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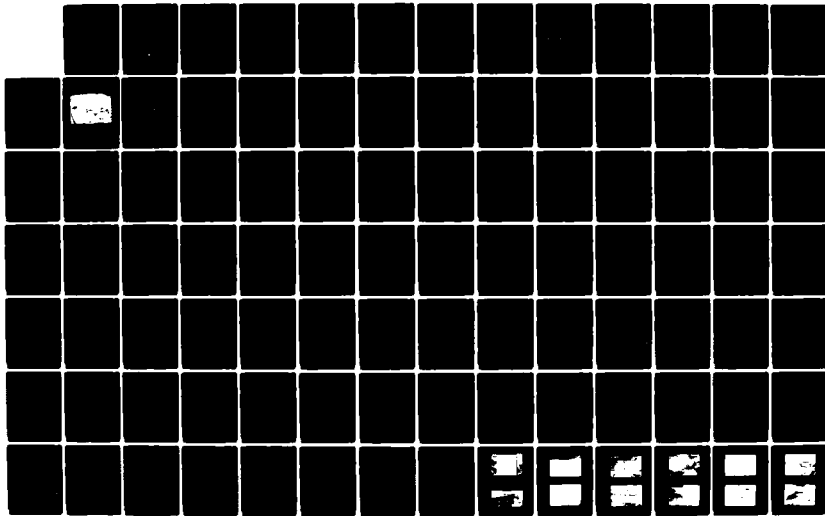
NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS  
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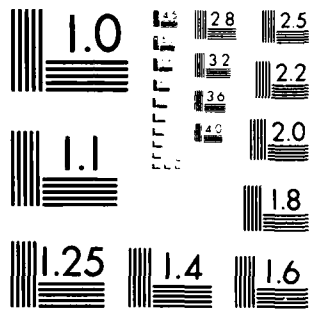
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AD-A144 623

THAMES RIVER BASIN  
STAFFORD, CONNECTICUT

ELLITHORPE DAM  
CT 00481

**PHASE I INSPECTION REPORT**  
**NATIONAL DAM INSPECTION REPORT**

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DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASS. 02154

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Thames River Basin Stafford, Connecticut		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Ellithorpe Dam consists of a 4,250 foot long earth embankment and a 200 foot wide grassed emergency spillway. Maximum height of dam is 29 feet with a maximum storage capacity of 5,860 acre-feet at crest elevation. Therefore, the size classification is intermediate. Based on visual inspection, the dam appears to be in good condition. Based on Corps of Engineers guidelines, the PMF was calculated to be 16,900 cfs inflow, with the outflow 10,800 cfs at an elevation of 591.6, which is 0.6 feet over the top of dam.		



DEPARTMENT OF THE ARMY  
 NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
 424 TRAPELO ROAD  
 WALTHAM, MASSACHUSETTS 02254

REPLY TO  
 ATTENTION OF:  
 NEDED

SEP 10 1981

Honorable William A. O'Neill  
 Governor of the State of Connecticut  
 State Capitol  
 Hartford, Connecticut 06115

Dear Governor O'Neill:

Inclosed is a copy of the Ellithorpe Dam (CT-00481) Phase I Inspection Report, prepared under the National Program for Inspection of Non-Federal Dams. This report is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. I approve 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 vitally important.

Copies of this report have been forwarded to the Department of Environmental Protection. Copies will be available to the public in thirty days.

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

Sincerely,

C. E. EDGAR, III  
 Colonel, Corps of Engineers  
 Division Engineer

Incl  
 As stated



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THAMES RIVER BASIN  
STAFFORD, CONNECTICUT

ELLITHORPE DAM

CT 00481

PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification No:	CT 00481
Name of Dam	Ellithorpe Dam
Town:	Stafford
County and State:	Tolland, Connecticut
Stream:	Middle River
Date of Inspection:	17 February, 1981

BRIEF ASSESSMENT

Ellithorpe Dam consists of a 4,250 foot long earth embankment and a 200 foot wide grassed emergency spillway. The outlet consists of a concrete riser with 23 foot long weirs and a 48-inch reinforced concrete outlet pipe discharging to Middle River at the toe of dam.

Construction of this dam was completed except for seeding in 1968 for the Connecticut Department of Agriculture and National Resources (now the Department of Environmental Protection). The dam was constructed for the purpose of flood control.

Maximum height of dam is 29 feet with a maximum storage capacity of 5,860 acre-feet at crest elevation. Therefore, the size classification is intermediate. The area of assumed dam failure impact encompasses two roads, Central Vermont Railroad tracks and the village of Orcutts. Hazard classification for Ellithorpe Dam is High.

Corps of Engineers Guidelines recommend a test flood of Probable Maximum Flood (PMF). Probable maximum rainfall in this area is 24 inches in 6 hours. The Soil Conservation Service design for this dam used a rainfall of 12.9 inches and a runoff of 11.4 inches for the emergency spillway design. Calculations show a peak inflow of 12,870 cfs and a peak outflow of 2,200 cfs with a maximum water surface elevation 2.1 feet below the crest of dam for the design flood.

Based on Corps of Engineers guidelines, the PMF was calculated to be 16,900 cfs inflow, with the outflow 10,800 cfs at an elevation of 591.6, which is 0.6 feet over the top of dam. This flow was used as the test flood.

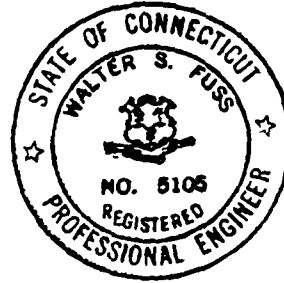
Based on the visual inspection, Ellithorpe Dam appears to be in good condition. There are several recreational vehicles paths on the slopes with some erosion taking place. Also, there are numerous rodent burrows on the upstream slope. Maintenance practices at Ellithorpe Dam appear to be good.

It is recommended that the owner accomplish the following: continue present maintenance practices; exterminate rodents; repair vehicle paths; prepare and implement a downstream warning system in case of an emergency; inspect for seepage during flood events; institute biennial technical inspections.

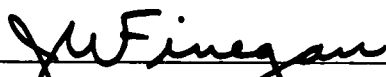
Recommendations and remedial measures listed above and detailed in Section 7 should be implemented by the Owner within two years after receipt of this Phase I Inspection Report.

FUSS & O'NEILL, INC.

By: Walter S. Fuss  
Walter S. Fuss, P.E.  
President



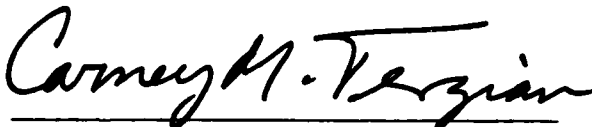
This Phase I Inspection Report on Ellithorpe Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice,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



JOSEPH W. FINEGAN, JR. MEMBER  
Water Control Branch  
Engineering Division

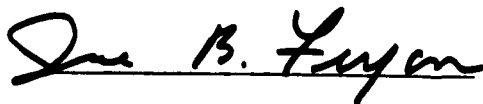


ARAMAST MAHTESIAN, MEMBER  
Geotechnical Engineering Branch  
Engineering Division



CARNEY M. TERZIAN, CHAIRMAN  
Design Branch  
Engineering Division

APPROVAL RECOMMENDED:



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 spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the 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

<u>Section</u>	<u>Page</u>
Letter of Transmittal	
Brief Assessment	
Review Board Page	
Preface	i
Table of Contents	iii
Overview Photo	vi
Location Map	vii

### REPORT

1. PROJECT INFORMATION	
1.1 General	1
a. Authority	
b. Purpose of Inspection	
1.2 Description of Project	2
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	5
2. ENGINEERING DATA	
2.1 Design Data	10
2.2 Construction Data	10

<u>Section</u>	<u>Page</u>
2.3 Operational Data	11
2.4 Evaluation of Data	11
3. VISUAL INSPECTION	
3.1 Findings	12
a. General	
b. Dam	
c. Appurtenant Structures	
d. Reservoir Area	
e. Downstream Channel	
3.2 Evaluation	16
4. OPERATIONAL AND MAINTENANCE PROCEDURES	
4.1 Operational Procedures	17
a. General	
b. Description of any Warning System in Effect	
4.2 Maintenance Procedures	17
a. General	
b. Operating Facilities	
4.3 Evaluation	17
5. EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES	
5.1 General	18
5.2 Design Data	18
5.3 Experience Data	18
5.4 Test Flood Analysis	19
5.5 Dam Failure Analysis	19

<u>Section</u>	<u>Page</u>
6. EVALUATION OF STRUCTURAL STABILITY	
6.1 Visual Observation	22
6.2 Design and Construction Data	22
6.3 Post-Construction Changes	22
6.4 Seismic Stability	22
7. ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES	
7.1 Dam Assessment	23
a. Condition	
b. Adequacy of Information	
c. Urgency	
7.2 Recommendations	23
7.3 Remedial Measures	23
a. Operation and Maintenance Procedures	
7.4 Alternatives	24

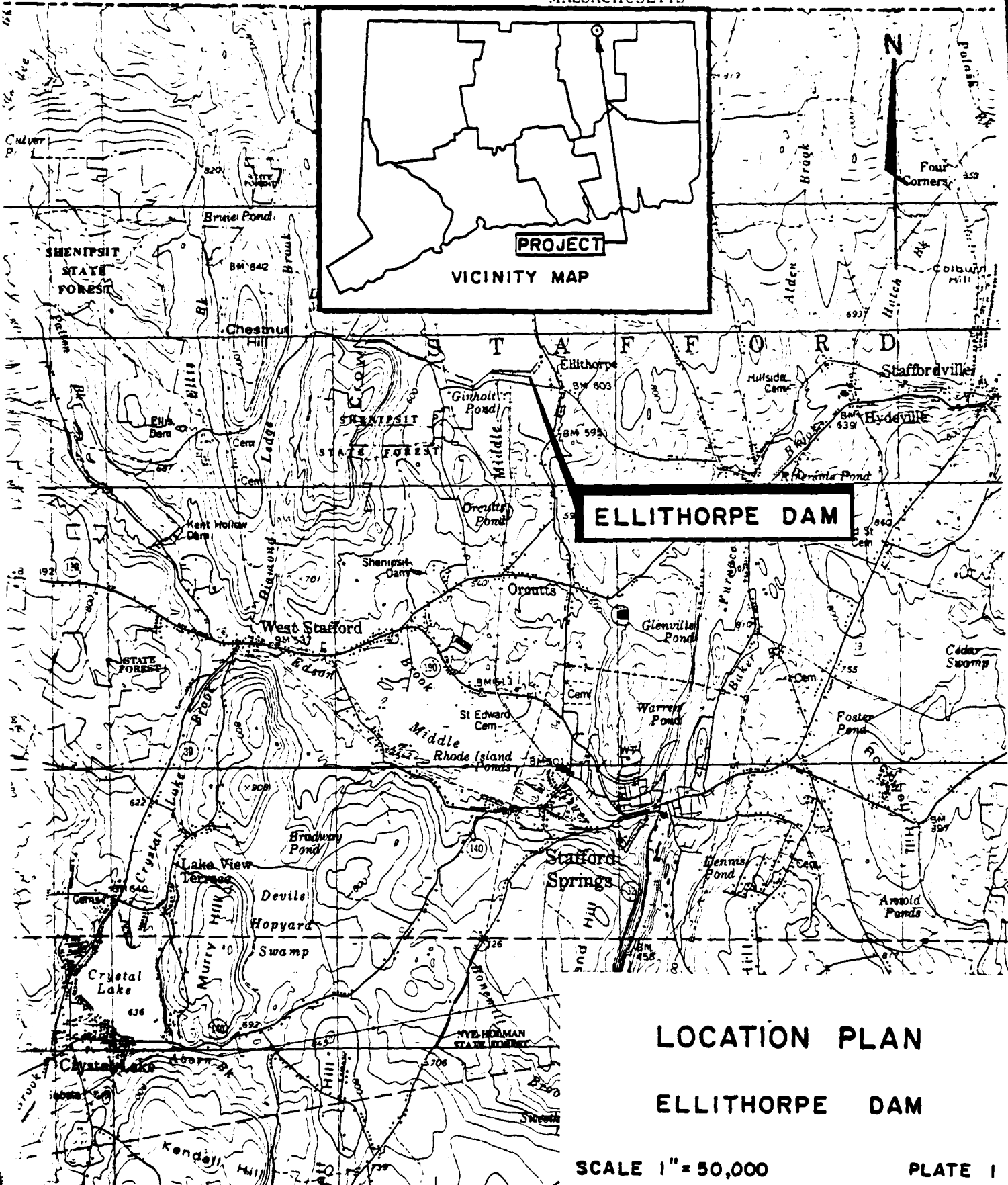
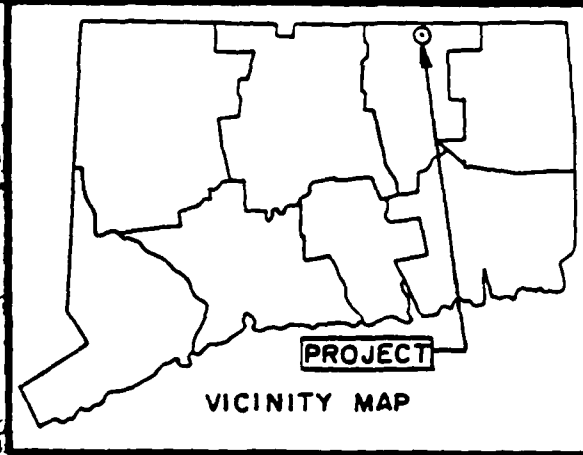
#### APPENDICES

<u>Appendix</u>	<u>Description</u>
A	INSPECTION CHECKLIST
B	ENGINEERING DATA
C	PHOTOGRAPHS
D	HYDROLOGIC AND HYDRAULIC COMPUTATIONS
E	INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS



OVERVIEW PHOTO

MASSACHUSETTS



**ELLITHORPE DAM**

**LOCATION PLAN**

**ELLITHORPE DAM**

**SCALE 1" = 50,000**

**PLATE I**

NATIONAL DAM INSPECTION PROGRAM  
PHASE I INSPECTION REPORT  
ELLITHORPE DAM CT 00481

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 through 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. Fuss & O'Neill, 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 Fuss & O'Neill, Inc. under a letter of 25 November, 1980 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-81-C-0020 has been assigned by the Corps of Engineers for this work.
- b. Purpose.
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 assist 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 THE PROJECT:

- a. Location. Ellithorpe Dam is located in the Town of Stafford, County of Tolland, State of Connecticut. The dam is located at Latitude 41°-59'-46" and Longitude 72°-19'-11". Ellithorpe Dam impounds flow in Middle River, with a 10.3 square mile watershed. Five miles downstream from the Dam, Middle River joins Furnace Brook to form the Willimantic River. Ellithorpe Dam borders the west side of Connecticut Route No. 30 and is about 350 feet north of Diamond Ledge Road. This structure is for flood control and, except during storms, the pool is dry. The detention pool runs in a northerly direction from the dam, west of Route 30 and east of the relocated tracks of the Central Vermont Railroad.
- b. Description of Dam and Appurtenances. Ellithorpe Dam is about 4,250 feet in length with a top width of 14 feet. The structure is a homogeneous earth embankment using local borrow material with a maximum height of 29 feet. Upstream slopes are 1.0 vertical to 3.0 horizontal and downstream slopes are 1.0 vertical to 2.0 horizontal. Top of dam elevation is 591.0.

The emergency spillway is grass lined with a crest 4.6 feet below the top of dam (Elevation 586.4). Spillway bottom width is 200 feet with side slopes of 1.0 vertical to 3.0 horizontal and is located at the east end of the dam. The first 110 feet of the spillway is level with the remaining 220 feet on a 2.2% slope.

The principal spillway consists of a reinforced concrete riser with 23 feet of overflow weirs at elevation 567.0 and an 8 foot by 1 foot low flow opening at elevation 562.5. A 48-inch reinforced concrete water pipe 134 feet long discharges from the riser to a reinforced concrete impact basin and then to the natural channel of Middle River. Invert elevation of this pipe is 562.5.

The dam embankment spans the natural stream valley with the emergency spillway cut into natural ground. Approximately 1.5 miles of Central Vermont Railroad track was relocated for the construction of Ellithorpe Dam.

- c. Size Classification. Height of dam is 29 feet from crest of dam to bed of outlet channel and the total storage volume is 5,860 acre-feet at crest of dam. The dam is therefore classified as an INTERMEDIATE structure in accordance with the recommended guidelines of the Corps of Engineers. Intermediate structures are those with heights from 40 to 99 feet and/or storage volumes from 1000 to 50,000 acre-feet.
- d. Hazard Classification. Ellithorpe Dam is classified as having a HIGH hazard potential because it is located in a rural area about 7,000 feet upstream of the Village of Orcutts and the failure discharge can cause damage due to high velocity, impact from debris and flooding to two businesses, three houses, two roads, parts of the trackage of the Central Vermont Railroad and the possible loss of more than a few lives.

Estimated water depth due to the possible dam failure discharge of 105,000 cfs may range from 18.8 feet just below the dam to 29.7 feet 2,000 feet downstream, with the depth dropping to 11.6 feet about 8,000 feet downstream of the dam.

In the vicinity of an industrial park 2,000 feet downstream, pre-failure depth would be 6.5 feet and post-failure would be 29.7 feet. In the Orcutt's Village area, pre-failure depths range from 3.7 feet to 3.4 feet with post-failure depths from 9.8 feet to 11.6 feet.

e. Ownership. Ellithorpe Dam is owned by the State of Connecticut and is maintained by the Department of Environmental Protection.

f. Operator. Operating personnel are under the direction of:

John Spencer  
Region 3 Director  
Department of Environmental Protection  
Marlborough, CT 06447  
Telephone: (203) 295-9523

g. Purpose of Dam. Ellithorpe Dam is a flood control dam to reduce damage in Stafford Springs due to flooding from Furnace Brook and Middle River. Since this is essentially a dry dam, flood control is the only present use.

h. Design and Construction History. Construction of this facility was completed in 1968. The dam was designed by the U.S. Department of Agriculture, Soil Conservation Service for the Connecticut Department of Agriculture and Natural Resources.

- i. Normal Operating Procedure. This facility is dry except during periods of storm flow. Water enters the outlet structure by passing over fixed weirs in the principal spillway riser. Therefore, operation is automatic.

1.3 PERTINENT DATA:

- a. Drainage Area. Ellithorpe Dam is located in Tolland County in northeastern Connecticut with a drainage basin that is generally square in shape with a total area of 10.3 square miles. The area is rolling with elevation from 570 to 1,100 feet and is rural. State Line Pond, with an 80 acre surface along with swamps above the pond, tend to dampen the flows from the watershed.

- b. Discharge at Dam Site. There is no history of discharge data available for this dam. Listed below are calculated discharge data for the ungated principal spillway and the ungated emergency spillway. There are no outlet works or gated spillways.

- |                                                            |           |
|------------------------------------------------------------|-----------|
| 1. Outlet works:                                           | N/A       |
| 2. Maximum known flood at dam site:                        | Unknown   |
| 3. Ungated spillway capacity at top of dam elevation 591.0 |           |
| a) Principal Spillway                                      | 330 cfs   |
| b) Emergency Spillway                                      | 5,400 cfs |
| 4. Ungated spillway capacity at test flood elevation 588.9 |           |
| a) Principal Spillway                                      | 310 cfs   |
| b) Emergency Spillway                                      | 1,890 cfs |

5. Gated spillway at normal pool elevation	N/A
6. Gated spillway at test flood elevation	N/A
7. Total spillway capacity at test flood elevation 588.9	2,200
8. Total project discharge at top of dam elevation 591.0	5,730
9. Total project discharge at test flood elevation 588.9	2,200

c. Elevation. (feet above N.G.V.D.)

1. Streambed at toe of dam	562.0
2. Bottom of cutoff	N/A
3. Maximum Tailwater	Unknown
4. Normal pool	None
5. Full flood control pool	586.4
6. Emergency spillway crest	586.4
7. Design surcharge	588.9
8. Top of dam	591.0
9. Test flood surcharge	588.9

d. Reservoir. (Length in feet)

1. Normal pool	None
2. Flood control pool	5,800'
3. Emergency spillway crest pool	5,800'
4. Top of dam pool	7,250'
5. Test flood pool	6,800'

e. Storage. (acre-feet)

1. Normal pool	None
2. Flood control pool	4,070
3. Emergency spillway crest pool	4,070
4. Top of dam pool	5,860
5. Test flood pool	5,010

f. Reservoir Surface. (acres)

1. Normal pool	None
2. Flood control pool	371
3. Emergency spillway crest pool	371
4. Test flood pool	397
5. Top of dam	415

g. Dam.

