

AD-A146 104

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS  
COMMODORE FOODS COMPA..(U) CORPS OF ENGINEERS WALTHAM  
MA NEW ENGLAND DIV MAY 79

1/1

UNCLASSIFIED

F/G 13/13 NL

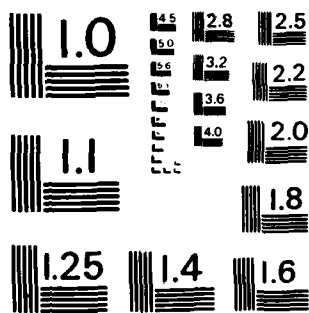
END

DATE

FORMED

10 84

DTIC



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS - 1963 - A

①

MIDDLESEX COUNTY  
WESTFORD, MASSACHUSETTS

AD-A146 104

COMMODORE FOODS COMPANY DAM  
MA-00131

DTIC FILE COPY

DTIC  
ELECTE  
OCT 0 1984  
E

NATIONAL DAM INSPECTION PROGRAM  
CORPS OF ENGINEERS

This document has been approved  
for public release and sales the  
distribution is unlimited.

84 : 09 28 057

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

| REPORT DOCUMENTATION PAGE                                                                                                                                                                                                                                                                                                                                      |                                  | READ INSTRUCTIONS<br>BEFORE COMPLETING FORM                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------|
| 1. REPORT NUMBER<br>MA 00131                                                                                                                                                                                                                                                                                                                                   | 2. GOVT ACCESSION NO.<br>A146104 | 3. RECIPIENT'S CATALOG NUMBER                               |
| 4. TITLE (and Subtitle)<br>Commodore Foods Company Dam<br>NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS                                                                                                                                                                                                                                                  |                                  | 5. TYPE OF REPORT & PERIOD COVERED<br>INSPECTION REPORT     |
| 7. AUTHOR(s)<br>U.S. ARMY CORPS OF ENGINEERS<br>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<br>DEPT. OF THE ARMY, CORPS OF ENGINEERS<br>NEW ENGLAND DIVISION, NEDED<br>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<br>May 1979                                 |
|                                                                                                                                                                                                                                                                                                                                                                |                                  | 13. NUMBER OF PAGES<br>40                                   |
|                                                                                                                                                                                                                                                                                                                                                                |                                  | 15. SECURITY CLASS. (of this report)<br>UNCLASSIFIED        |
|                                                                                                                                                                                                                                                                                                                                                                |                                  | 18a. DECLASSIFICATION/DOWNGRADING SCHEDULE                  |
| 16. DISTRIBUTION STATEMENT (of this Report)<br>APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED                                                                                                                                                                                                                                                             |                                  |                                                             |
| 17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)                                                                                                                                                                                                                                                                     |                                  |                                                             |
| 18. SUPPLEMENTARY NOTES<br>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)<br>DAMS, INSPECTION, DAM SAFETY,<br>Middlesex County<br>Westford, Mass.                                                                                                                                                                                                     |                                  |                                                             |
| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>It has been found to have a "low" hazard potential. The Commodore Foods Company Dam is of stone masonry construction, approximately 76.5 ft. in length and 16 ft. in height, with a 40 ft. wide overflow spillway. The peak failure outflow is estimated to be 3,300 cfs. |                                  |                                                             |

CONSULTING GEOTECHNICAL ENGINEERS AND GEOLOGISTS

**HALEY & ALDRICH, INC.**

238 MAIN STREET • CAMBRIDGE • MASSACHUSETTS 02142

617/492-6460

HARL R. ALDRICH, JR.  
THOMAS R. LIU  
EDMUND G. JOHNSON  
MARTIN C. MURPHY  
DAVID E. THOMPSON

PETER L. LECOUNT  
EDWARD B. KINNEER  
DOUGLAS G. GIFFORD  
JOSEPH J. RIXNER  
ALLEN W. HATHEWAY  
GARY S. BRIERLEY  
RICHARD R. STULGIS

CONSULTANT  
CHARLES C. LADD

24 May 1979  
File No. 4270

New England Division  
U.S. Army Corps of Engineers  
424 Trapelo Road  
Waltham, MA 02154

Attention: Mr. E.P. Gould, Project Manager

Subject: National Dam Inspection Program  
Contract No. DACW33-79-C-0018, Item 4

Gentlemen:

The Commodore Foods Company Dam, Identification No. MA 00131, has been found to have a "low" hazard potential, as a result of the site visit conducted on 8 March 1979. This finding was brought to the attention of your Mr. Gary James of Project Management on 12 March 1979. At his request, this brief letter report documenting the "low" hazard potential classification of the dam is submitted in lieu of a complete Phase I Investigation report.

