

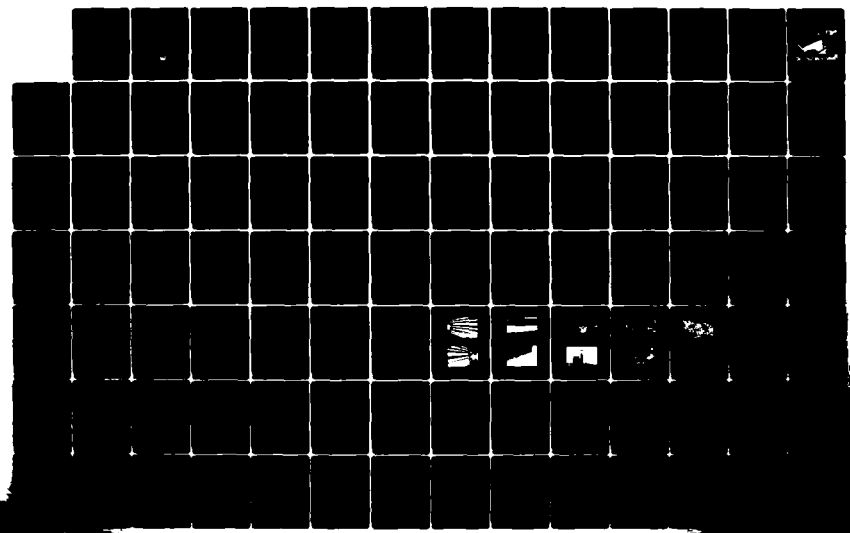
AD-A142 756

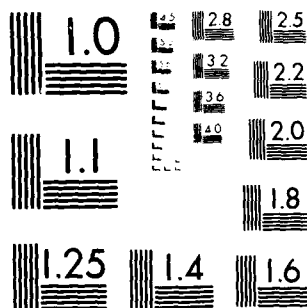
NATIONAL DAM INSPECTION PROGRAM AMERICAN CAN COMPANY
DAM CT 00047 SOUTHWEST (U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV FEB 80

172

UNCLASSIFIED

F/G 13/13 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

AD-A142 756

DTIC FILE COPY

**SOUTHWESTERN COASTAL BASIN
GREENWICH, CONNECTICUT**

**AMERICAN CAN COMPANY DAM
CT 00047**

**PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM**



**DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.**

FEBRUARY, 1980

This document has been approved
for public release and sale; its
distribution is unlimited.

84 07 02 046

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00047	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Southwestern Coastal Basin Greenwich, Conn., American Can Company Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE Feb. 1980
		13. NUMBER OF PAGES 85
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Southwestern Coastal Basin Greenwich, Conn. American Can Company Dam		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The dam at the American Can Company building in Greenwich, Conn, consists of the north wall of a parking garage which retains earth and the adjacent created pond to a depth of five levels below grade. The height of this wall is 53 ft. This dam is classified as INTERMEDIATED in size and a HIGH hazard structure in accordance with the recommended guidelines established by the Corps of Engineers. The test flood for this dam is equal to th PMF and has an outflow discharge equal to 83 cfs. The maximum outflow capacity of the overflow weir under a stillwater condition at the top of the weir opening is equal to 500 cfs, which represents more than 100 percent of the test flood.		



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF
NEDED

MAR 21 1980

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the American Can Company Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, American Can Company, Greenwich, Connecticut.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

SOUTHWESTERN COASTAL BASIN

GREENWICH, CONNECTICUT

AMERICAN CAN COMPANY DAM

CT 00047

Accession For

NTS _____
RPT _____
VLT _____
DCL _____

[X]

A-1

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Inspection No.: CT 00047
Name of Dam: American Can Company Dam
Town: Greenwich
County and State: Fairfield, Connecticut
Stream: Tributary to Loudon Cove
Date of Inspection: November 13, 1979

BRIEF ASSESSMENT

The dam at the American Can Company building in Greenwich, Connecticut, consists of the north wall of a parking garage which retains earth and the adjacent created pond (North Lake) to a depth of five levels below grade. The height of this wall is 53 feet.

There are no visible signs of physical distress and for reasons of fire protection, the water level is monitored very closely. Based on the visual inspection and a review of the technical data available, this dam is judged to be in GOOD condition.

This dam is classified as INTERMEDIATE in size and a HIGH hazard structure in accordance with the recommended guidelines established by the Corps of Engineers. The test flood for this dam is equal to the Probable Maximum Flood (PMF) and has an outflow discharge equal to 83 cfs. The maximum outflow capacity of the overflow weir under a stillwater condition at the top of the weir opening is equal to 500 cfs, which represents more than 100 percent of the test flood.

Rebuilding the headwall at the 48 inch outfall pipe is recommended within a 2 year period so that sedimentation buildup at this location can be monitored and clogging prevented.

Recommendations and remedial measures that should be implemented by the Owner within a two year period after receipt of this Phase I Inspection Report are further described in Section 7.

JAMES P. PURCELL ASSOCIATES, INC.

Sudhir A. Shah

Sudhir A. Shah, P.E.
Vice-President
Connecticut P.E. No. 8012



This Phase I Inspection Report on American Can Company Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Richard J. DiBuono

RICHARD DIBUONO, MEMBER
Water Control Branch
Engineering Division

Aramast Mahtesian

ARAMAST MAHTESIAN, CHAIRMAN
Foundation & Materials Branch
Engineering Division

APPROVAL RECORDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation. However, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

TABLE OF CONTENTS

Section	Page
Letter of Transmittal	
Brief Assessment	
Review Board Page	
Preface	i
Table of Contents	ii-iv
Overview Photo	v
Location Map	vi

REPORT

1. Project Information

1.1	General	1
	a. Authority	
	b. Purpose of Inspection	
1.2	Description of Project	1
	a. Location	
	b. Description of Dam and Appurtenances	
	c. Size Classification	
	d. Hazard Classification	
	e. Ownership	
	f. Operator	
	g. Purpose of Dam	
	h. Design and Construction History	
	i. Normal Operational Procedure	
1.3	Pertinent Data	3

TABLE OF CONTENTS (Cont'd)

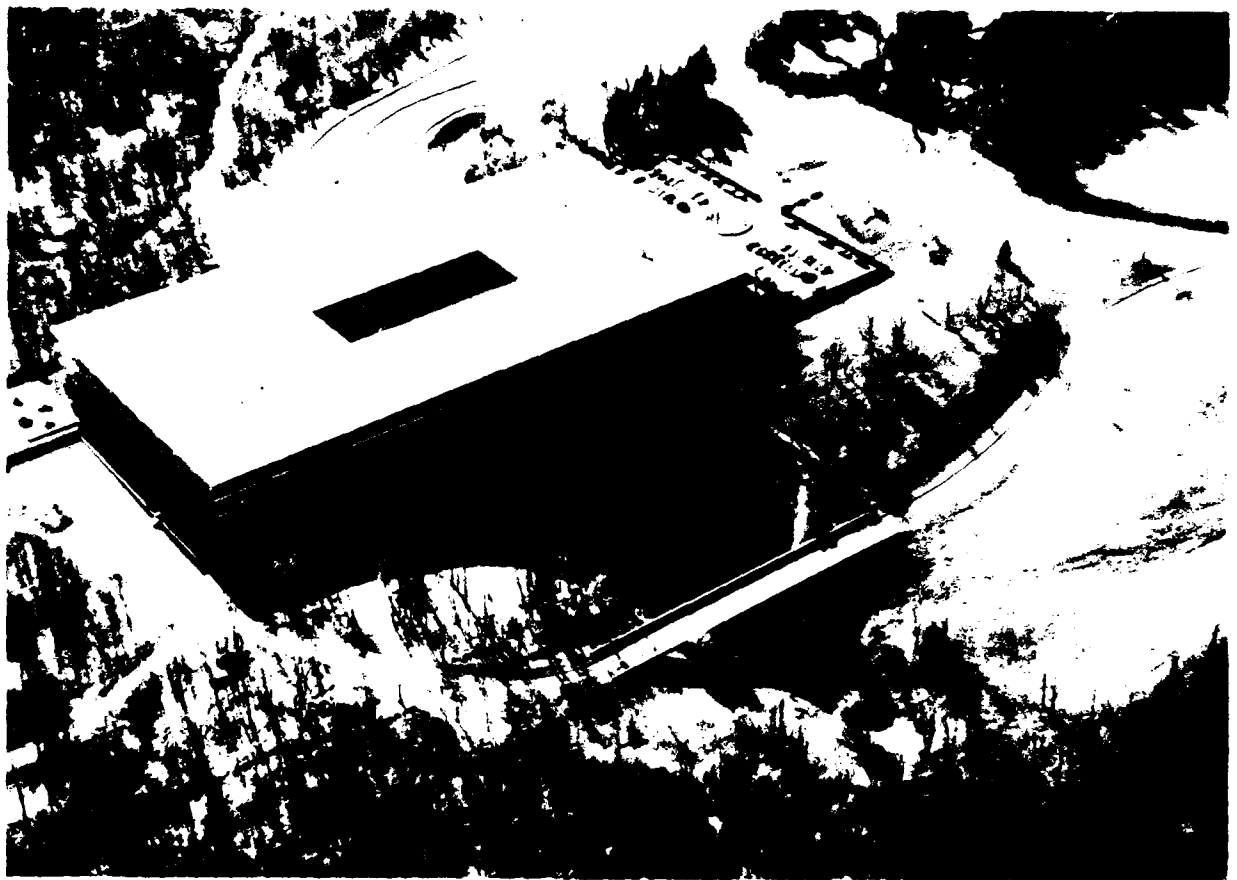
Section	Page
2. Project Information	
2.1 Design	8
2.2 Construction	8
2.3 Operation	8
2.4 Evaluation	8
3. Visual Inspection	
3.1 Findings	9
a. General	
b. Dam	
c. Appurtenant Structures	
d. Reservoir Area	
e. Downstream Channel	
3.2 Evaluation	10
4. Operational and Maintenance Procedures	
4.1 Operational Procedures	11
a. General	
b. Warning System	
4.2 Maintenance Procedures	11
a. General	
b. Operating Facilities	
4.33 Evaluation	11
5. Evaluation of Hydraulic/Hydrologic Features	
5.1 General	12
5.2 Design Data	12
5.3 Experience Data	12

TABLE OF CONTENTS (Cont'd)

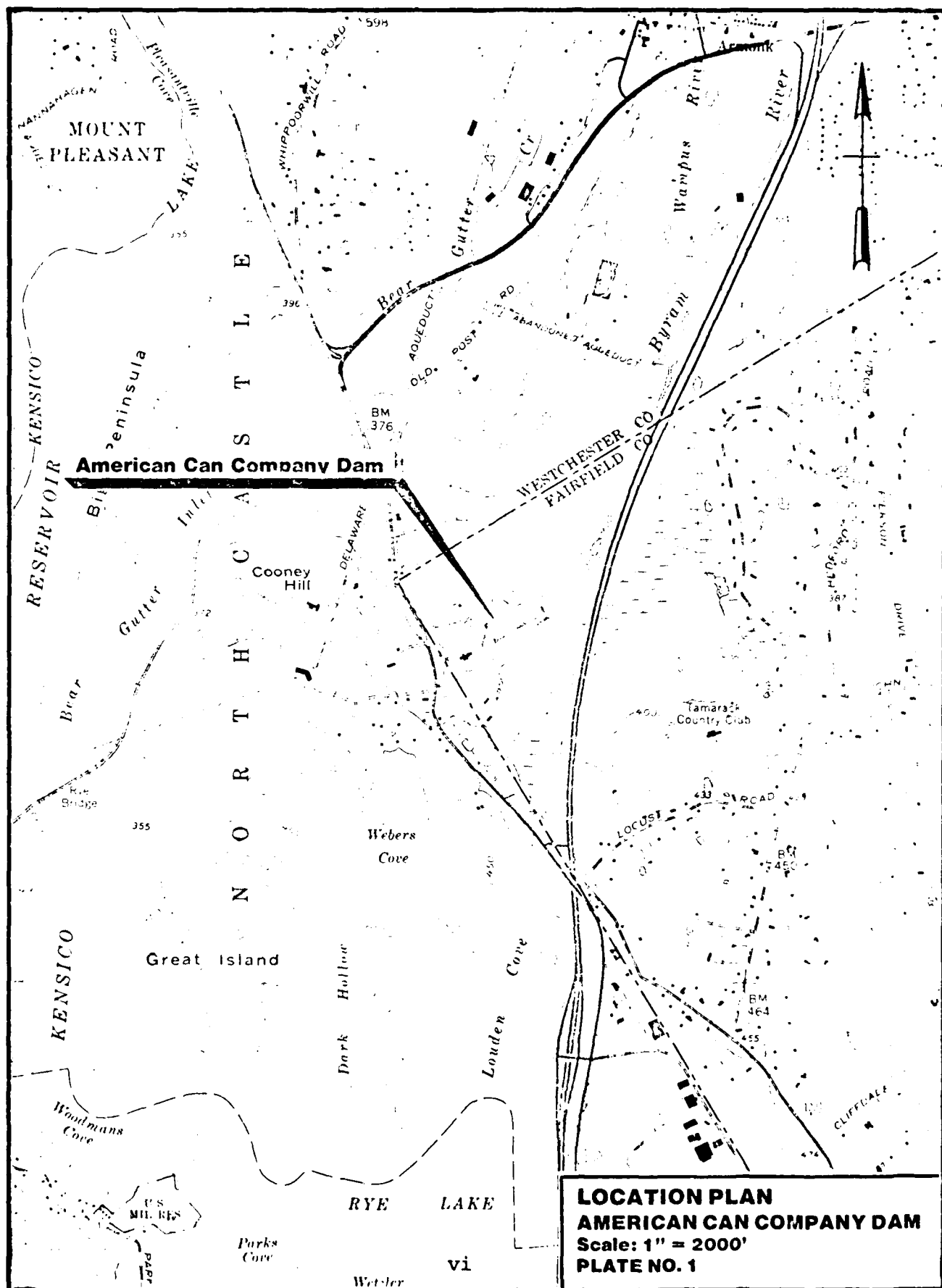
Section	Page
5.4 Test Flood Analysis	12
5.5 Dam Failure Analysis	13
6. Evaluation of Structural Stability	
6.1 Visual Observation	14
6.2 Design and Construction Data	14
6.3 Post-Construction Changes	14
6.4 Seismic Stability	14
7. Assessment, Recommendations and Remedial Measures	
7.1 Dam Assessment	15
a. Condition	
b. Adequacy of Information	
c. Urgency	
7.2 Recommendations	15
7.3 Remedial Measures	15
a. Operation and Maintenance Procedures	
7.4 Alternatives	15

APPENDIXES

Appendix A - Inspection Checklist	A-1
Appendix B - Engineering Data	B-1
Appendix C - Photographs	C-1
Appendix D - Hydrologic and Hydraulic Computations	D-1
Appendix E - Information as Contained in the National Inventory of Dams	E-1



AIRVIEW PHOTO OF THE BAY AREA CENTER



NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

NAME OF DAM: AMERICAN CAN COMPANY DAM

SECTION 1

PROJECT INFORMATION

1.1 General

- a. **Authority:** Public Law 92-367, August 8, 1972, authorized the Secretary of the Army through the Corps of Engineers to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. James P. Purcell Associates, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to James P. Purcell Associates, Inc., under a letter from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0002 has been assigned by the Corps of Engineers for this work.
- b. **Purpose of Inspection**
 - 1. Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.
 - 2. Encourage and prepare the States to initiate quickly, effective dam safety programs for non-Federal dams.
 - 3. To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

- a. **Location:** The dam at the American Can Company Executive Office Building is located in the Town of Greenwich near the New York - Connecticut State Line (See Plate No. 1). The impoundment is in the watershed of an unnamed tributary to Rye Lake entering at Loudon Cove. The dam is 3000 feet upstream of Loudon Cove. The latitude is 41° -06'-00" and the longitude is 73° -43'-18".

- b. **Description of Dam and Appurtenances:** The extent of this dam can best be described as the concrete structural wall on the north side of the underground parking garage for the employees of the American Can Company.

The pond (North Lake) is created by the north wall of the building and extends up a small natural valley. There are no streams entering the pond, which is fed by stormwater runoff and groundwater.

A 15 foot wide overflow weir in an opening in the north wall maintains a constant water elevation in the pond. A 12 inch drain extends from the bottom of the pond through the building wall. A 3 foot by 8 foot vertical chase carries water from the weir and building to an outfall below the south side of the building and a small natural channel. Other pipes for the fire protection system extend from the pond to the building.

- c. **Size Classification:** The size classification of this dam is INTERMEDIATE as per the criteria set forth in the Recommended Guidelines for Safety Inspection of Dams by the Corps of Engineers. The impoundment storage at the top of the dam (top of the weir opening) is 26 ac.-ft. (the "small" category range is 50 to 1000 ac.-ft.) and the maximum height of the dam is 53 feet (within the "intermediate" category range of 40 to 100 feet). The size classification is based on the height criteria.
- d. **Hazard Classification:** The hazard classification of this dam is HIGH as per the criteria set forth in the Recommended Guidelines for Safety Inspection of Dams by the Corps of Engineers. The failure of the dam (building wall) would result in extensive damage to the lower levels of the American Company building, the loss of the fire protection water supply, and the possibility of the loss of more than a few lives should failure occur during commuting hours when the garage is full of people.
- e. **Ownership:** The dam is the wall of the building, which is owned and maintained by the American Can Company of Greenwich, Connecticut.
- f. **Operator:** The person in charge of the day-to-day operation of this dam is:

Mr. Vincent Lex, Jr.
American Can Company
American Lane
Greenwich, CT 06830
Tel. (203) 522-2089

- g. **Purpose of Dam:** The purpose of this dam is to retain the earth and water on the north side of the garage for the office building. The water impounded by this dam is used primarily for fire protection and it also has an aesthetic function.
- h. **Design and Construction History:** North Lake and the dam was constructed in 1968 by the Turner Construction Company of New York as part of the garage for the office building of the American Can Company. The bottom of this pond, originally covered with bentonite, was recovered with a plastic liner in 1972 to prevent the loss of water and embankment material through the foundation drain (located along the building wall two feet below the fifth garage level). A piezometer, connected to the foundation drain, is located in the building. This pond has leaked once since the 1972 repairs, at which time the plastic liner was patched.

The original structural design for this building was done by Paul Weidlinger of New York and the design of the plastic liner repair was engineered by Mueser, Rutledge, Wentworth and Johnston of New York.

- i. **Normal Operational Procedure:** North Lake has a very small drainage area and as a result, the water level fluctuates very little during a heavy storm. This facility requires no operation; however, the spillway and the piezometer at the lowest level of the north wall are checked during each shift (3 times each day).