1. Type	Earth Embankment
2. Length	4,250'
3. Height	29'
4. Top width	14'
5. Side Slopes	Upstream 3H:1V Downstream 2H:1V
6. Zoning	None
7. Impervious core	None
8. Cutoff	None
9. Grout curtain	None

h. Diversion and Regulatory Tunnel.

N/A

i. Spillway.

Principal Spillway

- |                     |                                                                      |
|---------------------|----------------------------------------------------------------------|
| 1. Type             | Concrete riser with side weirs                                       |
| 2. Length of weir   | 23' of weir and 8'-0" x 1'-0" low flow opening at invert elev. 562.5 |
| 3. Crest elevation  | 567.0                                                                |
| 4. Gates            | None                                                                 |
| 5. U/S Channel      | Natural Bed                                                          |
| 6. D/S Channel      | Natural Bed                                                          |
| 7. Design Surcharge | 588.9                                                                |

Emergency Spillway

- |                     |                              |
|---------------------|------------------------------|
| 1. Type             | Grass with 3H:1V side slopes |
| 2. Length of weir   | 200' bottom width            |
| 3. Crest elevation  | 586.4                        |
| 4. Gates            | None                         |
| 5. U/S Channel      | Grass                        |
| 6. D/S Channel      | Grass                        |
| 7. Design Surcharge | 588.9                        |

j. Regulating Outlet.

- |                      |                                     |
|----------------------|-------------------------------------|
| 1. Invert            | 562.5                               |
| 2. Size              | 48" pipe and 8'x1' low flow opening |
| 3. Description       | Pipe from bottom of spillway riser  |
| 4. Control Mechanism | None                                |
| 5. Other             | None                                |

## SECTION 2 - ENGINEERING DATA

2.1 DESIGN DATA: Ellithorpe Dam was designed by the United States Department of Agriculture, Soil Conservation Service for the Connecticut Department of Agriculture and Natural Resources. The following Design Data was used in the design of this dam:

Drainage Area	10.27 square miles
Design Storm	12.9" in 6 hours
Total Precipitation Loss	1.5"
Net Runoff	11.4"
Design Peak Flow	12,868 cfs
Per Square Mile	1,260 cfs
Drawdown Time	4.41 days
Maximum Discharge	2,200 cfs
Emergency Spillway Construction	Earth Channel
Emergency Spillway Discharge	1,887 cfs
Emergency Spillway Width	200' (bottom)
Dc at Control Section	1.27'
Vc at Control Section	6.25 fps
Max V in Emergency Spillway	7.35 fps
Freeboard	2.0'

2.2 CONSTRUCTION DATA: The Construction Permit for Ellithorpe Dam was approved on December 2, 1965 by the Connecticut Water Resources Commission. Construction of the dam was started on October 17, 1966 and was completed in 1968. A final inspection was held on May 21, 1968 by the Consultant to Water Resources Commission. Another inspection was made on September 23, 1969 of the results of the seeding operation which was not complete at the time of the first inspection. A Certificate of Approval was issued October 27, 1969.

2.3 OPERATION DATA: Since this is basically a dry pool flood control dam with no recording instrumentation, there are no operation records available.

2.4 EVALUATION OF DATA:

- a. Availability. The Connecticut Department of Environmental Protection made their files available with limited design and construction information. Also, the Work Plan and Design Report were examined at the State Office of the Soil Conservation Service. Actual computations have been stored in the National Archives of the Soil Conservation Service and are not easily available.
- b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection with an empty pool, limited past performance and sound engineering judgement.
- c. Validity: The visual inspection indicated that the dam was constructed substantially as shown on the "As-Built" drawings.

## SECTION 3 - VISUAL INSPECTION

### 3.1 FINDINGS:

- a. General. Based on the visual inspection and a review of the design criteria and construction plans, Ellithorpe Dam and its appurtenances are judged to be in good condition.

The dam consists of an earth embankment with underlying soils as indicated in the Boring Logs included with Appendix B. The dam was constructed in conjunction with five other dams in the area for the purpose of flood control in the Borough of Stafford Springs and is a dry dam.

- b. Dam.

1. Upstream Face - The upstream face is grass covered with a very dense mat on most of the surface. There are no trees growing on this slope which is shown in Photo No. C-3. There are numerous rodent burrows in the upstream face. The burrows are about 8 inches in diameter and are located mainly from just east of the principal spillway to about 200 feet east of the spillway. Six burrows were found, but more may be evident during seasons when the animals are more active. Also, there are two recreational vehicles trails causing minor erosion on the slope. A typical rodent burrow is shown in Photo No. C-7.

2. Crest - The crest is grass covered (sparse in some areas) and can be seen in Photo No. C-2. It is relatively level with vehicle tracks, but no significant rutting. There does not appear to be a problem with the grass cover.
  
3. Downstream Face - The downstream face is grass covered with a very dense mat and is shown in Photos No. C-8 and C-9. Five recreational vehicle trails were observed with erosion occurring. A typical location is shown in Photo No. C-9. It appears that this area is frequently used by recreational vehicles.

The foundation drains appeared to be functioning with only minor flow at the time of the field inspection from some of the five (5) outlets. Flow is estimated to be less than one gallon per minute, and the water is clear.

The ditch along the base of slope for draining the flow from the foundation drains is shown in Photo No. C-8 and appears to be functioning as designed.

c. Appurtenant Structures.

1. Principal Spillway - Photo No. C-5 shows the inlet to the principal spillway. The inlet is a reinforced concrete riser with splitter wall and hooded inlet. An 8-foot by 1-foot slot opening is set at the elevation of the approach channel to carry low flows. Condition of the concrete and appurtenances is good.

There is a 48 inch concrete water pipe through the embankment to the outlet. This pipe appears to be in good condition. The entire pipe is set in a concrete cradle. Plans show four reinforced concrete anti-seep collars on 25-foot centers. The collars are 9.7 feet by 10.7 feet.

The pipe outlets into a reinforced concrete impact basin as shown in Photos C-10 and C-11. This basin is in good condition and appears to be functioning as designed with no erosion in the downstream channel.

2. Emergency Spillway - Photo No. C-14 shows the emergency spillway which is grass lined except for the bottom 3 feet which is stone lined. The bottom width is 200 feet and the side slopes are 3 horizontal to 1 vertical. There is a good mat of grass and the spillway is in good condition. Discharge from the spillway is directed away from the toe of slope and significant erosion would not appear to be a problem.

d. Reservoir Area. Much of the reservoir area is a heavily wooded wetland. There is a private 4.5 acre pond just upstream of the dam near the west end of the main dam embankment. This pond was in existence before construction of Ellithorpe Dam and is used for recreation. (See Photo No. C-6.) The edge of pond is at the toe of slope of Ellithorpe Dam, with the water level at elevation 574. The depth of pond is unknown.

The approach channel for Middle River appears to be stable and is shown in Photo No. C-4. Before construction of Ellithorpe Dam, tracks of the Central Vermont Railroad ran along the west side of Middle River. In connection with the Dam construction, the tracks were relocated to the westerly edge of the reservoir area. The abandoned right-of-way downstream of the dam is shown in Photo No. C-13.

The flooded area is located between Connecticut Route 32 and the relocated Central Vermont Railroad. This flooded area tails out at the base of dam for State Line Pond.

- e. Downstream Channel. The downstream channel for Ellithorpe Dam is a natural stream called Middle River as shown in Photo No. C-12. About 350 feet downstream, Middle River crosses Diamond Ledge Road. About 400 feet west of Middle River, there is a house on the north side of Diamond Ledge Road. This house is located 210 feet from the downstream toe of dam.

Just below Diamond Ledge Road, Middle River passes through Ginholt Pond which straddles the abandoned railroad. About 4,500 feet downstream of the dam, the river enters Orcutts Pond. Just below the pond, Middle River crosses Orcuttville Road in the Village of Orcutt.

The active portion of the Central Vermont Railroad is crossed by Middle River at points about 7,200 feet, 8,300 feet and 10,800 feet downstream of Ellithorpe Dam.

3.2 EVALUATION: Based on visual inspection, the overall condition of the dam is good and the maintenance program appears to be good. The following items require attention, but prompt action is not required. The work can be accomplished during routine maintenance inspection.

- a. Continue the existing routine maintenance program.
- b. Repair erosion caused by recreational vehicles.
- c. Exterminate rodents invading upstream face of dam and fill burrows with suitable compacted material.
- d. Develop and implement a warning system for downstream residents.
- e. Since the reservoir was dry during the inspection, possible areas of seepage could not be observed. The downstream face should be inspected during periods when significant levels of water are in the reservoir.

## SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

### 4.1 OPERATIONAL PROCEDURES:

- a. General. This dam is a flood control structure and the operation is automatic in that the principal spillway limits discharges and causes excess flow to be stored in the reservoir; when the inflow falls below the rate of discharge, the water level drops and eventually empties through the principal spillway.
- b. Description of Any Warning System in Effect. There is no formal downstream warning system in case of emergency at the dam.

### 4.2 MAINTENANCE PROCEDURES:

- a. General. This dam is checked for maintenance requirements two times per year by District maintenance personnel and any required work is done at that time. Maintenance consists mainly of cutting grass and tree growth. Maintenance appears to be good at this dam.
- b. Operating Facilities. There are no operating facilities at this dam.

- 4.3 EVALUATION: The existing maintenance schedule should be continued. A downstream warning system should be developed and put into effect in case of emergency at the dam.

## SECTION 5 - EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 GENERAL: Ellithorpe Dam consists of a 4,250 foot long earth dam with a maximum height of 29 feet. There is a principal spillway consisting of a reinforced concrete riser with a 48 inch concrete pipe outfall. The emergency spillway is a 200 foot wide grass spillway with a maximum surcharge of 4.6 feet before overtopping the dam.

Middle River and several tributary streams are impounded by this structure. The watershed is rolling and wooded. Minor swamp areas and 80 acre State Line Pond offer some storage volume in the watershed area.

5.2 DESIGN DATA: Ellithorpe Dam was designed by the Soil Conservation Service. The weighted curve number for the watershed was computed to be 66 for AMC II and 84 for AMC III. The time of concentration was computed to be 7.1 hours.

The design flood used a rainfall of 12.9 inches in 6 hours. A total precipitation loss of 1.5 inches resulted in a net runoff of 11.4 inches. Drawdown time was calculated to be 4.41 days.

The critical depth at the control section in the emergency spillway was calculated to be 1.27 feet and the maximum velocity to be 7.35 feet per second.

5.3 EXPERIENCE DATA: No historical data for recorded discharges or water surface elevations are available for this dam or watershed.

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". Ellithorpe Dam is classified as intermediate in size with a high hazard potential. Guidelines for these classifications indicate that an event equal in magnitude to the Probable Maximum Flood should be used. The probable maximum rainfall for this area is 24 inches in 6 hours for 10 square miles. When designing this facility, the Soil Conservation Service used a 6 hour rainfall of 12.9 inches and a runoff of 11.4 inches.

The design flood was calculated by SCS to be 12,870 cfs which is 1,260 CSM. A peak outflow for the design flood inflow was computed to be 2,200 cfs by the Soil Conservation Service. This outflow results in a water surface elevation 2.1 feet below the crest of dam with a maximum depth of flow in the emergency spillway of 2.5 feet.

Using Corps of Engineers methods, the PMF was calculated to be 16,900 cfs inflow with the peak outflow 10,800 cfs at an elevation of 591.6. This elevation is 0.6 feet above the top of dam. A test flood equal to the PMF was used for this report.

The capacity of spillways at the top of dam elevation is 5,730 cfs which is 53 percent of the calculated test flood discharge.

5.5 DAM FAILURE ANALYSIS: Applying the calculated dam failure discharge of 105,000 cfs when the impounded water level in the reservoir

is at elevation 591.0 (Top of Dam) will produce a flood depth of 18.8 feet and an approximate water surface elevation of 580.8 just downstream of the dam. At the peak discharge rate of 5,730 cfs at top of dam, the approximate water surface elevation would be 567.2 just downstream of the dam. About 210 feet below the dam, there is a house with the first floor at about elevation 570. Before failure, this house would not be flooded, but would have 10.8 feet of water over the first floor post-failure.

Approximately 2,000 feet downstream of Ellithorpe Dam, there is an Industrial Park with one business in the vicinity of the flood area. The first floor elevation of the building is at approximately elevation 578 with the pre-failure water elevation at 567.2. Post-failure water elevation would be at 580.8.

From 7,000 to 8,000 feet downstream, Middle River passes through the Village of Orcutts. In this area, there is a lumber yard with a storage building at elevation 531. The pre-failure water level would be elevation 532.7 while the post-failure level would be 538.8. In this same area, there is one house located south of Orcuttville Road with a first floor elevation of about 531. With water elevation at 531.4 before failure, there would be minor flooding of the first floor. Post-failure water level would be 539.6 with 8.6 feet of water over first floor level.

This dam is classified as having a high hazard potential because two businesses would have extensive damage and the assumed failure could cause the loss of more than a few lives.

Computations of water surface, elevations and a map showing the limits of the impact area are included in Appendix D.

## SECTION 6 - STRUCTURAL STABILITY

- 6.1 VISUAL OBSERVATION: The field inspection did not reveal any stability problems.
- 6.2 DESIGN AND CONSTRUCTION DATA: A review of the "As Built" drawings did not disclose any potential stability problems. It was assumed that the dam was constructed as shown on the drawings. The field inspection did not indicate any substantial variance from the plans.
- 6.3 POST CONSTRUCTION CHANGES: There are no post construction changes apparent.
- 6.4 SEISMIC STABILITY: Ellithorpe Dam is located in Seismic Zone 1 and in accordance with the Corps of Engineers' guidelines does not warrant further seismic analysis at this time.

## SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

### 7.1 DAM ASSESSMENT:

- a. Condition. Based on the visual inspection, Ellithorpe Dam appears to be in good condition.
- b. Adequacy of Information. "As Built" drawings were made available for this report. The Work Plan and Design Report were available for examination at the Soil Conservation Service office. Actual design calculations were not available, but were reviewed by engineers for the Connecticut Water Resources Commission before construction was started.
- c. Urgency. The recommendations presented in Sections 7.2 and 7.3 should be carried out within two years of receipt of this Report by the owner.

7.2 RECOMMENDATIONS: There are no recommendations requiring additional engineering investigation or major modifications to the dam.

### 7.3 REMEDIAL MEASURES:

- a. Operation and Maintenance Procedures. The following remedial measures should be implemented during routine maintenance trips to the dam:

1. Repair erosion caused by recreational vehicles running on the slopes.
2. Exterminate rodents invading the upstream face of the embankment and fill the burrows with suitable compacted material.
3. Emergency procedures consisting of an operation plan and warning system for downstream residents should be developed and implemented.
4. Maintain a record of maximum water levels during flood events for future evaluation studies.
5. During flood events, check dam for evidence of seepage.
6. Institute a biennial inspection of the dam by technical personnel.

7.4 ALTERNATIVES: There are no alternatives to the recommendations and remedial measures contained in Sections 7.2 and 7.3.

APPENDIX A

INSPECTION CHECK LIST

VISUAL INSPECTION CHECK LIST  
PARTY ORGANIZATION

PROJECT Ellithorpe Dam DATE 2-17-81

TIME 2:00 p.m.

WEATHER Clear 50°

W.S.Elev. 563.5 U.S. 563.0 DN.S.

PARTY:

- |                                                |           |
|------------------------------------------------|-----------|
| 1. <u>G. Mirtl, Hydrology &amp; Hydraulics</u> | 6. _____  |
| 2. <u>C. Welti, Soils &amp; Geology</u>        | 7. _____  |
| 3. <u>E. Lang, Structural &amp; Mechanical</u> | 8. _____  |
| 4. _____                                       | 9. _____  |
| 5. _____                                       | 10. _____ |

<u>PROJECT FEATURE</u>	<u>INSPECTED BY</u>	<u>REMARKS</u>
------------------------	---------------------	----------------

- |                                                           |       |       |
|-----------------------------------------------------------|-------|-------|
| 1. <u>All features inspected by all members of party.</u> | _____ | _____ |
| 2. _____                                                  | _____ | _____ |
| 3. _____                                                  | _____ | _____ |
| 4. _____                                                  | _____ | _____ |
| 5. _____                                                  | _____ | _____ |
| 6. _____                                                  | _____ | _____ |
| 7. _____                                                  | _____ | _____ |
| 8. _____                                                  | _____ | _____ |
| 9. _____                                                  | _____ | _____ |
| 10. _____                                                 | _____ | _____ |

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>DIKE EMBANKMENT</u>	
Crest Elevation	591.0
Current Pool Elevation	None
Maximum Impoundment to Date	Unknown
Surface Cracks	None Visible
Pavement Condition	No pavement, grass covered crest
Movement or Settlement of Crest	None apparent
Lateral Movement	None apparent
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	Not applicable (N/A)

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
----------------	-----------

DIKE EMBANKMENT (cont)

Trespassing on Slopes

Three recreational vehicle trails on D.S. slope and two on U.S. slope. Numerous animal burrows on U.S. slope. May be some on D.S. slope, but none observed

Sloughing or Erosion of Slopes or Abutments

Minor erosion at recreational vehicle trails

Rock Slope Protection - Riprap Failures

None - Riprap only on emergency spillway slopes.

Unusual Movement or Cracking at or near Toes

None

Unusual Embankment or Downstream Seepage

None

Piping or Boils

None

Foundation Drainage Features

Appear to be functioning

Toe Drains

Good

Instrumentation System

N/A

Vegetation

Very good grass cover, no trees.

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81  
 PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_  
 DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u>	
a. Approach Channel	
Slope Conditions	Good
Bottom Conditions	Good
Rock Slides or Falls	None
Log Boom	N/A
Debris	None
Condition of Concrete Lining	N/A
Drains or Weep Holes	N/A
b. Intake Structure	
Condition of Concrete	Good
Stop Logs and Slots	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u>	Concrete pipe principal spillway outlet
General Condition of Concrete	Good
Rust or Staining on Concrete	None
Spalling	None
Erosion or Cavitation	None
Cracking	None
Alignment of Monoliths	N/A
Alignment of Joints	N/A
Numbering of Monoliths	N/A

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81  
 PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_  
 DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	N/A
a. Concrete and Structural	
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u> (cont)	N/A
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u>	
General Condition of Concrete	Good
Rust or Staining	None
Spalling	None
Erosion or Cavitation	None
Visible Reinforcing	None
Any Seepage or Efflorescence	None
Condition at Joints	Good
Drain Holes	None
Channel	Good
Loose Rock or Trees Overhanging Channel	None
Condition of Discharge Channel	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	Emergency Spillway
a. Approach Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Good
b. Weir and Training Walls	N/A
General Condition of Concrete	
Rust of Staining	
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
----------------	-----------

OUTLET WORKS - SPILLWAY WEIR,  
APPROACH AND DISCHARGE  
CHANNELS

b. Weir and Training Walls	N/A
----------------------------	-----

Drain Holes

c. Discharge Channel

General Condition	Good
-------------------	------

Loose Rock Overhanging Channel	None
--------------------------------	------

Trees Overhanging Channel	None
---------------------------	------

Floor of Channel	Good
------------------	------

Other Obstructions	None
--------------------	------

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SERVICE BRIDGE</u>	N/A
a. Super Structure	
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	

PERIODIC INSPECTION CHECK LIST

PROJECT Ellithorpe Dam DATE 2-17-81

PROJECT FEATURE \_\_\_\_\_ NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_ NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
----------------	-----------

OUTLET WORKS - SERVICE BRIDGE  
(cont)