The dam is located across Stony Brook, adjacent to a Commodore Foods Company building in Westford, Massachusetts, Middlesex County, as shown on the Location Map, page A-1. A copy of the most recent available state inspection report, dated 9 October 1973, is included herein, page B-1. The Commodore Foods Company Dam is of stone masonry construction, approximately 76.5 ft. in length and 16 ft. in height, with a 40 ft. wide overflow spillway. Former outlet works gates and a pipe to the left and right of the spillway are no longer operative.

A "Site Sketch Plan", page C-1, shows the general configuration of the project and the direction of view of six photographs taken of the dam, Brookside Road Bridge and Stony Brook on 8 March 1979, pages C-2 through C-4. Measurements made at the dam site on the same day are given on pages D-1 and D-2.

New England Division

U.S. Army Corps of Engineers -2-

24 May 1979

Based on Corps of Engineers Guidelines for Estimating Dam Failure Hydrographs, and assuming that a failure would occur along 40 percent of the length of the dam structure, the peak failure outflow is estimated to be 3,300 cfs. The downstream channel capacity, as shown in the attached computations, page D-3 and D-4, is more than adequate for this flow, and no flooding of the channel banks is expected to occur. A preliminary flood impact analysis of the effect on a pond located about 1,500 ft. downstream of the Brookside Road Bridge shows that the maximum increase in water surface level of the pond following entry of the failure flood waters would be about 3 ft. No dwellings are expected to be flooded as a result of the dam failure.

Therefore, it is considered that the hazard potential at the Commodore Food Company Dam site is low. Because of this finding, the Phase I assessment of the condition of the dam was not completed.

Very truly yours,  
HALEY & ALDRICH, INC.

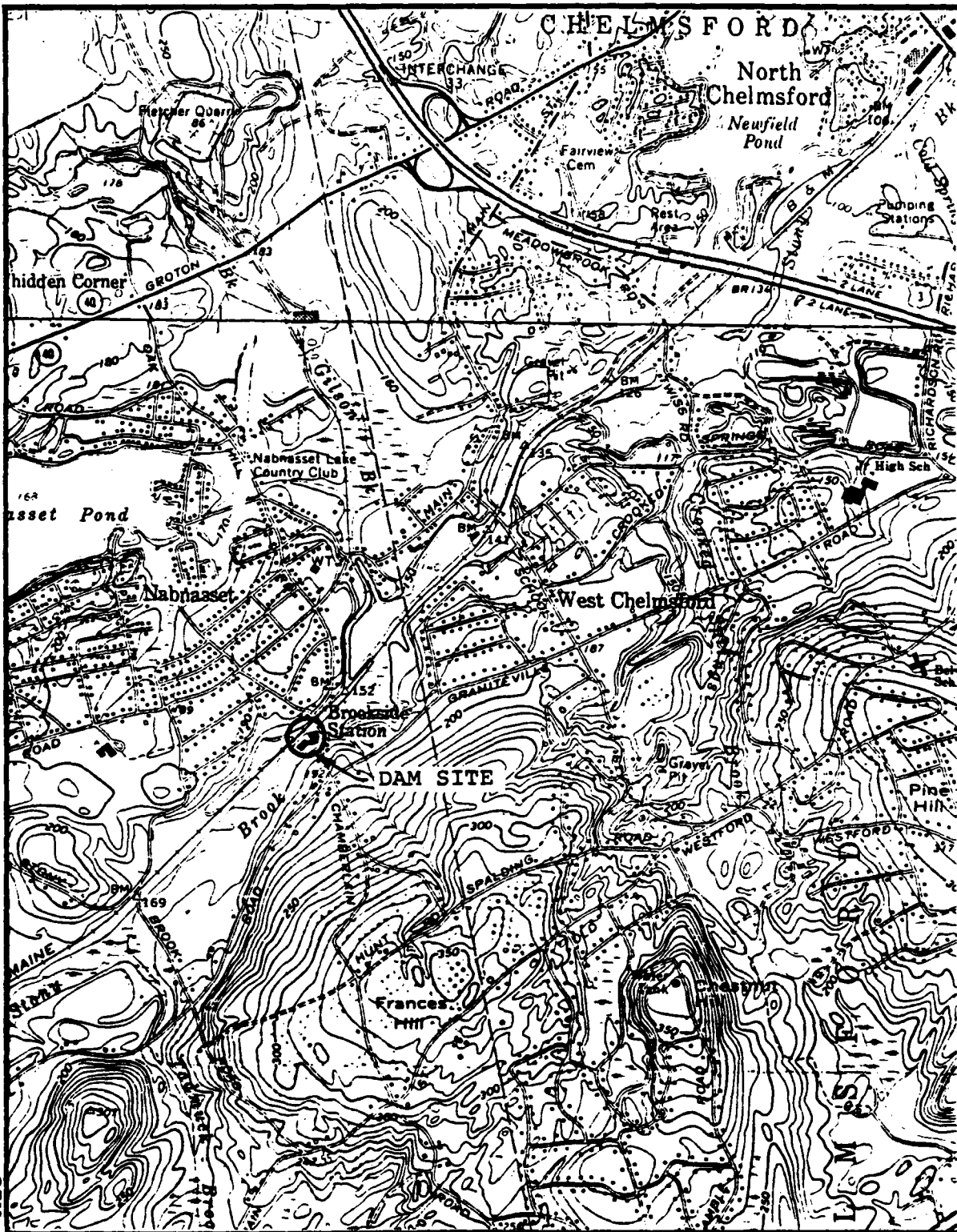
*P. L. LeCount*  
Peter L. LeCount  
Vice President