1.3 Pertinent Data

- a. **Drainage Area:** The American Can Company Dam is located in Fairfield County, Connecticut. The drainage basin lies approximately 2 miles west of North Greenwich, Connecticut. The basin is oval in shape with a length of 0.11 miles and an average width of 0.2 miles, resulting in a total drainage area of 0.02 square miles. (See drainage basin map in Appendix D). The topography is a generally rolling to steep terrain, with elevations ranging from a high of 440 feet to a low of 361 feet at the overflow weir crest. The basin slope is steep having average grades of 18 percent. The normal surface area of the pond is 2.0 acres, which is 16 percent of the watershed.

All elevations used in this report are based on an assumed datum (ACCD) established for the construction of the American Can Company Building. No relation to the National Geodetic Vertical Datum (NGVD) has been established.

- b. **Discharge at Dam Site:** There are no specific discharge records available for this dam. Listed below are calculated discharge values for the overflow weir and outlet works.
 - 1. **Outlet Works:** A 12 inch drain pipe with an intake elevation of 343.0 feet, and a discharge capacity of 16 cfs at a pond elevation of 361.0.

2. **Maximum Known Flood at Dam Site:** Calculated to be 6 cfs based on a reported maximum depth of flow over the weir of 3 inches.
3. **Overflow Weir Capacity at the Top of the Weir Opening:** 500 cfs at elevation 365.6.
4. **Overflow Weir Capacity at Test Flood Elevation:** 83 cfs at elevation 362.4.
5. **Gated Outlet Capacity at Normal Pool Elevation:** 16 cfs at elevation 361.0.
6. **Gated Outlet Capacity at Test Flood Elevation:** 16.5 cfs at elevation 362.4.
7. **Gated Outlet Capacity at the Top of the Weir Opening:** 18 cfs at elevation 365.6.
8. **Total Project Discharge at Top of the Weir Opening:** 518 cfs at elevation 365.6.
9. **Total Project Discharge at Test Flood Elevation:** 99.5 cfs at elevation 362.4.

c. Elevation (Ft. above American Can Company Datum - ACCD):

1. Stream bed at toe of dam	295 (Downstream)
2. Bottom of cutoff (foundation)	300+/-
3. Maximum tailwater	Unknown
4. Recreation pool	N/A
5. Full flood control pool	N/A
6. Spillway crest (overflow weir)	361.0
7. Design surcharge (original design)	Unknown

8.	Top of dam (top of weir opening)	365.6
9.	Test flood level	362.4
d.	Reservoir (Length in Feet)	
1.	Normal pool	450
2.	Flood control pool	N/A
3.	Spillway crest pool	450
4.	Top of dam	450
5.	Test flood pool	450
e.	Storage (Acre-Feet)	
1.	Normal pool	18
2.	Flood control pool	N/A
3.	Spillway crest pool	18
4.	Top of dam	26
5.	Test flood pool	21
f.	Reservoir Surface (Acres)	
1.	Normal pool	2.0
2.	Flood control pool	N/A
3.	Spillway crest	2.0
4.	Top of dam	2.3
5.	Test flood pool	2.1
g.	Dam (Building Wall)	
1.	Type	Concrete Wall

2.	Length	543 ft.
3.	Height	53 ft.
4.	Top Width (wall)	14 inches
5.	Side Slopes	Upstream: 2.5H:1V Downstream: Vertical
6.	Zoning	Pervious layer next to building leads to foundation drain.
7.	Impervious Core	N/A
8.	Cutoff	N/A
9.	Grout Curtain	N/A
10.	Other	N/A
h.	Diversion and Regulating Tunnel	N/A
i.	Spillway (overflow weir)	
1.	Type	Uncontrolled overflow, sharp crest weir plate
2.	Length of Weir	15'
3.	Crest Elevation	361.0
4.	Gates	None
5.	U/S Channel	Pond
6.	D/S Channel	Vertical Chase
7.	General	- - -

j. **Regulating Outlets** (12 inch drain)

Refer to Paragraph 1.2b "Description of Dam and Appurtenances" for description of outlet works.

1. Invert	343.0
2. Size	12 inches
3. Description	RCP
4. Control Mechanism	Hand operated valve within building
5. Other	Screened intake

SECTION 2

ENGINEERING DATA

2.1 Design

The design information available consists of the following:

- a. Structural computations done by Paul Weidlinger of New York.
- b. Several contract drawings from the original plans.
- c. A report by Mueser, Rutledge, Wentworth and Johnston, which outlines several suggested schemes for repair of the leakage problems experienced in 1972.

Refer to Appendix B-1 for the location of this information.

2.2 Construction

The construction of the dam (building) was started in 1968 by the Turner Construction Company. Since the newly created North Lake would not stay full and studies showed that the water was leaking out through the underdrain system, a plastic liner was installed on the lake bottom in 1972. This solution appears to have solved the problem as only one leak has been observed since. The lake was drained and a cavity was found where the liner had burst. The cavity was filled with sand and the liner was repaired.

2.3 Operation

No operation is required at this dam. However, for purposes of fire protection, there are two separate lines which feed different areas of the building as well as a sprinkler system which goes throughout the facility. The engineer in charge of maintenance, Mr. Lex, stated that the entire pond could be drained in less than 8 hours, if required, during an emergency.

2.4 Evaluation

Since there were no apparent visual signs of distress, there was no need for further review of the design data. The hydraulic capacity of the overflow weir and outlet works are discussed fully in Section 5.

SECTION 3

VISUAL INSPECTION

3.1 Findings

- a. **General:** The visual inspection was conducted on the morning of November 13, 1979 and a copy of the visual inspection check list is contained in Appendix C of this report.

The following procedure was used.

1. Inspection of the lake area around the north side of the building.
2. Visual survey of the outside portion of the north wall above the waterline.
3. Survey of structural wall condition at 1st, 3rd, and 5th floor levels of garage.
4. Check of drainage outlet at the south side of the building.
5. Photographs were taken of the general view of the building as well as other items given attention during the inspections, and are included in Appendix C of this report.

Before the inspection, the design and construction documents and aerial photographs were studied and reviewed.

- b. **Dam:** The north wall of the parking garage retains the earth and lake for 5 levels below grade. There was no seepage observed at any place on the face of this wall. The general condition of this wall was very good. No evidence of any settlement or movement was observed (Photos C-1, C-2).
- c. **Appurtenant Structures:** The overflow weir for this pond drains into a 3' x 8' vertical chase, outletting to a 48 inch RCP, which goes under the building and drains into the swamp area on the south side of the building. The weir was in good condition and seemed to be functioning very well. The maximum depth of water on the weir that anyone could recall was approximately 3 inches (Photos C-3, C-4). A 12 inch drain, controlled by a valve in the building (Photo C-5) also extends from the pond to the chase.
- d. **Reservoir Area:** An inspection of the immediate area of the lake showed there was no evidence of any movement of the embankment area next to the north wall of the building. The upstream area is mowed and maintained very well.

- e. **Downstream Channel:** The downstream channel consists of a 48 inch diameter blowoff pipe which carries the spillway flow into a swampy area at the south side of the building. The outlet is covered with field stone to prevent access. However, overflow from the pond appears to be flowing freely, although the pipe is approximately 1/3 full of sediment (Photo C-9, C-10).

3.2 Evaluation

In general, the visual inspection showed this dam to be in good condition. There were no signs of any distress to any part of the north wall of the building. There appeared to be a need for improvement of the headwall arrangement at the outfall, due to the blockage and sedimentation.

SECTION 4

OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

- a. **General:** The responsibility of the operation and maintenance for this facility is with the Maintenance Department of the American Can Company. The overflow weir level can be controlled with an adjustable stainless steel weir plate on the south face of the wall. Since the drainage area is so small, the water level has a very narrow range. The real maintenance concern at this site is that the plastic liner does not develop another leak, such that the water which is a source of fire protection, could be lost.
- b. **Warning System:** The warning system is the piezometer, which is located on the fifth level of the garage. The piezometer is monitored three times per day so that any groundwater pressure buildup (water not freely drained by the foundation drain), which would indicate a leak in the liner, could be detected. No written or formal operating procedure has been established. Each watch of the maintenance crew has been instructed to notify the supervisor if the piezometer reading changes from "zero" (Photo C-6).

4.2 Maintenance Procedures

- a. **General:** The building was designed so that its maintenance would be minimal. The outfall of this dam is hardly ever checked and as a result, the area near the headwall is in almost its natural condition.
- b. **Operating Facilities:** The three outlets to this pond penetrate the north wall at the third level. Two of these outlets feed the fire protection system and the third outlet is used to drain the pond. Insurance requirements are such that the pumps are exercised regularly (Photos C-7, C-8).

4.3 Evaluation

From the aspect of safety, the operational and maintenance procedures for this dam seem adequate. Improvement of the headwall arrangement at the outfall would help the monitoring of siltation at this point.

SECTION 5

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

The American Can Company building, built across a small natural valley, creates a pond against the north side of the building. The basin slopes are steep, having average grades of 18 percent. The impoundment has a total storage capacity of 18 ac.-ft. at elevation 361.0, the overflow weir crest. Each foot of depth in the pond above the overflow weir crest can accommodate approximately 2 ac.-ft. The overflow weir is a rectangular opening in the building wall and is 15 feet in length and 4.63 feet in height.

5.2 Design Data

- a. No specific hydraulic or hydrologic design data is available for this watershed or the drainage structures of the American Can Company Dam. In lieu of existing design information, U.S.G.S. Topographic Maps (Scale 1" - 2000') were utilized to develop hydrologic parameters such as drainage area, basin length, time of concentration and other runoff characteristics. Elevation - storage relationships for the reservoir were approximated. Reservoir surface area and surcharge storage was computed using a lake plan prepared by the American Can Company (see Appendix B). Some of the pertinent hydraulic design data was obtained and/or confirmed by actual field measurements at the time of the visual field inspection.
- b. Outflow values (routing procedures) and dam overtopping analyses were computed in accordance with the guidelines developed by the Corps of Engineers. Judgment was used in calculating final values outlined in this report, which are quite approximate and should not be considered a substitute for actual detailed analysis.

5.3 Experience Data

Historical data for recorded discharges is not available for this dam. The maximum discharge to date was calculated to be approximately 6 cfs corresponding to a reported depth of flow over the overflow weir of approximately 3 inches.

5.4 Test Flood Analysis

Recommended Guidelines for the Safety Inspection of Dams by the Corps of Engineers were used for the selection of the "Test Flood". This dam is classified as

a HIGH hazard and INTERMEDIATE size structure. Guidelines indicate that the Probable Maximum Flood (PMF) be used as the test flood for these classifications. The watershed has a total area of 0.02 square miles. Snyder's lag was calculated to be 0.48 hours and a Snyder peaking coefficient of 0.625 was used. The 200 square mile, 24 hour Probable Maximum Precipitation (PMF) is 22 inches. The Flood Hydrograph Package, HEC-1 computer program, developed by the Corps of Engineers was utilized to develop the inflow hydrograph, route the flood through the reservoir, and for the dam overtopping analysis. A test flood inflow was calculated to be 98 cfs. The inflow from 1/2 the PMF is 49 cfs. The 12 inch drain was assumed to be closed for this analysis.

The overflow weir capacity is hydraulically adequate to pass the test flood (PMF) and submergence of the overflow weir opening will not occur. The maximum outflow capacity of the overflow weir without submergence is 500 cfs. This corresponds to in excess of 100 percent of the test flood and a storage above the spillway level of approximately 6 ac.-ft. The maximum outflow discharge value for the test flood is 83 cfs corresponding to a depth of flow over the overflow weir of 1.41 feet and a storage above the spillway level of 3 ac.-ft. The outflow from 1/2 the PMF is 40 cfs. A spillway rating curve, outlet works rating curve, and a reservoir surface area-capacity curve are included in Appendix D of this report.

At the overflow weir crest elevation of 361.0, the capacity of the 12 inch drain outlet structure is 16 cfs. It will require approximately 1.5 hours to lower the water level the first foot assuming a water surface area of 2.0 acres and use of the outlet works to regulate the water level for expected inflows. Storage for impending flood conditions can be provided quickly by use of the outlet works if the pool level is high.

5.5 Dam Failure Analysis

This dam is classified as a high hazard structure. Failure discharge will cause damage to the American Can Company building. Loss of personal property is also possible because of the nature of the structure, as it is the north wall of the building. The loss of life is a possibility depending on the occupancy of the garage at the time of failure.

The calculated dam failure discharge is 9430 cfs at a pool level equal to the overflow weir crest. This level was chosen rather than the test flood level as having the greater hazard potential because a prefailure flow of the test flood would cause evacuation and/or a warning of flood conditions. Failure of the dam at normal pool level would catch the building occupants off guard and probably result in greater losses. Failure will produce a water surface level of approximately 3.5 feet deep at the 5th level parking area within the building.

Water surface elevations due to failure of the dam are listed in Appendix D. Probable consequences of a dam failure are limited to American Can Company building.

SECTION 6

EVALUATION OF STRUCTURAL STABILITY

6.1 1 Visual Observations

The maintenance staff routinely checks the equipment which could be used to drain the pond. No signs of physical distress in the north wall of this building is visible.

6.2 Design and Construction Data

The design and construction data available were construction drawings of the entire building, a study of the North Lake repair done in 1972, and structural computations for the north wall. The structural analysis done by Paul Weidlinger is contained in Appendix B of this report. No records or recollections of the construction for this building were readily available.

6.3 Post-Construction Changes

The following changes to the American Can Company Dam facility have been noted since its construction in 1968.

- a. Leaking and soil loss through the underdrain system of the foundation drains.
- b. Repair of above item by the installation of a plastic liner over the bottom of the pond adjacent to the north wall, and one subsequent repair of the liner.

6.4 Seismic Stability

This dam is in Seismic Zone 1 and, hence, does not require evaluation for seismic stability according to the Corps of Engineers Recommended Guidelines.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

- a. **Condition:** After study of the available documents, reports, structural analyses, and the results of this inspection, the conclusion is that the general condition of the dam at the American Can Company facility is GOOD. There is no cause to doubt the structural stability of the north wall based on visual observations.
- b. **Adequacy of Information:** The information that was available seemed adequate to make an assessment of the condition of this facility.
- c. **Urgency:** It is considered that the recommendations suggested below be implemented within 2 years.

7.2 Recommendations

It is recommended that the owner engage a qualified registered engineer to carry out the following actions:

- a. The headwall at the outfall of the 48 inch diameter drainline should be rebuilt so that the flow line of this pipe can be observed to monitor sediment buildup.
- b. The assumed datum used by the American Can Company should be related to the N.G.V.D.

7.3 Remedial Measures

- a. **Operation and Maintenance Procedures**
 - 1. Trees and brush on the downstream area around the outfall be removed to facilitate the visual observation of this outlet. This would preclude any problem of a possible plugged outlet during an emergency.
 - 2. Schedule a regular maintenance check of this area for monitoring of any blockages.
 - 3. Institute a program of biennial periodic technical inspection.
 - 4. Develop a formal flood warning and surveillance plan, including round-the-clock monitoring during heavy precipitation.

7.4 Alternatives

None.

APPENDIX A
INSPECTION CHECK LIST

INSPECTION CHECK LIST

PARTY ORGANIZATION

PROJECT AMERICAN CAN COMPANY DAM DATE November 13, 1979

TIME 8:30 - 10:00 A.M.

WEATHER Overcast

W.S. ELEV. _____ U.S. _____ DN.S. _____

PARTY:

- | | |
|-----------------------------|---|
| 1. <u>R. Johnston, JPPA</u> | 6. <u>V. Lex, Jr., American Can Co.</u> |
| 2. <u>R. Lyon, JPPA</u> | 7. <u>J. Reied, American Can Co.</u> |
| 3. <u>G. Salzman, CWDD</u> | 8. _____ |
| 4. _____ | 9. _____ |
| 5. _____ | 10. _____ |

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Hydraulics</u>	<u>R. Johnston</u>	
2. <u>Structural</u>	<u>R. Lyon</u>	
3. <u>Geotechnical</u>	<u>G. Salzman</u>	
4. _____		
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		

INSPECTION CHECK LIST

PROJECT AMERICAN CAN COMPANY DAM

DATE November 13, 1979

PROJECT FEATURE _____

NAME _____

DISCIPLINE _____

NAME _____

AREA EVALUATED	CONDITION
<u>DAM EMBANKMENT</u>	North side of building and embankment against building N/A
Crest Elevation	
Current Pool Elevation 361.0	Good - 1/2 inch above overflow weir.
Maximum Impoundment to Date	Approximately 3 inches above overflow weir.
Surface Cracks	None observed.
Pavement Condition	N/A
Movement or Settlement of Crest	None observed.
Lateral Movement	None observed.
Vertical Alignment	Good.
Horizontal Alignment	Good.
Condition at Abutment and at Concrete Structures	Good.
Indications of Movement of Structural Items on Slopes	None observed.
Trespassing on Slopes	Not permitted.
Vegetation on Slopes	None observed.
Sloughing or Erosion of Slopes or Abutments	None observed.
Rock Slope Protection - Riprap Failures	Good - Riprap along pond shore.
Unusual Movement or Cracking at or near Toes	None observed.
Unusual Embankment or Downstream Seepage	None observed.
Piping or Boils	None observed.
Foundation Drainage Features	Footing drains.
Toe Drains	None observed.
Instrumentation System	Piezometer in foundation drain reads dry.

INSPECTION CHECK LIST

PROJECT AMERICAN CAN COMPANY DAM DATE November 13, 1979
 PROJECT FEATURE _____ NAME _____
 DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<p><u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u></p> <p>a. Approach Channel</p> <p>b. Intake Structures</p> <p>12 inch drain</p> <p>8 Inch Fire Protection. (Two Separate systems)</p> <p>Overflow Weir</p>	<p>Entire pond bed - underwater.</p> <p>Screened, free access from the bottom of the pond. Also, free access from one 2 ft. square opening in each side of a catch basin located in the pond over the 12 inch drain.</p> <p>Free access from one 2 ft. square opening in each side of a catch basin located in the pond, near the building, one at each edge.</p> <p>(See Spillway Weir)</p>

INSPECTION CHECK LIST

PROJECT AMERICAN CAN COMPANY DAM

DATE November 13, 1979

PROJECT FEATURE _____

NAME _____

DISCIPLINE _____

NAME _____

AREA EVALUATED	CONDITION
<p><u>OUTLET WORKS - TRANSITION AND CONDUIT</u></p> <p>12 Inch Drain</p> <p>8 Inch Fire Protection Lines.</p> <p>Overflow Weir.</p> <p>Vertical Chase.</p>	<p>Extends from intake to a vertical chase where it enters the building on third garage level. Controlled by gate valve. Visible portions in good condition and apparently operable.</p> <p>Various valves, pipes, pumps and other appurtenances within building. Visible portions in good condition and apparently operable.</p> <p>Discharges directly to the vertical chase.</p> <p>A 3 ft. by 8 ft. vertical concrete chase extends from the overflow weir to a junction box below the fifth garage level. A 48 inch RCP extends from the junction box, under the building, to a drop manhole in front of the building. The 48 inch RCP continues to the outlet.</p>

INSPECTION CHECK LIST

PROJECT AMERICAN CAN COMPANY DAM

DATE November 13, 1979

PROJECT FEATURE _____

NAME _____

DISCIPLINE _____

NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
a. Approach Channel	N/A
General Condition	
Loose Rock Overhanging Channel	
Trees Overhanging Channel	
Floor of Approach Channel	
b. Weir	
General Condition	Overflow weir - concrete with steel weir plate. Good.
Rust or Staining	Normal rusting of steel.
Spalling	None observed.
Any Visible Reinforcing	None observed.
Any Seepage or Efflorescence	Weir flowing - none observed.
Drain Holes	None observed.
c. Discharge Channel	48 inch pipe outlet.
General Condition	Good.
Loose Rock Overhanging Channel	None observed.
Trees Overhanging Channel	Yes.
Floor of Channel	Grass and gravel.
Other Obstructions	Pipe culvert 400 ft. downstream.