N/A

b. Abutment & Piers

General Condition of Concrete

Alignment of Abutment

Approach to Bridge

Condition of Seat & Backwall

APPENDIX B

ENGINEERING DATA

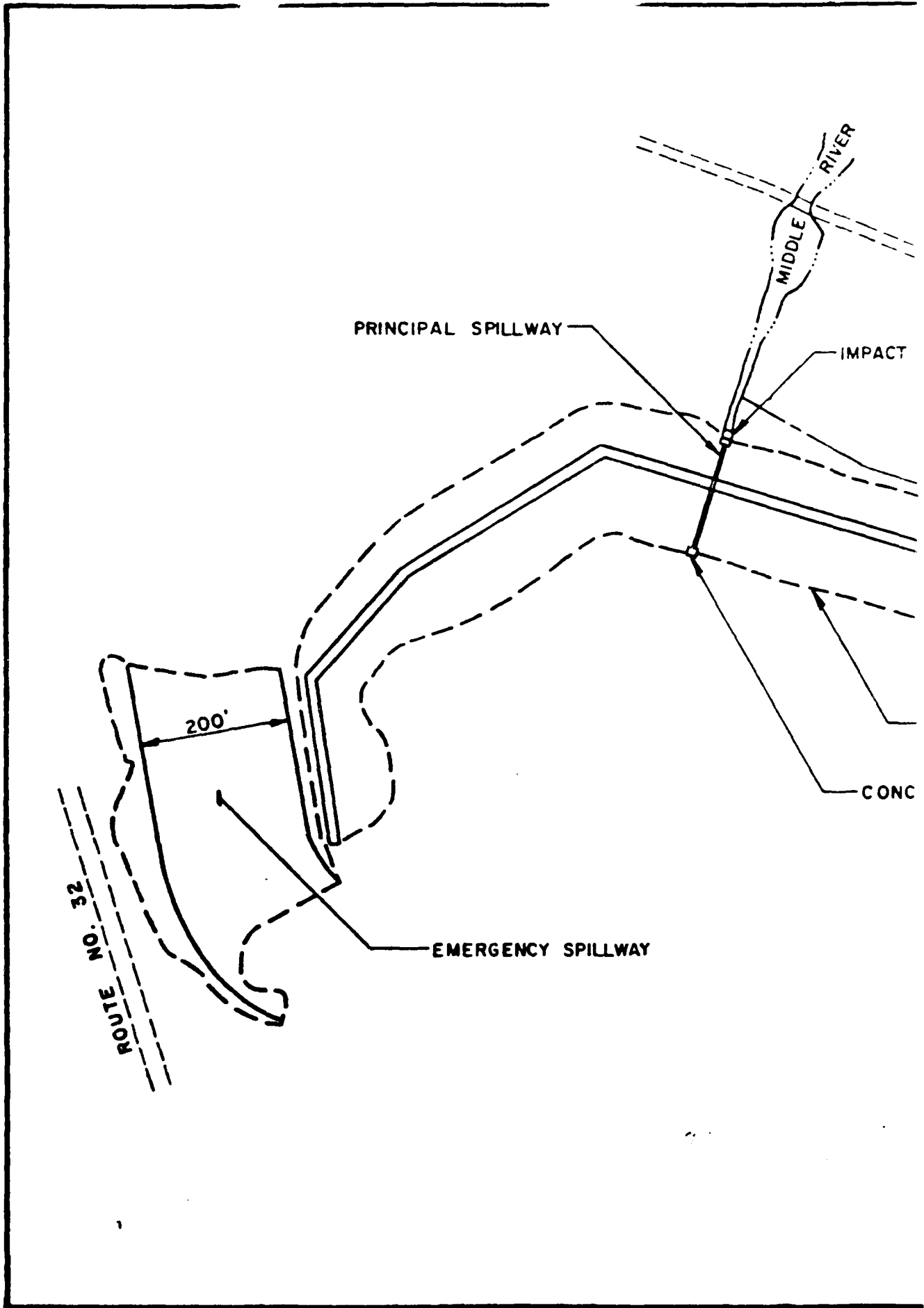
ENGINEERING DATA

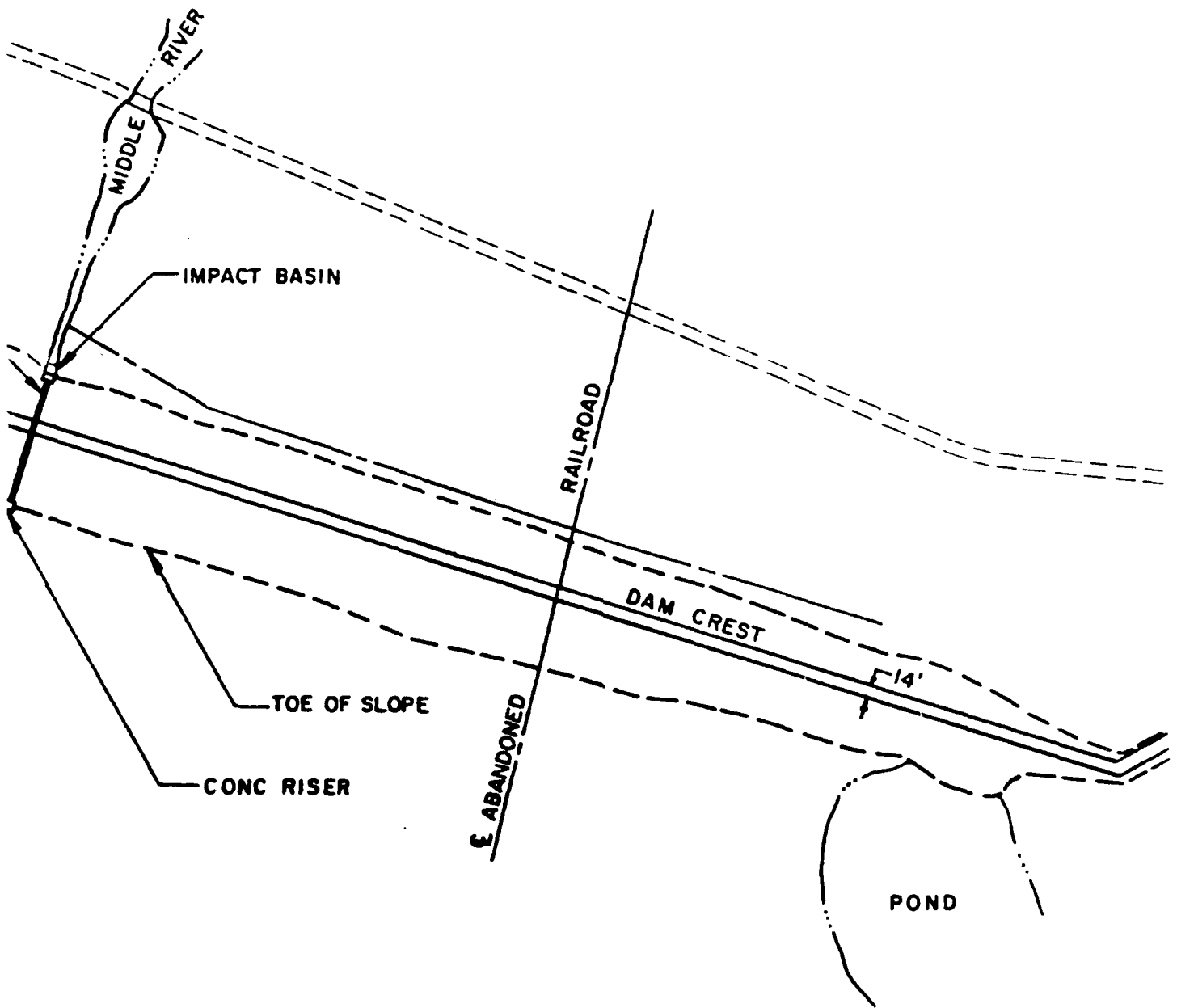
1. As Built drawings and maintenance information are on file at:

State of Connecticut  
Department of Environmental Protection  
State Office Building  
Hartford, CT 06114

2. Work Plan, Design Report and access to original calculations are available at:

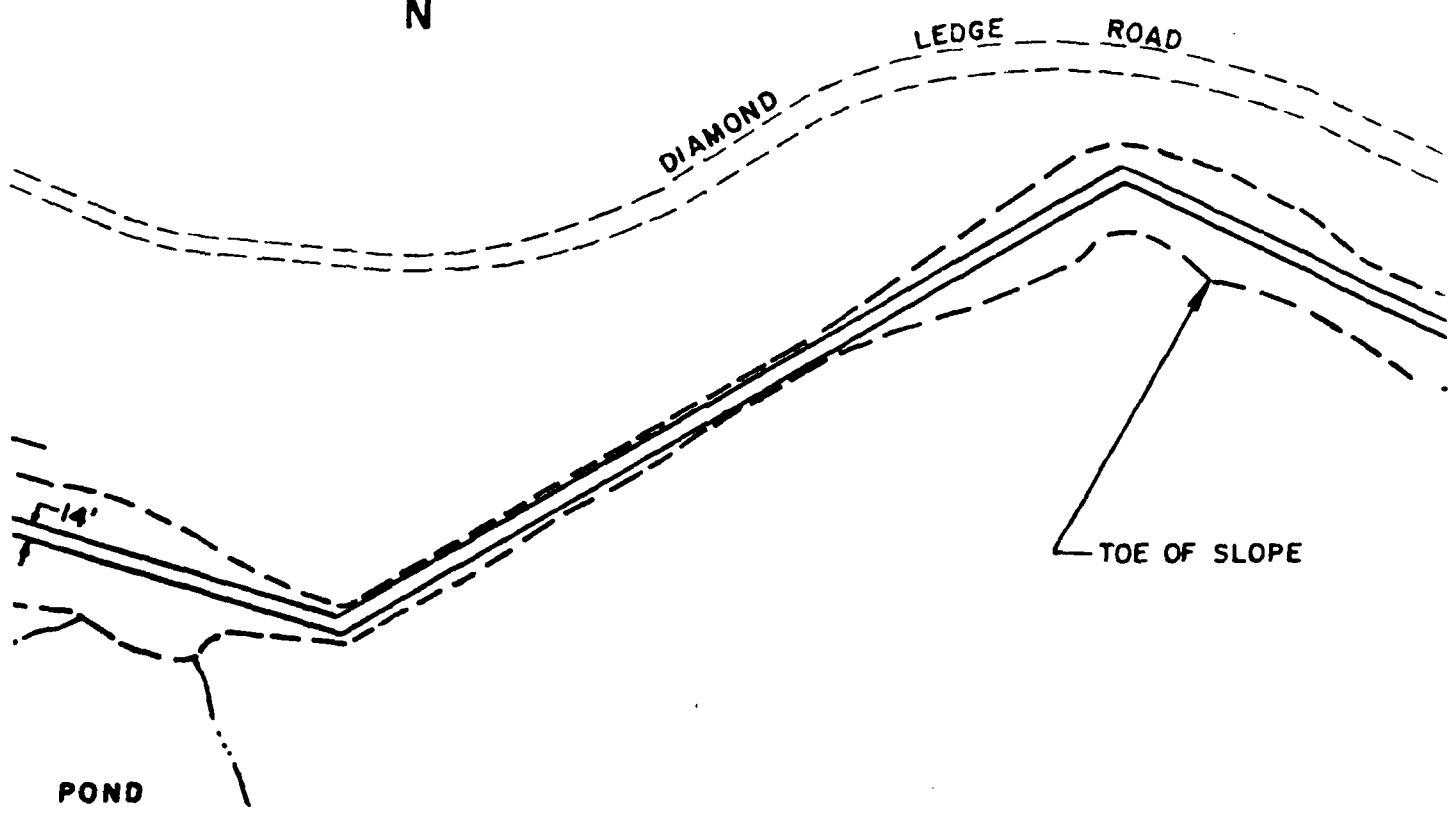
U.S. Department of Agriculture  
Soil Conservation Service  
Mansfield Professional Park  
Storrs, CT 06268





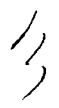
GENERAL PL

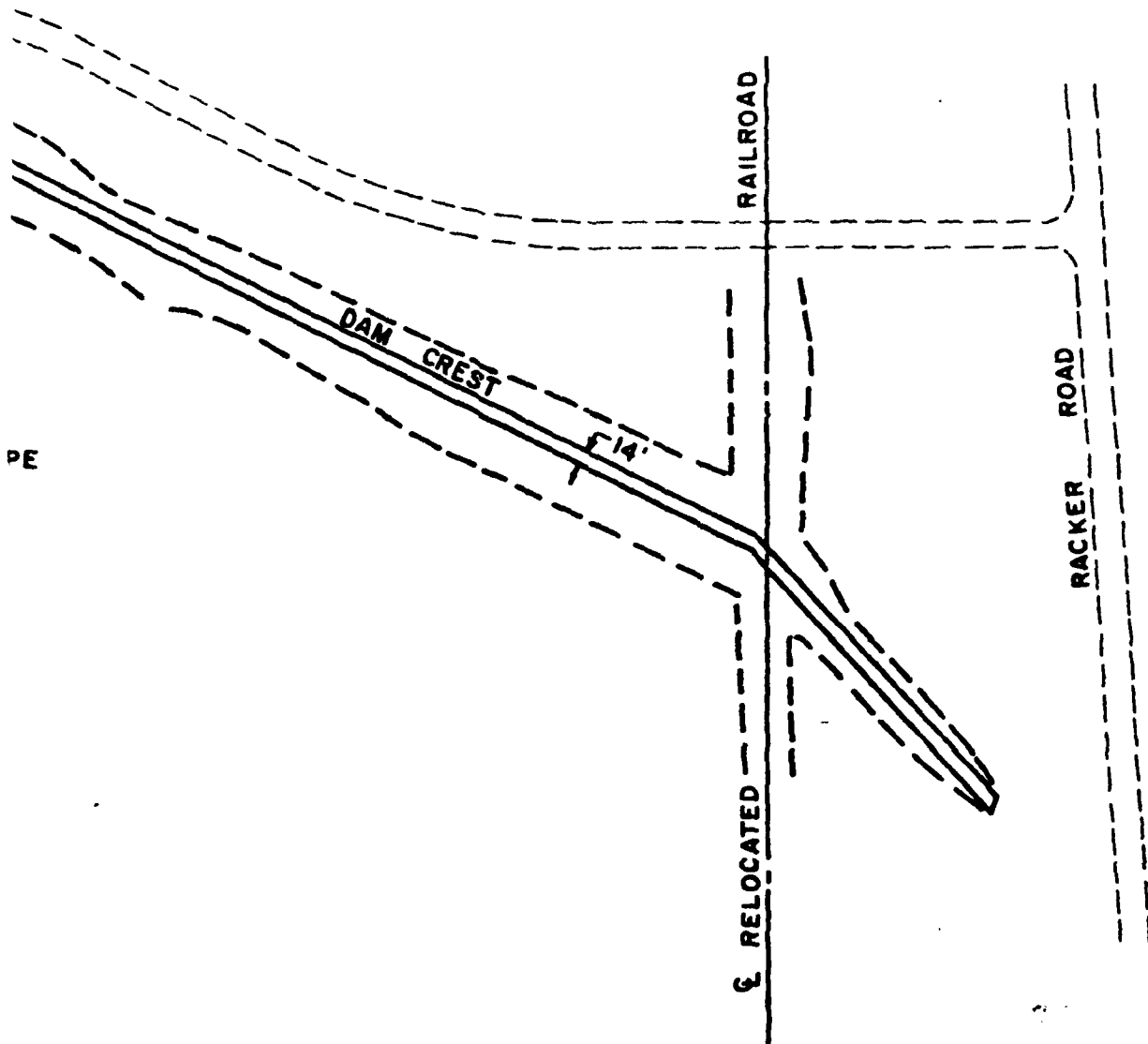
SCALE: 1" = 160' ±



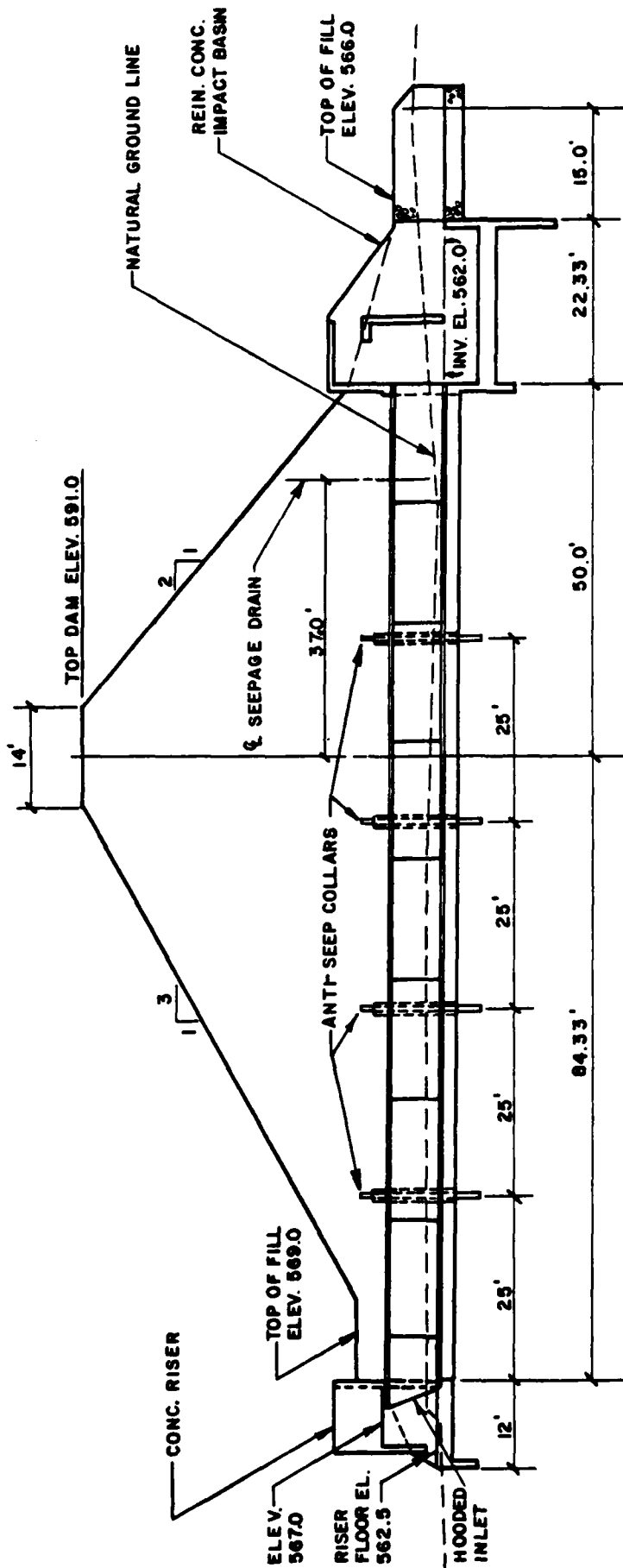
**GENERAL PLAN**

SCALE: 1" = 160' ±





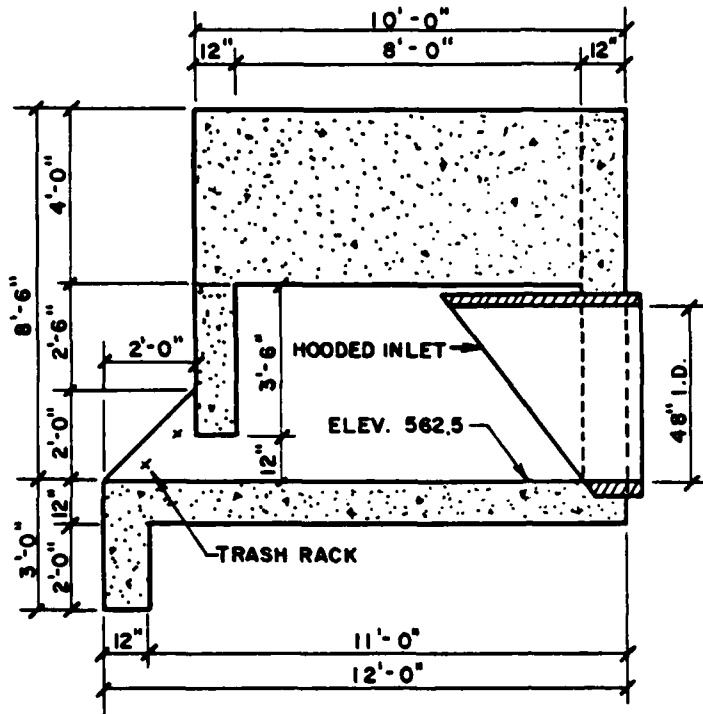
ELLITHORPE DAM  
PLATE B-1



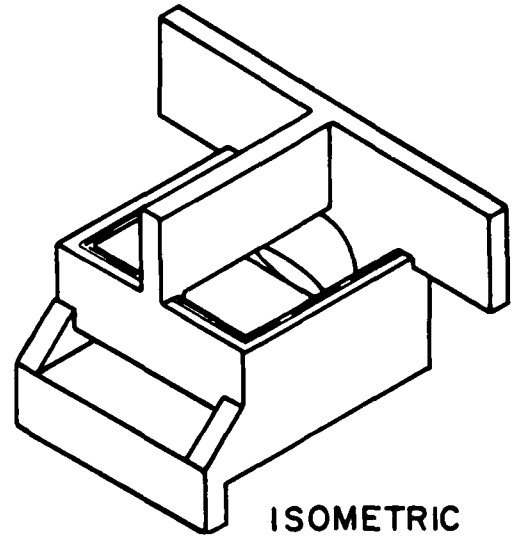
**PROFILE ALONG  $\mathcal{C}$  OF PRINCIPAL SPILLWAY**

SCALE: 1" = 20' HORIZ.  
1" = 12' VERT.