PLL/bms  
Enclosures

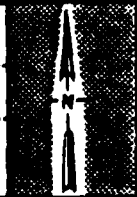
|                    |                                            |
|--------------------|--------------------------------------------|
| Accession For      |                                            |
| NTIS GRA&I         | <input checked="checked" type="checkbox"/> |
| DTIC TAB           | <input type="checkbox"/>                   |
| Unannounced        | <input type="checkbox"/>                   |
| Justification      |                                            |
| By _____           |                                            |
| Distribution/      |                                            |
| Availability Codes |                                            |
| Dist               | Avail and/or<br>Special                    |
| A-1                |                                            |



FILE NO. 4270 A25



DAM: ..... COMMODORE FOODS CO. ....  
IDENTIFICATION NO. .... MA 00131 .....



LOCATION MAP  
USGS QUADRANGLE  
WESTFORD, MA  
APPROX. SCALE: 1" = 2000'

January 15, 1974

Stuart Haywood, Plant Manager  
Commodore Foods Company  
645 Lawrence Street  
Lowell, Massachusetts 01850

Re: Inspection-Dam A-9-330-2  
Westford  
Commodore Foods Co. Dam

Dear Mr. Haywood:

An engineer from the Massachusetts Department of Public Works has inspected the above dam, owned by the Commodore Foods Company.

The inspection was made in accordance with Chapter 253 of the Massachusetts General Laws, as amended by Chapter 595 of the Acts of 1970.

The results of the inspection indicate that this dam is safe; however, the following conditions were noted that require attention:

1. The controls for the five foot drain pipes are broken and need to be repaired or replaced as necessary.
2. Remove the growth from the joints of the masonry wall and repoint as needed.
3. Replace the missing masonry stones.

We call these conditions to your attention now before they become serious and more expensive to correct.

Very truly yours,

*Fred C. Schwell*  
FRED. C. SCHWELM  
Deputy Chief Engineer

*LJA*  
LEA:DMY  
CC: C.F. Mistrretta  
L. McCalla

# INSPECTION REPORT - DAMS AND RESERVOIRS

(1.) Location: City/Town WESTFORD

Dam No. 4-9-330-2

Name of Dam COMMODORE FOODS CO DAM

Inspected by A. Z. PIZANO

Date of Inspection 10-9-'73

(2) Owners:

per:

Assessed ☒

Prev. Inspection

Reg. of Deeds

Reg. Contact

COMMODORE FOODS CO. 645 LAWRENCE ST. LOWELL, MASS 01850 (459-2551)

Name St. & No. City/Town State Tel. No.

2. Name St. & No. City/Town State Tel. No.

3. Name St. & No. City/Town State Tel. No.

(3) Caretaker: (if any) e.g. superintendent, plant manager, appointed by absentee owner, appointed by multiple owners.

STU. HEYWOOD, PLANT MGR, COMMODORE FOODS CO. 459-2551

Name St. & No. City/Town State Tel. No.

(4) No. of Pictures taken 3

(5) Degree of Hazard: (if dam should fail completely)\*

1. Minor

2. Moderate ☒

3. Severe

4. Disastrous

\*This rating may change as land use changes (future development)

(6) Outlet Control: Automatic ☒

Manual

Operative ☒

no.

Comments: THE ~~CONTROLS~~ CONTROLS FOR THE 5' EMERGENCY

DRAIN PIPES ARE BROKEN, AND HAVE NOT BEEN REPAIRED

THE PIPE VALVES SHOULD BE REPAIRED (SEE NO. 12)

(7) Spillway

Condition

Good ☒

Minor Repairs

Major Repairs

Major Repairs

-2-

(8) Downstream Face of Dam: Condition: 1. Good ☒ <sup>DAM NO. 4-4-590-2</sup> 2. Minor Repairs ☐  
3. Major Repairs ☐ 4. Urgent Repairs ☐

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(9) Emergency Spillway: Condition: 1. Good ☐ 2. Minor Repairs ☐  
3. Major Repairs ☒ 4. Urgent Repairs ☐

