| 110    | 26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAP&L/OFF    |
| 111    | 26/12/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF |
| 112    | 26/13/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF       |
| 113    | 26/14/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF |
| 114    | 26/15/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF |
| 115    | 26/16/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/OFF/OFF/OFF/OFF |
| 116    | 27/M/420/SF-PERS/255/255/2.31/WATT-SF/ASHRAE2               |

CONTENTS OF : C:\JOBS\C81228.TM

| LINE # | -----                                                                |
|--------|----------------------------------------------------------------------|
| 117    | 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0                                    |
| 118    | 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0                                      |
| 119    | 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                     |
| 120    | 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                     |
| 121    | 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                     |
| 122    | 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG         |
| 123    | 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                     |
| 124    | 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG         |
| 125    | 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                     |
| 126    | 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG        |
| 127    | 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF                        |
| 128    | 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                    |
| 129    | 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                      |
| 130    | 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                    |
| 131    | 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                    |
| 132    | 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                    |
| 133    | 30/1/23725/CFM/23725/CFM                                             |
| 134    | 30/2/14660/CFM/14660/CFM/////14660/CFM                               |
| 135    | 30/3/360/CFM/360/CFM                                                 |
| 136    | 30/4/12450/CFM/12450/CFM                                             |
| 137    | 30/5/5505/CFM/5505/CFM                                               |
| 138    | 30/6/10028/CFM/10028/CFM                                             |
| 139    | 30/7/6535/CFM/6535/CFM                                               |
| 140    | 30/8/8914/CFM/8914/CFM                                               |
| 141    | 30/9/6855/CFM/6855/CFM                                               |
| 142    | 30/10/8914/CFM/8914/CFM                                              |
| 143    | 30/11/3070/CFM/3070/CFM/////3070/CFM                                 |
| 144    | 30/12/180/CFM/180/CFM                                                |
| 145    | 30/13/0/CFM/1835/CFM                                                 |
| 146    | 30/14/10028/CFM/10028/CFM                                            |
| 147    | 30/15/8914/CFM/8914/CFM                                              |
| 148    | 30/16/8914/CFM/8914/CFM                                              |
| 149    | 31/1/1/535/10//135/SINE-FIT/80/50                                    |
| 150    | 31/1/2/656/12//135/SINE-FIT/80/50                                    |
| 151    | 31/4/1/279/12//135/SINE-FIT/80/50                                    |
| 152    | 31/13/1/136/12//135/SINE-FIT/80/50                                   |
| 153    | SYSTEM - 1                                                           |
| 154    | 39/1/REPLACE FLUORESCENT LAMPS                                       |
| 155    | 40/1/TRH/ROADK                                                       |
| 156    | 41/1/1/1/4/4                                                         |
| 157    | 42/1/3/3/.65                                                         |
| 158    | 44/1                                                                 |
| 159    | 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF     |
| 160    | 40/2/SZ                                                              |
| 161    | 41/2/2/2/11/11                                                       |
| 162    | 42/2////.75//.75                                                     |
| 163    | 44/2                                                                 |
| 164    | 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF                         |
| 165    | 40/3/INDFP                                                           |
| 166    | 41/3/3/3/5/5/7/7/9/9/12/12                                           |
| 167    | 42/3/8/8/1                                                           |
| 168    | 44/3/DRY-BULB/65/100                                                 |
| 169    | 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG |
| 170    | 40/4/UH                                                              |
| 171    | 41/4/13/13                                                           |
| 172    | 42/4/.20                                                             |
| 173    | 44/4                                                                 |
| 174    | 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF                     |

CONTENTS OF : C:\JOBS\CB122B.TM

LINE # -----

175 40/5/DD

176 41/5/6/6/8/8/10/10

177 42/5/8/8/1

178 44/5/DRY-BULB/65/100

179 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

180 40/6/DD

181 41/6/14/16

182 42/6/8/8/1

183 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

184 EQUIPMENT - 1

185 59/1/CARLISLE///REPLACE FLUORESCENT LAMPS

186 60/1/1/BLKPLANT/1/1/3/3/5/6

187 60/2/2/BLKPLANT/2/2

188 62/1/EQ1001S/2/306/TGNS

189 62/2/EQ1000

190 63/1/30/HP/30/HP/////1

191 65/1/1/1/1/3/3/5/6

192 65/2/2/1/1/3/6

193 65/3/3/2/2

194 66/1/1

195 66/2/2/2

196 67/1/EQ2101/1/30/HP/11874/M8H/2156/KW

197 67/2/EQ2101/1/25/HP/2620/M8H/2300/KW

198 67/3/EQ2000

199 69/1/EQ4003//EQ4003

200 69/2/////EQ4003

201 69/3/EQ4003//EQ4003

202 69/4

203 69/5/EQ4003//EQ4003

204 69/6/EQ4003//EQ4003

205 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

206 LOAD - 2

207 19/2/REPLACE FLUORESCENT BALLASTS

208 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

209 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

210 20/3/3/STAIRS/1/560/4/0//11

211 20/4/4/BSMT E/1/12424/4/3.3//12.7

212 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

213 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

214 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

215 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

216 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

217 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11

218 20/11/11/TOILETS W ROOF/1/580/4/2//11

219 20/12/12/STAIRS W ROOF/1/280/4/0//11

220 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

221 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

222 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

223 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11

224 21/M///CBADCTX///CBADHTX

225 22/9/1/YES////14

226 22/10/1/YES////14

227 22/11/1/YES////14

228 22/12/1/YES////14

229 22/16/1/YES////14

230 24/2/1/9/10.3//134/45

231 24/2/2/10/10.3//134/315

232 24/3/1/16/11//135/45

## CONTENTS OF : C:\JOBS\C8122B.TM

LINE # -----  
233 24/3/2/48/11//135/135  
234 24/3/3/16/11//135/225  
235 24/5/1/108/11.3//134/45  
236 24/5/2/281/11.3//134/135  
237 24/5/3/93/11.3//134/225  
238 24/5/4/235/11.3//134/315  
239 24/6/1/9/11.3//134/45  
240 24/6/2/27/11.3//134/135  
241 24/6/3/22/11.3//134/225  
242 24/6/4/56/11.3//134/315  
243 24/7/1/135/10//134/45  
244 24/7/2/320/10//134/135  
245 24/7/3/135/10//134/225  
246 24/7/4/344/10//134/315  
247 24/8/1/8/10//134/135  
248 24/8/2/8/10//134/315  
249 24/9/1/135/10.3//134/45  
250 24/9/2/320/10.3//134/135  
251 24/9/3/135/10.3//134/225  
252 24/9/4/344/10.3//134/315  
253 24/10/1/8/10.3//134/135  
254 24/10/2/8/10.3//134/315  
255 24/12/1/8/10.3//135/45  
256 24/12/2/24/10.3//135/135  
257 24/12/3/8/10.3//135/225  
258 24/14/1/9/11.3//134/45  
259 24/14/2/27/11.3//134/135  
260 24/14/3/22/11.3//134/225  
261 24/14/4/56/11.3//134/315  
262 24/15/1/8/10//134/135  
263 24/15/2/8/10//134/315  
264 24/16/1/8/10.3//134/135  
265 24/16/2/8/10.3//134/315  
266 25/2/1/8.5/2.5/1/.81/.64  
267 25/3/1/8.5/2.5/6/.81/.64  
268 25/3/3/8.5/2.5/6/.81/.64  
269 25/5/1/8.5/2.5/5/.81/.64  
270 25/5/2/8.5/2.5/35/.81/.64  
271 25/5/3/8.5/2.5/6/.81/.64  
272 25/5/4/8.5/2.5/28/.81/.64  
273 25/6/1/8.5/2.5/5/.81/.64  
274 25/6/2/8.5/2.5/7/.81/.64  
275 25/7/1/7/2.5/6/.81/.64  
276 25/7/2/7/2.5/40/.81/.64  
277 25/7/3/7/2.5/6/.81/.64  
278 25/7/4/7/2.5/40/.81/.64  
279 25/8/1/7/2.5/3/.81/.64  
280 25/8/2/7/2.5/3/.81/.64  
281 25/9/1/7/2.5/6/.81/.64  
282 25/9/2/7/2.5/40/.81/.64  
283 25/9/3/7/2.5/6/.81/.64  
284 25/9/4/7/2.5/40/.81/.64  
285 25/10/1/7/2.5/3/.81/.64  
286 25/10/2/7/2.5/3/.81/.64  
287 25/12/1/7/2.5/3/.81/.64  
288 25/12/3/7/2.5/3/.81/.64  
289 25/14/1/8.5/2.5/5/.81/.64  
290 25/14/2/8.5/2.5/7/.81/.64

| LINE # | -----                                                                             |
|--------|-----------------------------------------------------------------------------------|
| 291    | 25/15/1/7/2.5/3/.81/.64                                                           |
| 292    | 25/15/2/7/2.5/3/.81/.64                                                           |
| 293    | 25/16/1/7/2.5/3/.81/.64                                                           |
| 294    | 25/16/2/7/2.5/3/.81/.64                                                           |
| 295    | 26/1/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF |
| 296    | 26/2/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/CBAP&L/AVAIL/OFF     |
| 297    | 26/3/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF              |
| 298    | 26/4/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF              |
| 299    | 26/5/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF              |
| 300    | 26/6/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF              |
| 301    | 26/7/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF              |
| 302    | 26/8/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF              |
| 303    | 26/9/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF              |
| 304    | 26/10/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF             |
| 305    | 26/11/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF             |
| 306    | 26/12/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF             |
| 307    | 26/13/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF/OFF                      |
| 308    | 26/14/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF             |
| 309    | 26/15/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF             |
| 310    | 26/16/CBAP&L/CBAP&L/CBAP&L/AVAIL/OFF/CBAP&L/AVAIL/OFF/OFF/OFF/OFF/OFF             |
| 311    | 27/M/420/SF-PERS/255/255/2.0C/WATT-SF/ASHRAE2                                     |
| 312    | 29/1/30/PCT-MCLG/30/PCT-MHTG/0/0                                                  |
| 313    | 29/2/0/PCT-MCLG/0/PCT-MHTG/0/0                                                    |
| 314    | 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                                  |
| 315    | 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                                  |
| 316    | 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                                  |
| 317    | 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG                      |
| 318    | 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                                  |
| 319    | 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG                      |
| 320    | 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                                  |
| 321    | 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG                     |
| 322    | 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF                                     |
| 323    | 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                                 |
| 324    | 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                                   |
| 325    | 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                                 |
| 326    | 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                                 |
| 327    | 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                                 |
| 328    | 30/1/23725/CFM/23725/CFM                                                          |
| 329    | 30/2/14660/CFM/14660/CFM/////14660/CFM                                            |
| 330    | 30/3/360/CFM/360/CFM                                                              |
| 331    | 30/4/12450/CFM/12450/CFM                                                          |
| 332    | 30/5/5505/CFM/5505/CFM                                                            |
| 333    | 30/6/10028/CFM/10028/CFM                                                          |
| 334    | 30/7/6535/CFM/6535/CFM                                                            |
| 335    | 30/8/8914/CFM/8914/CFM                                                            |
| 336    | 30/9/6855/CFM/6855/CFM                                                            |
| 337    | 30/10/8914/CFM/8914/CFM                                                           |
| 338    | 30/11/3070/CFM/3070/CFM/////3070/CFM                                              |
| 339    | 30/12/180/CFM/180/CFM                                                             |
| 340    | 30/13/0/CFM/1835/CFM                                                              |
| 341    | 30/14/10028/CFM/10028/CFM                                                         |
| 342    | 30/15/8914/CFM/8914/CFM                                                           |
| 343    | 30/16/8914/CFM/8914/CFM                                                           |
| 344    | 31/1/1/535/10//135/SINE-FIT/80/50                                                 |
| 345    | 31/1/2/656/12//135/SINE-FIT/80/50                                                 |
| 346    | 31/4/1/279/12//135/SINE-FIT/80/50                                                 |
| 347    | 31/13/1/136/12//135/SINE-FIT/80/50                                                |
| 348    | SYSTEM - 2                                                                        |

CONTENTS OF : C:\JOBS\CBI22B.TM

LINE # -----

349 39/2/REPLACE FLUORESCENT BALLASTS

350 40/1/TRH/ROADK

351 41/1/1/1/4/4

352 42/1/3/3/.65

353 44/1

354 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

355 40/2/SZ

356 41/2/2/2/11/11

357 42/2/1/1/.75/1.75

358 44/2

359 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

360 40/3/INDFP

361 41/3/3/3/5/5/7/7/9/9/12/12

362 42/3/8/8/1

363 44/3/DRY-BULB/65/100

364 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADHTG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

365 40/4/UH

366 41/4/13/13

367 42/4/.20

368 44/4

369 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

370 40/5/00

371 41/5/6/6/8/8/10/10

372 42/5/8/8/1

373 44/5/DRY-BULB/65/100

374 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

375 40/6/00

376 41/6/14/16

377 42/6/8/8/1

378 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

379 EQUIPMENT - 2

380 59/2/CARLISLE///REPLACE FLUORESCENT BALLASTS

381 60/1/1/BLKPLANT/1/1/3/3/5/6

382 60/2/2/BLKPLANT/2/2

383 62/1/EQ1001S/2/306/TONS

384 62/2/EQ1000

385 63/1/30/HP/30/HP/////1

386 65/1/1/1/1/3/3/5/6

387 65/2/2/1/1/3/6

388 65/3/3/2/2

389 66/1/1/1

390 66/2/2/2

391 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW

392 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW

393 67/3/EQ2000

394 69/1/EQ4003//EQ4003

395 69/2/////EQ4003

396 69/3/EQ4003//EQ4003

397 69/4

398 69/5/EQ4003//EQ4003

399 69/6/EQ4003//EQ4003

400 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

401 LOAD - 3

402 19/3/REPLACE FLUORESCENT FIXTURES

403 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

404 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

405 20/3/3/STAIRS/1/560/4/0//11

406 20/4/4/BSMT E/1/12424/4/3.3//12.7

CONTENTS OF : C:\JOBS\CB122B.TM

LINE # -----

407 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

408 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

409 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

410 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

411 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

412 20/10/10/3RD FL CEN OFFCS/1/2563/4/0//11

413 20/11/11/TOILETS W ROOF/1/596/4/2//11

414 20/12/12/STAIRS W ROOF/1/280/4/0//11

415 20/13/13/SUPPLY STORAGE/1/254/4/0//12.7

416 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

417 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

418 20/16/16/3RD FL CEN OFFCS/2563/1/4/0//11

419 21/M///CBADCTX///CCADHTX

420 22/9/1/YES////14

421 22/10/1/YES////14

422 22/11/1/YES////14

423 22/12/1/YES////14

424 22/16/1/YES////14

425 24/2/1/9/10.3//134/45

426 24/2/2/10/10.3//134/315

427 24/3/1/16/11//135/45

428 24/3/2/48/11//135/135

429 24/3/3/16/11//135/225

430 24/5/1/108/11.3//134/45

431 24/5/2/281/11.3//134/135

432 24/5/3/93/11.3//134/225

433 24/5/4/235/11.3//134/315

434 24/6/1/9/11.3//134/45

435 24/6/2/27/11.3//134/135

436 24/6/3/22/11.3//134/225

437 24/6/4/56/11.3//134/315

438 24/7/1/135/10//134/45

439 24/7/2/320/10//134/135

440 24/7/3/135/10//134/225

441 24/7/4/344/10//134/315

442 24/8/1/8/10//134/135

443 24/8/2/8/10//134/315

444 24/9/1/135/10.3//134/45

445 24/9/2/320/10.3//134/135

446 24/9/3/135/10.3//134/225

447 24/9/4/344/10.3//134/315

448 24/10/1/8/10.3//134/135

449 24/10/2/8/10.3//134/315

450 24/12/1/8/10.3//135/45

451 24/12/2/24/10.3//135/135

452 24/12/3/8/10.3//135/225

453 24/14/1/9/11.3//134/45

454 24/14/2/27/11.3//134/135

455 24/14/3/22/11.3//134/225

456 24/14/4/56/11.3//134/315

457 24/15/1/8/10//134/135

458 24/15/2/8/10//134/315

459 24/16/1/8/10.3//134/135

460 24/16/2/8/10.3//134/315

461 25/2/1/8.5/2.5/1/.81/.64

462 25/3/1/8.5/2.5/6/.81/.64

463 25/3/3/8.5/2.5/6/.81/.64

464 25/5/1/8.5/2.5/5/.81/.64

CONTENTS OF : C:\JOBS\CB122B.TM

| LINE # | -----                                                            |
|--------|------------------------------------------------------------------|
| 465    | 25/5/2/8.5/2.5/35/.81/.64                                        |
| 466    | 25/5/3/8.5/2.5/6/.81/.64                                         |
| 467    | 25/5/4/8.5/2.5/28/.81/.64                                        |
| 468    | 25/6/1/8.5/2.5/5/.81/.64                                         |
| 469    | 25/6/2/8.5/2.5/7/.81/.64                                         |
| 470    | 25/7/1/7/2.5/6/.81/.64                                           |
| 471    | 25/7/2/7/2.5/40/.81/.64                                          |
| 472    | 25/7/3/7/2.5/6/.81/.64                                           |
| 473    | 25/7/4/7/2.5/40/.81/.64                                          |
| 474    | 25/8/1/7/2.5/3/.81/.64                                           |
| 475    | 25/8/2/7/2.5/3/.81/.64                                           |
| 476    | 25/9/1/7/2.5/6/.81/.64                                           |
| 477    | 25/9/2/7/2.5/40/.81/.64                                          |
| 478    | 25/9/3/7/2.5/6/.81/.64                                           |
| 479    | 25/9/4/7/2.5/40/.81/.64                                          |
| 480    | 25/10/1/7/2.5/3/.81/.64                                          |
| 481    | 25/10/2/7/2.5/3/.81/.64                                          |
| 482    | 25/12/1/7/2.5/3/.81/.64                                          |
| 483    | 25/12/3/7/2.5/3/.81/.64                                          |
| 484    | 25/14/1/8.5/2.5/5/.81/.64                                        |
| 485    | 25/14/2/8.5/2.5/7/.81/.64                                        |
| 486    | 25/15/1/7/2.5/3/.81/.64                                          |
| 487    | 25/15/2/7/2.5/3/.81/.64                                          |
| 488    | 25/16/1/7/2.5/3/.81/.64                                          |
| 489    | 25/16/2/7/2.5/3/.81/.64                                          |
| 490    | 26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF |
| 491    | 26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF   |
| 492    | 26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 493    | 26/4/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF |
| 494    | 26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 495    | 26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 496    | 26/7/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 497    | 26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 498    | 26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 499    | 26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF  |
| 500    | 26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF      |
| 501    | 26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF  |
| 502    | 26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF          |
| 503    | 26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF  |
| 504    | 26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF  |
| 505    | 26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF  |
| 506    | 27/M/420/SF-PERS/255/255/1.66/WATT-SF/ASHRAE2                    |
| 507    | 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0                                |
| 508    | 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0                                  |
| 509    | 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                 |
| 510    | 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                 |
| 511    | 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                 |
| 512    | 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG     |
| 513    | 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                 |
| 514    | 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG     |
| 515    | 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                 |
| 516    | 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG    |
| 517    | 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF                    |
| 518    | 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                |
| 519    | 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                  |
| 520    | 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                |
| 521    | 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                |
| 522    | 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF                |



CONTENTS OF : C:\JOBS\CB122B.TM

LINE # -----

523 30/1/23725/CFM/23725/CFM

524 30/2/14660/CFM/14660/CFM////14660/CFM

525 30/3/360/CFM/360/CFM

526 30/4/12450/CFM/12450/CFM

527 30/5/5505/CFM/5505/CFM

528 30/6/10028/CFM/10028/CFM

529 30/7/6535/CFM/6535/CFM

530 30/8/8914/CFM/8914/CFM

531 30/9/6855/CFM/6855/CFM

532 30/10/8914/CFM/8914/CFM

533 30/11/3070/CFM/3070/CFM////3070/CFM

534 30/12/180/CFM/180/CFM

535 30/13/0/CFM/1835/CFM

536 30/14/10028/CFM/10028/CFM

537 30/15/8914/CFM/8914/CFM

538 30/16/8914/CFM/8914/CFM

539 31/1/1/535/10//135/SINE-FIT/80/50

540 31/1/2/656/12//135/SINE-FIT/80/50

541 31/4/1/279/12//135/SINE-FIT/80/50

542 31/13/1/136/12//135/SINE-FIT/80/50

543 SYSTEM - 3

544 39/3/REPLACE FLUORESCENT FIXTURES

545 40/1/TRH/ROADK

546 41/1/1/1/4/4

547 42/1/3/3/.65

548 44/1

549 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

550 40/2/SZ

551 41/2/2/2/11/11

552 42/2////.75//.75

553 44/2

554 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

555 40/3/INDFP

556 41/3/3/3/5/5/7/7/9/9/12/12

557 42/3/8/8/1

558 44/3/DRY-BULB/65/100

559 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

560 40/4/UH

561 41/4/13/13

562 42/4/.20

563 44/4

564 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

565 40/5/DD

566 41/5/6/6/8/8/10/10

567 42/5/8/8/1

568 44/5/DRY-BULB/65/100

569 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

570 40/6/DD

571 41/6/14/16

572 42/6/8/8/1

573 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

574 EQUIPMENT - 3

575 59/3/CARLISLE//REPLACE FLUORESCENT FIXTURES

576 60/1/1/BLKPLANT/1/1/3/3/5/6

577 60/2/2/BLKPLANT/2/2

578 62/1/EQ1001S/2/306/TONS

579 62/2/EQ1000

580 63/1/30/HP/30/HP////1

## CONTENTS OF : C:\JOBS\CB122B.TM

LINE # -----

581 65/1/1/1/1/3/3/5/6  
582 65/2/2/1/1/3/6  
583 65/3/3/2/2  
584 66/1/1  
585 66/2/2/2  
586 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW  
587 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW  
588 67/3/EQ2000  
589 69/1/EQ4003//EQ4003  
590 69/2/////EQ4003  
591 69/3/EQ4003//EQ4003  
592 69/4  
593 69/5/EQ4003//EQ4003  
594 69/6/EQ4003//EQ4003  
595 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT  
596 LOAD - 4  
597 19/4/HEAT RECOVERY  
598 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10  
599 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11  
600 20/3/3/STAIRS/1/560/4/0//11  
601 20/4/4/BSMT E/1/12424/4/3.3//12.7  
602 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12  
603 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12  
604 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7  
605 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7  
606 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11  
607 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11  
608 20/11/11/TOILETS W ROOF/1/580/4/2//11  
609 20/12/12/STAIRS W ROOF/1/280/4/0//11  
610 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7  
611 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12  
612 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7  
613 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11  
614 21/M///CBADCTX//CBADHTX  
615 22/9/1/YES////14  
616 22/10/1/YES////14  
617 22/11/1/YES////14  
618 22/12/1/YES////14  
619 22/16/1/YES////14  
620 24/2/1/9/10.3//134/45  
621 24/2/2/10/10.3//134/315  
622 24/3/1/16/11//135/45  
623 24/3/2/48/11//135/135  
624 24/3/3/16/11//135/225  
625 24/5/1/108/11.3//134/45  
626 24/5/2/281/11.3//134/135  
627 24/5/3/93/11.3//134/225  
628 24/5/4/235/11.3//134/315  
629 24/6/1/9/11.3//134/45  
630 24/6/2/27/11.3//134/135  
631 24/6/3/22/11.3//134/225  
632 24/6/4/56/11.3//134/315  
633 24/7/1/135/10//134/45  
634 24/7/2/320/10//134/135  
635 24/7/3/135/10//134/225  
636 24/7/4/344/10//134/315  
637 24/8/1/8/10//134/135  
638 24/8/2/8/10//134/315

CONTENTS OF : C:\JOBS\C81228.TM

| LINE # |                                                                |
|--------|----------------------------------------------------------------|
| 639    | 24/9/1/135/10.3//134/45                                        |
| 640    | 24/9/2/320/10.3//134/135                                       |
| 641    | 24/9/3/135/10.3//134/225                                       |
| 642    | 24/9/4/344/10.3//134/315                                       |
| 643    | 24/10/1/8/10.3//134/135                                        |
| 644    | 24/10/2/8/10.3//134/315                                        |
| 645    | 24/12/1/8/10.3//135/45                                         |
| 646    | 24/12/2/24/10.3//135/135                                       |
| 647    | 24/12/3/8/10.3//135/225                                        |
| 648    | 24/14/1/9/11.3//134/45                                         |
| 649    | 24/14/2/27/11.3//134/135                                       |
| 650    | 24/14/3/22/11.3//134/225                                       |
| 651    | 24/14/4/56/11.3//134/315                                       |
| 652    | 24/15/1/8/10//134/135                                          |
| 653    | 24/15/2/8/10//134/315                                          |
| 654    | 24/16/1/8/10.3//134/135                                        |
| 655    | 24/16/2/8/10.3//134/315                                        |
| 656    | 25/2/1/8.5/2.5/1/.81/.64                                       |
| 657    | 25/3/1/8.5/2.5/6/.81/.64                                       |
| 658    | 25/3/3/8.5/2.5/6/.81/.64                                       |
| 659    | 25/5/1/8.5/2.5/5/.81/.64                                       |
| 660    | 25/5/2/8.5/2.5/35/.81/.64                                      |
| 661    | 25/5/3/8.5/2.5/6/.81/.64                                       |
| 662    | 25/5/4/8.5/2.5/28/.81/.64                                      |
| 663    | 25/6/1/8.5/2.5/5/.81/.64                                       |
| 664    | 25/6/2/8.5/2.5/7/.81/.64                                       |
| 665    | 25/7/1/7/2.5/6/.81/.64                                         |
| 666    | 25/7/2/7/2.5/40/.81/.64                                        |
| 667    | 25/7/3/7/2.5/6/.81/.64                                         |
| 668    | 25/7/4/7/2.5/40/.81/.64                                        |
| 669    | 25/8/1/7/2.5/3/.81/.64                                         |
| 670    | 25/8/2/7/2.5/3/.81/.64                                         |
| 671    | 25/9/1/7/2.5/6/.81/.64                                         |
| 672    | 25/9/2/7/2.5/40/.81/.64                                        |
| 673    | 25/9/3/7/2.5/6/.81/.64                                         |
| 674    | 25/9/4/7/2.5/40/.81/.64                                        |
| 675    | 25/10/1/7/2.5/3/.81/.64                                        |
| 676    | 25/10/2/7/2.5/3/.81/.64                                        |
| 677    | 25/12/1/7/2.5/3/.81/.64                                        |
| 678    | 25/12/3/7/2.5/3/.81/.64                                        |
| 679    | 25/14/1/8.5/2.5/5/.81/.64                                      |
| 680    | 25/14/2/8.5/2.5/7/.81/.64                                      |
| 681    | 25/15/1/7/2.5/3/.81/.64                                        |
| 682    | 25/15/2/7/2.5/3/.81/.64                                        |
| 683    | 25/16/1/7/2.5/3/.81/.64                                        |
| 684    | 25/16/2/7/2.5/3/.81/.64                                        |
| 685    | 26/1/CBAP&L/CBAP&L/CBAPFAN/OFF/CBAPFAN/CBAPFAN/OFF/OFF/OFF/OFF |
| 686    | 26/2/CBAP&L/CBAP&L/OFF/AVAIL/CBAPFAN/OFF/OFF/OFF/CBAPFAN/OFF   |
| 687    | 26/3/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 688    | 26/4/CBAP&L/CBAP&L/CBAPFAN/OFF/CBAPFAN/CBAPFAN/OFF/OFF/OFF/OFF |
| 689    | 26/5/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 690    | 26/6/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 691    | 26/7/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 692    | 26/8/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 693    | 26/9/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF   |
| 694    | 26/10/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF  |
| 695    | 26/11/CBAP&L/CBAP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBAPFAN/OFF      |
| 696    | 26/12/CBAP&L/CBAP&L/CBAPFAN/AVAIL/OFF/CBAPFAN/OFF/OFF/OFF/OFF  |

CONTENTS OF : C:\JOBS\CB122B.TM

LINE # -----

697 26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF

698 26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

699 26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

700 26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF

701 27/M/420/SF-PERS/255/255/2.57/WATT-SF/ASHRAE2

702 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0

703 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0

704 29/3/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

705 29/4/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

706 29/5/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

707 29/6/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

708 29/7/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

709 29/8/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

710 29/9/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

711 29/10/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF/50/PCT-MCLG

712 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

713 29/12/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

714 29/13/0/PCT-MCLG/0/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

715 29/14/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

716 29/15/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.6/CFM-SF

717 29/16/30/PCT-MCLG/30/PCT-MHTG/.6/CFM-SF/.5/CFM-SF

718 30/1/23725/CFM/23725/CFM

719 30/2/14660/CFM/14660/CFM/////14660/CFM

720 30/3/360/CFM/360/CFM

721 30/4/12450/CFM/12450/CFM

722 30/5/5505/CFM/5505/CFM

723 30/6/10028/CFM/10028/CFM

724 30/7/6535/CFM/6535/CFM

725 30/8/8914/CFM/8914/CFM

726 30/9/6855/CFM/6855/CFM

727 30/10/8914/CFM/8914/CFM

728 30/11/3070/CFM/3070/CFM/////3070/CFM

729 30/12/180/CFM/180/CFM

730 30/13/0/CFM/1835/CFM

731 30/14/10028/CFM/10028/CFM

732 30/15/8914/CFM/8914/CFM

733 30/16/8914/CFM/8914/CFM

734 31/1/1/535/10//135/SINE-FIT/80/50

735 31/1/2/656/12//135/SINE-FIT/80/50

736 31/4/1/279/12//135/SINE-FIT/80/50

737 31/13/1/136/12//135/SINE-FIT/80/50

738 SYSTEM - 4

739 39/4/HEAT RECOVERY

740 40/1/TRH/ROADK

741 41/1/1/1/4/4

742 42/1/3/3/.65

743 44/1/////60//CLG-HTG//RM-EXH

744 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

745 40/2/SZ

746 41/2/2/2/11/11

747 42/2////.75//.75

748 44/2

749 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

750 40/3/INDFP

751 41/3/3/3/5/5/7/7/9/9/12/12

752 42/3/8/8/1

753 44/3/////60//CLG-HTG//RM-EXH

754 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

CONTENTS OF : C:\JOBS\CB122B.TM

LINE # -----

755 40/4/UH

756 41/4/13/13

757 42/4/.20

758 44/4

759 45/4/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF

760 40/5/DD

761 41/5/6/6/8/8/10/10

762 42/5/8/8/1

763 44/5////////60//CLG-HTG//RM-EXH

764 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

765 40/6/DD

766 41/6/14/16

767 42/6/8/8/1

768 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF

769 EQUIPMENT - 4

770 59/4/CARLISLE///HEAT RECOVERY

771 60/1/1/BLKPLANT/1/1/3/3/5/6

772 60/2/2/BLKPLANT/2/2

773 62/1/EQ1001S/2/306/TONS

774 62/2/EQ1000

775 63/1/30/HP/30/HP////////1

776 65/1/1/1/1/3/3/5/6

777 65/2/2/1/1/3/6

778 65/3/3/2/2

779 66/1/1

780 66/2/2/2

781 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW

782 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW

783 67/3/EQ2000

784 69/1/EQ4003//EQ4003

785 69/2////////EQ4003

786 69/3/EQ4003//EQ4003

787 69/4

788 69/5/EQ4003//EQ4003

789 69/6/EQ4003//EQ4003

790 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT

CONTENTS OF : E:\CB122C.TM

LINE # -----

1 JOB - 1

2 01/ENERGY SAVINGS OPPORTUNITY STUDY

3 01/CARLISLE BARRACKS, PA

4 01/DEPARTMENT OF THE ARMY

5 01/BENATEC ASSOCIATES

6 01/BUILDING 122

7 08/CARLISLE

8 09/MAY/SEP////APR/OCT

9 10/CLTD-CLF

10 11///ZONE

11 LOAD - 1

12 19/1/COMBINED ECOS

13 20/1/1/SUB BSMT, BSMT W/1/45125/4/1//10

14 20/2/2/TOILETS, KITCHEN/1/3520/4/2//11

15 20/3/3/STAIRS/1/560/4/0//11

16 20/4/4/BSMT E/1/12424/4/3.3//12.7

17 20/5/5/1ST FL OFFICES/1/11724/4/1.3//12

18 20/6/6/1ST FL CEN OFFCS/1/9884/4/1.3//12

19 20/7/7/2ND FL OFFICES/1/14400/4/1.3//10.7

20 20/8/8/2ND FL CEN OFFCS/1/8674/4/0//10.7

21 20/9/9/3RD FL OFFICES/1/14400/4/1.3//11

22 20/10/10/3RD FL CEN OFFCS/1/8563/4/0//11

23 20/11/11/TOILETS W ROOF/1/580/4/2//11

24 20/12/12/STAIRS W ROOF/1/280/4/0//11

25 20/13/13/SUPPLY STORAGE/1/2544/4/0//12.7

26 20/14/14/1ST FL CEN OFFCS/9884/1/4/1.3//12

27 20/15/15/2ND FL CEN OFFCS/8674/1/4/0//10.7

28 20/16/16/3RD FL CEN OFFCS/8563/1/4/0//11

29 21/M////CBADCTX//CBADHTX

30 22/9/1/YES////14

31 22/10/1/YES////14

32 22/11/1/YES////14

33 22/12/1/YES////14

34 22/16/1/YES////14

35 24/2/1/9/10.3//134/45

36 24/2/2/10/10.3//134/315

37 24/3/1/16/11//135/45

38 24/3/2/48/11//135/135

39 24/3/3/16/11//135/225

40 24/5/1/108/11.3//134/45

41 24/5/2/281/11.3//134/135

42 24/5/3/93/11.3//134/225

43 24/5/4/235/11.3//134/315

44 24/6/1/9/11.3//134/45

45 24/6/2/27/11.3//134/135

46 24/6/3/22/11.3//134/225

47 24/6/4/56/11.3//134/315

48 24/7/1/135/10//134/45

49 24/7/2/320/10//134/135

50 24/7/3/135/10//134/225

51 24/7/4/344/10//134/315

52 24/8/1/8/10//134/135

53 24/8/2/8/10//134/315

54 24/9/1/135/10.3//134/45

55 24/9/2/320/10.3//134/135

56 24/9/3/135/10.3//134/225

57 24/9/4/344/10.3//134/315

58 24/10/1/8/10.3//134/135

CONTENTS OF : E:\CB122C.TM

| LINE # | -----                                                            |
|--------|------------------------------------------------------------------|
| 59     | 24/10/2/8/10.3//134/315                                          |
| 60     | 24/12/1/8/10.3//135/45                                           |
| 61     | 24/12/2/24/10.3//135/135                                         |
| 62     | 24/12/3/8/10.3//135/225                                          |
| 63     | 24/14/1/9/11.3//134/45                                           |
| 64     | 24/14/2/27/11.3//134/135                                         |
| 65     | 24/14/3/22/11.3//134/225                                         |
| 66     | 24/14/4/56/11.3//134/315                                         |
| 67     | 24/15/1/8/10//134/135                                            |
| 68     | 24/15/2/8/10//134/315                                            |
| 69     | 24/16/1/8/10.3//134/135                                          |
| 70     | 24/16/2/8/10.3//134/315                                          |
| 71     | 25/2/1/8.5/2.5/1/.55/.29                                         |
| 72     | 25/3/1/8.5/2.5/6/.55/.29                                         |
| 73     | 25/3/3/8.5/2.5/6/.55/.29                                         |
| 74     | 25/5/1/8.5/2.5/5/.55/.29                                         |
| 75     | 25/5/2/8.5/2.5/35/.55/.29                                        |
| 76     | 25/5/3/8.5/2.5/6/.55/.29                                         |
| 77     | 25/5/4/8.5/2.5/28/.55/.29                                        |
| 78     | 25/6/1/8.5/2.5/5/.55/.29                                         |
| 79     | 25/6/2/8.5/2.5/7/.55/.29                                         |
| 80     | 25/7/1/7/2.5/6/.55/.29                                           |
| 81     | 25/7/2/7/2.5/40/.55/.29                                          |
| 82     | 25/7/3/7/2.5/6/.55/.29                                           |
| 83     | 25/7/4/7/2.5/40/.55/.29                                          |
| 84     | 25/8/1/7/2.5/3/.55/.29                                           |
| 85     | 25/8/2/7/2.5/3/.55/.29                                           |
| 86     | 25/9/1/7/2.5/6/.55/.29                                           |
| 87     | 25/9/2/7/2.5/40/.55/.29                                          |
| 88     | 25/9/3/7/2.5/6/.55/.29                                           |
| 89     | 25/9/4/7/2.5/40/.55/.29                                          |
| 90     | 25/10/1/7/2.5/3/.55/.29                                          |
| 91     | 25/10/2/7/2.5/3/.55/.29                                          |
| 92     | 25/12/1/7/2.5/3/.55/.29                                          |
| 93     | 25/12/3/7/2.5/3/.55/.29                                          |
| 94     | 25/14/1/8.5/2.5/5/.55/.29                                        |
| 95     | 25/14/2/8.5/2.5/7/.55/.29                                        |
| 96     | 25/15/1/7/2.5/3/.55/.29                                          |
| 97     | 25/15/2/7/2.5/3/.55/.29                                          |
| 98     | 25/16/1/7/2.5/3/.55/.29                                          |
| 99     | 25/16/2/7/2.5/3/.55/.29                                          |
| 100    | 26/1/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF |
| 101    | 26/2/CBADP&L/CBADP&L/OFF/AVAIL/CBADFAN/OFF/OFF/OFF/CBADFAN/OFF   |
| 102    | 26/3/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 103    | 26/4/CBADP&L/CBADP&L/CBADFAN/OFF/CBADFAN/CBADFAN/OFF/OFF/OFF/OFF |
| 104    | 26/5/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 105    | 26/6/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 106    | 26/7/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 107    | 26/8/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 108    | 26/9/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF   |
| 109    | 26/10/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF  |
| 110    | 26/11/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/CBADFAN/OFF      |
| 111    | 26/12/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF  |
| 112    | 26/13/CBADP&L/CBADP&L/OFF/AVAIL/OFF/OFF/OFF/OFF/OFF/OFF          |
| 113    | 26/14/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF  |
| 114    | 26/15/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF  |
| 115    | 26/16/CBADP&L/CBADP&L/CBADFAN/AVAIL/OFF/CBADFAN/OFF/OFF/OFF/OFF  |
| 116    | 27/M/420/SF-PERS/255/255/1.66/WATT-SF/ASHRAE2                    |

CONTENTS OF : E:\CB122C.TM

LINE # -----

117 29/1/30/PCT-MCLG/30/PCT-MHTG/0//0

118 29/2/0/PCT-MCLG/0/PCT-MHTG/0//0

119 29/3/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF

120 29/4/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF

121 29/5/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF

122 29/6/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF/50/PCT-MCLG

123 29/7/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF

124 29/8/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF/50/PCT-MCLG

125 29/9/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF

126 29/10/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF/50/PCT-MCLG

127 29/11/0/PCT-MCLG/0/PCT-MHTG/0/CFM-SF/0/CFM-SF

128 29/12/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF

129 29/13/0/PCT-MCLG/0/PCT-MHTG/.5/CFM-SF/.5/CFM-SF

130 29/14/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF

131 29/15/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF

132 29/16/30/PCT-MCLG/30/PCT-MHTG/.5/CFM-SF/.5/CFM-SF

133 30/1/23725/CFM/23725/CFM

134 30/2/0/CFM/0/CFM/////14660/CFM

135 30/3/360/CFM/360/CFM

136 30/4/12450/CFM/12450/CFM

137 30/5/5505/CFM/5505/CFM

138 30/6/10028/CFM/10028/CFM

139 30/7/6535/CFM/6535/CFM

140 30/8/8914/CFM/8914/CFM

141 30/9/6855/CFM/6855/CFM

142 30/10/8914/CFM/8914/CFM

143 30/11/0/CFM/0/CFM/////3070/CFM

144 30/12/180/CFM/180/CFM

145 30/13/0/CFM/1835/CFM

146 30/14/10028/CFM/10028/CFM

147 30/15/8914/CFM/8914/CFM

148 30/16/8914/CFM/8914/CFM

149 31/1/1/535/10//135/SINE-FIT/80/50

150 31/1/2/656/12//135/SINE-FIT/80/50

151 31/4/1/279/12//135/SINE-FIT/80/50

152 31/13/1/136/12//135/SINE-FIT/80/50

153 SYSTEM - 1

154 39/1/COMBINED ECOS

155 40/1/TRH/ROADK

156 41/1/1/1/4/4

157 42/1/3/3/.65

158 44/1/////////60//CLG-HTG//RM-EXH

159 45/1/CBADCLG/CBADCLG/OFF/OFF/OFF/OFF/CBADHTG/CBADHTG/CBADFAN/OFF

160 40/2/SZ

161 41/2/2/2/11/11

162 42/2////.75//.75

163 44/2

164 45/2/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF/OFF

165 40/3/INDFP

166 41/3/3/3/5/5/7/7/9/9/12/12

167 42/3/8/8/1

168 44/3/////////60//CLG-HTG//RM-EXH

169 45/3/CBADCLG/CBADCLG/OFF/OFF/CBADCLG/OFF/CBADHTG/OFF/CBADFAN/CBADHTG

170 40/4/UH

171 41/4/13/13

172 42/4/.20

173 44/4

174 45/4/OFF/OFF/OFF/OFF/OFF/OFF/CBADHTG/OFF/OFF/OFF/OFF



CONTENTS OF : E:\CB122C.TM

| LINE # |                                                                  |
|--------|------------------------------------------------------------------|
| 175    | 40/5/DD                                                          |
| 176    | 41/5/6/6/8/8/10/10                                               |
| 177    | 42/5/8/8/1                                                       |
| 178    | 44/5/////////60//CLG-HTG//RM-EXH                                 |
| 179    | 45/5/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF |
| 180    | 40/6/DD                                                          |
| 181    | 41/6/14/16                                                       |
| 182    | 42/6/8/8/1                                                       |
| 183    | 45/6/CBADCLG/CBADCLG/OFF/OFF/OFF/CBADHTG/CBADHTG/OFF/CBADFAN/OFF |
| 184    | EQUIPMENT - 1                                                    |
| 185    | 59/1/CARLISLE///COMBINED ECOS                                    |
| 186    | 60/1/1/BLKPLANT/1/1/3/3/5/6                                      |
| 187    | 60/2/2/BLKPLANT/2/2                                              |
| 188    | 62/1/EQ1001S/2/306/TONS                                          |
| 189    | 62/2/EQ1000                                                      |
| 190    | 63/1/30/HP/30/HP/////1                                           |
| 191    | 65/1/1//1/1/3/3/5/6                                              |
| 192    | 65/2/2//1/1/3/6                                                  |
| 193    | 65/3/3//2/2                                                      |
| 194    | 66/1//1                                                          |
| 195    | 66/2/2//2                                                        |
| 196    | 67/1/EQ2101/1/30/HP/11874/MBH/2156/KW                            |
| 197    | 67/2/EQ2101/1/25/HP/2620/MBH/2300/KW                             |
| 198    | 67/3/EQ2000                                                      |
| 199    | 69/1/EQ4003//EQ4003                                              |
| 200    | 69/2////////EQ4003                                               |
| 201    | 69/3/EQ4003//EQ4003                                              |
| 202    | 69/4                                                             |
| 203    | 69/5/EQ4003//EQ4003                                              |
| 204    | 69/6/EQ4003//EQ4003                                              |
| 205    | 74/1/EQ5100/750/TONS/.031/KW-TON/T-WATER/CTOWER/2/50/50/PERCENT  |