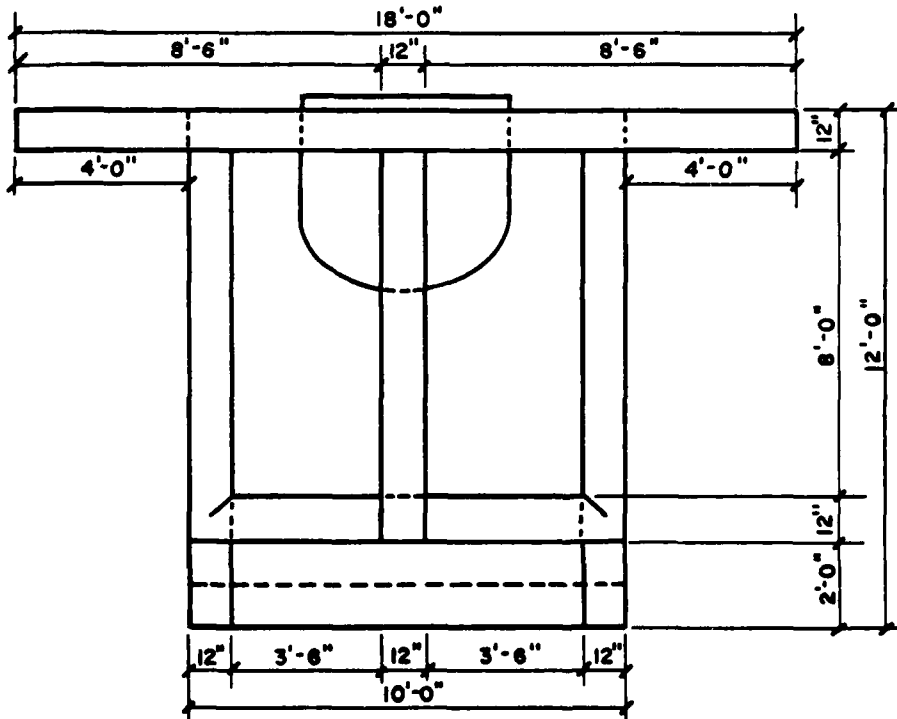
ELLITHORPE DAM



SECTION @ CENTERLINE



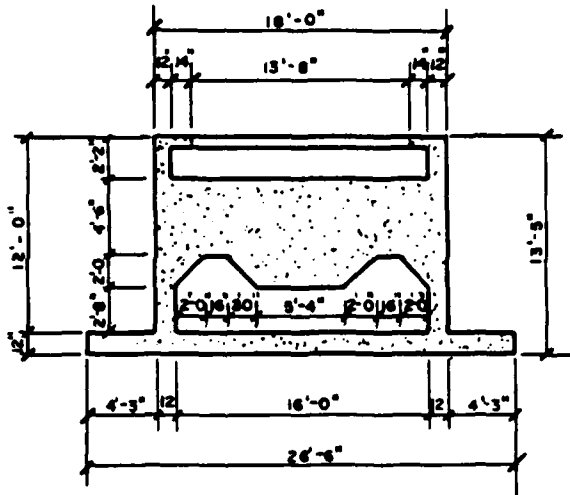
ISOMETRIC



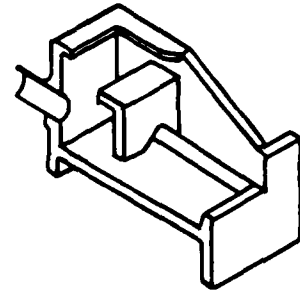
PLAN VIEW

CONCRETE RISER

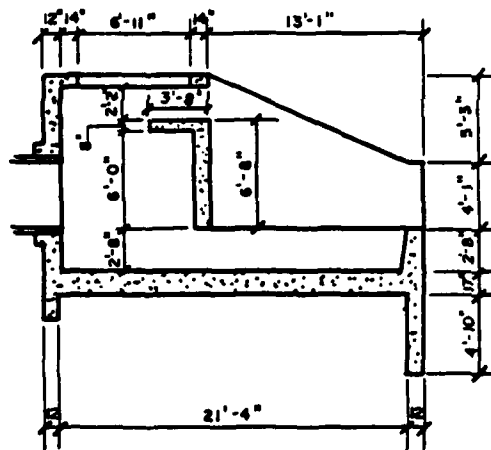
NOT TO SCALE



SECTION THRU BAFFLE



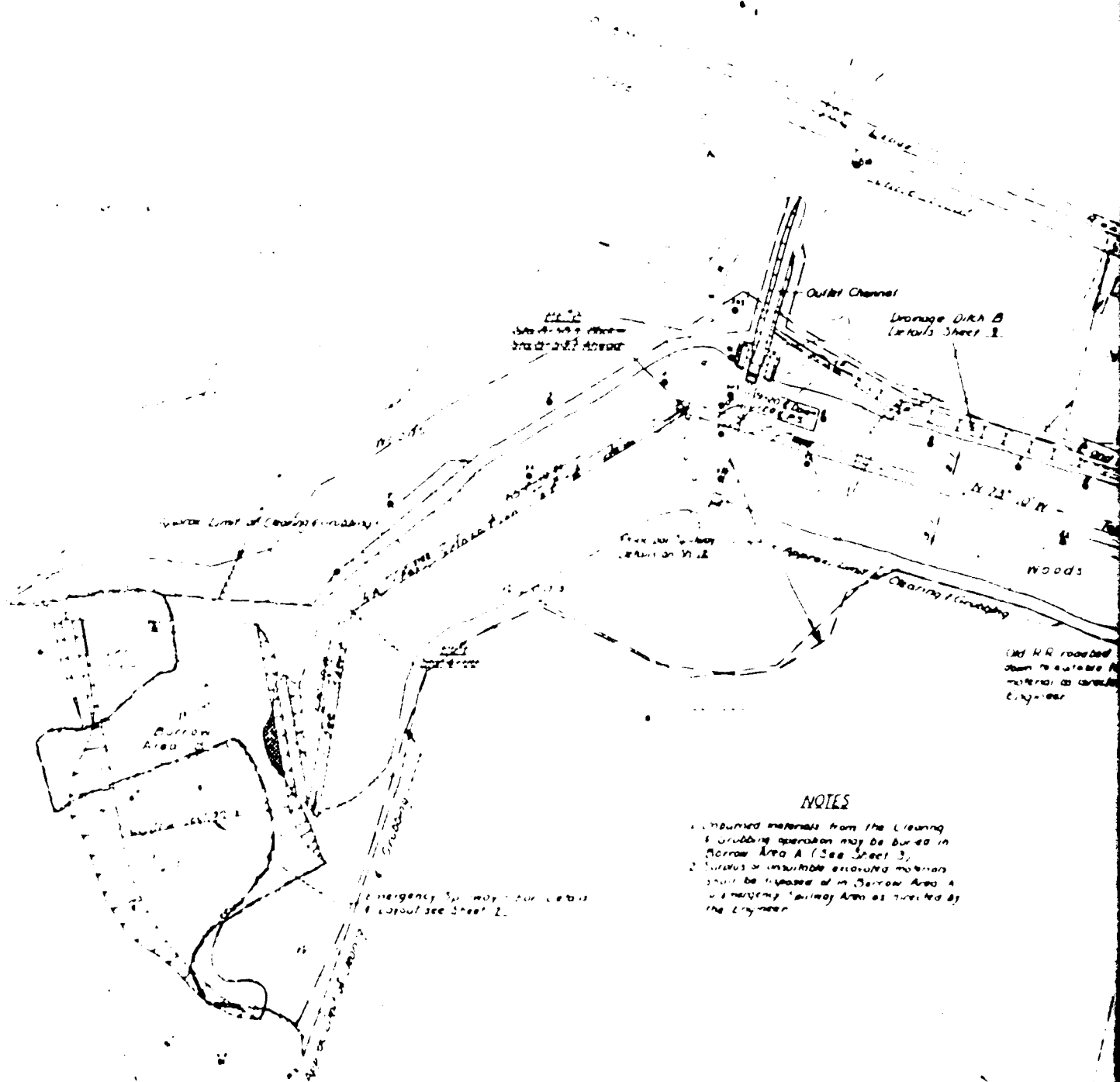
HALF ISOMETRIC



SECTION ON E

IMPACT BASIN

NOT TO SCALE



Water Limit of Clearing Boundary

Outlet Channel

Drainage Ditch B  
Details Sheet 3

Water Limit of Clearing Boundary

Emergency Spillway  
Location on Site

Woods

Clearing Boundary

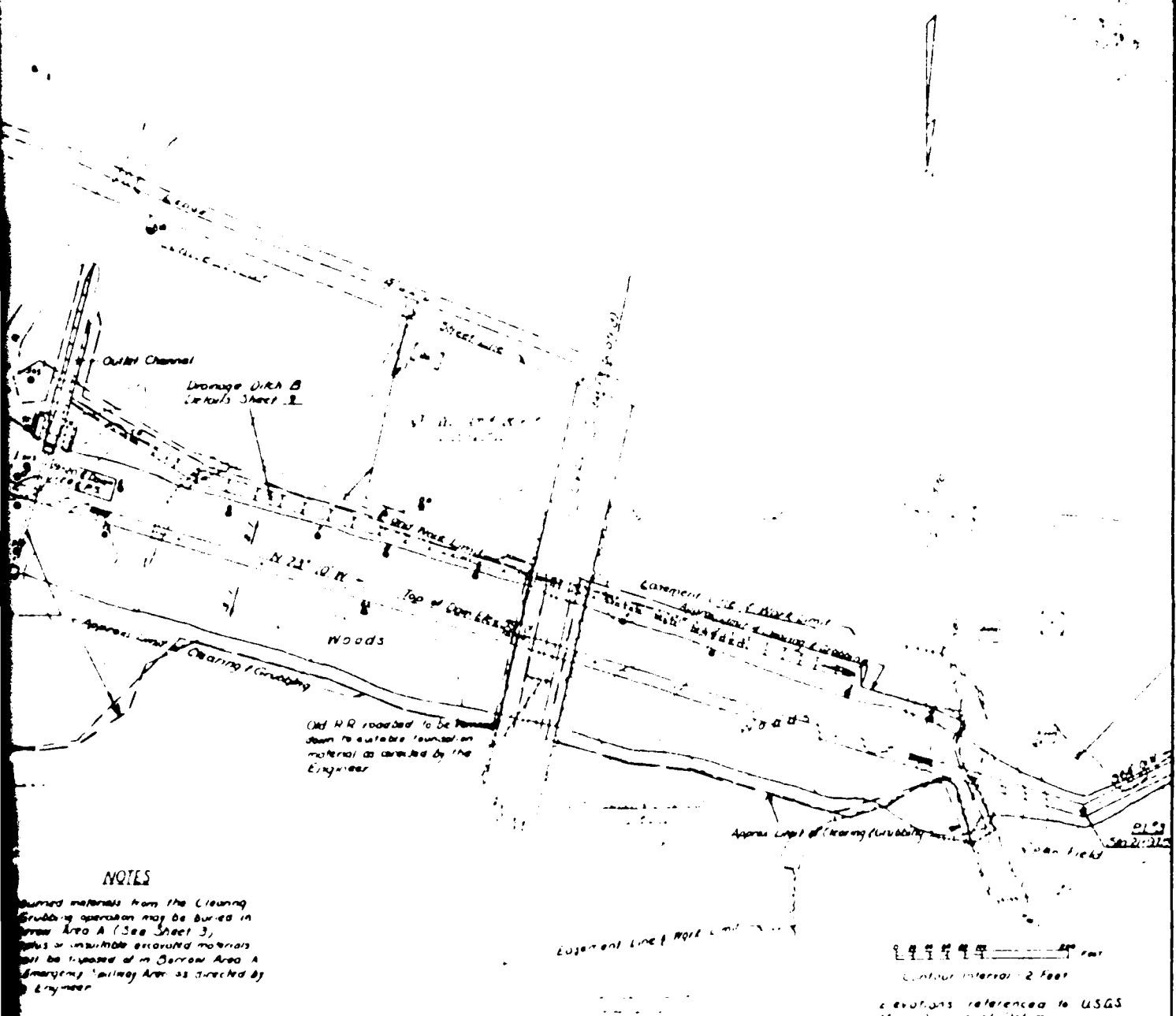
Old H.R. roadbed  
down to outside of  
material to be  
excavated

Curren  
Area A

**NOTES**

1. Unburned materials from the clearing & grubbing operation may be buried in Curren Area A (See Sheet 3).
2. Flammable or unstable excavated materials shall be disposed of in Curren Area A or emergency Spillway Area as directed by the Engineer.

Emergency Spillway for Levee & Outlet see Sheet 1



**NOTES**

Excavated materials from the Clearing & Grubbing operation may be buried in borrow Area A (See Sheet 3), unless or insurable excavated materials will be disposed of in borrow Area A (Emergency borrow Area) as directed by the Engineer.

**LEGEND**

- ✕ Iron Pin
- Property or Easement Line
- Soil Boring Location
- Test Pit Location
- - - Clearing & Grubbing Limits
- ~ Edge of woods

**AS-BUILT**

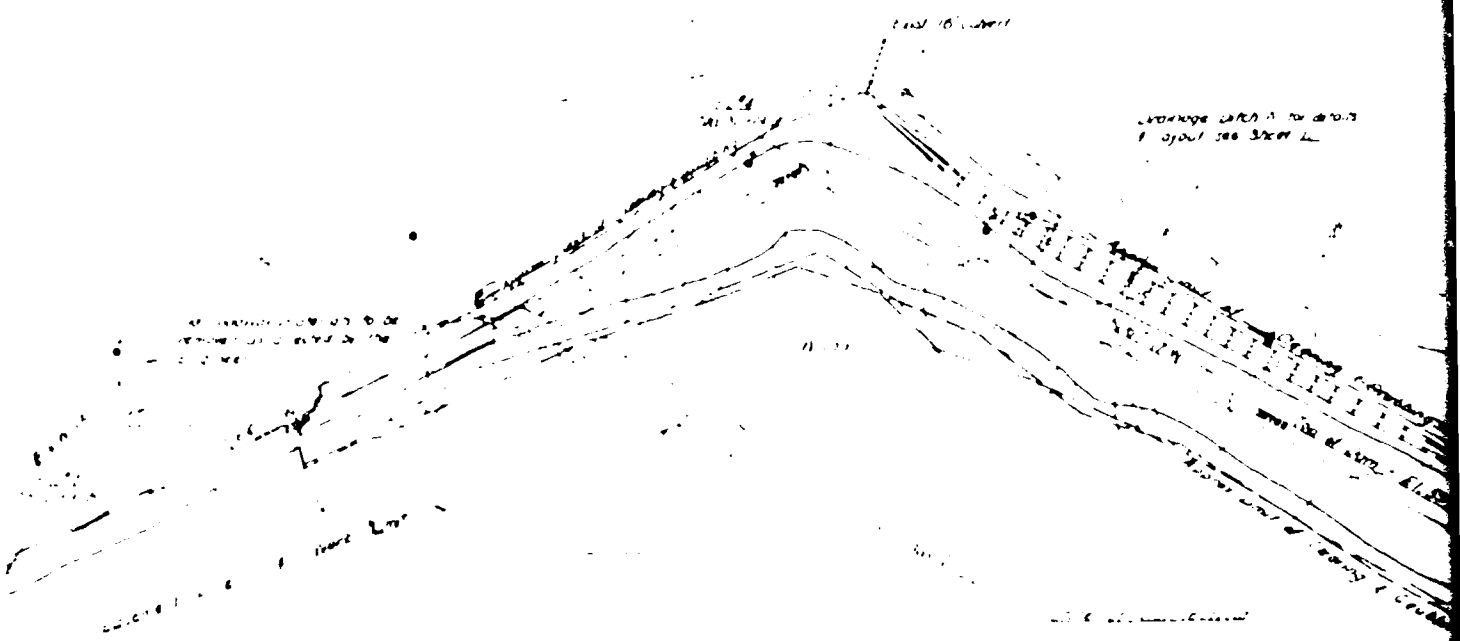
PLAN OF STRUCTURAL WORKS  
 PENNACE BRIDGE  
 MIDDLE RIVER WATERSHED PROTECTION PROJECT  
 SITE NO. 5 - EIGHTH PPE DAM  
 STAFFORD, CONNECTICUT

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

DATE: Sept. 65

FORM SCS 318 APRIL 1962  
 33

CN-409-P

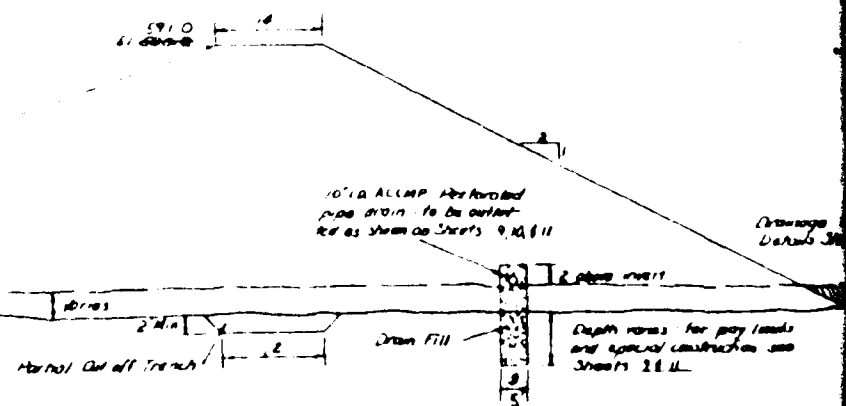


The embankment shall be earth fill. A 10% surcharge shall be placed on the embankment during construction. The embankment shall be well graded soil (S.P. or M.S.P.) as represented in the following table:

P. 201	10	10	10
P. 202	10	10	10
P. 203	10	10	10
P. 204	10	10	10
P. 205	10	10	10

Surcharge materials consisting of city trash, poorly graded gravel and well graded sand (No. 10 or 20) as represented in the following table shall be placed in the upper portion of the embankment as directed by the Engineer:

P. 206	10	10	10
P. 207	10	10	10
P. 208	10	10	10
P. 209	10	10	10



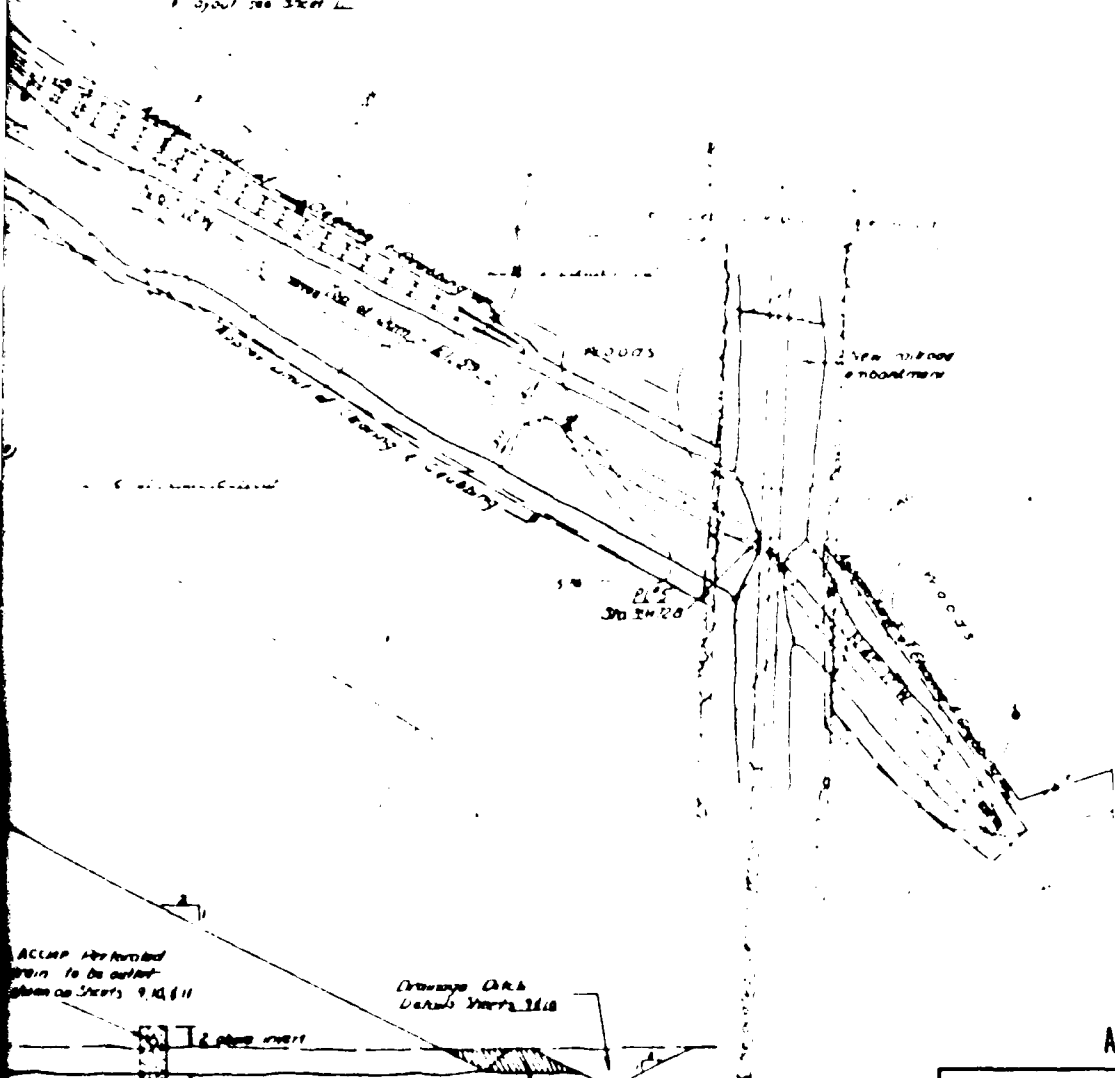
**TYPICAL SECTION OF EMBANKMENT**

NOT TO SCALE

Where Drainage Ditch is a suitable material shall be used and replaced with compacted to form bases for mass equipment as directed by the Engineer.