Comments: SEE NO. 6  
\_\_\_\_\_  
\_\_\_\_\_

(10) Water level @ time of inspection \_\_\_\_\_ ft. above 0.5' below \_\_\_\_\_  
top of dam ☒ Principal spillway \_\_\_\_\_  
other \_\_\_\_\_

(11) Summary of Deficiencies Noted:

Growth (Trees and Brush) on Embankment ☒ (SEE PICTURES)  
Animal Burrows and Washouts \_\_\_\_\_  
Damage to slopes or top of dam \_\_\_\_\_  
Cracked or Damaged Masonry \_\_\_\_\_  
Evidence of Seepage \_\_\_\_\_  
Evidence of Piping \_\_\_\_\_  
Erosion \_\_\_\_\_  
Leaks \_\_\_\_\_  
Trash and debris impeding flow \_\_\_\_\_  
Clogged or blocked spillway ☒  
Other \_\_\_\_\_

(12) Remarks &amp; Recommendations: (Fully Explain)

URGENT REPAIRS ARE NEEDED TO OPEN THE 5' DIAMETER  
PIPES, SO THAT HOMES DO NOT HAVE WATER IN CELLARS, UPSTREAM,  
WHEN WATER RISES TO HIGHER THAN DESIGNED ELEVATION.  
THE ~~CONTROL~~ CONTROL IS RATCHET OPERATED.

## (13) Overall Conditions:

1. Safe ☒
2. Minor repairs needed ☒
3. Conditionally safe - major repairs needed
4. Unsafe
5. Reservoir impoundment no longer exists (explain):  
Recommend removal from operation list

DESCRIPTION OF DAM  
DISTRICT #4

Submitted by FRANCIS H. PAREX ADAM 2 PIZAN  
Date 10-4-73

Dam No. 4-9-370-2  
City/Town WESTFORD  
Name of Dam COMMODORE FORDS  
DAM

1. Location: Topo Sheet No. 25C  
Provide 8 1/2" x 11" in clear copy of topo map with location of Dam  
Clearly indicate
2. Year built: UNKNOWN Year/s of subsequent repairs UNKNOWN
3. Purpose of Dam: Water Supply \_\_\_\_\_, Recreational L  
Irrigation \_\_\_\_\_, Other \_\_\_\_\_
4. Drainage Area: 3.5 SQ. MI. 2,250 ACRES.
5. Normal Ponding Area: 75 acres; Ave Depth 4'  
impoundment: 100 MIL. gals; 300 acre ft.
6. No. and type of dwellings located adjacent to pond or reservoir  
i.e. summer homes etc. \_\_\_\_\_
7. Dimensions of Dam: Length 25' Max. Height 5' DEPTH 2 DAM  
Slopes: Upstream Face WEST  
Downstream Face WEST  
Width across top 5'
8. Classifications of Dam by Materials:  
Earth \_\_\_\_\_, Conc. Masonary L, Stone Masonary L  
Timber \_\_\_\_\_, Rockfill \_\_\_\_\_, Other \_\_\_\_\_
9. A. Description of present land usage downstream of dam: FO 5 rural;  
10 % urban  
B. Is there a storage area or flood plain downstream of dam: which could  
accommodate the impoundment in the event of a complete dam failure  
no L yes \_\_\_\_\_

DAM NO. 4-9-330-2

Risk to life and property in event of complete failure.