*Building 122*

*Trace Output File*

933702

```
*****  
*****  
**  
**          TRACE  600  ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 122

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 8:18:43 2/ 2/94  
Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | TRH         | 10,853                | 36,175                | 36,175                | 36,175               | 10,853                | 0                    | 0                     |
| 2             | SZ          | 0                     | 17,730                | 17,730                | 17,730               | 0                     | 0                    | 17,730                |
| 3             | INDFP       | 5,830                 | 19,435                | 19,435                | 36,448               | 19,435                | 37,165               | 0                     |
| 4             | UH          | 0                     | 0                     | 1,835                 | 0                    | 0                     | 0                    | 0                     |
| 5             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 27,856                | 0                    | 0                     |
| 6             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 9,325                 | 0                    | 0                     |
| Totals        |             | 33,397                | 129,052               | 130,887               | 148,000              | 67,468                | 37,165               | 17,730                |

CAPACITY - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      | Cooling Totals (Tons) | Heating                   |                           |                         | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) |                       | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) |                        |                          |                      |                      |                       |
| 1             | TRH         | 81.5                      | 0.0                       | 0.0                  | 81.5                 | -68,182               | 0                         | -480,162                  | 0                       | 0                      | 0                        | 0                    | -548,345             |                       |
| 2             | SZ          | 3.2                       | 0.0                       | 0.0                  | 3.2                  | -9,837                | 0                         | -106,277                  | 0                       | 0                      | 0                        | 0                    | -9,837               |                       |
| 3             | INDFP       | 46.4                      | 102.4                     | 0.0                  | 148.8                | -680,963              | -1,230,942                | 0                         | 0                       | 0                      | 0                        | 0                    | -1,911,905           |                       |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | -6,715                | 0                         | 0                         | 0                       | 0                      | 0                        | 0                    | -6,715               |                       |
| 5             | DD          | 63.1                      | 0.0                       | 0.0                  | 63.1                 | -457,597              | 0                         | -365,035                  | 0                       | 0                      | 0                        | 0                    | -822,632             |                       |
| 6             | DD          | 63.1                      | 0.0                       | 0.0                  | 63.1                 | -245,454              | 0                         | -365,035                  | 0                       | 0                      | 0                        | 0                    | -610,489             |                       |
| Totals        |             | 257.3                     | 102.4                     | 0.0                  | 359.7                | -1,468,749            | -1,230,942                | -1,316,509                | 0                       | 0                      | 0                        | 0                    | -3,909,922           |                       |

The building peaked at hour 14 month 7 with a capacity of 257.3 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 BASE BUILDING

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | ----- Cooling ----- |         |           |            | --- Heating --- |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|---------------------|---------|-----------|------------|-----------------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft           | Cfm/Ton | Sq Ft/Ton | Btuh/Sq Ft | Cfm/Sq Ft       | Btuh/Sq Ft |                  |
| 1             | Main           | TRH         | 30.00               | 0.63                | 443.7   | 705.9     | 17.00      | 0.63            | -9.53      | 57,549           |
| 2             | Main           | SZ          | 0.00                | 4.32                | 5,605.2 | 1,296.2   | 9.26       | 4.32            | -2.40      | 4,100            |
| 3             | Main           | INDFP       | 30.00               | 0.47                | 418.7   | 891.2     | 13.46      | 0.47            | -16.46     | 41,364           |
| 3             | Auxiliary      | INDFP       | 0.00                | 0.90                | 363.0   | 404.1     | 29.70      | 0.90            | -29.76     | 41,364           |
| 4             | Main           | UH          | 0.00                | 0.00                | 0.0     | 0.0       | 0.00       | 0.72            | -2.64      | 2,544            |
| 5             | Main           | DD          | 30.00               | 1.03                | 441.4   | 429.7     | 27.92      | 1.03            | -30.33     | 27,121           |
| 6             | Main           | DD          | 30.00               | 1.03                | 441.4   | 429.7     | 27.92      | 1.03            | -22.51     | 27,121           |

System 1 Peak TRH - TERMINAL REHEAT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Partition       | 18,940                  |                          |                        | 18,940           | 1.94             | * | 18,940                | 4.00             | * | -68,182           | -68,182          | 100.00           |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 18,940                  | 0                        |                        | 18,940           | 1.94             | * | 18,940                | 4.00             | * | -68,182           | -68,182          | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 398,781                 | 0                        |                        | 398,781          | 40.76            | * | 424,020               | 89.45            | * | 0                 | 0                | 0.00             |
| People          | 63,941                  |                          |                        | 63,941           | 6.54             | * | 31,097                | 6.56             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 462,722                 | 0                        | 0                      | 462,722          | 47.30            | * | 455,117               | 96.00            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 406,913          | 41.59            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 77,173           | 7.89             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Ret. Fan Heat   |                         | 18,007                   |                        | 18,007           | 1.84             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | -0.00            | * | 0                     | -0.00            | * | 0                 | 0                | 0.00             |
| Exhaust Heat    |                         | -5,402                   | 0                      | -5,402           | -0.55            | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Grand Total==>  | 481,661                 | 12,605                   | 0                      | 978,353          | 100.00           | * | 474,057               | 100.00           | * | -68,182           | -68,182          | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------------|------------|-----|
| Main Clg | 81.5                  | 978.4           | 36,175           | 80.0                      | 67.5                     | 57,549            |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 16,570            |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |            |     |
| Totals   | 81.5                  | 978.4           |                  |                           |                          | 0                 | 0          | 0   |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -68.2          | 36,175           | 68.0        | 69.7        | Vent    | 10,853  | 0       | Clg Cfm/Sqft  | 0.63   | SADB     | 63.0 | 69.7 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 0       | 0       | Clg Cfm/Ton   | 443.70 | Plenum   | 75.0 | 68.0 |
| Preheat  | -480.2         | 36,175           | 48.8        | 61.0        | Supply  | 36,175  | 36,175  | Clg Sqft/Ton  | 705.87 | Return   | 75.5 | 68.0 |
| Reheat   | -0.0           | 0                | 0.0         | 0.0         | Mincfm  | 36,175  | 0       | Clg Btuh/Sqft | 17.00  | Ret/OA   | 80.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 36,175  | 36,175  | No. People    | 137    | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 10,853  | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.5  | 0.5  |
| Total    | -548.3         |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.63   | Fn BldTD | 0.4  | 0.4  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -9.53  | Fn Frict | 1.1  | 1.1  |

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 860                      | 0                      | 860              | 2.26             | * | 0                     | 0.00             | * | 0                 | -3,224           | 44.57            |
| Glass Solar     | 595                     | 0                        | 0                      | 595              | 1.57             | * | 595                   | 1.71             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 239                     | 0                        | 0                      | 239              | 0.63             | * | 239                   | 0.69             | * | -1,139            | -1,139           | 15.75            |
| Wall Cond       | 747                     | 183                      | 0                      | 929              | 2.45             | * | 747                   | 2.14             | * | -2,286            | -2,870           | 39.68            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 1,581                   | 1,042                    | 0                      | 2,623            | 6.91             | * | 1,581                 | 4.54             | * | -3,426            | -7,234           | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 30,623                  | 0                        | 0                      | 30,623           | 80.68            | * | 30,623                | 87.96            | * | 0                 | 0                | 0.00             |
| People          | 4,712                   | 0                        | 0                      | 4,712            | 12.41            | * | 2,223                 | 6.38             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 35,335                  | 0                        | 0                      | 35,335           | 93.09            | * | 32,845                | 94.34            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 1,918                   | -1,918                   | 0                      | 0                | 0.00             | * | 389                   | 1.12             | * | -243              | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | -0.00            | * | 0                 | 0                | -0.00            |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Grand Total==>  | 38,834                  | -876                     | 0                      | 37,958           | 100.00           | * | 34,815                | 100.00           | * | -3,668            | -7,234           | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|           | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)   |
|-----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-------|
|           |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |       |
| Main Clg- | 3.2                   | 38.0            | 17,730           | 76.6              | 68.9  | 96.8   | 73.2             | 68.3  | 99.1   | Part        | 4,100      |       |
| Aux Clg   | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |       |
| Opt Vent  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 580        | 0 0   |
| Totals    | 3.2                   | 38.0            |                  |                   |       |        |                  |       |        | Wall        | 196        | 21 11 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0     | Type     | Clg  | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|---------|----------|------|------|
|          |                |                  |           |           | Vent    |         |         | Clg Cfm/Sqft  | 4.32    | SADB     | 73.2 | 68.2 |
| Main Htg | -9.8           | 17,730           | 67.7      | 68.2      | Infil   | 0       | 0       | Clg Cfm/Ton   | 5605.16 | Plenum   | 76.5 | 67.7 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 17,730  | 17,730  | Clg Sqft/Ton  | 1296.17 | Return   | 79.7 | 67.7 |
| Preheat  | -106.3         | 17,730           | 67.7      | 73.2      | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 9.26    | Ret/OA   | 76.6 | 67.7 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 17,730  | No. People    | 10      | Runarnd  | 75.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % OA      | 0.0     | Fn MtrTD | 0.0  | 0.0  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 17,730  | 0       | Htg Cfm/Sqft  | 4.32    | Fn BldTD | 0.0  | 0.0  |
| Total    | -9.8           |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -2.40   | Fn Frict | 0.0  | 0.0  |

System 3 Block INDFP - 4-PIPE INDUCTION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/19 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 85 \* OADB: 4

|                 | Space      | Ret. Air | Ret. Air | Net       | Perct  | * | Space    | Perct  | * | Space Peak | Coil Peak  | Perct  |
|-----------------|------------|----------|----------|-----------|--------|---|----------|--------|---|------------|------------|--------|
|                 | Sens.+Lat. | Sensible | Latent   | Total     | Of Tot | * | Sensible | Of Tot | * | Space Sens | Tot Sens   | Of Tot |
|                 | (Btuh)     | (Btuh)   | (Btuh)   | (Btuh)    | (%)    | * | (Btuh)   | (%)    | * | (Btuh)     | (Btuh)     | (%)    |
| Envelope Loads  |            |          |          |           |        |   |          |        |   |            |            |        |
| Skylite Solr    | 0          | 0        | 0        | 0         | 0.00   | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Skylite Cond    | 0          | 0        | 0        | 0         | 0.00   | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Roof Cond       | 474        | 21,484   |          | 21,957    | 1.22   | * | 664      | 0.10   | * | -1,579     | -73,446    | 3.84   |
| Glass Solar     | 171,927    | 0        |          | 171,927   | 9.54   | * | 185,822  | 27.51  | * | 0          | 0          | 0.00   |
| Glass Cond      | 53,830     | 0        |          | 53,830    | 2.99   | * | 40,082   | 5.93   | * | -276,287   | -276,287   | 14.45  |
| Wall Cond       | 113,330    | 16,902   |          | 130,232   | 7.22   | * | 168,977  | 25.01  | * | -328,407   | -377,319   | 19.74  |
| Partition       | 0          |          |          | 0         | 0.00   | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Exposed Floor   | 0          |          |          | 0         | 0.00   | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Infiltration    | 736,354    |          |          | 736,354   | 40.85  | * | 170,578  | 25.25  | * | -1,184,852 | -1,184,852 | 61.97  |
| Sub Total==>    | 1,075,915  | 38,386   |          | 1,114,301 | 61.81  | * | 566,123  | 83.80  | * | -1,791,125 | -1,911,905 | 100.00 |
| Internal Loads  |            |          |          |           |        | * |          |        | * |            |            |        |
| Lights          | 277,628    | 0        |          | 277,628   | 15.40  | * | 79,744   | 11.80  | * | 0          | 0          | 0.00   |
| People          | 45,248     |          |          | 45,248    | 2.51   | * | 6,070    | 0.90   | * | 0          | 0          | 0.00   |
| Misc            | 0          | 0        | 0        | 0         | 0.00   | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Sub Total==>    | 322,876    | 0        | 0        | 322,876   | 17.91  | * | 85,814   | 12.70  | * | 0          | 0          | 0.00   |
| Ceiling Load    | 14,654     | -14,654  |          | 0         | 0.00   | * | 23,486   | 3.48   | * | -47,811    | 0          | 0.00   |
| Outside Air     | 0          | 0        | 0        | 252,361   | 14.00  | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Sup. Fan Heat   |            |          |          | 110,564   | 6.13   | * |          | 0.00   | * |            | 0          | 0.00   |
| Ret. Fan Heat   |            | 13,820   |          | 13,820    | 0.77   | * |          | 0.00   | * |            | 0          | 0.00   |
| Duct Heat Pkup  |            | 0        |          | 0         | 0.00   | * |          | 0.00   | * |            | 0          | 0.00   |
| OV/UNDR Sizing  | 119        |          |          | 119       | 0.01   | * | 119      | 0.02   | * | 0          | 0          | 0.00   |
| Exhaust Heat    |            | -11,266  | 0        | -11,266   | -0.62  | * |          | 0.00   | * |            | 0          | 0.00   |
| Terminal Bypass |            | 0        | 0        | 0         | 0.00   | * |          | 0.00   | * |            | 0          | 0.00   |
| Grand Total==>  | 1,413,564  | 26,287   | 0        | 1,802,776 | 100.00 | * | 675,542  | 100.00 | * | -1,838,936 | -1,911,905 | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |       | Glass (sf) | (%) |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|-------|------------|-----|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part  |            |     |
| Main Clg | 46.4           | 557.0     | 19,435     | 80.9              | 66.7  | 78.0   | 59.9             | 57.7  | 69.7   | 41,364      | 0     |            |     |
| Aux Clg  | 102.4          | 1,228.4   | 37,165     | 75.0              | 64.2  | 74.9   | 65.1             | 53.2  | 42.8   | 0           | 0     |            |     |
| Opt Vent | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 14,680      | 0     | 0          |     |
| Totals   | 148.8          | 1,785.4   |            |                   |       |        |                  |       |        | 28,354      | 5,152 | 18         |     |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------|------------|-------|-------|---------|---------|---------|------------------------|--------|----------------------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg % OA               | 30.0   | Type                 | Clg  | Htg  |
| Main Htg | -681.0   | 19,435     | 64.5  | 96.7  | Infil   | 17,013  | 17,013  | Clg Cfm/Sqft           | 0.47   | SADB                 | 65.1 | 96.7 |
| Aux Htg  | -1,230.9 | 37,165     | 68.0  | 98.5  | Supply  | 19,435  | 19,435  | Clg Cfm/Ton            | 418.73 | Plenum               | 76.1 | 64.4 |
| Preheat  | -0.0     | 19,435     | 64.5  | 59.9  | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 891.20 | Return               | 76.8 | 64.5 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 19,435  | 19,435  | Clg Btuh/Sqft          | 13.46  | Ret/OA               | 80.9 | 64.5 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 5,830   | 0       | No. People             | 98     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 1.3  | 1.3  |
| Total    | -1,911.9 |            |       |       | Auxil   | 37,165  | 37,165  | Htg Cfm/Sqft           | 0.47   | Fn BldTD             | 1.0  | 1.0  |
|          |          |            |       |       |         |         |         | Htg Btuh/Sqft          | -16.46 | Fn Frict             | 2.9  | 2.9  |



System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Solar     | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Wall Cond       | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Partition       | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | -6,715                       | -6,715                    | 100.00           |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | -6,715                       | -6,715                    | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -6,715                       | -6,715                    | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|           | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|-----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|           |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg- | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 2,544      |     |
| Aux Clg   | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 1,632      |     |
| Opt Vent  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals    | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % DA      | 0.0   | Type     | Clg | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|-------|----------|-----|------|
| Main Htg | -6.7           | 1,835            | 68.0      | 71.4      | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00  | SADB     | 0.0 | 71.4 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 0       | Clg Cfm/Ton   | 0.00  | Plenum   | 0.0 | 68.0 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 1,835   | Clg Sqft/Ton  | 0.00  | Return   | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00  | Ret/DA   | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 1,835   | No. People    | 0     | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % DA      | 0.0   | Fn MtrTD | 0.0 | 0.0  |
| Total    | -6.7           |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.72  | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -2.64 | Fn Frict | 0.1 | 0.0  |

System 5 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 1.91             | * | 16,221                | 5.75             | * | -48,286           | -48,286          | 21.28            |
| Glass Solar     | 17,909                  | 0                        | 0                      | 17,909           | 2.36             | * | 16,285                | 5.78             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.64             | * | 5,167                 | 1.83             | * | -24,690           | -24,690          | 10.88            |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.62             | * | 5,622                 | 1.99             | * | -16,677           | -18,921          | 8.34             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 33,323                  | 0                        | 0                      | 33,323           | 4.40             | * | 16,324                | 5.79             | * | -67,403           | -67,403          | 29.70            |
| Sub Total==>    | 74,719                  | 526                      | 0                      | 75,245           | 9.94             | * | 59,619                | 21.14            | * | -157,056          | -159,300         | 70.19            |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 190,447                 | 0                        | 0                      | 190,447          | 25.15            | * | 200,839               | 71.22            | * | 0                 | 0                | 0.00             |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 3.99             | * | 14,612                | 5.18             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 220,650                 | 0                        | 0                      | 220,650          | 29.13            | * | 215,452               | 76.40            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00             | * | 1,553                 | 0.55             | * | -4,627            | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 287,738          | 37.99            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 20.92            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 2.62             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 5,366                   | 0                        | 0                      | 5,366            | 0.71             | * | 5,366                 | 1.90             | * | -67,648           | -67,648          | 29.81            |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.31            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Grand Total==>  | 302,110                 | 9,026                    | 0                      | 757,343          | 100.00           | * | 281,990               | 100.00           | * | -229,331          | -226,948         | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total (Floor) | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|---------------------|------------|-----|
| Main Clg | 63.1                  | 757.3           | 27,856           | 80.4                      | 60.1                     | 27,121              |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                   |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                   |            |     |
| Totals   | 63.1                  | 757.3           |                  |                           |                          | 8,563               | 460        | 29  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -457.6         | 27,856           | 60.5        | 75.6        | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 65.7 | 75.6 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 968     | 968     | Clg Cfm/Ton   | 441.37 | Plenum   | 75.4 | 66.5 |
| Preheat  | -365.0         | 27,856           | 48.4        | 60.5        | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 429.73 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 27.92  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -822.6         |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -30.33 | Fn Frict | 2.9  | 2.9  |

System 6 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space      | Ret. Air | Ret. Air | Net     | Perct  |   | Space    | Perct  | Space Peak | Coil Peak | Perct  |
|-----------------|------------|----------|----------|---------|--------|---|----------|--------|------------|-----------|--------|
|                 | Sens.+Lat. | Sensible | Latent   | Total   | Of Tot |   | Sensible | Of Tot | Space Sens | Tot Sens  | Of Tot |
|                 | (Btuh)     | (Btuh)   | (Btuh)   | (Btuh)  | (%)    |   | (Btuh)   | (%)    | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads  |            |          |          |         |        |   |          |        |            |           |        |
| Skylite Solr    | 0          | 0        | 0        | 0       | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Skylite Cond    | 0          | 0        | 0        | 0       | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Roof Cond       | 14,486     | 0        | 0        | 14,486  | 1.91   | * | 16,221   | 5.75   | -48,286    | -48,286   | 21.28  |
| Glass Solar     | 17,909     | 0        | 0        | 17,909  | 2.36   | * | 16,285   | 5.78   | 0          | 0         | 0.00   |
| Glass Cond      | 4,840      | 0        | 0        | 4,840   | 0.64   | * | 5,167    | 1.83   | -24,690    | -24,690   | 10.88  |
| Wall Cond       | 4,161      | 526      | 0        | 4,687   | 0.62   | * | 5,622    | 1.99   | -16,677    | -18,921   | 8.34   |
| Partition       | 0          | 0        | 0        | 0       | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Exposed Floor   | 0          | 0        | 0        | 0       | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Infiltration    | 33,323     | 0        | 0        | 33,323  | 4.40   | * | 16,324   | 5.79   | -67,403    | -67,403   | 29.70  |
| Sub Total==>    | 74,719     | 526      | 0        | 75,245  | 9.94   | * | 59,619   | 21.14  | -157,056   | -159,300  | 70.19  |
| Internal Loads  |            |          |          |         |        |   |          |        |            |           |        |
| Lights          | 190,447    | 0        | 0        | 190,447 | 25.15  | * | 200,839  | 71.22  | 0          | 0         | 0.00   |
| People          | 30,203     | 0        | 0        | 30,203  | 3.99   | * | 14,612   | 5.18   | 0          | 0         | 0.00   |
| Misc            | 0          | 0        | 0        | 0       | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Sub Total==>    | 220,650    | 0        | 0        | 220,650 | 29.13  | * | 215,452  | 76.40  | 0          | 0         | 0.00   |
| Ceiling Load    | 1,375      | -1,375   | 0        | 0       | 0.00   | * | 1,553    | 0.55   | -4,627     | 0         | 0.00   |
| Outside Air     | 0          | 0        | 0        | 287,738 | 37.99  | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Sup. Fan Heat   | 0          | 0        | 0        | 158,470 | 20.92  | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Ret. Fan Heat   | 0          | 19,809   | 0        | 19,809  | 2.62   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Duct Heat Pkup  | 0          | 0        | 0        | 0       | 0.00   | * | 0        | 0.00   | 0          | 0         | 0.00   |
| OV/UNDR Sizing  | 5,366      | 0        | 0        | 5,366   | 0.71   | * | 5,366    | 1.90   | -67,648    | -67,648   | 29.81  |
| Exhaust Heat    | 0          | -9,934   | 0        | -9,934  | -1.31  | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Terminal Bypass | 0          | 0        | 0        | 0       | -0.00  | * | 0        | 0.00   | 0          | 0         | 0.00   |
| Grand Total==>  | 302,110    | 9,026    | 0        | 757,343 | 100.00 | * | 281,990  | 100.00 | -229,331   | -226,948  | 100.00 |

-----COOLING COIL SELECTION-----

-----AREAS-----

|           | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|-----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|           | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg- | 63.1           | 757.3     | 577.1      | 27,856            | 80.4  | 68.3   | 87.0             | 60.5  | 60.1   | 79.2        | Part       | 27,121 |
| Aux Clg   | 0.0            | 0.0       | 0.0        | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | ExFlr      | 0      |
| Opt Vent  | 0.0            | 0.0       | 0.0        | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0         | Roof       | 8,563  |
| Totals    | 63.1           | 757.3     |            |                   |       |        |                  |       |        |             | Wall       | 1,613  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------|------------|-------|-------|---------|---------|---------|---------------|--------|----------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg Cfm/Sqft  | 1.03   | SADB     | 65.7 | 75.6 |
| Main Htg | -245.5   | 27,856     | 67.5  | 75.6  | Infil   | 968     | 968     | Clg Cfm/Ton   | 441.37 | Plenum   | 75.4 | 66.5 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 429.73 | Return   | 76.1 | 67.5 |
| Preheat  | -365.0   | 27,856     | 48.4  | 60.5  | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 27.92  | Ret/OA   | 80.4 | 67.5 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
| Total    | -610.5   |            |       |       | Auxil   | 0       | 0       | Htg Btuh/Sqft | -22.51 | Fn Frict | 2.9  | 2.9  |

BUILDING U-VALUES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G U - V A L U E S -----

| Room<br>Number | Description      | Room U-Values<br>(Btu/hr/sqft/F) |       |                |                |       |                |                |       | Room<br>Mass<br>(lb/<br>sqft) | Room<br>Capac.<br>(Btu/<br>sqft/F) |       |       |
|----------------|------------------|----------------------------------|-------|----------------|----------------|-------|----------------|----------------|-------|-------------------------------|------------------------------------|-------|-------|
|                |                  | Part.                            | ExFlr | Summr<br>Skylt | Wintr<br>Skylt | Roof  | Summr<br>Windo | Wintr<br>Windo | Wall  |                               |                                    | Ceil. |       |
| 1              | SUB BSMT, BSMT W | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000                         | 0.317                              | 46.8  | 9.61  |
| Zone           | 1 Total/Ave.     | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000                         | 0.317                              | 46.8  | 9.61  |
| 4              | BSMT E           | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000                         | 0.317                              | 45.2  | 9.27  |
| Zone           | 4 Total/Ave.     | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000                         | 0.317                              | 45.2  | 9.27  |
| System         | 1 Total/Ave.     | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000                         | 0.317                              | 46.4  | 9.54  |
| 2              | TOILETS, KITCHEN | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 29.4  | 5.93  |
| Zone           | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 29.4  | 5.93  |
| 11             | TOILETS W ROOF   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.000          | 0.000          | 0.000 | 0.317                         |                                    | 71.1  | 15.13 |
| Zone           | 11 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.000          | 0.000          | 0.000 | 0.317                         |                                    | 71.1  | 15.13 |
| System         | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 35.3  | 7.23  |
| 3              | STAIRS           | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.229 | 0.000                         |                                    | 103.3 | 21.63 |
| Zone           | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.229 | 0.000                         |                                    | 103.3 | 21.63 |
| 5              | 1ST FL OFFICES   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 57.9  | 12.05 |
| Zone           | 5 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 57.9  | 12.05 |
| 7              | 2ND FL OFFICES   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 56.7  | 11.81 |
| Zone           | 7 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 56.7  | 11.81 |
| 9              | 3RD FL OFFICES   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 102.3 | 21.84 |
| Zone           | 9 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 102.3 | 21.84 |
| 12             | STAIRS W ROOF    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.229 | 0.000                         |                                    | 146.4 | 31.13 |
| Zone           | 12 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.229 | 0.000                         |                                    | 146.4 | 31.13 |
| System         | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.256 | 0.317                         |                                    | 74.1  | 15.63 |
| 13             | SUPPLY STORAGE   | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000                         |                                    | 70.7  | 14.70 |
| Zone           | 13 Total/Ave.    | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000                         |                                    | 70.7  | 14.70 |
| System         | 4 Total/Ave.     | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000                         |                                    | 70.7  | 14.70 |
| 6              | 1ST FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 32.5  | 6.60  |
| Zone           | 6 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 32.5  | 6.60  |
| 8              | 2ND FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.000                         |                                    | 27.0  | 5.41  |
| Zone           | 8 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.000                         |                                    | 27.0  | 5.41  |
| 10             | 3RD FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.000                         |                                    | 71.5  | 15.21 |
| Zone           | 10 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.000                         |                                    | 71.5  | 15.21 |
| System         | 5 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 43.1  | 8.94  |
| 14             | 1ST FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 32.5  | 6.60  |
| Zone           | 14 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 32.5  | 6.60  |
| 15             | 2ND FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.000                         |                                    | 27.0  | 5.41  |
| Zone           | 15 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.000                         |                                    | 27.0  | 5.41  |
| 16             | 3RD FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.000                         |                                    | 71.5  | 15.21 |
| Zone           | 16 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.000                         |                                    | 71.5  | 15.21 |
| System         | 6 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.317                         |                                    | 43.1  | 8.94  |
| Building       |                  | 0.229                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.256 | 0.317                         |                                    | 52.6  | 10.93 |

BUILDING AREAS - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G   A R E A S -----

| Room Number | Description      | Number of Duplicate Flr Rm | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Ski /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|----------------------------|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
| 1           | SUB BSMT, BSMT W | 1 1                        | 45,125                      | 45,125                  | 13,222                | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| Zone        | 1 Total/Ave.     |                            |                             | 45,125                  | 13,222                | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 4           | BSMT E           | 1 1                        | 12,424                      | 12,424                  | 3,348                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| Zone        | 4 Total/Ave.     |                            |                             | 12,424                  | 3,348                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| System      | 1 Total/Ave.     |                            |                             | 57,549                  | 16,570                | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 2           | TOILETS, KITCHEN | 1 1                        | 3,520                       | 3,520                   | 0                     | 0                         | 0                    | 0           | 0                    | 21                 | 11          | 174                  |
| Zone        | 2 Total/Ave.     |                            |                             | 3,520                   | 0                     | 0                         | 0                    | 0           | 0                    | 21                 | 11          | 174                  |
| 11          | TOILETS W ROOF   | 1 1                        | 580                         | 580                     | 0                     | 0                         | 0                    | 0           | 580                  | 0                  | 0           | 0                    |
| Zone        | 11 Total/Ave.    |                            |                             | 580                     | 0                     | 0                         | 0                    | 0           | 580                  | 0                  | 0           | 0                    |
| System      | 2 Total/Ave.     |                            |                             | 4,100                   | 0                     | 0                         | 0                    | 0           | 580                  | 21                 | 11          | 174                  |
| 3           | STAIRS           | 1 1                        | 560                         | 560                     | 0                     | 0                         | 0                    | 0           | 0                    | 255                | 29          | 625                  |
| Zone        | 3 Total/Ave.     |                            |                             | 560                     | 0                     | 0                         | 0                    | 0           | 0                    | 255                | 29          | 625                  |
| 5           | 1ST FL OFFICES   | 1 1                        | 11,724                      | 11,724                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,573              | 19          | 6,530                |
| Zone        | 5 Total/Ave.     |                            |                             | 11,724                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,573              | 19          | 6,530                |
| 7           | 2ND FL OFFICES   | 1 1                        | 14,400                      | 14,400                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,610              | 17          | 7,730                |
| Zone        | 7 Total/Ave.     |                            |                             | 14,400                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,610              | 17          | 7,730                |
| 9           | 3RD FL OFFICES   | 1 1                        | 14,400                      | 14,400                  | 0                     | 0                         | 0                    | 0           | 14,400               | 1,610              | 17          | 8,010                |
| Zone        | 9 Total/Ave.     |                            |                             | 14,400                  | 0                     | 0                         | 0                    | 0           | 14,400               | 1,610              | 17          | 8,010                |
| 12          | STAIRS W ROOF    | 1 1                        | 280                         | 280                     | 0                     | 0                         | 0                    | 0           | 280                  | 105                | 25          | 307                  |
| Zone        | 12 Total/Ave.    |                            |                             | 280                     | 0                     | 0                         | 0                    | 0           | 280                  | 105                | 25          | 307                  |
| System      | 3 Total/Ave.     |                            |                             | 41,364                  | 0                     | 0                         | 0                    | 0           | 14,680               | 5,152              | 18          | 23,202               |
| 13          | SUPPLY STORAGE   | 1 1                        | 2,544                       | 2,544                   | 1,632                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| Zone        | 13 Total/Ave.    |                            |                             | 2,544                   | 1,632                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| System      | 4 Total/Ave.     |                            |                             | 2,544                   | 1,632                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 6           | 1ST FL CEN OFFCS | 1 1                        | 9,884                       | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| Zone        | 6 Total/Ave.     |                            |                             | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| 8           | 2ND FL CEN OFFCS | 1 1                        | 8,674                       | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| Zone        | 8 Total/Ave.     |                            |                             | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| 10          | 3RD FL CEN OFFCS | 1 1                        | 8,563                       | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| Zone        | 10 Total/Ave.    |                            |                             | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| System      | 5 Total/Ave.     |                            |                             | 27,121                  | 0                     | 0                         | 0                    | 0           | 8,563                | 460                | 29          | 1,153                |
| 14          | 1ST FL CEN OFFCS | 1 1                        | 9,884                       | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| Zone        | 14 Total/Ave.    |                            |                             | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| 15          | 2ND FL CEN OFFCS | 1 1                        | 8,674                       | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| Zone        | 15 Total/Ave.    |                            |                             | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| 16          | 3RD FL CEN OFFCS | 1 1                        | 8,563                       | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| Zone        | 16 Total/Ave.    |                            |                             | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| System      | 6 Total/Ave.     |                            |                             | 27,121                  | 0                     | 0                         | 0                    | 0           | 8,563                | 460                | 29          | 1,153                |
| Building    |                  |                            |                             | 159,799                 | 18,202                | 0                         | 0                    | 0           | 32,386               | 6,095              | 19          | 25,681               |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
BASE BUILDING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 BASE BUILDING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 18.0                   | 0            | 0     | -200,810                 | 13           | 170   | 6,544.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 36.0                   | 0            | 4     | -401,620                 | 10           | 129   | 13,088.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 54.0                   | 9            | 94    | -602,430                 | 7            | 91    | 19,633.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 71.9                   | 7            | 78    | -803,240                 | 3            | 34    | 26,177.4                  | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 89.9                   | 9            | 92    | -1,004,050               | 5            | 68    | 32,721.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 107.9                  | 10           | 108   | -1,204,860               | 5            | 59    | 39,266.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 125.9                  | 8            | 90    | -1,405,670               | 9            | 114   | 45,810.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 143.9                  | 19           | 208   | -1,606,480               | 27           | 346   | 52,354.8                  | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 161.9                  | 3            | 34    | -1,807,290               | 15           | 187   | 58,899.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 179.8                  | 5            | 53    | -2,008,100               | 7            | 90    | 65,443.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 197.8                  | 6            | 67    | -2,208,910               | 0            | 0     | 71,987.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 215.8                  | 4            | 42    | -2,409,720               | 0            | 0     | 78,532.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 233.8                  | 3            | 35    | -2,610,530               | 0            | 0     | 85,076.6                  | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 251.8                  | 7            | 75    | -2,811,340               | 0            | 0     | 91,620.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 269.8                  | 7            | 75    | -3,012,150               | 0            | 0     | 98,165.3                  | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 287.8                  | 1            | 15    | -3,212,960               | 0            | 0     | 104,709.6                 | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 305.7                  | 0            | 0     | -3,413,770               | 0            | 0     | 111,254.0                 | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 323.7                  | 0            | 0     | -3,614,580               | 0            | 0     | 117,798.3                 | 100          | 2,520 | 0.0                       | 0            | 0     |
| 90 - 95                   | 341.7                  | 0            | 0     | -3,815,390               | 0            | 0     | 124,342.7                 | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 359.7                  | 0            | 0     | -4,016,200               | 0            | 0     | 130,887.0                 | 0            | 0     | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,690 | 0                        | 0            | 7,472 | 0.0                       | 0            | 6,240 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 BASE BUILDING

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | ----- Zone Number -----     |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
|-----------------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|
|                             | 1                           | 4     | 2     | 11    | 3     | 5     | 7     | 9     | 12    | 13    | 6      | 8     | 10     | 14    | 15    | 16    |
| Max. Temp.                  | 82.6                        | 81.5  | 201.1 | 120.2 | 86.4  | 85.1  | 84.9  | 83.3  | 85.3  | 96.2  | 85.1   | 88.5  | 84.5   | 85.1  | 88.5  | 84.5  |
| Mo./Hr.                     | 10 21                       | 10 23 | 9 19  | 8 16  | 7 20  | 7 24  | 7 24  | 7 22  | 7 20  | 8 17  | 7 3 10 | 1 7 6 | 7 3 10 | 1 7 6 | 1 7 6 |       |
| Day Type                    | 2                           | 2     | 2     | 2     | 4     | 1     | 1     | 4     | 4     | 2     | 5      | 2     | 5      | 5     | 2     | 5     |
|                             | ..... Number of Hours ..... |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
| Above 100                   | 0                           | 0     | 8,016 | 4,086 | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| 95 - 100                    | 0                           | 0     | 0     | 110   | 0     | 0     | 0     | 0     | 0     | 240   | 0      | 0     | 0      | 0     | 0     | 0     |
| 90 - 95                     | 0                           | 0     | 91    | 1,239 | 0     | 0     | 0     | 0     | 0     | 1,494 | 0      | 0     | 0      | 0     | 0     | 0     |
| 85 - 90                     | 0                           | 0     | 290   | 253   | 118   | 0     | 0     | 0     | 36    | 1,602 | 20     | 537   | 0      | 20    | 537   | 0     |
| 80 - 85                     | 954                         | 517   | 227   | 585   | 1,161 | 1,221 | 1,140 | 704   | 1,182 | 1,215 | 1,939  | 3,376 | 1,585  | 1,939 | 3,338 | 1,585 |
| 75 - 80                     | 5,027                       | 2,814 | 136   | 327   | 1,752 | 1,952 | 2,042 | 2,359 | 1,875 | 818   | 2,990  | 4,355 | 3,761  | 3,014 | 4,263 | 3,756 |
| 70 - 75                     | 1,202                       | 3,711 | 0     | 1,256 | 631   | 601   | 524   | 694   | 596   | 1,435 | 1,380  | 492   | 1,340  | 1,238 | 595   | 1,333 |
| 65 - 70                     | 1,418                       | 1,516 | 0     | 726   | 1,391 | 1,535 | 1,595 | 1,677 | 1,447 | 1,579 | 1,283  | 0     | 1,476  | 1,313 | 27    | 1,400 |
| 60 - 65                     | 159                         | 202   | 0     | 178   | 1,107 | 1,076 | 1,088 | 1,366 | 1,166 | 377   | 523    | 0     | 446    | 580   | 0     | 504   |
| 55 - 60                     | 0                           | 0     | 0     | 0     | 915   | 869   | 900   | 789   | 953   | 0     | 276    | 0     | 152    | 293   | 0     | 182   |
| 50 - 55                     | 0                           | 0     | 0     | 0     | 671   | 632   | 626   | 546   | 658   | 0     | 349    | 0     | 0      | 363   | 0     | 0     |
| Below 50                    | 0                           | 0     | 0     | 0     | 1,014 | 874   | 845   | 625   | 847   | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| Min. Temp.                  | 63.8                        | 63.0  | 68.0  | 63.6  | 34.0  | 34.6  | 34.7  | 37.4  | 35.6  | 61.7  | 50.6   | 67.9  | 57.7   | 50.3  | 67.9  | 57.5  |
| Mo./Hr.                     | 1 8                         | 1 10  | 1 1   | 2 6   | 2 11  | 2 7   | 2 7   | 2 7   | 2 7   | 1 6   | 2 7    | 1 7   | 1 7    | 2 7   | 1 7   | 1 7   |
| Day Type                    | 5                           | 5     | 1     | 5     | 4     | 5     | 5     | 5     | 5     | 5     | 5      | 1     | 5      | 5     | 1     | 5     |



MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | STEAM              | STEAM DMND         |                      |
|-------|-------------------|-----------------|--------------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | WATER<br>(1000 G1) | On Peak<br>(Thrm/hr) |
| Jan   | 163,358           | 813             | 12,170             | 0                  | 72                   |
| Feb   | 147,800           | 813             | 11,503             | 0                  | 72                   |
| March | 178,338           | 813             | 8,726              | 0                  | 65                   |
| April | 149,213           | 813             | 2,215              | 0                  | 47                   |
| May   | 191,208           | 948             | 0                  | 72                 | 0                    |
| June  | 197,998           | 1,020           | 0                  | 117                | 0                    |
| July  | 196,533           | 1,068           | 0                  | 192                | 0                    |
| Aug   | 208,320           | 1,021           | 0                  | 129                | 0                    |
| Sept  | 174,233           | 971             | 0                  | 67                 | 0                    |
| Oct   | 163,049           | 813             | 1,307              | 0                  | 46                   |
| Nov   | 152,314           | 813             | 4,498              | 0                  | 58                   |
| Dec   | 155,579           | 813             | 10,219             | 0                  | 71                   |
| Total | 2,077,943         | 1,068           | 50,638             | 578                | 72                   |

Building Energy Consumption = 76,070 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 175,408 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | ----- Monthly Consumption ----- |                           |       |       |       |       |       |       |       |       |       |       | Total   |
|---------|------------|---------------------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|         |            | Jan                             | Feb                       | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0       | LIGHTS     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 78913                           | 71397                     | 86428 | 75155 | 82671 | 82671 | 75155 | 86428 | 75155 | 82671 | 75155 | 75155 | 946,954 |
|         | PK         | 410.7                           | 410.7                     | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7   |
| 1       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | GAS        | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | OIL        | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P STEAM    | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P HOTH2O   | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P CHILL    | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1       | EQ1001S    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | 2-STG CTY <555 TONS       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 13792 | 20583 | 35246 | 22840 | 12946 | 0     | 0     | 0     | 105,407 |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 106.5 | 178.5 | 226.8 | 179.2 | 129.8 | 0.0   | 0.0   | 0.0   | 226.8   |
| 1       | EQ5100     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 5115  | 5115  | 4650  | 5348  | 4650  | 0     | 0     | 0     | 24,878  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 23.3  | 23.3  | 23.3  | 23.3  | 23.3  | 0.0   | 0.0   | 0.0   | 23.3    |
| 1       | EQ5100     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | WATER      | 0                               | 0                         | 0     | 0     | 72    | 117   | 192   | 129   | 67    | 0     | 0     | 0     | 578     |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.6   | 1.0   | 1.2   | 1.0   | 0.8   | 0.0   | 0.0   | 0.0   | 1.2     |
| 1       | EQ5001     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CHILLED WATER PUMP C.V.   |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5010     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CONDENSER WATER PUMP C.V. |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5300     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CONTROL PANEL & INTERLOCK |       |       |       |       |       |       |       |       |       |       |         |

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 BASE BUILDING

|   |         |                            |       |       |       |       |       |       |       |       |       |       |       |         |
|---|---------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|   | ELEC    | 0                          | 0     | 0     | 0     | 220   | 220   | 200   | 230   | 200   | 0     | 0     | 0     | 1,070   |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 0.0   | 0.0   | 0.0   | 1.0     |
| 2 | EQ1000  | PREVENTS COOLING ENERGY    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5001  | CHILLED WATER PUMP C.V.    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5010  | CONDENSER WATER PUMP C.V.  |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 9754                       | 8825  | 10683 | 9290  | 10219 | 10219 | 9290  | 10683 | 9290  | 10219 | 9290  | 9290  | 117,051 |
|   | PK      | 46.4                       | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4    |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2276                       | 2059  | 2493  | 2168  | 2384  | 2384  | 2168  | 2493  | 2168  | 2384  | 2168  | 2168  | 27,312  |
|   | PK      | 10.8                       | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8    |
| 2 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 13975                      | 12644 | 15305 | 13309 | 14640 | 14640 | 13309 | 15305 | 13309 | 14640 | 13309 | 13309 | 167,695 |
|   | PK      | 66.5                       | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5    |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 1747                       | 1580  | 1913  | 1664  | 1830  | 1830  | 1664  | 1913  | 1664  | 1830  | 1664  | 1664  | 20,962  |
|   | PK      | 8.3                        | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3     |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 1 | EQ2101  | PURCHASED DISTRICT STEAM   |       |       |       |       |       |       |       |       |       |       |       |         |
|   | P STEAM | 2086                       | 1971  | 1496  | 371   | 0     | 0     | 0     | 0     | 0     | 224   | 769   | 1751  | 8,668   |
|   | PK      | 12.4                       | 12.4  | 11.2  | 8.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 7.9   | 10.0  | 12.1  | 12.4    |
| 1 | EQ5020  | HEAT WATER CIRC. PUMP C.V. |       |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
BASE BUILDING

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value    1,068.1    (kW)  
Yearly Time of Peak    14 (hr)    7 (mo)

Hour 14    Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|------------------------|
| Cooling Equipment    |                        |                                    |                           |                        |
| 1                    | EQ1001S                | 2-STG CTV <555 TONS                | 310.7                     | 29.09                  |
| Sub Total            |                        |                                    | 310.7                     | 29.09                  |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Air Moving Equipment |                        |                                    |                           |                        |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 57.3                      | 5.36                   |
| 3                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 74.9                      | 7.01                   |
| 5                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 10.05                  |
| 6                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 10.05                  |
| Sub Total            |                        |                                    | 346.8                     | 32.46                  |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Miscellaneous        |                        |                                    |                           |                        |
| Lights               |                        |                                    | 410.7                     | 38.45                  |
| Base Utilities       |                        |                                    | 0.0                       | 0.00                   |
| Misc Equipment       |                        |                                    | 0.0                       | 0.00                   |
| Sub Total            |                        |                                    | 410.7                     | 38.45                  |
| Grand Total          |                        |                                    | 1,068.1                   | 100.00                 |

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 122

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 8:42:45 2/ 2/94  
Dataset Name: CBI22 .TM

AIRFLOW - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | TRH         | 10,853                | 36,175                | 36,175                | 36,175               | 10,853                | 0                    | 0                     |
| 2             | SZ          | 0                     | 17,670                | 17,670                | 17,670               | 0                     | 0                    | 17,730                |
| 3             | INDFP       | 5,830                 | 19,435                | 19,435                | 34,463               | 19,435                | 34,668               | 0                     |
| 4             | UH          | 0                     | 0                     | 1,835                 | 0                    | 0                     | 0                    | 0                     |
| 5             | DD          | 8,357                 | 27,856                | 27,856                | 28,711               | 27,856                | 0                    | 0                     |
| 6             | DD          | 8,357                 | 27,856                | 27,856                | 28,711               | 9,212                 | 0                    | 0                     |
| Totals        |             | 33,397                | 128,992               | 130,827               | 145,730              | 67,355                | 34,668               | 17,730                |

CAPACITY - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | TRH         | 81.5                      | 0.0                       | 0.0                  | 0.0                  | 81.5                  | -63,182                   | 0                         | -480,162                | 0                      | 0                        | 0                    | 0                    | -548,345              |
| 2             | SZ          | 3.2                       | 0.0                       | 0.0                  | 0.0                  | 3.2                   | -9,461                    | 0                         | -105,950                | 0                      | 0                        | 0                    | 0                    | -9,461                |
| 3             | INDFP       | 45.0                      | 92.8                      | 0.0                  | 0.0                  | 137.7                 | -590,294                  | -1,092,710                | 0                       | 0                      | 0                        | 0                    | 0                    | -1,683,004            |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -6,715                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -6,715                |
| 5             | DD          | 62.3                      | 0.0                       | 0.0                  | 0.0                  | 62.3                  | -422,817                  | 0                         | -370,128                | 0                      | 0                        | 0                    | 0                    | -792,945              |
| 6             | DD          | 62.3                      | 0.0                       | 0.0                  | 0.0                  | 62.3                  | -215,767                  | 0                         | -370,128                | 0                      | 0                        | 0                    | 0                    | -585,894              |
| Totals        |             | 254.3                     | 92.8                      | 0.0                  | 0.0                  | 347.1                 | -1,313,236                | -1,092,710                | -1,326,368              | 0                      | 0                        | 0                    | 0                    | -3,626,363            |

The building peaked at hour 14 month 7 with a capacity of 254.3 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | ----- Cooling ----- |         |            |            | --- Heating --- |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|---------------------|---------|------------|------------|-----------------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft           | Cfm/Ton | Sq Ft /Ton | Btuh/Sq Ft | Cfm/Sq Ft       | Btuh/Sq Ft |                  |
| 1             | Main           | TRH         | 30.00               | 0.63                | 443.7   | 705.9      | 17.00      | 0.63            | -9.53      | 57,549           |
| 2             | Main           | SZ          | 0.00                | 4.31                | 5,606.9 | 1,301.0    | 9.22       | 4.31            | -2.31      | 4,100            |
| 3             | Main           | INDFP       | 30.00               | 0.47                | 432.2   | 919.8      | 13.05      | 0.47            | -14.27     | 41,364           |
| 3             | Auxiliary      | INDFP       | 0.00                | 0.84                | 373.8   | 446.0      | 26.91      | 0.84            | -26.42     | 41,364           |
| 4             | Main           | UH          | 0.00                | 0.00                | 0.0     | 0.0        | 0.00       | 0.72            | -2.64      | 2,544            |
| 5             | Main           | DD          | 30.00               | 1.03                | 446.9   | 435.1      | 27.58      | 1.03            | -29.24     | 27,121           |
| 6             | Main           | DD          | 30.00               | 1.03                | 446.9   | 435.1      | 27.58      | 1.03            | -21.60     | 27,121           |



System 1 Peak TRH - TERMINAL REHEAT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Solar     | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Wall Cond       | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Partition       | 18,940                  |                          |                        | -18,940          | 1.94             | * | 18,940                | 4.00             | * | -68,182                      | -68,182                   | 100.00           |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 18,940                  | 0                        |                        | 18,940           | 1.94             | * | 18,940                | 4.00             | * | -68,182                      | -68,182                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 398,781                 | 0                        |                        | 398,781          | 40.76            | * | 424,020               | 89.45            | * | 0                            | 0                         | 0.00             |
| People          | 63,941                  |                          |                        | 63,941           | 6.54             | * | 31,097                | 6.56             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 462,722                 | 0                        | 0                      | 462,722          | 47.30            | * | 455,117               | 96.00            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 406,913          | 41.59            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 77,173           | 7.89             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 18,007                   |                        | 18,007           | 1.84             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | -0.00            | * | 0                     | -0.00            | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | -5,402                   | 0                      | -5,402           | -0.55            | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Grand Total==>  | 481,661                 | 12,605                   | 0                      | 978,353          | 100.00           | * | 474,057               | 100.00           | * | -68,182                      | -68,182                   | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 81.5                  | 978.4           | 36,175           | 80.0              | 67.5  | 83.9   | 61.0             | 59.3  | 74.8   | Part        | 16,570     |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 81.5                  | 978.4           |                  |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F |
|----------|----------------|------------------|-----------|-----------|
| Main Htg | -68.2          | 36,175           | 68.0      | 69.7      |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       |
| Preheat  | -480.2         | 36,175           | 48.8      | 61.0      |
| Reheat   | -0.0           | 0                | 0.0       | 0.0       |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       |
| Total    | -548.3         |                  |           |           |

-----AIRFLOWS (cfm)-----

| Type    | Cooling | Heating |
|---------|---------|---------|
| Vent    | 10,853  | 0       |
| Infil   | 0       | 0       |
| Supply  | 36,175  | 36,175  |
| Mincfm  | 36,175  | 0       |
| Return  | 36,175  | 36,175  |
| Exhaust | 10,853  | 0       |
| Rm Exh  | 0       | 0       |
| Auxil   | 0       | 0       |

-----ENGINEERING CHECKS-----

| Clg % OA      | 30.0   |
|---------------|--------|
| Clg Cfm/Sqft  | 0.63   |
| Clg Cfm/Ton   | 443.70 |
| Clg Sqft/Ton  | 705.87 |
| Clg Btuh/Sqft | 17.00  |
| No. People    | 137    |
| Htg % OA      | 0.0    |
| Htg Cfm/Sqft  | 0.63   |
| Htg Btuh/Sqft | -9.53  |

-----TEMPERATURES (F)-----

| Type     | Clg  | Htg  |
|----------|------|------|
| SADB     | 63.0 | 69.7 |
| Plenum   | 75.0 | 68.0 |
| Return   | 75.5 | 68.0 |
| Ret/OA   | 80.0 | 68.0 |
| Runarnd  | 75.0 | 68.0 |
| Fn MtrTD | 0.5  | 0.5  |
| Fn BldTD | 0.4  | 0.4  |
| Fn Frict | 1.1  | 1.1  |

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK                        |            |          |          |        |        | CLG SPACE PEAK |          |        |   |            |           | HEATING COIL PEAK |  |  |
|------------------------------------------|------------|----------|----------|--------|--------|----------------|----------|--------|---|------------|-----------|-------------------|--|--|
| Peaked at Time ==> Mo/Hr: 7/16           |            |          |          |        |        | Mo/Hr: 7/16    |          |        |   |            |           | Mo/Hr: 13/ 1      |  |  |
| Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 |            |          |          |        |        | OADB: 91       |          |        |   |            |           | OADB: 4           |  |  |
|                                          | Space      | Ret. Air | Ret. Air | Net    | Perct  |                | Space    | Perct  |   | Space Peak | Coil Peak | Perct             |  |  |
|                                          | Sens.+Lat. | Sensible | Latent   | Total  | Of Tot |                | Sensible | Of Tot |   | Space Sens | Tot Sens  | Of Tot            |  |  |
|                                          | (Btuh)     | (Btuh)   | (Btuh)   | (Btuh) | (%)    |                | (Btuh)   | (%)    |   | (Btuh)     | (Btuh)    | (%)               |  |  |
| Envelope Loads                           |            |          |          |        |        |                |          |        |   |            |           |                   |  |  |
| Skylite Solr                             | 0          | 0        |          | 0      | 0.00   | *              | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |
| Skylite Cond                             | 0          | 0        |          | 0      | 0.00   | *              | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |
| Roof Cond                                | 0          | 860      |          | 860    | 2.27   | *              | 0        | 0.00   | * | 0          | -3,224    | 47.00             |  |  |
| Glass Solar                              | 531        | 0        |          | 531    | 1.40   | *              | 531      | 1.53   | * | 0          | 0         | 0.00              |  |  |
| Glass Cond                               | 162        | 0        |          | 162    | 0.43   | *              | 162      | 0.47   | * | -766       | -766      | 11.16             |  |  |
| Wall Cond                                | 747        | 183      |          | 929    | 2.46   | *              | 747      | 2.15   | * | -2,286     | -2,870    | 41.84             |  |  |
| Partition                                | 0          |          |          | 0      | 0.00   | *              | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |
| Exposed Floor                            | 0          |          |          | 0      | 0.00   | *              | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |
| Infiltration                             | 0          |          |          | 0      | 0.00   | *              | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |
| Sub Total==>                             | 1,440      | 1,042    |          | 2,483  | 6.56   | *              | 1,440    | 4.15   | * | -3,052     | -6,860    | 100.00            |  |  |
| Internal Loads                           |            |          |          |        |        | *              |          |        | * |            |           |                   |  |  |
| Lights                                   | 30,623     | 0        |          | 30,623 | 80.98  | *              | 30,623   | 88.29  | * | 0          | 0         | 0.00              |  |  |
| People                                   | 4,712      |          |          | 4,712  | 12.46  | *              | 2,223    | 6.41   | * | 0          | 0         | 0.00              |  |  |
| Misc                                     | 0          | 0        | 0        | 0      | 0.00   | *              | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |
| Sub Total==>                             | 35,335     | 0        | 0        | 35,335 | 93.44  | *              | 32,845   | 94.70  | * | 0          | 0         | 0.00              |  |  |
| Ceiling Load                             | 1,918      | -1,918   |          | 0      | 0.00   | *              | 397      | 1.14   | * | -243       | 0         | 0.00              |  |  |
| Outside Air                              | 0          | 0        | 0        | 0      | 0.00   | *              | 0        | 0.00   | * | 0          | 0         | 0.00              |  |  |
| Sup. Fan Heat                            |            |          |          | 0      | 0.00   | *              |          | 0.00   | * |            | 0         | 0.00              |  |  |
| Ret. Fan Heat                            |            | 0        |          | 0      | 0.00   | *              |          | 0.00   | * |            | 0         | 0.00              |  |  |
| Duct Heat Pkup                           |            | 0        |          | 0      | 0.00   | *              |          | 0.00   | * |            | 0         | 0.00              |  |  |
| OV/UNDR Sizing                           | 0          |          |          | 0      | -0.00  | *              | 0        | -0.00  | * | 0          | 0         | 0.00              |  |  |
| Exhaust Heat                             |            | 0        | 0        | 0      | 0.00   | *              |          | 0.00   | * |            | 0         | 0.00              |  |  |
| Terminal Bypass                          |            | 0        | 0        | 0      | 0.00   | *              |          | 0.00   | * |            | 0         | 0.00              |  |  |
| Grand Total==>                           | 38,693     | -876     | 0        | 37,817 | 100.00 | *              | 34,683   | 100.00 | * | -3,295     | -6,860    | 100.00            |  |  |

-----COOLING COIL SELECTION-----

-----AREAS-----

|           | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)   |
|-----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-------|
|           | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |       |
| Main Clg- | 3.2            | 37.8      | 35.3       | 76.6              | 68.9  | 96.9   | 73.2             | 68.3  | 99.1   | Part        | 4,100      |       |
| Aux Clg   | 0.0            | 0.0       | 0.0        | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |       |
| Opt Vent  | 0.0            | 0.0       | 0.0        | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 580        | 0 0   |
| Totals    | 3.2            | 37.8      |            |                   |       |        |                  |       |        | Wall        | 196        | 21 11 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | Clg % OA      | 0.0     | Type     | Clg  | Htg  |
|----------|----------|------------|-------|-------|---------|---------|---------|---------------|---------|----------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg Cfm/Sqft  |         | SADB     |      |      |
| Main Htg | -9.5     | 17,670     | 67.7  | 68.2  | Infil   | 0       | 0       | Clg Cfm/Ton   | 4.31    | Plenum   | 73.2 | 68.2 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 17,670  | 17,670  | Clg Sqft/Ton  | 5606.95 | Return   | 76.5 | 67.7 |
| Preheat  | -106.0   | 17,670     | 67.7  | 73.2  | MinCFM  | 0       | 0       | Clg Btuh/Sqft | 9.22    | Ret/OA   | 76.6 | 67.7 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 0       | 17,670  | No. People    | 10      | Runarnd  | 75.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 0       | 0       | Htg % OA      | 0.0     | Fn MtrTD | 0.0  | 0.0  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 17,730  | 0       | Htg Cfm/Sqft  | 4.31    | Fn BldTD | 0.0  | 0.0  |
| Total    | -9.5     |            |       |       | Auxil   | 0       | 0       | Htg Btuh/Sqft | -2.31   | Fn Frict | 0.0  | 0.0  |

System 3 Block INDFP - 4-PIPE INDUCTION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 7/14              |          | *         |        | Mo/Hr: 7/20 |          | *      |   | Mo/Hr: 13/ 1 |            |        |
|--------------------|------------|--------------------------|----------|-----------|--------|-------------|----------|--------|---|--------------|------------|--------|
| Outside Air ==>    |            | OADB/WB/HR: 91/ 74/105.0 |          | *         |        | OADB: 83    |          | *      |   | OADB: 4      |            |        |
|                    | Space      | Ret. Air                 | Ret. Air | Net       | Perct  | *           | Space    | Perct  | * | Space Peak   | Coil Peak  | Perct  |
|                    | Sens.+Lat. | Sensible                 | Latent   | Total     | Of Tot | *           | Sensible | Of Tot | * | Space Sens   | Tot Sens   | Of Tot |
|                    | (Btuh)     | (Btuh)                   | (Btuh)   | (Btuh)    | (%)    | *           | (Btuh)   | (%)    | * | (Btuh)       | (Btuh)     | (%)    |
| Envelope Loads     |            |                          |          |           |        |             |          |        |   |              |            |        |
| Skylite Solr       | 0          | 0                        | 0        | 0         | 0.00   | *           | 0        | 0.00   | * | 0            | 0          | 0.00   |
| Skylite Cond       | 0          | 0                        | 0        | 0         | 0.00   | *           | 0        | 0.00   | * | 0            | 0          | 0.00   |
| Roof Cond          | 474        | 21,484                   |          | 21,957    | 1.31   | *           | 740      | 0.13   | * | -1,579       | -73,446    | 4.36   |
| Glass Solar        | 154,605    | 0                        |          | 154,605   | 9.19   | *           | 138,868  | 24.40  | * | 0            | 0          | 0.00   |
| Glass Cond         | 36,551     | 0                        |          | 36,551    | 2.17   | *           | 24,143   | 4.24   | * | -185,619     | -185,619   | 11.03  |
| Wall Cond          | 113,330    | 16,902                   |          | 130,232   | 7.74   | *           | 172,726  | 30.35  | * | -328,407     | -377,319   | 22.42  |
| Partition          | 0          |                          |          | 0         | 0.00   | *           | 0        | 0.00   | * | 0            | 0          | 0.00   |
| Exposed Floor      | 0          |                          |          | 0         | 0.00   | *           | 0        | 0.00   | * | 0            | 0          | 0.00   |
| Infiltration       | 650,287    |                          |          | 650,287   | 38.66  | *           | 126,598  | 22.24  | * | -1,046,619   | -1,046,619 | 62.19  |
| Sub Total==>       | 955,246    | 38,386                   |          | 993,632   | 59.07  | *           | 463,073  | 81.37  | * | -1,562,224   | -1,683,004 | 100.00 |
| Internal Loads     |            |                          |          |           |        | *           |          |        | * |              |            |        |
| Lights             | 277,628    | 0                        |          | 277,628   | 16.51  | *           | 75,396   | 13.25  | * | 0            | 0          | 0.00   |
| People             | 45,248     |                          |          | 45,248    | 2.69   | *           | 5,354    | 0.94   | * | 0            | 0          | 0.00   |
| Misc               | 0          | 0                        | 0        | 0         | 0.00   | *           | 0        | 0.00   | * | 0            | 0          | 0.00   |
| Sub Total==>       | 322,876    | 0                        | 0        | 322,876   | 19.20  | *           | 80,750   | 14.19  | * | 0            | 0          | 0.00   |
| Ceiling Load       | 14,654     | -14,654                  |          | 0         | 0.00   | *           | 25,171   | 4.42   | * | -47,811      | 0          | 0.00   |
| Outside Air        | 0          | 0                        | 0        | 252,299   | 15.00  | *           | 0        | 0.00   | * | 0            | 0          | 0.00   |
| Sup. Fan Heat      |            |                          |          | 110,564   | 6.57   | *           |          | 0.00   | * |              | 0          | 0.00   |
| Ret. Fan Heat      |            | 13,820                   |          | 13,820    | 0.82   | *           |          | 0.00   | * |              | 0          | 0.00   |
| Duct Heat Pkup     |            | 0                        |          | 0         | 0.00   | *           |          | 0.00   | * |              | 0          | 0.00   |
| OV/UNDR Sizing     | 122        |                          |          | 122       | 0.01   | *           | 122      | 0.02   | * | 0            | 0          | 0.00   |
| Exhaust Heat       |            | -11,266                  | 0        | -11,266   | -0.67  | *           |          | 0.00   | * |              | 0          | 0.00   |
| Terminal Bypass    |            | 0                        | 0        | 0         | 0.00   | *           |          | 0.00   | * |              | 0          | 0.00   |
| Grand Total==>     | 1,292,898  | 26,287                   | 0        | 1,682,048 | 100.00 | *           | 569,116  | 100.00 | * | -1,610,035   | -1,683,004 | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity |         | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |       | Glass (sf) | (% ) |
|----------|----------------|---------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|-------|------------|------|
|          | (Tons)         | (Mbh)   |           |            | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part  |            |      |
| Main Clg | 45.0           | 539.6   | 385.7     | 19,435     | 80.9              | 66.7  | 78.0   | 60.4             | 58.0  | 70.1   | 41,364      | 0     |            |      |
| Aux Clg  | 92.8           | 1,113.0 | 720.5     | 34,668     | 75.0              | 63.8  | 73.2   | 65.7             | 53.1  | 41.6   | 0           | 0     |            |      |
| Opt Vent | 0.0            | 0.0     | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 14,680      | 0     | 0          |      |
| Totals   | 137.7          | 1,652.6 |           |            |                   |       |        |                  |       |        | 28,354      | 5,152 | 18         |      |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------|------------|-------|-------|---------|----------------|---------|------------------------|--------|----------------------|------|------|
|          |          |            |       |       |         | Cooling        | Heating | Clg % OA               | 30.0   | Type                 | Clg  | Htg  |
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    | 5,830          | 0       | Clg Cfm/Sqft           | 0.47   | SADB                 | 65.7 | 92.4 |
| Main Htg | -590.3   | 19,435     | 64.5  | 92.4  | Infil   | 15,028         | 15,028  | Clg Cfm/Ton            | 432.19 | Plenum               | 76.1 | 64.4 |
| Aux Htg  | -1,092.7 | 34,668     | 68.0  | 97.0  | Supply  | 19,435         | 19,435  | Clg Sqft/Ton           | 919.84 | Return               | 76.8 | 64.5 |
| Preheat  | -0.0     | 19,435     | 64.5  | 60.4  | Mincfm  | 0              | 0       | Clg Btuh/Sqft          | 13.05  | Ret/OA               | 80.9 | 64.5 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 19,435         | 19,435  | No. People             | 98     | Runarnd              | 75.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 5,830          | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 1.3  | 1.3  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0              | 0       | Htg Cfm/Sqft           | 0.47   | Fn BldTD             | 1.0  | 1.0  |
| Total    | -1,683.0 |            |       |       | Auxil   | 34,668         | 34,668  | Htg Btuh/Sqft          | -14.27 | Fn Frict             | 2.9  | 2.9  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Solar     | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Cond      | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Wall Cond       | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Partition       | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | -6,715                       | -6,715                    | 100.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | -6,715                       | -6,715                    | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| People          | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -6,715                       | -6,715                    | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |       | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|-------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part  |            |     |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 2,544       | 1,632 |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0     | 0          | 0   |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0     | 0          | 0   |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | 0           | 0     | 0          | 0   |

-----AREAS-----

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |       | --TEMPERATURES (F)-- |     |      |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|-------|----------------------|-----|------|
|          |                |                  |           |           |         |         |         | Clg % OA               | 0.0   | Type                 | Clg | Htg  |
| Main Htg | -6.7           | 1,835            | 68.0      | 71.4      | Vent    | 0       | 0       | Clg Cfm/Sqft           | 0.00  | SADB                 | 0.0 | 71.4 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 0       | Clg Cfm/Ton            | 0.00  | Plenum               | 0.0 | 68.0 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 1,835   | Clg Sqft/Ton           | 0.00  | Return               | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft          | 0.00  | Ret/OA               | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 1,835   | No. People             | 0     | Runarnd              | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % OA               | 0.0   | Fn MtrTD             | 0.0 | 0.0  |
| Total    | -6.7           |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft           | 0.72  | Fn BldTD             | 0.0 | 0.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft          | -2.64 | Fn Frict             | 0.1 | 0.0  |

System 5 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 1.94             | * | 16,221                | 5.86             | * | -48,286                      | -48,286                   | 24.48            |
| Glass Solar     | 15,817                  | 0                        | 0                      | 15,817           | 2.11             | * | 14,694                | 5.31             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 3,286                   | 0                        | 0                      | 3,286            | 0.44             | * | 3,509                 | 1.27             | * | -16,588                      | -16,588                   | 8.41             |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.63             | * | 5,622                 | 2.03             | * | -16,677                      | -18,921                   | 9.59             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 29,259                  | 0                        | 0                      | 29,259           | 3.91             | * | 14,420                | 5.21             | * | -59,539                      | -59,539                   | 30.18            |
| Sub Total==>    | 67,009                  | 526                      | 0                      | 67,535           | 9.03             | * | 54,465                | 19.67            | * | -141,090                     | -143,334                  | 72.66            |
| Internal Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Lights          | 190,447                 | 0                        | 0                      | 190,447          | 25.46            | * | 200,839               | 72.53            | * | 0                            | 0                         | 0.00             |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 4.04             | * | 14,612                | 5.28             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 220,650                 | 0                        | 0                      | 220,650          | 29.50            | * | 215,452               | 77.81            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00             | * | 1,553                 | 0.56             | * | -4,627                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 286,016          | 38.24            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 21.19            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 2.65             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 5,428                   | 0                        | 0                      | 5,428            | 0.73             | * | 5,428                 | 1.96             | * | -53,926                      | -53,926                   | 27.34            |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.33            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 294,461                 | 9,026                    | 0                      | 747,973          | 100.00           | * | 276,897               | 100.00           | * | -199,643                     | -197,260                  | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 62.3                  | 748.0           | 27,856           | 80.4              | 68.3  | 87.2   | 60.6             | 60.3  | 79.7   | 27,121      |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 62.3                  | 748.0           |                  |                   |       |        |                  |       |        | 8,563       | 0          | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        | 1,613       | 460        | 29  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -422.8         | 27,856           | 60.6      | 74.6      | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 65.9 | 74.6 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 855     | 855     | Clg Cfm/Ton   | 446.90 | Plenum   | 75.4 | 66.5 |
| Preheat  | -370.1         | 27,856           | 48.4      | 60.6      | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 435.11 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 27.58  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -792.9         |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -29.24 | Fn Frict | 2.9  | 2.9  |

System 6 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 7/14              |          | *       | Mo/Hr: 7/16 |          | *      | Mo/Hr: 13/ 1 |           |        |
|--------------------|------------|--------------------------|----------|---------|-------------|----------|--------|--------------|-----------|--------|
| Outside Air ==>    |            | OADB/WB/HR: 91/ 74/105.0 |          | *       | OADB: 91    |          | *      | OADB: 4      |           |        |
|                    | Space      | Ret. Air                 | Ret. Air | Net     | Perct       | Space    | Perct  | Space Peak   | Coil Peak | Perct  |
|                    | Sens.+Lat. | Sensible                 | Latent   | Total   | Of Tot      | Sensible | Of Tot | Space Sens   | Tot Sens  | Of Tot |
|                    | (Btuh)     | (Btuh)                   | (Btuh)   | (Btuh)  | (%)         | (Btuh)   | (%)    | (Btuh)       | (Btuh)    | (%)    |
| Envelope Loads     |            |                          |          |         |             |          |        |              |           |        |
| Skylite Solr       | 0          | 0                        |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Skylite Cond       | 0          | 0                        |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Roof Cond          | 14,486     | 0                        |          | 14,486  | 1.94        | 16,221   | 5.86   | -48,286      | -48,286   | 24.48  |
| Glass Solar        | 15,817     | 0                        |          | 15,817  | 2.11        | 14,694   | 5.31   | 0            | 0         | 0.00   |
| Glass Cond         | 3,286      | 0                        |          | 3,286   | 0.44        | 3,509    | 1.27   | -16,588      | -16,588   | 8.41   |
| Wall Cond          | 4,161      | 526                      |          | 4,687   | 0.63        | 5,622    | 2.03   | -16,677      | -18,921   | 9.59   |
| Partition          | 0          |                          |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Exposed Floor      | 0          |                          |          | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Infiltration       | 29,259     |                          |          | 29,259  | 3.91        | 14,420   | 5.21   | -59,539      | -59,539   | 30.18  |
| Sub Total==>       | 67,009     | 526                      |          | 67,535  | 9.03        | 54,465   | 19.67  | -141,090     | -143,334  | 72.66  |
| Internal Loads     |            |                          |          |         |             |          |        |              |           |        |
| Lights             | 190,447    | 0                        |          | 190,447 | 25.46       | 200,839  | 72.53  | 0            | 0         | 0.00   |
| People             | 30,203     |                          |          | 30,203  | 4.04        | 14,612   | 5.28   | 0            | 0         | 0.00   |
| Misc               | 0          | 0                        | 0        | 0       | 0.00        | 0        | 0.00   | 0            | 0         | 0.00   |
| Sub Total==>       | 220,650    | 0                        | 0        | 220,650 | 29.50       | 215,452  | 77.81  | 0            | 0         | 0.00   |
| Ceiling Load       | 1,375      | -1,375                   |          | 0       | 0.00        | 1,553    | 0.56   | -4,627       | 0         | 0.00   |
| Outside Air        | 0          | 0                        | 0        | 286,016 | 38.24       | 0        | 0.00   | 0            | 0         | 0.00   |
| Sup. Fan Heat      |            |                          |          | 158,470 | 21.19       |          | 0.00   |              | 0         | 0.00   |
| Ret. Fan Heat      |            | 19,809                   |          | 19,809  | 2.65        |          | 0.00   |              | 0         | 0.00   |
| Duct Heat Pkup     |            | 0                        |          | 0       | 0.00        |          | 0.00   |              | 0         | 0.00   |
| OV/UNDR Sizing     | 5,428      |                          |          | 5,428   | 0.73        | 5,428    | 1.96   | -53,926      | -53,926   | 27.34  |
| Exhaust Heat       |            | -9,934                   | 0        | -9,934  | -1.33       |          | 0.00   |              | 0         | 0.00   |
| Terminal Bypass    |            | 0                        | 0        | 0       | -0.00       |          | 0.00   |              | 0         | 0.00   |
| Grand Total==>     | 294,461    | 9,026                    | 0        | 747,973 | 100.00      | 276,897  | 100.00 | -199,643     | -197,260  | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 62.3           | 748.0     | 571.6      | 80.4              | 68.3  | 87.2   | 60.6             | 60.3  | 79.7   | 27,121      |            |     |
| Aux Clg  | 0.0            | 0.0       | 0.0        | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Opt Vent | 0.0            | 0.0       | 0.0        | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 62.3           | 748.0     |            |                   |       |        |                  |       |        | 8,563       | 0          | 0   |
|          |                |           |            |                   |       |        |                  |       |        | 1,613       | 460        | 29  |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------|------------|-------|-------|---------|---------|---------|------------------------|--------|----------------------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg % OA               | 30.0   | Type                 | Clg  | Htg  |
| Main Htg | -215.8   | 27,856     | 67.5  | 74.6  | Infil   | 8,357   | 0       | Clg Cfm/Sqft           | 1.03   | SADB                 | 65.9 | 74.6 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 855     | 855     | Clg Cfm/Ton            | 446.90 | Plenum               | 75.4 | 66.5 |
| Preheat  | -370.1   | 27,856     | 48.4  | 60.6  | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 435.11 | Return               | 76.1 | 67.5 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 27,856  | 27,856  | Clg Btuh/Sqft          | 27.58  | Ret/OA               | 80.4 | 67.5 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 8,357   | 0       | No. People             | 65     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 1.3  | 1.3  |
| Total    | -585.9   |            |       |       | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 1.03   | Fn BldTD             | 1.0  | 1.0  |
|          |          |            |       |       |         |         |         | Htg Btuh/Sqft          | -21.60 | Fn Frict             | 2.9  | 2.9  |

BUILDING U-VALUES - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Room U-Values (Btu/hr/sqft/F) |       |             |             |       |             |             |       |       | Room Mass (lb/sqft) | Room Capac. (Btu/sqft/F) |
|-------------|------------------|-------------------------------|-------|-------------|-------------|-------|-------------|-------------|-------|-------|---------------------|--------------------------|
|             |                  | Part.                         | ExFlr | Summr Skylt | Wintr Skylt | Roof  | Summr Windo | Wintr Windo | Wall  | Ceil. |                     |                          |
| 1           | SUB BSMT, BSMT W | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.317 | 46.8                | 9.61                     |
| Zone        | 1 Total/Ave.     | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.317 | 46.8                | 9.61                     |
| 4           | BSMT E           | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.317 | 45.2                | 9.27                     |
| Zone        | 4 Total/Ave.     | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.317 | 45.2                | 9.27                     |
| System      | 1 Total/Ave.     | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.317 | 46.4                | 9.54                     |
| 2           | TOILETS, KITCHEN | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.317 | 29.4                | 5.93                     |
| Zone        | 2 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.317 | 29.4                | 5.93                     |
| 11          | TOILETS W ROOF   | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.000       | 0.000       | 0.000 | 0.317 | 71.1                | 15.13                    |
| Zone        | 11 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.000       | 0.000       | 0.000 | 0.317 | 71.1                | 15.13                    |
| System      | 2 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.257 | 0.317 | 35.3                | 7.23                     |
| 3           | STAIRS           | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.229 | 0.000 | 103.3               | 21.63                    |
| Zone        | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.229 | 0.000 | 103.3               | 21.63                    |
| 5           | 1ST FL OFFICES   | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.317 | 57.9                | 12.05                    |
| Zone        | 5 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.317 | 57.9                | 12.05                    |
| 7           | 2ND FL OFFICES   | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.317 | 56.7                | 11.81                    |
| Zone        | 7 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.317 | 56.7                | 11.81                    |
| 9           | 3RD FL OFFICES   | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.257 | 0.317 | 102.3               | 21.84                    |
| Zone        | 9 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.257 | 0.317 | 102.3               | 21.84                    |
| 12          | STAIRS W ROOF    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.229 | 0.000 | 146.4               | 31.13                    |
| Zone        | 12 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.229 | 0.000 | 146.4               | 31.13                    |
| System      | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.256 | 0.317 | 74.1                | 15.63                    |
| 13          | SUPPLY STORAGE   | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 70.7                | 14.70                    |
| Zone        | 13 Total/Ave.    | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 70.7                | 14.70                    |
| System      | 4 Total/Ave.     | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 70.7                | 14.70                    |
| 6           | 1ST FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.317 | 32.5                | 6.60                     |
| Zone        | 6 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.317 | 32.5                | 6.60                     |
| 8           | 2ND FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.000 | 27.0                | 5.41                     |
| Zone        | 8 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.000 | 27.0                | 5.41                     |
| 10          | 3RD FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.257 | 0.000 | 71.5                | 15.21                    |
| Zone        | 10 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.257 | 0.000 | 71.5                | 15.21                    |
| System      | 5 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.257 | 0.317 | 43.1                | 8.94                     |
| 14          | 1ST FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.317 | 32.5                | 6.60                     |
| Zone        | 14 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.317 | 32.5                | 6.60                     |
| 15          | 2ND FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.000 | 27.0                | 5.41                     |
| Zone        | 15 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.550       | 0.563       | 0.257 | 0.000 | 27.0                | 5.41                     |
| 16          | 3RD FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.257 | 0.000 | 71.5                | 15.21                    |
| Zone        | 16 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.257 | 0.000 | 71.5                | 15.21                    |
| System      | 6 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.257 | 0.317 | 43.1                | 8.94                     |
| Building    |                  | 0.229                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.550       | 0.563       | 0.256 | 0.317 | 52.6                | 10.93                    |

BUILDING AREAS - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description      | Number of<br>Duplicate<br>Flr Rm | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|------------------|----------------------------------|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 1              | SUB BSMT, BSMT W | 1 1                              | 45,125                               | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 1 Total/Ave.     |                                  |                                      | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 4              | BSMT E           | 1 1                              | 12,424                               | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 4 Total/Ave.     |                                  |                                      | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 1 Total/Ave.     |                                  |                                      | 57,549                           | 16,570                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 2              | TOILETS, KITCHEN | 1 1                              | 3,520                                | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| Zone           | 2 Total/Ave.     |                                  |                                      | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| 11             | TOILETS W ROOF   | 1 1                              | 580                                  | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| Zone           | 11 Total/Ave.    |                                  |                                      | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| System         | 2 Total/Ave.     |                                  |                                      | 4,100                            | 0                           | 0                                  | 0                          | 0                 | 580                        | 21                       | 11                | 174                        |
| 3              | STAIRS           | 1 1                              | 560                                  | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| Zone           | 3 Total/Ave.     |                                  |                                      | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| 5              | 1ST FL OFFICES   | 1 1                              | 11,724                               | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| Zone           | 5 Total/Ave.     |                                  |                                      | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| 7              | 2ND FL OFFICES   | 1 1                              | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| Zone           | 7 Total/Ave.     |                                  |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| 9              | 3RD FL OFFICES   | 1 1                              | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| Zone           | 9 Total/Ave.     |                                  |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| 12             | STAIRS W ROOF    | 1 1                              | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| Zone           | 12 Total/Ave.    |                                  |                                      | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| System         | 3 Total/Ave.     |                                  |                                      | 41,364                           | 0                           | 0                                  | 0                          | 0                 | 14,680                     | 5,152                    | 18                | 23,202                     |
| 13             | SUPPLY STORAGE   | 1 1                              | 2,544                                | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 13 Total/Ave.    |                                  |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 4 Total/Ave.     |                                  |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 6              | 1ST FL CEN OFFCS | 1 1                              | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 6 Total/Ave.     |                                  |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 8              | 2ND FL CEN OFFCS | 1 1                              | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 8 Total/Ave.     |                                  |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 10             | 3RD FL CEN OFFCS | 1 1                              | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 10 Total/Ave.    |                                  |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 5 Total/Ave.     |                                  |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| 14             | 1ST FL CEN OFFCS | 1 1                              | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 14 Total/Ave.    |                                  |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 15             | 2ND FL CEN OFFCS | 1 1                              | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 15 Total/Ave.    |                                  |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 16             | 3RD FL CEN OFFCS | 1 1                              | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 16 Total/Ave.    |                                  |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 6 Total/Ave.     |                                  |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| Building       |                  |                                  |                                      | 159,799                          | 18,202                      | 0                                  | 0                          | 0                 | 32,386                     | 6,095                    | 19                | 25,681                     |



ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
DOUBLE GLAZED WINDOWS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.313 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.199 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 21.90 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 17.4                   | 0            | 0     | -186,616                 | 16           | 190   | 6,541.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 34.7                   | 0            | 0     | -373,231                 | 4            | 44    | 13,082.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 52.1                   | 7            | 80    | -559,847                 | 10           | 121   | 19,624.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 69.4                   | 9            | 96    | -746,463                 | 3            | 40    | 26,165.4                  | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 86.8                   | 6            | 64    | -933,078                 | 5            | 65    | 32,706.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 104.1                  | 3            | 36    | -1,119,694               | 7            | 83    | 39,248.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 121.5                  | 17           | 186   | -1,306,310               | 7            | 82    | 45,789.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 138.8                  | 14           | 155   | -1,492,926               | 30           | 366   | 52,330.8                  | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 156.2                  | 9            | 91    | -1,679,541               | 16           | 191   | 58,872.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 173.5                  | 5            | 53    | -1,866,157               | 3            | 41    | 65,413.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 190.9                  | 6            | 64    | -2,052,773               | 0            | 0     | 71,954.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 208.2                  | 2            | 22    | -2,239,388               | 0            | 0     | 78,496.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 225.6                  | 2            | 23    | -2,426,004               | 0            | 0     | 85,037.6                  | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 242.9                  | 7            | 75    | -2,612,620               | 0            | 0     | 91,578.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 260.3                  | 7            | 80    | -2,799,236               | 0            | 0     | 98,120.3                  | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 277.7                  | 3            | 35    | -2,985,851               | 0            | 0     | 104,661.6                 | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 295.0                  | 1            | 10    | -3,172,467               | 0            | 0     | 111,203.0                 | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 312.4                  | 0            | 0     | -3,359,083               | 0            | 0     | 117,744.3                 | 100          | 2,520 | 0.0                       | 0            | 0     |
| 90 - 95                   | 329.7                  | 0            | 0     | -3,545,699               | 0            | 0     | 124,285.7                 | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 347.1                  | 0            | 0     | -3,732,314               | 0            | 0     | 130,827.0                 | 0            | 0     | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,690 | 0                        | 0            | 7,537 | 0.0                       | 0            | 6,240 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

----- BUILDING TEMPERATURE PROFILES -----

| Temperature<br>Range<br>(F) | Zone Number                 |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
|-----------------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|
|                             | 1                           | 4     | 2     | 11    | 3     | 5     | 7     | 9     | 12    | 13    | 6      | 8     | 10     | 14    | 15    | 16    |
| Max. Temp.                  | 82.6                        | 81.5  | 209.9 | 120.2 | 86.6  | 85.0  | 84.8  | 83.4  | 85.6  | 96.2  | 85.3   | 89.0  | 84.5   | 85.3  | 89.0  | 84.5  |
| Mo./Hr.                     | 10 21                       | 10 23 | 9 19  | 8 16  | 7 20  | 7 24  | 7 24  | 7 21  | 7 22  | 8 17  | 7 3 10 | 4 7 6 | 7 3 10 | 4 7 6 | 4 7 6 |       |
| Day Type                    | 2                           | 2     | 2     | 2     | 4     | 1     | 1     | 4     | 4     | 2     | 5      | 2     | 5      | 5     | 2     | 5     |
|                             | ..... Number of Hours ..... |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
| Above 100                   | 0                           | 0     | 8,016 | 4,086 | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| 95 - 100                    | 0                           | 0     | 0     | 110   | 0     | 0     | 0     | 0     | 0     | 240   | 0      | 0     | 0      | 0     | 0     | 0     |
| 90 - 95                     | 0                           | 0     | 162   | 1,239 | 0     | 0     | 0     | 0     | 0     | 1,494 | 0      | 0     | 0      | 0     | 0     | 0     |
| 85 - 90                     | 0                           | 0     | 265   | 253   | 140   | 0     | 0     | 0     | 52    | 1,602 | 30     | 744   | 0      | 30    | 664   | 0     |
| 80 - 85                     | 954                         | 517   | 215   | 585   | 1,221 | 1,271 | 1,220 | 804   | 1,200 | 1,215 | 2,044  | 3,664 | 1,616  | 2,044 | 3,611 | 1,616 |
| 75 - 80                     | 5,027                       | 2,814 | 102   | 327   | 1,883 | 1,994 | 2,016 | 2,407 | 1,999 | 818   | 3,012  | 4,056 | 3,808  | 3,032 | 4,053 | 3,803 |
| 70 - 75                     | 1,202                       | 3,711 | 0     | 1,256 | 462   | 627   | 656   | 801   | 472   | 1,435 | 1,541  | 296   | 1,324  | 1,406 | 420   | 1,289 |
| 65 - 70                     | 1,418                       | 1,516 | 0     | 726   | 1,570 | 1,513 | 1,493 | 1,612 | 1,514 | 1,579 | 1,141  | 0     | 1,438  | 1,186 | 12    | 1,386 |
| 60 - 65                     | 159                         | 202   | 0     | 178   | 1,132 | 1,147 | 1,205 | 1,409 | 1,295 | 377   | 421    | 0     | 453    | 466   | 0     | 509   |
| 55 - 60                     | 0                           | 0     | 0     | 0     | 838   | 872   | 855   | 746   | 957   | 0     | 330    | 0     | 121    | 340   | 0     | 157   |
| 50 - 55                     | 0                           | 0     | 0     | 0     | 659   | 543   | 519   | 428   | 548   | 0     | 241    | 0     | 0      | 256   | 0     | 0     |
| Below 50                    | 0                           | 0     | 0     | 0     | 855   | 793   | 796   | 553   | 723   | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| Min. Temp.                  | 63.8                        | 63.0  | 68.1  | 63.6  | 35.3  | 35.8  | 35.9  | 38.8  | 36.9  | 61.7  | 51.9   | 68.0  | 58.3   | 51.6  | 68.0  | 58.0  |
| Mo./Hr.                     | 1 8                         | 1 10  | 1 1   | 2 6   | 2 7   | 2 7   | 2 7   | 2 7   | 2 7   | 1 6   | 2 7    | 1 1   | 1 7    | 2 7   | 1 1   | 1 7   |
| Day Type                    | 5                           | 5     | 1     | 5     | 5     | 5     | 5     | 5     | 5     | 5     | 5      | 1     | 5      | 5     | 1     | 5     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | STEAM              | STEAM DMND         |                      |
|-------|-------------------|-----------------|--------------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | WATER<br>(1000 G1) | On Peak<br>(Thrm/hr) |
| Jan   | 163,358           | 813             | 10,933             | 0                  | 65                   |
| Feb   | 147,800           | 813             | 10,358             | 0                  | 65                   |
| March | 178,338           | 813             | 7,721              | 0                  | 58                   |
| April | 148,713           | 813             | 1,579              | 0                  | 41                   |
| May   | 191,368           | 947             | 0                  | 73                 | 0                    |
| June  | 198,133           | 1,011           | 0                  | 118                | 0                    |
| July  | 196,371           | 1,060           | 0                  | 192                | 0                    |
| Aug   | 208,413           | 1,018           | 0                  | 130                | 0                    |
| Sept  | 174,456           | 974             | 0                  | 69                 | 0                    |
| Oct   | 160,617           | 813             | 810                | 0                  | 40                   |
| Nov   | 151,428           | 813             | 3,728              | 0                  | 52                   |
| Dec   | 155,579           | 813             | 9,096              | 0                  | 63                   |
| Total | 2,074,575         | 1,060           | 44,225             | 582                | 65                   |

Building Energy Consumption = 71,984 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 169,840 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | ----- Monthly Consumption ----- |                           |       |       |       |       |       |       |       |       |       |       | Total   |
|---------|------------|---------------------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|         |            | Jan                             | Feb                       | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0       | LIGHTS     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 78913                           | 71397                     | 86428 | 75155 | 82671 | 82671 | 75155 | 86428 | 75155 | 82671 | 75155 | 75155 | 946,954 |
|         | PK         | 410.7                           | 410.7                     | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7   |
| 1       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | GAS        | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | OIL        | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P STEAM    | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P HOTH2O   | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P CHILL    | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1       | EQ1001S    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | 2-STG CTV <555 TONS       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 13952 | 20718 | 35085 | 22933 | 13170 | 0     | 0     | 0     | 105,857 |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 106.1 | 169.5 | 218.7 | 176.8 | 132.9 | 0.0   | 0.0   | 0.0   | 218.7   |
| 1       | EQ5100     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 5115  | 5115  | 4650  | 5348  | 4650  | 0     | 0     | 0     | 24,878  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 23.3  | 23.3  | 23.3  | 23.3  | 23.3  | 0.0   | 0.0   | 0.0   | 23.3    |
| 1       | EQ5100     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | WATER      | 0                               | 0                         | 0     | 0     | 73    | 118   | 192   | 130   | 69    | 0     | 0     | 0     | 582     |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.6   | 0.9   | 1.1   | 1.0   | 0.8   | 0.0   | 0.0   | 0.0   | 1.1     |
| 1       | EQ5001     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CHILLED WATER PUMP C.V.   |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5010     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CONDENSER WATER PUMP C.V. |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5300     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CONTROL PANEL & INTERLOCK |       |       |       |       |       |       |       |       |       |       |         |

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

|          |                            |       |       |       |       |       |       |       |       |       |       |       |         |
|----------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| ELEC     | 0                          | 0     | 0     | 0     | 220   | 220   | 200   | 230   | 200   | 0     | 0     | 0     | 1,070   |
| PK       | 0.0                        | 0.0   | 0.0   | 0.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 0.0   | 0.0   | 0.0   | 1.0     |
| 2 EQ1000 | PREVENTS COOLING ENERGY    |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
| PK       | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 EQ5001 | CHILLED WATER PUMP C.V.    |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
| PK       | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 EQ5010 | CONDENSER WATER PUMP C.V.  |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
| PK       | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 9754                       | 8825  | 10683 | 9290  | 10219 | 10219 | 9290  | 10683 | 9290  | 10219 | 9290  | 9290  | 117,051 |
| PK       | 46.4                       | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4    |
| 1 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 2276                       | 2059  | 2493  | 2168  | 2384  | 2384  | 2168  | 2493  | 2168  | 2384  | 2168  | 2168  | 27,312  |
| PK       | 10.8                       | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8    |
| 2 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
| PK       | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 13975                      | 12644 | 15305 | 13309 | 14640 | 14640 | 13309 | 15305 | 13309 | 14640 | 13309 | 13309 | 167,695 |
| PK       | 66.5                       | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5    |
| 3 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 1747                       | 1580  | 1913  | 1664  | 1830  | 1830  | 1664  | 1913  | 1664  | 1830  | 1664  | 1664  | 20,962  |
| PK       | 8.3                        | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3     |
| 5 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
| PK       | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 5 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
| PK       | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 6 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
| PK       | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 6 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
| PK       | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 1 EQ2101 | PURCHASED DISTRICT STEAM   |       |       |       |       |       |       |       |       |       |       |       |         |
| P STEAM  | 1874                       | 1775  | 1323  | 271   | 0     | 0     | 0     | 0     | 0     | 139   | 636   | 1559  | 7,578   |
| PK       | 11.2                       | 11.2  | 10.0  | 7.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 6.8   | 8.9   | 10.9  | 11.2    |
| 1 EQ5020 | HEAT WATER CIRC. PUMP C.V. |       |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
 DOUBLE GLAZED WINDOWS

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value    1,060.0    (kW)  
 Yearly Time of Peak    14 (hr)    7 (mo)

Hour 14    Month 7

| Eq.<br>Ref.<br>Num.         | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|-----------------------------|------------------------|------------------------------------|---------------------------|------------------------|
| <b>Cooling Equipment</b>    |                        |                                    |                           |                        |
| 1                           | EQ1001S                | 2-STG CTV <555 TONS                | 302.6                     | 28.55                  |
| Sub Total                   |                        |                                    | 302.6                     | 28.55                  |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                   |
| <b>Air Moving Equipment</b> |                        |                                    |                           |                        |
| 1                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 57.3                      | 5.40                   |
| 3                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 74.9                      | 7.06                   |
| 5                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 10.12                  |
| 6                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 10.12                  |
| Sub Total                   |                        |                                    | 346.8                     | 32.71                  |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                   |
| <b>Miscellaneous</b>        |                        |                                    |                           |                        |
| Lights                      |                        |                                    | 410.7                     | 38.74                  |
| Base Utilities              |                        |                                    | 0.0                       | 0.00                   |
| Misc Equipment              |                        |                                    | 0.0                       | 0.00                   |
| Sub Total                   |                        |                                    | 410.7                     | 38.74                  |
| <b>Grand Total</b>          |                        |                                    | <b>1,060.0</b>            | <b>100.00</b>          |