Approx. Sta. 1000 to 1050

STORAGE DAM AT THE POINT  
OF POINT 200 300 L



Reproduced from best available copy.

ACCOMP. HYDRAULIC  
WORKS TO BE OUTLET  
AS SHOWN ON SHEETS 9, 10, 11

Drainage Ditch  
Details Sheets 21, 22

Depth varies for pay lands  
and special construction see  
Sheets 21, 22.

Where Drainage Ditch is called for,  
unsuitable material shall be removed  
and replaced with compacted fill  
to form bases for maintenance  
equipment as directed by the Engineer.  
Approx. Sta. 11+00 to 11+500



Contour Interval - 2 Feet

Elevations referenced to U.S.G.S.  
Mean Sea Level Datum

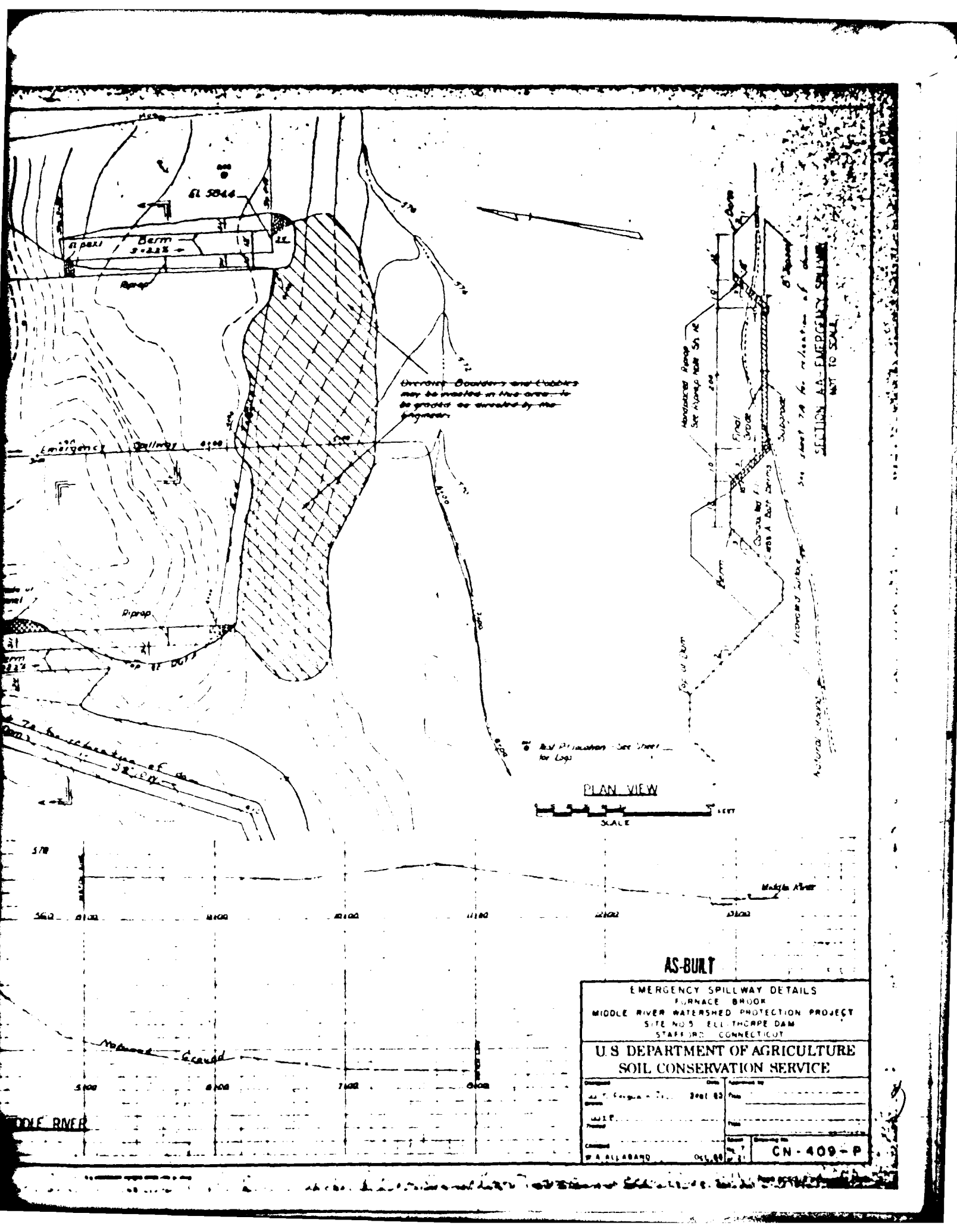
AS-BUILT

PLAN OF STRUCTURAL WORKS FINNACE BROOK MIDDLE RIVER WATERSHED PROTECTION PROJECT SITE NO. 3 ELLITHORPE DAM STAFFORD, CONNECTICUT	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Drawn by: W. J. ... Date: ... Checked by: ... Date: ...	Project No.: ... Sheet No.: ... Total Sheets: ...
Engineer: W. A. ALLABAND	Date: ... <b>CN-409-P</b>

BANKMENT

FROM SET 113, 114, 115

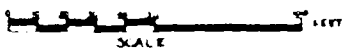




Overlaid - Boulders and cobbles may be washed in this area - to be graded as directed by the engineer

SECTION AA - EMERGENCY SPILLWAY  
NOT TO SCALE

PLAN VIEW

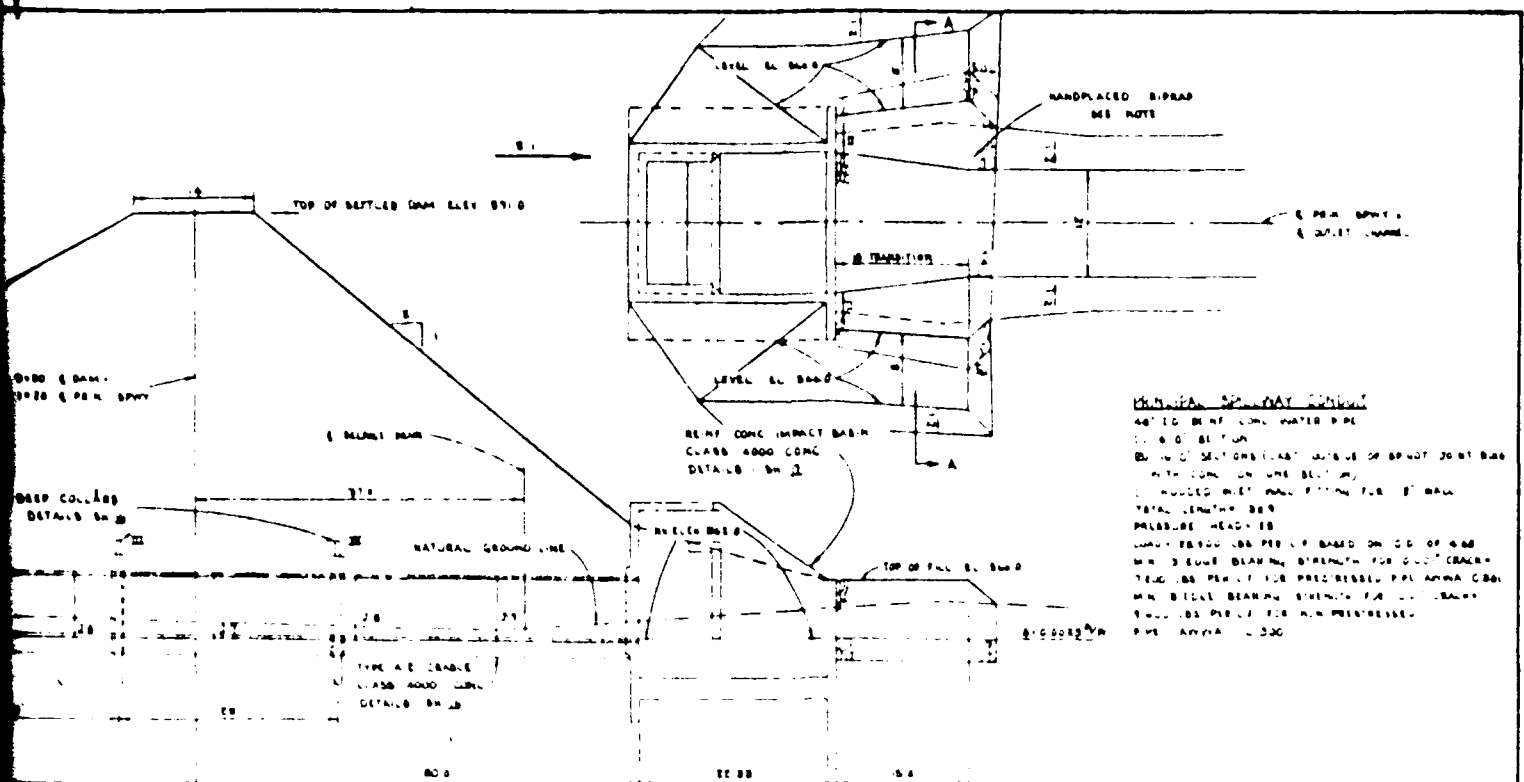


AS-BUILT

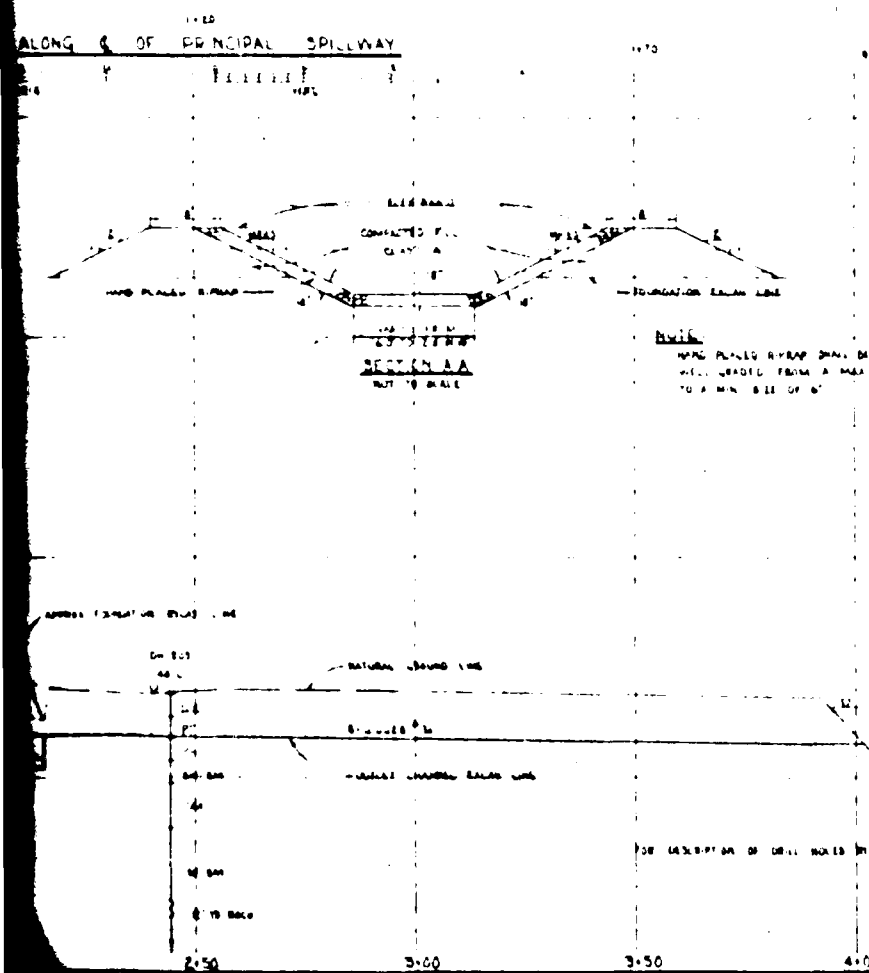
<p>EMERGENCY SPILLWAY DETAILS FURNACE BROOK MIDDLE RIVER WATERSHED PROTECTION PROJECT SITE NO. 5 ELL THORPE DAM STAFF RD. CONNECTICUT</p>	
<p>U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</p>	
<p>Designed by J. T. Ferguson Checked by J. S. P. Drawn by W. A. Allaband</p>	<p>Date 2001 03 Scale 1" = 10' Drawing No. CN-409-P</p>

DOLE RIVER





**PRINCIPAL SPILLWAY CONCRETE**  
 48" I.C. BENT CONC WATER PIPE  
 12" Ø SECTION  
 BENT CONC AT LEAST 12" ABOVE OR BELOW JOINT BASH  
 WITH CONC ON ONE SIDE ONLY  
 1" HOLED MET WALL FITTING FOR 1" WALL  
 TOTAL LENGTH 36"  
 PRESSURE HEAD 18"  
 LOAD 28000 LBS PER LF BASED ON 60% OF 4000  
 PSI 3000 BEARING STRENGTH FOR GOOD CRACK-  
 TEND 60% PER LF FOR PRESTRESSED POLYMER CON-  
 CRETE 3000 BEARING STRENGTH FOR 100% BEARING  
 STRENGTH PER LF FOR NON PRESTRESSED  
 PER APPROX 10000



DEPTH	NO. OF TESTS	MIN. STRENGTH	MAX. STRENGTH
0	0	0	0
1	3	5270	5610
2	3	5270	5610
3	3	5270	5610
4	3	5270	5610
5	3	5270	5610
6	3	5270	5610
7	3	5270	5610
8	3	5270	5610
9	3	5270	5610
10	3	5270	5610
11	3	5270	5610
12	3	5270	5610
13	3	5270	5610
14	3	5270	5610
15	3	5270	5610
16	3	5270	5610
17	3	5270	5610
18	3	5270	5610
19	3	5270	5610
20	3	5270	5610

**NOTE:**  
 HAND PLACED S-BRAND SHALL BE REASONABLY  
 WELL LEADED FROM A MAX SIZE OF 1/4"  
 TO A MAX SIZE OF 6"

DEPTH	MIN. STRENGTH	MAX. STRENGTH
I	5270	5610
II	5270	5610
III	5270	5610
IV	5270	5610

**AS-BUILT**

PRINCIPAL SPILLWAY  
 FRENCH BROOK  
 MIDDLE RIVER WATERSHED PROTECTION PROJECT  
 SITE NO. 1, 1111TH HPE DAM  
 STATE NO. CONNECTICUT

**U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE**

DATE: 11/1/52  
 DRAWN BY: W.A. BILLARANT  
 CHECKED BY: [Signature]  
 PROJECT NO. CN-409-P

5  
CT 481

No. \_\_\_\_\_ WATER RESOURCES COMMISSION  
SUPERVISION OF DAMS  
INVENTORY DATA

Inventoried  
By \_\_\_\_\_

Date \_\_\_\_\_

Name of Dam or Pond SCS #5 Filling

Code No. W 24.0 MR 5.0

Nearest Street Location \_\_\_\_\_

Town Stafford

LONG. 72°21.2'

U.S.G.S. Quad. STAFFORD SPRINGS

LAT. 11°59.7'

Name of Stream Middle R.

Owner State Comm. of Agric.

Address \_\_\_\_\_

CA 6870 AC

Pond Used For FLOOD CONTROL DA 10.27 SM

Dimensions of Pond: Width \_\_\_\_\_ Length \_\_\_\_\_ Area 371

Total Length of Dam \_\_\_\_\_ Length of Spillway 215

Location of Spillway SEQUEST

Height of Pond Above Stream Bed 14.4'

Height of Embankment Above Spillway 4.6'

1969

Type of Spillway Construction overland grass

Type of Dike Construction fill

Downstream Conditions village

Summary of File Data N. filling file

Remarks FLOODWATER DETENTION CAPACITY 4130

TOTAL RESERVOIR CAPACITY 4027

JOHN J. MOZZOCHI AND ASSOCIATES  
CIVIL ENGINEERS

GLASTONBURY, CONN.  
217 HEBRON AVENUE  
PHONE 633-9401

PROVIDENCE 3, R. I.  
200 DYER STREET  
PHONE GASPEE 1-0420

JOHN J. MOZZOCHI  
ASSOCIATES  
OWEN J. WHITE  
JOHN LUCHS, JR.  
ECTOR L. GIOVANNINI

January 18, 1965

REPLY TO: Glastonbury

Mr. Charles Pelletier  
State Water Resources Commission  
State Office Building  
Hartford 15, Connecticut

Re: Site No. 5  
Ellithorpe  
Stafford

Dear Mr. Pelletier:

We have received your letter of January 13, 1965 together with a copy of a letter to you from T. R. Wire of the Soil Conservation Service, dated January 5, 1965. Both letters deal with the hydrologic design of the Ellithorpe Dam, Site No. 5, Stafford.

I have discussed this matter over the telephone with Mr. Wire, and we are all in agreement on the following procedure:

1. "Diane" storm runoff will be used to design the principal spillway and to establish the crest elevation of the emergency spillway.
2. Disregarding the "Diane" storm, a 100 year - 6 hour - soil condition 3 storm will be routed into the reservoir and drawn down for five days in order to establish a starting water level elevation for the emergency spillway design.
3. Emergency spillway flood based on 15 inch rainfall will be routed into the reservoir with the water level elevation established as described above. The emergency spillway will be designed to handle the resulting outflow.
4. A 2 foot minimum freeboard will be provided above the maximum water level resulting from the emergency spillway flood as described above.

It is my understanding that all other established State requirements such as precipitation losses, maximum spillway velocity, etc., will be met.

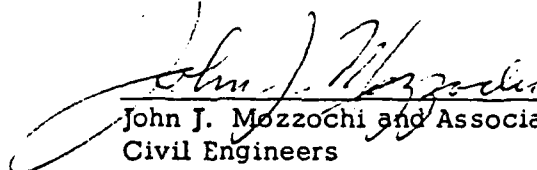
While your letter to N. Paul Tedrow of S. C. S. dated May 14, 1963 was part of the background for this particular design, it should be understood that the suggestions made in your letter are not established State criteria but may be used in certain specific locations where warranted.

STATE WATER RESOURCES COMMISSION RECEIVED JAN 20 1965 ANSWERED..... REFERRED..... FILED.....
----------------------------------------------------------------------------------------------------------------

You also questioned Mr. Wire's statement, "...with the elevation of the emergency spillway being set according to this storm (the 100 yr. storm) or an actual storm of record (the "Diane" storm) whichever might be greater." Mr. Wire told me that it is his understanding that at those locations in the State where the actual "Diane" rainfall was less than the 100 year storm, the 100 year storm would be used to design the principal spillway. This criteria does not apply to the Ellithorpe site, but he says it has been tentatively approved for other areas presently in the planning stages. Again, this criteria may apply to some specific sites, but should not be considered a general rule.

In any event, it appears that S. C. S. criteria for the Ellithorpe site will be satisfactory. I have indicated this to Mr. Wire over the telephone but I assume you will confirm this to him by letter.

Very truly yours,

  
John J. Mozzochi and Associates  
Civil Engineers

JJM:hk

**JOHN J. MOZZOCHI AND ASSOCIATES**  
CIVIL ENGINEERS

GLASTONBURY, CONN.  
217 HEBRON AVENUE  
PHONE 633-9401

PROVIDENCE 3, R. 1.  
200 DYER STREET  
PHONE GASPEE 1-0420

JOHN J. MOZZOCHI

ASSOCIATES

OWEN J. WHITE  
JOHN LUCHE, JR.  
ECTOR L. GIOVANNINI

November 26, 1965

REPLY TO: Glastonbury

William P. Sander-Engineer-Geologist  
Water Resources Commission  
State Office Building  
Hartford 15, Connecticut

Re: Our File-57-73-19-No. 5  
Ellithorpe Dam  
Stafford Springs, Connecticut

Dear Mr. Sander:

In accordance with your instructions dated November 17, 1965, I have reviewed the Plans and Design computations submitted by the S. C. S. for the referenced project.