No. of people

No. of homes

No. of businesses

BUSINESS, COMMODORE FOODS CO. ADJ. TO DAM

No. of utilities

NONE

Railroads

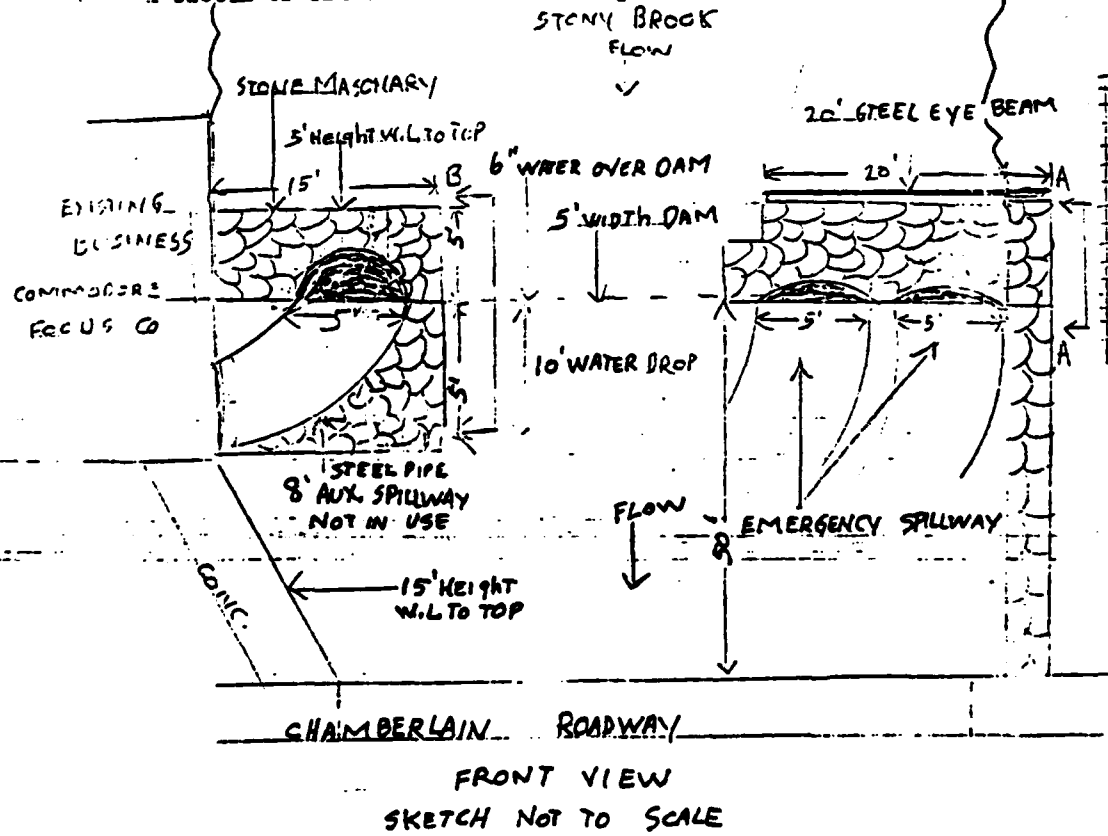
OPERATING, ADJ. TO PLANT

Other dams

NONE

Other

Sketch of dam to this form showing section and plan 8 1/2" x 11" sheet.



DAM NO. 4-9-330-2

20.

Risk to life and property in event of complete failure.

No. of houses

No. of homes

No. of businesses

No. of industries

No. of utilities

Railroads

Other dams

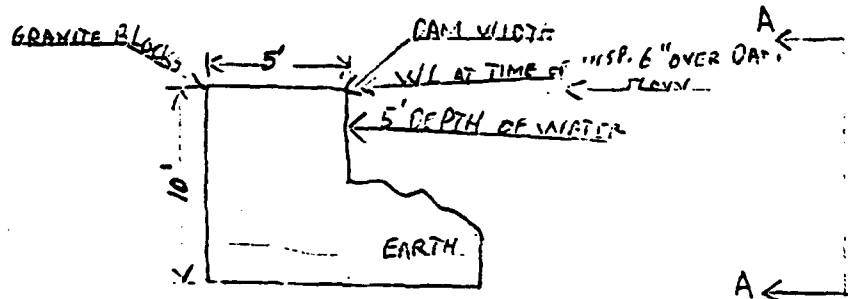
Other

1 OPERATING ADJ. TO PLANT B&M

NONE

21.

Sketch sketch of dam to this form showing section and plan 8 1/2" x 11" Sheet.