APPENDIX B
ENGINEERING DATA

APPENDIX B-1

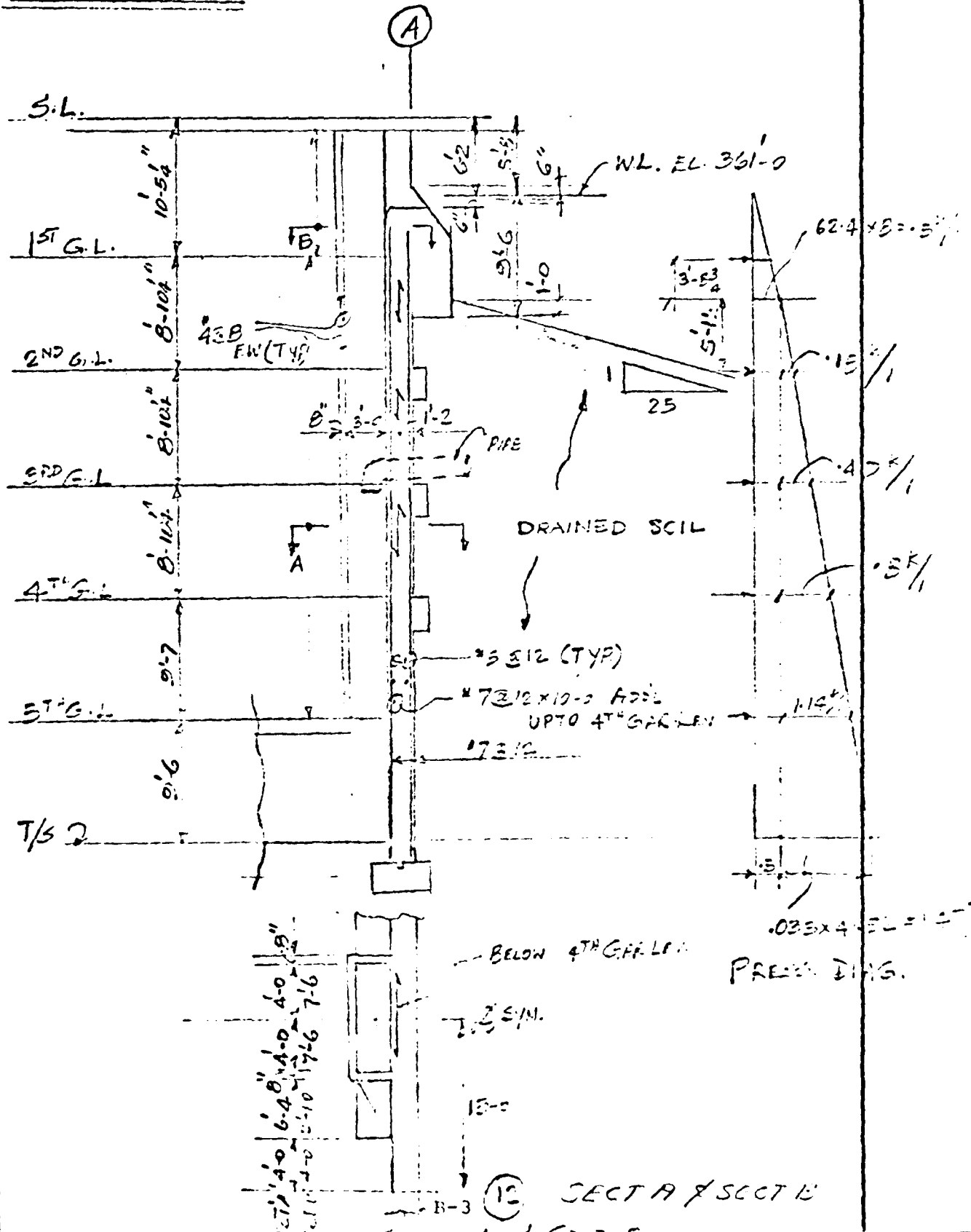
DESIGN, CONSTRUCTION AND MAINTENANCE RECORDS AND LOCATION

Mr. Victor J. Galgowski
Dam Safety Engineer
Water and Related Resources Unit
Department of Environmental Protection
State of Connecticut
State Office Building
Hartford, Connecticut 06115

American Can Company
American Lane
Greenwich, Connecticut 06830

STRUCTURAL COMPUTATIONS
AS CONTAINED IN CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FILES

NORTH WALL BTIN A11, A12



7114 THEATRON CIN

NORTH WALL (CONT'D)BELOW 5TH GAR. LEVEL

$$M = 1.97 \times \frac{9^2}{8} = 19.95 \text{ k/ft}$$

$$A_s = \frac{19.95}{1.76 \times 12.5} = .9080"$$

$$A_g = .910"$$

*5 @ 12 + '7 @ 12

BELOW 4TH GAR. LEVEL

$$M = 1.64 \times \frac{8.67^2}{8} = 15.45$$

$$A_s = .702$$

$$A_g = .702$$

*5 @ 12 + '7 @ 12

BELOW 3RD GAR. LEVEL

$$M = 4.85 \times 4.5 = 21.9 \text{ k}$$

$$- .99 \times \frac{4.5^2}{2} = -10.05$$

$$- \frac{.31 \times 4.5^3}{8.871 \times 3} = -.53$$

$$A_s = \frac{11.32}{1.76 \times 12.5} = .514$$

$$A_g = .514$$

*7 @ 12 OK E.F.

8' CONC. WALL

$$\text{Min. } A_s = 12 \times 8 \times .0025 = .24 \text{ E.F.}$$

USE #4 @ 5 E.W.

7114

AMERICAN CAN CO

STEEL FOR WALL STRIP 1'-0" WIDE :

Rel. Stiffness

$\frac{2}{3} \times 1 = .75$ 1.15 1.15 1.15 $\frac{3}{4} \times 1.09 = .82$

Distr. Factors

.4 .6 .5 .5 .5 .5 .6 .4

FEM

+1.6 -3.6 +4.5 -5.3 +5.7 -7.2 +7.6 -16.7
 +1.2 +1.8 +1.4 +1.4 +7 +8 +4.6 +3.5
 0 +2 +9 +4 +2 +1.3 -4 0
 -1 -1 -6 -7 -8 -7 -2 -2

M^- (ft-kips)

+1.7 -1.7 +5.2 -5.2 +5.8 -5.8 +12.4 -12.4

M simple km

.4 4.9 5.1 11.2 16.9

Correction

-.8 -3.5 -5.3 -9.1 -6.2

M^+ midspan (ft-kips)

-.4 +1.4 +2.8 -2.1 +10.6

Ref. $I/I_s = \frac{A}{1.76 \times 125}$ (in.²)

.03 .24 .26 .57

" A_s (in.²)

.02 .06 .13 .09 .43

Min. WALL REINF.

(HORIZ.) = $.0025 \times 12 \times 14 = .40$ in.² (0

" " "

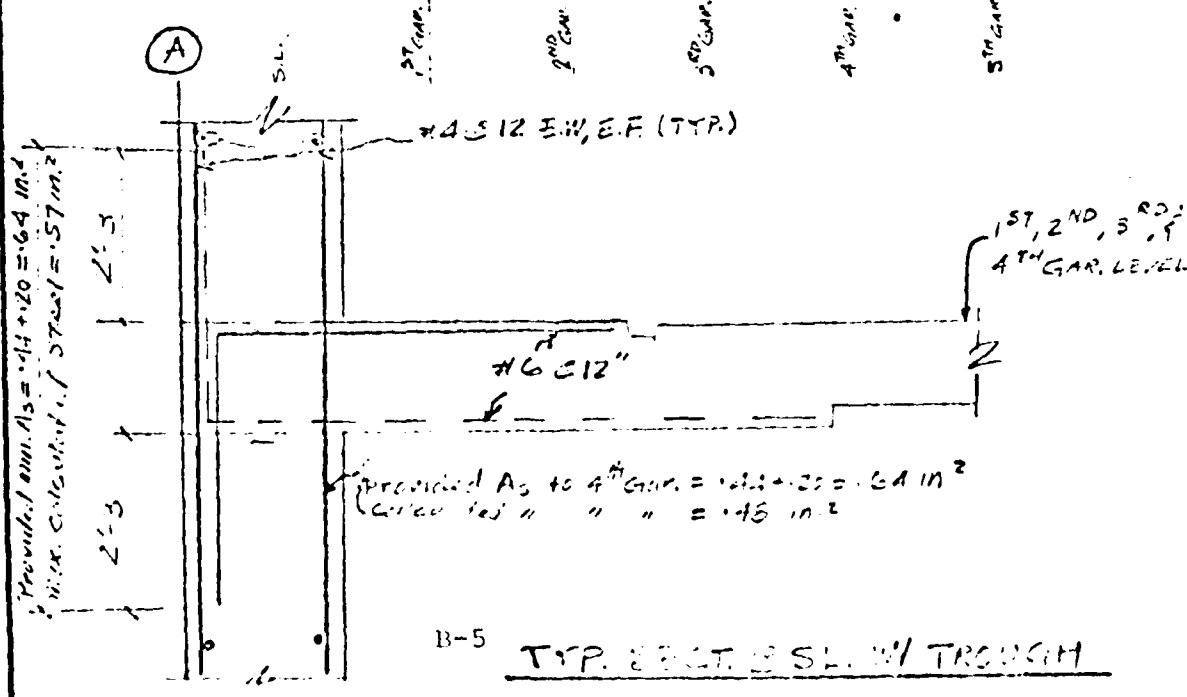
(VERTL) = $.0015 \times 12 \times 14 = .26$ in.² (0

Provided A_s (in.²)

.20 .22 .20 .20 .64

" A_s (in.²)

.20 .22 .20 .20 .64



7114

AMERICAN CAN CO.

DATE 1-1-60

BY

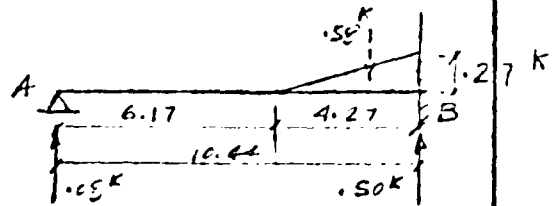
NO. 5

OF

FEM & SIMPLE BEAM MOMENT CALC'S

$$\bar{M}_{BA} = .58 + .138 \times 9.06 \frac{9.06 + 16.74}{2 \times 10.44} = .6 \text{ IK}$$

$$M^+ = .05 \times \frac{16.74}{2} = .4 \text{ IK}$$



$$\bar{M}_{BC} = \frac{.27 \times 5.5^2}{12} + \frac{[.55(4-2.155)](11.5) + \frac{.55^2(5-3.155)(.46)}{30} + .42(10-10.42 + 3.155) \cdot \frac{.42}{12}] \times 5.5}{12}$$

$$= 1.8 + [.1 + 0 + .1] \times 5.5 = 3.6 \text{ IK}$$

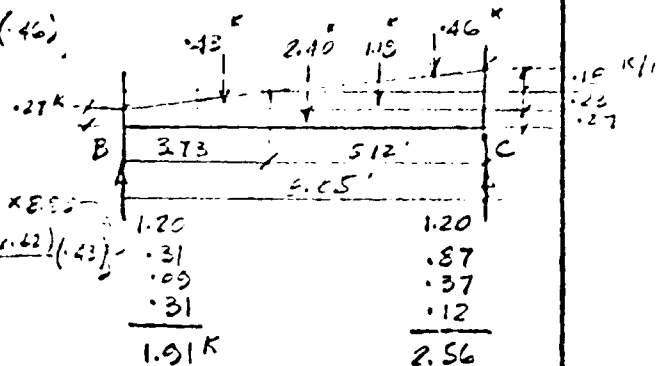
$$\bar{M}_{CB} = \frac{.27 \times 5.5^2}{12} - \frac{[.55(6-5.55 + 3.155)](11.5)}{12}$$

$$+ \frac{.55(10-10.42 + 3.155)(.46)}{30} + \frac{.42(5-4.42)(.42)}{10} \times 5.5$$

$$= 1.8 + [.2 + .1 + .1] \times 5.5 = 4.5 \text{ IK}$$

$$M^+ = 1.91 \times \frac{5.5}{2} - 1.20 \times \frac{5.5}{4} - .43 \times 1.93 - .5 \times 1.7 \times 7/2$$

$$= 8.5 - 2.7 - .8 - .1 = 4.9 \text{ IK}$$



$$\bar{M}_{CD} = \frac{.60 \times 5.5^2}{12} + \frac{1}{15} \times 1.37 \times 5.55$$

$$= 4.5 + .8 = 5.3 \text{ IK}$$

$$\bar{M}_{DC} = 4.5 + \frac{1}{15} \times 1.37 \times 8.15 = 4.5 + 1.2 = 5.7 \text{ IK}$$

$$M^+ = 3.46 \times \frac{5.5}{2} - 3 \times \frac{5.5}{4} - \frac{.31 \times 1.82 \times 5.5}{2} - \frac{.91 \times 1.7 \times 5.5}{3 \times 2}$$

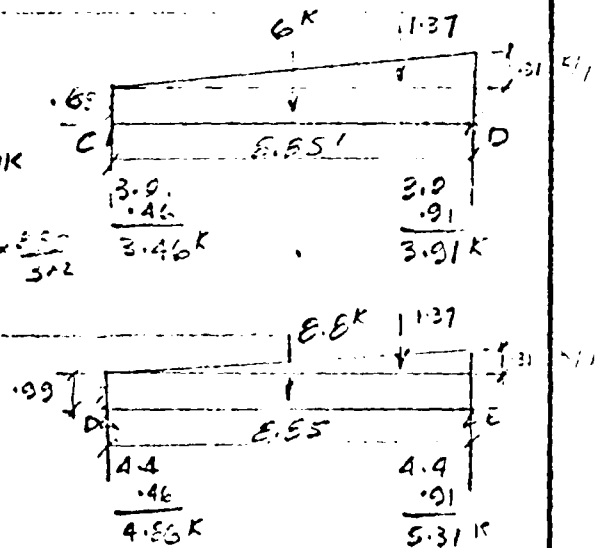
$$= 15.3 - 6.6 - .6 = 8.1 \text{ IK}$$

$$\bar{M}_{DE} = \frac{.92 \times 5.5^2}{12} + .8 = 6.4 + .8 = 7.2 \text{ IK}$$

$$\bar{M}_{ED} = 6.4 + 1.2 = 7.6 \text{ IK}$$

$$M^+ = 4.86 \times \frac{5.5}{2} - 4.4 \times \frac{5.5}{4} - 1.0$$

$$= 21.5 - 3.7 - .6 = 11.2 \text{ IK}$$

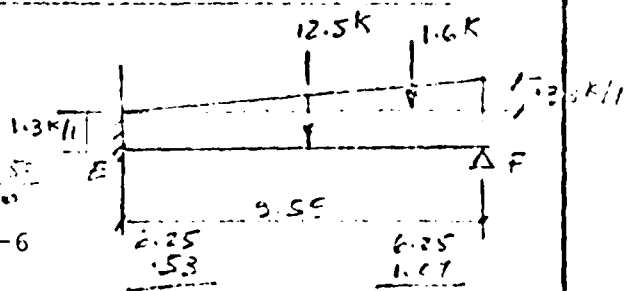


$$\bar{M}_{EF} = \frac{1.3 \times 5.5^2}{6} + \frac{7}{60} \times 1.6 \times 5.5$$

$$= 14.9 + 1.5 = 16.4 \text{ IK}$$

$$M^+ = 6.75 \times \frac{5.5}{2} - 6.25 \times \frac{5.5}{4} - 1.7 \times \frac{5.5}{2} - \frac{1.5 \times 1.7 \times 5.5}{3}$$

$$= 32.5 - 15.6 - .7 = 16.2 \text{ IK}$$



7114

AMERICAN CABLE CO.

NO.