```
*****  
*****  
**  
**          TRACE    600  ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 122

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9: 7: 3 2/ 2/94  
Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | TRH         | 10,853                | 36,175                | 36,175                | 36,175               | 10,853                | 0                    | 0                     |
| 2             | SZ          | 0                     | 17,730                | 17,730                | 17,730               | 0                     | 0                    | 17,730                |
| 3             | INDFP       | 5,830                 | 19,435                | 19,435                | 34,746               | 19,435                | 35,846               | 0                     |
| 4             | UH          | 0                     | 0                     | 1,835                 | 0                    | 0                     | 0                    | 0                     |
| 5             | DD          | 8,363                 | 27,876                | 27,876                | 28,747               | 27,876                | 0                    | 0                     |
| 6             | DD          | 8,357                 | 27,856                | 27,856                | 28,727               | 9,228                 | 0                    | 0                     |
| Totals        |             | 33,403                | 129,072               | 130,907               | 146,125              | 67,391                | 35,846               | 17,730                |

CAPACITY - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | TRH         | 81.5                      | 0.0                       | 0.0                  | 0.0                  | 81.5                  | -68,182                   | 0                         | -480,162                | 0                      | 0                        | 0                    | 0                    | -548,345              |
| 2             | SZ          | 3.2                       | 0.0                       | 0.0                  | 0.0                  | 3.2                   | -9,837                    | 0                         | -106,277                | 0                      | 0                        | 0                    | 0                    | -9,837                |
| 3             | INDFP       | 46.4                      | 95.1                      | 0.0                  | 0.0                  | 141.5                 | -680,963                  | -1,112,457                | 0                       | 0                      | 0                        | 0                    | 0                    | -1,793,420            |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -6,715                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -6,715                |
| 5             | DD          | 62.8                      | 0.0                       | 0.0                  | 0.0                  | 62.8                  | -441,147                  | 0                         | -367,097                | 0                      | 0                        | 0                    | 0                    | -808,244              |
| 6             | DD          | 62.8                      | 0.0                       | 0.0                  | 0.0                  | 62.8                  | -230,501                  | 0                         | -366,647                | 0                      | 0                        | 0                    | 0                    | -597,149              |
| Totals        |             | 256.8                     | 95.1                      | 0.0                  | 0.0                  | 351.9                 | -1,437,345                | -1,112,457                | -1,320,184              | 0                      | 0                        | 0                    | 0                    | -3,763,708            |

The building peaked at hour 14 month 7 with a capacity of 256.7 tons

ENGINEERING CHECKS - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- ENGINEERING CHECKS -----

| System<br>Number | Main/<br>Auxiliary | System<br>Type | Percent<br>Outside<br>Air | ----- Cooling ----- |             |               |                | --- Heating --- |                | Floor Area<br>Sq Ft |
|------------------|--------------------|----------------|---------------------------|---------------------|-------------|---------------|----------------|-----------------|----------------|---------------------|
|                  |                    |                |                           | Cfm/<br>Sq Ft       | Cfm/<br>Ton | Sq Ft<br>/Ton | Btuh/<br>Sq Ft | Cfm/<br>Sq Ft   | Btuh/<br>Sq Ft |                     |
| 1                | Main               | TRH            | 30.00                     | 0.63                | 443.7       | 705.9         | 17.00          | 0.63            | -9.53          | 57,549              |
| 2                | Main               | SZ             | 0.00                      | 4.32                | 5,605.2     | 1,296.2       | 9.26           | 4.32            | -2.40          | 4,100               |
| 3                | Main               | INDFP          | 30.00                     | 0.47                | 418.7       | 891.2         | 13.46          | 0.47            | -16.46         | 41,364              |
| 3                | Auxiliary          | INDFP          | 0.00                      | 0.87                | 376.9       | 434.9         | 27.59          | 0.87            | -26.89         | 41,364              |
| 4                | Main               | UH             | 0.00                      | 0.00                | 0.0         | 0.0           | 0.00           | 0.72            | -2.64          | 2,544               |
| 5                | Main               | DD             | 30.00                     | 1.03                | 443.7       | 431.6         | 27.80          | 1.03            | -29.80         | 27,121              |
| 6                | Main               | DD             | 30.00                     | 1.03                | -443.5      | 431.8         | 27.79          | 1.03            | -22.02         | 27,121              |

System 1 Peak TRH - TERMINAL REHEAT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Partition       | 18,940                  |                          |                        | -18,940          | 1.94               | 18,940                | 4.00               | -68,182                      | -68,182                   | 100.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 18,940                  | 0                        |                        | 18,940           | 1.94               | 18,940                | 4.00               | -68,182                      | -68,182                   | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 398,781                 | 0                        |                        | 398,781          | 40.76              | 424,020               | 89.45              | 0                            | 0                         | 0.00               |
| People          | 63,941                  |                          |                        | 63,941           | 6.54               | 31,097                | 6.56               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 462,722                 | 0                        | 0                      | 462,722          | 47.30              | 455,117               | 96.00              | 0                            | 0                         | 0.00               |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 406,913          | 41.59              | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   |                         |                          |                        | 77,173           | 7.89               |                       | 0.00               |                              | 0                         | 0.00               |
| Ret. Fan Heat   |                         | 18,007                   |                        | 18,007           | 1.84               |                       | 0.00               |                              | 0                         | 0.00               |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | -0.00              | 0                     | -0.00              | 0                            | 0                         | 0.00               |
| Exhaust Heat    |                         | -5,402                   | 0                      | -5,402           | -0.55              |                       | 0.00               |                              | 0                         | 0.00               |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| Grand Total==>  | 481,661                 | 12,605                   | 0                      | 978,353          | 100.00             | 474,057               | 100.00             | -68,182                      | -68,182                   | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 81.5                  | 978.4           | 36,175           | 80.0              | 67.5  | 83.9   | 61.0             | 59.3  | 74.8   | Part        | 16,570     |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 81.5                  | 978.4           |                  |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F |
|----------|----------------|------------------|-----------|-----------|
| Main Htg | -68.2          | 36,175           | 68.0      | 69.7      |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       |
| Preheat  | -480.2         | 36,175           | 48.8      | 61.0      |
| Reheat   | -0.0           | 0                | 0.0       | 0.0       |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       |
| Total    | -548.3         |                  |           |           |

-----AIRFLOWS (cfm)-----

| Type    | Cooling | Heating |
|---------|---------|---------|
| Vent    | 10,853  | 0       |
| Infil   | 0       | 0       |
| Supply  | 36,175  | 36,175  |
| Mincfm  | 36,175  | 0       |
| Return  | 36,175  | 36,175  |
| Exhaust | 10,853  | 0       |
| Rm Exh  | 0       | 0       |
| Auxil   | 0       | 0       |

-----ENGINEERING CHECKS-----

| Clg % OA      | 30.0   |
|---------------|--------|
| Clg Cfm/Sqft  | 0.63   |
| Clg Cfm/Ton   | 443.70 |
| Clg Sqft/Ton  | 705.87 |
| Clg Btuh/Sqft | 17.00  |
| No. People    | 137    |
| Htg % OA      | 0.0    |
| Htg Cfm/Sqft  | 0.63   |
| Htg Btuh/Sqft | -9.53  |

-----TEMPERATURES (F)-----

| Type     | Clg  | Htg  |
|----------|------|------|
| SADB     | 63.0 | 69.7 |
| Plenum   | 75.0 | 68.0 |
| Return   | 75.5 | 68.0 |
| Ret/OA   | 80.0 | 68.0 |
| Runarnd  | 75.0 | 68.0 |
| Fn MtrTD | 0.5  | 0.5  |
| Fn BldTD | 0.4  | 0.4  |
| Fn Frict | 1.1  | 1.1  |

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 7/16              |          | * Mo/Hr: 7/16 * |        | * Mo/Hr: 13/ 1 |        |            |           |        |
|--------------------|------------|--------------------------|----------|-----------------|--------|----------------|--------|------------|-----------|--------|
| Outside Air ==>    |            | GADB/WB/HR: 91/ 73/ 98.0 |          | * OADB: 91 *    |        | * OADB: 4      |        |            |           |        |
|                    | Space      | Ret. Air                 | Ret. Air | Net             | Perct  | Space          | Perct  | Space Peak | Coil Peak | Perct  |
|                    | Sens.+Lat. | Sensible                 | Latent   | Total           | Of Tot | Sensible       | Of Tot | Space Sens | Tot Sens  | Of Tot |
|                    | (Btuh)     | (Btuh)                   | (Btuh)   | (Btuh)          | (%)    | (Btuh)         | (%)    | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads     |            |                          |          |                 |        |                |        |            |           |        |
| Skylite Solr       | 0          | 0                        |          | 0               | 0.00   | 0              | 0.00   | 0          | 0         | 0.00   |
| Skylite Cond       | 0          | 0                        |          | 0               | 0.00   | 0              | 0.00   | 0          | 0         | 0.00   |
| Roof Cond          | 0          | 860                      |          | 860             | 2.26   | 0              | 0.00   | 0          | -3,224    | 44.57  |
| Glass Solar        | 595        | 0                        |          | 595             | 1.57   | 595            | 1.71   | 0          | 0         | 0.00   |
| Glass Cond         | 239        | 0                        |          | 239             | 0.63   | 239            | 0.69   | -1,139     | -1,139    | 15.75  |
| Wall Cond          | 747        | 183                      |          | 929             | 2.45   | 747            | 2.14   | -2,286     | -2,870    | 39.68  |
| Partition          | 0          |                          |          | 0               | 0.00   | 0              | 0.00   | 0          | 0         | 0.00   |
| Exposed Floor      | 0          |                          |          | 0               | 0.00   | 0              | 0.00   | 0          | 0         | 0.00   |
| Infiltration       | 0          |                          |          | 0               | 0.00   | 0              | 0.00   | 0          | 0         | 0.00   |
| Sub Total==>       | 1,581      | 1,042                    |          | 2,623           | 6.91   | 1,581          | 4.54   | -3,426     | -7,234    | 100.00 |
| Internal Loads     |            |                          |          |                 |        |                |        |            |           |        |
| Lights             | 30,623     | 0                        |          | 30,623          | 80.68  | 30,623         | 87.96  | 0          | 0         | 0.00   |
| People             | 4,712      |                          |          | 4,712           | 12.41  | 2,223          | 6.38   | 0          | 0         | 0.00   |
| Misc               | 0          | 0                        | 0        | 0               | 0.00   | 0              | 0.00   | 0          | 0         | 0.00   |
| Sub Total==>       | 35,335     | 0                        | 0        | 35,335          | 93.09  | 32,845         | 94.34  | 0          | 0         | 0.00   |
| Ceiling Load       | 1,918      | -1,918                   |          | 0               | 0.00   | 389            | 1.12   | -243       | 0         | 0.00   |
| Outside Air        | 0          | 0                        | 0        | 0               | 0.00   | 0              | 0.00   | 0          | 0         | 0.00   |
| Sup. Fan Heat      |            |                          |          | 0               | 0.00   |                | 0.00   |            | 0         | 0.00   |
| Ret. Fan Heat      |            | 0                        |          | 0               | 0.00   |                | 0.00   |            | 0         | 0.00   |
| Duct Heat Pkup     |            | 0                        |          | 0               | 0.00   |                | 0.00   |            | 0         | 0.00   |
| OV/UNDR Sizing     | 0          |                          |          | 0               | -0.00  | 0              | -0.00  | 0          | 0         | -0.00  |
| Exhaust Heat       |            | 0                        | 0        | 0               | 0.00   |                | 0.00   |            | 0         | 0.00   |
| Terminal Bypass    |            | 0                        | 0        | 0               | 0.00   |                | 0.00   |            | 0         | 0.00   |
| Grand Total==>     | 38,834     | -876                     | 0        | 37,958          | 100.00 | 34,815         | 100.00 | -3,668     | -7,234    | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       |                 | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |      | Glass (sf) | (% ) |
|----------|----------------|-------|-----------------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------|------------|------|
|          | (Tons)         | (Mbh) | Sens Cap. (Mbh) |            | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part |            |      |
| Main Clg | 3.2            | 38.0  | 35.5            | 17,730     | 76.6              | 68.9  | 96.8   | 73.2             | 68.3  | 99.1   | 4,100       | 0    |            |      |
| Aux Clg  | 0.0            | 0.0   | 0.0             | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0    |            |      |
| Opt Vent | 0.0            | 0.0   | 0.0             | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 580         | 0    | 0          |      |
| Totals   | 3.2            | 38.0  |                 |            |                   |       |        |                  |       |        | 196         | 21   | 11         |      |

-----HEATING COIL SELECTION-----

|          | Capacity |                  | Ent  | Lvg  | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |         | --TEMPERATURES (F)-- |      |      |
|----------|----------|------------------|------|------|---------|----------------|---------|------------------------|---------|----------------------|------|------|
|          | (Mbh)    | Coil Airfl (cfm) |      |      |         | Cooling        | Heating | Clg % OA               | 0.0     | Type                 | Clg  | Htg  |
| Main Htg | -9.8     | 17,730           | 67.7 | 68.2 | Vent    | 0              | 0       | Clg Cfm/Sqft           | 4.32    | SADB                 | 73.2 | 68.2 |
| Aux Htg  | 0.0      | 0                | 0.0  | 0.0  | Infil   | 0              | 0       | Clg Cfm/Ton            | 5605.16 | Plenum               | 76.5 | 67.7 |
| Preheat  | -106.3   | 17,730           | 67.7 | 73.2 | Supply  | 17,730         | 17,730  | Clg Sqft/Ton           | 1296.17 | Return               | 79.7 | 67.7 |
| Reheat   | 0.0      | 0                | 0.0  | 0.0  | Mincfm  | 0              | 0       | Clg Btuh/Sqft          | 9.26    | Ret/OA               | 76.6 | 67.7 |
| Humidif  | 0.0      | 0                | 0.0  | 0.0  | Return  | 0              | 17,730  | No. People             | 10      | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0      | 0                | 0.0  | 0.0  | Exhaust | 0              | 0       | Htg % OA               | 0.0     | Fn MtrTD             | 0.0  | 0.0  |
| Total    | -9.8     |                  |      |      | Rm Exh  | 17,730         | 0       | Htg Cfm/Sqft           | 4.32    | Fn BldTD             | 0.0  | 0.0  |
|          |          |                  |      |      | Auxil   | 0              | 0       | Htg Btuh/Sqft          | -2.40   | Fn Frict             | 0.0  | 0.0  |

System 3 Block INDFP - 4-PIPE INDUCTION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/19 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 85 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 474                     | 21,484                   | 0                      | 21,957           | 1.27             | * | 664                   | 0.10             | * | -1,579                       | -73,446                   | 4.10             |
| Glass Solar     | 171,927                 | 0                        | 0                      | 171,927          | 9.94             | * | 185,822               | 28.22            | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 53,830                  | 0                        | 0                      | 53,830           | 3.11             | * | 40,082                | 6.09             | * | -276,287                     | -276,287                  | 15.41            |
| Wall Cond       | 113,330                 | 16,902                   | 0                      | 130,232          | 7.53             | * | 168,977               | 25.66            | * | -328,407                     | -377,319                  | 21.04            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 662,719                 | 0                        | 0                      | 662,719          | 38.33            | * | 153,520               | 23.31            | * | -1,066,367                   | -1,066,367                | 59.46            |
| Sub Total==>    | 1,002,279               | 38,386                   | 0                      | 1,040,665        | 60.18            | * | 549,065               | 83.38            | * | -1,672,640                   | -1,793,420                | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Lights          | 277,628                 | 0                        | 0                      | 277,628          | 16.06            | * | 79,744                | 12.11            | * | 0                            | 0                         | 0.00             |
| People          | 45,248                  | 0                        | 0                      | 45,248           | 2.62             | * | 6,070                 | 0.92             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 322,876                 | 0                        | 0                      | 322,876          | 18.67            | * | 85,814                | 13.03            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 14,654                  | -14,654                  | 0                      | 0                | 0.00             | * | 23,486                | 3.57             | * | -47,811                      | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 252,361          | 14.59            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 110,564          | 6.39             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 13,820                   | 0                      | 13,820           | 0.80             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 119                     | 0                        | 0                      | 119              | 0.01             | * | 119                   | 0.02             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | -11,266                  | 0                      | -11,266          | -0.65            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 1,339,929               | 26,287                   | 0                      | 1,729,140        | 100.00           | * | 658,484               | 100.00           | * | -1,720,451                   | -1,793,420                | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |      |      | Leaving DB/WB/HR |      |      | Gross Total | Glass (sf) | (%)      |
|----------|-----------------------|-----------------|------------------|-------------------|------|------|------------------|------|------|-------------|------------|----------|
| Main Clg | 46.4                  | 557.0           | 19,435           | 80.9              | 66.7 | 78.0 | 59.9             | 57.7 | 69.7 | Floor       | 41,364     |          |
| Aux Clg  | 95.1                  | 1,141.4         | 35,846           | 75.0              | 63.8 | 73.0 | 65.1             | 53.1 | 42.6 | Part        | 0          |          |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | ExFlr       | 0          |          |
| Totals   | 141.5                 | 1,698.3         |                  |                   |      |      |                  |      |      | Roof        | 14,680     | 0 0      |
|          |                       |                 |                  |                   |      |      |                  |      |      | Wall        | 28,354     | 5,152 18 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------------------|------|------|
| Main Htg | -681.0         | 19,435           | 64.5      | 96.7      | Vent    | 5,830   | 0       | Clg % OA               | 30.0   | Type                 | Clg  | Htg  |
| Aux Htg  | -1,112.5       | 35,846           | 68.0      | 96.6      | Infil   | 15,311  | 15,311  | Clg Cfm/Sqft           | 0.47   | SADB                 | 65.1 | 96.7 |
| Preheat  | -0.0           | 19,435           | 64.5      | 59.9      | Supply  | 19,435  | 19,435  | Clg Cfm/Ton            | 418.73 | Plenum               | 76.1 | 64.4 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 891.20 | Return               | 76.8 | 64.5 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 19,435  | 19,435  | Clg Btuh/Sqft          | 13.46  | Ret/OA               | 80.9 | 64.5 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 5,830   | 0       | No. People             | 98     | Runarnd              | 75.0 | 68.0 |
| Total    | -1,793.4       |                  |           |           | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 1.3  | 1.3  |
|          |                |                  |           |           | Auxil   | 35,846  | 35,846  | Htg Cfm/Sqft           | 0.47   | Fn BldTD             | 1.0  | 1.0  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -16.46 | Fn Frict             | 2.9  | 2.9  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -6,715                       | -6,715                    | 100.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -6,715                       | -6,715                    | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| People          | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -6,715                       | -6,715                    | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 2,544      |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 1,632      |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 0.0                   | 0.0             | 0                |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |       | --TEMPERATURES (F)-- |     |      |
|----------|----------------|------------------|-----------|-----------|---------|----------------|---------|------------------------|-------|----------------------|-----|------|
|          |                |                  |           |           |         | Cooling        | Heating | Clg % OA               | 0.0   | Type                 | Clg | Htg  |
| Main Htg | -6.7           | 1,835            | 68.0      | 71.4      | Vent    | 0              | 0       | Clg Cfm/Sqft           | 0.00  | SADB                 | 0.0 | 71.4 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0              | 0       | Clg Cfm/Ton            | 0.00  | Plenum               | 0.0 | 68.0 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0              | 1,835   | Clg Sqft/Ton           | 0.00  | Return               | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0              | 0       | Clg Btuh/Sqft          | 0.00  | Ret/OA               | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0              | 1,835   | No. People             | 0     | Runarnd              | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0              | 0       | Htg % OA               | 0.0   | Fn MtrTD             | 0.0 | 0.0  |
| Total    | -6.7           |                  |           |           | Rm Exh  | 0              | 0       | Htg Cfm/Sqft           | 0.72  | Fn BldTD             | 0.0 | 0.0  |
|          |                |                  |           |           | Auxil   | 0              | 0       | Htg Btuh/Sqft          | -2.64 | Fn Frict             | 0.1 | 0.0  |

System 5 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 1.92             | 16,221                | 5.79             | -48,286           | -48,286          | 22.76            |
| Glass Solar     | 17,909                  | 0                        | 0                      | 17,909           | 2.38             | 16,285                | 5.81             | 0                 | 0                | 0.00             |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.64             | 5,167                 | 1.84             | -24,690           | -24,690          | 11.64            |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.62             | 5,622                 | 2.01             | -16,677           | -18,921          | 8.92             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Infiltration    | 29,955                  | 0                        | 0                      | 29,955           | 3.97             | 14,692                | 5.24             | -60,663           | -60,663          | 28.59            |
| Sub Total==>    | 71,351                  | 526                      | 0                      | 71,877           | 9.53             | 57,987                | 20.68            | -150,315          | -152,560         | 71.91            |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Lights          | 190,447                 | 0                        | 0                      | 190,447          | 25.26            | 200,839               | 71.63            | 0                 | 0                | 0.00             |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 4.01             | 14,612                | 5.21             | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total==>    | 220,650                 | 0                        | 0                      | 220,650          | 29.26            | 215,452               | 76.84            | 0                 | 0                | 0.00             |
| Ceiling Load    | 1,374                   | -1,374                   | 0                      | 0                | 0.00             | 1,552                 | 0.55             | -4,624            | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 287,603          | 38.14            | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,583          | 21.03            | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 19,823                   | 0                      | 19,823           | 2.63             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 5,387                   | 0                        | 0                      | 5,387            | 0.71             | 5,387                 | 1.92             | -59,592           | -59,592          | 28.09            |
| Exhaust Heat    | 0                       | -9,939                   | 0                      | -9,939           | -1.32            | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00            | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Grand Total==>  | 298,761                 | 9,036                    | 0                      | 753,984          | 100.00           | 280,377               | 100.00           | -214,532          | -212,152         | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |      |      | Leaving DB/WB/HR |      |      | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|------|------|------------------|------|------|-------------|------------|-----|
| Main Clg | 62.8                  | 754.0           | 27,876           | 80.4              | 68.3 | 87.1 | 60.5             | 60.2 | 79.4 | Floor       | 27,121     |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | Part        | 0          |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | ExFlr       | 0          |     |
| Totals   | 62.8                  | 754.0           |                  |                   |      |      |                  |      |      | Roof        | 8,563      |     |
|          |                       |                 |                  |                   |      |      |                  |      |      | Wall        | 1,613      |     |
|          |                       |                 |                  |                   |      |      |                  |      |      |             | 460        |     |
|          |                       |                 |                  |                   |      |      |                  |      |      |             | 29         |     |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)-- |      |  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------|----------------------|------|--|
| Main Htg | -441.1         | 27,876           | 60.5      | 75.1      | Vent    | 8,363   | 0       | Clg % OA               | 30.0   | Type     | Clg                  | Htg  |  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 871     | 871     | Clg Cfm/Sqft           | 1.03   | SADB     | 65.8                 | 75.1 |  |
| Preheat  | -367.1         | 27,876           | 49.4      | 60.5      | Supply  | 27,876  | 27,876  | Clg Cfm/Ton            | 443.66 | Plenum   | 75.4                 | 66.5 |  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 431.64 | Return   | 76.1                 | 67.5 |  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 27,876  | 27,876  | Clg Btuh/Sqft          | 27.80  | Ret/OA   | 80.4                 | 67.5 |  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 8,363   | 0       | No. People             | 65     | Runarnd  | 75.0                 | 68.0 |  |
| Total    | -808.2         |                  |           |           | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD | 1.3                  | 1.3  |  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 1.03   | Fn BldTD | 1.0                  | 1.0  |  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -29.80 | Fn Frict | 2.9                  | 2.9  |  |



System 6 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) |   | Space Sensible (Btuh) | Percent Of Tot (%) |   | Space Peak (Btuh) | Coil Peak (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|---|-----------------------|--------------------|---|-------------------|------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |   |                       |                    |   |                   |                  |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 1.92               | * | 16,221                | 5.79               | * | -48,286           | -48,286          | 22.78              |
| Glass Solar     | 17,909                  | 0                        | 0                      | 17,909           | 2.38               | * | 16,285                | 5.81               | * | 0                 | 0                | 0.00               |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.64               | * | 5,167                 | 1.84               | * | -24,690           | -24,690          | 11.65              |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.62               | * | 5,622                 | 2.01               | * | -16,677           | -18,921          | 8.93               |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Infiltration    | 29,963                  | 0                        | 0                      | 29,963           | 3.98               | * | 14,692                | 5.24               | * | -60,663           | -60,663          | 28.62              |
| Sub Total==>    | 71,359                  | 526                      | 0                      | 71,885           | 9.54               | * | 57,987                | 20.68              | * | -150,315          | -152,560         | 71.96              |
| Internal Loads  |                         |                          |                        |                  |                    |   |                       |                    |   |                   |                  |                    |
| Lights          | 190,447                 | 0                        | 0                      | 190,447          | 25.27              | * | 200,839               | 71.63              | * | 0                 | 0                | 0.00               |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 4.01               | * | 14,612                | 5.21               | * | 0                 | 0                | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Sub Total==>    | 220,650                 | 0                        | 0                      | 220,650          | 29.27              | * | 215,452               | 76.84              | * | 0                 | 0                | 0.00               |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00               | * | 1,553                 | 0.55               | * | -4,627            | 0                | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 287,477          | 38.14              | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 21.02              | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 2.63               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| OV/UNDR Sizing  | 5,386                   | 0                        | 0                      | 5,386            | 0.71               | * | 5,386                 | 1.92               | * | -59,435           | -59,435          | 28.04              |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.32              | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00              | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Grand Total==>  | 298,770                 | 9,026                    | 0                      | 753,742          | 100.00             | * | 280,377               | 100.00             | * | -214,378          | -211,995         | 100.00             |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------|------------|--------|
| Main Clg | 62.8                  | 753.7           | 27,856           | 80.4                      | 60.2                     | Floor       | 27,121     |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | Part        | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | Exflr       | 0          |        |
| Totals   | 62.8                  | 753.7           |                  |                           |                          | Roof        | 8,563      | 0 0    |
|          |                       |                 |                  |                           |                          | Wall        | 1,613      | 460 29 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -230.5         | 27,856           | 67.5        | 75.1        | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 65.8 | 75.1 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 871     | 871     | Clg Cfm/Ton   | 443.48 | Plenum   | 75.4 | 66.5 |
| Preheat  | -366.6         | 27,856           | 48.4        | 60.5        | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 431.78 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 27.79  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -597.1         |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -22.02 | Fn Frict | 2.9  | 2.9  |

BUILDING U-VALUES - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G U - V A L U E S -----

| Room<br>Number | Description      | Room U-Values<br>(Btu/hr/sqft/F) |       |                |                |       |                |                |       |       | Room<br>Mass<br>(lb/<br>sqft) | Room<br>Capac.<br>(Btu/<br>sqft/F) |
|----------------|------------------|----------------------------------|-------|----------------|----------------|-------|----------------|----------------|-------|-------|-------------------------------|------------------------------------|
|                |                  | Part.                            | ExFlr | Summr<br>Skylt | Wintr<br>Skylt | Roof  | Summr<br>Windo | Wintr<br>Windo | Wall  | Ceil. |                               |                                    |
| 1              | SUB BSMT, BSMT W | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.317 | 46.8                          | 9.61                               |
| Zone           | 1 Total/Ave.     | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.317 | 46.8                          | 9.61                               |
| 4              | BSMT E           | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.317 | 45.2                          | 9.27                               |
| Zone           | 4 Total/Ave.     | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.317 | 45.2                          | 9.27                               |
| System         | 1 Total/Ave.     | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.317 | 46.4                          | 9.54                               |
| 2              | TOILETS, KITCHEN | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317 | 29.4                          | 5.93                               |
| Zone           | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317 | 29.4                          | 5.93                               |
| 11             | TOILETS W ROOF   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.000          | 0.000          | 0.000 | 0.317 | 71.1                          | 15.13                              |
| Zone           | 11 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.000          | 0.000          | 0.000 | 0.317 | 71.1                          | 15.13                              |
| System         | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.317 | 35.3                          | 7.23                               |
| 3              | STAIRS           | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.229 | 0.000 | 103.3                         | 21.63                              |
| Zone           | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.229 | 0.000 | 103.3                         | 21.63                              |
| 5              | 1ST FL OFFICES   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317 | 57.9                          | 12.05                              |
| Zone           | 5 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317 | 57.9                          | 12.05                              |
| 7              | 2ND FL OFFICES   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317 | 56.7                          | 11.81                              |
| Zone           | 7 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317 | 56.7                          | 11.81                              |
| 9              | 3RD FL OFFICES   | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.317 | 102.3                         | 21.84                              |
| Zone           | 9 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.317 | 102.3                         | 21.84                              |
| 12             | STAIRS W ROOF    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.229 | 0.000 | 146.4                         | 31.13                              |
| Zone           | 12 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.229 | 0.000 | 146.4                         | 31.13                              |
| System         | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.256 | 0.317 | 74.1                          | 15.63                              |
| 13             | SUPPLY STORAGE   | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000 | 70.7                          | 14.70                              |
| Zone           | 13 Total/Ave.    | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000 | 70.7                          | 14.70                              |
| System         | 4 Total/Ave.     | 0.229                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.000          | 0.000          | 0.000 | 0.000 | 70.7                          | 14.70                              |
| 6              | 1ST FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317 | 32.5                          | 6.60                               |
| Zone           | 6 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317 | 32.5                          | 6.60                               |
| 8              | 2ND FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.000 | 27.0                          | 5.41                               |
| Zone           | 8 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.000 | 27.0                          | 5.41                               |
| 10             | 3RD FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.000 | 71.5                          | 15.21                              |
| Zone           | 10 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.000 | 71.5                          | 15.21                              |
| System         | 5 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.317 | 43.1                          | 8.94                               |
| 14             | 1ST FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317 | 32.5                          | 6.60                               |
| Zone           | 14 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.317 | 32.5                          | 6.60                               |
| 15             | 2ND FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.000 | 27.0                          | 5.41                               |
| Zone           | 15 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.000 | 0.810          | 0.837          | 0.257 | 0.000 | 27.0                          | 5.41                               |
| 16             | 3RD FL CEN OFFCS | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.000 | 71.5                          | 15.21                              |
| Zone           | 16 Total/Ave.    | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.000 | 71.5                          | 15.21                              |
| System         | 6 Total/Ave.     | 0.000                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.257 | 0.317 | 43.1                          | 8.94                               |
| Building       |                  | 0.229                            | 0.000 | 0.000          | 0.000          | 0.088 | 0.810          | 0.837          | 0.256 | 0.317 | 52.6                          | 10.93                              |

BUILDING AREAS - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description      | Number of<br>Duplicate<br>Flr | Rm | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|------------------|-------------------------------|----|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 1              | SUB BSMT, BSMT W | 1                             | 1  | 45,125                               | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 1 Total/Ave.     |                               |    |                                      | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 4              | BSMT E           | 1                             | 1  | 12,424                               | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 4 Total/Ave.     |                               |    |                                      | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 1 Total/Ave.     |                               |    |                                      | 57,549                           | 16,570                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 2              | TOILETS, KITCHEN | 1                             | 1  | 3,520                                | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| Zone           | 2 Total/Ave.     |                               |    |                                      | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| 11             | TOILETS W ROOF   | 1                             | 1  | 580                                  | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| Zone           | 11 Total/Ave.    |                               |    |                                      | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| System         | 2 Total/Ave.     |                               |    |                                      | 4,100                            | 0                           | 0                                  | 0                          | 0                 | 580                        | 21                       | 11                | 174                        |
| 3              | STAIRS           | 1                             | 1  | 560                                  | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| Zone           | 3 Total/Ave.     |                               |    |                                      | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| 5              | 1ST FL OFFICES   | 1                             | 1  | 11,724                               | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| Zone           | 5 Total/Ave.     |                               |    |                                      | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| 7              | 2ND FL OFFICES   | 1                             | 1  | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| Zone           | 7 Total/Ave.     |                               |    |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| 9              | 3RD FL OFFICES   | 1                             | 1  | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| Zone           | 9 Total/Ave.     |                               |    |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| 12             | STAIRS W ROOF    | 1                             | 1  | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| Zone           | 12 Total/Ave.    |                               |    |                                      | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| System         | 3 Total/Ave.     |                               |    |                                      | 41,364                           | 0                           | 0                                  | 0                          | 0                 | 14,680                     | 5,152                    | 18                | 23,202                     |
| 13             | SUPPLY STORAGE   | 1                             | 1  | 2,544                                | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 13 Total/Ave.    |                               |    |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 4 Total/Ave.     |                               |    |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 6              | 1ST FL CEN OFFCS | 1                             | 1  | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 6 Total/Ave.     |                               |    |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 8              | 2ND FL CEN OFFCS | 1                             | 1  | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 8 Total/Ave.     |                               |    |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 10             | 3RD FL CEN OFFCS | 1                             | 1  | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 10 Total/Ave.    |                               |    |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 5 Total/Ave.     |                               |    |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| 14             | 1ST FL CEN OFFCS | 1                             | 1  | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 14 Total/Ave.    |                               |    |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 15             | 2ND FL CEN OFFCS | 1                             | 1  | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 15 Total/Ave.    |                               |    |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 16             | 3RD FL CEN OFFCS | 1                             | 1  | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 16 Total/Ave.    |                               |    |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 6 Total/Ave.     |                               |    |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| Building       |                  |                               |    |                                      | 159,799                          | 18,202                      | 0                                  | 0                          | 0                 | 32,386                     | 6,095                    | 19                | 25,681                     |