X-SECTION A

SKETCH NOT TO SCALE

FILE NO. 4270 A36

NOTE

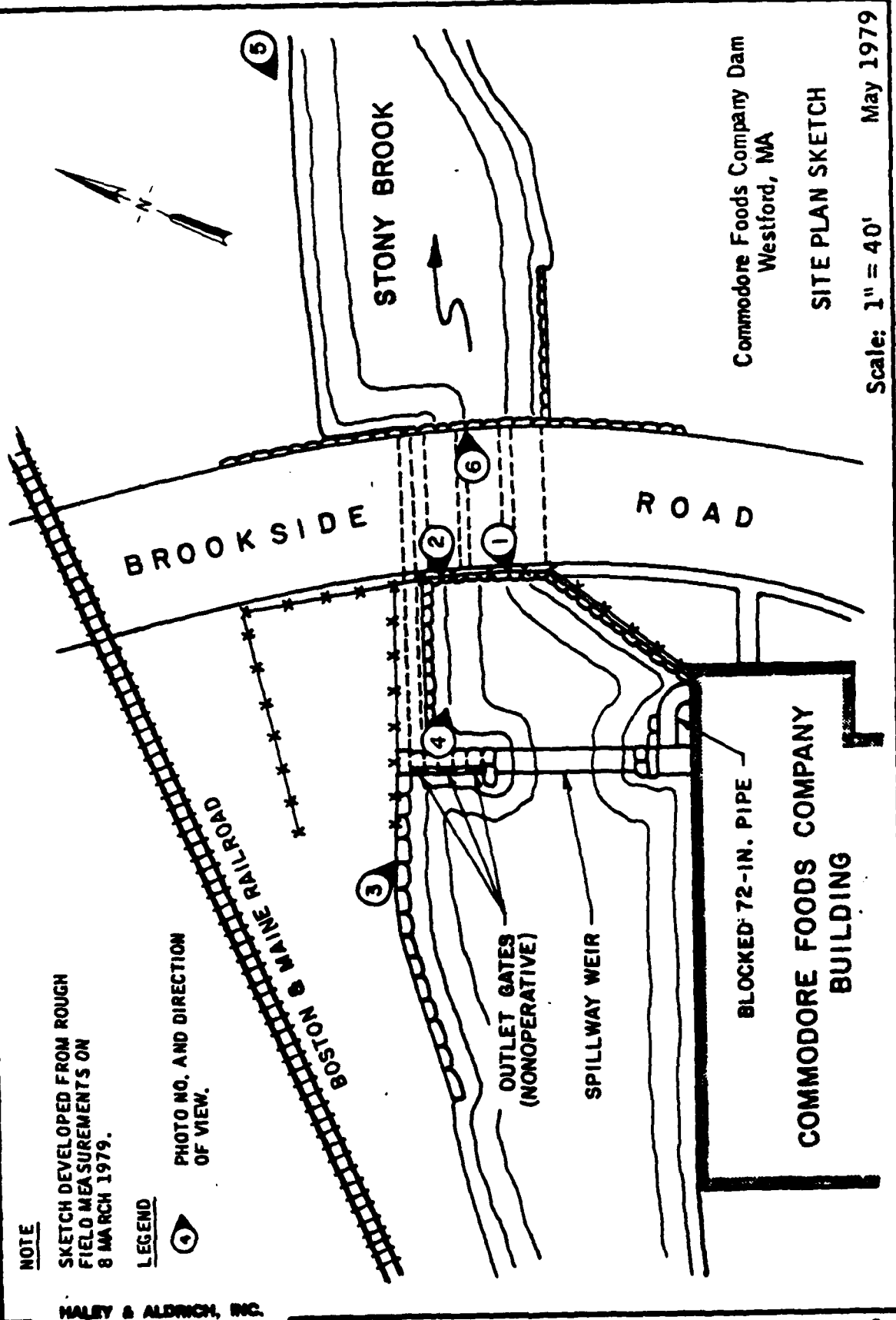
SKETCH DEVELOPED FROM ROUGH  
FIELD MEASUREMENTS ON  
8 MARCH 1979.

LEGEND



PHOTO NO. AND DIRECTION  
OF VIEW.

HALEY & ALDRICH, INC.  
CAMBRIDGE, MASSACHUSETTS



Commodore Foods Company Dam  
Westford, MA

SITE PLAN SKETCH

Scale: 1" = 40' May 1979



1. Overview of Commodore Foods Company Dam and Stony Brook upstream of dam



2. Left side of dam, showing two inoperative 48-in. diameter outlets



3. Stems of three inoperative gates left of spillway



4. Upstream side of Brookside Road Bridge



5. Downstream side of Brookside Road Bridge



6. Stony Brook channel downstream of Brookside Road

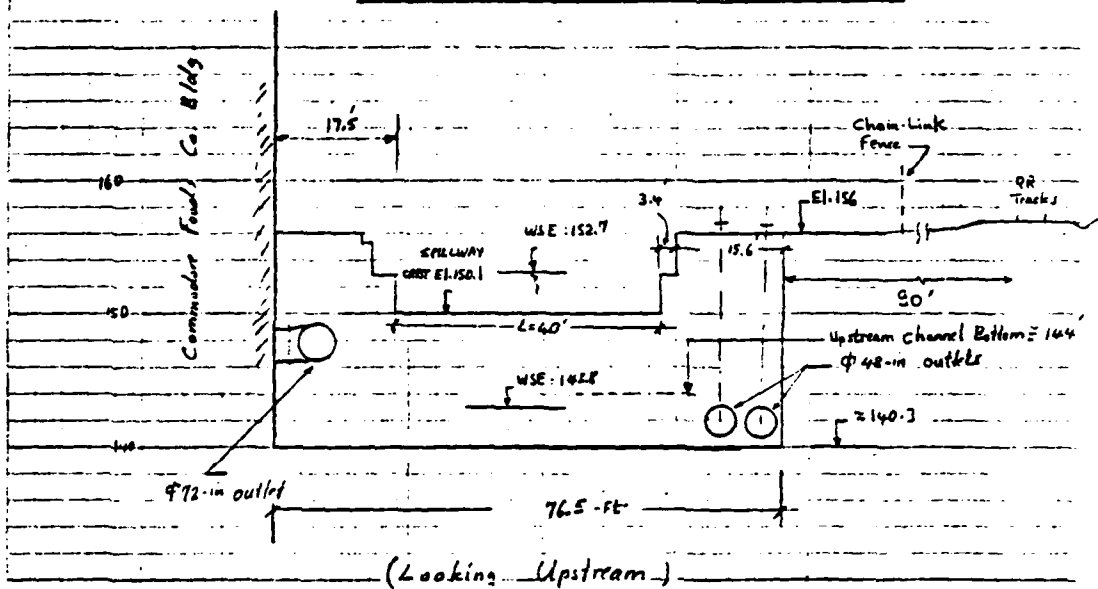
CAMP DRESSER & MCKEE  
Environmental Engineers  
Boston, Mass.