Reference to the following correspondence, which is in your file, will establish the modified design criteria that was agreed to for this project:

January 5, 1965 - T. R. Wire to William S. Wise  
January 13, 1965 - Charles J. Pelletier to John J. Mozzochi  
January 18, 1965 - John J. Mozzochi to Charles J. Pelletier

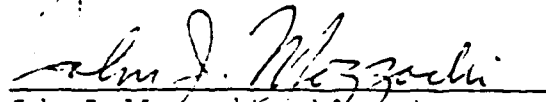
The following data is tabulated to compare the actual design with criteria established for flood retention dams by letter dated April 30, 1959 from Charles J. Pelletier.

	<u>Design Data</u>	<u>Established Criteria</u>
Drainage Area	10.27 Sq. Mi.	
Principal Spillway Design Flood	100 year - 6 Hr.	
Emergency Spillway Design Flood	12.9" in 6 Hrs. *	15" in 6 Hrs.
Total Precipitation Loss	1.5"	1.5" Max.
Net Run-off	11.4"	13.5" Min.
Design Peak Flow	12,868 CFS	
Per Sq. Mile	1,260 CFS	
Drawdown Time from Principal Spillway		
Design Storm High-water	4.41 Days	5 Days Max.
Maximum Discharge	2200 CFS	
Emergency Spillway Construction	Earth Channel	
Emergency Spillway Discharge	1887 CFS	
Emergency Spillway Width	200' Bottom	
Dc at Control Section	1.27'	
Vc at Control Section	6.25 FPS	9.0 FPS
Max. V in Emergency Spillway	7.35 FPS	9.0 FPS
Freeboard	2.0'	2.0'

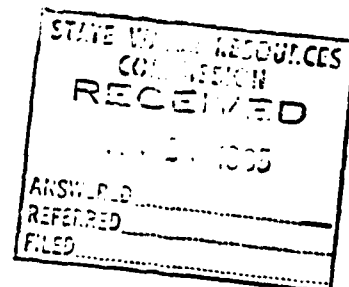
\*15" Point rainfall was modified to 12.9" areal due to size of watershed.  
This case is similar to modification of criteria accepted by W. R. C. for Site No. 15  
on Blackberry River in Norfolk.

I find that the design meets the modified criteria established and recommend  
that a Construction Permit be issued for this project.

Very truly yours,

  
John J. Mozzochi and Associates  
Civil Engineers

JJM:hk





STATE OF CONNECTICUT  
WATER RESOURCES COMMISSION  
STATE OFFICE BUILDING • HARTFORD 15, CONNECTICUT

CONSTRUCTION PERMIT FOR DAM

December 2, 1965

State of Connecticut  
Department of Agriculture &  
Natural Resources  
Hartford, Connecticut

TOWN: Stafford  
RIVER: Willimantic River  
TRIBUTARY: Middle River

Attention: Mr. Joseph M. Gill, Commissioner

Gentlemen:

Your application for a permit to (~~repeal~~) a dam on Middle River  
(construct)

at Site #5, Ellithorpe Dam

in the Town of Stafford in accordance

with plans prepared by the Soil Conservation Service

dated September 1965 has been reviewed.

The construction, in accordance with those plans, is APPROVED under the conditions which follow.

- I. The Commission shall be notified as follows:
  - A) When construction is started.
  - B) When foundation is excavated.
  - C) When project is complete and before water is impounded.
  - D) When project is complete and ready for final inspection.
- II. This permit with the plans and specifications must be kept at the site of the work and made available to the Commission at any time during the construction.
- III. If any changes are contemplated or required, the Commission must be notified and supplementary approval obtained.
- IV. If the construction authorized by this permit is not started within two years of the date of this permit and completed within four years of the same date, this permit must be renewed.
- V. Additional requirements -

Your attention is directed to Section 25-112 of the 1958 Revision of the General Statutes which states in part regarding this Construction Permit: "A copy of the permit shall be sent to the town clerk." The enclosed carbon copy of this permit is the copy intended for the town clerk and it is your obligation to duly file this copy.

Your attention is further directed to Section 25-115 of the 1958 Revision of the General Statutes - "Liability of Owner or Operator." Nothing in this chapter and no order, approval or advice of the Commission or a member thereof, shall relieve any owner or operator of such a structure from his legal duties, obligations and liabilities resulting from such ownership or operation. No action for damages sustained through the partial or total failure of any structure or its maintenance shall be brought or maintained against the state, a member of the Commission or the Commission, or its employees or agents, by reason of supervision of such structure exercised by the Commission under this chapter."

The Commission cannot convey or waive any property right in any lands of the State, nor is this permit to be construed as giving any property rights in real estate or material or any exclusive privileges, nor does it authorize any injury to private property or the invasion of private rights or any infringement of federal, state or local laws or regulations.

Your attention is also directed to Section 26-134 of the 1958 Revision of the General Statutes - "Obstructing Streams." No person shall, unless authorized by the director, prevent the passing of fish in any stream or through the outlet or inlet of any pond or stream by means of any rack, screen, weir or other obstruction or fail, within ten days after service upon him of a copy of an order issued by the director, to remove such obstruction." The address of the State Board of Fisheries and Game is State Office Building, Hartford, Connecticut.

Very truly yours,

WATER RESOURCES COMMISSION

By: \_\_\_\_\_  
William S. Wise, Director

WSW:js

cc: Fish and Game



STATE OF CONNECTICUT  
 BOARD OF FISHERIES AND GAME  
 STATE OFFICE BUILDING • HARTFORD 15, CONNECTICUT

December 6, 1965

STATE WATER RESOURCES COMMISSION RECEIVED DEC 10 1965 ANSWERED _____ REFERRED _____ FILED _____
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State of Connecticut  
 Department of Agriculture &  
 Natural Resources  
 Hartford, Conn.

Attention: Mr. Joseph N. Gill, Commissioner

Gentlemen:

Under Section 26-134 of the General Statutes authorization for the construction of a dam on the Middle River in the Town of Stafford is hereby granted with the understanding that such a structure at this location does not warrant the installation of a fishway at this time. Should conditions on this stream and/or watershed change so that free migration of fish in the waterway is prevented by this dam, you or the person owning the dam at that time may then be required to install a fishway or remove the barrier.

It will be necessary to obtain a construction permit from the Water Resources Commission, State Office Building, Hartford, Conn.

Sincerely yours,

*Theodore B. Bampton*  
 Theodore B. Bampton  
 Director

TBB:ds  
 cc: Water Resources Commission  
 Soil Conservation Service, Hartford

COPY

**JOHN J. MOZZOCHI AND ASSOCIATES**  
CIVIL ENGINEERS

GLASTONBURY, CONN. 06033  
217 HEBRON AVENUE  
PHONE 633-9401

PROVIDENCE, R. I. 02903  
200 DYER STREET  
PHONE GASPEE 1-0420

JOHN J. MOZZOCHI

May 23, 1968

ASSOCIATES

OWEN J. WHITE  
JOHN LUCHS, JR.  
ECTOR L. GIOVANNINI

REPLY TO: Glastonbury

William H. O'Brien III-C.E.  
Water Resources Commission  
State Office Building  
Hartford, Connecticut 06115

Re: Ellithorpe Dam  
Site No. 5  
Stafford Springs  
Our File 57-73-19-No. 5

Dear Bill:

On May 21, 1968, Mr. Leonard Warburton of this office, accompanied Messrs. Wire, Ferguson and others of the Federal SCS, on their final inspection of the Ellithorpe Dam, Site No. 5 in Stafford Springs.

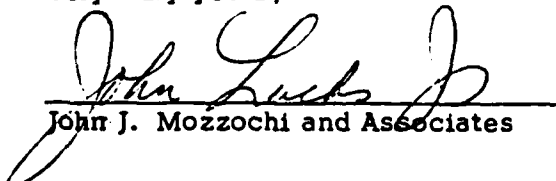
The modification of the termination point of the riprap for construction of the riprapped dike as shown on Drawing No. CN-409-P dated April 18, 1968, is approved and the Amended Construction Permit should be issued if it is still required.

Mr. Musial, Selectman from the Town of Stafford Springs, was also along on the inspection tour. He raised some questions concerning the drainage of the waste area on the Lorum property downstream of the dam which has not been resolved to the Town's satisfaction.

Seeding on this project is to be a separate contract and has not yet been awarded.

A Certificate of Approval should not be issued until the drainage of the waste area is resolved and the dam slopes and the emergency spillway have an acceptable stand of grass.

Very truly yours,

  
John J. Mozzochi and Associates

JLjr:hk

STATE WATER RESOURCES  
COMMISSION  
RECEIVED

MAY 24 1968

ANSWERED \_\_\_\_\_  
REFERRED \_\_\_\_\_  
FILED \_\_\_\_\_

JOHN J. MOZZOCHI AND ASSOCIATES  
CIVIL ENGINEERS

GLASTONBURY, CONN. 06033  
217 HEBRON AVENUE  
PHONE 633-9401

PROVIDENCE, R. I. 02903  
198 DYER STREET  
PHONE 421-0420

ASSOCIATES

JOHN LUCHS, JR.  
ECTOR L. GIOVANNINI

September 25, 1969  
STATE WATER RESOURCES  
COMMISSION  
RECEIVED

REPLY ToGlastonbury

SEP 26 1969

William H. O'Brien, III  
Civil Engineer  
Water Resources Commission  
State Office Building  
Hartford, Connecticut 06115

ANSWERED \_\_\_\_\_  
REFERRED \_\_\_\_\_  
FILED \_\_\_\_\_

Re: Our File #57-73-19  
Site #5  
Ellithorpe Dam  
Stafford Springs

Dear Mr. O'Brien:


On September 23, 1969 a final inspection was made of the site with the following in attendance, William H. O'Brien, Joseph W. Voboril, Jr. and John Luchs, Jr.

The seeding on this dam has been completed and there is a satisfactory stand of grass. Several areas have been reseeded due to the nature of the soil and it appears additional maintenance work will be required to correct these areas.

The magnitude of the problem becomes one of maintenance. Previous correspondence regarding this site has always mentioned the drainage problem on the Lorum Property. I feel this is not a problem pertaining to the safety of the structure.

It is recommended that a Certificate of Approval be issued for this dam.

Very truly yours,

  
John J. Mozzochi and Associates  
Civil Engineers

JL/ed  
file



# STATE OF CONNECTICUT

WATER RESOURCES COMMISSION

STATE OFFICE BUILDING • HARTFORD, CONNECTICUT 06115

October 27, 1969

## CERTIFICATE OF APPROVAL

State of Connecticut  
Department of Agriculture and  
Natural Resources  
State Office Building  
Hartford, Connecticut

Attention: Mr. Joseph Gillette  
Commissioner

TOWN: Stafford  
RIVER: Willimantic River  
TRIBUTARY: Middle River  
CODE NO.: W24.OMR5.0

Gentlemen:

NAME AND LOCATION OF STRUCTURE: Ellithorpe Dam, Site #5 Middle River. Dam is located on the Middle River on the west side of Route #32 about 0.2 miles north (upstream) from a pond shown as Ginholt Pond on the USGS map.

DESCRIPTION OF STRUCTURE AND WORK PERFORMED: This is an earth dam constructed as a flood control structure.

CONSTRUCTION PERMIT ISSUED UNDER DATE OF: December 2, 1965

This certifies that the work and construction included in the plans submitted, for the structure described above, has been completed to the satisfaction of this Commission and that this structure is hereby approved in accordance with Section 25-114 of the 1958 Revision of the General Statutes.

The owner is required by law to record this Certificate in the land records of the town or towns in which the structure is located.

WATER RESOURCES COMMISSION

JJC:O'B:hm

---

John J. Curry, Director

# MACCHI & HOFFMAN • ENGINEERS

EXECUTIVE OFFICES • 44 GILLETT STREET • HARTFORD, CONN., 06105 • PHONE (203) 525-6631

A. J. MACCHI, P.E.  
H. R. HOFFMAN, P.E.  
MICHAEL GIRARD

ASSOCIATE CONSULTANT  
PROF. C. W. DUNHAM

WATER & RELATED  
RESOURCES  
RECEIVED

January 24, 1972

JAN 26 1972

ANSWERED \_\_\_\_\_  
REFERRED \_\_\_\_\_  
FILED \_\_\_\_\_

State of Connecticut  
Department of Environmental  
Protection  
165 Capitol Avenue  
Hartford, Connecticut

Attention: Mr. William H. O'Brien, III

Re: Ellitrope Flood Control Dam  
Approx. 2 Miles North of  
Stafford Springs

Gentlemen:


An inspection was made of the above-referenced dam by  
William H. O'Brien, Victor Galgowski and A. J. Macchi on  
Friday, January 21, 1972.

This dam is a long earth fill structure about 35 feet  
high (maximum) for the purpose of controlling flood flow  
conditions

This dam was found in very good condition.

Very truly yours,

MACCHI & HOFFMAN, ENGINEERS



A. J. MACCHI

VMC

W.H.O.



**21-11 Elev. 542.8, Centerline Sta. 114.70**  
 10 foot uppermost 5 ft of core

W.L. - 175.6, Ground Level

Organic silt, gray to black, some brown, fine to medium grained, poorly graded, some sub-round gravel pieces.

Sand, fine to medium grained, poorly graded, gray, some silty, low plasticity fines, some pebbles.

Sand, fine to medium grained, more coarse grained, low plasticity fines, some angular pebbles, some sub-round gravel pieces from 1/2 to 1/4 inch. Sand grains angular, some silty, some rounded, some pebbles. Better grading from 11.5 feet. Some pebbles present.

Sand, fine to medium grained, well graded, low plasticity fines, pebbles to gray.

7.5 - 11 feet.

**21-12 Elev. 542.8, Centerline Sta. 114.70**  
 10 foot uppermost 5 ft of core

W.L. - 175.6, Ground Level

Organic silt, black, organic silt.

Sand, fine to medium grained, poorly graded, some medium to coarse quartzite from 1/2 to 1/4 inch, gray silt from 1.5 feet, silty sand, silty, estimated 10.75. Coarsest pebbles and fragmental rock from 11.5 feet. Best grading from 11.5 feet - light gray fine to medium grained silt, some silty and fragmental rock.

Sand, fine to medium grained, poorly graded, some silty, from 1.5 feet to estimated 13 to 14.5 feet. Some pebbles from 1.5 feet.

Sand, fine to medium grained, poorly graded, some coarse angular sand, less fragmental rock than above. 11.5 feet.

**21-13 Elev. 542.8, Centerline Sta. 114.70**  
 10 foot uppermost 5 ft of core

W.L. - 175.6, Ground Level

Sand, fine to medium grained, and primarily from low angular gravel, poorly graded, some low plasticity clay, some silty.

Clay, gray, sandy, pebbles and quartzite fragments at bottom of 11.5.

Sand, fine grained, poorly graded, some medium to coarse angular grains, gray, some rust below, angular quartzite pebbles.

Sand, well graded, fine to coarse grained, sub-angular rock fragments estimated 5.5, some silty.

Sand, fine to medium grained, poorly graded, gray to rust, some fragmental rock, sand grains angular, some silty.

Core - Quartzite, fine grained, white to gray. Brown pebbles, fine grained white, Bar-wise throughout.

7.5 - 10.5 feet

**21-14 Elev. 542.8, Centerline Sta. 114.70**  
 10 foot uppermost 5 ft of core

W.L. - 175.6, Ground Level

Sand, fine to medium grained, organic traces, some gravel not noted 5 to 11.5.

Sand, fine to medium grained, poorly graded, dark gray to rust, clay low plasticity, trace of silty, some pebbles, angular fragmental rock approximately 1/2 inch diameter.

Sand, fine to coarse grained, well graded, gray, sand grains angular, some fragmental pebbles, some silty.

Sand, fine grained, poorly graded, some medium to coarse angular gravel not noted 10.5, gray to brown. Some gravel sizes estimated 1-1.5.

Sand, medium grained, poorly graded, some fine to coarse grained, gray to brown, some sub-round gravel pieces.

Known trace formation, mostly quartzite with some Muscovite inclusions, white.

7.5 - 20.0 feet.

**21-15 Elev. 542.8, Centerline Sta. 114.70**  
 10 foot uppermost 5 ft of core

W.L. - 175.6, Ground Level

Silt, silty, organic, light brown, woody fragments.

Sand, fine to medium grained, poorly graded, dark gray, some low plasticity silt.

Sand, fine grained, poorly graded, low plasticity clay, somewhat coarser from 11.5 feet, gray.

Sand, fine to coarse grained, poorly graded, some gravel pieces, gravel size angular, some coarse sand from 15.0 feet.

7.5 - 11.5

Known trace  
 Sand filled cavity - no recovery

7.5 - 11.5  
 Known trace, very fine grained, white to gray.

Sand filled cavity - no recovery  
 Known trace, very fine grained, quartzite, white to gray.

7.5 - 11.5

**21-16 Elev. 542.8, Sta. 114.70**  
 10 foot uppermost 5 ft of core

W.L. - Ground Level, 175.6

Organic silt grading to sand, fine to medium grained.

Sand, fine grained, poorly graded, gray, some silty, some sub-round gravel pieces, trace of clay estimated less than 2 percent. Quartzite grains from 1/2 to 1/4 inch from 10.0 feet. From 11.5 feet sand, well graded, gravel angular, rust colored, quartzite fragments, grading to fine to medium grained at 11.5 feet, poorly graded, gray, trace of silty.

7.5 - 10.5 feet.

**21-17**

**TEST LOG**

Centerline of hole: 1 - 99  
 Surface area: 1.71 - 199  
 Low quality fill: 201 - 299  
 Centerline of existing structure: 301 - 399  
 Storage channel: 401 - 499  
 Sewer main: 501 - 599  
 Relief valve: 601 - 699

**TEST LOG**

Well graded gravel, gravel-sand mixture  
 Poorly graded gravel  
 Silty gravel, gravel-sand-silt mixture  
 Clayey gravel, gravel-sand-silt mixture  
 Well graded sand, sand-gravel mixture  
 Poorly graded sand  
 Silty sand, sand-silt mixture  
 Clayey sand, sand-clay mixture  
 Clay of low to medium plasticity, silty, sandy or gravelly  
 Clay of high plasticity, fat clay  
 Plastic silt, silty sand or silty clay  
 Organic silt and organic silty clay of low plasticity  
 Organic clay or silt of medium to high plasticity

**MARK DATA**

1	Sand	5a	Schist
2	Gravel	5b	Silt
3	Granite	5c	Siltstone
4	Lime stone	5d	Slate
5	Partic	5e	Sandstone

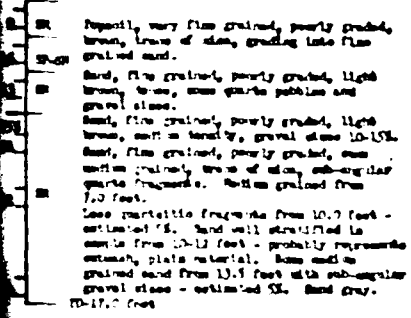
**21-18**

1 - 21.0 feet  
 22 - 23.0 feet  
 24 - 25.0 feet  
 26 - 27.0 feet  
 28 - 29.0 feet  
 30 - 31.0 feet  
 32 - 33.0 feet  
 34 - 35.0 feet  
 36 - 37.0 feet  
 38 - 39.0 feet  
 40 - 41.0 feet  
 42 - 43.0 feet  
 44 - 45.0 feet  
 46 - 47.0 feet  
 48 - 49.0 feet  
 50 - 51.0 feet  
 52 - 53.0 feet  
 54 - 55.0 feet  
 56 - 57.0 feet  
 58 - 59.0 feet  
 60 - 61.0 feet  
 62 - 63.0 feet  
 64 - 65.0 feet  
 66 - 67.0 feet  
 68 - 69.0 feet  
 70 - 71.0 feet  
 72 - 73.0 feet  
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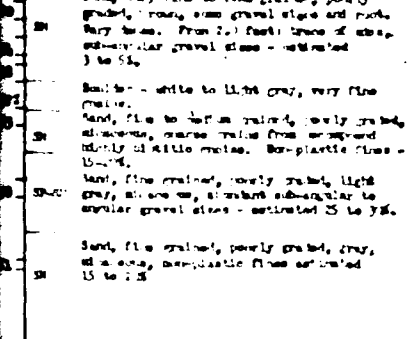
**18-14, Elev. 571.5 Sta. 2025**