ASHRAE 90 ANALYSIS - ALTERNATIVE 3  
WEATHERSTRIP & CAULKING

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 17.6                   | 0         | 0     | -193,499                 | 18        | 233   | 6,545.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 35.2                   | 0         | 4     | -386,999                 | 3         | 40    | 13,090.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 52.8                   | 7         | 76    | -580,498                 | 7         | 92    | 19,636.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 70.4                   | 9         | 96    | -773,997                 | 3         | 37    | 26,181.4                  | 0         | 0     | 0.0                       | 0         | 0     |
| 20 - 25             | 88.0                   | 8         | 84    | -967,496                 | 5         | 59    | 32,726.8                  | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 105.6                  | 5         | 52    | -1,160,996               | 8         | 106   | 39,272.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 30 - 35             | 123.2                  | 16        | 173   | -1,354,495               | 8         | 99    | 45,817.5                  | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 140.7                  | 12        | 132   | -1,547,995               | 29        | 364   | 52,362.8                  | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 158.3                  | 9         | 91    | -1,741,494               | 15        | 195   | 58,908.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 175.9                  | 7         | 72    | -1,934,993               | 3         | 37    | 65,453.5                  | 0         | 0     | 0.0                       | 0         | 0     |
| 50 - 55             | 193.5                  | 4         | 45    | -2,128,492               | 0         | 0     | 71,998.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 211.1                  | 2         | 22    | -2,321,992               | 0         | 0     | 78,544.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 60 - 65             | 228.7                  | 4         | 38    | -2,515,491               | 0         | 0     | 85,089.6                  | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 246.3                  | 7         | 75    | -2,708,990               | 0         | 0     | 91,634.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 263.9                  | 6         | 65    | -2,902,490               | 0         | 0     | 98,180.3                  | 0         | 0     | 0.0                       | 0         | 0     |
| 75 - 80             | 281.5                  | 3         | 35    | -3,095,989               | 0         | 0     | 104,725.6                 | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 299.1                  | 1         | 10    | -3,289,488               | 0         | 0     | 111,271.0                 | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 316.7                  | 0         | 0     | -3,482,988               | 0         | 0     | 117,816.3                 | 100       | 2,520 | 0.0                       | 0         | 0     |
| 90 - 95             | 334.3                  | 0         | 0     | -3,676,487               | 0         | 0     | 124,361.7                 | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 351.9                  | 0         | 0     | -3,869,986               | 0         | 0     | 130,907.0                 | 0         | 0     | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,690 | 0                        | 0         | 7,498 | 0.0                       | 0         | 6,240 | 0.0                       | 0         | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature<br>Range<br>(F) | ----- Zone Number -----     |       |       |       |       |       |       |       |       |       |        |       |       |       |       |       |
|-----------------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
|                             | 1                           | 4     | 2     | 11    | 3     | 5     | 7     | 9     | 12    | 13    | 6      | 8     | 10    | 14    | 15    | 16    |
| Max. Temp.                  | 82.6                        | 81.5  | 201.1 | 120.2 | 86.6  | 85.2  | 84.9  | 83.5  | 85.6  | 96.2  | 85.2   | 88.7  | 84.5  | 85.2  | 88.7  | 84.5  |
| Mo./Hr.                     | 10 21                       | 10 23 | 9 19  | 8 16  | 7 20  | 7 24  | 7 24  | 7 22  | 7 20  | 8 17  | 7 2 10 | 3 7   | 5 7   | 2 10  | 3 7   | 5 5   |
| Day Type                    | 2                           | 2     | 2     | 2     | 4     | 1     | 1     | 4     | 4     | 2     | 5      | 2     | 5     | 5     | 2     | 5     |
|                             | ..... Number of Hours ..... |       |       |       |       |       |       |       |       |       |        |       |       |       |       |       |
| Above 100                   | 0                           | 0     | 8,016 | 4,086 | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0     | 0     | 0     | 0     | 0     |
| 95 - 100                    | 0                           | 0     | 0     | 110   | 0     | 0     | 0     | 0     | 0     | 240   | 0      | 0     | 0     | 0     | 0     | 0     |
| 90 - 95                     | 0                           | 0     | 91    | 1,239 | 0     | 0     | 0     | 0     | 0     | 1,494 | 0      | 0     | 0     | 0     | 0     | 0     |
| 85 - 90                     | 0                           | 0     | 290   | 253   | 135   | 12    | 0     | 0     | 52    | 1,602 | 25     | 552   | 0     | 25    | 552   | 0     |
| 80 - 85                     | 954                         | 517   | 227   | 585   | 1,193 | 1,272 | 1,200 | 826   | 1,192 | 1,215 | 1,955  | 3,532 | 1,608 | 1,955 | 3,437 | 1,608 |
| 75 - 80                     | 5,027                       | 2,814 | 136   | 327   | 1,803 | 1,962 | 2,027 | 2,366 | 1,961 | 818   | 3,009  | 4,226 | 3,751 | 3,033 | 4,159 | 3,746 |
| 70 - 75                     | 1,202                       | 3,711 | 0     | 1,256 | 558   | 579   | 598   | 701   | 501   | 1,435 | 1,462  | 450   | 1,334 | 1,306 | 586   | 1,323 |
| 65 - 70                     | 1,418                       | 1,516 | 0     | 726   | 1,454 | 1,481 | 1,524 | 1,587 | 1,425 | 1,579 | 1,203  | 0     | 1,471 | 1,265 | 26    | 1,397 |
| 60 - 65                     | 159                         | 202   | 0     | 178   | 1,054 | 1,107 | 1,104 | 1,345 | 1,172 | 377   | 504    | 0     | 444   | 553   | 0     | 504   |
| 55 - 60                     | 0                           | 0     | 0     | 0     | 957   | 879   | 895   | 875   | 994   | 0     | 299    | 0     | 152   | 312   | 0     | 182   |
| 50 - 55                     | 0                           | 0     | 0     | 0     | 649   | 624   | 585   | 454   | 664   | 0     | 303    | 0     | 0     | 311   | 0     | 0     |
| Below 50                    | 0                           | 0     | 0     | 0     | 957   | 844   | 827   | 606   | 799   | 0     | 0      | 0     | 0     | 0     | 0     | 0     |
| Min. Temp.                  | 63.8                        | 63.0  | 68.0  | 63.6  | 34.6  | 35.2  | 35.2  | 38.0  | 36.1  | 61.7  | 51.1   | 68.0  | 57.8  | 50.9  | 68.0  | 57.6  |
| Mo./Hr.                     | 1 8                         | 1 10  | 1 1   | 2 6   | 2 11  | 2 7   | 2 7   | 2 7   | 2 7   | 1 6   | 2 7    | 1 1   | 1 7   | 2 7   | 1 1   | 1 7   |
| Day Type                    | 5                           | 5     | 1     | 5     | 4     | 5     | 5     | 5     | 5     | 5     | 5      | 1     | 5     | 5     | 1     | 5     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3  
WEATHERSTRIP & CAULKING

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | STEAM              | STEAM DMND         |                      |
|-------|-------------------|-----------------|--------------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | WATER<br>(1000 G1) | On Peak<br>(Thrm/hr) |
| Jan   | 163,374           | 813             | 11,257             | 0                  | 67                   |
| Feb   | 147,815           | 813             | 10,595             | 0                  | 67                   |
| March | 177,304           | 813             | 8,100              | 0                  | 60                   |
| April | 148,829           | 813             | 1,856              | 0                  | 42                   |
| May   | 191,290           | 948             | 0                  | 73                 | 0                    |
| June  | 198,163           | 1,013           | 0                  | 118                | 0                    |
| July  | 196,626           | 1,067           | 0                  | 193                | 0                    |
| Aug   | 208,452           | 1,022           | 0                  | 130                | 0                    |
| Sept  | 174,396           | 975             | 0                  | 68                 | 0                    |
| Oct   | 162,125           | 813             | 1,028              | 0                  | 41                   |
| Nov   | 152,329           | 813             | 4,082              | 0                  | 53                   |
| Dec   | 155,594           | 813             | 9,549              | 0                  | 65                   |
| Total | 2,076,296         | 1,067           | 46,466             | 582                | 67                   |

Building Energy Consumption = 73,424 (Btu/Sq Ft/Year)  
Source Energy Consumption = 171,821 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | Monthly Consumption |                           |       |       |       |       |       |       |       |       |       |       | Total   |
|---------|------------|---------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|         |            | Jan                 | Feb                       | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0       | LIGHTS     |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 78913               | 71397                     | 86428 | 75155 | 82671 | 82671 | 75155 | 86428 | 75155 | 82671 | 75155 | 75155 | 946,954 |
|         | PK         | 410.7               | 410.7                     | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7   |
| 1       | MISC LD    |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2       | MISC LD    |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | GAS        | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3       | MISC LD    |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | OIL        | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4       | MISC LD    |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P STEAM    | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5       | MISC LD    |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P HOTH2O   | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6       | MISC LD    |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P CHILL    | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1       | EQ1001S    |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | 2-STG CTV <555 TONS       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                         | 0     | 0     | 13858 | 20730 | 35324 | 22954 | 13093 | 0     | 0     | 0     | 105,959 |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 106.5 | 171.6 | 225.3 | 181.1 | 134.1 | 0.0   | 0.0   | 0.0   | 225.3   |
| 1       | EQ5100     |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                         | 0     | 0     | 5115  | 5115  | 4650  | 5348  | 4650  | 0     | 0     | 0     | 24,878  |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 23.3  | 23.3  | 23.3  | 23.3  | 23.3  | 0.0   | 0.0   | 0.0   | 23.3    |
| 1       | EQ5100     |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | WATER      | 0                   | 0                         | 0     | 0     | 73    | 118   | 193   | 130   | 68    | 0     | 0     | 0     | 582     |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.6   | 0.9   | 1.2   | 1.0   | 0.8   | 0.0   | 0.0   | 0.0   | 1.2     |
| 1       | EQ5001     |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | CHILLED WATER PUMP C.V.   |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5010     |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | CONDENSER WATER PUMP C.V. |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                   | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                 | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5300     |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                     | CONTROL PANEL & INTERLOCK |       |       |       |       |       |       |       |       |       |       |         |



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
 WEATHERSTRIP & CAULKING

|   |         |                            |       |       |       |       |       |       |       |       |       |       |       |         |
|---|---------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|   | ELEC    | 0                          | 0     | 0     | 0     | 220   | 220   | 200   | 230   | 200   | 0     | 0     | 0     | 1,070   |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 0.0   | 0.0   | 0.0   | 1.0     |
| 2 | EQ1000  | PREVENTS COOLING ENERGY    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5001  | CHILLED WATER PUMP C.V.    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5010  | CONDENSER WATER PUMP C.V.  |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 9754                       | 8825  | 10683 | 9290  | 10219 | 10219 | 9290  | 10683 | 9290  | 10219 | 9290  | 9290  | 117,051 |
|   | PK      | 46.4                       | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4    |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2276                       | 2059  | 2493  | 2168  | 2384  | 2384  | 2168  | 2493  | 2168  | 2384  | 2168  | 2168  | 27,312  |
|   | PK      | 10.8                       | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8    |
| 2 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 13975                      | 12644 | 15305 | 13309 | 14640 | 14640 | 13309 | 15305 | 13309 | 14640 | 13309 | 13309 | 167,695 |
|   | PK      | 66.5                       | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5    |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 1747                       | 1580  | 1913  | 1664  | 1830  | 1830  | 1664  | 1913  | 1664  | 1830  | 1664  | 1664  | 20,962  |
|   | PK      | 8.3                        | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3     |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20044                      | 18135 | 21953 | 19089 | 20998 | 20998 | 19089 | 21953 | 19089 | 20998 | 19089 | 19089 | 240,527 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2505                       | 2267  | 2744  | 2386  | 2625  | 2625  | 2386  | 2744  | 2386  | 2625  | 2386  | 2386  | 30,066  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 1 | EQ2101  | PURCHASED DISTRICT STEAM   |       |       |       |       |       |       |       |       |       |       |       |         |
|   | P STEAM | 1929                       | 1816  | 1388  | 318   | 0     | 0     | 0     | 0     | 0     | 178   | 695   | 1637  | 7,961   |
|   | PK      | 11.5                       | 11.5  | 10.3  | 7.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 7.1   | 9.2   | 11.2  | 11.5    |
| 1 | EQ5020  | HEAT WATER CIRC. PUMP C.V. |       |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 3  
WEATHERSTRIP & CAULKING

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 1,066.7 (kW)  
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| Cooling Equipment    |                        |                                    |                           |                          |
| 1                    | EQ1001S                | 2-STG CTV <555 TONS                | 309.2                     | 28.98                    |
| Sub Total            |                        |                                    | 309.2                     | 28.98                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Air Moving Equipment |                        |                                    |                           |                          |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 57.3                      | 5.37                     |
| 3                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 74.9                      | 7.02                     |
| 5                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.4                     | 10.07                    |
| 6                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 10.06                    |
| Sub Total            |                        |                                    | 346.8                     | 32.51                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Miscellaneous        |                        |                                    |                           |                          |
| Lights               |                        |                                    | 410.7                     | 38.50                    |
| Base Utilities       |                        |                                    | 0.0                       | 0.00                     |
| Misc Equipment       |                        |                                    | 0.0                       | 0.00                     |
| Sub Total            |                        |                                    | 410.7                     | 38.50                    |
| Grand Total          |                        |                                    | 1,066.7                   | 100.00                   |

```
*****  
*****  
**  
**          T R A C E    6 0 0    A N A L Y S I S          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 122

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 9:31:32 2/ 2/94  
Dataset Name: CB122 .TM

AIRFLOW - ALTERNATIVE 4  
 LOW E GLASS

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | TRH         | 10,853                | 36,175                | 36,175                | 36,175               | 10,853                | 0                    | 0                     |
| 2             | SZ          | 0                     | 17,730                | 17,730                | 17,730               | 0                     | 0                    | 17,730                |
| 3             | INDFP       | 5,830                 | 19,435                | 19,435                | 36,448               | 19,435                | 32,234               | 0                     |
| 4             | UH          | 0                     | 0                     | 1,835                 | 0                    | 0                     | 0                    | 0                     |
| 5             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 27,856                | 0                    | 0                     |
| 6             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 9,325                 | 0                    | 0                     |
| Totals        |             | 33,397                | 129,052               | 130,887               | 148,000              | 67,468                | 32,234               | 17,730                |

CAPACITY - ALTERNATIVE 4  
 LOW E GLASS

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | TRH         | 81.5                      | 0.0                       | 0.0                  | 0.0                  | 81.5                  | -68,182                   | 0                         | -480,162                | 0                      | 0                        | 0                    | 0                    | -548,345              |
| 2             | SZ          | 3.1                       | 0.0                       | 0.0                  | 0.0                  | 3.1                   | -9,837                    | 0                         | -106,598                | 0                      | 0                        | 0                    | 0                    | -9,837                |
| 3             | INDFP       | 46.4                      | 88.5                      | 0.0                  | 0.0                  | 134.9                 | -680,963                  | -1,230,942                | 0                       | 0                      | 0                        | 0                    | 0                    | -1,911,905            |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -6,715                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -6,715                |
| 5             | DD          | 61.9                      | 0.0                       | 0.0                  | 0.0                  | 61.9                  | -448,643                  | 0                         | -373,989                | 0                      | 0                        | 0                    | 0                    | -822,632              |
| 6             | DD          | 61.9                      | 0.0                       | 0.0                  | 0.0                  | 61.9                  | -245,454                  | 0                         | -373,989                | 0                      | 0                        | 0                    | 0                    | -619,443              |
| Totals        |             | 254.9                     | 88.5                      | 0.0                  | 0.0                  | 343.4                 | -1,459,795                | -1,230,942                | -1,334,738              | 0                      | 0                        | 0                    | 0                    | -3,918,877            |

The building peaked at hour 14 month 7 with a capacity of 254.9 tons

ENGINEERING CHECKS - ALTERNATIVE 4  
 LOW E GLASS

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | ----- Cooling ----- |         |            |            | --- Heating --- |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|---------------------|---------|------------|------------|-----------------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft           | Cfm/Ton | Sq Ft /Ton | Btuh/Sq Ft | Cfm/Sq Ft       | Btuh/Sq Ft |                  |
| 1             | Main           | TRH         | 30.00               | 0.63                | 443.7   | 705.9      | 17.00      | 0.63            | -9.53      | 57,549           |
| 2             | Main           | SZ          | 0.00                | 4.32                | 5,655.8 | 1,307.9    | 9.18       | 4.32            | -2.40      | 4,100            |
| 3             | Main           | INDFP       | 30.00               | 0.47                | 418.7   | 891.2      | 13.46      | 0.47            | -16.46     | 41,364           |
| 3             | Auxiliary      | INDFP       | 0.00                | 0.78                | 364.4   | 467.7      | 25.66      | 0.78            | -29.76     | 41,364           |
| 4             | Main           | UH          | 0.00                | 0.00                | 0.0     | 0.0        | 0.00       | 0.72            | -2.64      | 2,544            |
| 5             | Main           | DD          | 30.00               | 1.03                | 449.8   | 437.9      | 27.40      | 1.03            | -30.33     | 27,121           |
| 6             | Main           | DD          | 30.00               | 1.03                | 449.8   | 437.9      | 27.40      | 1.03            | -22.84     | 27,121           |

System 1 Peak TRH - TERMINAL REHEAT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Partition       | 18,940                  |                          |                        | - 18,940         | 1.94             | * | 18,940                | 4.00             | * | -68,182                      | -68,182                   | 100.00           |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 18,940                  | 0                        |                        | 18,940           | 1.94             | * | 18,940                | 4.00             | * | -68,182                      | -68,182                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 398,781                 | 0                        |                        | 398,781          | 40.76            | * | 424,020               | 89.45            | * | 0                            | 0                         | 0.00             |
| People          | 63,941                  |                          |                        | 63,941           | 6.54             | * | 31,097                | 6.56             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 462,722                 | 0                        | 0                      | 462,722          | 47.30            | * | 455,117               | 96.00            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 406,913          | 41.59            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 77,173           | 7.89             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 18,007                   |                        | 18,007           | 1.84             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | -0.00            | * | 0                     | -0.00            | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | -5,402                   | 0                      | -5,402           | -0.55            | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Grand Total==>  | 481,661                 | 12,605                   | 0                      | 978,353          | 100.00           | * | 474,057               | 100.00           | * | -68,182                      | -68,182                   | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |      |      | Leaving DB/WB/HR |      |      | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|------|------|------------------|------|------|-------------------|------------|-----|
| Main Clg | 81.5                  | 978.4           | 36,175           | 80.0              | 67.5 | 83.9 | 61.0             | 59.3 | 74.8 | 57,549            |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | 16,570            |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0  | 0.0  | 0.0              | 0.0  | 0.0  | 0                 | 0          | 0   |
| Totals   | 81.5                  | 978.4           |                  |                   |      |      |                  |      |      | 0                 | 0          | 0   |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -68.2          | 36,175           | 68.0      | 69.7      | Vent    | 10,853  | 0       | Clg Cfm/Sqft  | 0.63   | SADB     | 63.0 | 69.7 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 0       | Clg Cfm/Ton   | 443.70 | Plenum   | 75.0 | 68.0 |
| Preheat  | -480.2         | 36,175           | 48.8      | 61.0      | Supply  | 36,175  | 36,175  | Clg Sqft/Ton  | 705.87 | Return   | 75.5 | 68.0 |
| Reheat   | -0.0           | 0                | 0.0       | 0.0       | Mincfm  | 36,175  | 0       | Clg Btuh/Sqft | 17.00  | Ret/OA   | 80.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 36,175  | 36,175  | No. People    | 137    | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 10,853  | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.5  | 0.5  |
| Total    | -548.3         |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.63   | Fn BldTD | 0.4  | 0.4  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -9.53  | Fn Frict | 1.1  | 1.1  |

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 860                      |                        | 860              | 2.29             | * | 0                     | 0.00             | * | 0                 | -3,224           | 44.57            |
| Glass Solar     | 255                     | 0                        |                        | 255              | 0.68             | * | 255                   | 0.74             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 239                     | 0                        |                        | 239              | 0.64             | * | 239                   | 0.69             | * | -1,139            | -1,139           | 15.75            |
| Wall Cond       | 747                     | 183                      |                        | 929              | 2.47             | * | 747                   | 2.16             | * | -2,286            | -2,870           | 39.68            |
| Partition       | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 1,241                   | 1,042                    |                        | 2,283            | 6.07             | * | 1,241                 | 3.60             | * | -3,426            | -7,234           | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 30,623                  | 0                        |                        | 30,623           | 81.40            | * | 30,623                | 88.78            | * | 0                 | 0                | 0.00             |
| People          | 4,712                   |                          |                        | 4,712            | 12.53            | * | 2,223                 | 6.44             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 35,335                  | 0                        | 0                      | 35,335           | 93.93            | * | 32,845                | 95.22            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 1,918                   | -1,918                   |                        | 0                | 0.00             | * | 408                   | 1.18             | * | -243              | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | -0.00            |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Grand Total==>  | 38,494                  | -876                     | 0                      | 37,618           | 100.00           | * | 34,495                | 100.00           | * | -3,668            | -7,234           | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity |       |                 | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |      | Glass (sf) | (% ) |
|----------|----------------|-------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------|------------|------|
|          | (Tons)         | (Mbh) | Sens Cap. (Mbh) |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part |            |      |
| Main Clg | 3.1            | 37.6  | 35.1            | 17,730           | 76.6              | 68.9  | 96.6   | 73.2             | 68.3  | 98.9   | 4,100       | 0    |            |      |
| Aux Clg  | 0.0            | 0.0   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           | 0    |            |      |
| Opt Vent | 0.0            | 0.0   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 580         | 0    | 0          |      |
| Totals   | 3.1            | 37.6  |                 |                  |                   |       |        |                  |       |        | 196         | 21   | 11         |      |

-----HEATING COIL SELECTION-----

|          | Capacity |                  | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm) |         | --ENGINEERING CHECKS-- |         | --TEMPERATURES (F)-- |      |      |
|----------|----------|------------------|-----------|-----------|---------|----------------|---------|------------------------|---------|----------------------|------|------|
|          | (Mbh)    | Coil Airfl (cfm) |           |           |         | Cooling        | Heating | Clg % OA               | 0.0     | Type                 | Clg  | Htg  |
| Main Htg | -9.8     | 17,730           | 67.7      | 68.2      | Vent    | 0              | 0       | Clg % OA               | 0.0     | SADB                 | 73.2 | 68.2 |
| Aux Htg  | 0.0      | 0                | 0.0       | 0.0       | Infil   | 0              | 0       | Clg Cfm/Sqft           | 4.32    | Plenum               | 76.5 | 67.7 |
| Preheat  | -106.6   | 17,730           | 67.7      | 73.2      | Supply  | 17,730         | 17,730  | Clg Cfm/Ton            | 5655.81 | Return               | 79.7 | 67.7 |
| Reheat   | 0.0      | 0                | 0.0       | 0.0       | Mincfm  | 0              | 0       | Clg Sqft/Ton           | 1307.89 | Ret/OA               | 76.6 | 67.7 |
| Humidif  | 0.0      | 0                | 0.0       | 0.0       | Return  | 0              | 17,730  | Clg Btuh/Sqft          | 9.18    | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0      | 0                | 0.0       | 0.0       | Exhaust | 0              | 0       | No. People             | 10      | Fn MtrTD             | 0.0  | 0.0  |
| Total    | -9.8     |                  |           |           | Rm Exh  | 17,730         | 0       | Htg % OA               | 0.0     | Fn BldTD             | 0.0  | 0.0  |
|          |          |                  |           |           | Auxil   | 0              | 0       | Htg Cfm/Sqft           | 4.32    | Fn Frict             | 0.0  | 0.0  |
|          |          |                  |           |           |         |                |         | Htg Btuh/Sqft          | -2.40   |                      |      |      |



System 3 Block INDFP - 4-PIPE INDUCTION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/19 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 85 \* OADB: 4

|                 | Space      | Ret. Air | Ret. Air | Net       | Perct  | * | Space    | Perct  | * | Space Peak | Coil Peak  | Perct  |
|-----------------|------------|----------|----------|-----------|--------|---|----------|--------|---|------------|------------|--------|
|                 | Sens.+Lat. | Sensible | Latent   | Total     | Of Tot | * | Sensible | Of Tot | * | Space Sens | Tot Sens   | Of Tot |
|                 | (Btuh)     | (Btuh)   | (Btuh)   | (Btuh)    | (%)    | * | (Btuh)   | (%)    | * | (Btuh)     | (Btuh)     | (%)    |
| Envelope Loads  |            |          |          |           |        |   |          |        |   |            |            |        |
| Skylite Solr    | 0          | 0        | 0        | 0         | 0.00   | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Skylite Cond    | 0          | 0        | 0        | 0         | 0.00   | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Roof Cond       | 474        | 21,484   |          | 21,957    | 1.29   | * | 664      | 0.12   | * | -1,579     | -73,446    | 3.84   |
| Glass Solar     | 77,250     | 0        |          | 77,250    | 4.52   | * | 81,767   | 14.31  | * | 0          | 0          | 0.00   |
| Glass Cond      | 53,830     | 0        |          | 53,830    | 3.15   | * | 40,082   | 7.01   | * | -276,287   | -276,287   | 14.45  |
| Wall Cond       | 113,330    | 16,902   |          | 130,232   | 7.62   | * | 168,977  | 29.57  | * | -328,407   | -377,319   | 19.74  |
| Partition       | 0          |          |          | 0         | 0.00   | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Exposed Floor   | 0          |          |          | 0         | 0.00   | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Infiltration    | 736,354    |          |          | 736,354   | 43.11  | * | 170,578  | 29.85  | * | -1,184,852 | -1,184,852 | 61.97  |
| Sub Total==>    | 981,237    | 38,386   |          | 1,019,623 | 59.69  | * | 462,068  | 80.85  | * | -1,791,125 | -1,911,905 | 100.00 |
| Internal Loads  |            |          |          |           |        | * |          |        | * |            |            |        |
| Lights          | 277,628    | 0        |          | 277,628   | 16.25  | * | 79,744   | 13.95  | * | 0          | 0          | 0.00   |
| People          | 45,248     |          |          | 45,248    | 2.65   | * | 6,070    | 1.06   | * | 0          | 0          | 0.00   |
| Misc            | 0          | 0        | 0        | 0         | 0.00   | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Sub Total==>    | 322,876    | 0        | 0        | 322,876   | 18.90  | * | 85,814   | 15.02  | * | 0          | 0          | 0.00   |
| Ceiling Load    | 14,654     | -14,654  |          | 0         | 0.00   | * | 23,486   | 4.11   | * | -47,811    | 0          | 0.00   |
| Outside Air     | 0          | 0        | 0        | 252,361   | 14.77  | * | 0        | 0.00   | * | 0          | 0          | 0.00   |
| Sup. Fan Heat   |            |          |          | 110,564   | 6.47   | * |          | 0.00   | * |            | 0          | 0.00   |
| Ret. Fan Heat   |            | 13,820   |          | 13,820    | 0.81   | * |          | 0.00   | * |            | 0          | 0.00   |
| Duct Heat Pkup  |            | 0        |          | 0         | 0.00   | * |          | 0.00   | * |            | 0          | 0.00   |
| OV/UNDR Sizing  | 119        |          |          | 119       | 0.01   | * | 119      | 0.02   | * | 0          | 0          | 0.00   |
| Exhaust Heat    |            | -11,266  | 0        | -11,266   | -0.66  | * |          | 0.00   | * |            | 0          | 0.00   |
| Terminal Bypass |            | 0        | 0        | 0         | 0.00   | * |          | 0.00   | * |            | 0          | 0.00   |
| Grand Total==>  | 1,318,886  | 26,287   | 0        | 1,708,098 | 100.00 | * | 571,487  | 100.00 | * | -1,838,936 | -1,911,905 | 100.00 |

-----COOLING COIL SELECTION-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total |       | Glass (sf) | (%) |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|-------|------------|-----|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       | Part  |            |     |
| Main Clg | 46.4           | 557.0     | 19,435     | 80.9              | 66.7  | 78.0   | 59.9             | 57.7  | 69.7   | 41,364      | 0     |            |     |
| Aux Clg  | 88.5           | 1,061.4   | 32,234     | 75.0              | 63.9  | 73.7   | 65.1             | 52.9  | 41.7   | 0           | 0     |            |     |
| Opt Vent | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 14,680      | 0     | 0          |     |
| Totals   | 134.9          | 1,618.4   |            |                   |       |        |                  |       |        | 28,354      | 5,152 | 18         |     |

-----HEATING COIL SELECTION-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------|------------|-------|-------|---------|---------|---------|------------------------|--------|----------------------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg % OA               | 30.0   | Type                 | Clg  | Htg  |
| Main Htg | -681.0   | 19,435     | 64.5  | 96.7  | Infil   | 17,013  | 17,013  | Clg Cfm/Sqft           | 0.47   | SADB                 | 65.1 | 96.7 |
| Aux Htg  | -1,230.9 | 32,234     | 68.0  | 103.1 | Supply  | 19,435  | 19,435  | Clg Cfm/Ton            | 418.73 | Plenum               | 76.1 | 64.4 |
| Preheat  | -0.0     | 19,435     | 64.5  | 59.9  | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 891.20 | Return               | 76.8 | 64.5 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 19,435  | 19,435  | Clg Btuh/Sqft          | 13.46  | Ret/OA               | 80.9 | 64.5 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 5,830   | 0       | No. People             | 98     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 1.3  | 1.3  |
| Total    | -1,911.9 |            |       |       | Auxil   | 32,234  | 32,234  | Htg Cfm/Sqft           | 0.47   | Fn BldTD             | 1.0  | 1.0  |
|          |          |            |       |       |         |         |         | Htg Btuh/Sqft          | -16.46 | Fn Frict             | 2.9  | 2.9  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -6,715            | -6,715           | 100.00           |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -6,715            | -6,715           | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -6,715            | -6,715           | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------------|------------|-----|
| Main Clg | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 2,544             |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 1,632             |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |            |     |
| Totals   | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 | 0          | 0   |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 0.0   | Type     | Clg | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|-------|----------|-----|------|
| Main Htg | -6.7           | 1,835            | 68.0        | 71.4        | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00  | SADB     | 0.0 | 71.4 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 0       | 0       | Clg Cfm/Ton   | 0.00  | Plenum   | 0.0 | 68.0 |
| Preheat  | 0.0            | 0                | 0.0         | 0.0         | Supply  | 0       | 1,835   | Clg Sqft/Ton  | 0.00  | Return   | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00  | Ret/OA   | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 0       | 1,835   | No. People    | 0     | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0       | 0       | Htg % OA      | 0.0   | Fn MtrTD | 0.0 | 0.0  |
| Total    | -6.7           |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.72  | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -2.64 | Fn Frict | 0.1 | 0.0  |

System 5 Block 00 - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|-------------------|------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                   |                  |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 1.95               | 16,221                | 5.94               | -48,286           | -48,286          | 21.28              |
| Glass Solar     | 8,014                   | 0                        | 0                      | 8,014            | 1.08               | 7,222                 | 2.64               | 0                 | 0                | 0.00               |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.65               | 5,167                 | 1.89               | -24,690           | -24,690          | 10.88              |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.63               | 5,622                 | 2.06               | -16,677           | -18,921          | 8.34               |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Infiltration    | 32,866                  | 0                        | 0                      | 32,866           | 4.42               | 16,324                | 5.98               | -67,403           | -67,403          | 29.70              |
| Sub Total==>    | 64,366                  | 526                      | 0                      | 64,892           | 8.73               | 50,556                | 18.52              | -157,056          | -159,300         | 70.19              |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                   |                  |                    |
| Lights          | 190,447                 | 0                        | 0                      | 190,447          | 25.63              | 200,839               | 73.56              | 0                 | 0                | 0.00               |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 4.06               | 14,612                | 5.35               | 0                 | 0                | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Sub Total==>    | 220,650                 | 0                        | 0                      | 220,650          | 29.69              | 215,452               | 78.91              | 0                 | 0                | 0.00               |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00               | 1,553                 | 0.57               | -4,627            | 0                | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 283,790          | 38.19              | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 21.32              | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 2.67               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| OV/UNDR Sizing  | 5,476                   | 0                        | 0                      | 5,476            | 0.74               | 5,476                 | 2.01               | -67,648           | -67,648          | 29.81              |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.34              | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00              | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Grand Total==>  | 291,866                 | 9,026                    | 0                      | 743,152          | 100.00             | 273,035               | 100.00             | -229,331          | -226,948         | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 61.9                  | 743.2           | 27,856           | 80.4              | 68.4  | 87.5   | 60.8             | 60.4  | 80.0   | Part        | 27,121     |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 8,563      | 0 0    |
| Totals   | 61.9                  | 743.2           |                  |                   |       |        |                  |       |        | Wall        | 1,613      | 460 29 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) |
|----------|----------------|------------------|-------------|-------------|
| Main Htg | -448.6         | 27,856           | 60.8        | 75.6        |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         |
| Preheat  | -374.0         | 27,856           | 48.4        | 60.8        |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         |
| Total    | -822.6         |                  |             |             |

-----AIRFLOWS (cfm)-----

| Type    | Cooling | Heating |
|---------|---------|---------|
| Vent    | 8,357   | 0       |
| Infil   | 968     | 968     |
| Supply  | 27,856  | 27,856  |
| Mincfm  | 0       | 0       |
| Return  | 27,856  | 27,856  |
| Exhaust | 8,357   | 0       |
| Rm Exh  | 0       | 0       |
| Auxil   | 0       | 0       |

-----ENGINEERING CHECKS-----

| Clg % OA      | 30.0   |
|---------------|--------|
| Clg Cfm/Sqft  | 1.03   |
| Clg Cfm/Ton   | 449.80 |
| Clg Sqft/Ton  | 437.93 |
| Clg Btuh/Sqft | 27.40  |
| No. People    | 65     |
| Htg % OA      | 0.0    |
| Htg Cfm/Sqft  | 1.03   |
| Htg Btuh/Sqft | -30.33 |

-----TEMPERATURES (F)-----

| Type     | Clg  | Htg  |
|----------|------|------|
| SADB     | 66.0 | 75.6 |
| Plenum   | 75.4 | 66.5 |
| Return   | 76.1 | 67.5 |
| Ret/OA   | 80.4 | 67.5 |
| Runarnd  | 75.0 | 68.0 |
| Fn MtrTD | 1.3  | 1.3  |
| Fn BldTD | 1.0  | 1.0  |
| Fn Frict | 2.9  | 2.9  |

System 6 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|-------------------|------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                   |                  |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 1.95               | 16,221                | 5.94               | -48,286           | -48,286          | 21.28              |
| Glass Solar     | 8,014                   | 0                        | 0                      | 8,014            | 1.08               | 7,222                 | 2.64               | 0                 | 0                | 0.00               |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.65               | 5,167                 | 1.89               | -24,690           | -24,690          | 10.88              |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.63               | 5,622                 | 2.06               | -16,677           | -18,921          | 8.34               |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Infiltration    | 32,866                  | 0                        | 0                      | 32,866           | 4.42               | 16,324                | 5.98               | -67,403           | -67,403          | 29.70              |
| Sub Total==>    | 64,366                  | 526                      | 0                      | 64,892           | 8.73               | 50,556                | 18.52              | -157,056          | -159,300         | 70.19              |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                   |                  |                    |
| Lights          | 190,447                 | 0                        | 0                      | 190,447          | 25.63              | 200,839               | 73.56              | 0                 | 0                | 0.00               |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 4.06               | 14,612                | 5.35               | 0                 | 0                | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Sub Total==>    | 220,650                 | 0                        | 0                      | 220,650          | 29.69              | 215,452               | 78.91              | 0                 | 0                | 0.00               |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00               | 1,553                 | 0.57               | -4,627            | 0                | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 283,790          | 38.19              | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 21.32              | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 2.67               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                 | 0                | 0.00               |
| OV/UNDR Sizing  | 5,476                   | 0                        | 0                      | 5,476            | 0.74               | 5,476                 | 2.01               | -67,648           | -67,648          | 29.81              |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.34              | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00              | 0                     | 0.00               | 0                 | 0                | 0.00               |
| Grand Total==>  | 291,866                 | 9,026                    | 0                      | 743,152          | 100.00             | 273,035               | 100.00             | -229,331          | -226,948         | 100.00             |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/deg F | Entering WB/deg F | Grains | Leaving DB/deg F | Leaving WB/deg F | Grains | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------------------|--------|------------------|------------------|--------|-------------------|------------|-----|
| Main Clg | 61.9                  | 743.2           | 27,856           | 80.4              | 68.4              | 87.5   | 60.8             | 60.4             | 80.0   | 27,121            |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0               | 0.0    | 0.0              | 0.0              | 0.0    | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0               | 0.0    | 0.0              | 0.0              | 0.0    | 0                 |            |     |
| Totals   | 61.9                  | 743.2           | 27,856           | 80.4              | 68.4              | 87.5   | 60.8             | 60.4             | 80.0   | 8,563             | 460        | 29  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -245.5         | 27,856           | 67.5      | 75.6      | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 66.0 | 75.6 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 968     | 968     | Clg Cfm/Ton   | 449.80 | Plenum   | 75.4 | 66.5 |
| Preheat  | -374.0         | 27,856           | 48.4      | 60.8      | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 437.93 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 27.40  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -619.4         | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg Cfm/SqFt  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/SqFt | -22.84 | Fn Frict | 2.9  | 2.9  |

BUILDING U-VALUES - ALTERNATIVE 4  
 LOW E GLASS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |            |             |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |      |
|-------------|------------------|-------|-------|----------------------------------|-------------|------------|-------------|-------------|-------|-------|------------------------|-----------------------------|------|
|             |                  |       |       | Summr Skylt                      | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wall  | Ceil. |                        |                             |      |
| 1           | SUB BSMT, BSMT W | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317                  | 46.8                        | 9.61 |
| Zone        | 1 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317                  | 46.8                        | 9.61 |
| 4           | BSMT E           | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317                  | 45.2                        | 9.27 |
| Zone        | 4 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317                  | 45.2                        | 9.27 |
| System      | 1 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317                  | 46.4                        | 9.54 |
| 2           | TOILETS, KITCHEN | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 29.4                   | 5.93                        |      |
| Zone        | 2 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 29.4                   | 5.93                        |      |
| 11          | TOILETS W ROOF   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.000       | 0.000       | 0.000 | 0.317 | 71.1                   | 15.13                       |      |
| Zone        | 11 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.000       | 0.000       | 0.000 | 0.317 | 71.1                   | 15.13                       |      |
| System      | 2 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.317 | 35.3                   | 7.23                        |      |
| 3           | STAIRS           | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.229 | 0.000 | 103.3                  | 21.63                       |      |
| Zone        | 3 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.229 | 0.000 | 103.3                  | 21.63                       |      |
| 5           | 1ST FL OFFICES   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 57.9                   | 12.05                       |      |
| Zone        | 5 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 57.9                   | 12.05                       |      |
| 7           | 2ND FL OFFICES   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 56.7                   | 11.81                       |      |
| Zone        | 7 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 56.7                   | 11.81                       |      |
| 9           | 3RD FL OFFICES   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.317 | 102.3                  | 21.84                       |      |
| Zone        | 9 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.317 | 102.3                  | 21.84                       |      |
| 12          | STAIRS W ROOF    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.229 | 0.000 | 146.4                  | 31.13                       |      |
| Zone        | 12 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.229 | 0.000 | 146.4                  | 31.13                       |      |
| System      | 3 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.256 | 0.317 | 74.1                   | 15.63                       |      |
| 13          | SUPPLY STORAGE   | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 70.7                   | 14.70                       |      |
| Zone        | 13 Total/Ave.    | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 70.7                   | 14.70                       |      |
| System      | 4 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 70.7                   | 14.70                       |      |
| 6           | 1ST FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 32.5                   | 6.60                        |      |
| Zone        | 6 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 32.5                   | 6.60                        |      |
| 8           | 2ND FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.000 | 27.0                   | 5.41                        |      |
| Zone        | 8 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.000 | 27.0                   | 5.41                        |      |
| 10          | 3RD FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.000 | 71.5                   | 15.21                       |      |
| Zone        | 10 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.000 | 71.5                   | 15.21                       |      |
| System      | 5 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.317 | 43.1                   | 8.94                        |      |
| 14          | 1ST FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 32.5                   | 6.60                        |      |
| Zone        | 14 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 32.5                   | 6.60                        |      |
| 15          | 2ND FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.000 | 27.0                   | 5.41                        |      |
| Zone        | 15 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.000 | 27.0                   | 5.41                        |      |
| 16          | 3RD FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.000 | 71.5                   | 15.21                       |      |
| Zone        | 16 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.000 | 71.5                   | 15.21                       |      |
| System      | 6 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.317 | 43.1                   | 8.94                        |      |
| Building    |                  | 0.229 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.256 | 0.317 | 52.6                   | 10.93                       |      |

BUILDING AREAS - ALTERNATIVE 4  
 LOW E GLASS

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description      | Number of<br>Duplicate<br>Flr Rm |   | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|------------------|----------------------------------|---|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 1              | SUB BSMT, BSMT W | 1                                | 1 | 45,125                               | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 1 Total/Ave.     |                                  |   |                                      | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 4              | BSMT E           | 1                                | 1 | 12,424                               | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 4 Total/Ave.     |                                  |   |                                      | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 1 Total/Ave.     |                                  |   |                                      | 57,549                           | 16,570                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 2              | TOILETS, KITCHEN | 1                                | 1 | 3,520                                | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| Zone           | 2 Total/Ave.     |                                  |   |                                      | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| 11             | TOILETS W ROOF   | 1                                | 1 | 580                                  | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| Zone           | 11 Total/Ave.    |                                  |   |                                      | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| System         | 2 Total/Ave.     |                                  |   |                                      | 4,100                            | 0                           | 0                                  | 0                          | 0                 | 580                        | 21                       | 11                | 174                        |
| 3              | STAIRS           | 1                                | 1 | 560                                  | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| Zone           | 3 Total/Ave.     |                                  |   |                                      | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| 5              | 1ST FL OFFICES   | 1                                | 1 | 11,724                               | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| Zone           | 5 Total/Ave.     |                                  |   |                                      | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| 7              | 2ND FL OFFICES   | 1                                | 1 | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| Zone           | 7 Total/Ave.     |                                  |   |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| 9              | 3RD FL OFFICES   | 1                                | 1 | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| Zone           | 9 Total/Ave.     |                                  |   |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| 12             | STAIRS W ROOF    | 1                                | 1 | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| Zone           | 12 Total/Ave.    |                                  |   |                                      | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| System         | 3 Total/Ave.     |                                  |   |                                      | 41,364                           | 0                           | 0                                  | 0                          | 0                 | 14,680                     | 5,152                    | 18                | 23,202                     |
| 13             | SUPPLY STORAGE   | 1                                | 1 | 2,544                                | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 13 Total/Ave.    |                                  |   |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 4 Total/Ave.     |                                  |   |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 6              | 1ST FL CEN OFFCS | 1                                | 1 | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 6 Total/Ave.     |                                  |   |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 8              | 2ND FL CEN OFFCS | 1                                | 1 | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 8 Total/Ave.     |                                  |   |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 10             | 3RD FL CEN OFFCS | 1                                | 1 | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 10 Total/Ave.    |                                  |   |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 5 Total/Ave.     |                                  |   |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| 14             | 1ST FL CEN OFFCS | 1                                | 1 | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 14 Total/Ave.    |                                  |   |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 15             | 2ND FL CEN OFFCS | 1                                | 1 | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 15 Total/Ave.    |                                  |   |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 16             | 3RD FL CEN OFFCS | 1                                | 1 | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 16 Total/Ave.    |                                  |   |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 6 Total/Ave.     |                                  |   |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| Building       |                  |                                  |   |                                      | 159,799                          | 18,202                      | 0                                  | 0                          | 0                 | 32,386                     | 6,095                    | 19                | 25,681                     |

ASHRAE 90 ANALYSIS - ALTERNATIVE 4  
LOW E GLASS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 3.96 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTvw) = 15.92 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4  
 LOW E GLASS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 17.2                   | 0         | 0     | -201,274                 | 18        | 246   | 6,544.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 34.3                   | 0         | 4     | -402,547                 | 5         | 69    | 13,088.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 51.5                   | 7         | 76    | -603,821                 | 4         | 57    | 19,633.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 68.7                   | 9         | 100   | -805,095                 | 6         | 86    | 26,177.4                  | 0         | 0     | 0.0                       | 0         | 0     |
| 20 - 25             | 85.8                   | 14        | 151   | -1,006,369               | 2         | 32    | 32,721.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 103.0                  | 4         | 45    | -1,207,642               | 8         | 106   | 39,266.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 30 - 35             | 120.2                  | 11        | 113   | -1,408,916               | 8         | 107   | 45,810.5                  | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 137.4                  | 19        | 201   | -1,610,190               | 27        | 363   | 52,354.8                  | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 154.5                  | 3         | 30    | -1,811,464               | 15        | 202   | 58,899.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 171.7                  | 6         | 60    | -2,012,738               | 7         | 94    | 65,443.5                  | 0         | 0     | 0.0                       | 0         | 0     |
| 50 - 55             | 188.9                  | 6         | 67    | -2,214,012               | 0         | 0     | 71,987.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 206.0                  | 2         | 23    | -2,415,285               | 0         | 0     | 78,532.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 60 - 65             | 223.2                  | 4         | 40    | -2,616,559               | 0         | 0     | 85,076.6                  | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 240.4                  | 8         | 90    | -2,817,833               | 0         | 0     | 91,620.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 257.5                  | 4         | 45    | -3,019,106               | 0         | 0     | 98,165.3                  | 0         | 0     | 0.0                       | 0         | 0     |
| 75 - 80             | 274.7                  | 2         | 25    | -3,220,380               | 0         | 0     | 104,709.6                 | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 291.9                  | 0         | 0     | -3,421,654               | 0         | 0     | 111,254.0                 | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 309.0                  | 0         | 0     | -3,622,928               | 0         | 0     | 117,798.3                 | 100       | 2,520 | 0.0                       | 0         | 0     |
| 90 - 95             | 326.2                  | 0         | 0     | -3,824,202               | 0         | 0     | 124,342.7                 | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 343.4                  | 0         | 0     | -4,025,475               | 0         | 0     | 130,887.0                 | 0         | 0     | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,690 | 0                        | 0         | 7,398 | 0.0                       | 0         | 6,240 | 0.0                       | 0         | 8,760 |



BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4  
 LOW E GLASS

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature Range (F) | Zone Number                               |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
|-----------------------|-------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|
|                       | 1                                         | 4     | 2     | 11    | 3     | 5     | 7     | 9     | 12    | 13    | 6      | 8     | 10     | 14    | 15    | 16    |
| Max. Temp.            | 82.6                                      | 81.5  | 198.7 | 120.2 | 84.1  | 84.0  | 83.8  | 81.8  | 83.1  | 96.2  | 84.3   | 88.1  | 84.2   | 84.3  | 88.1  | 84.2  |
| Mo./Hr.               | 10 21                                     | 10 23 | 9 18  | 8 16  | 7 22  | 7 24  | 7 23  | 7 24  | 7 24  | 8 17  | 7 3 10 | 2 7 6 | 7 3 10 | 2 7 6 | 2 7 6 |       |
| Day Type              | 2                                         | 2     | 2     | 2     | 1     | 1     | 1     | 1     | 1     | 2     | 5      | 2     | 5      | 5     | 2     | 5     |
|                       | ..... N u m b e r   o f   H o u r s ..... |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
| Above 100             | 0                                         | 0     | 8,016 | 4,086 | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| 95 - 100              | 0                                         | 0     | 0     | 110   | 0     | 0     | 0     | 0     | 0     | 240   | 0      | 0     | 0      | 0     | 0     | 0     |
| 90 - 95               | 0                                         | 0     | 91    | 1,239 | 0     | 0     | 0     | 0     | 0     | 1,494 | 0      | 0     | 0      | 0     | 0     | 0     |
| 85 - 90               | 0                                         | 0     | 290   | 253   | 0     | 0     | 0     | 0     | 0     | 1,602 | 0      | 453   | 0      | 0     | 453   | 0     |
| 80 - 85               | 954                                       | 517   | 227   | 585   | 657   | 850   | 868   | 477   | 570   | 1,215 | 1,726  | 2,982 | 1,538  | 1,726 | 2,961 | 1,538 |
| 75 - 80               | 5,027                                     | 2,814 | 136   | 327   | 1,900 | 2,026 | 2,072 | 2,297 | 1,992 | 818   | 3,122  | 4,726 | 3,751  | 3,174 | 4,626 | 3,746 |
| 70 - 75               | 1,202                                     | 3,711 | 0     | 1,256 | 920   | 731   | 672   | 915   | 1,075 | 1,435 | 1,338  | 599   | 1,315  | 1,174 | 675   | 1,308 |
| 65 - 70               | 1,418                                     | 1,516 | 0     | 726   | 1,353 | 1,528 | 1,562 | 1,609 | 1,305 | 1,579 | 1,370  | 0     | 1,537  | 1,376 | 45    | 1,451 |
| 60 - 65               | 159                                       | 202   | 0     | 178   | 957   | 966   | 993   | 1,252 | 984   | 377   | 485    | 0     | 442    | 573   | 0     | 510   |
| 55 - 60               | 0                                         | 0     | 0     | 0     | 1,027 | 1,060 | 1,057 | 927   | 1,150 | 0     | 329    | 0     | 177    | 325   | 0     | 207   |
| 50 - 55               | 0                                         | 0     | 0     | 0     | 716   | 687   | 643   | 546   | 728   | 0     | 387    | 0     | 0      | 406   | 0     | 0     |
| Below 50              | 0                                         | 0     | 0     | 0     | 1,230 | 912   | 893   | 737   | 956   | 0     | 3      | 0     | 0      | 6     | 0     | 0     |
| Min. Temp.            | 63.8                                      | 63.0  | 68.0  | 63.6  | 32.4  | 33.6  | 33.7  | 36.3  | 34.1  | 61.7  | 50.0   | 67.9  | 57.4   | 49.8  | 67.9  | 57.2  |
| Mo./Hr.               | 1 8                                       | 1 10  | 1 1   | 2 6   | 2 11  | 2 7   | 2 7   | 2 7   | 2 7   | 1 6   | 2 7    | 1 7   | 1 7    | 2 7   | 1 7   | 1 7   |
| Day Type              | 5                                         | 5     | 1     | 5     | 4     | 5     | 5     | 5     | 5     | 5     | 5      | 1     | 5      | 5     | 1     | 5     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4  
LOW E GLASS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | STEAM              | STEAM DMND         |                      |
|-------|-------------------|-----------------|--------------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | WATER<br>(1000 G1) | On Peak<br>(Thrm/hr) |
| Jan   | 163,358           | 813             | 12,331             | 0                  | 72                   |
| Feb   | 147,800           | 813             | 11,547             | 0                  | 72                   |
| March | 178,338           | 813             | 9,310              | 0                  | 66                   |
| April | 150,842           | 813             | 2,990              | 0                  | 48                   |
| May   | 190,942           | 946             | 0                  | 70                 | 0                    |
| June  | 196,626           | 1,002           | 0                  | 108                | 0                    |
| July  | 194,441           | 1,057           | 0                  | 182                | 0                    |
| Aug   | 206,928           | 1,017           | 0                  | 120                | 0                    |
| Sept  | 173,936           | 964             | 0                  | 65                 | 0                    |
| Oct   | 165,117           | 813             | 1,997              | 0                  | 47                   |
| Nov   | 152,835           | 813             | 5,066              | 0                  | 60                   |
| Dec   | 155,579           | 813             | 10,554             | 0                  | 71                   |
| Total | 2,076,741         | 1,057           | 53,795             | 544                | 72                   |

Building Energy Consumption = 78,019 (Btu/Sq Ft/Year)  
Source Energy Consumption = 177,964 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
 LOW E GLASS

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | ----- Monthly Consumption ----- |                           |       |       |       |       |       |       |       |       |       |       | Total   |
|---------|------------|---------------------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|         |            | Jan                             | Feb                       | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0       | LIGHTS     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 78913                           | 71397                     | 86428 | 75155 | 82671 | 82671 | 75155 | 86428 | 75155 | 82671 | 75155 | 75155 | 946,954 |
|         | PK         | 410.7                           | 410.7                     | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7   |
| 1       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | GAS        | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | OIL        | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P STEAM    | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P HOTH2O   | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P CHILL    | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1       | EQ1001S    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | 2-STG CTV <555 TONS       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 13526 | 19210 | 33154 | 21448 | 12650 | 0     | 0     | 0     | 99,988  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 104.7 | 160.8 | 215.4 | 175.6 | 122.5 | 0.0   | 0.0   | 0.0   | 215.4   |
| 1       | EQ5100     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 5115  | 5115  | 4650  | 5348  | 4650  | 0     | 0     | 0     | 24,878  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 23.3  | 23.3  | 23.3  | 23.3  | 23.3  | 0.0   | 0.0   | 0.0   | 23.3    |
| 1       | EQ5100     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | WATER      | 0                               | 0                         | 0     | 0     | 70    | 108   | 182   | 120   | 65    | 0     | 0     | 0     | 544     |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.6   | 0.9   | 1.1   | 1.0   | 0.7   | 0.0   | 0.0   | 0.0   | 1.1     |
| 1       | EQ5001     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CHILLED WATER PUMP C.V.   |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5010     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CONDENSER WATER PUMP C.V. |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5300     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CONTROL PANEL & INTERLOCK |       |       |       |       |       |       |       |       |       |       |         |

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
 LOW E GLASS

|   |         |                            |       |       |       |       |       |       |       |       |       |       |       |         |
|---|---------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|   | ELEC    | 0                          | 0     | 0     | 0     | 220   | 220   | 200   | 230   | 200   | 0     | 0     | 0     | 1,070   |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 0.0   | 0.0   | 0.0   | 1.0     |
| 2 | EQ1000  | PREVENTS COOLING ENERGY    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5001  | CHILLED WATER PUMP C.V.    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5010  | CONDENSER WATER PUMP C.V.  |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 9754                       | 8825  | 10683 | 9290  | 10219 | 10219 | 9290  | 10683 | 9290  | 10219 | 9290  | 9290  | 117,051 |
|   | PK      | 46.4                       | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4    |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2276                       | 2059  | 2493  | 2168  | 2384  | 2384  | 2168  | 2493  | 2168  | 2384  | 2168  | 2168  | 27,312  |
|   | PK      | 10.8                       | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8    |
| 2 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 13975                      | 12644 | 15305 | 13309 | 14640 | 14640 | 13309 | 15305 | 13309 | 14640 | 13309 | 13309 | 167,695 |
|   | PK      | 66.5                       | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5    |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 1747                       | 1580  | 1913  | 1664  | 1830  | 1830  | 1664  | 1913  | 1664  | 1830  | 1664  | 1664  | 20,962  |
|   | PK      | 8.3                        | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3     |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 1 | EQ2101  | PURCHASED DISTRICT STEAM   |       |       |       |       |       |       |       |       |       |       |       |         |
|   | P STEAM | 2113                       | 1979  | 1589  | 512   | 0     | 0     | 0     | 0     | 0     | 335   | 859   | 1809  | 9,197   |
|   | PK      | 12.4                       | 12.4  | 11.3  | 8.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 8.0   | 10.4  | 12.2  | 12.4    |
| 1 | EQ5020  | HEAT WATER CIRC. PUMP C.V. |       |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 4  
LOW E GLASS

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 1,056.7 (kW)  
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

| Eq.<br>Ref.<br>Num.  | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| Cooling Equipment    |                        |                                    |                           |                          |
| 1                    | EQ1001S                | 2-STG CTV <555 TONS                | 299.3                     | 28.32                    |
| Sub Total            |                        |                                    | 299.3                     | 28.32                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Air Moving Equipment |                        |                                    |                           |                          |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 57.3                      | 5.42                     |
| 3                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 74.9                      | 7.08                     |
| 5                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 167.3                     | 10.15                    |
| 6                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 10.15                    |
| Sub Total            |                        |                                    | 346.8                     | 32.81                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Miscellaneous        |                        |                                    |                           |                          |
| Lights               |                        |                                    | 410.7                     | 38.86                    |
| Base Utilities       |                        |                                    | 0.0                       | 0.00                     |
| Misc Equipment       |                        |                                    | 0.0                       | 0.00                     |
| Sub Total            |                        |                                    | 410.7                     | 38.86                    |
| Grand Total          |                        |                                    | 1,056.7                   | 100.00                   |

```
*****  
*****  
**  
**          TRACE 600 ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 122

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Reflectance: 0.20  
Winter Ground Reflectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 11:42:49 2/ 2/94  
Dataset Name: CB122B .TM

AIRFLOW - ALTERNATIVE 1  
 REPLACE FLUORESCENT LAMPS

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | TRH         | 10,853                | 36,175                | 36,175                | 36,175               | 10,853                | 0                    | 0                     |
| 2             | SZ          | 0                     | 17,730                | 17,730                | 17,730               | 0                     | 0                    | 17,730                |
| 3             | INDFP       | 5,830                 | 19,435                | 19,435                | 36,448               | 19,435                | 35,813               | 0                     |
| 4             | UH          | 0                     | 0                     | 1,835                 | 0                    | 0                     | 0                    | 0                     |
| 5             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 27,856                | 0                    | 0                     |
| 6             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 9,325                 | 0                    | 0                     |
| Totals        |             | 33,397                | 129,052               | 130,887               | 148,000              | 67,468                | 35,813               | 17,730                |

CAPACITY - ALTERNATIVE 1  
 REPLACE FLUORESCENT LAMPS

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      | Cooling Totals (Tons) | Heating                   |                           |                         |                        | Heating Totals (Btuh) |                          |                      |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|-----------------------|--------------------------|----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) |                       | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) |                       | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) |
| 1             | TRH         | 76.6                      | 0.0                       | 0.0                  | 0.0                  | 76.6                  | -68,182                   | 0                         | -523,059                | 0                      | 0                     | 0                        | -591,242             |
| 2             | SZ          | 2.9                       | 0.0                       | 0.0                  | 0.0                  | 2.9                   | -9,837                    | 0                         | -109,353                | 0                      | 0                     | 0                        | -9,837               |
| 3             | INDFP       | 46.4                      | 101.4                     | 0.0                  | 0.0                  | 147.8                 | -680,963                  | -1,230,942                | 0                       | 0                      | 0                     | 0                        | -1,911,905           |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -6,715                    | 0                         | 0                       | 0                      | 0                     | 0                        | -6,715               |
| 5             | DD          | 60.7                      | 0.0                       | 0.0                  | 0.0                  | 60.7                  | -437,529                  | 0                         | -385,103                | 0                      | 0                     | 0                        | -822,632             |
| 6             | DD          | 60.7                      | 0.0                       | 0.0                  | 0.0                  | 60.7                  | -245,454                  | 0                         | -385,103                | 0                      | 0                     | 0                        | -630,557             |
| Totals        |             | 247.3                     | 101.4                     | 0.0                  | 0.0                  | 348.7                 | -1,448,680                | -1,230,942                | -1,402,619              | 0                      | 0                     | 0                        | -3,972,888           |