CLIENT H&A  
PROJECT COE Dam Inspection  
DETAIL Commodore Ford's Co. Dam

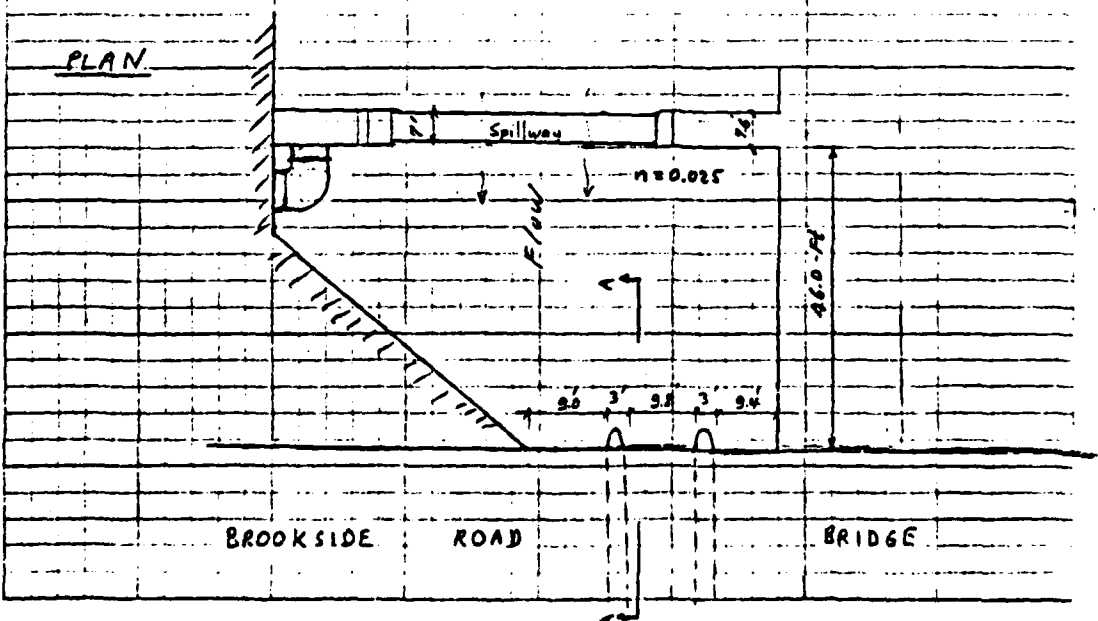
JOB NO 561-9 Pt-4  
DATE CHECKED 5/17/  
CHECKED BY