OF

BEAM DES. FOR WALL SPANNING IN VERT'L DIRECTION @ OPEN'G

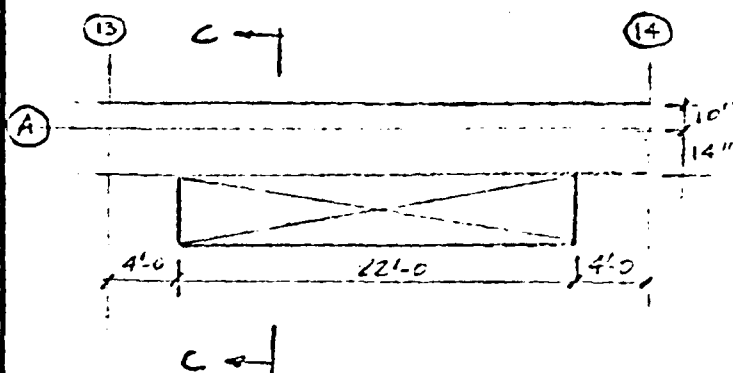
Assume Plate action exists & the loading shown on p. 58F will be distributed evenly among the floors when load is transferred in vertical direction.

$$\text{Total lateral earth load} = \frac{1.14 \times 32.42}{2} = 18.5 \text{ K}$$

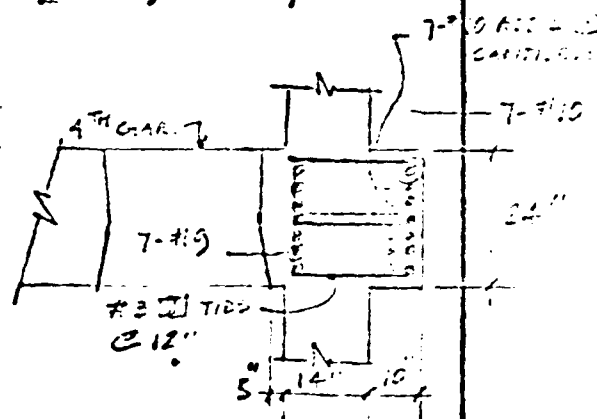
$$\text{water load} = .5(32.42 + \frac{2.5}{2}) = \frac{15.3}{36.8} \text{ K}$$

$$\text{Avg. unif. load} = \frac{36.8}{47.52} = .77 \text{ K/1' for 1'c strip}$$

$$w = \text{lateral load @ A}^{\text{th}} \text{ GAR.} = .77 \left(\frac{8.55 + 2.55}{2} \right) = 7.1 \text{ K/1'}$$



TYP'L OPEN'G



SECT. C-C

$$\text{Resulting Moment, } M_R = 295 \text{ K} \times 27 = 420 \text{ K}$$

$$M = \frac{7.1 \times 22^2}{10} = 344$$

$$A_s = \frac{344}{1.76 \times 26} = 7.5 \text{ in}^2 \quad \underline{7\text{-}\#10}$$

$$M^+ = \frac{7.1 \times 14^2}{14} = 245 \text{ K}$$

$$A_s^+ = \frac{245}{1.76 \times 27} = 5.2 \text{ in}^2 \quad \underline{7\text{-}\#9}$$

$$D = \frac{11 \times 7.1}{24 \times 26} = 12.5 \text{ PSI}$$

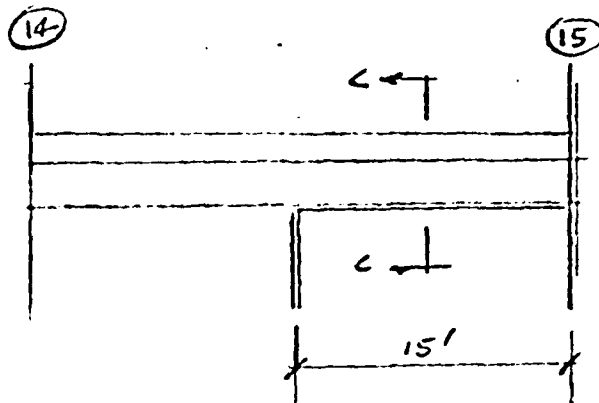
$$D_d = \frac{6.8 \times 7.1}{24 \times 26} = \frac{93}{70} = \frac{29}{29} \text{ PSI}$$

$$\text{For } \#3 \text{ [] TIES } s = \frac{2 \times 4 \times 27}{24 \times 29} = 12.7 \text{ in}$$

USE #3 [] TIES @ 12 TYP'L

7114

AMERICAN CAN CO.

BM @ CANTILEVER

$$M = \frac{7.1 \times 15^2}{2} = 800 \text{ IK}$$

$$A_s = \frac{800}{1.76 \times 26} = 17.5 \text{ in.}^2$$

14 - #10

APPENDIX B-2
COPIES OF PAST INSPECTION REPORTS

No. _____

WATER RESOURCES COMMISSION

SUPERVISION OF DAMS

INVENTORY DATA

Inventoried _____

By WJDate 9/15/73Name of Dam or Pond North Lake (P.M.)Code No. 628Nearest Street Location Bulford RoadTown GreenwichU.S.G.S. Quad. Greenwich

Name of Stream _____

Owner American Can

Address _____

Pond Used For Landfill

Dimensions of Pond: Width _____

Length _____

Area 4ATotal Length of Dam 330'Length of Spillway 2'Location of Spillway centerHeight of Pond Above Stream Bed 35'Height of Embankment Above Spillway 10'Type of Spillway Construction 1-1

Type of Dike Construction _____

Downstream Conditions T 6.5 1

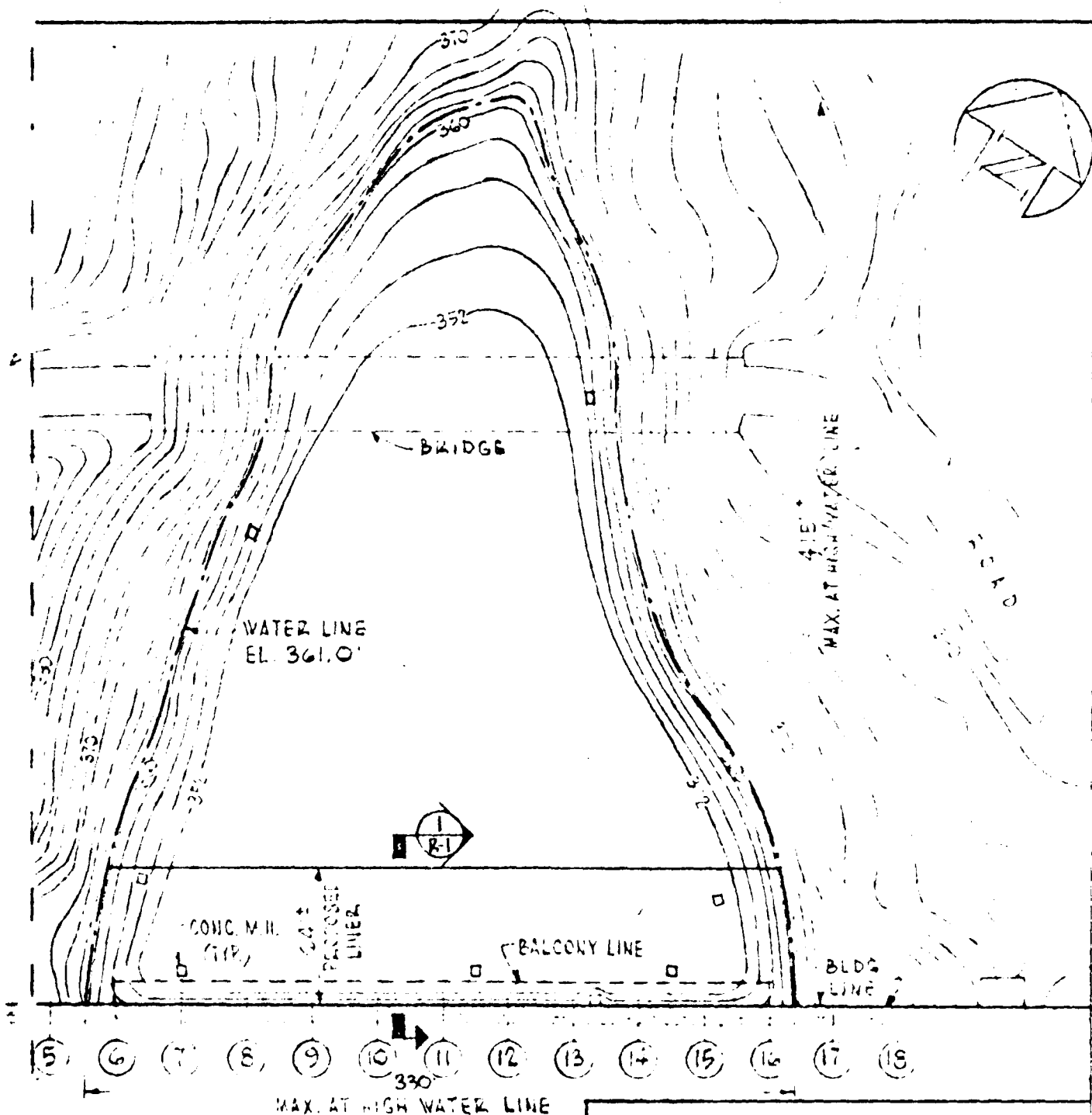
Summary of File Data _____

Remarks 7/25/73 dike is north side of officedam appears safe (P.M.)

Would Failure Cause Damage? _____

Class _____

APPENDIX B-3
RECORD DRAWINGS AND SKETCHES



LAKE PLAN

(VERIFY DIMENSIONS & CONDITIONS IN FIELD)

NORTH LAKE REPAIR
AMERICAN CAN COMPANY
GREENWICH, CONN

AMERICAN CAN COMPANY
ENGINEERING CENTER
1900 POLLEY DRIVE
FAIR LAWN, NEW JERSEY

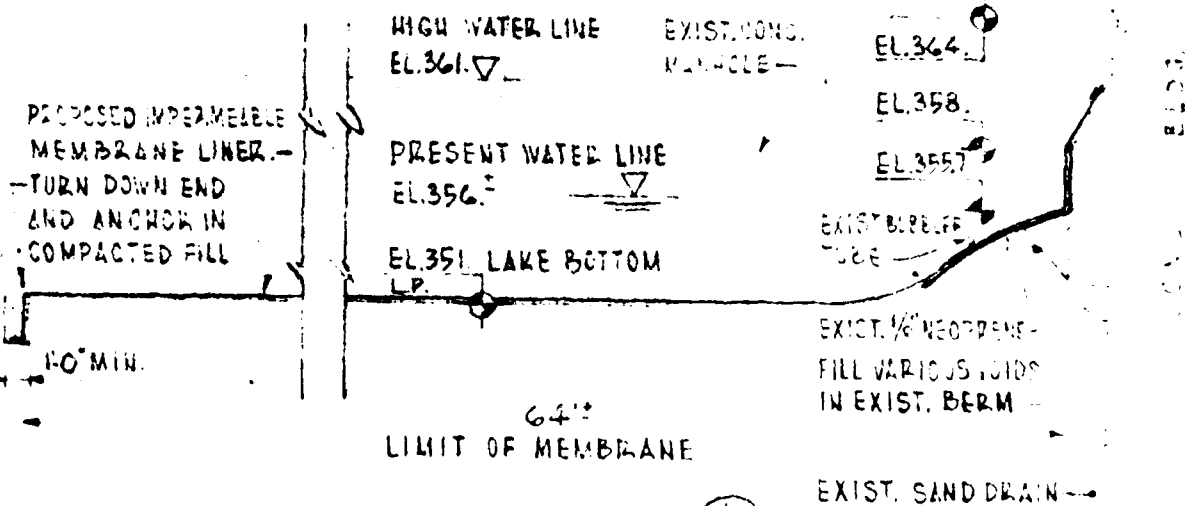
DRAWN BY T. J. CAMLEY

DATE 3-11-72

SCALE 1" = 100'

B-12

R-1



SECTION

SCALE: 1/8" = 1'-0"

- CONC. ICEBREAKER—
- THICKOL CALK—
- HIGH WATER LINE—
- 1 1/2" RED WD. BATTEN—
- ADHESIVE—
- POWDER TOOL TYPE ST. STEEL ANCHOR—
- PROPOSED LINER—

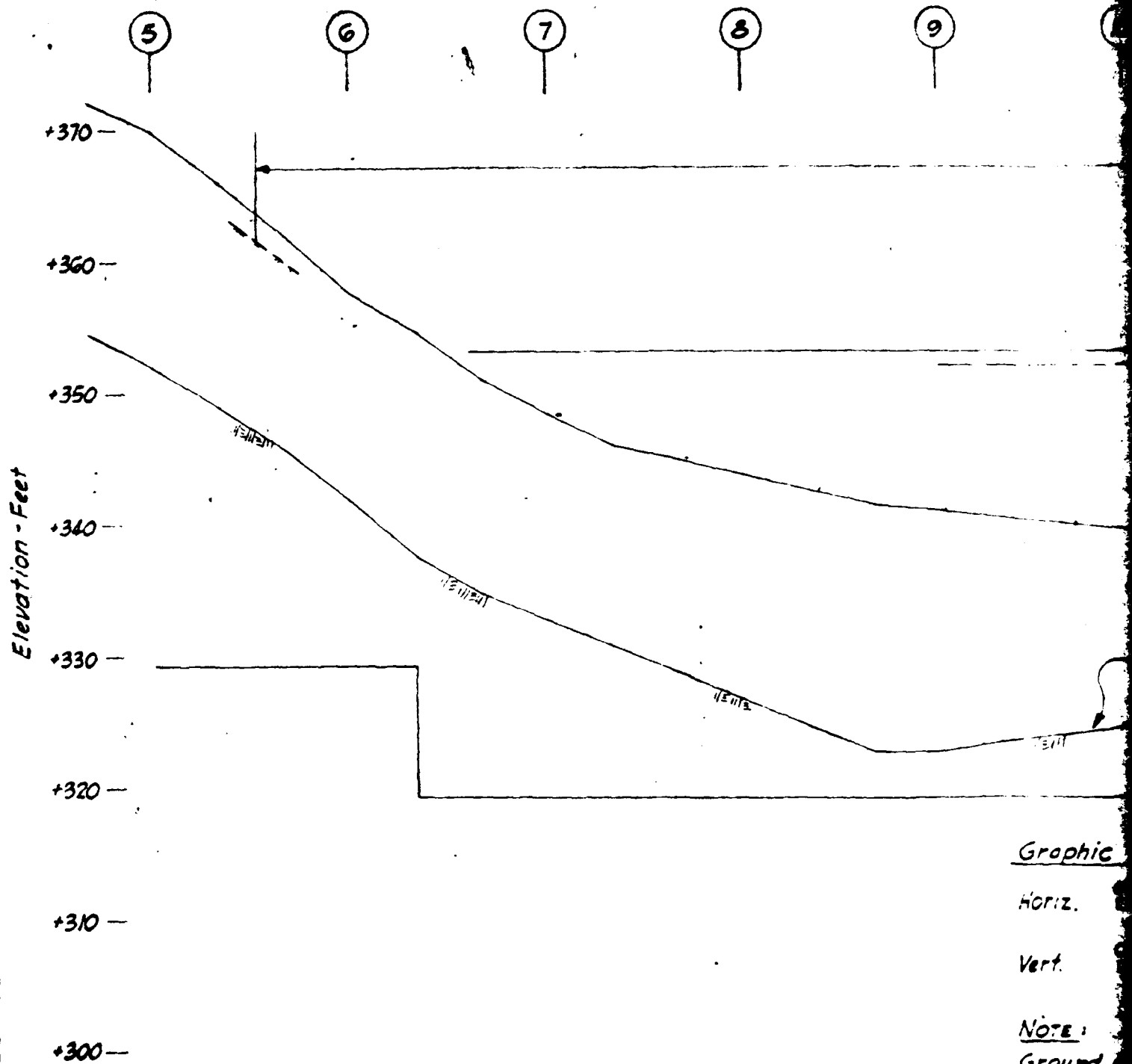
DETAIL

SCALE: 1 1/2" = 1'-0"

NORTH LAKE REPAIR AMERICAN CAN COMPANY GREENWICH, CONN.	
AMERICAN CAN COMPANY ENGINEERING CENTER 1900 POLLITT DRIVE FAIR LAWN, NEW JERSEY	DWN FILE NO. R-2

DESIGNED BY J. J. CAGLEY
DATE 9-11-72
SCALE

B-13



Graphic

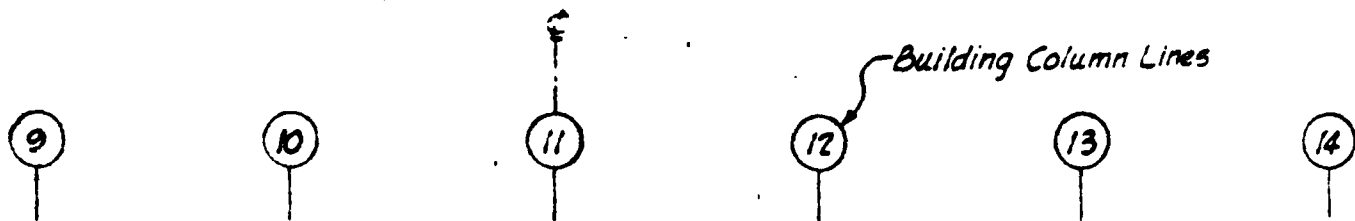
Horiz.

Vert.

NOTE:

Ground
subgrade
Construct
Building
and "NW"

West ← ○ → East



Approximate Limit of Lake when full

Lake Overflow Wier El. +301

Crest of Earth Fill +353

Bottom of Ice Breaker Beam +352

Original Ground Surface

Original Bedrock Surface

Building Subgrade

Graphic scales:

Horiz. 0' 20' 40' 60'

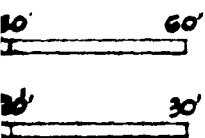
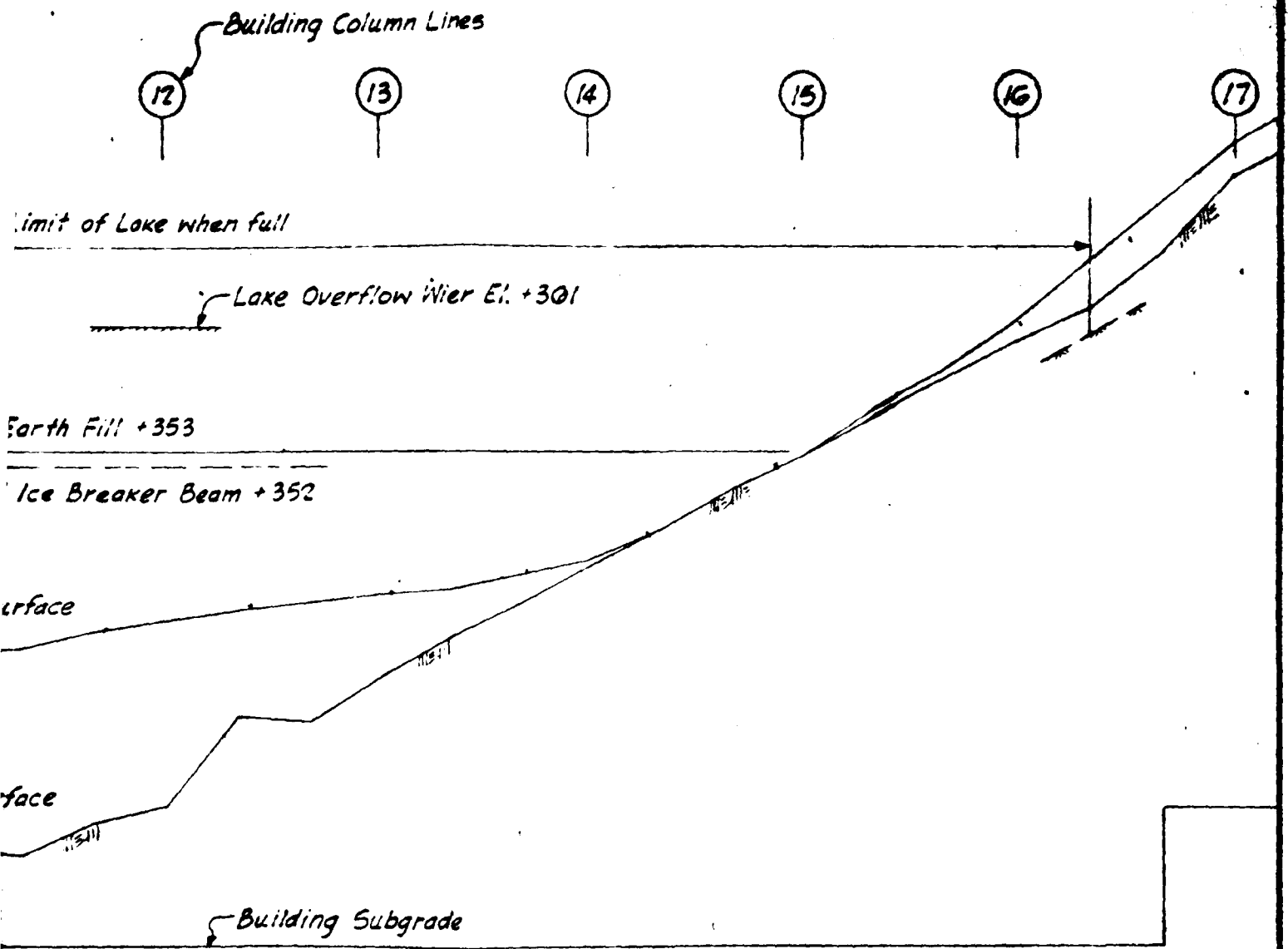
Vert. 0' 10' 20' 30'

NOTE:

Ground surface, bedrock surface and building subgrade data taken from drawings by Turner Construction Company titled "Rock Excavation, Building Site, NE Quadrant", dated Jan. 17, 1968, and "NW Quadrant", dated Feb. 26, 1968.