The building peaked at hour 14 month 7 with a capacity of 247.3 tons



ENGINEERING CHECKS - ALTERNATIVE 1  
 REPLACE FLUORESCENT LAMPS

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | ----- Cooling ----- |         |            |            | --- Heating --- |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|---------------------|---------|------------|------------|-----------------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft           | Cfm/Ton | Sq Ft /Ton | Btuh/Sq Ft | Cfm/Sq Ft       | Btuh/Sq Ft |                  |
| 1             | Main           | TRH         | 30.00               | 0.63                | 472.2   | 751.1      | 15.98      | 0.63            | -10.27     | 57,549           |
| 2             | Main           | SZ          | 0.00                | 4.32                | 6,103.3 | 1,411.4    | 8.50       | 4.32            | -2.40      | 4,100            |
| 3             | Main           | INDFP       | 30.00               | 0.47                | 418.7   | 891.2      | 13.46      | 0.47            | -16.46     | 41,364           |
| 3             | Auxiliary      | INDFP       | 0.00                | 0.87                | 353.3   | 408.1      | 29.40      | 0.87            | -29.76     | 41,364           |
| 4             | Main           | UH          | 0.00                | 0.00                | 0.0     | 0.0        | 0.00       | 0.72            | -2.64      | 2,544            |
| 5             | Main           | DD          | 30.00               | 1.03                | 458.9   | 446.8      | 26.86      | 1.03            | -30.33     | 27,121           |
| 6             | Main           | DD          | 30.00               | 1.03                | 458.9   | 446.8      | 26.86      | 1.03            | -23.25     | 27,121           |

System 1 Peak TRH - TERMINAL REHEAT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Partition       | 18,940                  |                          |                        | - 18,940         | 2.06             | * | 18,940                | 4.39             | * | -68,182                      | -68,182                   | 100.00           |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 18,940                  | 0                        |                        | 18,940           | 2.06             | * | 18,940                | 4.39             | * | -68,182                      | -68,182                   | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 358,437                 | 0                        |                        | 358,437          | 38.99            | * | 381,123               | 88.39            | * | 0                            | 0                         | 0.00             |
| People          | 63,941                  |                          |                        | 63,941           | 6.95             | * | 31,097                | 7.21             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 422,378                 | 0                        | 0                      | 422,378          | 45.94            | * | 412,220               | 95.61            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 388,314          | 42.24            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 77,173           | 8.39             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 18,007                   |                        | 18,007           | 1.96             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | -0.00            | * | 0                     | -0.00            | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | -5,402                   | 0                      | -5,402           | -0.59            | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Grand Total==>  | 441,318                 | 12,605                   | 0                      | 919,411          | 100.00           | * | 431,160               | 100.00           | * | -68,182                      | -68,182                   | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 76.6                  | 919.4           | 679.2            | 80.0              | 67.9  | 85.7   | 62.1             | 60.2  | 77.2   | Part        | 16,570     |     |
| Aux Clg  | 0.0                   | 0.0             | 0.0              | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |     |
| Opt Vent | 0.0                   | 0.0             | 0.0              | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 76.6                  | 919.4           |                  |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

-----AIRFLWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -68.2          | 36,175           | 68.0      | 69.7      | Vent    | 10,853  | 0       | Clg Cfm/Sqft  | 0.63   | SADB     | 64.0 | 69.7 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 0       | Clg Cfm/Ton   | 472.15 | Plenum   | 75.0 | 68.0 |
| Preheat  | -523.1         | 36,175           | 48.8      | 62.1      | Supply  | 36,175  | 36,175  | Clg Sqft/Ton  | 751.12 | Return   | 75.5 | 68.0 |
| Reheat   | -0.0           | 0                | 0.0       | 0.0       | MinCFM  | 36,175  | 0       | Clg Btuh/Sqft | 15.98  | Ret/OA   | 80.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 36,175  | 36,175  | No. People    | 137    | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 10,853  | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.5  | 0.5  |
| Total    | -591.2         |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.63   | Fn BldTD | 0.4  | 0.4  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -10.27 | Fn Frict | 1.1  | 1.1  |

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 860                      | 0                      | 860              | 2.47               | 0                     | 0.00               | 0                            | -3,224                    | 44.57              |
| Glass Solar     | 595                     | 0                        | 0                      | 595              | 1.71               | 595                   | 1.87               | 0                            | 0                         | 0.00               |
| Glass Cond      | 239                     | 0                        | 0                      | 239              | 0.69               | 239                   | 0.75               | -1,139                       | -1,139                    | 15.75              |
| Wall Cond       | 747                     | 183                      | 0                      | 929              | 2.67               | 747                   | 2.35               | -2,286                       | -2,870                    | 39.68              |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 1,581                   | 1,042                    | 0                      | 2,623            | 7.52               | 1,581                 | 4.98               | -3,426                       | -7,234                    | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 27,525                  | 0                        | 0                      | 27,525           | 78.96              | 27,525                | 86.72              | 0                            | 0                         | 0.00               |
| People          | 4,712                   | 0                        | 0                      | 4,712            | 13.52              | 2,223                 | 7.00               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 32,237                  | 0                        | 0                      | 32,237           | 92.48              | 29,747                | 93.72              | 0                            | 0                         | 0.00               |
| Ceiling Load    | 1,918                   | -1,918                   | 0                      | 0                | 0.00               | 411                   | 1.30               | -243                         | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | -0.00              |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Grand Total==>  | 35,736                  | -876                     | 0                      | 34,860           | 100.00             | 31,739                | 100.00             | -3,668                       | -7,234                    | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 2.9                   | 34.9            | 17,730           | 76.6              | 69.0  | 97.1   | 73.4             | 68.4  | 99.4   | 4,100       |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 2.9                   | 34.9            |                  |                   |       |        |                  |       |        | 580         | 0          | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        | 196         | 21         | 11  |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F |
|----------|----------------|------------------|-----------|-----------|
| Main Htg | -9.8           | 17,730           | 67.7      | 68.2      |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       |
| Preheat  | -109.4         | 17,750           | 67.7      | 73.4      |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       |
| Total    | -9.8           |                  |           |           |

-----AIRFLOWS (cfm)-----

| Type    | Cooling | Heating |
|---------|---------|---------|
| Vent    | 0       | 0       |
| Infil   | 0       | 0       |
| Supply  | 17,730  | 17,730  |
| Mincfm  | 0       | 0       |
| Return  | 0       | 17,730  |
| Exhaust | 0       | 0       |
| Rm Exh  | 17,730  | 0       |
| Auxil   | 0       | 0       |

-----ENGINEERING CHECKS-----

| Clg % OA      | 0.0     |
|---------------|---------|
| Clg Cfm/Sqft  | 4.32    |
| Clg Cfm/Ton   | 6103.28 |
| Clg Sqft/Ton  | 1411.36 |
| Clg Btuh/Sqft | 8.50    |
| No. People    | 10      |
| Htg % OA      | 0.0     |
| Htg Cfm/Sqft  | 4.32    |
| Htg Btuh/Sqft | -2.40   |

-----TEMPERATURES (F)-----

| Type     | Clg  | Htg  |
|----------|------|------|
| SADB     | 73.4 | 68.2 |
| Plenum   | 76.5 | 67.7 |
| Return   | 79.7 | 67.7 |
| Ret/OA   | 76.6 | 67.7 |
| Runarnd  | 75.0 | 68.0 |
| Fn MtrTD | 0.0  | 0.0  |
| Fn BldTD | 0.0  | 0.0  |
| Fn Frict | 0.0  | 0.0  |

System 3 Block INDFP - 4-PIPE INDUCTION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/19 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 85 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 474                     | 21,484                   | 0                      | 21,957           | 1.24             | * | 664                   | 0.10             | * | -1,579                       | -73,446                   | 3.84             |
| Glass Solar     | 171,927                 | 0                        | 0                      | 171,927          | 9.69             | * | 185,822               | 27.84            | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 53,830                  | 0                        | 0                      | 53,830           | 3.03             | * | 40,082                | 6.01             | * | -276,287                     | -276,287                  | 14.45            |
| Wall Cond       | 113,330                 | 16,902                   | 0                      | 130,232          | 7.34             | * | 168,977               | 25.32            | * | -328,407                     | -377,319                  | 19.74            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 736,354                 | 0                        | 0                      | 736,354          | 41.49            | * | 170,578               | 25.56            | * | -1,184,852                   | -1,184,852                | 61.97            |
| Sub Total==>    | 1,075,915               | 38,386                   | 0                      | 1,114,301        | 62.79            | * | 566,123               | 84.82            | * | -1,791,125                   | -1,911,905                | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Lights          | 249,542                 | 0                        | 0                      | 249,542          | 14.06            | * | 71,677                | 10.74            | * | 0                            | 0                         | 0.00             |
| People          | 45,248                  | 0                        | 0                      | 45,248           | 2.55             | * | 6,070                 | 0.91             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 294,790                 | 0                        | 0                      | 294,790          | 16.61            | * | 77,746                | 11.65            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 14,654                  | -14,654                  | 0                      | 0                | 0.00             | * | 23,486                | 3.52             | * | -47,811                      | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 252,361          | 14.22            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 110,564          | 6.23             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 13,820                   | 0                      | 13,820           | 0.78             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 119                     | 0                        | 0                      | 119              | 0.01             | * | 119                   | 0.02             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | -11,266                  | 0                      | -11,266          | -0.63            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 1,385,477               | 26,287                   | 0                      | 1,774,689        | 100.00           | * | 667,475               | 100.00           | * | -1,838,936                   | -1,911,905                | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)      |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|----------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |          |
| Main Clg | 46.4                  | 557.0           | 19,435           | 80.9              | 66.7  | 78.0   | 59.9             | 57.7  | 69.7   | Part        | 0          |          |
| Aux Clg  | 101.4                 | 1,216.2         | 35,813           | 75.0              | 64.5  | 76.4   | 65.1             | 53.2  | 43.1   | ExFlr       | 0          |          |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 14,680     | 0 0      |
| Totals   | 147.8                 | 1,773.2         |                  |                   |       |        |                  |       |        | Wall        | 28,354     | 5,152 18 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------------------|------|------|
|          |                |                  |           |           |         |         |         | Clg % GA               | 30.0   | Type                 | Clg  | Htg  |
| Main Htg | -681.0         | 19,435           | 64.5      | 96.7      | Vent    | 5,830   | 0       | Clg Cfm/Sqft           | 0.47   | SADB                 | 65.1 | 96.7 |
| Aux Htg  | -1,230.9       | 35,813           | 68.0      | 99.6      | Infil   | 17,013  | 17,013  | Clg Cfm/Ton            | 418.73 | Plenum               | 76.1 | 64.4 |
| Preheat  | -0.0           | 19,435           | 64.5      | 59.9      | Supply  | 19,435  | 19,435  | Clg Sqft/Ton           | 891.20 | Return               | 76.8 | 64.5 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft          | 13.46  | Ret/OA               | 80.9 | 64.5 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 19,435  | 19,435  | No. People             | 98     | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 5,830   | 0       | Htg % GA               | 0.0    | Fn MtrTD             | 1.3  | 1.3  |
| Total    | -1,911.9       |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/SqFt           | 0.47   | Fn BldTD             | 1.0  | 1.0  |
|          |                |                  |           |           | Auxil   | 35,813  | 35,813  | Htg Btuh/SqFt          | -16.46 | Fn Frict             | 2.9  | 2.9  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time => Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air => OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -6,715                       | -6,715                    | 100.00           |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total=>     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -6,715                       | -6,715                    | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total=>     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total=>   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -6,715                       | -6,715                    | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 2,544      |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 1,632      |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0   | Type     | Clg | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|-------|----------|-----|------|
| Main Htg | -6.7           | 1,835            | 68.0      | 71.4      | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00  | SADB     | 0.0 | 71.4 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 0       | Clg Cfm/Ton   | 0.00  | Plenum   | 0.0 | 68.0 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 1,835   | Clg Sqft/Ton  | 0.00  | Return   | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00  | Ret/OA   | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 1,835   | No. People    | 0     | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % OA      | 0.0   | Fn MtrTD | 0.0 | 0.0  |
| Total    | -6.7           |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.72  | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -2.64 | Fn Frict | 0.1 | 0.0  |

System 5 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 1.99             | * | 16,221                | 6.19             | * | -48,286           | -48,286          | 21.28            |
| Glass Solar     | 17,909                  | 0                        | 0                      | 17,909           | 2.46             | * | 16,285                | 6.22             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.66             | * | 5,167                 | 1.97             | * | -24,690           | -24,690          | 10.88            |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.64             | * | 5,622                 | 2.15             | * | -16,677           | -18,921          | 8.34             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 32,290                  | 0                        | 0                      | 32,290           | 4.43             | * | 16,324                | 6.23             | * | -67,403           | -67,403          | 29.70            |
| Sub Total==>    | 73,686                  | 526                      | 0                      | 74,213           | 10.19            | * | 59,619                | 22.76            | * | -157,056          | -159,300         | 70.19            |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 171,180                 | 0                        | 0                      | 171,180          | 23.50            | * | 180,521               | 68.92            | * | 0                 | 0                | 0.00             |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 4.15             | * | 14,612                | 5.58             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 201,383                 | 0                        | 0                      | 201,383          | 27.65            | * | 195,133               | 74.50            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00             | * | 1,553                 | 0.59             | * | -4,627            | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 278,822          | 38.28            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 21.76            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 2.72             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 5,616                   | 0                        | 0                      | 5,616            | 0.77             | * | 5,616                 | 2.14             | * | -67,648           | -67,648          | 29.81            |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.36            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Grand Total==>  | 282,060                 | 9,026                    | 0                      | 728,377          | 100.00           | * | 261,921               | 100.00           | * | -229,331          | -226,948         | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------|------------|-----|
| Main Clg | 60.7                  | 728.4           | 27,856           | 80.4                      | 68.5                     | Floor       | 27,121     |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | Part        | 0          |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | ExFlr       | 0          |     |
| Totals   | 60.7                  | 728.4           |                  |                           |                          | Roof        | 8,563      | 0   |
|          |                       |                 |                  |                           |                          | Wall        | 1,613      | 460 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -437.5         | 27,856           | 61.1        | 75.6        | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 66.4 | 75.6 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 968     | 968     | Clg Cfm/Ton   | 458.93 | Plenum   | 75.4 | 66.5 |
| Preheat  | -385.1         | 27,856           | 48.4        | 61.1        | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 446.82 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 26.86  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -822.6         |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -30.33 | Fn Frict | 2.9  | 2.9  |

System 6 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 1.99             | * | 16,221                | 6.19             | * | -48,286           | -48,286          | 21.28            |
| Glass Solar     | 17,909                  | 0                        | 0                      | 17,909           | 2.46             | * | 16,285                | 6.22             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.66             | * | 5,167                 | 1.97             | * | -24,690           | -24,690          | 10.88            |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.64             | * | 5,622                 | 2.15             | * | -16,677           | -18,921          | 8.34             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 32,290                  | 0                        | 0                      | 32,290           | 4.43             | * | 16,324                | 6.23             | * | -67,403           | -67,403          | 29.70            |
| Sub Total==>    | 73,686                  | 526                      | 0                      | 74,213           | 10.19            | * | 59,619                | 22.76            | * | -157,056          | -159,300         | 70.19            |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 171,180                 | 0                        | 0                      | 171,180          | 23.50            | * | 180,521               | 68.92            | * | 0                 | 0                | 0.00             |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 4.15             | * | 14,612                | 5.58             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 201,383                 | 0                        | 0                      | 201,383          | 27.65            | * | 195,133               | 74.50            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00             | * | 1,553                 | 0.59             | * | -4,627            | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 278,822          | 38.28            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 21.76            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 2.72             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 5,616                   | 0                        | 0                      | 5,616            | 0.77             | * | 5,616                 | 2.14             | * | -67,648           | -67,648          | 29.81            |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.36            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Grand Total==>  | 282,060                 | 9,026                    | 0                      | 728,377          | 100.00           | * | 261,921               | 100.00           | * | -229,331          | -226,948         | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |        |
| Main Clg | 60.7                  | 728.4           | 27,856           | 80.4              | 68.5  | 88.1   | 61.1             | 60.7  | 80.8   | Part        | 27,121     |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Exflr       | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 8,563      | 0 0    |
| Totals   | 60.7                  | 728.4           |                  |                   |       |        |                  |       |        | Wall        | 1,613      | 460 29 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -245.5         | 27,856           | 67.5      | 75.6      | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 66.4 | 75.6 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 968     | 968     | Clg Cfm/Ton   | 458.93 | Plenum   | 75.4 | 66.5 |
| Preheat  | -385.1         | 27,856           | 48.4      | 61.1      | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 446.82 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 26.86  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -630.6         |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -23.25 | Fn Frict | 2.9  | 2.9  |

BUILDING U-VALUES - ALTERNATIVE 1  
 REPLACE FLUORESCENT LAMPS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Room U-Values<br>(Btu/hr/sqft/F) |       |             |             |       |             |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|------------------|----------------------------------|-------|-------------|-------------|-------|-------------|-------------|-------|-------|------------------------|-----------------------------|
|             |                  | Part.                            | ExFlr | Summr Skylt | Wintr Skylt | Roof  | Summr Windo | Wintr Windo | Wall  | Ceil. |                        |                             |
| 1           | SUB BSMT, BSMT W | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.317 | 46.8                   | 9.61                        |
| Zone        | 1 Total/Ave.     | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.317 | 46.8                   | 9.61                        |
| 4           | BSMT E           | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.317 | 45.2                   | 9.27                        |
| Zone        | 4 Total/Ave.     | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.317 | 45.2                   | 9.27                        |
| System      | 1 Total/Ave.     | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.317 | 46.4                   | 9.54                        |
| 2           | TOILETS, KITCHEN | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 | 29.4                   | 5.93                        |
| Zone        | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 | 29.4                   | 5.93                        |
| 11          | TOILETS W ROOF   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.000       | 0.000       | 0.000 | 0.317 | 71.1                   | 15.13                       |
| Zone        | 11 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.000       | 0.000       | 0.000 | 0.317 | 71.1                   | 15.13                       |
| System      | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 | 35.3                   | 7.23                        |
| 3           | STAIRS           | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.229 | 0.000 | 103.3                  | 21.63                       |
| Zone        | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.229 | 0.000 | 103.3                  | 21.63                       |
| 5           | 1ST FL OFFICES   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 | 57.9                   | 12.05                       |
| Zone        | 5 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 | 57.9                   | 12.05                       |
| 7           | 2ND FL OFFICES   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 | 56.7                   | 11.81                       |
| Zone        | 7 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 | 56.7                   | 11.81                       |
| 9           | 3RD FL OFFICES   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 | 102.3                  | 21.84                       |
| Zone        | 9 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 | 102.3                  | 21.84                       |
| 12          | STAIRS W ROOF    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.229 | 0.000 | 146.4                  | 31.13                       |
| Zone        | 12 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.229 | 0.000 | 146.4                  | 31.13                       |
| System      | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.256 | 0.317 | 74.1                   | 15.63                       |
| 13          | SUPPLY STORAGE   | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 70.7                   | 14.70                       |
| Zone        | 13 Total/Ave.    | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 70.7                   | 14.70                       |
| System      | 4 Total/Ave.     | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 70.7                   | 14.70                       |
| 6           | 1ST FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 | 32.5                   | 6.60                        |
| Zone        | 6 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 | 32.5                   | 6.60                        |
| 8           | 2ND FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 | 27.0                   | 5.41                        |
| Zone        | 8 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 | 27.0                   | 5.41                        |
| 10          | 3RD FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 | 71.5                   | 15.21                       |
| Zone        | 10 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 | 71.5                   | 15.21                       |
| System      | 5 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 | 43.1                   | 8.94                        |
| 14          | 1ST FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 | 32.5                   | 6.60                        |
| Zone        | 14 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 | 32.5                   | 6.60                        |
| 15          | 2ND FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 | 27.0                   | 5.41                        |
| Zone        | 15 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 | 27.0                   | 5.41                        |
| 16          | 3RD FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 | 71.5                   | 15.21                       |
| Zone        | 16 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 | 71.5                   | 15.21                       |
| System      | 6 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 | 43.1                   | 8.94                        |
| Building    |                  | 0.229                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.256 | 0.317 | 52.6                   | 10.93                       |



BUILDING AREAS - ALTERNATIVE 1  
 REPLACE FLUORESCENT LAMPS

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description      | Number of<br>Duplicate |   | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|------------------|------------------------|---|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 1              | SUB BSMT, BSMT W | 1                      | 1 | 45,125                               | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 1 Total/Ave.     |                        |   |                                      | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 4              | BSMT E           | 1                      | 1 | 12,424                               | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 4 Total/Ave.     |                        |   |                                      | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 1 Total/Ave.     |                        |   |                                      | 57,549                           | 16,570                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 2              | TOILETS, KITCHEN | 1                      | 1 | 3,520                                | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| Zone           | 2 Total/Ave.     |                        |   |                                      | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| 11             | TOILETS W ROOF   | 1                      | 1 | 580                                  | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| Zone           | 11 Total/Ave.    |                        |   |                                      | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| System         | 2 Total/Ave.     |                        |   |                                      | 4,100                            | 0                           | 0                                  | 0                          | 0                 | 580                        | 21                       | 11                | 174                        |
| 3              | STAIRS           | 1                      | 1 | 560                                  | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| Zone           | 3 Total/Ave.     |                        |   |                                      | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| 5              | 1ST FL OFFICES   | 1                      | 1 | 11,724                               | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| Zone           | 5 Total/Ave.     |                        |   |                                      | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| 7              | 2ND FL OFFICES   | 1                      | 1 | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| Zone           | 7 Total/Ave.     |                        |   |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| 9              | 3RD FL OFFICES   | 1                      | 1 | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| Zone           | 9 Total/Ave.     |                        |   |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| 12             | STAIRS W ROOF    | 1                      | 1 | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| Zone           | 12 Total/Ave.    |                        |   |                                      | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| System         | 3 Total/Ave.     |                        |   |                                      | 41,364                           | 0                           | 0                                  | 0                          | 0                 | 14,680                     | 5,152                    | 18                | 23,202                     |
| 13             | SUPPLY STORAGE   | 1                      | 1 | 2,544                                | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 13 Total/Ave.    |                        |   |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 4 Total/Ave.     |                        |   |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 6              | 1ST FL CEN OFFCS | 1                      | 1 | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 6 Total/Ave.     |                        |   |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 8              | 2ND FL CEN OFFCS | 1                      | 1 | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 8 Total/Ave.     |                        |   |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 10             | 3RD FL CEN OFFCS | 1                      | 1 | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 10 Total/Ave.    |                        |   |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 5 Total/Ave.     |                        |   |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| 14             | 1ST FL CEN OFFCS | 1                      | 1 | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 14 Total/Ave.    |                        |   |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 15             | 2ND FL CEN OFFCS | 1                      | 1 | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 15 Total/Ave.    |                        |   |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 16             | 3RD FL CEN OFFCS | 1                      | 1 | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 16 Total/Ave.    |                        |   |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 6 Total/Ave.     |                        |   |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| Building       |                  |                        |   |                                      | 159,799                          | 18,202                      | 0                                  | 0                          | 0                 | 32,386                     | 6,095                    | 19                | 25,681                     |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
REPLACE FLUORESCENT LAMPS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 REPLACE FLUORESCENT LAMPS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 17.4                   | 0            | 0     | -204,112                 | 17           | 229   | 6,544.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 34.9                   | 1            | 12    | -408,224                 | 6            | 82    | 13,088.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 52.3                   | 11           | 122   | -612,336                 | 5            | 72    | 19,633.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 69.7                   | 8            | 88    | -816,448                 | 6            | 73    | 26,177.4                  | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 87.2                   | 8            | 87    | -1,020,560               | 2            | 31    | 32,721.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 104.6                  | 9            | 91    | -1,224,672               | 7            | 87    | 39,266.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 122.0                  | 18           | 191   | -1,428,784               | 8            | 102   | 45,810.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 139.5                  | 9            | 99    | -1,632,896               | 26           | 344   | 52,354.8                  | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 156.9                  | 6            | 67    | -1,837,009               | 14           | 182   | 58,899.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 174.3                  | 3            | 27    | -2,041,121               | 9            | 114   | 65,443.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 191.8                  | 4            | 44    | -2,245,233               | 0            | 0     | 71,987.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 209.2                  | 4            | 42    | -2,449,345               | 0            | 0     | 78,532.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 226.6                  | 3            | 35    | -2,653,457               | 0            | 0     | 85,076.6                  | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 244.1                  | 9            | 95    | -2,857,569               | 0            | 0     | 91,620.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 261.5                  | 6            | 60    | -3,061,681               | 0            | 0     | 98,165.3                  | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 278.9                  | 1            | 10    | -3,265,793               | 0            | 0     | 104,709.6                 | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 296.4                  | 0            | 0     | -3,469,905               | 0            | 0     | 111,254.0                 | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 313.8                  | 0            | 0     | -3,674,018               | 0            | 0     | 117,798.3                 | 100          | 2,520 | 0.0                       | 0            | 0     |
| 90 - 95                   | 331.3                  | 0            | 0     | -3,878,130               | 0            | 0     | 124,342.7                 | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 348.7                  | 0            | 0     | -4,082,242               | 0            | 0     | 130,887.0                 | 0            | 0     | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,690 | 0                        | 0            | 7,444 | 0.0                       | 0            | 6,240 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 1  
 REPLACE FLUORESCENT LAMPS

----- BUILDING TEMPERATURE PROFILES -----

| Temperature Range (F) | ----- Zone Number -----     |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
|-----------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|
|                       | 1                           | 4     | 2     | 11    | 3     | 5     | 7     | 9     | 12    | 13    | 6      | 8     | 10     | 14    | 15    | 16    |
| Max. Temp.            | 81.3                        | 80.3  | 189.2 | 117.0 | 86.4  | 85.0  | 84.7  | 83.2  | 85.3  | 94.4  | 85.0   | 87.5  | 84.4   | 85.0  | 87.5  | 84.4  |
| Mo./Hr.               | 10 22                       | 10 24 | 9 18  | 8 17  | 7 20  | 7 24  | 7 24  | 7 21  | 7 20  | 8 16  | 7 3 10 | 2 7 6 | 7 3 10 | 2 7 6 | 2 7 6 | 2 7 6 |
| Day Type              | 2                           | 2     | 2     | 2     | 4     | 1     | 1     | 4     | 4     | 2     | 5      | 2     | 5      | 5     | 2     | 5     |
|                       | ..... Number of Hours ..... |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
| Above 100             | 0                           | 0     | 7,727 | 3,297 | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| 95 - 100              | 0                           | 0     | 289   | 813   | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| 90 - 95               | 0                           | 0     | 0     | 338   | 0     | 0     | 0     | 0     | 0     | 1,533 | 0      | 0     | 0      | 0     | 0     | 0     |
| 85 - 90               | 0                           | 0     | 261   | 1,171 | 118   | 0     | 0     | 0     | 36    | 1,634 | 0      | 306   | 0      | 0     | 306   | 0     |
| 80 - 85               | 238                         | 76    | 313   | 129   | 1,161 | 1,168 | 1,136 | 690   | 1,145 | 688   | 1,810  | 3,004 | 1,449  | 1,810 | 2,999 | 1,449 |
| 75 - 80               | 5,226                       | 2,694 | 170   | 852   | 1,748 | 1,925 | 1,957 | 2,319 | 1,904 | 1,157 | 3,022  | 4,785 | 3,784  | 3,062 | 4,503 | 3,774 |
| 70 - 75               | 1,482                       | 3,922 | 0     | 565   | 635   | 596   | 596   | 731   | 587   | 1,403 | 1,203  | 662   | 1,170  | 1,067 | 904   | 1,033 |
| 65 - 70               | 1,538                       | 1,712 | 0     | 1,283 | 1,387 | 1,552 | 1,571 | 1,610 | 1,456 | 1,816 | 1,467  | 0     | 1,706  | 1,479 | 48    | 1,744 |
| 60 - 65               | 276                         | 356   | 0     | 312   | 1,106 | 1,136 | 1,101 | 1,370 | 1,135 | 524   | 550    | 0     | 456    | 600   | 0     | 526   |
| 55 - 60               | 0                           | 0     | 0     | 0     | 916   | 868   | 900   | 857   | 987   | 0     | 318    | 0     | 195    | 334   | 0     | 234   |
| 50 - 55               | 0                           | 0     | 0     | 0     | 655   | 641   | 630   | 545   | 655   | 0     | 390    | 0     | 0      | 405   | 0     | 0     |
| Below 50              | 0                           | 0     | 0     | 0     | 1,034 | 874   | 869   | 638   | 855   | 0     | 0      | 0     | 0      | 3     | 0     | 0     |
| Min. Temp.            | 62.9                        | 62.1  | 68.0  | 62.0  | 34.0  | 34.6  | 34.6  | 37.3  | 35.5  | 61.1  | 50.2   | 67.8  | 57.3   | 50.0  | 67.8  | 57.1  |
| Mo./Hr.               | 1 8                         | 1 10  | 1 1   | 2 7   | 2 11  | 2 7   | 2 7   | 2 7   | 2 7   | 1 7   | 2 7    | 1 7   | 1 7    | 2 7   | 1 7   | 1 7   |
| Day Type              | 5                           | 5     | 1     | 5     | 4     | 5     | 5     | 5     | 5     | 5     | 5      | 1     | 5      | 5     | 1     | 5     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
 REPLACE FLUORESCENT LAMPS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC<br>Off Peak<br>(kWh) | DEMAND<br>On Peak<br>(kW) | STEAM<br>On Peak<br>(Therm) | WATER<br>(1000 G1) | STEAM DMND<br>On Peak<br>(Thrm/hr) |
|-------|---------------------------|---------------------------|-----------------------------|--------------------|------------------------------------|
| Jan   | 155,374                   | 771                       | 12,323                      | 0                  | 72                                 |
| Feb   | 140,577                   | 771                       | 11,801                      | 0                  | 72                                 |
| March | 169,595                   | 771                       | 9,001                       | 0                  | 68                                 |
| April | 142,010                   | 771                       | 2,412                       | 0                  | 48                                 |
| May   | 182,073                   | 901                       | 0                           | 66                 | 0                                  |
| June  | 188,324                   | 962                       | 0                           | 108                | 0                                  |
| July  | 187,009                   | 1,016                     | 0                           | 183                | 0                                  |
| Aug   | 198,135                   | 970                       | 0                           | 120                | 0                                  |
| Sept  | 165,886                   | 924                       | 0                           | 62                 | 0                                  |
| Oct   | 154,686                   | 771                       | 1,462                       | 0                  | 47                                 |
| Nov   | 144,710                   | 771                       | 4,799                       | 0                  | 62                                 |
| Dec   | 147,976                   | 771                       | 10,498                      | 0                  | 72                                 |
| Total | 1,976,354                 | 1,016                     | 52,296                      | 538                | 72                                 |

Building Energy Consumption = 74,937 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 170,281 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 REPLACE FLUORESCENT LAMPS

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref<br>Num | Equip<br>Code | ----- Monthly Consumption ----- |                           |       |       |       |       |       |       |       |       |       |       | Total   |
|------------|---------------|---------------------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|            |               | Jan                             | Feb                       | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0          | LIGHTS        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 70929                           | 64174                     | 77685 | 67552 | 74307 | 74307 | 67552 | 77685 | 67552 | 74307 | 67552 | 67552 | 851,153 |
|            | PK            | 369.1                           | 369.1                     | 369.1 | 369.1 | 369.1 | 369.1 | 369.1 | 369.1 | 369.1 | 369.1 | 369.1 | 369.1 | 369.1   |
| 1          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | GAS           | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | OIL           | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | P STEAM       | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | P HOTH2O      | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | P CHILL       | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1          | EQ1001S       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | 2-STG CTV <555 TONS       |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                               | 0                         | 0     | 0     | 13021 | 19272 | 33325 | 21399 | 12203 | 0     | 0     | 0     | 99,220  |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 100.8 | 162.4 | 216.2 | 170.3 | 123.9 | 0.0   | 0.0   | 0.0   | 216.2   |
| 1          | EQ5100        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                               | 0                         | 0     | 0     | 5115  | 5115  | 4650  | 5348  | 4650  | 0     | 0     | 0     | 24,878  |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 23.3  | 23.3  | 23.3  | 23.3  | 23.3  | 0.0   | 0.0   | 0.0   | 23.3    |
| 1          | EQ5100        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|            | WATER         | 0                               | 0                         | 0     | 0     | 66    | 108   | 183   | 120   | 62    | 0     | 0     | 0     | 538     |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.6   | 0.9   | 1.1   | 0.9   | 0.7   | 0.0   | 0.0   | 0.0   | 1.1     |
| 1          | EQ5001        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | CHILLED WATER PUMP C.V.   |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1          | EQ5010        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | CONDENSER WATER PUMP C.V. |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1          | EQ5300        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | CONTROL PANEL & INTERLOCK |       |       |       |       |       |       |       |       |       |       |         |

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 REPLACE FLUORESCENT LAMPS

|   |         |                            |       |       |       |       |       |       |       |       |       |       |       |         |
|---|---------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|   | ELEC    | 0                          | 0     | 0     | 0     | 220   | 220   | 200   | 230   | 200   | 0     | 0     | 0     | 1,070   |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 0.0   | 0.0   | 0.0   | 1.0     |
| 2 | EQ1000  | PREVENTS COOLING ENERGY    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5001  | CHILLED WATER PUMP C.V.    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5010  | CONDENSER WATER PUMP C.V.  |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 9754                       | 8825  | 10683 | 9290  | 10219 | 10219 | 9290  | 10683 | 9290  | 10219 | 9290  | 9290  | 117,051 |
|   | PK      | 46.4                       | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4    |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2276                       | 2059  | 2493  | 2168  | 2384  | 2384  | 2168  | 2493  | 2168  | 2384  | 2168  | 2168  | 27,312  |
|   | PK      | 10.8                       | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8    |
| 2 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 13975                      | 12644 | 15305 | 13309 | 14640 | 14640 | 13309 | 15305 | 13309 | 14640 | 13309 | 13309 | 167,695 |
|   | PK      | 66.5                       | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5    |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 1747                       | 1580  | 1913  | 1664  | 1830  | 1830  | 1664  | 1913  | 1664  | 1830  | 1664  | 1664  | 20,962  |
|   | PK      | 8.3                        | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3     |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 1 | EQ2101  | PURCHASED DISTRICT STEAM   |       |       |       |       |       |       |       |       |       |       |       |         |
|   | P STEAM | 2112                       | 2023  | 1529  | 401   | 0     | 0     | 0     | 0     | 0     | 239   | 818   | 1799  | 8,920   |
|   | PK      | 12.3                       | 12.3  | 11.7  | 8.2   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 8.0   | 10.6  | 12.3  | 12.3    |
| 1 | EQ5020  | HEAT WATER CIRC. PUMP C.V. |       |       |       |       |       |       |       |       |       |       |       |         |





UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
REPLACE FLUORESCENT LAMPS

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value    1,016.0    (kW)  
Yearly Time of Peak    14 (hr)    7 (mo)