PAGE 3  
DATE 3/22/70  
COMPUTED BY PHL

### SPILLWAY & DAM - FRONT ELEVATION

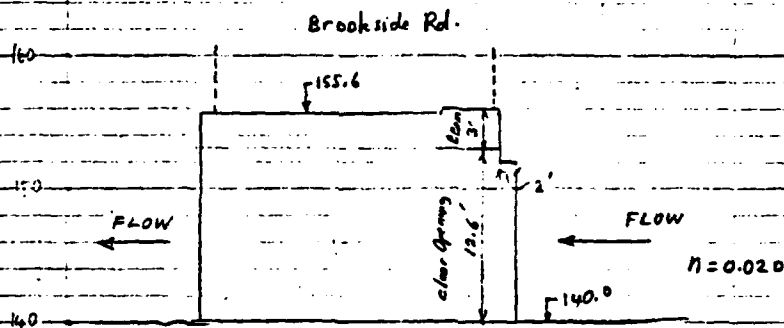


### PLAN

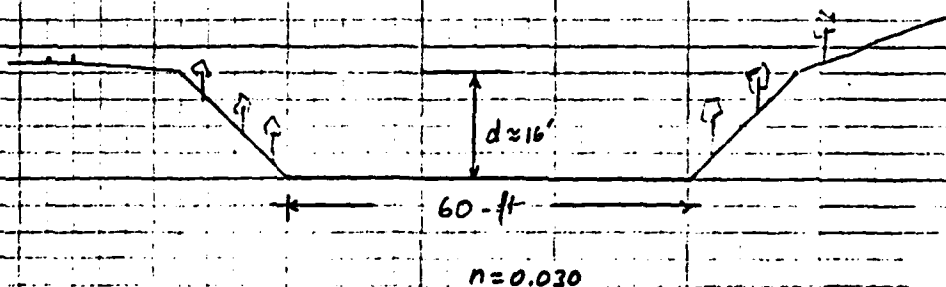


CAMP DRESSER & MCKEE CLIENT HWA JOB NO 561-9-Rt-4 PAGE 4  
 Environmental Engineers PROJECT C&E Dam Inspection DATE CHECKED \_\_\_\_\_ DATE 3/22/79  
 Boston, Mass. DETAIL Cambridge Falls Co. Dam CHECKED BY \_\_\_\_\_ COMPUTED BY BHC

SECTION A-A @ BRIDGE



DOWNSTREAM CHANNEL SECTION : Below the Bridge



## Size Classification

Storage Volume: Normally no ponding exists behind the dam. (No ponding is shown upstream of the Commodore Foods Company dam on USGS map). The pond shown on the left bank, upstream of the dam, has no connection to Stony Brook; the WSE in Stony Brook, during the inspection, was about 4.2 feet lower than the level in the pond. The storage volume at the top of the dam was estimated from the USGS as follows:

$$V = \frac{3000 \text{ ft} \times 300 \text{ ft} \times 12 \text{ ft}}{43,560} = 124 \text{ ac-ft} < 1000 \text{ ac-ft}$$

Dam Height:  $H = 156.0 - 140.3 = 15.7 \approx 16 \text{ ft} < 40 \text{ ft}$ .

SIZE: SMALL

Hazard Potential: requires checking of downstream channel hydraulics for the dam failure flood:

$$Q_p = \frac{8}{27} \times 0.4 \times 76.5 \times 5.67 \times 16^{3/2} = 3,300 \text{ cfs}$$

Channel Reach upstream of the bridge on Brookside Road:

$$\text{Channel Capacity: } A = 10 \times 76.5 = 765 \text{ ft}^2 \quad R^{2/3} = 3.98 \quad n = 0.025$$

(see page 3)

$$S = 0.005$$

$$Q_{max} = \frac{1.49}{0.025} \times 765 \times 3.98 \times 0.07 = 12,700 \text{ cfs}$$

Capacity of the Bridge openings: 3 - 9.5 x 12.6 (h) openings

(see pages 3 & 4)

$$A = 9.5 \times 12 = 114 \text{ ft}^2 \quad R^{2/3} = 2.28 \quad n = 0.02$$

$$S = 0.005 \quad \sqrt{S} = 0.07 \quad Q = \frac{1.49}{0.02} \times 114 \times 2.28 \times 0.07 \approx 1,350 \text{ cfs}$$

$$\Sigma Q = 3 \times 1,350 = 4,050 \text{ cfs}$$

CAMP DRESSER & MCKEE  
Environmental Engineers  
Boston, Mass.

CLIENT H & A  
PROJECT COE Dam Inspection  
DETAIL Commodore Frode Co. Dam

JOB NO 561-S-H-4  
DATE CHECKED 5/17/79  
CHECKED BY RHS

PAGE 2  
DATE 3/21/79  
COMPUTED BY AKG

Downstream channel below the bridge: (See page 4)

$$\text{Flow Capacity: } A = 16 \times \frac{60+90}{2} = 1,200 \text{ ft}^2 \quad n = 0.03$$
$$R^{2/3} = 5.1 \quad S = \frac{143.3-140}{1500} = 0.0022$$

$$Q = \frac{1.49}{0.03} 1200 \cdot 5.1 \cdot 0.047 = 14,250 \text{ cfs}$$

Flow capacity of the downstream channel and the bridge is more than the failure flood flow of 3300 cfs, therefore no overtopping of the stream banks is expected.

Failure Flood Impact in the Pond between Brookline and West Chelmsford:

Normal Pond Area  $\approx$  21 acres + <sup>Swamps</sup> 10.3 = 31.3 acres

$$\text{Channel storage during the failure flood: } 80 \cdot \frac{16+8}{2} \cdot 1500 \cdot \frac{1}{43,560} = 33 \text{ ac-ft}$$

Storage Volume above the dam: 124 ac-ft @ E1. 156.0 (top of Dam)

Net Flow into the downstream Pond: 124 - 33 = 91 ac-ft

Assuming no outflow from the downstream pond:

$$h_w = \frac{91}{31.3} = 2.9 \text{ ft. WSE in the downstream pond would rise by about 3.0 feet to E1. 143.0}$$

With exception of one plant building on the right bank near the outlet of the downstream pond, no dwellings can be seen below 150 contour on USGS map.

Conclusion: Hazard Potential is LOW

END

DATE  
FILMED

0-84

DTIC