SHEET REDD
NOT TO SC

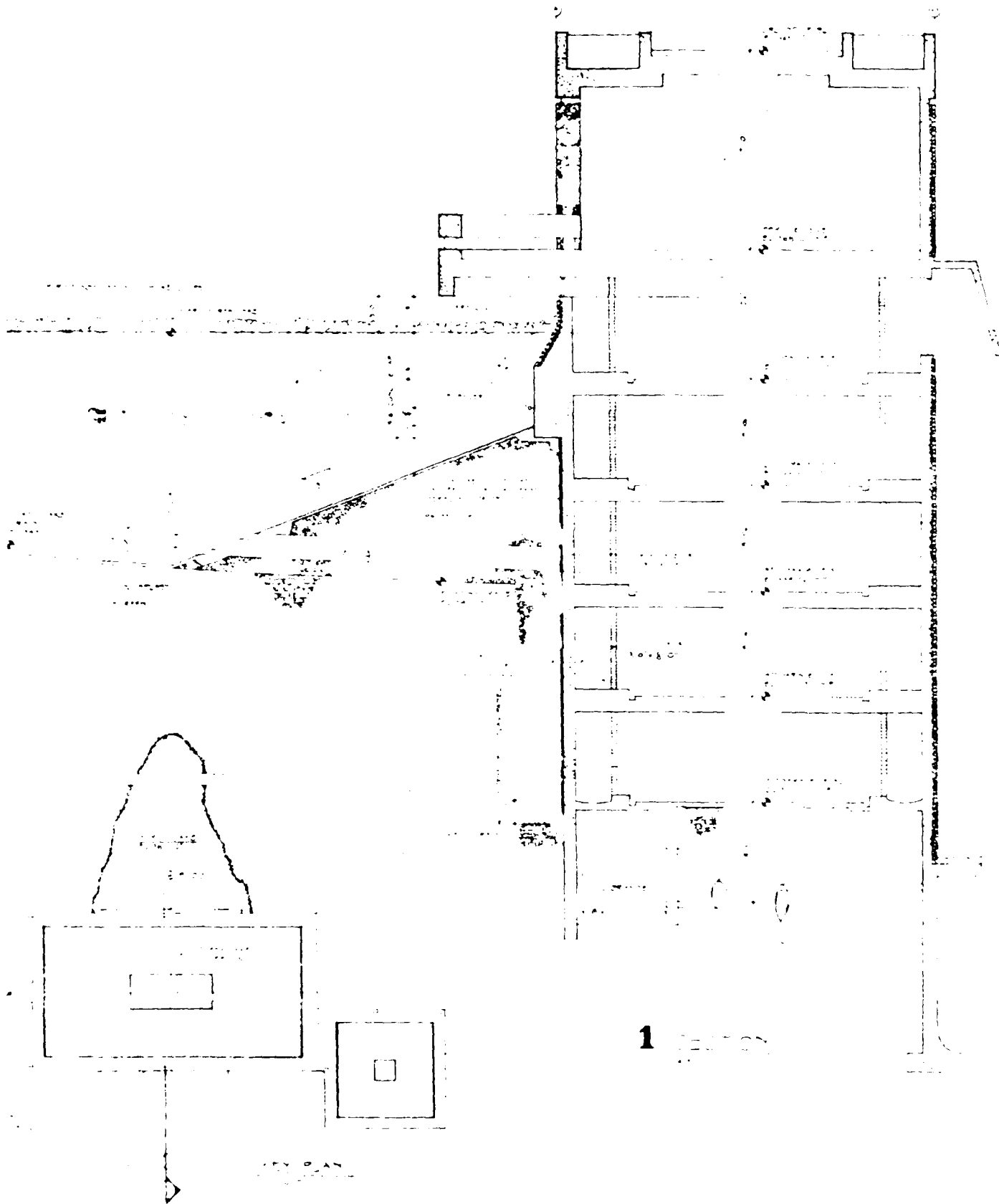
East



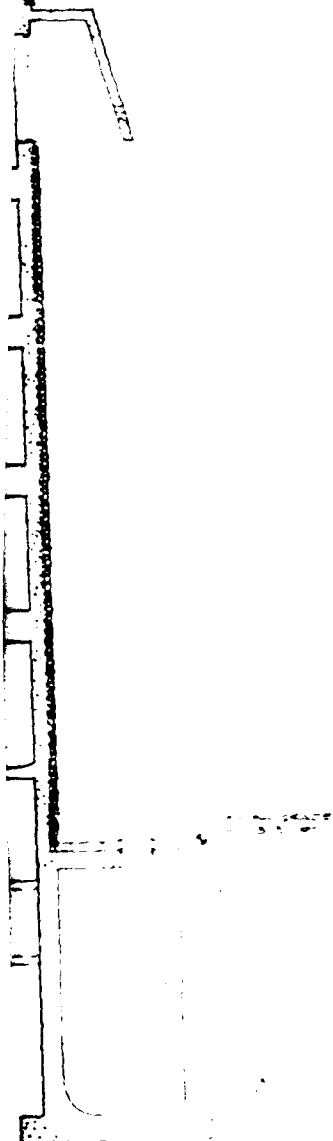
ice and building
by Turner
Rock Excavation,
dated Jan. 17, 1968,
26, 1968.

NORTH LAKE REPAIR			
AMERICAN CAN COMPANY			
GREENWICH		CONNECTICUT	
MINNER • RUTLEDGE • WENTWORTH & JOHNSTON			
CONSULTING ENGINEERS			
ONE MADISON AVE., NEW YORK, N. Y. 10017			
DATE AS SHOWN	MADE BY HEC DATE 12-26-62	FILE NO. 4122	DRAWING NO. 2
SECTION ALONG NORTH FACE OF BUILDING			

SHEET REDUCED
NOT TO SCALE



6-11-68
1-1-69
2-1-69
3-1-69
4-1-69
5-1-69
6-1-69
7-1-69
8-1-69
9-1-69
10-1-69
11-1-69
12-1-69
13-1-69
14-1-69
15-1-69
16-1-69
17-1-69
18-1-69
19-1-69
20-1-69
21-1-69
22-1-69
23-1-69
24-1-69
25-1-69
26-1-69
27-1-69
28-1-69
29-1-69
30-1-69
31-1-69
32-1-69
33-1-69
34-1-69
35-1-69
36-1-69
37-1-69
38-1-69
39-1-69
40-1-69
41-1-69
42-1-69
43-1-69
44-1-69
45-1-69
46-1-69
47-1-69
48-1-69
49-1-69
50-1-69
51-1-69
52-1-69
53-1-69
54-1-69
55-1-69
56-1-69
57-1-69
58-1-69
59-1-69
60-1-69
61-1-69
62-1-69
63-1-69
64-1-69
65-1-69
66-1-69
67-1-69
68-1-69
69-1-69
70-1-69
71-1-69
72-1-69
73-1-69
74-1-69
75-1-69
76-1-69
77-1-69
78-1-69
79-1-69
80-1-69
81-1-69
82-1-69
83-1-69
84-1-69
85-1-69
86-1-69
87-1-69
88-1-69
89-1-69
90-1-69
91-1-69
92-1-69
93-1-69
94-1-69
95-1-69
96-1-69
97-1-69
98-1-69
99-1-69
100-1-69

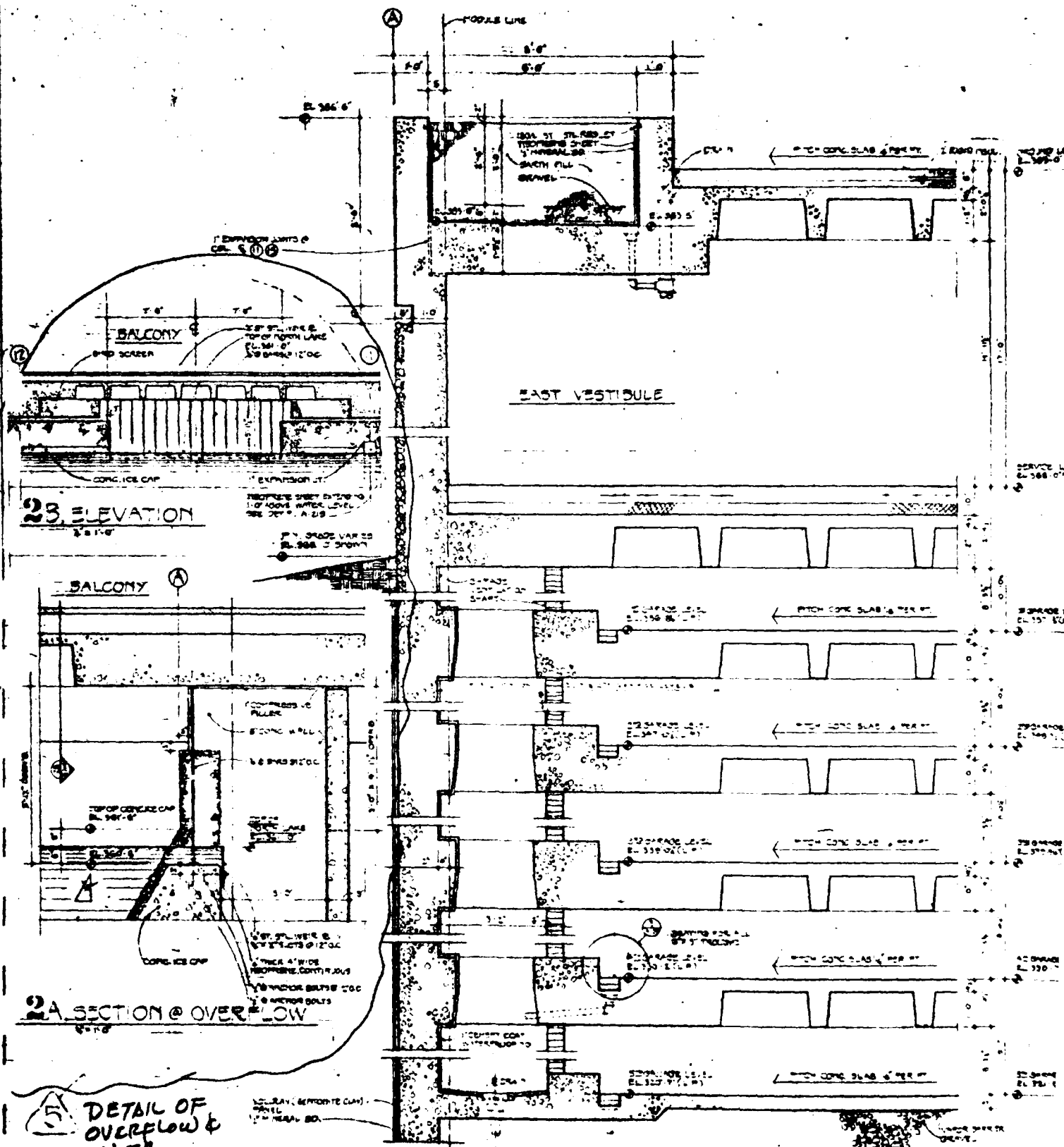


NOT REDUCED
FROM SCALE

AMERICAN CAN COMPANY
CORPORATE HEADQUARTERS
GREENWICH CONNECTICUT

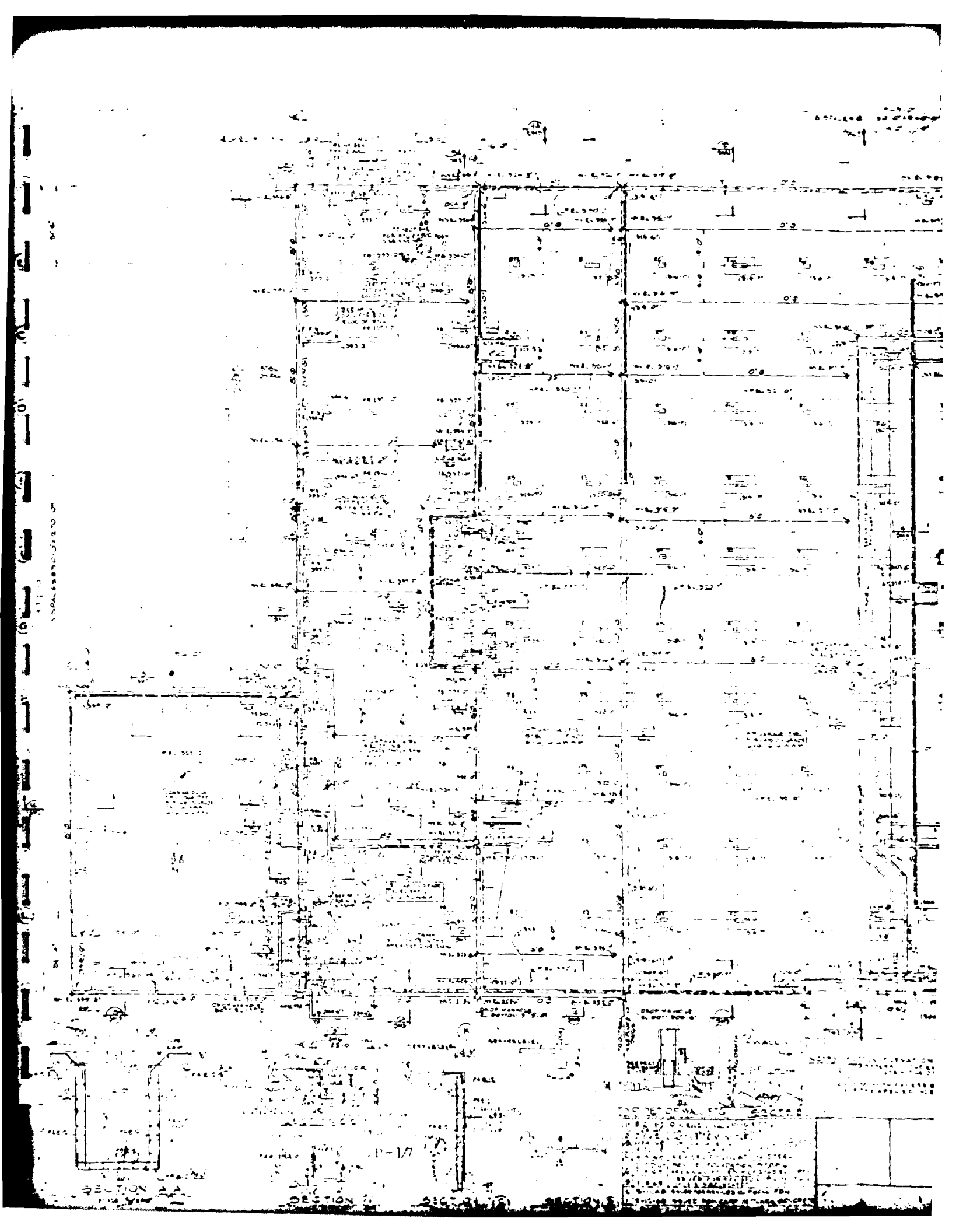
VIEW OF BUILDING
FROM THE STREET
1900-1901
GREENWICH, CONNECTICUT

173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200



1	23 ELEVATION	1" EXPANSION JOINT @ EL. 306.6'
2	2A SECTION @ OVERFLOW	1" EXPANSION JOINT @ EL. 306.6'
3	1 SECTION @ NORTH WALL	1" EXPANSION JOINT @ EL. 306.6'
4	DETAIL OF OVERFLOW & WEIR	1" EXPANSION JOINT @ EL. 306.6'

SHEET R1
 NOT TO SCALE



P-17

SECTION AA

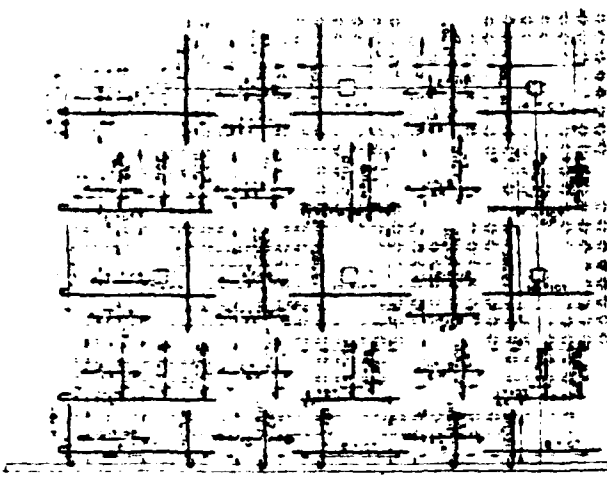
SECTION

SECTION

SECTION

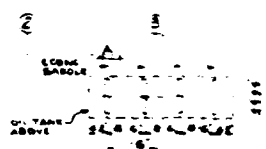
SECTION

SECTION

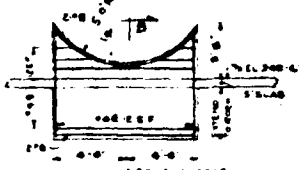


SECTION A-A

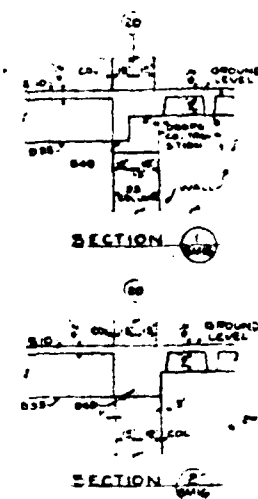
PART 1 - SERVICE LEVEL
 SEE DIMENSIONS ON PLAN FOR THE HATCHES PLAT BLA BOUNDING SHW
 10' EACH R 2