• 10 feet downstream from centerline of dam



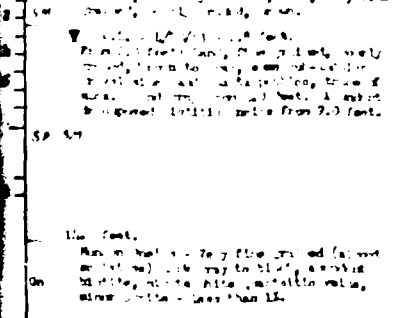
**18-15, Elev. 571.5 Sta. 2027**

• 115 feet downstream from centerline of dam



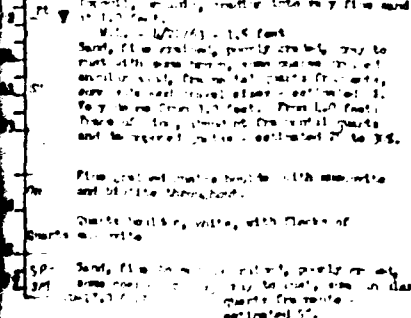
**18-16, Elev. 571.5 Sta. 2029**

• 100 feet downstream



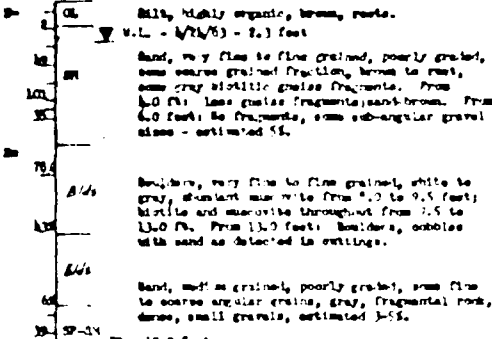
**18-17, Elev. 571.5 Sta. 2031**

• 300 feet downstream from centerline of dam



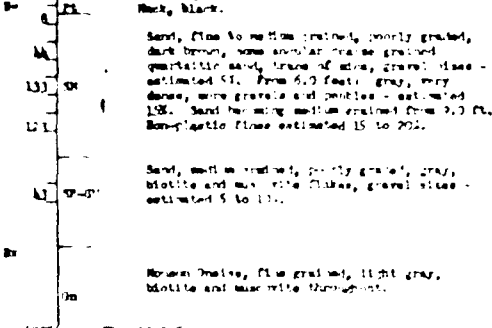
**18-18, Elev. 571.5 Sta. 2033**

• 60 feet downstream from centerline of dam



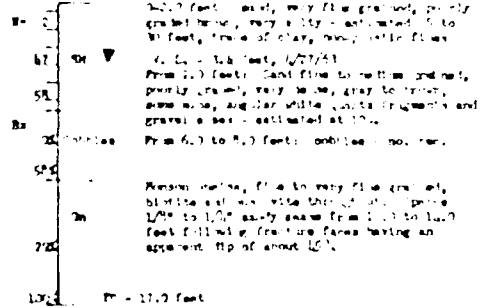
**18-19, Elev. 571.5 Sta. 2035**

• 10 feet downstream from centerline of dam



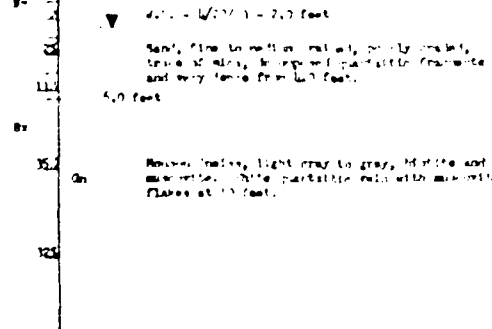
**18-20, Elev. 571.5 Sta. 2037**

• 25 feet downstream from centerline of dam



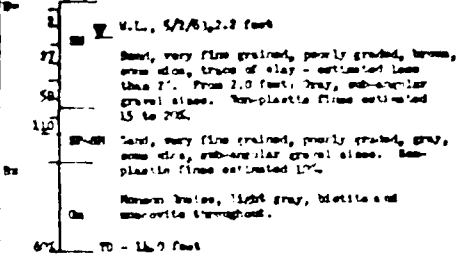
**18-21, Elev. 571.5 Sta. 2039**

• 70 feet downstream from centerline of dam



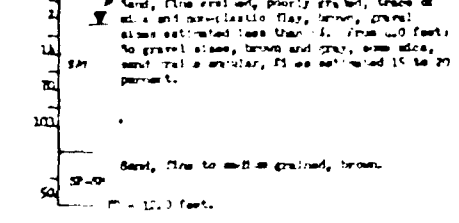
**18-22, Elev. 571.5 Sta. 2041**

• 60 feet downstream from centerline of dam



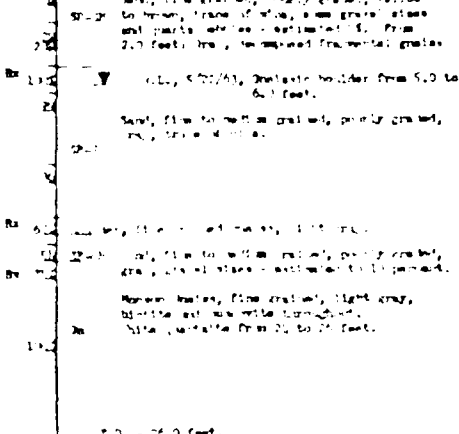
**18-23, Elev. 571.5 Sta. 2043**

• 60 feet downstream from centerline of dam



**18-24, Elev. 571.5 Sta. 2045**

• 60 feet downstream from centerline of dam



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**AS-BUILT**

Logs of 18-14, 18-15 and Test Hole  
 Future work - State Dept. approved  
 18-14, 18-15, 18-16, 18-17, 18-18, 18-19, 18-20, 18-21, 18-22, 18-23, 18-24

**U.S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE**

18-14, 18-15, 18-16, 18-17, 18-18, 18-19, 18-20, 18-21, 18-22, 18-23, 18-24



**NO. 12**  
**PL 100 - Emergency Spilling**  
 Elevation 511.1

Topsoil  
 SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

PL 101 - Emergency Spilling  
 Elevation 511.2

SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

PL 102 - Emergency Spilling  
 Elevation 511.3

SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

PL 103 - Emergency Spilling  
 Elevation 511.4

SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

PL 104 - Emergency Spilling  
 Elevation 511.5

SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

PL 105 - Emergency Spilling  
 Elevation 511.6

SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

PL 106 - Emergency Spilling  
 Elevation 511.7

SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

**NO. 13**  
**PL 200 - Emergency Spilling**  
 Elevation 511.1

Topsoil  
 SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

**NO. 14**  
**PL 201 - Emergency Spilling**  
 Elevation 511.2

Topsoil, fine grained earth, brown, poorly graded.  
 SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

**NO. 15**  
**PL 202 - Emergency Spilling**  
 Elevation 511.3

Topsoil, dark brown  
 SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

**NO. 16**  
**PL 203 - Emergency Spilling**  
 Elevation 511.4

Topsoil  
 SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

**NO. 17**  
**PL 204 - Emergency Spilling**  
 Elevation 511.5

Topsoil  
 SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

**NO. 18**  
**PL 205 - Emergency Spilling**  
 Elevation 511.6

Topsoil  
 SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

**NO. 19 - Sample from Area Spill**  
 11/15/58

Soil due to medium ground, poorly graded, with some trace of mica  
 SP - 1.0 feet. Sample (D.S.) 4.0 to 7.0 feet.

**MOISTURE DENSITY RELATIONSHIP**  
**OF BORROW MATERIAL**  
 (Proctor Curve Data)

DN 103      Cpl. Moisture      10.8%  
 TP 207      Cpl. Density      117.8 lb/cu ft  
                  Cpl. Moisture      11.5%  
                  Cpl. Density      112.5 lb/cu ft

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 best available copy.

**AS-BUILT**

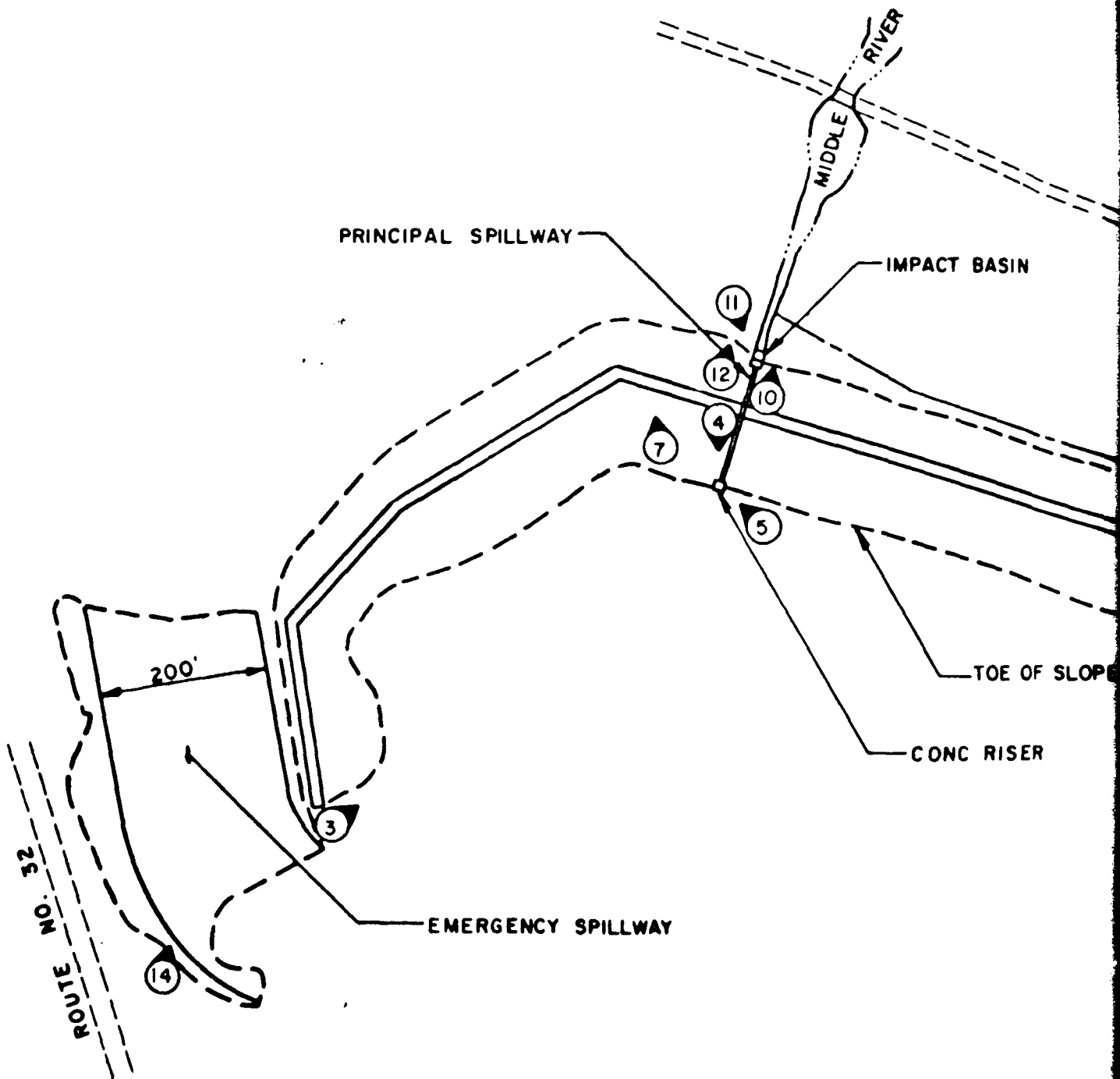
NO. 19 - Sample from Area Spill  
 11/15/58  
 11/15/58  
 11/15/58

**U. S. DEPARTMENT OF AGRICULTURE**  
**SOIL CONSERVATION SERVICE**

Investigated by: \_\_\_\_\_  
 Typed by: \_\_\_\_\_  
 Date: \_\_\_\_\_

APPENDIX C

PHOTOGRAPHS



PRINCIPAL SPILLWAY

IMPACT BASIN

MIDDLE RIVER

TOE OF SLOPE

CONC RISER

EMERGENCY SPILLWAY

ROUTE NO. 32

200'

11

12

10

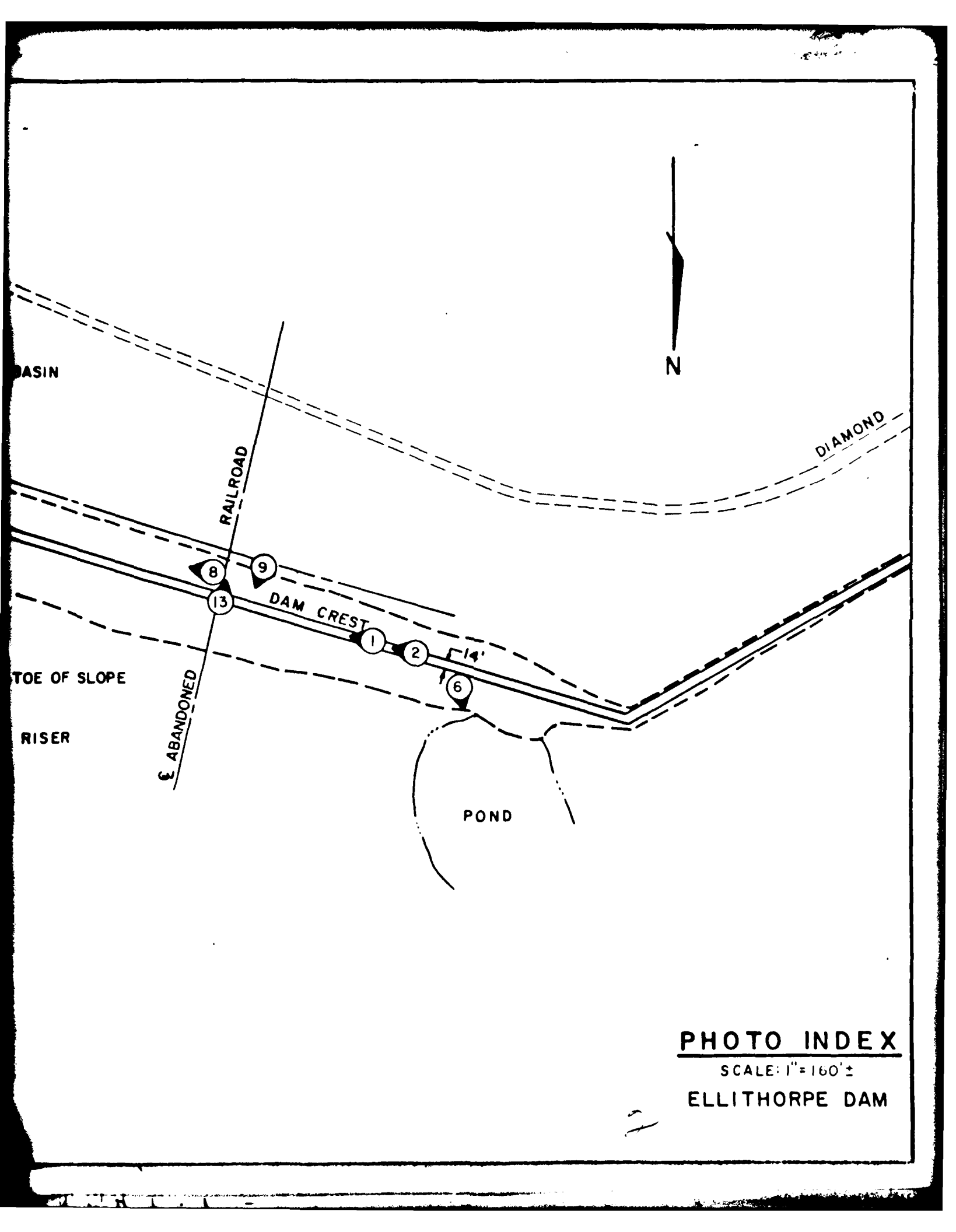
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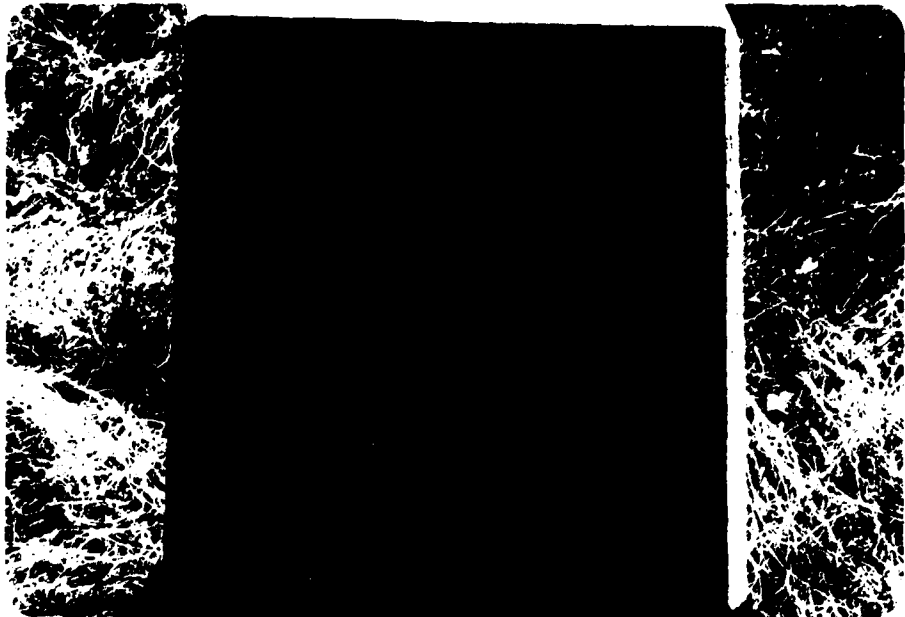
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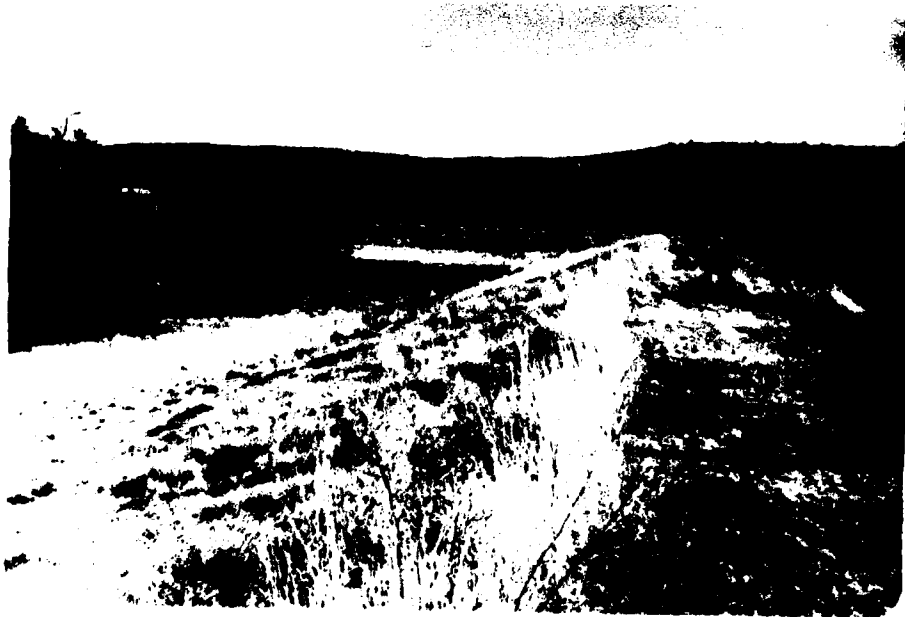
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14