Hour 14    Month 7

| Eqp.<br>Ref.<br>Num.        | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|-----------------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| <b>Cooling Equipment</b>    |                        |                                    |                           |                          |
| 1                           | EQ1001S                | 2-STG CTV <555 TONS                | 300.1                     | 29.54                    |
| Sub Total                   |                        |                                    | 300.1                     | 29.54                    |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                     |
| <b>Air Moving Equipment</b> |                        |                                    |                           |                          |
| 1                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 57.3                      | 5.64                     |
| 3                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 74.9                      | 7.37                     |
| 5                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 10.56                    |
| 6                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 10.56                    |
| Sub Total                   |                        |                                    | 346.8                     | 34.13                    |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                     |
| <b>Miscellaneous</b>        |                        |                                    |                           |                          |
| Lights                      |                        |                                    | 369.1                     | 36.33                    |
| Base Utilities              |                        |                                    | 0.0                       | 0.00                     |
| Misc Equipment              |                        |                                    | 0.0                       | 0.00                     |
| Sub Total                   |                        |                                    | 369.1                     | 36.33                    |
| Grand Total                 |                        |                                    | 1,016.0                   | 100.00                   |

```
*****  
*****  
**  
**          TRACE 600 ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 122

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 72 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 12: 6:50 2/ 2/94  
Dataset Name: CB1228 .TM

AIRFLOW - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | TRH         | 10,853                | 36,175                | 36,175                | 36,175               | 10,853                | 0                    | 0                     |
| 2             | SZ          | 0                     | 17,730                | 17,730                | 17,730               | 0                     | 0                    | 17,730                |
| 3             | INDFP       | 5,830                 | 19,435                | 19,435                | 36,448               | 19,435                | 34,201               | 0                     |
| 4             | UH          | 0                     | 0                     | 1,835                 | 0                    | 0                     | 0                    | 0                     |
| 5             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 27,856                | 0                    | 0                     |
| 6             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 9,325                 | 0                    | 0                     |
| <b>Totals</b> |             | <b>33,397</b>         | <b>129,052</b>        | <b>130,887</b>        | <b>148,000</b>       | <b>67,468</b>         | <b>34,201</b>        | <b>17,730</b>         |

CAPACITY - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      | Cooling Totals (Tons) | Heating                   |                           |                         |                        |                          |                      | Heating Totals (Btuh) |                      |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|-----------------------|----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) |                       | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) |                       | Vent Capacity (Btuh) |
| 1             | TRH         | 70.7                      | 0.0                       | 0.0                  | 0.0                  | 70.7                  | -68,182                   | 0                         | -574,205                | 0                      | 0                        | 0                    | 0                     | -642,386             |
| 2             | SZ          | 2.6                       | 0.0                       | 0.0                  | 0.0                  | 2.6                   | -9,837                    | 0                         | -113,011                | 0                      | 0                        | 0                    | 0                     | -9,837               |
| 3             | INDFP       | 46.4                      | 96.0                      | 0.0                  | 0.0                  | 142.4                 | -680,963                  | -1,230,942                | 0                       | 0                      | 0                        | 0                    | 0                     | -1,911,905           |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -6,715                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                     | -6,715               |
| 5             | DD          | 57.8                      | 0.0                       | 0.0                  | 0.0                  | 57.8                  | -363,404                  | 0                         | -409,007                | 0                      | 0                        | 0                    | 0                     | -772,411             |
| 6             | DD          | 57.8                      | 0.0                       | 0.0                  | 0.0                  | 57.8                  | -245,454                  | 0                         | -409,007                | 0                      | 0                        | 0                    | 0                     | -654,461             |
| <b>Totals</b> |             | <b>235.3</b>              | <b>96.0</b>               | <b>0.0</b>           | <b>0.0</b>           | <b>331.3</b>          | <b>-1,374,555</b>         | <b>-1,230,942</b>         | <b>-1,505,230</b>       | <b>0</b>               | <b>0</b>                 | <b>0</b>             | <b>0</b>              | <b>-3,997,717</b>    |

The building peaked at hour 14 month 7 with a capacity of 235.3 tons

ENGINEERING CHECKS - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | ----- Cooling ----- |          |            |             | --- Heating --- |             | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|---------------------|----------|------------|-------------|-----------------|-------------|------------------|
|               |                |             |                     | Cfm/ Sq Ft          | Cfm/ Ton | Sq Ft /Ton | Btuh/ Sq Ft | Cfm/ Sq Ft      | Btuh/ Sq Ft |                  |
| 1             | Main           | TRH         | 30.00               | 0.63                | 511.9    | 814.3      | 14.74       | 0.63            | -11.16      | 57,549           |
| 2             | Main           | SZ          | 0.00                | 4.32                | 6,826.6  | 1,578.6    | 7.60        | 4.32            | -2.40       | 4,100            |
| 3             | Main           | INDFP       | 30.00               | 0.47                | 418.7    | 891.2      | 13.46       | 0.47            | -16.46      | 41,364           |
| 3             | Auxiliary      | INDFP       | 0.00                | 0.83                | 356.2    | 430.8      | 27.86       | 0.83            | -29.76      | 41,364           |
| 4             | Main           | UH          | 0.00                | 0.00                | 0.0      | 0.0        | 0.00        | 0.72            | -2.64       | 2,544            |
| 5             | Main           | DD          | 30.00               | 1.03                | 482.0    | 469.3      | 25.57       | 1.03            | -28.48      | 27,121           |
| 6             | Main           | DD          | 30.00               | 1.03                | 482.0    | 469.3      | 25.57       | 1.03            | -24.13      | 27,121           |

System 1 Peak TRH - TERMINAL REHEAT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) |   | Space Sensible (Btuh) | Percent Of Tot (%) |   | Space Peak (Btuh) | Coil Peak (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|---|-----------------------|--------------------|---|-------------------|------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |   |                       |                    |   |                   |                  |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Partition       | 18,940                  |                          |                        | - 18,940         | 2.23               | * | 18,940                | 4.98               | * | -68,182           | -68,182          | 100.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Infiltration    | 0                       |                          |                        | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Sub Total==>    | 18,940                  | 0                        |                        | 18,940           | 2.23               | * | 18,940                | 4.98               | * | -68,182           | -68,182          | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    | * |                       |                    | * |                   |                  |                    |
| Lights          | 310,335                 | 0                        |                        | 310,335          | 36.59              | * | 329,977               | 86.83              | * | 0                 | 0                | 0.00               |
| People          | 63,941                  |                          |                        | 63,941           | 7.54               | * | 31,097                | 8.18               | * | 0                 | 0                | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Sub Total==>    | 374,276                 | 0                        | 0                      | 374,276          | 44.13              | * | 361,074               | 95.02              | * | 0                 | 0                | 0.00               |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 365,080          | 43.05              | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Sup. Fan Heat   |                         |                          |                        | 77,173           | 9.10               | * |                       | 0.00               | * |                   | 0                | 0.00               |
| Ret. Fan Heat   |                         | 18,007                   |                        | 18,007           | 2.12               | * |                       | 0.00               | * |                   | 0                | 0.00               |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00               | * |                       | 0.00               | * |                   | 0                | 0.00               |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | -0.00              | * | 0                     | -0.00              | * | 0                 | 0                | 0.00               |
| Exhaust Heat    |                         | -5,402                   | 0                      | -5,402           | -0.64              | * |                       | 0.00               | * |                   | 0                | 0.00               |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00               | * |                       | 0.00               | * |                   | 0                | 0.00               |
| Grand Total==>  | 393,216                 | 12,605                   | 0                      | 848,074          | 100.00             | * | 380,013               | 100.00             | * | -68,182           | -68,182          | 100.00             |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 70.7                  | 848.1           | 36,175           | 80.0              | 68.3  | 87.8   | 63.4             | 61.3  | 80.2   | Part        | 16,570     |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 70.7                  | 848.1           |                  |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -68.2          | 36,175           | 68.0      | 69.7      | Vent    | 10,853  | 0       | Clg Cfms/Sqft | 0.63   | SADB     | 65.3 | 69.7 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 0       | Clg Cfms/Ton  | 511.87 | Plenum   | 75.0 | 68.0 |
| Preheat  | -574.2         | 36,175           | 48.8      | 63.4      | Supply  | 36,175  | 36,175  | Clg Sqft/Ton  | 814.30 | Return   | 75.5 | 68.0 |
| Reheat   | -0.0           | 0                | 0.0       | 0.0       | Mincfm  | 36,175  | 0       | Clg Btuh/Sqft | 14.74  | Ret/OA   | 80.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 36,175  | 36,175  | No. People    | 137    | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 10,853  | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.5  | 0.5  |
| Total    | -642.4         |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfms/Sqft | 0.63   | Fn BldTD | 0.4  | 0.4  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -11.16 | Fn Frict | 1.1  | 1.1  |

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | *      | Space Sensible (Btuh) | Perct Of Tot (%) | *      | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|--------|-----------------------|------------------|--------|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | *      |                       |                  | *      |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | *      | 0                     | 0.00             | *      | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | *      | 0                     | 0.00             | *      | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 860                      | 860                    | 860              | 2.76             | *      | 0                     | 0.00             | *      | 0                 | -3,224           | 44.57            |
| Glass Solar     | 595                     | 0                        | 595                    | 595              | 1.91             | *      | 595                   | 2.12             | *      | 0                 | 0                | 0.00             |
| Glass Cond      | 239                     | 0                        | 239                    | 239              | 0.77             | *      | 239                   | 0.85             | *      | -1,139            | -1,139           | 15.75            |
| Wall Cond       | 747                     | 183                      | 929                    | 929              | 2.98             | *      | 747                   | 2.66             | *      | -2,286            | -2,870           | 39.68            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | *      | 0                     | 0.00             | *      | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | *      | 0                     | 0.00             | *      | 0                 | 0                | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | *      | 0                     | 0.00             | *      | 0                 | 0                | 0.00             |
| Sub Total==>    | 1,581                   | 1,042                    | 2,623                  | 8.42             | *                | 1,581  | 5.63                  | *                | -3,426 | -7,234            | 100.00           |                  |
| Internal Loads  |                         |                          |                        |                  |                  | *      |                       |                  | *      |                   |                  |                  |
| Lights          | 23,831                  | 0                        | 23,831                 | 76.46            | *                | 23,831 | 84.86                 | *                | 0      | 0                 | 0.00             |                  |
| People          | 4,712                   | 0                        | 4,712                  | 15.12            | *                | 2,223  | 7.92                  | *                | 0      | 0                 | 0.00             |                  |
| Misc            | 0                       | 0                        | 0                      | 0.00             | *                | 0      | 0.00                  | *                | 0      | 0                 | 0.00             |                  |
| Sub Total==>    | 28,543                  | 0                        | 28,543                 | 91.58            | *                | 26,054 | 92.78                 | *                | 0      | 0                 | 0.00             |                  |
| Ceiling Load    | 1,918                   | -1,918                   | 0                      | 0.00             | *                | 447    | 1.59                  | *                | -243   | 0                 | 0.00             |                  |
| Outside Air     | 0                       | 0                        | 0                      | 0.00             | *                | 0      | 0.00                  | *                | 0      | 0                 | 0.00             |                  |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0.00             | *                | 0      | 0.00                  | *                | 0      | 0                 | 0.00             |                  |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0.00             | *                | 0      | 0.00                  | *                | 0      | 0                 | 0.00             |                  |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0.00             | *                | 0      | 0.00                  | *                | 0      | 0                 | 0.00             |                  |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0.00             | *                | 0      | 0.00                  | *                | 0      | 0                 | -0.00            |                  |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0.00             | *                | 0      | 0.00                  | *                | 0      | 0                 | 0.00             |                  |
| Terminal Bypass | 0                       | 0                        | 0                      | 0.00             | *                | 0      | 0.00                  | *                | 0      | 0                 | 0.00             |                  |
| Grand Total==>  | 32,042                  | -876                     | 31,166                 | 100.00           | *                | 28,081 | 100.00                | *                | -3,668 | -7,234            | 100.00           |                  |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total (Floor) | Glass (sf) | (%)   |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|---------------------|------------|-------|
| Main Clg | 2.6                   | 31.2            | 17,730           | 76.6                      | 68.6                     | 4,100               |            |       |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                   |            |       |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                   |            |       |
| Totals   | 2.6                   | 31.2            |                  |                           |                          | 580                 | 196        | 21 11 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 0.0     | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|---------|----------|------|------|
| Main Htg | -9.8           | 17,730           | 67.7        | 68.2        | Vent    | 0       | 0       | Clg Cfm/Sqft  | 4.32    | SADB     | 73.5 | 68.2 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 0       | 0       | Clg Cfm/Ton   | 6826.64 | Plenum   | 76.5 | 67.7 |
| Preheat  | -113.0         | 17,730           | 67.7        | 73.5        | Supply  | 17,730  | 17,730  | Clg Sqft/Ton  | 1578.64 | Return   | 79.7 | 67.7 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 7.60    | Ret/OA   | 76.6 | 67.7 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 0       | 17,730  | No. People    | 10      | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 0       | 0       | Htg % OA      | 0.0     | Fn MtrTD | 0.0  | 0.0  |
| Total    | -9.8           |                  |             |             | Rm Exh  | 17,730  | 0       | Htg Cfm/Sqft  | 4.32    | Fn BldTD | 0.0  | 0.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -2.40   | Fn Frict | 0.0  | 0.0  |

System 3 Block INDFP - 4-PIPE INDUCTION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/19 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 85 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 474                     | 21,484                   | 0                      | 21,957           | 1.26             | * | 664                   | 0.10             | * | -1,579            | -73,446          | 3.84             |
| Glass Solar     | 171,927                 | 0                        | 0                      | 171,927          | 9.87             | * | 185,822               | 28.25            | * | 0                 | 0                | 0.00             |
| Glass Cond      | 53,830                  | 0                        | 0                      | 53,830           | 3.09             | * | 40,082                | 6.09             | * | -276,287          | -276,287         | 14.45            |
| Wall Cond       | 113,330                 | 16,902                   | 0                      | 130,232          | 7.48             | * | 168,977               | 25.69            | * | -328,407          | -377,319         | 19.74            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 736,354                 | 0                        | 0                      | 736,354          | 42.29            | * | 170,578               | 25.93            | * | -1,184,852        | -1,184,852       | 61.97            |
| Sub Total==>    | 1,075,915               | 38,386                   | 0                      | 1,114,301        | 64.00            | * | 566,123               | 86.06            | * | -1,791,125        | -1,911,905       | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 216,053                 | 0                        | 0                      | 216,053          | 12.41            | * | 62,058                | 9.43             | * | 0                 | 0                | 0.00             |
| People          | 45,248                  | 0                        | 0                      | 45,248           | 2.60             | * | 6,070                 | 0.92             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 261,301                 | 0                        | 0                      | 261,301          | 15.01            | * | 68,127                | 10.36            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 14,654                  | -14,654                  | 0                      | 0                | 0.00             | * | 23,486                | 3.57             | * | -47,811           | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 252,361          | 14.49            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 110,564          | 6.35             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 13,820                   | 0                      | 13,820           | 0.79             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 119                     | 0                        | 0                      | 119              | 0.01             | * | 119                   | 0.02             | * | 0                 | 0                | 0.00             |
| Exhaust Heat    | 0                       | -11,266                  | 0                      | -11,266          | -0.65            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Grand Total==>  | 1,351,989               | 26,287                   | 0                      | 1,741,200        | 100.00           | * | 657,856               | 100.00           | * | -1,838,936        | -1,911,905       | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total | Glass (sf) | (%)      |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------|------------|----------|
| Main Clg | 46.4                  | 557.0           | 19,435           | 80.9                      | 59.9                     | Floor       | 41,364     |          |
| Aux Clg  | 96.0                  | 1,152.3         | 34,201           | 75.0                      | 65.1                     | Part        | 0          |          |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | Exflr       | 0          |          |
| Totals   | 142.4                 | 1,709.3         |                  |                           |                          | Roof        | 14,680     | 0 0      |
|          |                       |                 |                  |                           |                          | Wall        | 28,354     | 5,152 18 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -681.0         | 19,435           | 64.5        | 96.7        | Vent    | 5,830   | 0       | Clg Cfm/Sqft  | 0.47   | SADB     | 65.1 | 96.7 |
| Aux Htg  | -1,230.9       | 34,201           | 68.0        | 101.1       | Infil   | 17,013  | 17,013  | Clg Cfm/Ton   | 418.73 | Plenum   | 76.1 | 64.4 |
| Preheat  | -0.0           | 19,435           | 64.5        | 59.9        | Supply  | 19,435  | 19,435  | Clg Sqft/Ton  | 891.20 | Return   | 76.8 | 64.5 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 13.46  | Ret/OA   | 80.9 | 64.5 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 19,435  | 19,435  | No. People    | 98     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 5,830   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -1,911.9       |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.47   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |             |             | Auxil   | 34,201  | 34,201  | Htg Btuh/Sqft | -16.46 | Fn Frict | 2.9  | 2.9  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -6,715                       | -6,715                    | 100.00           |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -6,715                       | -6,715                    | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | -6,715                       | -6,715                    | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 2,544      |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Exflr       | 1,632      |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0   | Type     | Clg | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|-------|----------|-----|------|
| Main Htg | -6.7           | 1,835            | 68.0      | 71.4      | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00  | SADB     | 0.0 | 71.4 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 0       | Clg Cfm/Ton   | 0.00  | Plenum   | 0.0 | 68.0 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 1,835   | Clg Sqft/Ton  | 0.00  | Return   | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00  | Ret/DA   | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 1,835   | No. People    | 0     | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % OA      | 0.0   | Fn MtrTD | 0.0 | 0.0  |
| Total    | -6.7           |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.72  | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -2.64 | Fn Frict | 0.1 | 0.0  |



System 5 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 2.09             | * | 16,221                | 6.82             | * | -48,286                      | -48,286                   | 21.28            |
| Glass Solar     | 17,909                  | 0                        | 0                      | 17,909           | 2.58             | * | 16,285                | 6.84             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.70             | * | 5,167                 | 2.17             | * | -24,690                      | -24,690                   | 10.88            |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.68             | * | 5,622                 | 2.36             | * | -16,677                      | -18,921                   | 8.34             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 31,019                  | 0                        | 0                      | 31,019           | 4.47             | * | 16,324                | 6.86             | * | -67,403                      | -67,403                   | 29.70            |
| Sub Total==>    | 72,415                  | 526                      | 0                      | 72,941           | 10.52            | * | 59,619                | 25.05            | * | -157,056                     | -159,300                  | 70.19            |
| Internal Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Lights          | 148,208                 | 0                        | 0                      | 148,208          | 21.37            | * | 156,295               | 65.67            | * | 0                            | 0                         | 0.00             |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 4.36             | * | 14,612                | 6.14             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 178,410                 | 0                        | 0                      | 178,410          | 25.73            | * | 170,907               | 71.80            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00             | * | 1,553                 | 0.65             | * | -4,627                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 267,845          | 38.62            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 22.85            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 2.86             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 5,938                   | 0                        | 0                      | 5,938            | 0.86             | * | 5,938                 | 2.49             | * | -67,648                      | -67,648                   | 29.81            |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.43            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 258,138                 | 9,026                    | 0                      | 693,479          | 100.00           | * | 238,017               | 100.00           | * | -229,331                     | -226,948                  | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------------|------------|-----|
| Main Clg | 57.8                  | 693.5           | 27,856           | 80.4                      | 61.9                     | 27,121            |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |            |     |
| Totals   | 57.8                  | 693.5           |                  |                           |                          | 8,563             | 460        | 29  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -363.4         | 27,856           | 63.6        | 75.6        | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 67.1 | 75.6 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 968     | 968     | Clg Cfm/Ton   | 482.02 | Plenum   | 75.4 | 66.5 |
| Preheat  | -409.0         | 27,856           | 48.4        | 61.9        | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 469.30 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 25.57  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -772.4         |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -28.48 | Fn Frict | 2.9  | 2.9  |

System 6 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |            | Mo/Hr: 7/14              |          | *       | Mo/Hr: 7/16 |   | *        | Mo/Hr: 13/1 |   |            |           |        |
|--------------------|------------|--------------------------|----------|---------|-------------|---|----------|-------------|---|------------|-----------|--------|
| Outside Air ==>    |            | OADB/WB/HR: 91/ 74/105.0 |          | *       | OADB: 91    |   | *        | OADB: 4     |   |            |           |        |
|                    | Space      | Ret. Air                 | Ret. Air | Net     | Perct       | * | Space    | Perct       | * | Space Peak | Coil Peak | Perct  |
|                    | Sens.+Lat. | Sensible                 | Latent   | Total   | Of Tot      | * | Sensible | Of Tot      | * | Space Sens | Tot Sens  | Of Tot |
|                    | (Btuh)     | (Btuh)                   | (Btuh)   | (Btuh)  | (%)         | * | (Btuh)   | (%)         | * | (Btuh)     | (Btuh)    | (%)    |
| Envelope Loads     |            |                          |          |         |             | * |          |             | * |            |           |        |
| Skylite Solr       | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| Skylite Cond       | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| Roof Cond          | 14,486     | 0                        | 0        | 14,486  | 2.09        | * | 16,221   | 6.82        | * | -48,286    | -48,286   | 21.28  |
| Glass Solar        | 17,909     | 0                        | 0        | 17,909  | 2.58        | * | 16,285   | 6.84        | * | 0          | 0         | 0.00   |
| Glass Cond         | 4,840      | 0                        | 0        | 4,840   | 0.70        | * | 5,167    | 2.17        | * | -24,690    | -24,690   | 10.88  |
| Wall Cond          | 4,161      | 526                      | 0        | 4,687   | 0.68        | * | 5,622    | 2.36        | * | -16,677    | -18,921   | 8.34   |
| Partition          | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| Exposed Floor      | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| Infiltration       | 31,019     | 0                        | 0        | 31,019  | 4.47        | * | 16,324   | 6.86        | * | -67,403    | -67,403   | 29.70  |
| Sub Total==>       | 72,415     | 526                      | 0        | 72,941  | 10.52       | * | 59,619   | 25.05       | * | -157,056   | -159,300  | 70.19  |
| Internal Loads     |            |                          |          |         |             | * |          |             | * |            |           |        |
| Lights             | 148,208    | 0                        | 0        | 148,208 | 21.37       | * | 156,295  | 65.67       | * | 0          | 0         | 0.00   |
| People             | 30,203     | 0                        | 0        | 30,203  | 4.36        | * | 14,612   | 6.14        | * | 0          | 0         | 0.00   |
| Misc               | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| Sub Total==>       | 178,410    | 0                        | 0        | 178,410 | 25.73       | * | 170,907  | 71.80       | * | 0          | 0         | 0.00   |
| Ceiling Load       | 1,375      | -1,375                   | 0        | 0       | 0.00        | * | 1,553    | 0.65        | * | -4,627     | 0         | 0.00   |
| Outside Air        | 0          | 0                        | 0        | 267,845 | 38.62       | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| Sup. Fan Heat      | 0          | 0                        | 0        | 158,470 | 22.85       | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| Ret. Fan Heat      | 0          | 19,809                   | 0        | 19,809  | 2.86        | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| Duct Heat Pkup     | 0          | 0                        | 0        | 0       | 0.00        | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| OV/UNDR Sizing     | 5,938      | 0                        | 0        | 5,938   | 0.86        | * | 5,938    | 2.49        | * | -67,648    | -67,648   | 29.81  |
| Exhaust Heat       | 0          | -9,934                   | 0        | -9,934  | -1.43       | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| Terminal Bypass    | 0          | 0                        | 0        | 0       | -0.00       | * | 0        | 0.00        | * | 0          | 0         | 0.00   |
| Grand Total==>     | 258,138    | 9,026                    | 0        | 693,479 | 100.00      | * | 238,017  | 100.00      | * | -229,331   | -226,948  | 100.00 |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 57.8           | 693.5     | 27,856     | 80.4              | 68.7  | 89.5   | 61.9             | 61.4  | 82.7   | Part        | 27,121     |     |
| Aux Clg  | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |     |
| Opt Vent | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 8,563      |     |
| Totals   | 57.8           | 693.5     |            |                   |       |        |                  |       |        | Wall        | 1,613      |     |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------|------------|-------|-------|---------|---------|---------|---------------|--------|----------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    |         |         | Clg Cfm/Sqft  | 1.03   | SADB     | 67.1 | 75.6 |
| Main Htg | -245.5   | 27,856     | 67.5  | 75.6  | Infil   | 968     | 968     | Clg Cfm/Ton   | 482.02 | Plenum   | 75.4 | 66.5 |
| Aux Htg  | 0.0      | 0          | 0.0   | 0.0   | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 469.30 | Return   | 76.1 | 67.5 |
| Preheat  | -409.0   | 27,856     | 48.4  | 61.9  | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 25.57  | Ret/OA   | 80.4 | 67.5 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
| Total    | -654.5   |            |       |       | Auxil   | 0       | 0       | Htg Btuh/Sqft | -24.13 | Fn Frict | 2.9  | 2.9  |

BUILDING U-VALUES - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Room U-Values (Btu/hr/sqft/F) |       |             |             |       |             |             |       |       |       | Room Mass (lb/sqft) | Room Capac. (Btu/sqft/F) |
|-------------|------------------|-------------------------------|-------|-------------|-------------|-------|-------------|-------------|-------|-------|-------|---------------------|--------------------------|
|             |                  | Part.                         | ExFlr | Summr Skylt | Wintr Skylt | Roof  | Summr Windo | Wintr Windo | Wall  | Ceil. |       |                     |                          |
| 1           | SUB BSMT, BSMT W | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 46.8                | 9.61                     |
| Zone        | 1 Total/Ave.     | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 46.8                | 9.61                     |
| 4           | BSMT E           | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 45.2                | 9.27                     |
| Zone        | 4 Total/Ave.     | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 45.2                | 9.27                     |
| System      | 1 Total/Ave.     | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 46.4                | 9.54                     |
| 2           | TOILETS, KITCHEN | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 29.4                | 5.93                     |
| Zone        | 2 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 29.4                | 5.93                     |
| 11          | TOILETS W ROOF   | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.000       | 0.000       | 0.000 | 0.317 |       | 71.1                | 15.13                    |
| Zone        | 11 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.000       | 0.000       | 0.000 | 0.317 |       | 71.1                | 15.13                    |
| System      | 2 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 |       | 35.3                | 7.23                     |
| 3           | STAIRS           | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.229 | 0.000 |       | 103.3               | 21.63                    |
| Zone        | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.229 | 0.000 |       | 103.3               | 21.63                    |
| 5           | 1ST FL OFFICES   | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 57.9                | 12.05                    |
| Zone        | 5 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 57.9                | 12.05                    |
| 7           | 2ND FL OFFICES   | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 56.7                | 11.81                    |
| Zone        | 7 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 56.7                | 11.81                    |
| 9           | 3RD FL OFFICES   | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 |       | 102.3               | 21.84                    |
| Zone        | 9 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 |       | 102.3               | 21.84                    |
| 12          | STAIRS W ROOF    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.229 | 0.000 |       | 146.4               | 31.13                    |
| Zone        | 12 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.229 | 0.000 |       | 146.4               | 31.13                    |
| System      | 3 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.256 | 0.317 |       | 74.1                | 15.63                    |
| 13          | SUPPLY STORAGE   | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 |       | 70.7                | 14.70                    |
| Zone        | 13 Total/Ave.    | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 |       | 70.7                | 14.70                    |
| System      | 4 Total/Ave.     | 0.229                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 |       | 70.7                | 14.70                    |
| 6           | 1ST FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 32.5                | 6.60                     |
| Zone        | 6 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 32.5                | 6.60                     |
| 8           | 2ND FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 |       | 27.0                | 5.41                     |
| Zone        | 8 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 |       | 27.0                | 5.41                     |
| 10          | 3RD FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 |       | 71.5                | 15.21                    |
| Zone        | 10 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 |       | 71.5                | 15.21                    |
| System      | 5 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 |       | 43.1                | 8.94                     |
| 14          | 1ST FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 32.5                | 6.60                     |
| Zone        | 14 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 32.5                | 6.60                     |
| 15          | 2ND FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 |       | 27.0                | 5.41                     |
| Zone        | 15 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 |       | 27.0                | 5.41                     |
| 16          | 3RD FL CEN OFFCS | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 |       | 71.5                | 15.21                    |
| Zone        | 16 Total/Ave.    | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 |       | 71.5                | 15.21                    |
| System      | 6 Total/Ave.     | 0.000                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 |       | 43.1                | 8.94                     |
| Building    |                  | 0.229                         | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.256 | 0.317 |       | 52.6                | 10.93                    |

BUILDING AREAS - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

BUILDING AREAS

| Room Number | Description      | Number of Duplicate Flr Rm | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|----------------------------|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
| 1           | SUB BSMT, BSMT W | 1 1                        | 45,125                      | 45,125                  | 13,222                | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| Zone        | 1 Total/Ave.     |                            |                             | 45,125                  | 13,222                | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 4           | BSMT E           | 1 1                        | 12,424                      | 12,424                  | 3,348                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| Zone        | 4 Total/Ave.     |                            |                             | 12,424                  | 3,348                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| System      | 1 Total/Ave.     |                            |                             | 57,549                  | 16,570                | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 2           | TOILETS, KITCHEN | 1 1                        | 3,520                       | 3,520                   | 0                     | 0                         | 0                    | 0           | 0                    | 21                 | 11          | 174                  |
| Zone        | 2 Total/Ave.     |                            |                             | 3,520                   | 0                     | 0                         | 0                    | 0           | 0                    | 21                 | 11          | 174                  |
| 11          | TOILETS W ROOF   | 1 1                        | 580                         | 580                     | 0                     | 0                         | 0                    | 0           | 580                  | 0                  | 0           | 0                    |
| Zone        | 11 Total/Ave.    |                            |                             | 580                     | 0                     | 0                         | 0                    | 0           | 580                  | 0                  | 0           | 0                    |
| System      | 2 Total/Ave.     |                            |                             | 4,100                   | 0                     | 0                         | 0                    | 0           | 580                  | 21                 | 11          | 174                  |
| 3           | STAIRS           | 1 1                        | 560                         | 560                     | 0                     | 0                         | 0                    | 0           | 0                    | 255                | 29          | 625                  |
| Zone        | 3 Total/Ave.     |                            |                             | 560                     | 0                     | 0                         | 0                    | 0           | 0                    | 255                | 29          | 625                  |
| 5           | 1ST FL OFFICES   | 1 1                        | 11,724                      | 11,724                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,573              | 19          | 6,530                |
| Zone        | 5 Total/Ave.     |                            |                             | 11,724                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,573              | 19          | 6,530                |
| 7           | 2ND FL OFFICES   | 1 1                        | 14,400                      | 14,400                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,610              | 17          | 7,730                |
| Zone        | 7 Total/Ave.     |                            |                             | 14,400                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,610              | 17          | 7,730                |
| 9           | 3RD FL OFFICES   | 1 1                        | 14,400                      | 14,400                  | 0                     | 0                         | 0                    | 0           | 14,400               | 1,610              | 17          | 8,010                |
| Zone        | 9 Total/Ave.     |                            |                             | 14,400                  | 0                     | 0                         | 0                    | 0           | 14,400               | 1,610              | 17          | 8,010                |
| 12          | STAIRS W ROOF    | 1 1                        | 280                         | 280                     | 0                     | 0                         | 0                    | 0           | 280                  | 105                | 25          | 307                  |
| Zone        | 12 Total/Ave.    |                            |                             | 280                     | 0                     | 0                         | 0                    | 0           | 280                  | 105                | 25          | 307                  |
| System      | 3 Total/Ave.     |                            |                             | 41,364                  | 0                     | 0                         | 0                    | 0           | 14,680               | 5,152              | 18          | 23,202               |
| 13          | SUPPLY STORAGE   | 1 1                        | 2,544                       | 2,544                   | 1,632                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| Zone        | 13 Total/Ave.    |                            |                             | 2,544                   | 1,632                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| System      | 4 Total/Ave.     |                            |                             | 2,544                   | 1,632                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 6           | 1ST FL CEN OFFCS | 1 1                        | 9,884                       | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| Zone        | 6 Total/Ave.     |                            |                             | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| 8           | 2ND FL CEN OFFCS | 1 1                        | 8,674                       | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| Zone        | 8 Total/Ave.     |                            |                             | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| 10          | 3RD FL CEN OFFCS | 1 1                        | 8,563                       | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| Zone        | 10 Total/Ave.    |                            |                             | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| System      | 5 Total/Ave.     |                            |                             | 27,121                  | 0                     | 0                         | 0                    | 0           | 8,563                | 460                | 29          | 1,153                |
| 14          | 1ST FL CEN OFFCS | 1 1                        | 9,884                       | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| Zone        | 14 Total/Ave.    |                            |                             | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| 15          | 2ND FL CEN OFFCS | 1 1                        | 8,674                       | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| Zone        | 15 Total/Ave.    |                            |                             | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| 16          | 3RD FL CEN OFFCS | 1 1                        | 8,563                       | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| Zone        | 16 Total/Ave.    |                            |                             | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| System      | 6 Total/Ave.     |                            |                             | 27,121                  | 0                     | 0                         | 0                    | 0           | 8,563                | 460                | 29          | 1,153                |
| Building    |                  |                            |                             | 159,799                 | 18,202                | 0                         | 0                    | 0           | 32,386               | 6,095              | 19          | 25,681               |

ASHRAE 90 ANALYSIS - ALTERNATIVE 2  
REPLACE FLUORESCENT BALLASTS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent<br>Design<br>Load | ---- Cooling Load ---- |              |       | ----- Heating Load ----- |              |       | ---- Cooling Airflow ---- |              |       | ---- Heating Airflow ---- |              |       |
|---------------------------|------------------------|--------------|-------|--------------------------|--------------|-------|---------------------------|--------------|-------|---------------------------|--------------|-------|
|                           | Cap.<br>(Ton)          | Hours<br>(%) | Hours | Capacity<br>(Btuh)       | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours | Cap.<br>(Cfm)             | Hours<br>(%) | Hours |
| 0 - 5                     | 16.6                   | 0            | 0     | -205,536                 | 19           | 257   | 6,544.3                   | 0            | 0     | 0.0                       | 0            | 0     |
| 5 - 10                    | 33.1                   | 1            | 16    | -411,073                 | 2            | 30    | 13,088.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 10 - 15                   | 49.7                   | 14           | 152   | -616,609                 | 5            | 69    | 19,633.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 15 - 20                   | 66.3                   | 7            | 80    | -822,146                 | 5            | 69    | 26,177.4                  | 0            | 0     | 0.0                       | 0            | 0     |
| 20 - 25                   | 82.8                   | 12           | 124   | -1,027,682               | 4            | 48    | 32,721.7                  | 0            | 0     | 0.0                       | 0            | 0     |
| 25 - 30                   | 99.4                   | 6            | 68    | -1,233,218               | 7            | 90    | 39,266.1                  | 0            | 0     | 0.0                       | 0            | 0     |
| 30 - 35                   | 116.0                  | 20           | 218   | -1,438,755               | 9            | 118   | 45,810.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 35 - 40                   | 132.5                  | 5            | 50    | -1,644,291               | 22           | 287   | 52,354.8                  | 0            | 0     | 0.0                       | 0            | 0     |
| 40 - 45                   | 149.1                  | 5            | 49    | -1,849,828               | 16           | 207   | 58,899.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 45 - 50                   | 165.6                  | 3            | 27    | -2,055,364               | 11           | 150   | 65,443.5                  | 0            | 0     | 0.0                       | 0            | 0     |
| 50 - 55                   | 182.2                  | 8            | 82    | -2,260,901               | 0            | 0     | 71,987.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| 55 - 60                   | 198.8                  | 2            | 19    | -2,466,437               | 0            | 0     | 78,532.2                  | 0            | 0     | 0.0                       | 0            | 0     |
| 60 - 65                   | 215.3                  | 6            | 65    | -2,671,974               | 0            | 0     | 85,076.6                  | 0            | 0     | 0.0                       | 0            | 0     |
| 65 - 70                   | 231.9                  | 7            | 75    | -2,877,510               | 0            | 0     | 91,620.9                  | 0            | 0     | 0.0                       | 0            | 0     |
| 70 - 75                   | 248.5                  | 3            | 35    | -3,083,046               | 0            | 0     | 98,165.3                  | 0            | 0     | 0.0                       | 0            | 0     |
| 75 - 80                   | 265.0                  | 1            | 10    | -3,288,583               | 0            | 0     | 104,709.6                 | 0            | 0     | 0.0                       | 0            | 0     |
| 80 - 85                   | 281.6                  | 0            | 0     | -3,494,119               | 0            | 0     | 111,254.0                 | 0            | 0     | 0.0                       | 0            | 0     |
| 85 - 90                   | 298.2                  | 0            | 0     | -3,699,656               | 0            | 0     | 117,798.3                 | 100          | 2,520 | 0.0                       | 0            | 0     |
| 90 - 95                   | 314.7                  | 0            | 0     | -3,905,192               | 0            | 0     | 124,342.7                 | 0            | 0     | 0.0                       | 0            | 0     |
| 95 - 100                  | 331.3                  | 0            | 0     | -4,110,729               | 0            | 0     | 130,887.0                 | 0            | 0     | 0.0                       | 0            | 0     |
| Hours Off                 | 0.0                    | 0            | 7,690 | 0                        | 0            | 7,435 | 0.0                       | 0            | 6,240 | 0.0                       | 0            | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature Range (F) | Zone Number                                        |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
|-----------------------|----------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|
|                       | 1                                                  | 4     | 2     | 11    | 3     | 5     | 7     | 9     | 12    | 13    | 6      | 8     | 10     | 14    | 15    | 16    |
| Max. Temp.            | 79.7                                               | 78.8  | 175.2 | 113.1 | 86.4  | 84.8  | 84.5  | 83.2  | 85.3  | 92.4  | 84.8   | 86.2  | 84.3   | 84.8  | 86.2  | 84.3  |
| Mo./Hr.               | 10 21                                              | 10 24 | 9 19  | 8 16  | 7 20  | 7 23  | 7 24  | 7 21  | 7 20  | 8 17  | 7 2 10 | 1 7 6 | 7 2 10 | 1 7 6 |       |       |
| Day Type              | 2                                                  | 2     | 2     | 2     | 4     | 1     | 1     | 4     | 4     | 2     | 5      | 2     | 5      | 5     | 2     | 5     |
|                       | ..... N u m b e r   o f   H o u r s .....<br>..... |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
| Above 100             | 0                                                  | 0     | 7,408 | 2,729 | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| 95 - 100              | 0                                                  | 0     | 280   | 1,294 | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| 90 - 95               | 0                                                  | 0     | 328   | 119   | 0     | 0     | 0     | 0     | 0     | 744   | 0      | 0     | 0      | 0     | 0     | 0     |
| 85 - 90               | 0                                                  | 0     | 24    | 1,050 | 118   | 0     | 0     | 0     | 36    | 1,581 | 0      | 102   | 0      | 0     | 102   | 0     |
| 80 - 85               | 0                                                  | 0     | 370   | 462   | 1,137 | 1,163 | 1,128 | 645   | 1,141 | 1,171 | 1,591  | 2,544 | 1,146  | 1,591 | 2,507 | 1,146 |
| 75 - 80               | 4,707                                              | 2,139 | 350   | 464   | 1,764 | 1,899 | 1,908 | 2,297 | 1,868 | 1,340 | 2,913  | 5,099 | 3,607  | 2,957 | 4,733 | 3,570 |
| 70 - 75               | 1,731                                              | 3,820 | 0     | 516   | 643   | 627   | 636   | 781   | 627   | 1,386 | 1,131  | 991   | 1,204  | 1,047 | 1,313 | 1,084 |
| 65 - 70               | 1,881                                              | 2,084 | 0     | 1,646 | 1,352 | 1,530 | 1,548 | 1,586 | 1,437 | 1,580 | 1,730  | 24    | 1,989  | 1,656 | 105   | 2,082 |
| 60 - 65               | 441                                                | 717   | 0     | 480   | 1,105 | 1,070 | 1,064 | 1,365 | 1,117 | 958   | 629    | 0     | 537    | 729   | 0     | 567   |
| 55 - 60               | 0                                                  | 0     | 0     | 0     | 932   | 925   | 952   | 864   | 1,008 | 0     | 331    | 0     | 277    | 331   | 0     | 311   |
| 50 - 55               | 0                                                  | 0     | 0     | 0     | 671   | 664   | 651   | 569   | 663   | 0     | 429    | 0     | 0      | 436   | 0     | 0     |
| Below 50              | 0                                                  | 0     | 0     | 0     | 1,038 | 882   | 873   | 653   | 863   | 0     | 6      | 0     | 0      | 13    | 0     | 0     |
| Min. Temp.            | 62.3                                               | 61.1  | 67.9  | 60.1  | 34.0  | 34.5  | 34.5  | 37.1  | 35.5  | 60.4  | 49.8   | 67.7  | 56.9   | 49.6  | 66.8  | 56.8  |
| Mo./Hr.               | 1 9                                                | 2 11  | 1 7   | 2 7   | 2 11  | 2 7   | 2 7   | 2 7   | 2 7   | 1 7   | 2 7    | 1 7   | 1 7    | 2 7   | 2 10  | 1 7   |
| Day Type              | 5                                                  | 5     | 1     | 5     | 4     | 5     | 5     | 5     | 5     | 5     | 5      | 1     | 5      | 5     | 5     | 5     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | STEAM             | STEAM DMND         |                      |
|-------|-------------------|-----------------|-------------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Thrm) | WATER<br>(1000 G1) | On Peak<br>(Thrm/hr) |
| Jan   | 145,856           | 722             | 12,754            | 0                  | 69                   |
| Feb   | 131,965           | 722             | 12,060            | 0                  | 69                   |
| March | 158,118           | 722             | 9,487             | 0                  | 69                   |
| April | 133,044           | 722             | 2,677             | 0                  | 49                   |
| May   | 171,211           | 844             | 0                 | 59                 | 0                    |
| June  | 176,857           | 903             | 0                 | 98                 | 0                    |
| July  | 175,648           | 954             | 0                 | 170                | 0                    |
| Aug   | 186,059           | 910             | 0                 | 109                | 0                    |
| Sept  | 156,023           | 869             | 0                 | 56                 | 0                    |
| Oct   | 146,080           | 722             | 1,735             | 0                  | 47                   |
| Nov   | 136,166           | 722             | 5,197             | 0                  | 63                   |
| Dec   | 138,910           | 722             | 10,791            | 0                  | 69                   |
| Total | 1,855,935         | 954             | 54,701            | 492                | 69                   |

Building Energy Consumption = 73,870 (8tu/Sq Ft/Year)  
 Source Energy Consumption = 164,571 (8tu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)



EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref<br>Num | Equip<br>Code | Monthly Consumption |                           |       |       |       |       |       |       |       |       |       |       | Total   |
|------------|---------------|---------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|            |               | Jan                 | Feb                       | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0          | LIGHTS        |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 61411               | 55562                     | 67259 | 58486 | 64335 | 64335 | 58486 | 67259 | 58486 | 64335 | 58486 | 58486 | 736,929 |
|            | PK            | 319.6               | 319.6                     | 319.6 | 319.6 | 319.6 | 319.6 | 319.6 | 319.6 | 319.6 | 319.6 | 319.6 | 319.6 | 319.6   |
| 1          | MISC LD       |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2          | MISC LD       |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | GAS           | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3          | MISC LD       |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | OIL           | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4          | MISC LD       |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | P STEAM       | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5          | MISC LD       |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | P HOTH2O      | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6          | MISC LD       |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | P CHILL       | 0                   | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1          | EQ1001S       |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                     | 2-STG CTV <555 TONS       |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                   | 0                         | 0     | 0     | 12131 | 17777 | 31029 | 19748 | 11405 | 0     | 0     | 0     | 92,089  |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 93.5  | 152.5 | 204.2 | 159.8 | 118.3 | 0.0   | 0.0   | 0.0   | 204.2   |
| 1          | EQ5100        |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                     | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                   | 0                         | 0     | 0     | 5115  | 5115  | 4650  | 5348  | 4650  | 0     | 0     | 0     | 24,878  |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 23.3  | 23.3  | 23.3  | 23.3  | 23.3  | 0.0   | 0.0   | 0.0   | 23.3    |
| 1          | EQ5100        |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                     | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|            | WATER         | 0                   | 0                         | 0     | 0     | 59    | 98    | 170   | 109   | 56    | 0     | 0     | 0     | 492     |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 0.5   | 0.8   | 1.1   | 0.9   | 0.7   | 0.0   | 0.0   | 0.0   | 1.1     |
| 1          | EQ5001        |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                     | CHILLED WATER PUMP C.V.   |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                   | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1          | EQ5010        |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                     | CONDENSER WATER PUMP C.V. |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                   | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|            | PK            | 0.0                 | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1          | EQ5300        |                     |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                     | CONTROL PANEL & INTERLOCK |       |       |       |       |       |       |       |       |       |       |         |

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

|          |                            |       |       |       |       |       |       |       |       |       |       |       |         |
|----------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| ELEC     | 0                          | 0     | 0     | 0     | 220   | 220   | 200   | 230   | 200   | 0     | 0     | 0     | 1,070   |
| PK       | 0.0                        | 0.0   | 0.0   | 0.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 0.0   | 0.0   | 0.0   | 1.0     |
| 2 EQ1000 | PREVENTS COOLING ENERGY    |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
| PK       | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 EQ5001 | CHILLED WATER PUMP C.V.    |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
| PK       | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 EQ5010 | CONDENSER WATER PUMP C.V.  |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
| PK       | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 9754                       | 8825  | 10683 | 9290  | 10219 | 10219 | 9290  | 10583 | 9290  | 10219 | 9290  | 9290  | 117,051 |
| PK       | 46.4                       | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4    |
| 1 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 2276                       | 2059  | 2493  | 2168  | 2384  | 2384  | 2168  | 2493  | 2168  | 2384  | 2168  | 2168  | 27,312  |
| PK       | 10.8                       | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8    |
| 2 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
| PK       | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 13975                      | 12644 | 15305 | 13309 | 14640 | 14640 | 13309 | 15305 | 13309 | 14640 | 13309 | 13309 | 167,695 |
| PK       | 66.5                       | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5    |
| 3 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 1747                       | 1580  | 1913  | 1664  | 1830  | 1830  | 1664  | 1913  | 1664  | 1830  | 1664  | 1664  | 20,962  |
| PK       | 8.3                        | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3     |
| 5 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
| PK       | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 5 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
| PK       | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 6 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
| PK       | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 6 EQ4003 | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
| ELEC     | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
| PK       | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 1 EQ2101 | PURCHASED DISTRICT STEAM   |       |       |       |       |       |       |       |       |       |       |       |         |
| P STEAM  | 2186                       | 2067  | 1626  | 441   | 0     | 0     | 0     | 0     | 0     | 297   | 881   | 1849  | 9,347   |
| PK       | 11.8                       | 11.8  | 11.8  | 8.3   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 8.1   | 10.8  | 11.8  | 11.8    |
| 1 EQ5020 | HEAT WATER CIRC. PUMP C.V. |       |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 2  
 REPLACE FLUORESCENT BALLASTS

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        954.5    (kW)  
 Yearly Time of Peak 14 (hr)    7 (mo)

Hour 14    Month 7

| Eqp.<br>Ref.<br>Num.        | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|-----------------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| <b>Cooling Equipment</b>    |                        |                                    |                           |                          |
| 1                           | EQ1001S                | 2-STG CTV <555 TONS                | 288.1                     | 30.19                    |
| Sub Total                   |                        |                                    | 288.1                     | 30.19                    |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                     |
| <b>Air Moving Equipment</b> |                        |                                    |                           |                          |
| 1                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 57.3                      | 6.00                     |
| 3                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 74.9                      | 7.84                     |
| 5                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 11.24                    |
| 6                           |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 11.24                    |
| Sub Total                   |                        |                                    | 346.8                     | 36.33                    |
| Sub Total                   |                        |                                    | 0.0                       | 0.00                     |
| <b>Miscellaneous</b>        |                        |                                    |                           |                          |
| Lights                      |                        |                                    | 319.6                     | 33.48                    |
| Base Utilities              |                        |                                    | 0.0                       | 0.00                     |
| Misc Equipment              |                        |                                    | 0.0                       | 0.00                     |
| Sub Total                   |                        |                                    | 319.6                     | 33.48                    |
| Grand Total                 |                        |                                    | 954.5                     | 100.00                   |

```
*****  
*****  
**  
**          TRACE 600 ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 122

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 12:31: 9 2/ 2/94  
Dataset Name: CBI22B .TM

AIRFLOW - ALTERNATIVE 3  
 REPLACE FLUORESCENT FIXTURES

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | TRH         | 10,853                | 36,175                | 36,175                | 36,175               | 10,853                | 0                    | 0                     |
| 2             | SZ          | 0                     | 17,730                | 17,730                | 17,730               | 0                     | 0                    | 17,730                |
| 3             | INDFP       | 5,830                 | 19,435                | 19,435                | 36,448               | 19,435                | 32,434               | 0                     |
| 4             | UH          | 0                     | 0                     | 1,835                 | 0                    | 0                     | 0                    | 0                     |
| 5             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 27,856                | 0                    | 0                     |
| 6             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 9,325                 | 0                    | 0                     |
| <b>Totals</b> |             | <b>33,397</b>         | <b>129,052</b>        | <b>130,887</b>        | <b>148,000</b>       | <b>67,468</b>         | <b>32,434</b>        | <b>17,730</b>         |

CAPACITY - ALTERNATIVE 3  
 REPLACE FLUORESCENT FIXTURES

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | TRH         | 64.2                      | 0.0                       | 0.0                  | 0.0                  | 64.2                  | -68,182                   | 0                         | -630,301                | 0                      | 0                        | 0                    | 0                    | -698,484              |
| 2             | SZ          | 2.3                       | 0.0                       | 0.0                  | 0.0                  | 2.3                   | -9,837                    | 0                         | -117,003                | 0                      | 0                        | 0                    | 0                    | -9,837                |
| 3             | INDFP       | 46.4                      | 88.4                      | 0.0                  | 0.0                  | 134.8                 | -680,963                  | -1,230,942                | 0                       | 0                      | 0                        | 0                    | 0                    | -1,911,905            |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -6,715                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -6,715                |
| 5             | DD          | 54.6                      | 0.0                       | 0.0                  | 0.0                  | 54.6                  | -245,454                  | 0                         | -435,189                | 0                      | 0                        | 0                    | 0                    | -680,644              |
| 6             | DD          | 54.6                      | 0.0                       | 0.0                  | 0.0                  | 54.6                  | -245,454                  | 0                         | -435,189                | 0                      | 0                        | 0                    | 0                    | -680,644              |
| <b>Totals</b> |             | <b>222.0</b>              | <b>88.4</b>               | <b>0.0</b>           | <b>0.0</b>           | <b>310.4</b>          | <b>-1,256,606</b>         | <b>-1,230,942</b>         | <b>-1,617,683</b>       | <b>0</b>               | <b>0</b>                 | <b>0</b>             | <b>0</b>             | <b>-3,988,228</b>     |

The building peaked at hour 14 month 7 with a capacity of 222.0 tons

ENGINEERING CHECKS - ALTERNATIVE 3  
 REPLACE FLUORESCENT FIXTURES

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | ----- Cooling ----- |         |            |            | --- Heating --- |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|---------------------|---------|------------|------------|-----------------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft           | Cfm/Ton | Sq Ft /Ton | Btuh/Sq Ft | Cfm/Sq Ft       | Btuh/Sq Ft |                  |
| 1             | Main           | TRH         | 30.00               | 0.63                | 563.3   | 896.2      | 13.39      | 0.63            | -12.14     | 57,549           |
| 2             | Main           | SZ          | 0.00                | 4.32                | 7,846.6 | 1,814.5    | 6.61       | 4.32            | -2.40      | 4,100            |
| 3             | Main           | INDFP       | 30.00               | 0.47                | 418.7   | 891.2      | 13.46      | 0.47            | -16.46     | 41,364           |
| 3             | Auxiliary      | INDFP       | 0.00                | 0.78                | 367.0   | 468.0      | 25.64      | 0.78            | -29.76     | 41,364           |
| 4             | Main           | UH          | 0.00                | 0.00                | 0.0     | 0.0        | 0.00       | 0.72            | -2.64      | 2,544            |
| 5             | Main           | DD          | 30.00               | 1.03                | 510.6   | 497.1      | 24.14      | 1.03            | -25.10     | 27,121           |
| 6             | Main           | DD          | 30.00               | 1.03                | 510.6   | 497.1      | 24.14      | 1.03            | -25.10     | 27,121           |

System 1 Peak TRH - TERMINAL REHEAT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Partition       | 18,940                  |                          |                        | 18,940           | 2.46             | * | 18,940                | 5.85             | * | -68,182           | -68,182          | 100.00           |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 18,940                  | 0                        |                        | 18,940           | 2.46             | * | 18,940                | 5.35             | * | -68,182           | -68,182          | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 257,578                 | 0                        |                        | 257,578          | 33.43            | * | 273,881               | 84.55            | * | 0                 | 0                | 0.00             |
| People          | 63,941                  |                          |                        | 63,941           | 8.30             | * | 31,097                | 9.60             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 321,519                 | 0                        | 0                      | 321,519          | 41.72            | * | 304,978               | 94.15            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 340,359          | 44.17            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 77,173           | 10.01            | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Ret. Fan Heat   |                         | 18,007                   |                        | 18,007           | 2.34             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exhaust Heat    |                         | -5,402                   | 0                      | -5,402           | -0.70            | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Grand Total==>  | 340,459                 | 12,605                   | 0                      | 770,597          | 100.00           | * | 323,917               | 100.00           | * | -68,182           | -68,182          | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 64.2                  | 770.6           | 36,175           | 80.0              | 68.7  | 90.2   | 64.8             | 62.5  | 83.4   | Part        | 16,570     |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 64.2                  | 770.6           |                  |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        | --TEMPERATURES (F)-- |      |      |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------------------|------|------|
|          |                |                  |           |           | Vent    |         |         | Clg % OA               | 30.0   | Type                 | Clg  | Htg  |
| Main Htg | -68.2          | 36,175           | 68.0      | 69.7      | Infil   | 0       | 0       | Clg Cfm/Sqft           | 0.63   | SADB                 | 66.8 | 69.7 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 36,175  | 36,175  | Clg Cfm/Ton            | 563.33 | Plenum               | 75.0 | 68.0 |
| Preheat  | -630.3         | 36,175           | 48.8      | 64.8      | Mincfm  | 36,175  | 0       | Clg Sqft/Ton           | 896.17 | Return               | 75.5 | 68.0 |
| Reheat   | -0.0           | 0                | 0.0       | 0.0       | Return  | 36,175  | 36,175  | Clg Btuh/Sqft          | 13.39  | Ret/OA               | 80.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 10,853  | 0       | No. People             | 137    | Runarnd              | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 0       | 0       | Htg % OA               | 0.0    | Fn MtrTD             | 0.5  | 0.5  |
| Total    | -698.5         |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 0.63   | Fn BldTD             | 0.4  | 0.4  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -12.14 | Fn Frict             | 1.1  | 1.1  |



System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 860                      | 860                    | 860              | 3.17               | 0                     | 0.00               | 0                            | -3,224                    | 44.57              |
| Glass Solar     | 595                     | 0                        | 595                    | 595              | 2.19               | 595                   | 2.47               | 0                            | 0                         | 0.00               |
| Glass Cond      | 239                     | 0                        | 239                    | 239              | 0.88               | 239                   | 0.99               | -1,139                       | -1,139                    | 15.75              |
| Wall Cond       | 747                     | 183                      | 929                    | 929              | 3.43               | 747                   | 3.10               | -2,286                       | -2,870                    | 39.68              |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 1,581                   | 1,042                    | 2,623                  | 2,623            | 9.67               | 1,581                 | 6.56               | -3,426                       | -7,234                    | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 19,780                  | 0                        | 19,780                 | 19,780           | 72.95              | 19,780                | 82.11              | 0                            | 0                         | 0.00               |
| People          | 4,712                   | 0                        | 4,712                  | 4,712            | 17.38              | 2,223                 | 9.23               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 24,492                  | 0                        | 24,492                 | 24,492           | 90.33              | 22,002                | 91.34              | 0                            | 0                         | 0.00               |
| Ceiling Load    | 1,918                   | -1,918                   | 0                      | 0                | 0.00               | 506                   | 2.10               | -243                         | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | -0.00              |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Grand Total==>  | 27,991                  | -876                     | 0                      | 27,115           | 100.00             | 24,089                | 100.00             | -3,668                       | -7,234                    | 100.00             |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)   |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |       |
| Main Clg | 2.3                   | 27.1            | 17,730           | 76.6              | 69.9  | 102.0  | 73.8             | 69.4  | 104.3  | Part        | 4,100      |       |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |       |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 580        | 0 0   |
| Totals   | 2.3                   | 27.1            |                  |                   |       |        |                  |       |        | Wall        | 196        | 21 11 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0     | Type     | Clg  | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|---------|----------|------|------|
|          |                |                  |           |           | Vent    |         |         | Clg Cfm/Sqft  | 4.32    | SADB     | 73.8 | 68.2 |
| Main Htg | -9.8           | 17,730           | 67.7      | 68.2      | Infil   | 0       | 0       | Clg Cfm/Ton   | 7846.61 | Plenum   | 76.5 | 67.7 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 17,730  | 17,730  | Clg Sqft/Ton  | 1814.50 | Return   | 79.7 | 67.7 |
| Preheat  | -117.0         | 17,730           | 67.7      | 73.8      | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 6.61    | Ret/OA   | 76.6 | 67.7 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 17,730  | No. People    | 10      | Runarnd  | 75.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % OA      | 0.0     | Fn MtrTD | 0.0  | 0.0  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 17,730  | 0       | Htg Cfm/Sqft  | 4.32    | Fn BldTD | 0.0  | 0.0  |
| Total    | -9.8           |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -2.40   | Fn Frict | 0.0  | 0.0  |

System 3 Block INDFP - 4-PIPE INDUCTION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/19 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 85 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | * | Space Sensible (Btuh) | Percent Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|---|-----------------------|--------------------|---|-------------------|------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    | * |                       |                    | * |                   |                  |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Roof Cond       | 474                     | 21,484                   | 0                      | 21,957           | 1.29               | * | 664                   | 0.10               | * | -1,579            | -73,446          | 3.84               |
| Glass Solar     | 171,927                 | 0                        | 0                      | 171,927          | 10.09              | * | 185,822               | 28.71              | * | 0                 | 0                | 0.00               |
| Glass Cond      | 53,830                  | 0                        | 0                      | 53,830           | 3.16               | * | 40,082                | 6.19               | * | -276,287          | -276,287         | 14.45              |
| Wall Cond       | 113,330                 | 16,902                   | 0                      | 130,232          | 7.64               | * | 168,977               | 26.10              | * | -328,407          | -377,319         | 19.74              |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Infiltration    | 736,354                 | 0                        | 0                      | 736,354          | 43.20              | * | 170,578               | 26.35              | * | -1,184,852        | -1,184,852       | 61.97              |
| Sub Total==>    | 1,075,915               | 38,386                   | 0                      | 1,114,301        | 65.38              | * | 566,123               | 87.46              | * | -1,791,125        | -1,911,905       | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    | * |                       |                    | * |                   |                  |                    |
| Lights          | 179,324                 | 0                        | 0                      | 179,324          | 10.52              | * | 51,508                | 7.96               | * | 0                 | 0                | 0.00               |
| People          | 45,248                  | 0                        | 0                      | 45,248           | 2.65               | * | 6,070                 | 0.94               | * | 0                 | 0                | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Sub Total==>    | 224,572                 | 0                        | 0                      | 224,572          | 13.18              | * | 57,577                | 8.89               | * | 0                 | 0                | 0.00               |
| Ceiling Load    | 14,654                  | -14,654                  | 0                      | 0                | 0.00               | * | 23,486                | 3.63               | * | -47,811           | 0                | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 252,361          | 14.81              | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 110,564          | 6.49               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Ret. Fan Heat   | 0                       | 13,820                   | 0                      | 13,820           | 0.81               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| OV/UNDR Sizing  | 119                     | 0                        | 0                      | 119              | 0.01               | * | 119                   | 0.02               | * | 0                 | 0                | 0.00               |
| Exhaust Heat    | 0                       | -11,266                  | 0                      | -11,266          | -0.66              | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00               | * | 0                     | 0.00               | * | 0                 | 0                | 0.00               |
| Grand Total==>  | 1,315,260               | 26,287                   | 0                      | 1,704,471        | 100.00             | * | 647,306               | 100.00             | * | -1,838,936        | -1,911,905       | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total | Glass (sf) | (%)      |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------|------------|----------|
| Main Clg | 46.4                  | 557.0           | 19,435           | 80.9                      | 66.7                     | Floor       | 41,364     |          |
| Aux Clg  | 88.4                  | 1,060.6         | 32,434           | 75.0                      | 63.9                     | Part        | 0          |          |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | ExFlr       | 0          |          |
| Totals   | 134.8                 | 1,617.6         |                  |                           |                          | Roof        | 14,680     | 0 0      |
|          |                       |                 |                  |                           |                          | Wall        | 28,354     | 5,152 18 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -681.0         | 19,435           | 64.5        | 96.7        | Vent    | 5,830   | 0       | Clg Cfm/Sqft  | 0.47   | SADB     | 65.1 | 96.7 |
| Aux Htg  | -1,230.9       | 32,434           | 68.0        | 102.9       | Infil   | 17,013  | 17,013  | Clg Cfm/Ton   | 418.73 | Plenum   | 76.1 | 64.4 |
| Preheat  | -0.0           | 19,435           | 64.5        | 59.9        | Supply  | 19,435  | 19,435  | Clg Sqft/Ton  | 891.20 | Return   | 76.8 | 64.5 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | MinCFM  | 0       | 0       | Clg Btuh/Sqft | 13.46  | Ret/OA   | 80.9 | 64.5 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 19,435  | 19,435  | No. People    | 98     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 5,830   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -1,911.9       |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.47   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |             |             | Auxil   | 32,434  | 32,434  | Htg Btuh/Sqft | -16.46 | Fn Frict | 2.9  | 2.9  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 0/ 0 \* Mo/Hr: 0/ 0 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 0/ 0/ 0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -6,715                       | -6,715                    | 100.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -6,715                       | -6,715                    | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| People          | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | -6,715                       | -6,715                    | 100.00             |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 2,544      |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 1,632      |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0   |
| Totals   | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Wall        | 0          | 0   |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0   | Type     | Clg | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|-------|----------|-----|------|
| Main Htg | -6.7           | 1,835            | 68.0      | 71.4      | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00  | SADB     | 0.0 | 71.4 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 0       | Clg Cfm/Ton   | 0.00  | Plenum   | 0.0 | 68.0 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 1,835   | Clg Sqft/Ton  | 0.00  | Return   | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00  | Ret/OA   | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 1,835   | No. People    | 0     | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % OA      | 0.0   | Fn MtrTD | 0.0 | 0.0  |
| Total    | -6.7           |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.72  | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -2.64 | Fn Frict | 0.1 | 0.0  |

System 5 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 2.21             | * | 16,221                | 7.66             | * | -48,286                      | -48,286                   | 21.28            |
| Glass Solar     | 17,909                  | 0                        | 0                      | 17,909           | 2.74             | * | 16,285                | 7.69             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.74             | * | 5,167                 | 2.44             | * | -24,690                      | -24,690                   | 10.88            |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.72             | * | 5,622                 | 2.65             | * | -16,677                      | -18,921                   | 8.34             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 29,570                  | 0                        | 0                      | 29,570           | 4.52             | * | 16,324                | 7.71             | * | -67,403                      | -67,403                   | 29.70            |
| Sub Total==>    | 70,966                  | 526                      | 0                      | 71,492           | 10.92            | * | 59,619                | 28.14            | * | -157,056                     | -159,300                  | 70.19            |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 123,012                 | 0                        | 0                      | 123,012          | 18.79            | * | 129,725               | 61.24            | * | 0                            | 0                         | 0.00             |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 4.61             | * | 14,612                | 6.90             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 153,215                 | 0                        | 0                      | 153,215          | 23.40            | * | 144,337               | 68.14            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00             | * | 1,553                 | 0.73             | * | -4,627                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 255,335          | 39.00            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 24.20            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 3.03             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 6,326                   | 0                        | 0                      | 6,326            | 0.97             | * | 6,326                 | 2.99             | * | -67,648                      | -67,648                   | 29.81            |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.52            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 231,882                 | 9,026                    | 0                      | 654,712          | 100.00           | * | 211,835               | 100.00           | * | -229,331                     | -226,948                  | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR Deg F | Entering DB/WB/HR Deg F | Entering DB/WB/HR Grains | Leaving DB/WB/HR Deg F | Leaving DB/WB/HR Deg F | Leaving DB/WB/HR Grains | Gross Total Floor | Glass (sf) Part | (%) ExFlr |
|----------|-----------------------|-----------------|------------------|-------------------------|-------------------------|--------------------------|------------------------|------------------------|-------------------------|-------------------|-----------------|-----------|
| Main Clg | 54.6                  | 654.7           | 27,856           | 80.4                    | 69.0                    | 91.0                     | 62.8                   | 62.1                   | 84.9                    | 27,121            | 0               | 0         |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                     | 0.0                     | 0.0                      | 0.0                    | 0.0                    | 0.0                     | 0                 | 0               | 0         |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                     | 0.0                     | 0.0                      | 0.0                    | 0.0                    | 0.0                     | 8,563             | 0               | 0         |
| Totals   | 54.6                  | 654.7           |                  |                         |                         |                          |                        |                        |                         | 1,613             | 460             | 29        |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -245.5         | 27,856           | 67.5      | 75.6      | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SAOB     | 68.0 | 75.6 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 968     | 968     | Clg Cfm/Ton   | 510.56 | Plenum   | 75.4 | 66.5 |
| Preheat  | -435.2         | 27,856           | 48.4      | 62.8      | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 497.09 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 24.14  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -680.6         |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -25.10 | Fn Frict | 2.9  | 2.9  |

System 6 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| Peaked at Time ==> |                         | Mo/Hr: 7/14              |                        | *                | Mo/Hr: 7/16      |   | *                     | Mo/Hr: 13/1      |   |                   |                  |                  |
|--------------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Outside Air ==>    |                         | OADB/WB/HR: 91/ 74/105.0 |                        | *                | OADB: 91         |   | *                     | OADB: 4          |   |                   |                  |                  |
|                    | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
| Envelope Loads     |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Skylite Solr       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond          | 14,486                  | 0                        | 0                      | 14,486           | 2.21             | * | 16,221                | 7.66             | * | -48,286           | -48,286          | 21.28            |
| Glass Solar        | 17,909                  | 0                        | 0                      | 17,909           | 2.74             | * | 16,285                | 7.69             | * | 0                 | 0                | 0.00             |
| Glass Cond         | 4,840                   | 0                        | 0                      | 4,840            | 0.74             | * | 5,167                 | 2.44             | * | -24,690           | -24,690          | 10.88            |
| Wall Cond          | 4,161                   | 526                      | 0                      | 4,687            | 0.72             | * | 5,622                 | 2.65             | * | -16,677           | -18,921          | 8.34             |
| Partition          | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration       | 29,570                  | 0                        | 0                      | 29,570           | 4.52             | * | 16,324                | 7.71             | * | -67,403           | -67,403          | 29.70            |
| Sub Total==>       | 70,966                  | 526                      | 0                      | 71,492           | 10.92            | * | 59,619                | 28.14            | * | -157,056          | -159,300         | 70.19            |
| Internal Loads     |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Lights             | 123,012                 | 0                        | 0                      | 123,012          | 18.79            | * | 129,725               | 61.24            | * | 0                 | 0                | 0.00             |
| People             | 30,203                  | 0                        | 0                      | 30,203           | 4.61             | * | 14,612                | 6.90             | * | 0                 | 0                | 0.00             |
| Misc               | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>       | 153,215                 | 0                        | 0                      | 153,215          | 23.40            | * | 144,337               | 68.14            | * | 0                 | 0                | 0.00             |
| Ceiling Load       | 1,375                   | -1,375                   | 0                      | 0                | 0.00             | * | 1,553                 | 0.73             | * | -4,627            | 0                | 0.00             |
| Outside Air        | 0                       | 0                        | 0                      | 255,335          | 39.00            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat      | 0                       | 0                        | 0                      | 158,470          | 24.20            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Ret. Fan Heat      | 0                       | 19,809                   | 0                      | 19,809           | 3.03             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Duct Heat Pkup     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| OV/UNDR Sizing     | 6,326                   | 0                        | 0                      | 6,326            | 0.97             | * | 6,326                 | 2.99             | * | -67,648           | -67,648          | 29.81            |
| Exhaust Heat       | 0                       | -9,934                   | 0                      | -9,934           | -1.52            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Terminal Bypass    | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Grand Total==>     | 231,882                 | 9,026                    | 0                      | 654,712          | 100.00           | * | 211,835               | 100.00           | * | -229,331          | -226,948         | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 54.6                  | 654.7           | 27,856           | 80.4              | 69.0  | 91.0   | 62.8             | 62.1  | 84.9   | 27,121      |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 54.6                  | 654.7           |                  |                   |       |        |                  |       |        | 8,563       | 0          | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        | 1,613       | 460        | 29  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -245.5         | 27,856           | 67.5        | 75.6        | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 68.0 | 75.6 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 968     | 968     | Clg Cfm/Ton   | 510.56 | Plenum   | 75.4 | 66.5 |
| Preheat  | -435.2         | 27,856           | 48.4        | 62.8        | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 497.09 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 24.14  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -680.6         |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -25.10 | Fn Frict | 2.9  | 2.9  |

BUILDING U-VALUES - ALTERNATIVE 3  
 REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |            |             |             |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |       |
|-------------|------------------|-------|-------|----------------------------------|-------------|------------|-------------|-------------|-------|-------|------------------------|-----------------------------|-------|
|             |                  |       |       | Summr Skylt                      | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wall  | Ceil. |                        |                             |       |
| 1           | SUB BSMT, BSMT W | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317                  | 46.8                        | 9.61  |
| Zone        | 1 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317                  | 46.8                        | 9.61  |
| 4           | BSMT E           | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317                  | 45.2                        | 9.27  |
| Zone        | 4 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317                  | 45.2                        | 9.27  |
| System      | 1 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317                  | 46.4                        | 9.54  |
| 2           | TOILETS, KITCHEN | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 29.4                        | 5.93  |
| Zone        | 2 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 29.4                        | 5.93  |
| 11          | TOILETS W ROOF   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.000       | 0.000       | 0.000 | 0.317 | 0.317                  | 71.1                        | 15.13 |
| Zone        | 11 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.000       | 0.000       | 0.000 | 0.317 | 0.317                  | 71.1                        | 15.13 |
| System      | 2 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 35.3                        | 7.23  |
| 3           | STAIRS           | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.229 | 0.000 | 0.000                  | 103.3                       | 21.63 |
| Zone        | 3 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.229 | 0.000 | 0.000                  | 103.3                       | 21.63 |
| 5           | 1ST FL OFFICES   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 57.9                        | 12.05 |
| Zone        | 5 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 57.9                        | 12.05 |
| 7           | 2ND FL OFFICES   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 56.7                        | 11.81 |
| Zone        | 7 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 56.7                        | 11.81 |
| 9           | 3RD FL OFFICES   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 102.3                       | 21.84 |
| Zone        | 9 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 102.3                       | 21.84 |
| 12          | STAIRS W ROOF    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.229 | 0.000 | 0.000                  | 146.4                       | 31.13 |
| Zone        | 12 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.229 | 0.000 | 0.000                  | 146.4                       | 31.13 |
| System      | 3 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.256 | 0.317 | 0.317                  | 74.1                        | 15.63 |
| 13          | SUPPLY STORAGE   | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.000                  | 70.7                        | 14.70 |
| Zone        | 13 Total/Ave.    | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.000                  | 70.7                        | 14.70 |
| System      | 4 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.000                  | 70.7                        | 14.70 |
| 6           | 1ST FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 32.5                        | 6.60  |
| Zone        | 6 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 32.5                        | 6.60  |
| 8           | 2ND FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.000 | 0.000                  | 27.0                        | 5.41  |
| Zone        | 8 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.000 | 0.000                  | 27.0                        | 5.41  |
| 10          | 3RD FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.000 | 0.000                  | 71.5                        | 15.21 |
| Zone        | 10 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.000 | 0.000                  | 71.5                        | 15.21 |
| System      | 5 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 43.1                        | 8.94  |
| 14          | 1ST FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 32.5                        | 6.60  |
| Zone        | 14 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 32.5                        | 6.60  |
| 15          | 2ND FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.000 | 0.000                  | 27.0                        | 5.41  |
| Zone        | 15 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.810       | 0.837       | 0.257 | 0.000 | 0.000                  | 27.0                        | 5.41  |
| 16          | 3RD FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.000 | 0.000                  | 71.5                        | 15.21 |
| Zone        | 16 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.000 | 0.000                  | 71.5                        | 15.21 |
| System      | 6 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.257 | 0.317 | 0.317                  | 43.1                        | 8.94  |
| Building    |                  | 0.229 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.810       | 0.837       | 0.256 | 0.317 | 0.317                  | 52.6                        | 10.93 |

BUILDING AREAS - ALTERNATIVE 3  
 REPLACE FLUORESCENT FIXTURES

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description      | Number of<br>Duplicate |   | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skl<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wl<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|------------------|------------------------|---|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 1              | SUB BSMT, BSMT W | 1                      | 1 | 45,125                               | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 1 Total/Ave.     |                        |   |                                      | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 4              | BSMT E           | 1                      | 1 | 12,424                               | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 4 Total/Ave.     |                        |   |                                      | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 1 Total/Ave.     |                        |   |                                      | 57,549                           | 16,570                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 2              | TOILETS, KITCHEN | 1                      | 1 | 3,520                                | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| Zone           | 2 Total/Ave.     |                        |   |                                      | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| 11             | TOILETS W ROOF   | 1                      | 1 | 580                                  | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| Zone           | 11 Total/Ave.    |                        |   |                                      | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| System         | 2 Total/Ave.     |                        |   |                                      | 4,100                            | 0                           | 0                                  | 0                          | 0                 | 580                        | 21                       | 11                | 174                        |
| 3              | STAIRS           | 1                      | 1 | 560                                  | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| Zone           | 3 Total/Ave.     |                        |   |                                      | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| 5              | 1ST FL OFFICES   | 1                      | 1 | 11,724                               | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| Zone           | 5 Total/Ave.     |                        |   |                                      | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| 7              | 2ND FL OFFICES   | 1                      | 1 | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| Zone           | 7 Total/Ave.     |                        |   |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| 9              | 3RD FL OFFICES   | 1                      | 1 | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| Zone           | 9 Total/Ave.     |                        |   |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| 12             | STAIRS W ROOF    | 1                      | 1 | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| Zone           | 12 Total/Ave.    |                        |   |                                      | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| System         | 3 Total/Ave.     |                        |   |                                      | 41,364                           | 0                           | 0                                  | 0                          | 0                 | 14,680                     | 5,152                    | 18                | 23,202                     |
| 13             | SUPPLY STORAGE   | 1                      | 1 | 2,544                                | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 13 Total/Ave.    |                        |   |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 4 Total/Ave.     |                        |   |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 6              | 1ST FL CEN OFFCS | 1                      | 1 | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 6 Total/Ave.     |                        |   |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 8              | 2ND FL CEN OFFCS | 1                      | 1 | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 8 Total/Ave.     |                        |   |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 10             | 3RD FL CEN OFFCS | 1                      | 1 | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 10 Total/Ave.    |                        |   |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 5 Total/Ave.     |                        |   |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| 14             | 1ST FL CEN OFFCS | 1                      | 1 | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 14 Total/Ave.    |                        |   |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 15             | 2ND FL CEN OFFCS | 1                      | 1 | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 15 Total/Ave.    |                        |   |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 16             | 3RD FL CEN OFFCS | 1                      | 1 | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 16 Total/Ave.    |                        |   |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 6 Total/Ave.     |                        |   |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| Building       |                  |                        |   |                                      | 159,799                          | 18,202                      | 0                                  | 0                          | 0                 | 32,386                     | 6,095                    | 19                | 25,681                     |

ASHRAE 90 ANALYSIS - ALTERNATIVE 3  
REPLACE FLUORESCENT FIXTURES

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTvr) = 3.96 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTvw) = 24.46 (Btu/Hr/Sq Ft)



SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 3  
 REPLACE FLUORESCENT FIXTURES

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 15.5                   | 0         | 0     | -205,262                 | 15        | 202   | 6,544.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 31.0                   | 9         | 100   | -410,523                 | 7         | 93    | 13,088.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 46.6                   | 7         | 72    | -615,785                 | 4         | 57    | 19,633.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 62.1                   | 13        | 135   | -821,046                 | 5         | 68    | 26,177.4                  | 0         | 0     | 0.0                       | 0         | 0     |
| 20 - 25             | 77.6                   | 6         | 65    | -1,026,308               | 1         | 17    | 32,721.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 93.1                   | 11        | 113   | -1,231,569               | 8         | 104   | 39,266.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 30 - 35             | 108.6                  | 18        | 189   | -1,436,831               | 8         | 109   | 45,810.5                  | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 124.2                  | 4         | 38    | -1,642,093               | 14        | 194   | 52,354.8                  | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 139.7                  | 4         | 45    | -1,847,354               | 37        | 497   | 58,899.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 155.2                  | 6         | 63    | -2,052,616               | 0         | 0     | 65,443.5                  | 0         | 0     | 0.0                       | 0         | 0     |
| 50 - 55             | 170.7                  | 5         | 50    | -2,257,878               | 0         | 0     | 71,987.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 186.2                  | 1         | 15    | -2,463,139               | 0         | 0     | 78,532.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 60 - 65             | 201.8                  | 7         | 80    | -2,668,401               | 0         | 0     | 85,076.6                  | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 217.3                  | 6         | 60    | -2,873,662               | 0         | 0     | 91,620.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 232.8                  | 3         | 35    | -3,078,924               | 0         | 0     | 98,165.3                  | 0         | 0     | 0.0                       | 0         | 0     |
| 75 - 80             | 248.3                  | 1         | 10    | -3,284,186               | 0         | 0     | 104,709.6                 | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 263.8                  | 0         | 0     | -3,489,447               | 0         | 0     | 111,254.0                 | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 279.4                  | 0         | 0     | -3,694,709               | 0         | 0     | 117,798.3                 | 100       | 2,520 | 0.0                       | 0         | 0     |
| 90 - 95             | 294.9                  | 0         | 0     | -3,899,971               | 0         | 0     | 124,342.7                 | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 310.4                  | 0         | 0     | -4,105,232               | 0         | 0     | 130,887.0                 | 0         | 0     | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,690 | 0                        | 0         | 7,419 | 0.0                       | 0         | 6,240 | 0.0                       | 0         | 8,760 |



MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 3  
REPLACE FLUORESCENT FIXTURES

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | STEAM              | STEAM DMND         |                      |
|-------|-------------------|-----------------|--------------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Therm) | WATER<br>(1000 G1) | On Peak<br>(Thrm/hr) |
| Jan   | 135,416           | 667             | 12,925             | 0                  | 65                   |
| Feb   | 122,519           | 667             | 12,105             | 0                  | 65                   |
| March | 147,735           | 667             | 10,306             | 0                  | 65                   |
| April | 123,809           | 667             | 3,053              | 0                  | 52                   |
| May   | 159,200           | 779             | 0                  | 51                 | 0                    |
| June  | 164,416           | 835             | 0                  | 87                 | 0                    |
| July  | 163,349           | 885             | 0                  | 158                | 0                    |
| Aug   | 172,958           | 844             | 0                  | 97                 | 0                    |
| Sept  | 145,106           | 807             | 0                  | 49                 | 0                    |
| Oct   | 135,567           | 667             | 2,033              | 0                  | 49                   |
| Nov   | 127,595           | 667             | 5,605              | 0                  | 62                   |
| Dec   | 128,968           | 667             | 11,211             | 0                  | 65                   |
| Total | 1,726,640         | 885             | 57,237             | 442                | 65                   |

Building Energy Consumption = 72,696 (Btu/Sq Ft/Year)  
Source Energy Consumption = 158,402 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
 REPLACE FLUORESCENT FIXTURES

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | ----- Monthly Consumption ----- |                           |       |       |       |       |       |       |       |       |       |       | Total   |
|---------|------------|---------------------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|         |            | Jan                             | Feb                       | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0       | LIGHTS     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 50971                           | 46117                     | 55825 | 48544 | 53398 | 53398 | 48544 | 55825 | 48544 | 53398 | 48544 | 48544 | 611,651 |
|         | PK         | 265.3                           | 265.3                     | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3   |
| -1      | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | GAS        | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | OIL        | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P STEAM    | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P HOTH2O   | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P CHILL    | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1       | EQ1001S    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | 2-STG CTV <555 TONS       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 11057 | 16273 | 28674 | 18082 | 10430 | 0     | 0     | 0     | 84,515  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 83.2  | 139.5 | 188.6 | 147.6 | 110.9 | 0.0   | 0.0   | 0.0   | 188.6   |
| 1       | EQ5100     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 5115  | 5115  | 4650  | 5348  | 4650  | 0     | 0     | 0     | 24,878  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 23.3  | 23.3  | 23.3  | 23.3  | 23.3  | 0.0   | 0.0   | 0.0   | 23.3    |
| 1       | EQ5100     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | WATER      | 0                               | 0                         | 0     | 0     | 51    | 87    | 158   | 97    | 49    | 0     | 0     | 0     | 442     |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.5   | 0.8   | 1.0   | 0.8   | 0.6   | 0.0   | 0.0   | 0.0   | 1.0     |
| 1       | EQ5001     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CHILLED WATER PUMP C.V.   |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5010     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CONDENSER WATER PUMP C.V. |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5300     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CONTROL PANEL & INTERLOCK |       |       |       |       |       |       |       |       |       |       |         |

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 3  
 REPLACE FLUORESCENT FIXTURES

|   |         |                            |       |       |       |       |       |       |       |       |       |       |       |         |
|---|---------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|   | ELEC    | 0                          | 0     | 0     | 0     | 220   | 220   | 200   | 230   | 200   | 0     | 0     | 0     | 1,070   |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 0.0   | 0.0   | 0.0   | 1.0     |
| 2 | EQ1000  | PREVENTS COOLING ENERGY    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5001  | CHILLED WATER PUMP C.V.    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5010  | CONDENSER WATER PUMP C.V.  |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 9754                       | 8825  | 10683 | 9290  | 10219 | 10219 | 9290  | 10683 | 9290  | 10219 | 9290  | 9290  | 117,051 |
|   | PK      | 46.4                       | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4    |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2276                       | 2059  | 2493  | 2168  | 2384  | 2384  | 2168  | 2493  | 2168  | 2384  | 2168  | 2168  | 27,312  |
|   | PK      | 10.8                       | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8    |
| 2 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 13975                      | 12644 | 15305 | 13309 | 14640 | 14640 | 13309 | 15305 | 13309 | 14640 | 13309 | 13309 | 167,695 |
|   | PK      | 66.5                       | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5    |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 1747                       | 1580  | 1913  | 1664  | 1830  | 1830  | 1664  | 1913  | 1664  | 1830  | 1664  | 1664  | 20,962  |
|   | PK      | 8.3                        | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3     |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 1 | EQ2101  | PURCHASED DISTRICT STEAM   |       |       |       |       |       |       |       |       |       |       |       |         |
|   | P STEAM | 2215                       | 2075  | 1750  | 521   | 0     | 0     | 0     | 0     | 0     | 340   | 961   | 1921  | 9,783   |
|   | PK      | 11.1                       | 11.1  | 11.1  | 8.9   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 8.3   | 10.7  | 11.1  | 11.1    |
| 1 | EQ5020  | HEAT WATER CIRC. PUMP C.V. |       |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 3  
REPLACE FLUORESCENT FIXTURES

----- U T I L I T Y   P E A K   C H E C K S U M S -----

Utility    ELECTRIC DEMAND

Peak Value        884.5    (kW)  
Yearly Time of Peak 13 (hr)    7 (mo)

Hour 13    Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Perct<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|------------------------|
| Cooling Equipment    |                        |                                    |                           |                        |
| 1                    | EQ1001S                | 2-STG CTV <555 TONS                | 272.5                     | 30.81                  |
| Sub Total            |                        |                                    | 272.5                     | 30.81                  |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Air Moving Equipment |                        |                                    |                           |                        |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 57.3                      | 6.48                   |
| 3                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 74.9                      | 8.46                   |
| 5                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 12.13                  |
| 6                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 12.13                  |
| Sub Total            |                        |                                    | 346.8                     | 39.20                  |
| Sub Total            |                        |                                    | 0.0                       | 0.00                   |
| Miscellaneous        |                        |                                    |                           |                        |
|                      | Lights                 |                                    | 265.3                     | 29.99                  |
|                      | Base Utilities         |                                    | 0.0                       | 0.00                   |
|                      | Misc Equipment         |                                    | 0.0                       | 0.00                   |
| Sub Total            |                        |                                    | 265.3                     | 29.99                  |
| Grand Total          |                        |                                    | 884.5                     | 100.00                 |

```
*****  
*****  
**  
**          TRACE 600 ANALYSIS          **  
**  
**          by          **  
**  
*****  
*****
```

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 122

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relactance: 0.20  
Winter Ground Relactance: 0.20

Air Density: 0.0742 (lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 12:55:35 2/ 2/94  
Dataset Name: CB122B .TM



AIRFLOW - ALTERNATIVE 4  
 HEAT RECOVERY

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil.               | Room                  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Supply Airflow (Cfm) | Exhaust Airflow (Cfm) |
| 1             | TRH         | 10,853                | 36,175                | 36,175                | 36,175               | 10,853                | 0                    | 0                     |
| 2             | SZ          | 0                     | 17,730                | 17,730                | 17,730               | 0                     | 0                    | 17,730                |
| 3             | INDFP       | 5,830                 | 19,435                | 19,435                | 36,448               | 22,843                | 37,165               | 0                     |
| 4             | UH          | 0                     | 0                     | 1,835                 | 0                    | 0                     | 0                    | 0                     |
| 5             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 9,325                 | 0                    | 0                     |
| 6             | DD          | 8,357                 | 27,856                | 27,856                | 28,824               | 9,325                 | 0                    | 0                     |
| Totals        |             | 33,397                | 129,052               | 130,887               | 148,000              | 52,345                | 37,165               | 17,730                |

CAPACITY - ALTERNATIVE 4  
 HEAT RECOVERY

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      | Cooling Totals (Tons) | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) |                       | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | TRH         | 81.5                      | 0.0                       | 0.0                  | 0.0                  | 81.5                  | -68,182                   | 0                         | -480,162                | 0                      | 0                        | 0                    | 0                    | -548,345              |
| 2             | SZ          | 3.2                       | 0.0                       | 0.0                  | 0.0                  | 3.2                   | -9,837                    | 0                         | -106,277                | 0                      | 0                        | 0                    | 0                    | -9,837                |
| 3             | INDFP       | 46.4                      | 102.4                     | 0.0                  | 0.0                  | 148.8                 | -680,963                  | -1,230,942                | 0                       | 0                      | 0                        | 0                    | 0                    | -1,911,905            |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -6,715                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -6,715                |
| 5             | DD          | 63.1                      | 0.0                       | 0.0                  | 0.0                  | 63.1                  | -245,454                  | 0                         | -365,035                | 0                      | 0                        | 0                    | 0                    | -610,489              |
| 6             | DD          | 63.1                      | 0.0                       | 0.0                  | 0.0                  | 63.1                  | -245,454                  | 0                         | -365,035                | 0                      | 0                        | 0                    | 0                    | -610,489              |
| Totals        |             | 257.3                     | 102.4                     | 0.0                  | 0.0                  | 359.7                 | -1,256,606                | -1,230,942                | -1,316,509              | 0                      | 0                        | 0                    | 0                    | -3,697,779            |

The building peaked at hour 14 month 7 with a capacity of 257.3 tons

ENGINEERING CHECKS - ALTERNATIVE 4  
 HEAT RECOVERY

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | ----- Cooling ----- |         |            |            | --- Heating --- |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|---------------------|---------|------------|------------|-----------------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft           | Cfm/Ton | Sq Ft /Ton | Btuh/Sq Ft | Cfm/Sq Ft       | Btuh/Sq Ft |                  |
| 1             | Main           | TRH         | 30.00               | 0.63                | 443.7   | 705.9      | 17.00      | 0.63            | -9.53      | 57,549           |
| 2             | Main           | SZ          | 0.00                | 4.32                | 5,605.2 | 1,296.2    | 9.26       | 4.32            | -2.40      | 4,100            |
| 3             | Main           | INDFP       | 30.00               | 0.47                | 418.7   | 891.2      | 13.46      | 0.47            | -16.46     | 41,364           |
| 3             | Auxiliary      | INDFP       | 0.00                | 0.90                | 363.0   | 404.1      | 29.70      | 0.90            | -29.76     | 41,364           |
| 4             | Main           | UH          | 0.00                | 0.00                | 0.0     | 0.0        | 0.00       | 0.72            | -2.64      | 2,544            |
| 5             | Main           | DD          | 30.00               | 1.03                | 441.4   | 429.7      | 27.92      | 1.03            | -22.51     | 27,121           |
| 6             | Main           | DD          | 30.00               | 1.03                | 441.4   | 429.7      | 27.92      | 1.03            | -22.51     | 27,121           |

System 1 Peak TRH - TERMINAL REHEAT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Partition       | 18,940                  |                          |                        | 18,940           | 1.94             | * | 18,940                | 4.00             | * | -68,182           | -68,182          | 100.00           |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 18,940                  | 0                        |                        | 18,940           | 1.94             | * | 18,940                | 4.00             | * | -68,182           | -68,182          | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 398,781                 | 0                        |                        | 398,781          | 40.76            | * | 424,020               | 89.45            | * | 0                 | 0                | 0.00             |
| People          | 63,941                  |                          |                        | 63,941           | 6.54             | * | 31,097                | 6.56             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 462,722                 | 0                        | 0                      | 462,722          | 47.30            | * | 455,117               | 96.00            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 406,913          | 41.59            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 77,173           | 7.89             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Ret. Fan Heat   |                         | 18,007                   |                        | 18,007           | 1.84             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | -0.00            | * | 0                     | -0.00            | * | 0                 | 0                | 0.00             |
| Exhaust Heat    |                         | -5,402                   | 0                      | -5,402           | -0.55            | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Grand Total==>  | 481,661                 | 12,605                   | 0                      | 978,353          | 100.00           | * | 474,057               | 100.00           | * | -68,182           | -68,182          | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------|------------|-----|
| Main Clg | 81.5                  | 978.4           | 36,175           | 80.0                      | 67.5                     | Floor       | 57,549     |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | Part        | 16,570     |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | ExFlr       | 0          |     |
| Totals   | 81.5                  | 978.4           |                  |                           |                          | Roof        | 0          | 0 0 |
|          |                       |                 |                  |                           |                          | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -68.2          | 36,175           | 68.0        | 69.7        | Vent    | 10,853  | 0       | Clg Cfm/Sqft  | 0.63   | SADB     | 63.0 | 69.7 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 0       | 0       | Clg Cfm/Ton   | 443.70 | Plenum   | 75.0 | 68.0 |
| Preheat  | -480.2         | 36,175           | 48.8        | 61.0        | Supply  | 36,175  | 36,175  | Clg Sqft/Ton  | 705.87 | Return   | 75.5 | 68.0 |
| Reheat   | -0.0           | 0                | 0.0         | 0.0         | Mincfm  | 36,175  | 0       | Clg Btuh/Sqft | 17.00  | Ret/OA   | 80.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 36,175  | 36,175  | No. People    | 137    | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 10,853  | 0       | Htg % OA      | 0.0    | Fn MtrTD | 0.5  | 0.5  |
| Total    | -548.3         |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.63   | Fn BldTD | 0.4  | 0.4  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -9.53  | Fn Frict | 1.1  | 1.1  |

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 860                      | 860                    | 860              | 2.26             | * | 0                     | 0.00             | * | 0                            | -3,224                    | 44.57            |
| Glass Solar     | 595                     | 0                        | 595                    | 595              | 1.57             | * | 595                   | 1.71             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 239                     | 0                        | 239                    | 239              | 0.63             | * | 239                   | 0.69             | * | -1,139                       | -1,139                    | 15.75            |
| Wall Cond       | 747                     | 183                      | 929                    | 929              | 2.45             | * | 747                   | 2.14             | * | -2,286                       | -2,870                    | 39.68            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 1,581                   | 1,042                    | 2,623                  | 2,623            | 6.91             | * | 1,581                 | 4.54             | * | -3,426                       | -7,234                    | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                              |                           |                  |
| Lights          | 30,623                  | 0                        | 30,623                 | 30,623           | 80.68            | * | 30,623                | 87.96            | * | 0                            | 0                         | 0.00             |
| People          | 4,712                   | 0                        | 4,712                  | 4,712            | 12.41            | * | 2,223                 | 6.38             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 35,335                  | 0                        | 35,335                 | 35,335           | 93.09            | * | 32,845                | 94.34            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 1,918                   | -1,918                   | 0                      | 0                | 0.00             | * | 389                   | 1.12             | * | -243                         | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | -0.00            | * | 0                            | 0                         | -0.00            |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Grand Total==>  | 38,834                  | -876                     | 0                      | 37,958           | 100.00           | * | 34,815                | 100.00           | * | -3,668                       | -7,234                    | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | -----AREAS----- |            |       |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-----------------|------------|-------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Gross Total     | Glass (sf) | (%)   |
| Main Clg | 3.2                   | 38.0            | 17,730           | 76.6              | 68.9  | 96.8   | 73.2             | 68.3  | 99.1   | Floor           | 4,100      |       |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part            | 0          |       |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr           | 0          |       |
| Totals   | 3.2                   | 38.0            |                  |                   |       |        |                  |       |        | Roof            | 580        | 0 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        | Wall            | 196        | 21 11 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | -----AIRFLOWS (cfm)----- |         |         | --ENGINEERING CHECKS-- |         |          | --TEMPERATURES (F)--- |      |  |
|----------|----------------|------------------|-----------|-----------|--------------------------|---------|---------|------------------------|---------|----------|-----------------------|------|--|
|          |                |                  |           |           | Type                     | Cooling | Heating | Clg % OA               | 0.0     | Type     | Clg                   | Htg  |  |
| Main Htg | -9.8           | 17,730           | 67.7      | 68.2      | Vent                     | 0       | 0       | Clg Cfm/Sqft           | 4.32    | SADB     | 73.2                  | 68.2 |  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil                    | 0       | 0       | Clg Cfm/Ton            | 5605.16 | Plenum   | 76.5                  | 67.7 |  |
| Preheat  | -106.3         | 17,730           | 67.7      | 73.2      | Supply                   | 17,730  | 17,730  | Clg Sqft/Ton           | 1296.17 | Return   | 79.7                  | 67.7 |  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm                   | 0       | 0       | Clg Btuh/Sqft          | 9.26    | Ret/OA   | 76.6                  | 67.7 |  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return                   | 0       | 17,730  | No. People             | 10      | Runarnd  | 75.0                  | 68.0 |  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust                  | 0       | 0       | Htg % OA               | 0.0     | Fn MtrTD | 0.0                   | 0.0  |  |
| Total    | -9.8           |                  |           |           | Rm Exh                   | 17,730  | 0       | Htg Cfm/Sqft           | 4.32    | Fn BldTD | 0.0                   | 0.0  |  |
|          |                |                  |           |           | Auxil                    | 0       | 0       | Htg Btuh/Sqft          | -2.40   | Fn Frict | 0.0                   | 0.0  |  |

System 3 Block INDFP - 4-PIPE INDUCTION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/19 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 85 \* OADB: 4

|                 | Space      | Ret. Air | Ret. Air | Net       | Perct  |   | Space    | Perct  | Space Peak | Coil Peak  | Perct  |
|-----------------|------------|----------|----------|-----------|--------|---|----------|--------|------------|------------|--------|
|                 | Sens.+Lat. | Sensible | Latent   | Total     | Of Tot |   | Sensible | Of Tot | Space Sens | Tot Sens   | Of Tot |
|                 | (Btuh)     | (Btuh)   | (Btuh)   | (Btuh)    | (%)    |   | (Btuh)   | (%)    | (Btuh)     | (Btuh)     | (%)    |
| Envelope Loads  |            |          |          |           |        |   |          |        |            |            |        |
| Skylite Solr    | 0          | 0        |          | 0         | 0.00   | * | 0        | 0.00   | 0          | 0          | 0.00   |
| Skylite Cond    | 0          | 0        |          | 0         | 0.00   | * | 0        | 0.00   | 0          | 0          | 0.00   |
| Roof Cond       | 474        | 21,484   |          | 21,957    | 1.22   | * | 664      | 0.10   | -1,579     | -73,446    | 3.84   |
| Glass Solar     | 171,927    | 0        |          | 171,927   | 9.54   | * | 185,822  | 27.51  | 0          | 0          | 0.00   |
| Glass Cond      | 53,830     | 0        |          | 53,830    | 2.99   | * | 40,082   | 5.93   | -276,287   | -276,287   | 14.45  |
| Wall Cond       | 113,330    | 16,902   |          | 130,232   | 7.22   | * | 168,977  | 25.01  | -328,407   | -377,319   | 19.74  |
| Partition       | 0          |          |          | 0         | 0.00   | * | 0        | 0.00   | 0          | 0          | 0.00   |
| Exposed Floor   | 0          |          |          | 0         | 0.00   | * | 0        | 0.00   | 0          | 0          | 0.00   |
| Infiltration    | 736,354    |          |          | 736,354   | 40.85  | * | 170,578  | 25.25  | -1,184,852 | -1,184,852 | 61.97  |
| Sub Total==>    | 1,075,915  | 38,386   |          | 1,114,301 | 61.81  | * | 566,123  | 83.80  | -1,791,125 | -1,911,905 | 100.00 |
| Internal Loads  |            |          |          |           |        | * |          |        |            |            |        |
| Lights          | 277,628    | 0        |          | 277,628   | 15.40  | * | 79,744   | 11.80  | 0          | 0          | 0.00   |
| People          | 45,248     |          |          | 45,248    | 2.51   | * | 6,070    | 0.90   | 0          | 0          | 0.00   |
| Misc            | 0          | 0        | 0        | 0         | 0.00   | * | 0        | 0.00   | 0          | 0          | 0.00   |
| Sub Total==>    | 322,876    | 0        | 0        | 322,876   | 17.91  | * | 85,814   | 12.70  | 0          | 0          | 0.00   |
| Ceiling Load    | 14,654     | -14,654  |          | 0         | 0.00   | * | 23,486   | 3.48   | -47,811    | 0          | 0.00   |
| Outside Air     | 0          | 0        | 0        | 252,361   | 14.00  | * | 0        | 0.00   | 0          | 0          | 0.00   |
| Sup. Fan Heat   |            |          |          | 110,564   | 6.13   | * |          | 0.00   |            | 0          | 0.00   |
| Ret. Fan Heat   |            | 13,820   |          | 13,820    | 0.77   | * |          | 0.00   |            | 0          | 0.00   |
| Duct Heat Pkup  |            | 0        |          | 0         | 0.00   | * |          | 0.00   |            | 0          | 0.00   |
| OV/UNDR Sizing  | 119        |          |          | 119       | 0.01   | * | 119      | 0.02   | 0          | 0          | 0.00   |
| Exhaust Heat    |            | -11,266  | 0        | -11,266   | -0.62  | * |          | 0.00   |            | 0          | 0.00   |
| Terminal Bypass |            | 0        | 0        | 0         | 0.00   | * |          | 0.00   |            | 0          | 0.00   |
| Grand Total==>  | 1,413,564  | 26,287   | 0        | 1,802,776 | 100.00 | * | 675,542  | 100.00 | -1,838,936 | -1,911,905 | 100.00 |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity | Sens Cap. | Coil Airfl | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%)      |
|----------|----------------|-----------|------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|----------|
|          | (Tons)         | (Mbh)     | (cfm)      | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |          |
| Main Clg | 46.4           | 557.0     | 19,435     | 80.9              | 66.7  | 78.0   | 59.9             | 57.7  | 69.7   | Part        | 41,364     |          |
| Aux Clg  | 102.4          | 1,228.4   | 37,165     | 75.0              | 64.2  | 74.9   | 65.1             | 53.2  | 42.8   | ExFlr       | 0          |          |
| Opt Vent | 0.0            | 0.0       | 0          | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 14,680     | 0 0      |
| Totals   | 148.8          | 1,785.4   |            |                   |       |        |                  |       |        | Wall        | 28,354     | 5,152 18 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity | Coil Airfl | Ent   | Lvg   | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------|------------|-------|-------|---------|---------|---------|---------------|--------|----------|------|------|
|          | (Mbh)    | (cfm)      | Deg F | Deg F | Vent    | 5,830   | 0       | Clg Cfm/Sqft  | 0.47   | SADB     | 65.1 | 96.7 |
| Main Htg | -681.0   | 19,435     | 64.5  | 96.7  | Infil   | 17,013  | 17,013  | Clg Cfm/Ton   | 418.73 | Plenum   | 76.1 | 64.4 |
| Aux Htg  | -1,230.9 | 37,165     | 68.0  | 98.5  | Supply  | 19,435  | 19,435  | Clg Sqft/Ton  | 891.20 | Return   | 76.8 | 64.5 |
| Preheat  | -0.0     | 19,435     | 64.5  | 59.9  | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 13.46  | Ret/OA   | 80.9 | 64.5 |
| Reheat   | 0.0      | 0          | 0.0   | 0.0   | Return  | 19,435  | 19,435  | No. People    | 98     | Runarnd  | 75.0 | 68.0 |
| Humidif  | 0.0      | 0          | 0.0   | 0.0   | Exhaust | 5,830   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Opt Vent | 0.0      | 0          | 0.0   | 0.0   | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.47   | Fn 8ldTD | 1.0  | 1.0  |
| Total    | -1,911.9 |            |       |       | Auxil   | 37,165  | 37,165  | Htg Btuh/Sqft | -16.46 | Fn Frict | 2.9  | 2.9  |

System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

| COOLING COIL PEAK  |                         |                          |                        |                  |                  | CLG SPACE PEAK        |                  |                   | HEATING COIL PEAK |                  |                   |                  |                  |  |
|--------------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|-------------------|------------------|-------------------|------------------|------------------|--|
| Peaked at Time ==> |                         |                          |                        |                  |                  | Mo/Hr: 0/ 0           |                  |                   | Mo/Hr: 0/ 0       |                  |                   | Mo/Hr: 13/ 1     |                  |  |
| Outside Air ==>    |                         |                          |                        |                  |                  | OADB/WB/HR: 0/ 0/ 0.0 |                  |                   | OADB: 0           |                  |                   | OADB: 4          |                  |  |
| Envelope Loads     | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh)  | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |  |
| Skylite Solr       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Skylite Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Roof Cond          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Glass Solar        | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Glass Cond         | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Wall Cond          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Partition          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -6,715            | -6,715            | 100.00           | 0                 | 0                | 0.00             |  |
| Exposed Floor      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Infiltration       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Sub Total==>       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -6,715            | -6,715            | 100.00           | 0                 | 0                | 0.00             |  |
| Internal Loads     |                         |                          |                        |                  |                  |                       |                  |                   |                   |                  |                   |                  |                  |  |
| Lights             | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| People             | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Misc               | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Sub Total==>       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Ceiling Load       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Outside Air        | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Sup. Fan Heat      |                         |                          |                        | 0                | 0.00             |                       | 0.00             |                   |                   | 0.00             |                   |                  | 0.00             |  |
| Ret. Fan Heat      |                         |                          |                        | 0                | 0.00             |                       | 0.00             |                   |                   | 0.00             |                   |                  | 0.00             |  |
| Duct Heat Pkup     |                         |                          |                        | 0                | 0.00             |                       | 0.00             |                   |                   | 0.00             |                   |                  | 0.00             |  |
| OV/UNDR Sizing     | 0                       |                          |                        | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                 | 0.00             | 0                 | 0                | 0.00             |  |
| Exhaust Heat       |                         |                          |                        | 0                | 0.00             |                       | 0.00             |                   |                   | 0.00             |                   |                  | 0.00             |  |
| Terminal Bypass    |                         |                          |                        | 0                | 0.00             |                       | 0.00             |                   |                   | 0.00             |                   |                  | 0.00             |  |
| Grand Total==>     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -6,715            | -6,715            | 100.00           | 0                 | 0                | 0.00             |  |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 2,544      |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 1,632      |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 0.0                   | 0.0             |                  |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 0.0   | Type     | Clg | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|-------|----------|-----|------|
| Main Htg | -6.7           | 1,835            | 68.0      | 71.4      | Vent    | 0       | 0       | Clg Cfm/Sqft  | 0.00  | SADB     | 0.0 | 71.4 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 0       | 0       | Clg Cfm/Ton   | 0.00  | Plenum   | 0.0 | 68.0 |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 1,835   | Clg Sqft/Ton  | 0.00  | Return   | 0.0 | 68.0 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 0.00  | Ret/OA   | 0.0 | 68.0 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 1,835   | No. People    | 0     | Runarnd  | 0.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | Htg % OA      | 0.0   | Fn MtrTD | 0.0 | 0.0  |
| Total    | -6.7           |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 0.72  | Fn BldTD | 0.0 | 0.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -2.64 | Fn Frict | 0.1 | 0.0  |

System 5 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 1.91             | * | 16,221                | 5.75             | * | -48,286           | -48,286          | 21.28            |
| Glass Solar     | 17,909                  | 0                        | 0                      | 17,909           | 2.36             | * | 16,285                | 5.78             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.64             | * | 5,167                 | 1.83             | * | -24,690           | -24,690          | 10.88            |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.62             | * | 5,622                 | 1.99             | * | -16,677           | -18,921          | 8.34             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 33,323                  | 0                        | 0                      | 33,323           | 4.40             | * | 16,324                | 5.79             | * | -67,403           | -67,403          | 29.70            |
| Sub Total==>    | 74,719                  | 526                      | 0                      | 75,245           | 9.94             | * | 59,619                | 21.14            | * | -157,056          | -159,300         | 70.19            |
| Internal Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Lights          | 190,447                 | 0                        | 0                      | 190,447          | 25.15            | * | 200,839               | 71.22            | * | 0                 | 0                | 0.00             |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 3.99             | * | 14,612                | 5.18             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 220,650                 | 0                        | 0                      | 220,650          | 29.13            | * | 215,452               | 76.40            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00             | * | 1,553                 | 0.55             | * | -4,627            | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 287,738          | 37.99            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 20.92            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 2.62             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 5,366                   | 0                        | 0                      | 5,366            | 0.71             | * | 5,366                 | 1.90             | * | -67,648           | -67,648          | 29.81            |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.31            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Grand Total==>  | 302,110                 | 9,026                    | 0                      | 757,343          | 100.00           | * | 281,990               | 100.00           | * | -229,331          | -226,948         | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total Floor | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|-------------------|------------|-----|
| Main Clg | 63.1                  | 757.3           | 27,856           | 80.4                      | 60.1                     | 27,121            |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                 |            |     |
| Totals   | 63.1                  | 757.3           |                  |                           |                          | 8,563             | 460        | 29  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -245.5         | 27,856           | 67.5        | 75.6        | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 65.7 | 75.6 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 968     | 968     | Clg Cfm/Ton   | 441.37 | Plenum   | 75.4 | 66.5 |
| Preheat  | -365.0         | 27,856           | 48.4        | 60.5        | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 429.73 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 27.92  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -610.5         |                  |             |             | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -22.51 | Fn Frict | 2.9  | 2.9  |

System 6 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 1.91             | * | 16,221                | 5.75             | * | -48,286           | -48,286          | 21.28            |
| Glass Solar     | 17,909                  | 0                        | 0                      | 17,909           | 2.36             | * | 16,285                | 5.78             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 4,840                   | 0                        | 0                      | 4,840            | 0.64             | * | 5,167                 | 1.83             | * | -24,690           | -24,690          | 10.88            |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.62             | * | 5,622                 | 1.99             | * | -16,677           | -18,921          | 8.34             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 33,323                  | 0                        | 0                      | 33,323           | 4.40             | * | 16,324                | 5.79             | * | -67,403           | -67,403          | 29.70            |
| Sub Total==>    | 74,719                  | 526                      | 0                      | 75,245           | 9.94             | * | 59,619                | 21.14            | * | -157,056          | -159,300         | 70.19            |
| Internal Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Lights          | 190,447                 | 0                        | 0                      | 190,447          | 25.15            | * | 200,839               | 71.22            | * | 0                 | 0                | 0.00             |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 3.99             | * | 14,612                | 5.18             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 220,650                 | 0                        | 0                      | 220,650          | 29.13            | * | 215,452               | 76.40            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00             | * | 1,553                 | 0.55             | * | -4,627            | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 287,738          | 37.99            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 20.92            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 2.62             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 5,366                   | 0                        | 0                      | 5,366            | 0.71             | * | 5,366                 | 1.90             | * | -67,648           | -67,648          | 29.81            |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.31            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Grand Total==>  | 302,110                 | 9,026                    | 0                      | 757,343          | 100.00           | * | 281,990               | 100.00           | * | -229,331          | -226,948         | 100.00           |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR (Deg F) | Leaving DB/WB/HR (Deg F) | Gross Total (Floor) | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|---------------------------|--------------------------|---------------------|------------|-----|
| Main Clg | 63.1                  | 757.3           | 27,856           | 80.4                      | 68.3                     | 27,121              |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                   |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0                       | 0.0                      | 0                   |            |     |
| Totals   | 63.1                  | 757.3           |                  |                           |                          | 8,563               | 460        | 29  |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent (Deg F) | Lvg (Deg F) | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-------------|-------------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -245.5         | 27,856           | 67.5        | 75.6        | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 65.7 | 75.6 |
| Aux Htg  | 0.0            | 0                | 0.0         | 0.0         | Infil   | 968     | 968     | Clg Cfm/Ton   | 441.37 | Plenum   | 75.4 | 66.5 |
| Preheat  | -365.0         | 27,856           | 48.4        | 60.5        | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 429.73 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0         | 0.0         | Mincfm  | 0       | 0       | Clg Btuh/Sqft | 27.92  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0         | 0.0         | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0         | 0.0         | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -610.5         |                  |             |             | Rn Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |             |             | Auxil   | 0       | 0       | Htg Btuh/Sqft | -22.51 | Fn Frict | 2.9  | 2.5  |



BUILDING U-VALUES - ALTERNATIVE 4  
 HEAT RECOVERY

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Room U-Values<br>(Btu/hr/sqft/F) |       |             |             |       |             |             |       |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|------------------|----------------------------------|-------|-------------|-------------|-------|-------------|-------------|-------|-------|-------|------------------------|-----------------------------|
|             |                  | Part.                            | ExFlr | Summr Skylt | Wintr Skylt | Roof  | Summr Windo | Wintr Windo | Wall  | Ceil. |       |                        |                             |
| 1           | SUB BSMT, BSMT W | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 46.8                   | 9.61                        |
| Zone        | 1 Total/Ave.     | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 46.8                   | 9.61                        |
| 4           | BSMT E           | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 45.2                   | 9.27                        |
| Zone        | 4 Total/Ave.     | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 45.2                   | 9.27                        |
| System      | 1 Total/Ave.     | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 46.4                   | 9.54                        |
| 2           | TOILETS, KITCHEN | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 29.4                   | 5.93                        |
| Zone        | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 29.4                   | 5.93                        |
| 11          | TOILETS W ROOF   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.000       | 0.000       | 0.000 | 0.317 |       | 71.1                   | 15.13                       |
| Zone        | 11 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.000       | 0.000       | 0.000 | 0.317 |       | 71.1                   | 15.13                       |
| System      | 2 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 |       | 35.3                   | 7.23                        |
| 3           | STAIRS           | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.229 | 0.000 |       | 103.3                  | 21.63                       |
| Zone        | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.229 | 0.000 |       | 103.3                  | 21.63                       |
| 5           | 1ST FL OFFICES   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 57.9                   | 12.05                       |
| Zone        | 5 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 57.9                   | 12.05                       |
| 7           | 2ND FL OFFICES   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 56.7                   | 11.81                       |
| Zone        | 7 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 56.7                   | 11.81                       |
| 9           | 3RD FL OFFICES   | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 |       | 102.3                  | 21.84                       |
| Zone        | 9 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 |       | 102.3                  | 21.84                       |
| 12          | STAIRS W ROOF    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.229 | 0.000 |       | 146.4                  | 31.13                       |
| Zone        | 12 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.229 | 0.000 |       | 146.4                  | 31.13                       |
| System      | 3 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.256 | 0.317 |       | 74.1                   | 15.63                       |
| 13          | SUPPLY STORAGE   | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 |       | 70.7                   | 14.70                       |
| Zone        | 13 Total/Ave.    | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 |       | 70.7                   | 14.70                       |
| System      | 4 Total/Ave.     | 0.229                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.000       | 0.000       | 0.000 | 0.000 |       | 70.7                   | 14.70                       |
| 6           | 1ST FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 32.5                   | 6.60                        |
| Zone        | 6 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 32.5                   | 6.60                        |
| 8           | 2ND FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 |       | 27.0                   | 5.41                        |
| Zone        | 8 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 |       | 27.0                   | 5.41                        |
| 10          | 3RD FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 |       | 71.5                   | 15.21                       |
| Zone        | 10 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 |       | 71.5                   | 15.21                       |
| System      | 5 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 |       | 43.1                   | 8.94                        |
| 14          | 1ST FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 32.5                   | 6.60                        |
| Zone        | 14 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.317 |       | 32.5                   | 6.60                        |
| 15          | 2ND FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 |       | 27.0                   | 5.41                        |
| Zone        | 15 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.000 | 0.810       | 0.837       | 0.257 | 0.000 |       | 27.0                   | 5.41                        |
| 16          | 3RD FL CEN OFFCS | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 |       | 71.5                   | 15.21                       |
| Zone        | 16 Total/Ave.    | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.000 |       | 71.5                   | 15.21                       |
| System      | 6 Total/Ave.     | 0.000                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.257 | 0.317 |       | 43.1                   | 8.94                        |
| Building    |                  | 0.229                            | 0.000 | 0.000       | 0.000       | 0.088 | 0.810       | 0.837       | 0.256 | 0.317 |       | 52.6                   | 10.93                       |

BUILDING AREAS - ALTERNATIVE 4  
 HEAT RECOVERY

----- B U I L D I N G   A R E A S -----

| Room<br>Number | Description      | Number of<br>Duplicate |   | Floor<br>Area/Dupl<br>Room<br>(sqft) | Total<br>Floor<br>Area<br>(sqft) | Partition<br>Area<br>(sqft) | Exposed<br>Floor<br>Area<br>(sqft) | Skylight<br>Area<br>(sqft) | Skf<br>/Rf<br>(%) | Net Roof<br>Area<br>(sqft) | Window<br>Area<br>(sqft) | Win<br>/Wf<br>(%) | Net Wall<br>Area<br>(sqft) |
|----------------|------------------|------------------------|---|--------------------------------------|----------------------------------|-----------------------------|------------------------------------|----------------------------|-------------------|----------------------------|--------------------------|-------------------|----------------------------|
| 1              | SUB BSMT, BSMT W | 1                      | 1 | 45,125                               | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 1 Total/Ave.     |                        |   |                                      | 45,125                           | 13,222                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 4              | BSMT E           | 1                      | 1 | 12,424                               | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 4 Total/Ave.     |                        |   |                                      | 12,424                           | 3,348                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 1 Total/Ave.     |                        |   |                                      | 57,549                           | 16,570                      | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 2              | TOILETS, KITCHEN | 1                      | 1 | 3,520                                | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| Zone           | 2 Total/Ave.     |                        |   |                                      | 3,520                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 21                       | 11                | 174                        |
| 11             | TOILETS W ROOF   | 1                      | 1 | 580                                  | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| Zone           | 11 Total/Ave.    |                        |   |                                      | 580                              | 0                           | 0                                  | 0                          | 0                 | 580                        | 0                        | 0                 | 0                          |
| System         | 2 Total/Ave.     |                        |   |                                      | 4,100                            | 0                           | 0                                  | 0                          | 0                 | 580                        | 21                       | 11                | 174                        |
| 3              | STAIRS           | 1                      | 1 | 560                                  | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| Zone           | 3 Total/Ave.     |                        |   |                                      | 560                              | 0                           | 0                                  | 0                          | 0                 | 0                          | 255                      | 29                | 625                        |
| 5              | 1ST FL OFFICES   | 1                      | 1 | 11,724                               | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| Zone           | 5 Total/Ave.     |                        |   |                                      | 11,724                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,573                    | 19                | 6,530                      |
| 7              | 2ND FL OFFICES   | 1                      | 1 | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| Zone           | 7 Total/Ave.     |                        |   |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 0                          | 1,610                    | 17                | 7,730                      |
| 9              | 3RD FL OFFICES   | 1                      | 1 | 14,400                               | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| Zone           | 9 Total/Ave.     |                        |   |                                      | 14,400                           | 0                           | 0                                  | 0                          | 0                 | 14,400                     | 1,610                    | 17                | 8,010                      |
| 12             | STAIRS W ROOF    | 1                      | 1 | 280                                  | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| Zone           | 12 Total/Ave.    |                        |   |                                      | 280                              | 0                           | 0                                  | 0                          | 0                 | 280                        | 105                      | 25                | 307                        |
| System         | 3 Total/Ave.     |                        |   |                                      | 41,364                           | 0                           | 0                                  | 0                          | 0                 | 14,680                     | 5,152                    | 18                | 23,202                     |
| 13             | SUPPLY STORAGE   | 1                      | 1 | 2,544                                | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| Zone           | 13 Total/Ave.    |                        |   |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| System         | 4 Total/Ave.     |                        |   |                                      | 2,544                            | 1,632                       | 0                                  | 0                          | 0                 | 0                          | 0                        | 0                 | 0                          |
| 6              | 1ST FL CEN OFFCS | 1                      | 1 | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 6 Total/Ave.     |                        |   |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 8              | 2ND FL CEN OFFCS | 1                      | 1 | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 8 Total/Ave.     |                        |   |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 10             | 3RD FL CEN OFFCS | 1                      | 1 | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 10 Total/Ave.    |                        |   |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 5 Total/Ave.     |                        |   |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| 14             | 1ST FL CEN OFFCS | 1                      | 1 | 9,884                                | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| Zone           | 14 Total/Ave.    |                        |   |                                      | 9,884                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 250                      | 19                | 1,038                      |
| 15             | 2ND FL CEN OFFCS | 1                      | 1 | 8,674                                | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| Zone           | 15 Total/Ave.    |                        |   |                                      | 8,674                            | 0                           | 0                                  | 0                          | 0                 | 0                          | 105                      | 66                | 55                         |
| 16             | 3RD FL CEN OFFCS | 1                      | 1 | 8,563                                | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| Zone           | 16 Total/Ave.    |                        |   |                                      | 8,563                            | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 105                      | 64                | 60                         |
| System         | 6 Total/Ave.     |                        |   |                                      | 27,121                           | 0                           | 0                                  | 0                          | 0                 | 8,563                      | 460                      | 29                | 1,153                      |
| Building       |                  |                        |   |                                      | 159,799                          | 18,202                      | 0                                  | 0                          | 0                 | 32,386                     | 6,095                    | 19                | 25,681                     |

ASHRAE 90 ANALYSIS - ALTERNATIVE 4  
HEAT RECOVERY

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)

Overall Wall U-Value = 0.362 (Btu/Hr/Sq Ft/F)

Overall Building U-Value = 0.224 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)

Wall Overall Thermal Transfer Value (OTTVw) = 24.46 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 4  
 HEAT RECOVERY

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 18.0                   | 0         | 0     | -190,203                 | 13        | 170   | 6,544.3                   | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 36.0                   | 0         | 0     | -380,406                 | 10        | 129   | 13,088.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 54.0                   | 1         | 12    | -570,609                 | 7         | 91    | 19,633.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 71.9                   | 8         | 86    | -760,811                 | 3         | 34    | 26,177.4                  | 0         | 0     | 0.0                       | 0         | 0     |
| 20 - 25             | 89.9                   | 11        | 120   | -951,014                 | 1         | 16    | 32,721.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 107.9                  | 5         | 56    | -1,141,217               | 7         | 89    | 39,266.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 30 - 35             | 125.9                  | 10        | 110   | -1,331,420               | 10        | 132   | 45,810.5                  | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 143.9                  | 23        | 245   | -1,521,623               | 13        | 168   | 52,354.8                  | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 161.9                  | 4         | 42    | -1,711,826               | 18        | 223   | 58,899.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 179.8                  | 8         | 90    | -1,902,029               | 18        | 231   | 65,443.5                  | 0         | 0     | 0.0                       | 0         | 0     |
| 50 - 55             | 197.8                  | 6         | 67    | -2,092,231               | 0         | 0     | 71,987.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 215.8                  | 4         | 42    | -2,282,434               | 0         | 0     | 78,532.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 60 - 65             | 233.8                  | 3         | 35    | -2,472,637               | 0         | 0     | 85,076.6                  | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 251.8                  | 7         | 75    | -2,662,840               | 0         | 0     | 91,620.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 269.8                  | 7         | 75    | -2,853,043               | 0         | 0     | 98,165.3                  | 0         | 0     | 0.0                       | 0         | 0     |
| 75 - 80             | 287.8                  | 1         | 15    | -3,043,246               | 0         | 0     | 104,709.6                 | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 305.7                  | 0         | 0     | -3,233,448               | 0         | 0     | 111,254.0                 | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 323.7                  | 0         | 0     | -3,423,652               | 0         | 0     | 117,798.3                 | 100       | 2,520 | 0.0                       | 0         | 0     |
| 90 - 95             | 341.7                  | 0         | 0     | -3,613,854               | 0         | 0     | 124,342.7                 | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 359.7                  | 0         | 0     | -3,804,057               | 0         | 0     | 130,887.0                 | 0         | 0     | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,690 | 0                        | 0         | 7,472 | 0.0                       | 0         | 6,240 | 0.0                       | 0         | 8,760 |

BUILDING TEMPERATURE PROFILES - ALTERNATIVE 4  
 HEAT RECOVERY

----- B U I L D I N G   T E M P E R A T U R E   P R O F I L E S -----

| Temperature Range (F) | Zone Number                               |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
|-----------------------|-------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------|-------|-------|-------|
|                       | 1                                         | 4     | 2     | 11    | 3     | 5     | 7     | 9     | 12    | 13    | 6      | 8     | 10     | 14    | 15    | 16    |
| Max. Temp.            | 82.6                                      | 81.5  | 201.1 | 120.2 | 86.4  | 85.1  | 84.9  | 83.3  | 85.3  | 96.2  | 85.1   | 88.5  | 84.5   | 85.1  | 88.5  | 84.5  |
| Mo./Hr.               | 10 21                                     | 10 23 | 9 19  | 8 16  | 7 20  | 7 24  | 7 24  | 7 22  | 7 20  | 8 17  | 7 3 10 | 1 7 6 | 7 3 10 | 1 7 6 | 1 7 6 |       |
| Day Type              | 2                                         | 2     | 2     | 2     | 4     | 1     | 1     | 4     | 4     | 2     | 5      | 2     | 5      | 5     | 2     | 5     |
|                       | ..... N u m b e r   o f   H o u r s ..... |       |       |       |       |       |       |       |       |       |        |       |        |       |       |       |
| Above 100             | 0                                         | 0     | 8,016 | 4,086 | 0     | 0     | 0     | 0     | 0     | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| 95 - 100              | 0                                         | 0     | 0     | 110   | 0     | 0     | 0     | 0     | 0     | 240   | 0      | 0     | 0      | 0     | 0     | 0     |
| 90 - 95               | 0                                         | 0     | 91    | 1,239 | 0     | 0     | 0     | 0     | 0     | 1,494 | 0      | 0     | 0      | 0     | 0     | 0     |
| 85 - 90               | 0                                         | 0     | 290   | 253   | 118   | 0     | 0     | 0     | 36    | 1,602 | 20     | 537   | 0      | 20    | 537   | 0     |
| 80 - 85               | 954                                       | 517   | 227   | 585   | 1,161 | 1,221 | 1,140 | 704   | 1,182 | 1,215 | 1,939  | 3,338 | 1,585  | 1,939 | 3,338 | 1,585 |
| 75 - 80               | 5,027                                     | 2,814 | 136   | 327   | 1,752 | 1,952 | 2,042 | 2,359 | 1,875 | 818   | 3,014  | 4,263 | 3,756  | 3,014 | 4,263 | 3,756 |
| 70 - 75               | 1,202                                     | 3,711 | 0     | 1,256 | 631   | 601   | 524   | 694   | 596   | 1,435 | 1,238  | 595   | 1,333  | 1,238 | 595   | 1,333 |
| 65 - 70               | 1,418                                     | 1,516 | 0     | 726   | 1,391 | 1,535 | 1,595 | 1,677 | 1,447 | 1,579 | 1,313  | 27    | 1,400  | 1,313 | 27    | 1,400 |
| 60 - 65               | 159                                       | 202   | 0     | 178   | 1,107 | 1,076 | 1,088 | 1,366 | 1,166 | 377   | 580    | 0     | 504    | 580   | 0     | 504   |
| 55 - 60               | 0                                         | 0     | 0     | 0     | 915   | 869   | 900   | 789   | 953   | 0     | 293    | 0     | 182    | 293   | 0     | 182   |
| 50 - 55               | 0                                         | 0     | 0     | 0     | 671   | 632   | 626   | 546   | 658   | 0     | 363    | 0     | 0      | 363   | 0     | 0     |
| Below 50              | 0                                         | 0     | 0     | 0     | 1,014 | 874   | 845   | 625   | 847   | 0     | 0      | 0     | 0      | 0     | 0     | 0     |
| Min. Temp.            | 63.8                                      | 63.0  | 68.0  | 63.6  | 34.0  | 34.6  | 34.7  | 37.4  | 35.6  | 61.7  | 50.3   | 67.9  | 57.5   | 50.3  | 67.9  | 57.5  |
| Mo./Hr.               | 1 8                                       | 1 10  | 1 1   | 2 6   | 2 11  | 2 7   | 2 7   | 2 7   | 2 7   | 1 6   | 2 7    | 1 7   | 1 7    | 2 7   | 1 7   | 1 7   |
| Day Type              | 5                                         | 5     | 1     | 5     | 4     | 5     | 5     | 5     | 5     | 5     | 5      | 1     | 5      | 5     | 1     | 5     |

MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 4  
 HEAT RECOVERY

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | STEAM             | STEAM DMND         |                      |
|-------|-------------------|-----------------|-------------------|--------------------|----------------------|
|       | Off Peak<br>(kWh) | On Peak<br>(kW) | On Peak<br>(Thrm) | WATER<br>(1000 G1) | On Peak<br>(Thrm/hr) |
| Jan   | 163,358           | 813             | 11,985            | 0                  | 65                   |
| Feb   | 147,800           | 813             | 11,328            | 0                  | 65                   |
| March | 178,338           | 813             | 8,748             | 0                  | 63                   |
| April | 149,213           | 813             | 2,215             | 0                  | 47                   |
| May   | 192,292           | 948             | 0                 | 81                 | 0                    |
| June  | 199,334           | 1,020           | 0                 | 127                | 0                    |
| July  | 196,533           | 1,068           | 0                 | 192                | 0                    |
| Aug   | 209,689           | 1,021           | 0                 | 139                | 0                    |
| Sept  | 175,152           | 971             | 0                 | 75                 | 0                    |
| Oct   | 165,049           | 813             | 1,307             | 0                  | 46                   |
| Nov   | 152,314           | 813             | 4,498             | 0                  | 58                   |
| Dec   | 155,579           | 813             | 10,159            | 0                  | 64                   |
| Total | 2,082,650         | 1,068           | 50,241            | 614                | 65                   |

Building Energy Consumption = 75,922 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 175,378 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
 HEAT RECOVERY

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref Num | Equip Code | ----- Monthly Consumption ----- |                           |       |       |       |       |       |       |       |       |       |       | Total   |
|---------|------------|---------------------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|         |            | Jan                             | Feb                       | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0       | LIGHTS     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 78913                           | 71397                     | 86428 | 75155 | 82671 | 82671 | 75155 | 86428 | 75155 | 82671 | 75155 | 75155 | 946,954 |
|         | PK         | 410.7                           | 410.7                     | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7 | 410.7   |
| 1       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | GAS        | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | OIL        | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P STEAM    | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P HOTH2O   | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6       | MISC LD    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         | P CHILL    | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1       | EQ1001S    |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | 2-STG CTY <555 TONS       |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 14876 | 21919 | 35246 | 24209 | 13865 | 0     | 0     | 0     | 110,115 |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 106.5 | 178.5 | 226.8 | 179.2 | 129.8 | 0.0   | 0.0   | 0.0   | 226.8   |
| 1       | EQ5100     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 5115  | 5115  | 4650  | 5348  | 4650  | 0     | 0     | 0     | 24,878  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 23.3  | 23.3  | 23.3  | 23.3  | 23.3  | 0.0   | 0.0   | 0.0   | 23.3    |
| 1       | EQ5100     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|         | WATER      | 0                               | 0                         | 0     | 0     | 81    | 127   | 192   | 139   | 75    | 0     | 0     | 0     | 614     |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.6   | 1.0   | 1.2   | 1.0   | 0.8   | 0.0   | 0.0   | 0.0   | 1.2     |
| 1       | EQ5001     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CHILLED WATER PUMP C.V.   |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5010     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CONDENSER WATER PUMP C.V. |       |       |       |       |       |       |       |       |       |       |         |
|         | ELEC       | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|         | PK         | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1       | EQ5300     |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|         |            |                                 | CONTROL PANEL & INTERLOCK |       |       |       |       |       |       |       |       |       |       |         |

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 4  
 HEAT RECOVERY

|   |         |                            |       |       |       |       |       |       |       |       |       |       |       |         |
|---|---------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|   | ELEC    | 0                          | 0     | 0     | 0     | 220   | 220   | 200   | 230   | 200   | 0     | 0     | 0     | 1,070   |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 0.0   | 0.0   | 0.0   | 1.0     |
| 2 | EQ1000  | PREVENTS COOLING ENERGY    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5001  | CHILLED WATER PUMP C.V.    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5010  | CONDENSER WATER PUMP C.V.  |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 9754                       | 8825  | 10683 | 9290  | 10219 | 10219 | 9290  | 10683 | 9290  | 10219 | 9290  | 9290  | 117,051 |
|   | PK      | 46.4                       | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4    |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2276                       | 2059  | 2493  | 2168  | 2384  | 2384  | 2168  | 2493  | 2168  | 2384  | 2168  | 2168  | 27,312  |
|   | PK      | 10.8                       | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8    |
| 2 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 13975                      | 12644 | 15305 | 13309 | 14640 | 14640 | 13309 | 15305 | 13309 | 14640 | 13309 | 13309 | 167,695 |
|   | PK      | 66.5                       | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5    |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 1747                       | 1580  | 1913  | 1664  | 1830  | 1830  | 1664  | 1913  | 1664  | 1830  | 1664  | 1664  | 20,962  |
|   | PK      | 8.3                        | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3     |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 1 | EQ2101  | PURCHASED DISTRICT STEAM   |       |       |       |       |       |       |       |       |       |       |       |         |
|   | P STEAM | 2054                       | 1941  | 1499  | 371   | 0     | 0     | 0     | 0     | 0     | 224   | 769   | 1741  | 8,600   |
|   | PK      | 11.1                       | 11.1  | 10.8  | 8.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 7.9   | 10.0  | 10.9  | 11.1    |
| 1 | EQ5020  | HEAT WATER CIRC. PUMP C.V. |       |       |       |       |       |       |       |       |       |       |       |         |





UTILITY PEAK CHECKSUMS - ALTERNATIVE 4  
HEAT RECOVERY

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 1,068.1 (kW)  
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

| Eq.<br>Ref.<br>Num.  | Equipment<br>Code Name | Equipment Description              | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|------------------------------------|---------------------------|--------------------------|
| Cooling Equipment    |                        |                                    |                           |                          |
| 1                    | EQ1001S                | 2-STG CTV <555 TONS                | 310.7                     | 29.09                    |
| Sub Total            |                        |                                    | 310.7                     | 29.09                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Air Moving Equipment |                        |                                    |                           |                          |
| 1                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 57.3                      | 5.36                     |
| 3                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 74.9                      | 7.01                     |
| 5                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 10.05                    |
| 6                    |                        | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3                     | 10.05                    |
| Sub Total            |                        |                                    | 346.8                     | 32.46                    |
| Sub Total            |                        |                                    | 0.0                       | 0.00                     |
| Miscellaneous        |                        |                                    |                           |                          |
| Lights               |                        |                                    | 410.7                     | 38.45                    |
| Base Utilities       |                        |                                    | 0.0                       | 0.00                     |
| Misc Equipment       |                        |                                    | 0.0                       | 0.00                     |
| Sub Total            |                        |                                    | 410.7                     | 38.45                    |
| Grand Total          |                        |                                    | 1,068.1                   | 100.00                   |

\*\*\*\*\*  
\*\*\*\*\*  
\*\*  
\*\* TRACE 600 ANALYSIS \*\*  
\*\*  
\*\* by \*\*  
\*\*  
\*\*\*\*\*  
\*\*\*\*\*

ENERGY SAVINGS OPPORTUNITY STUDY  
CARLISLE BARRACKS, PA  
DEPARTMENT OF THE ARMY  
BENATEC ASSOCIATES  
BUILDING 122

Weather File Code: CARLISLE  
Location: ENERGY SAVINGS OPPORTUNITY STUDY  
Latitude: 40.2 (deg)  
Longitude: 77.2 (deg)  
Time Zone: 5  
Elevation: 475 (ft)  
Barometric Pressure: 29.2 (in. Hg)

Summer Clearness Number: 1.00  
Winter Clearness Number: 1.00  
Summer Design Dry Bulb: 92 (F)  
Summer Design Wet Bulb: 72 (F)  
Winter Design Dry Bulb: 4 (F)  
Summer Ground Relectance: 0.20  
Winter Ground Relectance: 0.20

Air Density: 0.0742 (Lbm/cuft)  
Air Specific Heat: 0.2444 (Btu/lbm/F)  
Density-Specific Heat Prod: 1.0882 (Btu-min./hr/cuft/F)  
Latent Heat Factor: 4,790.2 (Btu-min./hr/cuft)  
Enthalpy Factor: 4.4519 (Lb-min./hr/cuft)

Design Simulation Period: May To September  
System Simulation Period: January To December  
Cooling Load Methodology: CLTD/CLF (Transfer Function Method)