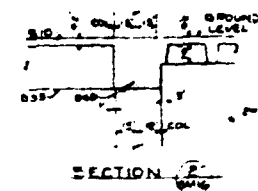
PART 2 - SERVICE LEVEL



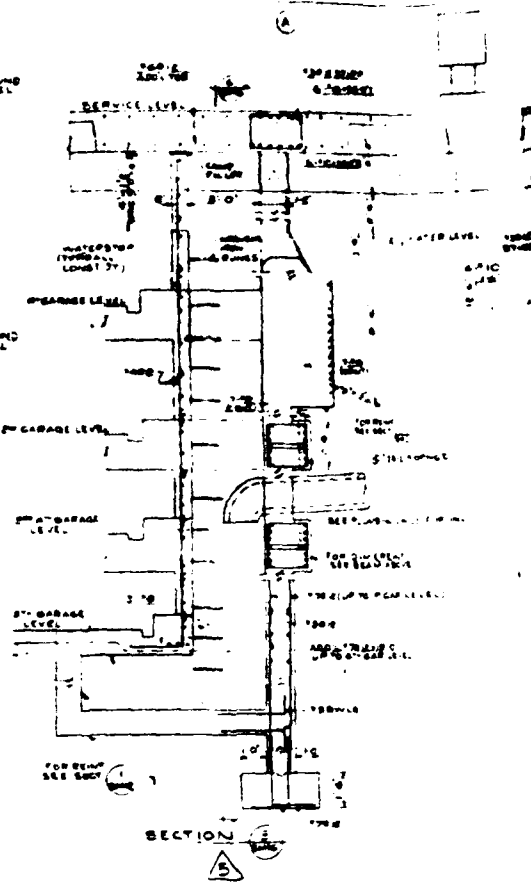
SECTION A-A



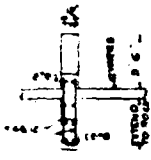
SECTION 1



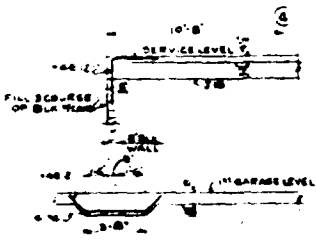
SECTION 2



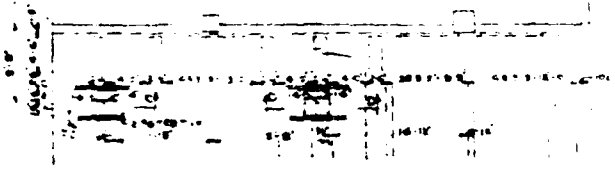
SECTION 3



SECTION B-B

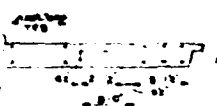


SECTION 4

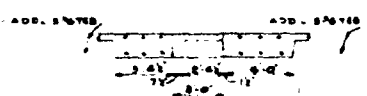


PART 1 - SERVICE LEVEL

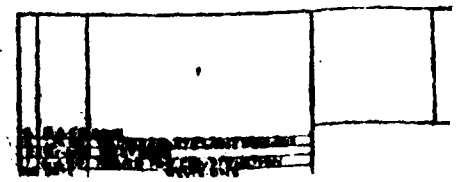
SEE DIMENSIONS SHW ON PLAN
 AND TO DETAIL OF DETAIL

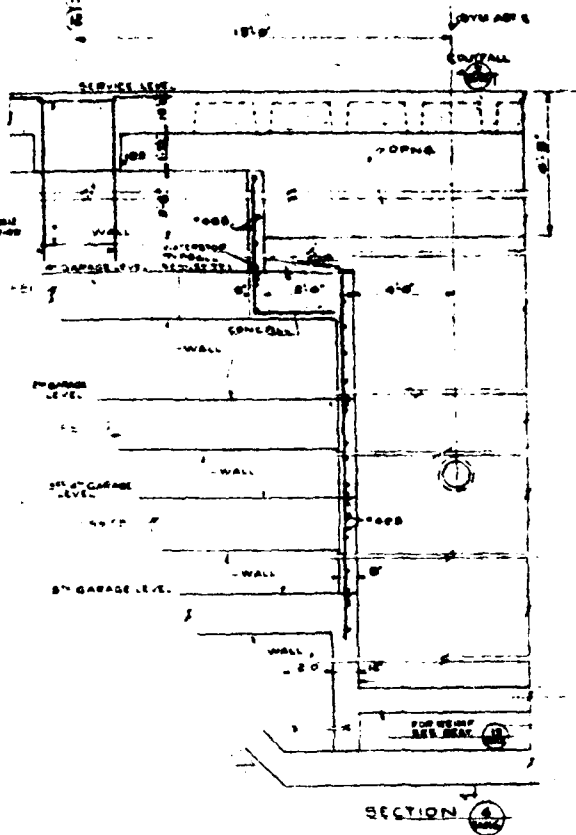


SECTION C-C



SECTION D-D





SHEET REDUCED
NOT TO SCALE

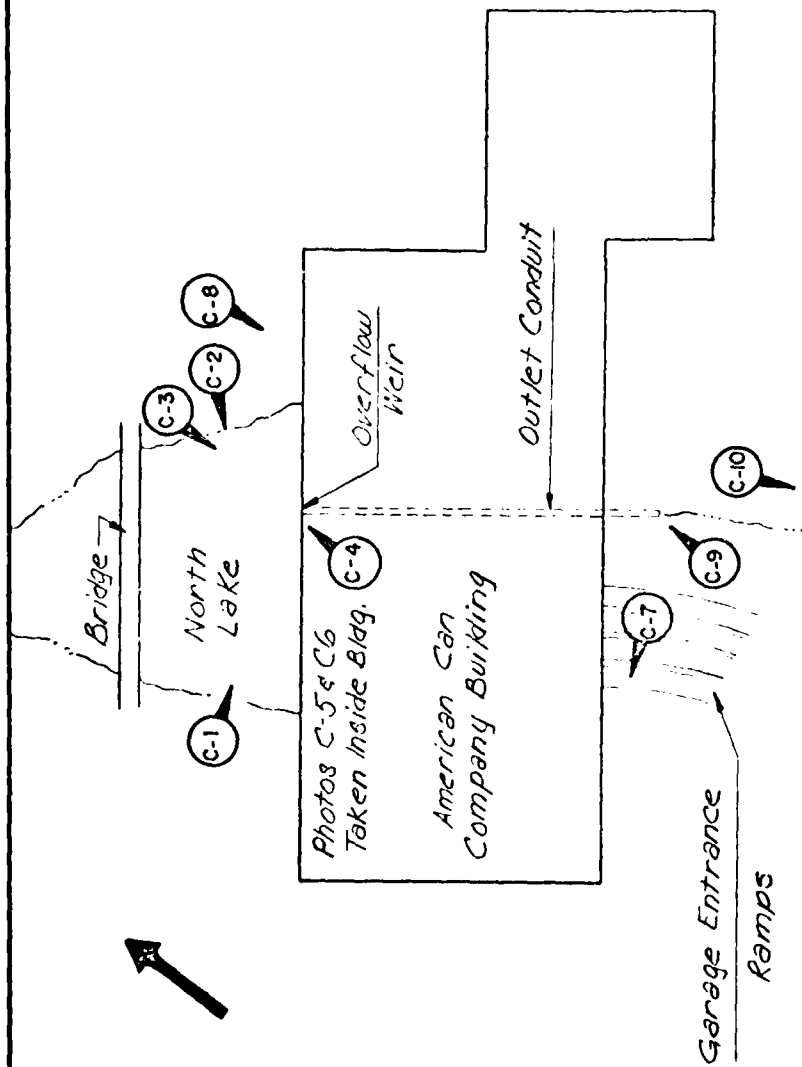
SEIDMORE SWINGS & MERRILL
ARCHITECTS
NEW YORK, N.Y.
PAUL WEINGER
ARCHITECT
NEW YORK, N.Y.
JOHN BROWN & SONS
NEW YORK, N.Y.

AMERICAN CAN COMPANY
CORPORATE HEADQUARTERS
GREENWICH CONNECTICUT

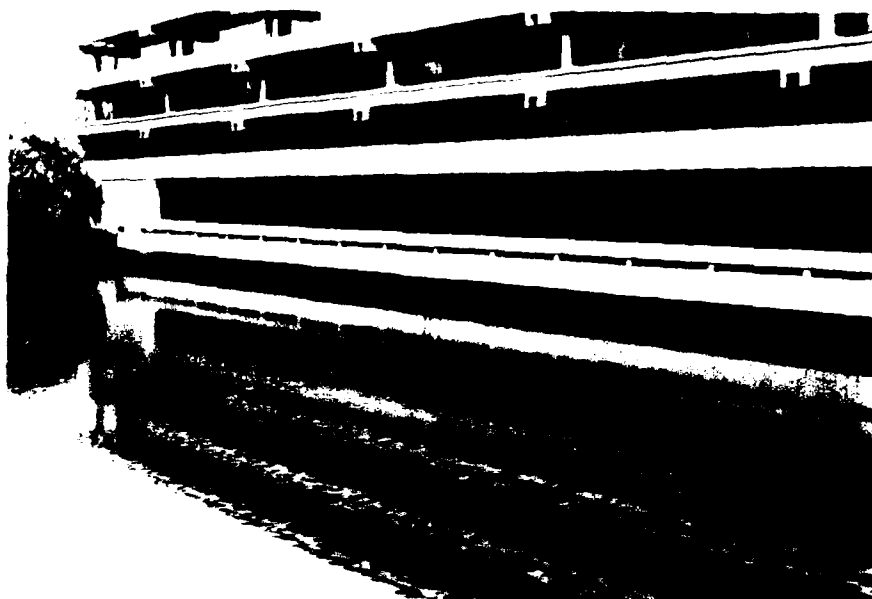
PART PLAN 12

SM 16

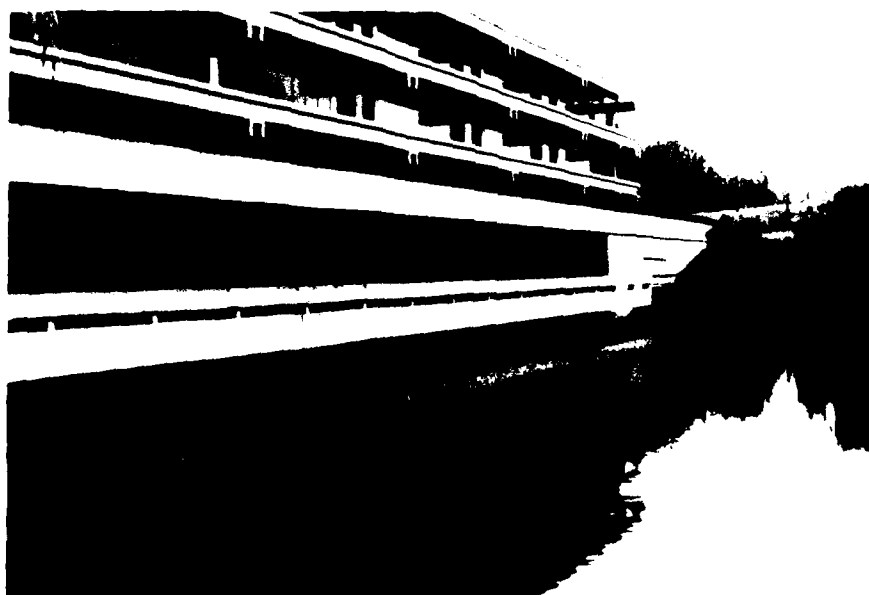
APPENDIX C
PHOTOGRAPHS



AMERICAN CAN COMPANY DAM
PHOTO INDEX

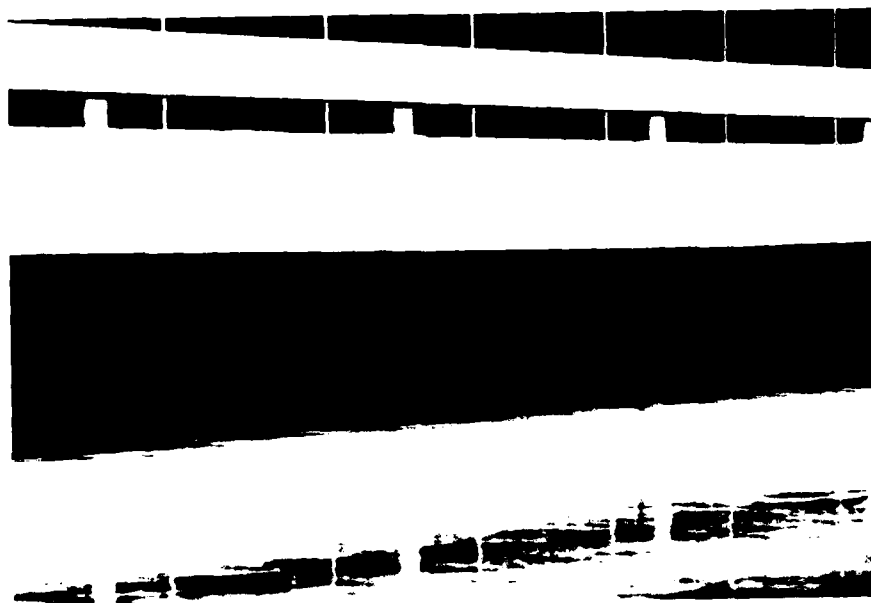


C-1 NORTH FACE OF BUILDING - LOOKING AT EAST ADJUTMENT



C-2 NORTH FACE OF BUILDING - LOOKING AT WEST ADJUTMENT

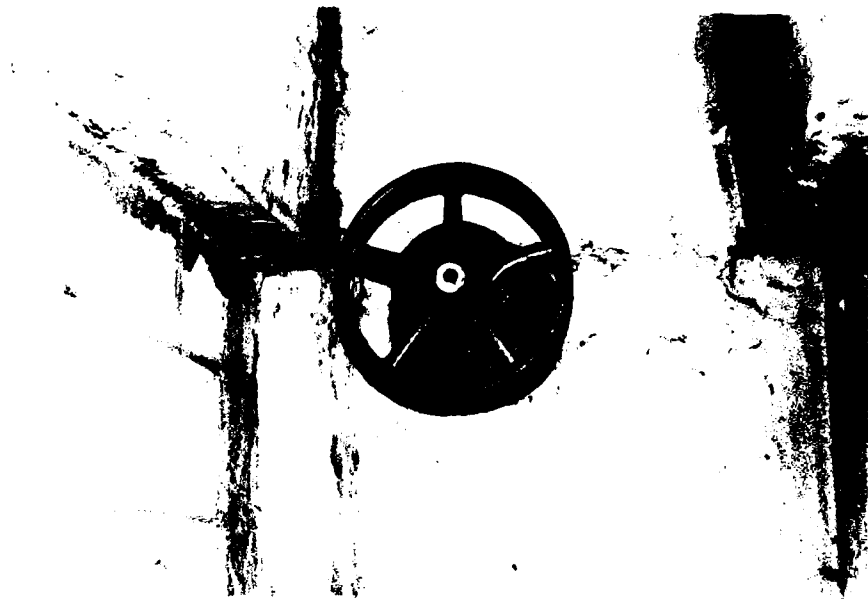
C-1



C-3 OVERFLOW WEIR



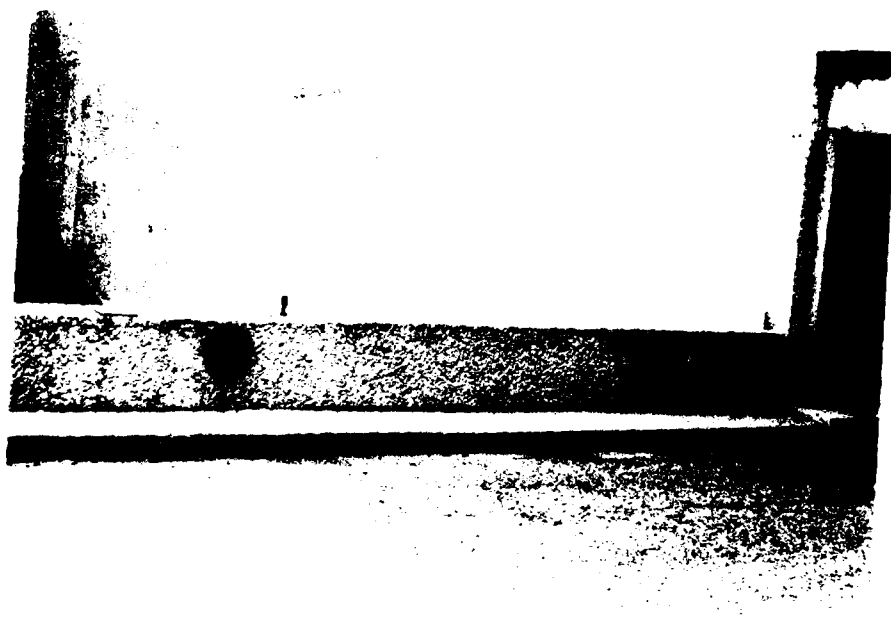
C-4 OVERFLOW WEIR - LOOKING FROM INTERIOR OF BUILDING



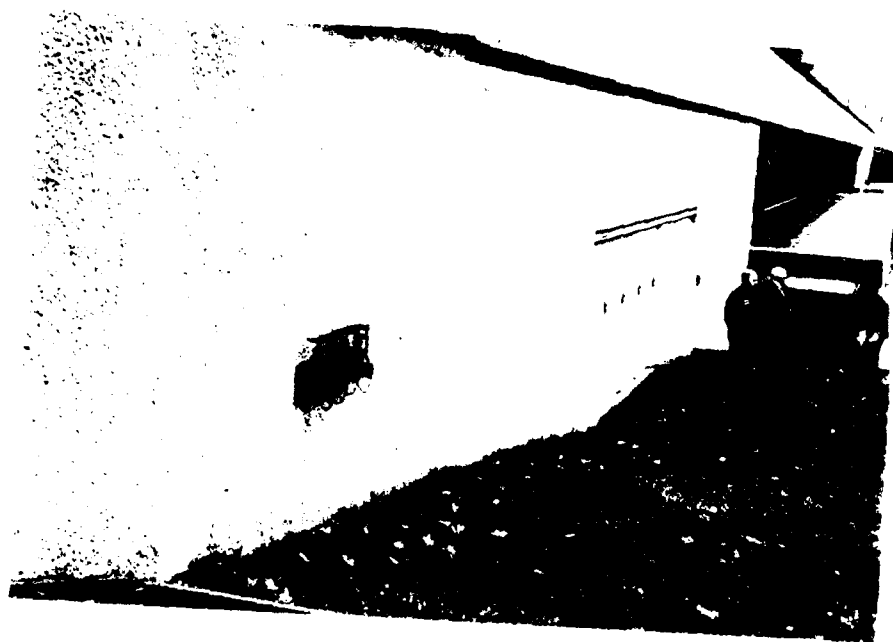
C-5 GATE VALVE CONTROL FOR 12 INCH DRAIN



C-6 PIEZOMETER IN FIFTH GARAGE LEVEL



C-7 FIRE HYDRANTS - SOUTH SIDE OF BUILDING



C-8 FIRE HYDRANTS - NORTH SIDE OF BUILDING



C-9 48 INCH R.C.P. OUTLET



C-10 DISCHARGE CHANNEL FOR 48 INCH R.C.P. OUTLET

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

HYDROLOGIC AND HYDRAULIC ANALYSIS
SUMMARY SHEET

Dam American Can Company Dam

Test Flood PMF

INFLOW HYDROGRAPH DEVELOPMENT

Drainage Area 0.02 sq. mi.

Probable Maximum Precipitation
24 hour - 200 square mile PMP 22 inches

Initial Rairfall Loss 0 Inch
Uniform Rairfall loss .1 Inch

Snyder's Lag .48 hours
Snyder's Peaking Coefficient .625

Test Flood Inflow 98 CFS

PMF Inflow 98 CFS

RESERVOIR ROUTING AND DAM OVERTOPPING

Test Flood Outflow 83 CFS

Spillway Capacity at Top of Dam 500 CFS
more than 100 % of Test Flood

Flow Over Spillway at Test Flood 83 CFS

Spillway Crest Elevation	<u>361.0</u>	Feet
Top of Dam Elevation	<u>365.6</u>	Feet
Test Flood Elevation	<u>362.4</u>	Feet

OVERVIEW OF SEQUENCE OF SIMFAM NETWORK CALCULATIONS

WINDOFF HYDROGRAPH AT
ROUTE HYDROGRAPH TO
END OF NETWORK

1914 10760 12/11/79.
1915 11460 13.6.81.

ADAM SAFETY ANALYSIS-JOB NO. 79-905/ 04-EMJ
AMERICAN CAN COMPANY, HAM-CHENWICH-CONN.
12-03-79 TEST FLUID - DEF

NO	NINP	NMIN	IUAY	JOB SPECIFICATION	IMH	IMIN	METRC	IPLT	IPRT	NSTAN
150	0	20	0		0	0	0	2	0	0
			JOB-1		N=1	LROPT	IMACE			
			5		0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED

.....50 1.00

.....

.....

.....

.....

.....

SUB-AREA KUNGF COMPUTATION

COMPUTATION OF PMF-DEVELOPMENT OF INFLUX HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRY	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA									
DATE	TIME	TYPE	SNAP	INPC	INPC	INPC	INPC	INPC	INPC
1970	1	1	0.00	0.02	0.00	0.00	0.00	0.00	0.00
1970	1	1	0.00	0.02	0.00	0.00	0.00	0.00	0.00

DATE	TIME	WIND DIRECTION	WIND SPEED	PRECIP DATA					W49	P72	P96
				W46	W12	W24	W48	W72			
01-01-00	00:00	22:00	110.00	124.00	133.00	142.00	0.00	0.00			

TIME SP COMPLETED BY THE PROGRAM IS .000

LPROT	STRAP	DLTRK	LUSS DATA					CNSLT	ALSNX	RTJMP
			WTIOL	ENRAIN	STKPS	RTIUK	STOTL			
1	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	
2	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	

UNIT HYDROGRAPH DATA
IP= .4H CP=.63 NTA= 0

```

APPROXIMATE CLAIM COEFFICIENTS FROM
WATERWAY STUDY IN CP AGO IP AGE IC = 1.54 AND PE = 1.15 INTERVALS
WELLSION DATA
STATIS = 0.00
LOCUS = .05
WITOW = 2.00

```

[illegible]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

[illegible]

STATION 1

[illegible]

[illegible]

[illegible]

	HYDROGRAPH AT STA		1 FUR PLAN 1. W101 1		
0.	0.	0.	0.	0.	0.
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.	0.	1.	0.	2.	1.
1.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.
1.	0.	2.	0.	2.	2.
2.	0.	2.	0.	2.	2.
12.	13.	15.	16.	2.	4.
25.	20.	17.	14.	21.	38.
0.	0.	0.	0.	0.	2.
0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.

HYDROGRAPH AT STA 1 FOR PLAN 1. RHO 2									
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	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.	1.	1.	1.	2.	4.	5.	4.	2.	0.
1.	1.	1.	0.	0.	0.	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.	3.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	24.	30.	34.	44.	41.	4.	16.	98.
27.	26.	40.	40.	27.	21.	11.	76.	5.	2.
50.	40.	1.	1.	1.	1.	1.	1.	1.	0.
1.	1.	1.	1.	0.	0.	0.	0.	0.	0.

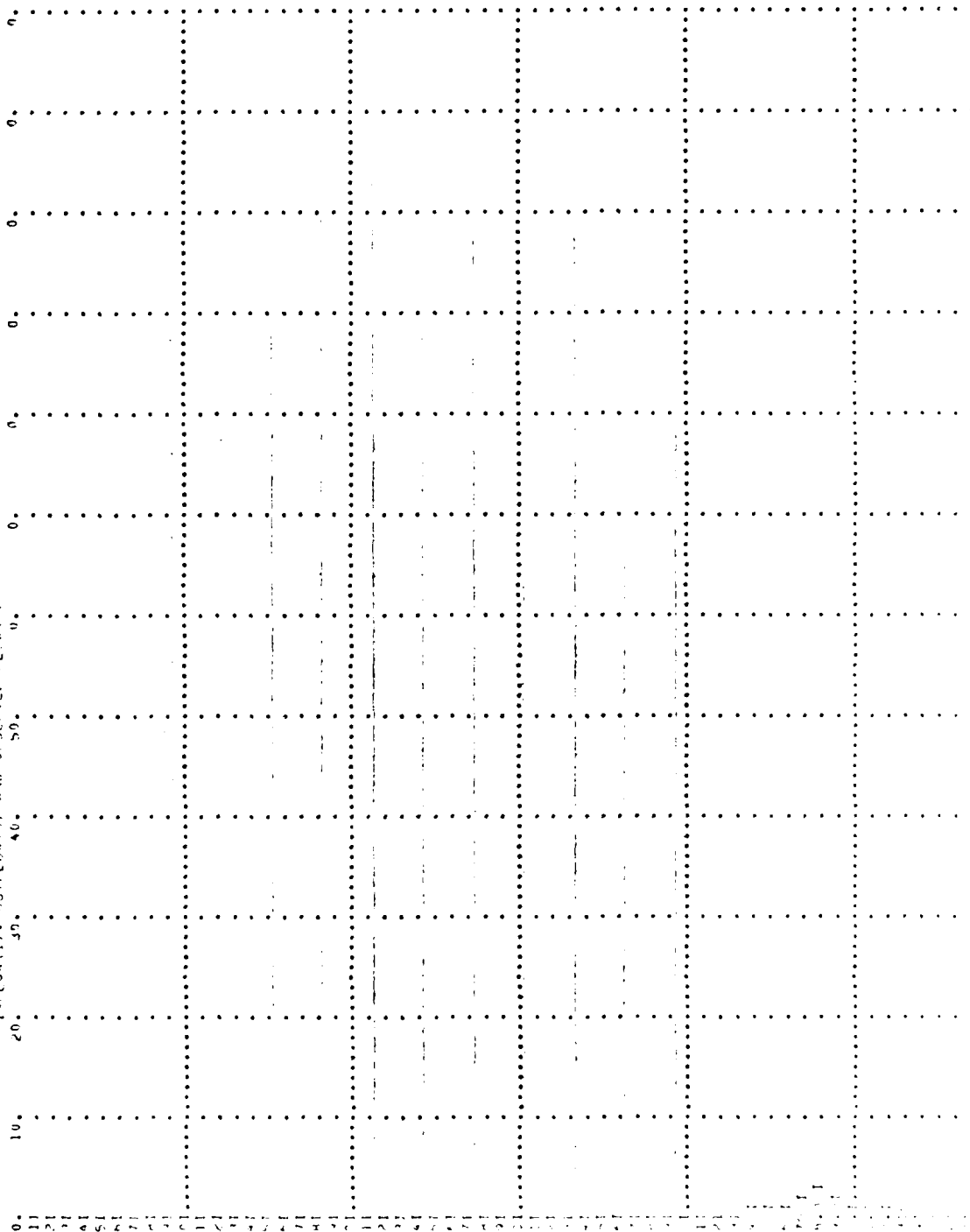
THE UNIVERSITY OF CHICAGO

DEVELOPMENT OF A NEW ANALYSIS

DATE

STATION 1

INFLUX (I), OUTFLOW (O) AND OBSERVED FLOW (F)



[illegible]

21.001250	1	0	0
21.001251	1	0	0
21.001252	1	0	0
21.001253	1	0	0
21.001254	1	0	0
21.001255	1	0	0
21.001256	1	0	0
21.001257	1	0	0
21.001258	1	0	0
21.001259	1	0	0
21.001260	1	0	0
21.001261	1	0	0
21.001262	1	0	0
21.001263	1	0	0
21.001264	1	0	0
21.001265	1	0	0
21.001266	1	0	0
21.001267	1	0	0
21.001268	1	0	0
21.001269	1	0	0
21.001270	1	0	0
21.001271	1	0	0
21.001272	1	0	0
21.001273	1	0	0
21.001274	1	0	0
21.001275	1	0	0
21.001276	1	0	0
21.001277	1	0	0
21.001278	1	0	0
21.001279	1	0	0
21.001280	1	0	0
21.001281	1	0	0
21.001282	1	0	0
21.001283	1	0	0
21.001284	1	0	0
21.001285	1	0	0
21.001286	1	0	0
21.001287	1	0	0
21.001288	1	0	0
21.001289	1	0	0
21.001290	1	0	0
21.001291	1	0	0
21.001292	1	0	0
21.001293	1	0	0
21.001294	1	0	0
21.001295	1	0	0
21.001296	1	0	0
21.001297	1	0	0
21.001298	1	0	0
21.001299	1	0	0
21.001300	1	0	0

•

PEAK OUTFLOW IS 40. AT TIME 40.11 MINUTES.

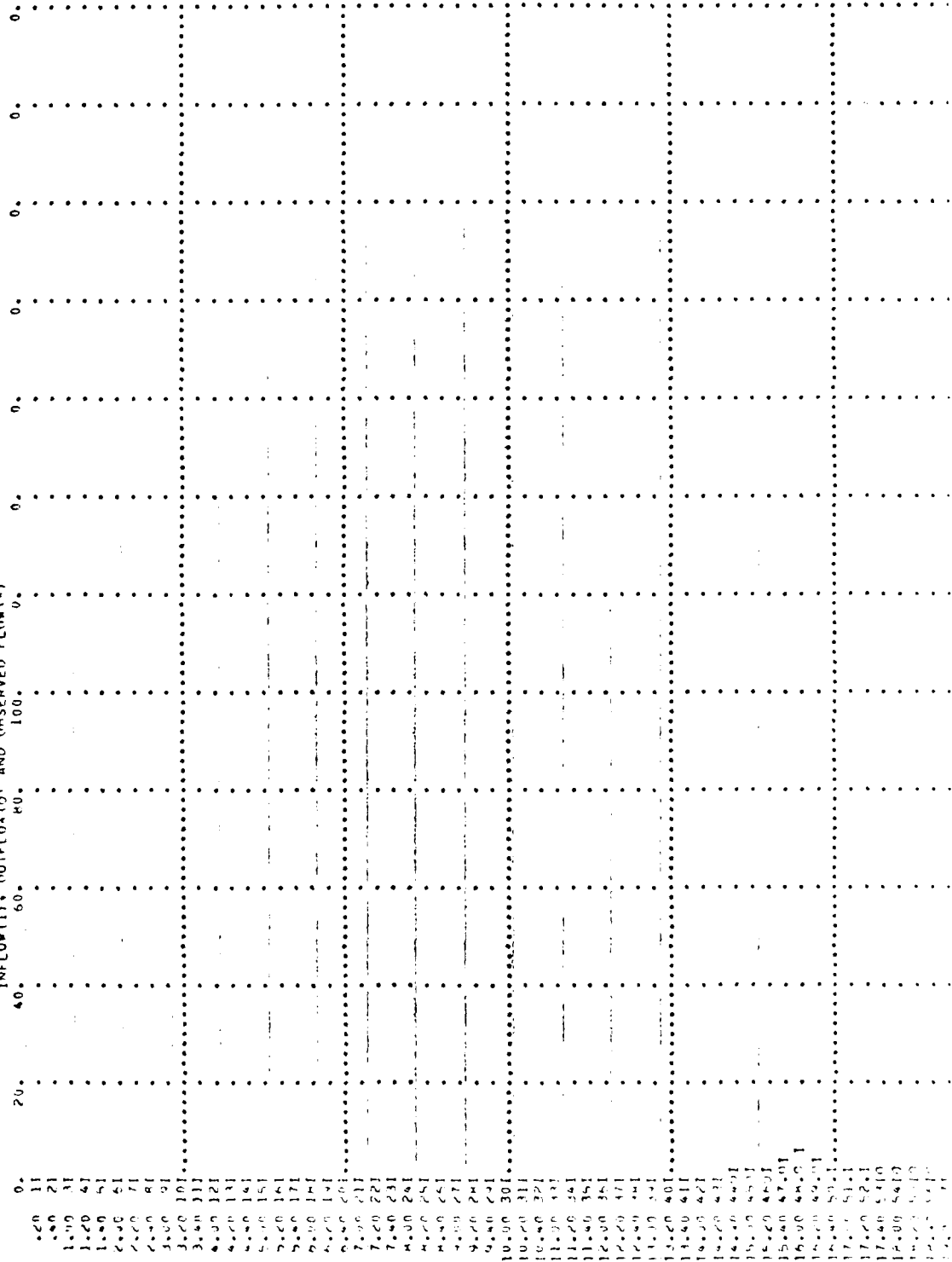
D-17

INCHES	CM	INCHES	CM	INCHES	CM	INCHES	CM
451.44	20.41	547.93	21.91	547.91	21.91	547.91	21.91
19.	22.	23.	23.	23.	23.	23.	23.
23.	27.	28.	28.	28.	28.	28.	28.

0.00

STATION 1

INFLOW (1), OUTFLOW (2) AND OBSERVED FLOW (3)



PEAK FLOW AND STORAGE (EAD OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

RATIOS APPLIED TO FLOWS

RATIO 1 RATIO 2
 .50 1.00

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2
HYDROGRAPH AT	1	.02 (.05)	1	.49	.98
ROUTED TO	1	.02 (.05)	1	.40	.83
				1.14	2.36

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1	ELEVATION STORAGE OUTFLOW	INITIAL VALUE	SPILLWAY CHEST	TOP OF DAM	TIME OF MAX OUTFLOW HOURS	DURATION OVER TOP HOURS	TIME OF FAILURE HOURS
		361.00	361.00	364.63			
		0.	0.	10.			
		0.	0.	698.			
RATIO OF ONE	MAXIMUM WEIR ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	TIME OF MAX OUTFLOW HOURS	DURATION OVER TOP HOURS	TIME OF FAILURE HOURS
1.00	361.07	0.00	2.	40.	40.33	0.00	0.00
1.00	362.01	0.00	3.	83.	40.33	0.00	0.00

AMERICAN CAN COMPANY DAM

A. Size Classification

Height of dam = 53 ft.; hence Intermediate

Storage capacity at top of dam ^{*}(elev. 365.6) = 26 AC-FT.; hence small

Adopted size classification Intermediate

B.i) Hazard Potential

This dam is part of the north wall of American Can Co.
Failure would cause extensive damage to the Commercial
Building. The Pond is used for fire protection
supply water by American Can Co.

ii) Impact of Failure of Dam with pool at weir crest.

It is estimated from the "rule of thumb" failure hydrograph, that the following adverse impacts are a possibility by the failure of this dam.

- a) Loss of homes None ;
- b) Loss of buildings 1 ;
- c) Loss of highways or roads None ;
- d) Loss of bridges None ;

The failure profile can affect a distance of N/A feet from the dam.

C. Hazard Potential Classifications

<u>HAZARD</u>	<u>SIZE</u>	<u>TEST FLOOD RANGE</u>
<u>High</u>	<u>Intermediate</u>	<u>PMF</u>
Adopted Test Flood =	<u>PMF</u>	= <u>4900</u> CSM
		= <u>98</u> CFS

D. Overtopping Potential

Drainage Area 13.77 Acres = 0.02 sq. miles

Spillway crest elevation = 361.0 ACCD

Top of Dam Elevation ^{*}= 365.6 ACCD

<u>Maximum spillway discharge</u>	
Capacity without overtopping of dam =	<u>500</u> CFS
"test flood" inflow discharge =	<u>98</u> CFS
"test flood" outflow discharge =	<u>83</u> CFS

* Top of overflow weir opening.

AMERICAN CAN COMPANY DAM

Dam Failure Analysis

1. Failure discharge with pool at top of weir (elev. 361.0) = 9430 CFS
2. Depth of water in reservoir at time of failure = 18.0 ft.
3. Maximum depth of flow downstream of dam = 3.5 ft.
4. Water surface elevation just downstream)
of dam at time of failure) = 324.5

The failure discharge of 9430 CFS will enter The American Can Company Building and be contained.

The failure discharge will be contained within the building resulting in 3.5 feet of water in its lowest parking level (5th level).

The failure profile will have the following hydraulic characteristics:

DISTANCE FROM THE DAM	WATER SURFACE ELEVATION	REMARKS
0	361.0	Upstream of dam
0	324.5 (within building)	Downstream of dam

"Rule of Thumb Guidance for Estimating
Downstream Dam Failure Analysis"

DATA

Name of Dam American Can Company
Location South of Mount Pleasant, New York
Drainage Area 0.02 sq. mi., Top of Dam* 365.6
Spillway Type Overflow- sharpcrest, Crest of Spillway 361.0
Surface Area @ Crest Elev. 2.3 Acres = 0.004 sq. mi.
Pool Bottom Near Dam = 343.0 Upstream, 300.0 Downstream
Assumed Side Slopes of Embankments = 2.5:1 upstream, vertical downstream
Depth of Pool at Dam (Y_o) = 18 Feet
Mid-Height Elev. 352.0
Length of Dam at Crest = 330 Feet
Length of Dam at Mid-Height = 294 Feet
25% of Dam Length at Mid-Height = W_b = 73.5 Feet

Step 1

Storage (S) at time of failure 18 Ac-FT
(Equal to top of weir)

Step 2

Peak Failure Discharge

$$Q_{pl} = 8/27 W_b \sqrt{g} Y_o^{3/2}$$

$$= 1.68 W_b Y_o^{3/2} = 9430 \text{ cfs}$$

Failure is assumed to coincide with pool elevation at top of weir.