Time/Date Program was Run: 14:14: 6 2/ 2/94  
Dataset Name: CB122C .TM

AIRFLOW - ALTERNATIVE 1  
 COMBINED ECOS

----- SYSTEM SUMMARY -----  
 (Design Airflow Quantities)

| System Number | System Type | Main                  |                       |                       |                      |                       | Auxil. Supply | Room Exhaust  |
|---------------|-------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|---------------|---------------|
|               |             | Outside Airflow (Cfm) | Cooling Airflow (Cfm) | Heating Airflow (Cfm) | Return Airflow (Cfm) | Exhaust Airflow (Cfm) | Airflow (Cfm) | Airflow (Cfm) |
| 1             | TRH         | 10,853                | 36,175                | 36,175                | 36,175               | 10,853                | 0             | 0             |
| 2             | SZ          | 0                     | 1,450                 | 104                   | 1,450                | 0                     | 0             | 17,730        |
| 3             | INDFP       | 5,830                 | 19,435                | 19,435                | 33,612               | 20,008                | 25,306        | 0             |
| 4             | UH          | 0                     | 0                     | 1,835                 | 0                    | 0                     | 0             | 0             |
| 5             | DD          | 8,357                 | 27,856                | 27,856                | 28,662               | 9,163                 | 0             | 0             |
| 6             | DD          | 8,357                 | 27,856                | 27,856                | 28,662               | 9,163                 | 0             | 0             |
| Totals        |             | 33,397                | 112,772               | 113,261               | 128,562              | 49,187                | 25,306        | 17,730        |

CAPACITY - ALTERNATIVE 1  
 COMBINED ECOS

----- SYSTEM SUMMARY -----  
 (Design Capacity Quantities)

| System Number | System Type | Cooling                   |                           |                      |                      |                       | Heating                   |                           |                         |                        |                          |                      |                      |                       |
|---------------|-------------|---------------------------|---------------------------|----------------------|----------------------|-----------------------|---------------------------|---------------------------|-------------------------|------------------------|--------------------------|----------------------|----------------------|-----------------------|
|               |             | Main Sys. Capacity (Tons) | Aux. Sys. Capacity (Tons) | Opt. Capacity (Tons) | Vent Capacity (Tons) | Cooling Totals (Tons) | Main Sys. Capacity (Btuh) | Aux. Sys. Capacity (Btuh) | Preheat Capacity (Btuh) | Reheat Capacity (Btuh) | Humidif. Capacity (Btuh) | Opt. Capacity (Btuh) | Vent Capacity (Btuh) | Heating Totals (Btuh) |
| 1             | TRH         | 64.2                      | 0.0                       | 0.0                  | 0.0                  | 64.2                  | -68,182                   | 0                         | -630,301                | 0                      | 0                        | 0                    | 0                    | -698,483              |
| 2             | SZ          | 2.2                       | 0.0                       | 0.0                  | 0.0                  | 2.2                   | -8,951                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -8,951                |
| 3             | INDFP       | 45.0                      | 70.5                      | 0.0                  | 0.0                  | 115.5                 | -590,294                  | -1,033,467                | 0                       | 0                      | 0                        | 0                    | 0                    | -1,623,761            |
| 4             | UH          | 0.0                       | 0.0                       | 0.0                  | 0.0                  | 0.0                   | -6,715                    | 0                         | 0                       | 0                      | 0                        | 0                    | 0                    | -6,715                |
| 5             | DD          | 52.7                      | 0.0                       | 0.0                  | 0.0                  | 52.7                  | -208,290                  | 0                         | -448,421                | 0                      | 0                        | 0                    | 0                    | -656,711              |
| 6             | DD          | 52.7                      | 0.0                       | 0.0                  | 0.0                  | 52.7                  | -208,290                  | 0                         | -448,421                | 0                      | 0                        | 0                    | 0                    | -656,711              |
| Totals        |             | 216.8                     | 70.5                      | 0.0                  | 0.0                  | 287.3                 | -1,090,723                | -1,033,467                | -1,527,143              | 0                      | 0                        | 0                    | 0                    | -3,651,333            |

The building peaked at hour 14 month 7 with a capacity of 216.8 tons

ENGINEERING CHECKS - ALTERNATIVE 1  
 COMBINED ECOS

----- ENGINEERING CHECKS -----

| System Number | Main/Auxiliary | System Type | Percent Outside Air | ----- Cooling ----- |         |            |            | --- Heating --- |            | Floor Area Sq Ft |
|---------------|----------------|-------------|---------------------|---------------------|---------|------------|------------|-----------------|------------|------------------|
|               |                |             |                     | Cfm/Sq Ft           | Cfm/Ton | Sq Ft /Ton | Btuh/Sq Ft | Cfm/Sq Ft       | Btuh/Sq Ft |                  |
| 1             | Main           | TRH         | 30.00               | 0.63                | 563.3   | 896.2      | 13.39      | 0.63            | -12.14     | 57,549           |
| 2             | Main           | SZ          | 0.00                | 0.35                | 651.8   | 1,842.8    | 6.51       | 0.03            | -2.18      | 4,100            |
| 3             | Main           | INDFP       | 30.00               | 0.47                | 432.2   | 919.8      | 13.05      | 0.47            | -14.27     | 41,364           |
| 3             | Auxiliary      | INDFP       | 0.00                | 0.61                | 359.0   | 586.7      | 20.45      | 0.61            | -24.98     | 41,364           |
| 4             | Main           | UH          | 0.00                | 0.00                | 0.0     | 0.0        | 0.00       | 0.72            | -2.64      | 2,544            |
| 5             | Main           | DD          | 30.00               | 1.03                | 528.9   | 514.9      | 23.30      | 1.03            | -24.21     | 27,121           |
| 6             | Main           | DD          | 30.00               | 1.03                | 528.9   | 514.9      | 23.30      | 1.03            | -24.21     | 27,121           |

System 1 Peak TRH - TERMINAL REHEAT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Partition       | 18,940                  |                          |                        | 18,940           | 2.46               | 18,940                | 5.85               | -68,182                      | -68,182                   | 100.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 18,940                  | 0                        |                        | 18,940           | 2.46               | 18,940                | 5.85               | -68,182                      | -68,182                   | 100.00             |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 257,578                 | 0                        |                        | 257,578          | 33.43              | 273,881               | 84.55              | 0                            | 0                         | 0.00               |
| People          | 63,941                  |                          |                        | 63,941           | 8.30               | 31,097                | 9.60               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 321,519                 | 0                        | 0                      | 321,519          | 41.72              | 304,978               | 94.15              | 0                            | 0                         | 0.00               |
| Ceiling Load    | 0                       | 0                        |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 340,359          | 44.17              | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   |                         |                          |                        | 77,173           | 10.01              |                       | 0.00               |                              | 0                         | 0.00               |
| Ret. Fan Heat   |                         | 18,007                   |                        | 18,007           | 2.34               |                       | 0.00               |                              | 0                         | 0.00               |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exhaust Heat    |                         | -5,402                   | 0                      | -5,402           | -0.70              |                       | 0.00               |                              | 0                         | 0.00               |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00               |                       | 0.00               |                              | 0                         | 0.00               |
| Grand Total==>  | 340,459                 | 12,605                   | 0                      | 770,597          | 100.00             | 323,917               | 100.00             | -68,182                      | -68,182                   | 100.00             |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 64.2                  | 770.6           | 36,175           | 80.0              | 68.7  | 90.2   | 64.8             | 62.5  | 83.4   | Part        | 57,549     |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 16,570     |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 64.2                  | 770.6           |                  |                   |       |        |                  |       |        | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |        |          | --TEMPERATURES (F)-- |      |  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|--------|----------|----------------------|------|--|
|          |                |                  |           |           | Vent    |         |         | Clg % OA               | 30.0   | Type     | Clg                  | Htg  |  |
| Main Htg | -68.2          | 36,175           | 68.0      | 69.7      | Infil   | 10,853  | 0       | Clg Cfm/Sqft           | 0.63   | SADB     | 66.8                 | 69.7 |  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 0       | 0       | Clg Cfm/Ton            | 563.33 | Plenum   | 75.0                 | 68.0 |  |
| Preheat  | -630.3         | 36,175           | 48.8      | 64.8      | Mincfm  | 36,175  | 0       | Clg Sqft/Ton           | 896.17 | Return   | 75.5                 | 68.0 |  |
| Reheat   | -0.0           | 0                | 0.0       | 0.0       | Return  | 36,175  | 36,175  | Clg Btuh/Sqft          | 13.39  | Ret/OA   | 80.0                 | 68.0 |  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 36,175  | 0       | No. People             | 137    | Runarnd  | 75.0                 | 68.0 |  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 10,853  | 0       | Htg % OA               | 0.0    | Fn MtrTD | 0.5                  | 0.5  |  |
| Total    | -698.5         |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 0.63   | Fn BldTD | 0.4                  | 0.4  |  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -12.14 | Fn Frict | 1.1                  | 1.1  |  |

System 2 Peak SZ - SINGLE ZONE

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/16 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 73/ 98.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | * | Space Sensible (Btuh) | Perct Of Tot (%) | * | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 860                      |                        | 860              | 3.22             | * | 0                     | 0.00             | * | 0                            | -2,559                    | 41.46            |
| Glass Solar     | 255                     | 0                        |                        | 255              | 0.96             | * | 255                   | 1.05             | * | 0                            | 0                         | 0.00             |
| Glass Cond      | 162                     | 0                        |                        | 162              | 0.61             | * | 162                   | 0.67             | * | -766                         | -766                      | 12.40            |
| Wall Cond       | 747                     | 183                      |                        | 929              | 3.48             | * | 747                   | 3.06             | * | -2,286                       | -2,848                    | 46.14            |
| Partition       | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | -1,164                  | 1,042                    |                        | 2,206            | 8.26             | * | 1,164                 | 4.77             | * | -3,052                       | -6,172                    | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                              |                           |                  |
| Lights          | 19,780                  | 0                        |                        | 19,780           | 74.09            | * | 19,780                | 81.07            | * | 0                            | 0                         | 0.00             |
| People          | 4,712                   |                          |                        | 4,712            | 17.65            | * | 2,223                 | 9.11             | * | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sub Total==>    | 24,492                  | 0                        | 0                      | 24,492           | 91.74            | * | 22,002                | 90.18            | * | 0                            | 0                         | 0.00             |
| Ceiling Load    | 1,918                   | -1,918                   |                        | 0                | 0.00             | * | 1,233                 | 5.05             | * | -3,429                       | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Ret. Fan Heat   |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                            | 0                         | 0.00             |
| Exhaust Heat    |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | 0.00             | * |                       | 0.00             | * |                              | 0                         | 0.00             |
| Grand Total==>  | 27,574                  | -876                     | 0                      | 26,698           | 100.00           | * | 24,399                | 100.00           | * | -6,481                       | -6,172                    | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 2.2                   | 26.7            | 1,450            | 76.4              | 62.9  | 66.5   | 59.5             | 56.8  | 66.4   | 4,100       |            |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 2.2                   | 26.7            |                  |                   |       |        |                  |       |        | 580         | 0          | 0   |
|          |                       |                 |                  |                   |       |        |                  |       |        | 196         | 21         | 11  |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | --ENGINEERING CHECKS-- |         |          | --TEMPERATURES (F)-- |       |  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|------------------------|---------|----------|----------------------|-------|--|
|          |                |                  |           |           | Vent    |         |         | Clg % OA               | 0.0     | Type     | Clg                  | Htg   |  |
| Main Htg | -9.0           | 104              | 46.3      | 125.0     | Infil   | 0       | 0       | Clg Cfm/Sqft           | 0.35    | SADB     | 59.5                 | 125.0 |  |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Supply  | 1,450   | 104     | Clg Cfm/Ton            | 651.78  | Plenum   | 76.5                 | 63.8  |  |
| Preheat  | -0.0           | 1,450            | 64.5      | 59.5      | Mincfm  | 0       | 0       | Clg Sqft/Ton           | 1842.83 | Return   | 79.7                 | 64.5  |  |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Return  | 0       | 104     | Clg Btuh/Sqft          | 6.51    | Ret/OA   | 76.4                 | 64.5  |  |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 0       | 0       | No. People             | 10      | Runarnd  | 75.0                 | 68.0  |  |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Rm Exh  | 17,730  | 0       | Htg % OA               | 0.0     | Fn MtrTD | 0.0                  | 0.0   |  |
| Total    | -9.0           |                  |           |           | Auxil   | 0       | 0       | Htg Cfm/Sqft           | 0.03    | Fn BldTD | 0.0                  | 0.0   |  |
|          |                |                  |           |           |         |         |         | Htg Btuh/Sqft          | -2.18   | Fn Frict | 0.0                  | 0.0   |  |

System 3 Block INDFP - 4-PIPE INDUCTION

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/20 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 83 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Roof Cond       | 474                     | 21,484                   | 0                      | 21,957           | 1.49             | 740                   | 0.16             | -1,579            | -73,446          | 4.52             |
| Glass Solar     | 77,250                  | 0                        | 0                      | 77,250           | 5.26             | 70,438                | 15.09            | 0                 | 0                | 0.00             |
| Glass Cond      | 36,551                  | 0                        | 0                      | 36,551           | 2.49             | 24,143                | 5.17             | -185,619          | -185,619         | 11.43            |
| Wall Cond       | 113,330                 | 16,902                   | 0                      | 130,232          | 8.86             | 172,726               | 37.00            | -328,407          | -377,319         | 23.24            |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Infiltration    | 613,478                 | 0                        | 0                      | 613,478          | 41.75            | 119,432               | 25.58            | -987,377          | -987,377         | 60.81            |
| Sub Total==>    | 841,082                 | 38,386                   | 0                      | 879,468          | 59.84            | 387,477               | 83.00            | -1,502,981        | -1,623,761       | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                   |                  |                  |
| Lights          | 179,324                 | 0                        | 0                      | 179,324          | 12.20            | 48,699                | 10.43            | 0                 | 0                | 0.00             |
| People          | 45,248                  | 0                        | 0                      | 45,248           | 3.08             | 5,354                 | 1.15             | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sub Total==>    | 224,572                 | 0                        | 0                      | 224,572          | 15.28            | 54,053                | 11.58            | 0                 | 0                | 0.00             |
| Ceiling Load    | 14,654                  | -14,654                  | 0                      | 0                | 0.00             | 25,171                | 5.39             | -47,811           | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 252,299          | 17.17            | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 110,564          | 7.52             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Ret. Fan Heat   | 0                       | 13,820                   | 0                      | 13,820           | 0.94             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Duct Heat PkUp  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| OV/UNDR Sizing  | 122                     | 0                        | 0                      | 122              | 0.01             | 122                   | 0.03             | 0                 | 0                | 0.00             |
| Exhaust Heat    | 0                       | -11,266                  | 0                      | -11,266          | -0.77            | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                 | 0                | 0.00             |
| Grand Total==>  | 1,080,430               | 26,287                   | 0                      | 1,469,580        | 100.00           | 466,824               | 100.00           | -1,550,792        | -1,623,761       | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 45.0                  | 539.6           | 19,435           | 80.9              | 66.7  | 78.0   | 60.4             | 58.0  | 70.1   | 41,364      |            |     |
| Aux Clg  | 70.5                  | 846.0           | 25,306           | 75.0              | 64.1  | 74.4   | 65.7             | 52.9  | 40.9   | 0           |            |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0           |            |     |
| Totals   | 115.5                 | 1,385.6         |                  |                   |       |        |                  |       |        | 28,354      | 5,152      | 18  |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F |
|----------|----------------|------------------|-----------|-----------|
| Main Htg | -590.3         | 19,435           | 64.5      | 92.4      |
| Aux Htg  | -1,033.5       | 25,306           | 68.1      | 105.6     |
| Preheat  | -0.0           | 19,435           | 64.5      | 60.4      |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       |
| Total    | -1,623.8       |                  |           |           |

-----AIRFLOWS (cfm)-----

| Type    | Cooling | Heating |
|---------|---------|---------|
| Vent    | 5,830   | 0       |
| Infil   | 14,177  | 14,177  |
| Supply  | 19,435  | 19,435  |
| Mincfm  | 0       | 0       |
| Return  | 19,435  | 19,435  |
| Exhaust | 5,830   | 0       |
| Rm Exh  | 0       | 0       |
| Auxil   | 25,306  | 25,306  |

-----ENGINEERING CHECKS-----

| Clg % OA      | 30.0   |
|---------------|--------|
| Clg Cfm/Sqft  | 0.47   |
| Clg Cfm/Ton   | 432.19 |
| Clg Sqft/Ton  | 919.84 |
| Clg Btuh/Sqft | 13.05  |
| No. People    | 98     |
| Htg % OA      | 0.0    |
| Htg Cfm/Sqft  | 0.47   |
| Htg Btuh/Sqft | -14.27 |

-----TEMPERATURES (F)-----

| Type     | Clg  | Htg  |
|----------|------|------|
| SADB     | 65.7 | 92.4 |
| Plenum   | 76.1 | 64.4 |
| Return   | 76.8 | 64.5 |
| Ret/OA   | 80.9 | 64.5 |
| Runarnd  | 75.0 | 68.0 |
| Fn MtrTD | 1.3  | 1.3  |
| Fn BldTD | 1.0  | 1.0  |
| Fn Frict | 2.9  | 2.9  |



System 4 Block UH - UNIT HEATERS

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*

Peaked at Time ==> Mo/Hr: 0/0 \* Mo/Hr: 0/0 \* Mo/Hr: 13/1  
 Outside Air ==> OADB/WB/HR: 0/0/0.0 \* OADB: 0 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) | Space Sensible (Btuh) | Perct Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|-----------------------|------------------|------------------------------|---------------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Roof Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Solar     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Glass Cond      | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Wall Cond       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -6,715                       | -6,715                    | 100.00           |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Infiltration    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -6,715                       | -6,715                    | 100.00           |
| Internal Loads  |                         |                          |                        |                  |                  |                       |                  |                              |                           |                  |
| Lights          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| People          | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sub Total==>    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ceiling Load    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Ret. Fan Heat   | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| OV/UNDR Sizing  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Exhaust Heat    | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | 0                            | 0                         | 0.00             |
| Grand Total==>  | 0                       | 0                        | 0                      | 0                | 0.00             | 0                     | 0.00             | -6,715                       | -6,715                    | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total | Glass (sf) | (%) |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|-----|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Floor       |            |     |
| Main Clg | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 2,544      |     |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 1,632      |     |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Roof        | 0          | 0 0 |
| Totals   | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Wall        | 0          | 0 0 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F |
|----------|----------------|------------------|-----------|-----------|
| Main Htg | -6.7           | 1,835            | 68.0      | 71.4      |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       |
| Preheat  | 0.0            | 0                | 0.0       | 0.0       |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       |
| Total    | -6.7           |                  |           |           |

-----AIRFLOWS (cfm)-----

| Type    | Cooling | Heating |
|---------|---------|---------|
| Vent    | 0       | 0       |
| Infil   | 0       | 0       |
| Supply  | 0       | 1,835   |
| Mincfm  | 0       | 0       |
| Return  | 0       | 1,835   |
| Exhaust | 0       | 0       |
| Rm Exh  | 0       | 0       |
| Auxil   | 0       | 0       |

-----ENGINEERING CHECKS-----

|               |       |
|---------------|-------|
| Clg % OA      | 0.0   |
| Clg Cfm/Sqft  | 0.00  |
| Clg Cfm/Ton   | 0.00  |
| Clg Btuh/Sqft | 0.00  |
| No. People    | 0     |
| Htg % OA      | 0.0   |
| Htg Cfm/Sqft  | 0.72  |
| Htg Btuh/Sqft | -2.64 |

-----TEMPERATURES (F)-----

| Type     | Clg | Htg  |
|----------|-----|------|
| SADB     | 0.0 | 71.4 |
| Plenum   | 0.0 | 68.0 |
| Return   | 0.0 | 68.0 |
| Ret/OA   | 0.0 | 68.0 |
| Runarnd  | 0.0 | 68.0 |
| Fn MtrTD | 0.0 | 0.0  |
| Fn BldTD | 0.0 | 0.0  |
| Fn Frict | 0.1 | 0.0  |

System 5 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Percent Of Tot (%) | Space Sensible (Btuh) | Percent Of Tot (%) | Space Peak Space Sens (Btuh) | Coil Peak Tot Sens (Btuh) | Percent Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|--------------------|-----------------------|--------------------|------------------------------|---------------------------|--------------------|
| Envelope Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Skylite Solr    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Skylite Cond    | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Roof Cond       | 14,486                  | 0                        | 0                      | 14,486           | 2.29               | 16,221                | 8.17               | -48,286                      | -48,286                   | 25.44              |
| Glass Solar     | 8,014                   | 0                        | 0                      | 8,014            | 1.27               | 7,222                 | 3.64               | 0                            | 0                         | 0.00               |
| Glass Cond      | 3,286                   | 0                        | 0                      | 3,286            | 0.52               | 3,509                 | 1.77               | -16,588                      | -16,588                   | 8.74               |
| Wall Cond       | 4,161                   | 526                      | 0                      | 4,687            | 0.74               | 5,622                 | 2.83               | -16,677                      | -18,921                   | 9.97               |
| Partition       | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Exposed Floor   | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Infiltration    | 24,070                  | 0                        | 0                      | 24,070           | 3.81               | 13,603                | 6.85               | -56,169                      | -56,169                   | 29.60              |
| Sub Total==>    | 54,017                  | 526                      | 0                      | 54,543           | 8.63               | 46,176                | 23.25              | -137,719                     | -139,964                  | 73.75              |
| Internal Loads  |                         |                          |                        |                  |                    |                       |                    |                              |                           |                    |
| Lights          | 123,012                 | 0                        | 0                      | 123,012          | 19.46              | 129,725               | 65.32              | 0                            | 0                         | 0.00               |
| People          | 30,203                  | 0                        | 0                      | 30,203           | 4.78               | 14,612                | 7.36               | 0                            | 0                         | 0.00               |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sub Total==>    | 153,215                 | 0                        | 0                      | 153,215          | 24.24              | 144,337               | 72.68              | 0                            | 0                         | 0.00               |
| Ceiling Load    | 1,375                   | -1,375                   | 0                      | 0                | 0.00               | 1,553                 | 0.78               | -4,627                       | 0                         | 0.00               |
| Outside Air     | 0                       | 0                        | 0                      | 249,413          | 39.46              | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Sup. Fan Heat   | 0                       | 0                        | 0                      | 158,470          | 25.07              | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Ret. Fan Heat   | 0                       | 19,809                   | 0                      | 19,809           | 3.13               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Duct Heat Pkup  | 0                       | 0                        | 0                      | 0                | 0.00               | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| OV/UNDR Sizing  | 6,537                   | 0                        | 0                      | 6,537            | 1.03               | 6,537                 | 3.29               | -49,820                      | -49,820                   | 26.25              |
| Exhaust Heat    | 0                       | -9,934                   | 0                      | -9,934           | -1.57              | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Terminal Bypass | 0                       | 0                        | 0                      | 0                | -0.00              | 0                     | 0.00               | 0                            | 0                         | 0.00               |
| Grand Total==>  | 215,144                 | 9,026                    | 0                      | 632,052          | 100.00             | 198,603               | 100.00             | -192,167                     | -189,784                  | 100.00             |

-----COOLING COIL SELECTION-----

-----AREAS-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | Gross Total Floor | Glass (sf) | (%)    |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Part              |            |        |
| Main Clg | 52.7                  | 632.1           | 496.7            | 27,856            | 80.4  | 69.1   | 91.7             | 63.2  | 62.6   | 86.1              | 0          |        |
| Aux Clg  | 0.0                   | 0.0             | 0.0              | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0               | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0.0              | 0                 | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | 0.0               | 0          |        |
| Totals   | 52.7                  | 632.1           |                  |                   |       |        |                  |       |        |                   | 8,563      | 0 0    |
|          |                       |                 |                  |                   |       |        |                  |       |        |                   | 1,613      | 460 29 |

-----HEATING COIL SELECTION-----

-----AIRFLOWS (cfm)-----

-----ENGINEERING CHECKS-----

-----TEMPERATURES (F)-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | Cooling | Heating | Clg % OA      | 30.0   | Type     | Clg  | Htg  |
|----------|----------------|------------------|-----------|-----------|---------|---------|---------|---------------|--------|----------|------|------|
| Main Htg | -208.3         | 27,856           | 67.5      | 74.3      | Vent    | 8,357   | 0       | Clg Cfm/Sqft  | 1.03   | SADB     | 68.4 | 74.3 |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 907     | 807     | Clg Cfm/Ton   | 528.87 | Plenum   | 75.4 | 66.5 |
| Preheat  | -448.4         | 27,856           | 48.4      | 63.2      | Supply  | 27,856  | 27,856  | Clg Sqft/Ton  | 514.91 | Return   | 76.1 | 67.5 |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | MinCFM  | 0       | 0       | Clg Btuh/Sqft | 23.30  | Ret/OA   | 80.4 | 67.5 |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 27,856  | 27,856  | No. People    | 65     | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 8,357   | 0       | Htg % OA      | 0.0    | Fn MtrTD | 1.3  | 1.3  |
| Total    | -656.7         |                  |           |           | Rm Exh  | 0       | 0       | Htg Cfm/Sqft  | 1.03   | Fn BldTD | 1.0  | 1.0  |
|          |                |                  |           |           | Auxil   | 0       | 0       | Htg Btuh/Sqft | -24.21 | Fn Frict | 2.9  | 2.9  |

System 6 Block DD - DOUBLE DUCT

\*\*\*\*\* COOLING COIL PEAK \*\*\*\*\* CLG SPACE PEAK \*\*\*\*\* HEATING COIL PEAK \*\*\*\*\*  
 Peaked at Time ==> Mo/Hr: 7/14 \* Mo/Hr: 7/16 \* Mo/Hr: 13/ 1  
 Outside Air ==> OADB/WB/HR: 91/ 74/105.0 \* OADB: 91 \* OADB: 4

|                 | Space Sens.+Lat. (Btuh) | Ret. Air Sensible (Btuh) | Ret. Air Latent (Btuh) | Net Total (Btuh) | Perct Of Tot (%) |   | Space Sensible (Btuh) | Perct Of Tot (%) |   | Space Peak (Btuh) | Coil Peak (Btuh) | Perct Of Tot (%) |
|-----------------|-------------------------|--------------------------|------------------------|------------------|------------------|---|-----------------------|------------------|---|-------------------|------------------|------------------|
| Envelope Loads  |                         |                          |                        |                  |                  |   |                       |                  |   |                   |                  |                  |
| Skylite Solr    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Skylite Cond    | 0                       | 0                        |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Roof Cond       | 14,486                  | 0                        |                        | 14,486           | 2.29             | * | 16,221                | 8.17             | * | -48,286           | -48,286          | 25.44            |
| Glass Solar     | 8,014                   | 0                        |                        | 8,014            | 1.27             | * | 7,222                 | 3.64             | * | 0                 | 0                | 0.00             |
| Glass Cond      | 3,286                   | 0                        |                        | 3,286            | 0.52             | * | 3,509                 | 1.77             | * | -16,588           | -16,588          | 8.74             |
| Wall Cond       | 4,161                   | 526                      |                        | 4,687            | 0.74             | * | 5,622                 | 2.83             | * | -16,677           | -18,921          | 9.97             |
| Partition       | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Exposed Floor   | 0                       |                          |                        | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Infiltration    | 24,070                  |                          |                        | 24,070           | 3.81             | * | 13,603                | 6.85             | * | -56,169           | -56,169          | 29.60            |
| Sub Total==>    | 54,017                  | 526                      |                        | 54,543           | 8.63             | * | 46,176                | 23.25            | * | -137,719          | -139,964         | 73.75            |
| Internal Loads  |                         |                          |                        |                  |                  | * |                       |                  | * |                   |                  |                  |
| Lights          | 123,012                 | 0                        |                        | 123,012          | 19.46            | * | 129,725               | 65.32            | * | 0                 | 0                | 0.00             |
| People          | 30,203                  |                          |                        | 30,203           | 4.78             | * | 14,612                | 7.36             | * | 0                 | 0                | 0.00             |
| Misc            | 0                       | 0                        | 0                      | 0                | 0.00             | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sub Total==>    | 153,215                 | 0                        | 0                      | 153,215          | 24.24            | * | 144,337               | 72.68            | * | 0                 | 0                | 0.00             |
| Ceiling Load    | 1,375                   | -1,375                   |                        | 0                | 0.00             | * | 1,553                 | 0.78             | * | -4,627            | 0                | 0.00             |
| Outside Air     | 0                       | 0                        | 0                      | 249,413          | 39.46            | * | 0                     | 0.00             | * | 0                 | 0                | 0.00             |
| Sup. Fan Heat   |                         |                          |                        | 158,470          | 25.07            | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Ret. Fan Heat   |                         | 19,809                   |                        | 19,809           | 3.13             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Duct Heat Pkup  |                         | 0                        |                        | 0                | 0.00             | * |                       | 0.00             | * |                   | 0                | 0.00             |
| OV/UNDR Sizing  | 6,537                   |                          |                        | 6,537            | 1.03             | * | 6,537                 | 3.29             | * | -49,820           | -49,820          | 26.25            |
| Exhaust Heat    |                         | -9,934                   | 0                      | -9,934           | -1.57            | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Terminal Bypass |                         | 0                        | 0                      | 0                | -0.00            | * |                       | 0.00             | * |                   | 0                | 0.00             |
| Grand Total==>  | 215,144                 | 9,026                    | 0                      | 632,052          | 100.00           | * | 198,603               | 100.00           | * | -192,167          | -189,784         | 100.00           |

-----COOLING COIL SELECTION-----

|          | Total Capacity (Tons) | Sens Cap. (Mbh) | Coil Airfl (cfm) | Entering DB/WB/HR |       |        | Leaving DB/WB/HR |       |        | AREAS-----  |            |        |
|----------|-----------------------|-----------------|------------------|-------------------|-------|--------|------------------|-------|--------|-------------|------------|--------|
|          |                       |                 |                  | Deg F             | Deg F | Grains | Deg F            | Deg F | Grains | Gross Total | Glass (sf) | (%)    |
| Main Clg | 52.7                  | 632.1           | 27,856           | 80.4              | 69.1  | 91.7   | 63.2             | 62.6  | 86.1   | Floor       | 27,121     |        |
| Aux Clg  | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | Part        | 0          |        |
| Opt Vent | 0.0                   | 0.0             | 0                | 0.0               | 0.0   | 0.0    | 0.0              | 0.0   | 0.0    | ExFlr       | 0          |        |
| Totals   | 52.7                  | 632.1           |                  |                   |       |        |                  |       |        | Roof        | 8,563      | 0 0    |
|          |                       |                 |                  |                   |       |        |                  |       |        | Wall        | 1,613      | 460 29 |

-----HEATING COIL SELECTION-----

|          | Capacity (Mbh) | Coil Airfl (cfm) | Ent Deg F | Lvg Deg F | Type    | AIRFLOWS (cfm)----- |         | --ENGINEERING CHECKS-- |        |            | --TEMPERATURES (F)--- |          |      |      |
|----------|----------------|------------------|-----------|-----------|---------|---------------------|---------|------------------------|--------|------------|-----------------------|----------|------|------|
|          |                |                  |           |           |         | Cooling             | Heating | Clg % DA               |        | Type       | Clg                   | Htg      |      |      |
| Main Htg | -208.3         | 27,856           | 67.5      | 74.3      | Vent    | 8,357               | 0       | 30.0                   |        | SADB       | 68.4                  | 74.3     |      |      |
| Aux Htg  | 0.0            | 0                | 0.0       | 0.0       | Infil   | 807                 | 807     | Clg Cfm/Sqft           | 1.03   | Plenum     | 75.4                  | 66.5     |      |      |
| Preheat  | -448.4         | 27,856           | 48.4      | 63.2      | Supply  | 27,856              | 27,856  | Clg Cfm/Ton            | 528.87 | Return     | 76.1                  | 67.5     |      |      |
| Reheat   | 0.0            | 0                | 0.0       | 0.0       | Mincfm  | 0                   | 0       | Clg Sqft/Ton           | 514.91 | Ret/OA     | 80.4                  | 67.5     |      |      |
| Humidif  | 0.0            | 0                | 0.0       | 0.0       | Return  | 27,856              | 27,856  | Clg Btuh/Sqft          | 23.30  | No. People | 65                    | Runarnd  | 75.0 | 68.0 |
| Opt Vent | 0.0            | 0                | 0.0       | 0.0       | Exhaust | 8,357               | 0       | No. People             | 65     | Htg % DA   | 0.0                   | Fn MtrTD | 1.3  | 1.3  |
| Total    | -656.7         |                  |           |           | Rm Exh  | 0                   | 0       | Htg Cfm/Sqft           | 1.03   | Fn BldTD   | 1.0                   | 1.0      |      |      |
|          |                |                  |           |           | Auxil   | 0                   | 0       | Htg Btuh/Sqft          | -24.21 | Fn Frict   | 2.9                   | 2.9      |      |      |

BUILDING U-VALUES - ALTERNATIVE 1  
 COMBINED ECOS

----- B U I L D I N G U - V A L U E S -----

| Room Number | Description      | Part. | ExFlr | Room U-Values<br>(Btu/hr/sqft/F) |             |            |             |             |       |       |       | Room Mass<br>(lb/sqft) | Room Capac.<br>(Btu/sqft/F) |
|-------------|------------------|-------|-------|----------------------------------|-------------|------------|-------------|-------------|-------|-------|-------|------------------------|-----------------------------|
|             |                  |       |       | Summr Skylt                      | Wintr Skylt | Summr Roof | Wintr Windo | Summr Windo | Wall  | Ceil. |       |                        |                             |
| 1           | SUB BSMT, BSMT W | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 46.8                   | 9.61                        |
| Zone        | 1 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 46.8                   | 9.61                        |
| 4           | BSMT E           | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 45.2                   | 9.27                        |
| Zone        | 4 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 45.2                   | 9.27                        |
| System      | 1 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 0.317 | 46.4                   | 9.54                        |
| 2           | TOILETS, KITCHEN | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.317 | 29.4  | 5.93                   |                             |
| Zone        | 2 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.317 | 29.4  | 5.93                   |                             |
| 11          | TOILETS W ROOF   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.000       | 0.000       | 0.000 | 0.317 | 71.1  | 15.13                  |                             |
| Zone        | 11 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.000       | 0.000       | 0.000 | 0.317 | 71.1  | 15.13                  |                             |
| System      | 2 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.257 | 0.317 | 35.3  | 7.23                   |                             |
| 3           | STAIRS           | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.229 | 0.000 | 103.3 | 21.63                  |                             |
| Zone        | 3 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.229 | 0.000 | 103.3 | 21.63                  |                             |
| 5           | 1ST FL OFFICES   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.317 | 57.9  | 12.05                  |                             |
| Zone        | 5 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.317 | 57.9  | 12.05                  |                             |
| 7           | 2ND FL OFFICES   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.317 | 56.7  | 11.81                  |                             |
| Zone        | 7 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.317 | 56.7  | 11.81                  |                             |
| 9           | 3RD FL OFFICES   | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.257 | 0.317 | 102.3 | 21.84                  |                             |
| Zone        | 9 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.257 | 0.317 | 102.3 | 21.84                  |                             |
| 12          | STAIRS W ROOF    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.229 | 0.000 | 146.4 | 31.13                  |                             |
| Zone        | 12 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.229 | 0.000 | 146.4 | 31.13                  |                             |
| System      | 3 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.256 | 0.317 | 74.1  | 15.63                  |                             |
| 13          | SUPPLY STORAGE   | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 70.7  | 14.70                  |                             |
| Zone        | 13 Total/Ave.    | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 70.7  | 14.70                  |                             |
| System      | 4 Total/Ave.     | 0.229 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.000       | 0.000       | 0.000 | 0.000 | 70.7  | 14.70                  |                             |
| 6           | 1ST FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.317 | 32.5  | 6.60                   |                             |
| Zone        | 6 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.317 | 32.5  | 6.60                   |                             |
| 8           | 2ND FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.000 | 27.0  | 5.41                   |                             |
| Zone        | 8 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.000 | 27.0  | 5.41                   |                             |
| 10          | 3RD FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.257 | 0.000 | 71.5  | 15.21                  |                             |
| Zone        | 10 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.257 | 0.000 | 71.5  | 15.21                  |                             |
| System      | 5 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.257 | 0.317 | 43.1  | 8.94                   |                             |
| 14          | 1ST FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.317 | 32.5  | 6.60                   |                             |
| Zone        | 14 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.317 | 32.5  | 6.60                   |                             |
| 15          | 2ND FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.000 | 27.0  | 5.41                   |                             |
| Zone        | 15 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.000      | 0.550       | 0.563       | 0.257 | 0.000 | 27.0  | 5.41                   |                             |
| 16          | 3RD FL CEN OFFCS | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.257 | 0.000 | 71.5  | 15.21                  |                             |
| Zone        | 16 Total/Ave.    | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.257 | 0.000 | 71.5  | 15.21                  |                             |
| System      | 6 Total/Ave.     | 0.000 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.257 | 0.317 | 43.1  | 8.94                   |                             |
| Building    |                  | 0.229 | 0.000 | 0.000                            | 0.000       | 0.088      | 0.550       | 0.563       | 0.256 | 0.317 | 52.6  | 10.93                  |                             |

BUILDING AREAS - ALTERNATIVE 1  
 COMBINED ECOS

----- B U I L D I N G   A R E A S -----

| Room Number | Description      | Number of Duplicate Flr Rm | Floor Area/Dupl Room (sqft) | Total Floor Area (sqft) | Partition Area (sqft) | Exposed Floor Area (sqft) | Skylight Area (sqft) | Skl /Rf (%) | Net Roof Area (sqft) | Window Area (sqft) | Win /Wl (%) | Net Wall Area (sqft) |
|-------------|------------------|----------------------------|-----------------------------|-------------------------|-----------------------|---------------------------|----------------------|-------------|----------------------|--------------------|-------------|----------------------|
| 1           | SUB BSMT, BSMT W | 1 1                        | 45,125                      | 45,125                  | 13,222                | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| Zone        | 1 Total/Ave.     |                            |                             | 45,125                  | 13,222                | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 4           | BSMT E           | 1 1                        | 12,424                      | 12,424                  | 3,348                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| Zone        | 4 Total/Ave.     |                            |                             | 12,424                  | 3,348                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| System      | 1 Total/Ave.     |                            |                             | 57,549                  | 16,570                | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 2           | TOILETS, KITCHEN | 1 1                        | 3,520                       | 3,520                   | 0                     | 0                         | 0                    | 0           | 0                    | 21                 | 11          | 174                  |
| Zone        | 2 Total/Ave.     |                            |                             | 3,520                   | 0                     | 0                         | 0                    | 0           | 0                    | 21                 | 11          | 174                  |
| 11          | TOILETS W ROOF   | 1 1                        | 580                         | 580                     | 0                     | 0                         | 0                    | 0           | 580                  | 0                  | 0           | 0                    |
| Zone        | 11 Total/Ave.    |                            |                             | 580                     | 0                     | 0                         | 0                    | 0           | 580                  | 0                  | 0           | 0                    |
| System      | 2 Total/Ave.     |                            |                             | 4,100                   | 0                     | 0                         | 0                    | 0           | 580                  | 21                 | 11          | 174                  |
| 3           | STAIRS           | 1 1                        | 560                         | 560                     | 0                     | 0                         | 0                    | 0           | 0                    | 255                | 29          | 625                  |
| Zone        | 3 Total/Ave.     |                            |                             | 560                     | 0                     | 0                         | 0                    | 0           | 0                    | 255                | 29          | 625                  |
| 5           | 1ST FL OFFICES   | 1 1                        | 11,724                      | 11,724                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,573              | 19          | 6,530                |
| Zone        | 5 Total/Ave.     |                            |                             | 11,724                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,573              | 19          | 6,530                |
| 7           | 2ND FL OFFICES   | 1 1                        | 14,400                      | 14,400                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,610              | 17          | 7,730                |
| Zone        | 7 Total/Ave.     |                            |                             | 14,400                  | 0                     | 0                         | 0                    | 0           | 0                    | 1,610              | 17          | 7,730                |
| 9           | 3RD FL OFFICES   | 1 1                        | 14,400                      | 14,400                  | 0                     | 0                         | 0                    | 0           | 14,400               | 1,610              | 17          | 8,010                |
| Zone        | 9 Total/Ave.     |                            |                             | 14,400                  | 0                     | 0                         | 0                    | 0           | 14,400               | 1,610              | 17          | 8,010                |
| 12          | STAIRS W ROOF    | 1 1                        | 280                         | 280                     | 0                     | 0                         | 0                    | 0           | 280                  | 105                | 25          | 307                  |
| Zone        | 12 Total/Ave.    |                            |                             | 280                     | 0                     | 0                         | 0                    | 0           | 280                  | 105                | 25          | 307                  |
| System      | 3 Total/Ave.     |                            |                             | 41,364                  | 0                     | 0                         | 0                    | 0           | 14,680               | 5,152              | 18          | 23,202               |
| 13          | SUPPLY STORAGE   | 1 1                        | 2,544                       | 2,544                   | 1,632                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| Zone        | 13 Total/Ave.    |                            |                             | 2,544                   | 1,632                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| System      | 4 Total/Ave.     |                            |                             | 2,544                   | 1,632                 | 0                         | 0                    | 0           | 0                    | 0                  | 0           | 0                    |
| 6           | 1ST FL CEN OFFCS | 1 1                        | 9,884                       | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| Zone        | 6 Total/Ave.     |                            |                             | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| 8           | 2ND FL CEN OFFCS | 1 1                        | 8,674                       | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| Zone        | 8 Total/Ave.     |                            |                             | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| 10          | 3RD FL CEN OFFCS | 1 1                        | 8,563                       | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| Zone        | 10 Total/Ave.    |                            |                             | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| System      | 5 Total/Ave.     |                            |                             | 27,121                  | 0                     | 0                         | 0                    | 0           | 8,563                | 460                | 29          | 1,153                |
| 14          | 1ST FL CEN OFFCS | 1 1                        | 9,884                       | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| Zone        | 14 Total/Ave.    |                            |                             | 9,884                   | 0                     | 0                         | 0                    | 0           | 0                    | 250                | 19          | 1,038                |
| 15          | 2ND FL CEN OFFCS | 1 1                        | 8,674                       | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| Zone        | 15 Total/Ave.    |                            |                             | 8,674                   | 0                     | 0                         | 0                    | 0           | 0                    | 105                | 66          | 55                   |
| 16          | 3RD FL CEN OFFCS | 1 1                        | 8,563                       | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| Zone        | 16 Total/Ave.    |                            |                             | 8,563                   | 0                     | 0                         | 0                    | 0           | 8,563                | 105                | 64          | 60                   |
| System      | 6 Total/Ave.     |                            |                             | 27,121                  | 0                     | 0                         | 0                    | 0           | 8,563                | 460                | 29          | 1,153                |
| Building    |                  |                            |                             | 159,799                 | 18,202                | 0                         | 0                    | 0           | 32,386               | 6,095              | 19          | 25,681               |

ASHRAE 90 ANALYSIS - ALTERNATIVE 1  
COMBINED ECOS

----- A S H R A E 9 0 A N A L Y S I S -----

Overall Roof U-Value = 0.088 (Btu/Hr/Sq Ft/F)  
Overall Wall U-Value = 0.313 (Btu/Hr/Sq Ft/F)  
Overall Building U-Value = 0.199 (Btu/Hr/Sq Ft/F)

Roof Overall Thermal Transfer Value (OTTVr) = 3.96 (Btu/Hr/Sq Ft)  
Wall Overall Thermal Transfer Value (OTTVw) = 15.07 (Btu/Hr/Sq Ft)

SYSTEM TOTALS LOAD PROFILE - ALTERNATIVE 1  
 COMBINED ECOS

----- SYSTEM LOAD PROFILE -----

System Totals

| Percent Design Load | ---- Cooling Load ---- |           |       | ----- Heating Load ----- |           |       | ---- Cooling Airflow ---- |           |       | ---- Heating Airflow ---- |           |       |
|---------------------|------------------------|-----------|-------|--------------------------|-----------|-------|---------------------------|-----------|-------|---------------------------|-----------|-------|
|                     | Cap. (Ton)             | Hours (%) | Hours | Capacity (Btuh)          | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours | Cap. (Cfm)                | Hours (%) | Hours |
| 0 - 5               | 14.4                   | 0         | 0     | -182,567                 | 13        | 173   | 5,730.4                   | 0         | 0     | 0.0                       | 0         | 0     |
| 5 - 10              | 28.7                   | 1         | 12    | -365,133                 | 6         | 78    | 11,460.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 10 - 15             | 43.1                   | 7         | 70    | -547,700                 | 6         | 78    | 17,191.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 15 - 20             | 57.5                   | 9         | 98    | -730,267                 | 4         | 59    | 22,921.4                  | 0         | 0     | 0.0                       | 0         | 0     |
| 20 - 25             | 71.8                   | 7         | 72    | -912,833                 | 4         | 48    | 28,651.8                  | 0         | 0     | 0.0                       | 0         | 0     |
| 25 - 30             | 86.2                   | 9         | 93    | -1,095,400               | 7         | 94    | 34,382.1                  | 0         | 0     | 0.0                       | 0         | 0     |
| 30 - 35             | 100.5                  | 21        | 226   | -1,277,966               | 10        | 139   | 40,112.5                  | 0         | 0     | 0.0                       | 0         | 0     |
| 35 - 40             | 114.9                  | 9         | 100   | -1,460,533               | 11        | 147   | 45,842.8                  | 0         | 0     | 0.0                       | 0         | 0     |
| 40 - 45             | 129.3                  | 8         | 86    | -1,643,100               | 40        | 541   | 51,573.2                  | 0         | 0     | 0.0                       | 0         | 0     |
| 45 - 50             | 143.6                  | 5         | 49    | -1,825,667               | 0         | 0     | 57,303.6                  | 0         | 0     | 0.0                       | 0         | 0     |
| 50 - 55             | 158.0                  | 4         | 45    | -2,008,233               | 0         | 0     | 63,033.9                  | 0         | 0     | 0.0                       | 0         | 0     |
| 55 - 60             | 172.4                  | 2         | 19    | -2,190,800               | 0         | 0     | 68,764.3                  | 0         | 0     | 0.0                       | 0         | 0     |
| 60 - 65             | 186.7                  | 7         | 70    | -2,373,366               | 0         | 0     | 74,494.6                  | 0         | 0     | 0.0                       | 0         | 0     |
| 65 - 70             | 201.1                  | 6         | 60    | -2,555,933               | 0         | 0     | 80,225.0                  | 0         | 0     | 0.0                       | 0         | 0     |
| 70 - 75             | 215.4                  | 6         | 60    | -2,738,500               | 0         | 0     | 85,955.3                  | 0         | 0     | 0.0                       | 0         | 0     |
| 75 - 80             | 229.8                  | 0         | 5     | -2,921,067               | 0         | 0     | 91,685.7                  | 0         | 0     | 0.0                       | 0         | 0     |
| 80 - 85             | 244.2                  | 0         | 5     | -3,103,633               | 0         | 0     | 97,416.0                  | 0         | 0     | 0.0                       | 0         | 0     |
| 85 - 90             | 258.5                  | 0         | 0     | -3,286,200               | 0         | 0     | 103,146.4                 | 0         | 0     | 0.0                       | 0         | 0     |
| 90 - 95             | 272.9                  | 0         | 0     | -3,468,767               | 0         | 0     | 108,876.8                 | 0         | 0     | 0.0                       | 0         | 0     |
| 95 - 100            | 287.3                  | 0         | 0     | -3,651,333               | 0         | 0     | 114,607.1                 | 100       | 2,520 | 0.0                       | 0         | 0     |
| Hours Off           | 0.0                    | 0         | 7,690 | 0                        | 0         | 7,403 | 0.0                       | 0         | 6,240 | 0.0                       | 0         | 8,760 |





MONTHLY ENERGY CONSUMPTION - ALTERNATIVE 1  
 COMBINED ECOS

----- MONTHLY ENERGY CONSUMPTION -----

| Month | ELEC              | DEMAND          | STEAM              | STEAM DMND         |                      |
|-------|-------------------|-----------------|--------------------|--------------------|----------------------|
|       | Off Peak<br>(kwh) | On Peak<br>(kW) | On Peak<br>(Therm) | WATER<br>(1000 G1) | On Peak<br>(Thrm/hr) |
| Jan   | 135,416           | 667             | 11,246             | 0                  | 55                   |
| Feb   | 122,519           | 667             | 10,411             | 0                  | 55                   |
| March | 148,313           | 667             | 9,724              | 0                  | 55                   |
| April | 123,931           | 667             | 2,842              | 0                  | 43                   |
| May   | 160,025           | 778             | 0                  | 57                 | 0                    |
| June  | 164,813           | 823             | 0                  | 91                 | 0                    |
| July  | 161,875           | 874             | 0                  | 149                | 0                    |
| Aug   | 173,409           | 834             | 0                  | 101                | 0                    |
| Sept  | 145,893           | 794             | 0                  | 55                 | 0                    |
| Oct   | 134,870           | 667             | 1,822              | 0                  | 40                   |
| Nov   | 127,109           | 667             | 4,967              | 0                  | 52                   |
| Dec   | 128,968           | 667             | 9,808              | 0                  | 55                   |
| Total | 1,727,141         | 874             | 50,822             | 454                | 55                   |

Building Energy Consumption = 68,692 (Btu/Sq Ft/Year)  
 Source Energy Consumption = 153,081 (Btu/Sq Ft/Year)

Floor Area = 159,799 (Sq Ft)

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 COMBINED ECOS

----- EQUIPMENT ENERGY CONSUMPTION -----

| Ref<br>Num | Equip<br>Code | ----- Monthly Consumption ----- |                           |       |       |       |       |       |       |       |       |       |       | Total   |
|------------|---------------|---------------------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|            |               | Jan                             | Feb                       | Mar   | Apr   | May   | June  | July  | Aug   | Sep   | Oct   | Nov   | Dec   |         |
| 0          | LIGHTS        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 50971                           | 46117                     | 55825 | 48544 | 53398 | 53398 | 48544 | 55825 | 48544 | 53398 | 48544 | 48544 | 611,651 |
|            | PK            | 265.3                           | 265.3                     | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3 | 265.3   |
| 1          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | GAS           | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | OIL           | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 4          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | P STEAM       | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 5          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | P HOTH2O      | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 6          | MISC LD       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            | P CHILL       | 0                               | 0                         | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1          | EQ1001S       |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | 2-STG CTV <555 TONS       |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                               | 0                         | 0     | 0     | 11882 | 16670 | 27199 | 18532 | 11218 | 0     | 0     | 0     | 85,501  |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 81.7  | 127.2 | 177.8 | 137.7 | 98.3  | 0.0   | 0.0   | 0.0   | 177.8   |
| 1          | EQ5100        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                               | 0                         | 0     | 0     | 5115  | 5115  | 4650  | 5348  | 4650  | 0     | 0     | 0     | 24,878  |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 23.3  | 23.3  | 23.3  | 23.3  | 23.3  | 0.0   | 0.0   | 0.0   | 23.3    |
| 1          | EQ5100        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | COOLING TOWER             |       |       |       |       |       |       |       |       |       |       |         |
|            | WATER         | 0                               | 0                         | 0     | 0     | 57    | 91    | 149   | 101   | 55    | 0     | 0     | 0     | 454     |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 0.4   | 0.7   | 0.9   | 0.8   | 0.6   | 0.0   | 0.0   | 0.0   | 0.9     |
| 1          | EQ5001        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | CHILLED WATER PUMP C.V.   |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1          | EQ5010        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | CONDENSER WATER PUMP C.V. |       |       |       |       |       |       |       |       |       |       |         |
|            | ELEC          | 0                               | 0                         | 0     | 0     | 6562  | 6562  | 5966  | 6860  | 5966  | 0     | 0     | 0     | 31,916  |
|            | PK            | 0.0                             | 0.0                       | 0.0   | 0.0   | 29.8  | 29.8  | 29.8  | 29.8  | 29.8  | 0.0   | 0.0   | 0.0   | 29.8    |
| 1          | EQ5300        |                                 |                           |       |       |       |       |       |       |       |       |       |       |         |
|            |               |                                 | CONTROL PANEL & INTERLOCK |       |       |       |       |       |       |       |       |       |       |         |

EQUIPMENT ENERGY CONSUMPTION - ALTERNATIVE 1  
 COMBINED ECOS

|   |         |                            |       |       |       |       |       |       |       |       |       |       |       |         |
|---|---------|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
|   | ELEC    | 0                          | 0     | 0     | 0     | 220   | 220   | 200   | 230   | 200   | 0     | 0     | 0     | 1,070   |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 1.0   | 1.0   | 1.0   | 1.0   | 1.0   | 0.0   | 0.0   | 0.0   | 1.0     |
| 2 | EQ1000  | PREVENTS COOLING ENERGY    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5001  | CHILLED WATER PUMP C.V.    |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 2 | EQ5010  | CONDENSER WATER PUMP C.V.  |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 9754                       | 8825  | 10683 | 9290  | 10219 | 10219 | 9290  | 10683 | 9290  | 10219 | 9290  | 9290  | 117,051 |
|   | PK      | 46.4                       | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4  | 46.4    |
| 1 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2276                       | 2059  | 2493  | 2168  | 2384  | 2384  | 2168  | 2493  | 2168  | 2384  | 2168  | 2168  | 27,312  |
|   | PK      | 10.8                       | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8  | 10.8    |
| 2 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 0                          | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0     | 0       |
|   | PK      | 0.0                        | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0     |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 13975                      | 12644 | 15305 | 13309 | 14640 | 14640 | 13309 | 15305 | 13309 | 14640 | 13309 | 13309 | 167,695 |
|   | PK      | 66.5                       | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5  | 66.5    |
| 3 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 1747                       | 1580  | 1913  | 1664  | 1830  | 1830  | 1664  | 1913  | 1664  | 1830  | 1664  | 1664  | 20,962  |
|   | PK      | 8.3                        | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3   | 8.3     |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 5 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 20030                      | 18122 | 21937 | 19076 | 20983 | 20983 | 19076 | 21937 | 19076 | 20983 | 19076 | 19076 | 240,355 |
|   | PK      | 95.4                       | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4  | 95.4    |
| 6 | EQ4003  | FC CENTRIF. FAN C.V.       |       |       |       |       |       |       |       |       |       |       |       |         |
|   | ELEC    | 2504                       | 2265  | 2742  | 2384  | 2623  | 2623  | 2384  | 2742  | 2384  | 2623  | 2384  | 2384  | 30,044  |
|   | PK      | 11.9                       | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9  | 11.9    |
| 1 | EQ2101  | PURCHASED DISTRICT STEAM   |       |       |       |       |       |       |       |       |       |       |       |         |
|   | P STEAM | 1927                       | 1784  | 1667  | 485   | 0     | 0     | 0     | 0     | 0     | 306   | 846   | 1681  | 8,696   |
|   | PK      | 9.4                        | 9.4   | 9.4   | 7.4   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 6.9   | 9.0   | 9.4   | 9.4     |
| 1 | EQ5020  | HEAT WATER CIRC. PUMP C.V. |       |       |       |       |       |       |       |       |       |       |       |         |



UTILITY PEAK CHECKSUMS - ALTERNATIVE 1  
COMBINED ECOS

----- UTILITY PEAK CHECKSUMS -----

Utility ELECTRIC DEMAND

Peak Value 873.7 (kW)  
Yearly Time of Peak 14 (hr) 7 (mo)

Hour 14 Month 7

| Eqp.<br>Ref.<br>Num. | Equipment<br>Code Name | Equipment Description | Utility<br>Demand<br>(kW) | Percent<br>Of Tot<br>(%) |
|----------------------|------------------------|-----------------------|---------------------------|--------------------------|
|----------------------|------------------------|-----------------------|---------------------------|--------------------------|

Cooling Equipment

|   |         |                     |       |       |
|---|---------|---------------------|-------|-------|
| 1 | EQ1001S | 2-STG CTV <555 TONS | 261.7 | 29.95 |
|---|---------|---------------------|-------|-------|

|           |  |  |       |       |
|-----------|--|--|-------|-------|
| Sub Total |  |  | 261.7 | 29.95 |
|-----------|--|--|-------|-------|

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Air Moving Equipment

|   |  |                                    |       |       |
|---|--|------------------------------------|-------|-------|
| 1 |  | SUMMATION OF FAN ELECTRICAL DEMAND | 57.3  | 6.56  |
| 3 |  | SUMMATION OF FAN ELECTRICAL DEMAND | 74.9  | 8.57  |
| 5 |  | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3 | 12.28 |
| 6 |  | SUMMATION OF FAN ELECTRICAL DEMAND | 107.3 | 12.28 |

|           |  |  |       |       |
|-----------|--|--|-------|-------|
| Sub Total |  |  | 346.8 | 39.69 |
|-----------|--|--|-------|-------|

|           |  |  |     |      |
|-----------|--|--|-----|------|
| Sub Total |  |  | 0.0 | 0.00 |
|-----------|--|--|-----|------|

Miscellaneous

|                |  |  |       |       |
|----------------|--|--|-------|-------|
| Lights         |  |  | 265.3 | 30.36 |
| Base Utilities |  |  | 0.0   | 0.00  |
| Misc Equipment |  |  | 0.0   | 0.00  |
| Sub Total      |  |  | 265.3 | 30.36 |

|             |  |  |       |        |
|-------------|--|--|-------|--------|
| Grand Total |  |  | 873.7 | 100.00 |
|-------------|--|--|-------|--------|