* Top of overflow weir opening.

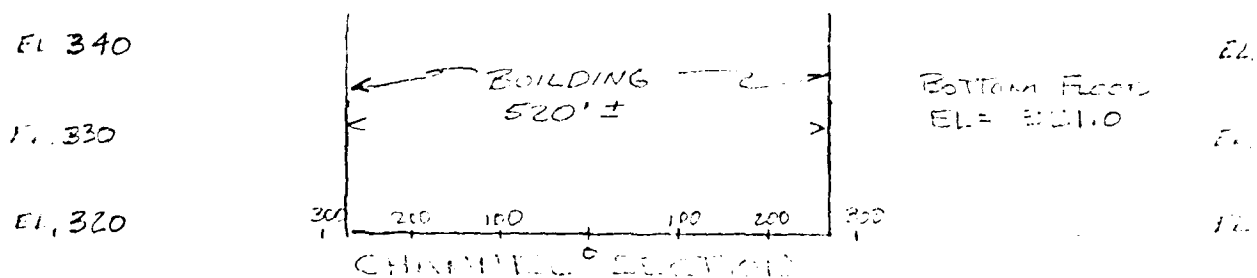
DOWNSTREAM W.S. EL. COMPUTATIONS

NAME OF DAM: AMERICAN CAN CO.

SECTION LOCATION: AT FACE DOWNSTREAM OF DAM

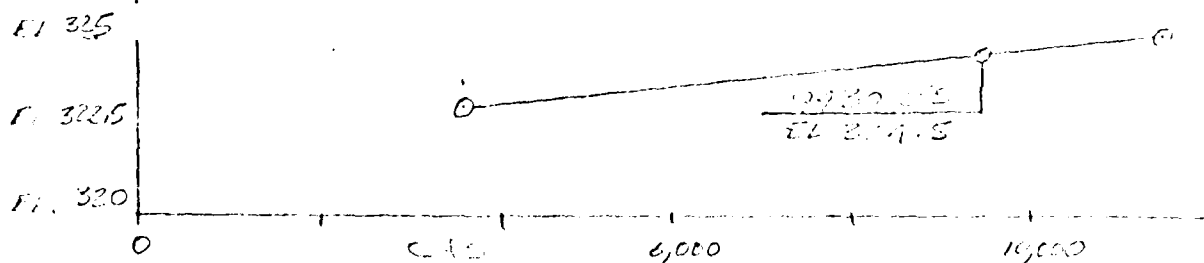
USING: $Q = 1.485 / n A R^{4/3} S^{1/2}$

WHERE: $n = 0.02$ $S = \text{SLOPE} = .0014$ (FROM EL)



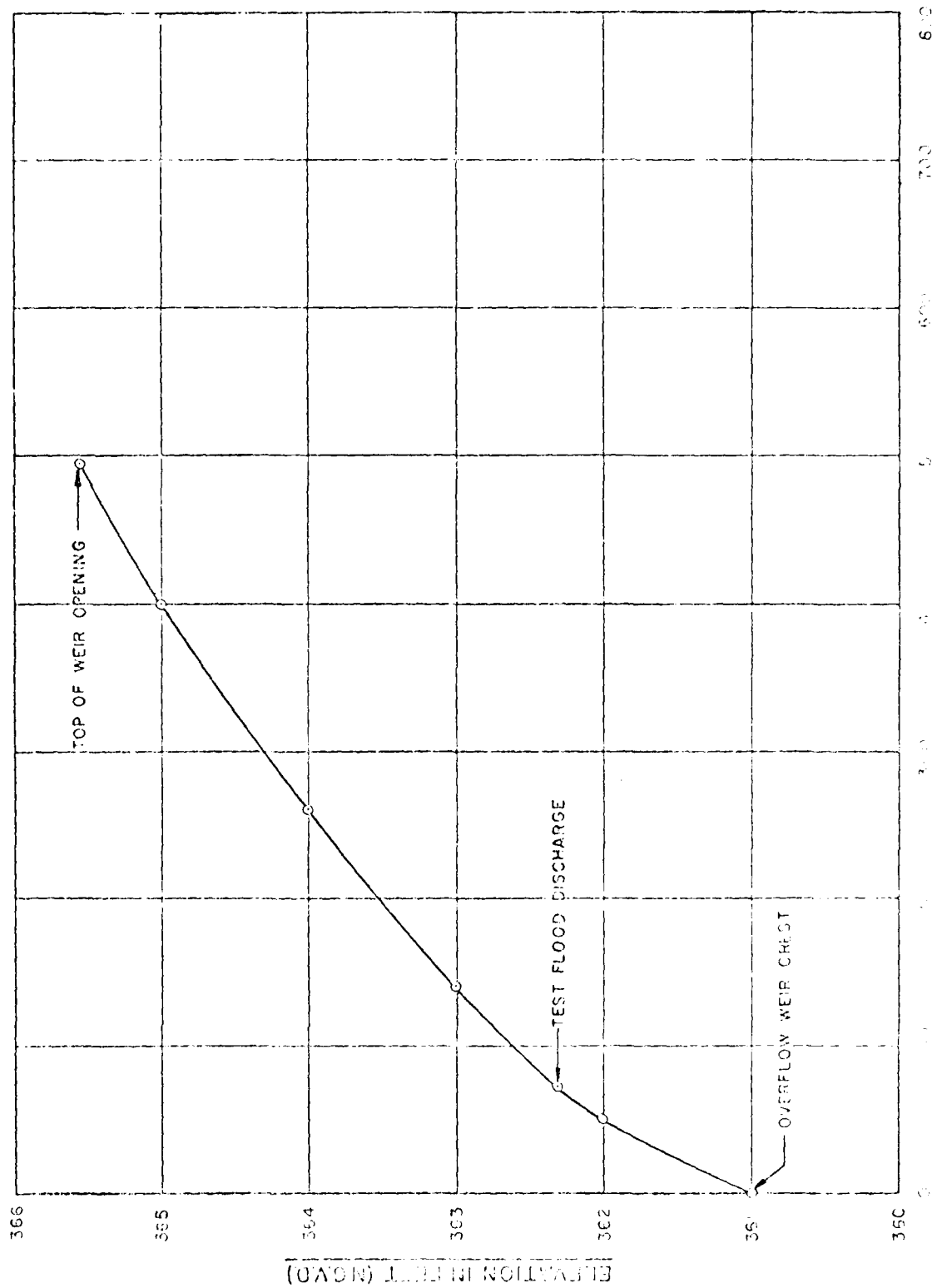
$Q_p = 9430$ CFS STORM (S) 26 AC-F

ELEV	AREA	W	H	A ₁	S	A ₂	Q	W
325	2080	528	3.94	2.49	.03	74.3	11,505	4'
323	1040	524	1.98	1.55	.03	27.3	3,531	2



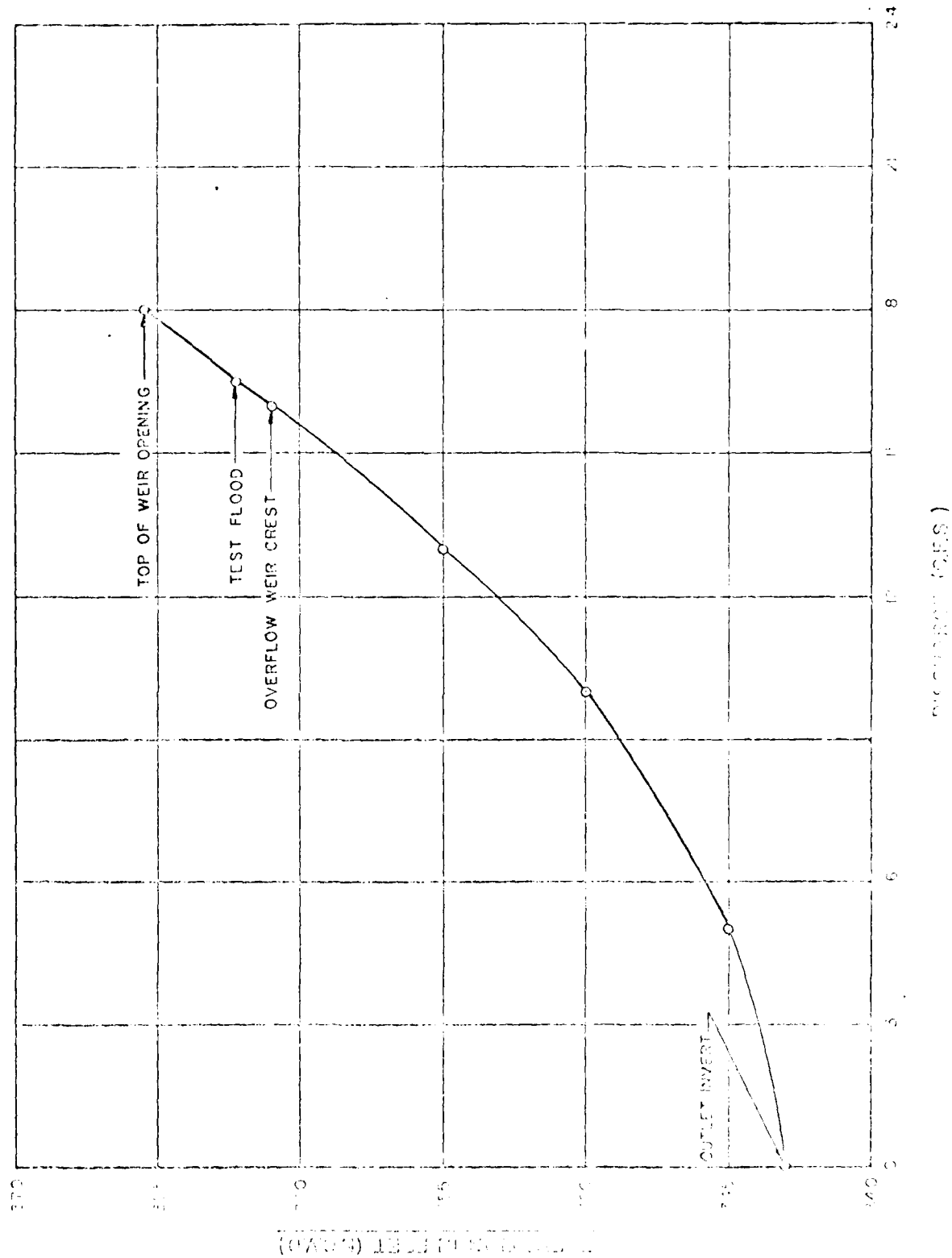
BOTTOM FLOOR WILL FLOOD 3.5' - NO FURTHER
 DOWNSTREAM SECTIONS DONE. DAMMEL SHOULD
 BE COMPLETED TO AMERICAN CAN CO.

SINCE DOWNSTREAM 9430 CFS EL 321.5 NO FURTHER
 NEXT DOWNSTREAM SECTION N/A AT (2) FURTHER



DISCHARGE (CFS)

AMERICAN CAN COMPANY DAM
SPILLWAY RATING CURVE



AMERICAN CAN COMPANY DAM

10" DRAIN

D-30

OUTLET WORKS

DATE

AD-A142 756

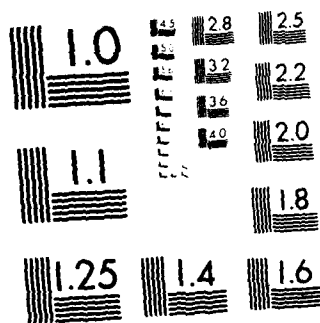
NATIONAL DAM INSPECTION PROGRAM AMERICAN CAN COMPANY
DAM CT 00047 SOUTHWEST (U) CORPS OF ENGINEERS WALTHAM MA
NEW ENGLAND DIV FEB 80

22

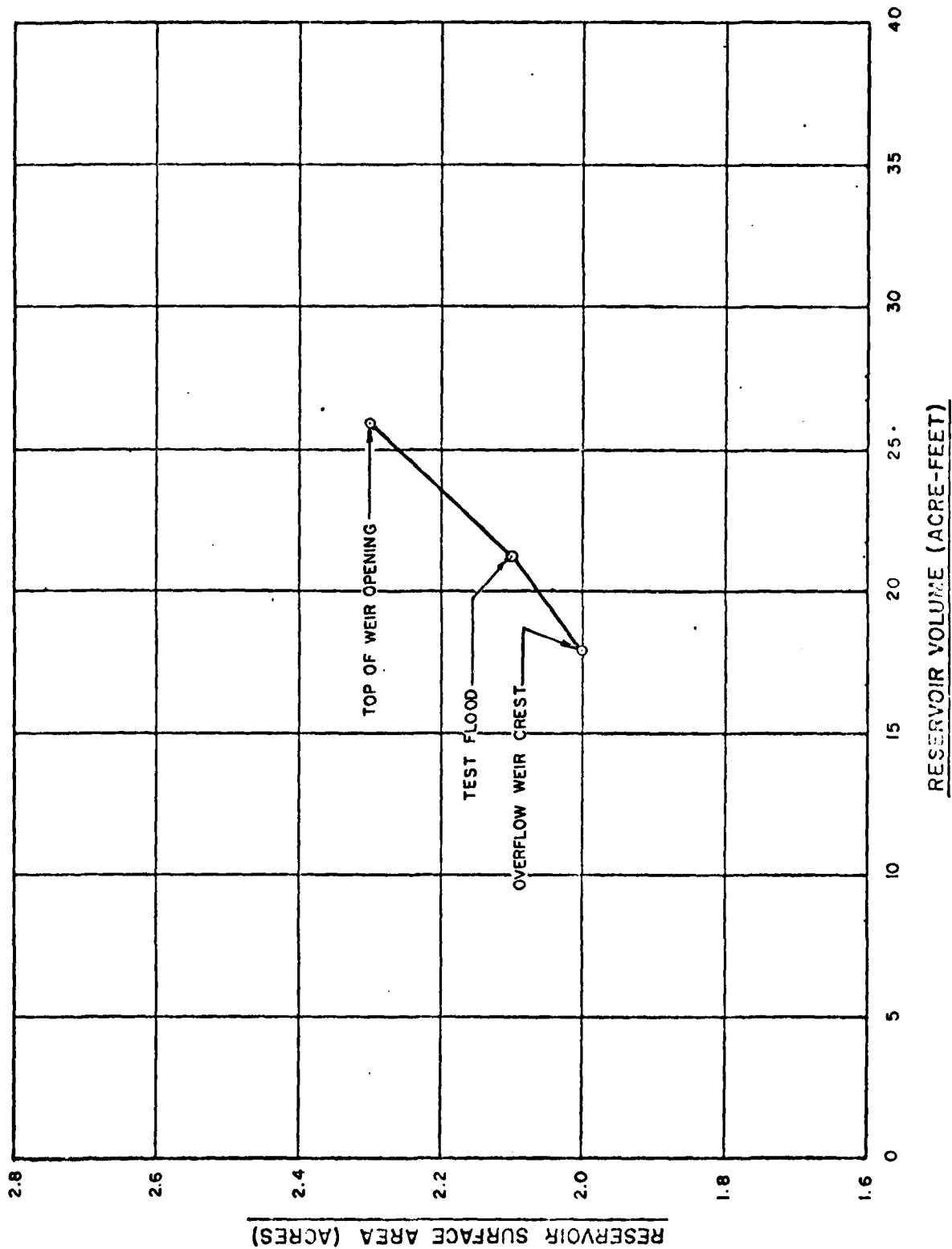
UNCLASSIFIED

F/G 13/13 NL

				END
				DATE
				FIGURED
				8-84
				DTIC



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A



AMERICAN CAN COMPANY DAM
RESERVOIR AREA-CAPACITY CURVE

APPENDIX E
INFORMATION AS CONTAINED IN THE
NATIONAL INVENTORY OF DAMS



INVENTORY OF DAMS IN THE UNITED STATES

IDENTITY NUMBER	47	STATE	CT	DIVISION	01	COUNTY	01	COUNTY	04	NAME	AMERICAN CAN COMPANY DAM	LATITUDE (NORTH)	1106.0	LONGITUDE (WEST)	7345.3	REPORT DATE	17DEC79
-----------------	----	-------	----	----------	----	--------	----	--------	----	------	--------------------------	------------------	--------	------------------	--------	-------------	---------

POPULAR NAME	NAME OF IMPOUNDMENT			
NORTH LAKE DAM	NORTH LAKE			
REGION	RIVER OR STREAM	NEAREST DOWNSTREAM CITY - TOWN - VILLAGE	DIST FROM DAM (MI.)	POPULATION
01	TR-LOUDEN COVE OFFSTREAM	GREENWICH	0	59799

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STAGNANT HEIGHT (FT.)	HYDRAULIC HEIGHT (FT.)	IMPOUNDING CAPACITY (ACRE-FT.)	MAXIMUM NORMAL (ACRE-FT.)	MAXIMUM FLOOD (ACRE-FT.)
CFOI	1970	D	55	61	26	18	10

DIST OWN FED R PRIV/ED SCS A VER/DATE
N N N N N

REMARKS									
18-LOUDEN COVE, 21-NORTH WALL OF BUILDING, 23-FIRE PROTECTION AESTHETIC									
U/S	SPILLWAY	MAXIMUM DISCHARGE (CFS)	VOLUME OF DAM (CU YD)	POWER CAPACITY (KW)	INSTALLED PROPOSED (KW)	NO. OF LOCKS	NAVIGATION LOCKS	NO. OF LOCKS	NAVIGATION LOCKS
1	503 U 15	500	1450						

OWNER	ENGINEERING BY	CONSTRUCTION BY
AMERICAN CAN COMPANY	PAUL WEIDINGER CNL ENG	TURNER CONSTRUCTION CO

DESIGN		CONSTRUCTION		OPERATION		MAINTENANCE	
CT DEPT ENVIR PROT	CT DEPT ENVIR PROT	CT DEPT ENVIR PROT	CT DEPT ENVIR PROT	CT DEPT ENVIR PROT	CT DEPT ENVIR PROT	CT DEPT ENVIR PROT	CT DEPT ENVIR PROT

INSPECTION BY	INSPECTION DATE	DAY	MO	YR	AUTHORITY FOR INSPECTION
JAMES P PURCELL ASSOCIATES INC	13NOV79				PL-92-367

REMARKS	