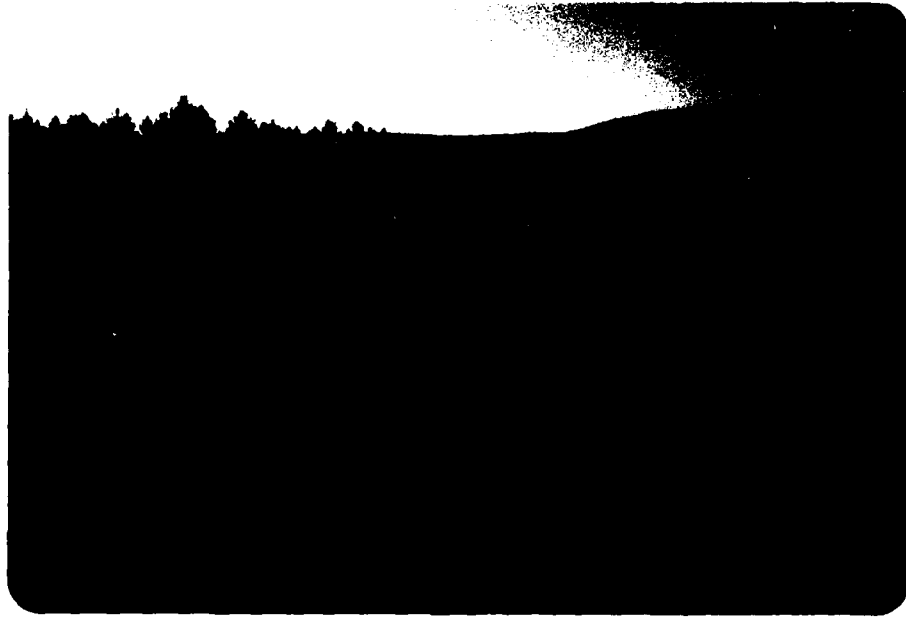


C-1 IDENTIFYING MONUMENT

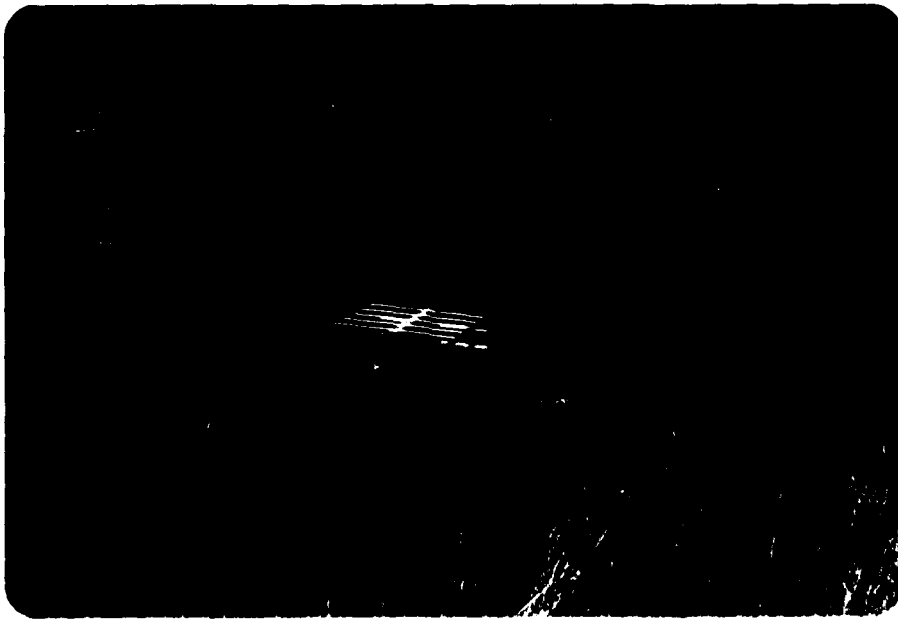


C-2 DAM CREST

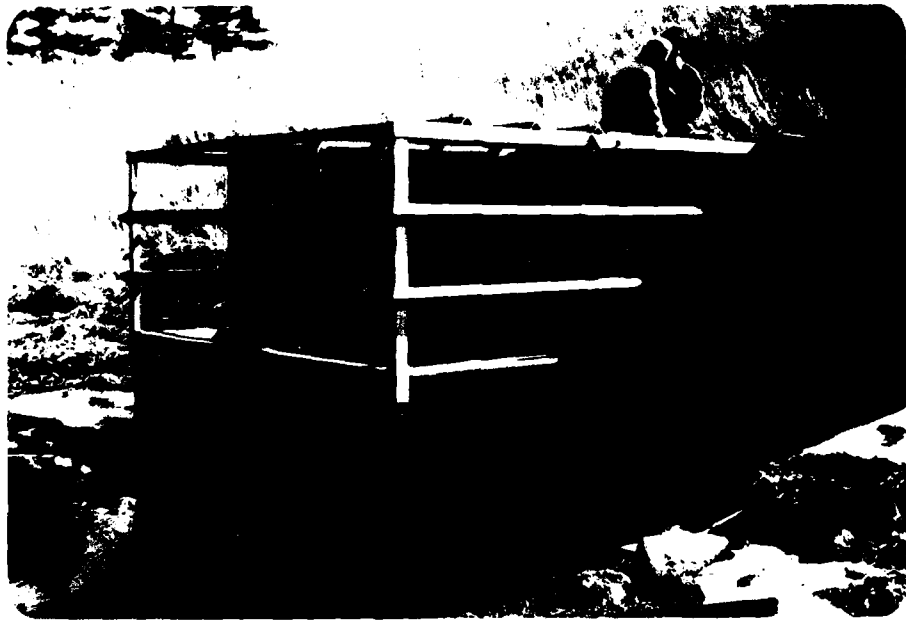
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1



C-3 UPSTREAM SLOPE



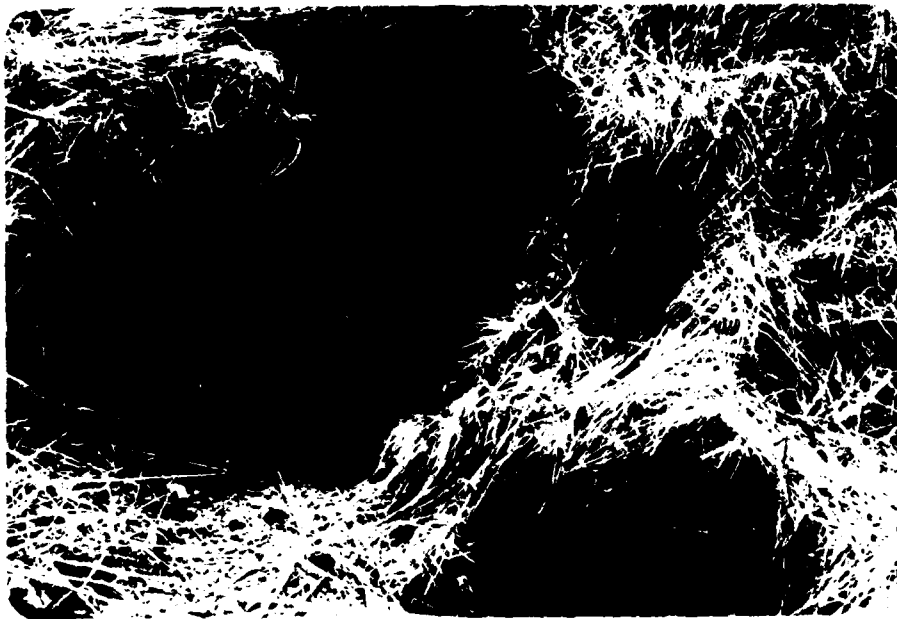
C-4 UPSTREAM APPROACH CHANNEL



C-5 INLET STRUCTURE



C-6 EXISTING UPSTREAM RECREATION POND



C-7 RODENT BURROW



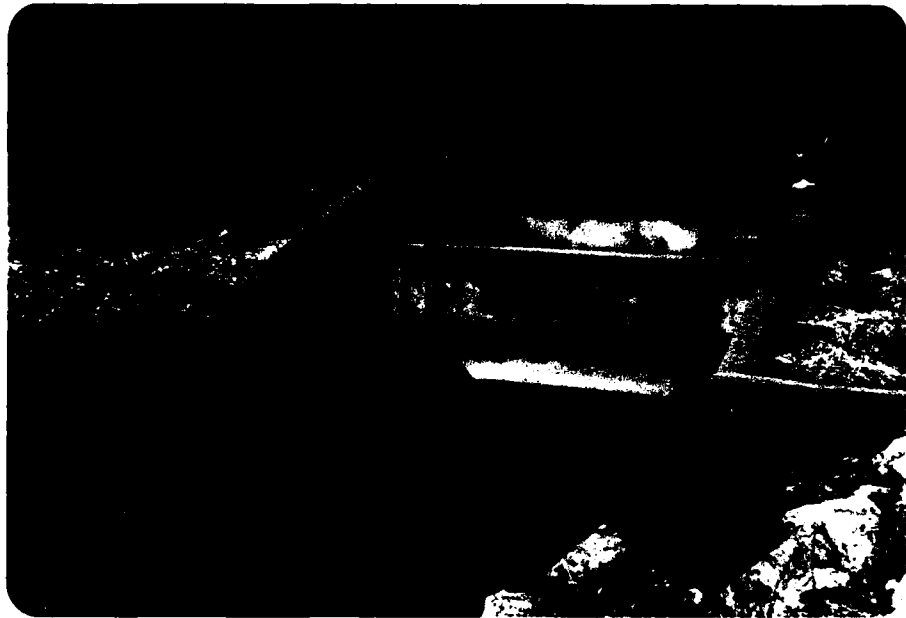
C-8 DOWNSTREAM SLOPE



C-9 VEHICLE TRACKS - DOWNSTREAM SLOPE



C-10 DOWNSTREAM CHANNEL AND OUTLET STRUCTURE



C-11 OUTLET STRUCTURE



C-12 MIDDLE RIVER DOWNSTREAM OF DAM

AD-A144 623

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS  
ELLITHORPE DAM (CT 00..(U) CORPS OF ENGINEERS WALTHAM  
MA NEW ENGLAND DIV FEB 81

22

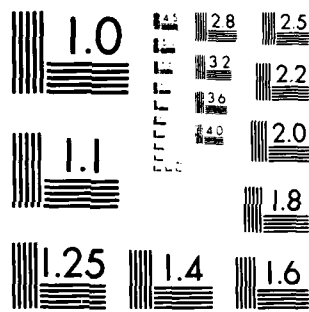
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A



C-13 ABANDONED RAILROAD DOWNSTREAM



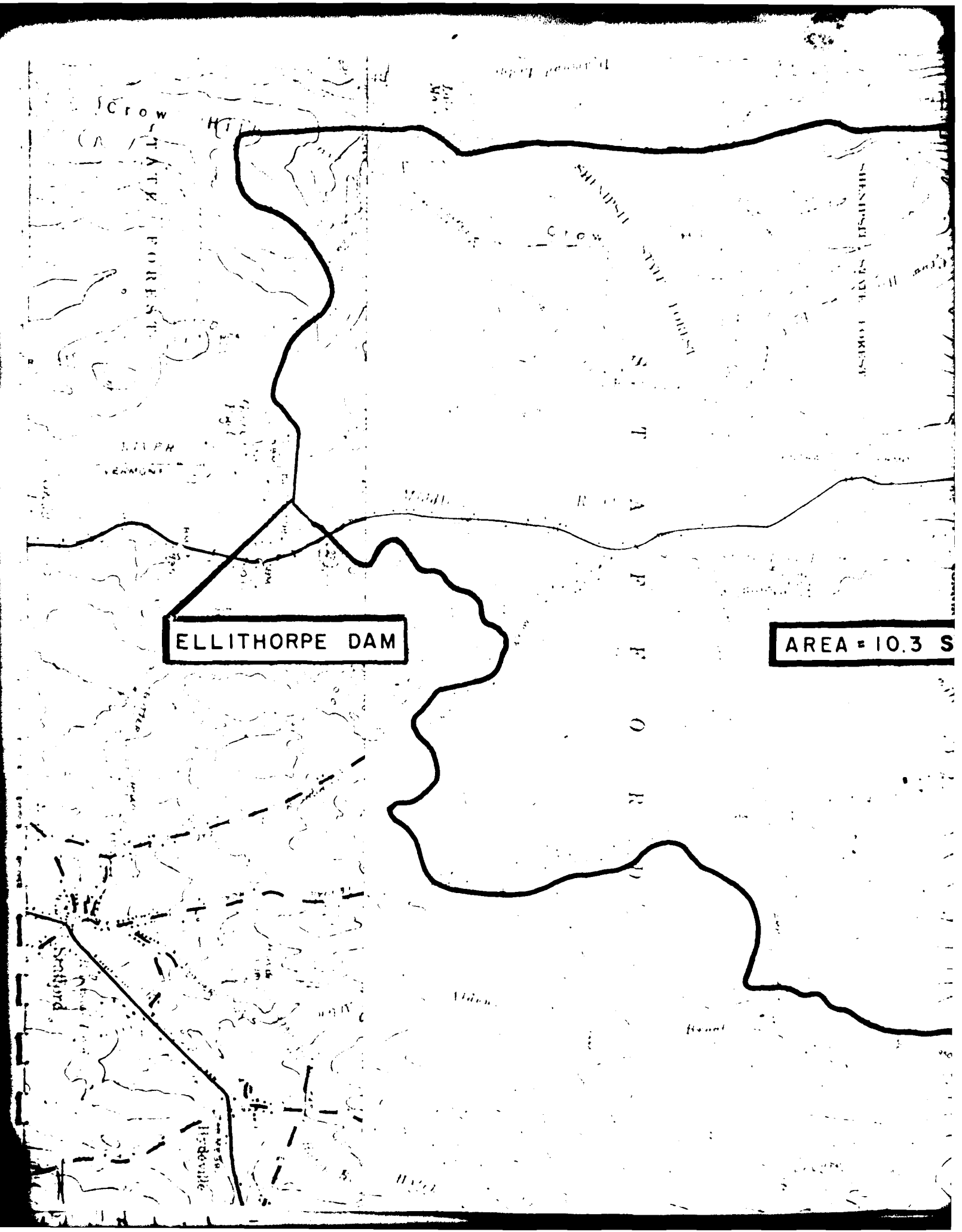
C-14 EMERGENCY SPILLWAY

APPENDIX D

HYDROLOGIC AND HYDRAULIC  
COMPUTATIONS

ELLITHORPE DAM

AREA = 10.3 S



SUBSIDENT STATE FOREST

Peaked  
Mtn



10.3 SQ. MI.

Point

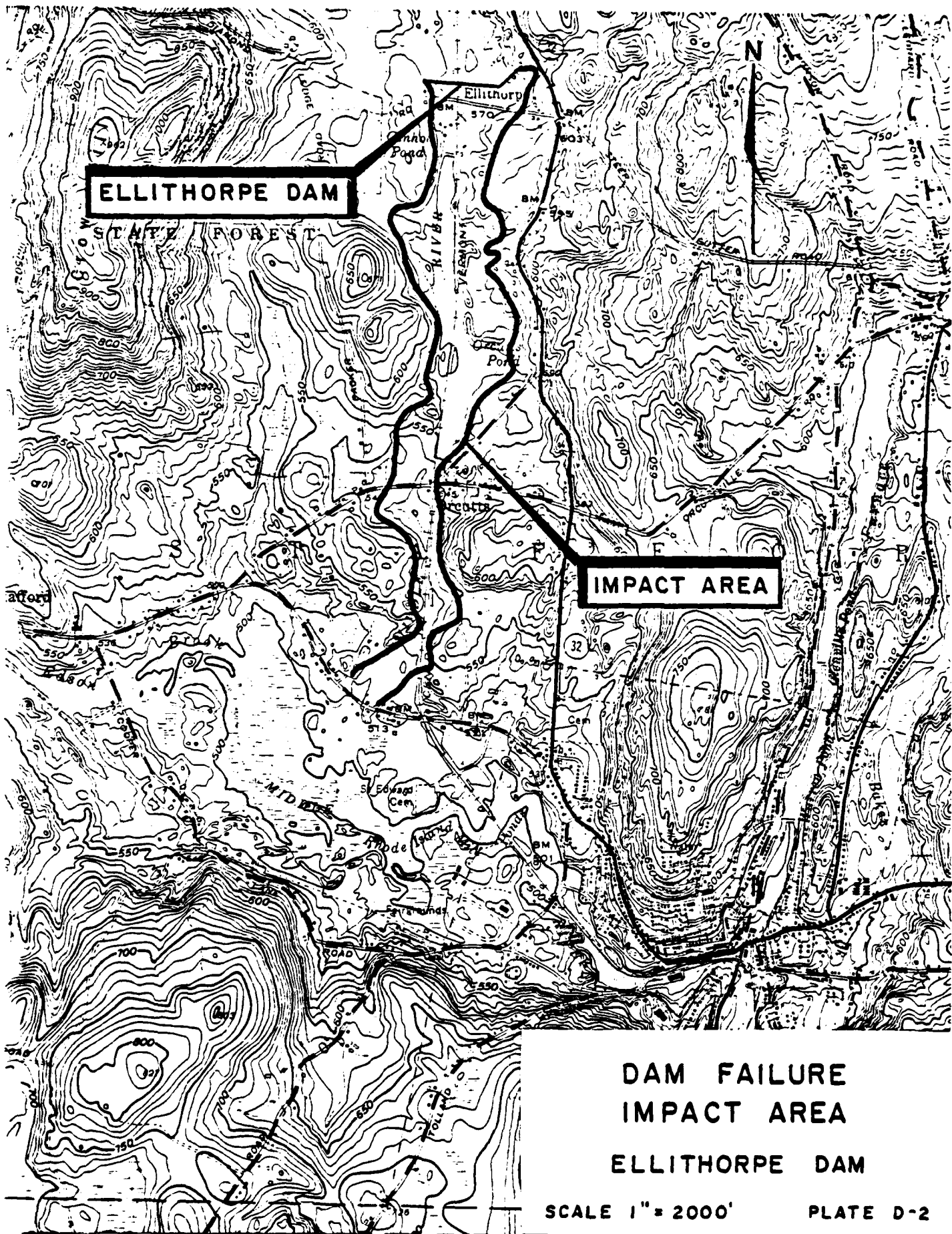
DRAINAGE AREA

ELLITHORPE DAM

SCALE 1" = 2000'

PLATE D-1

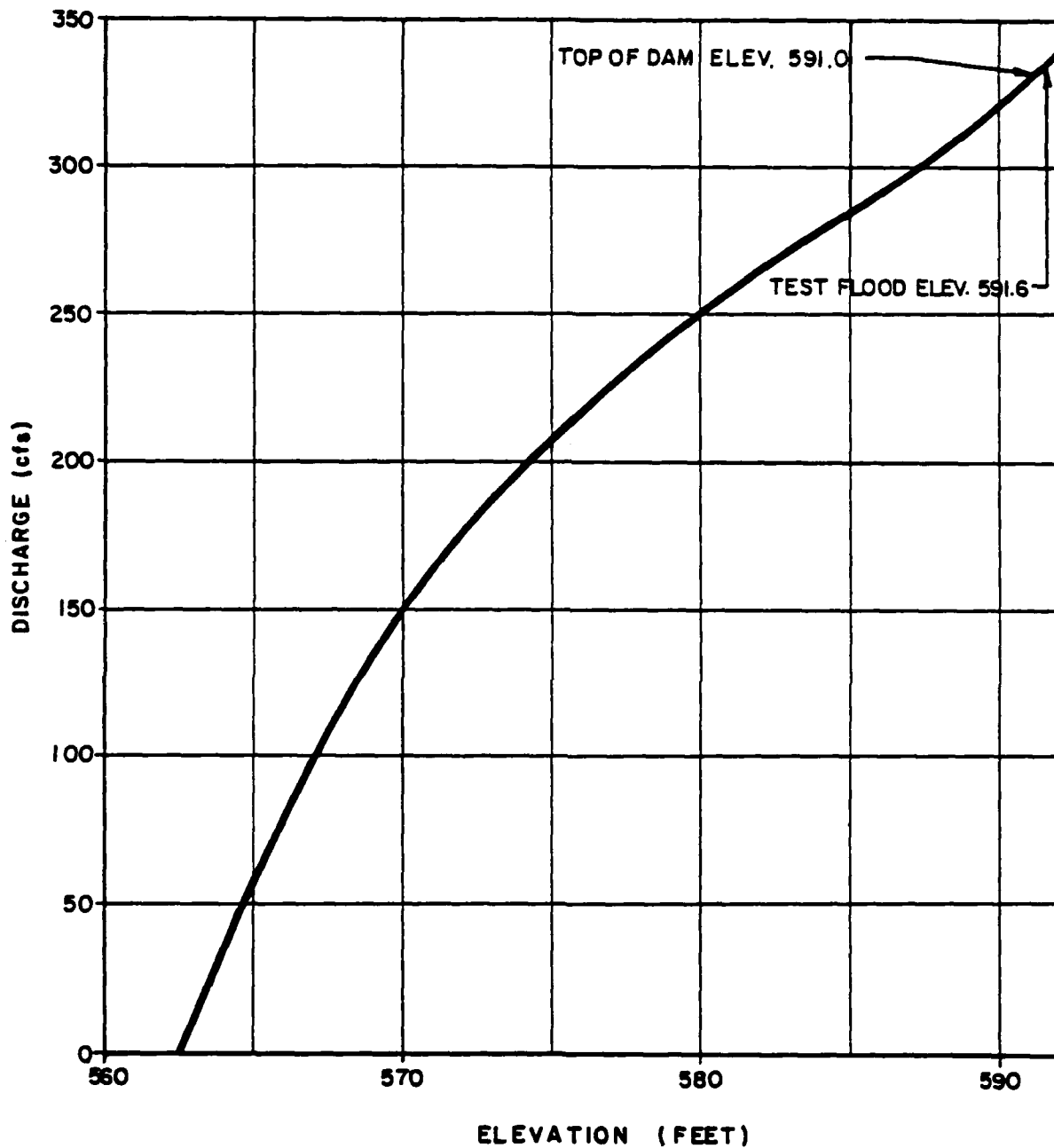
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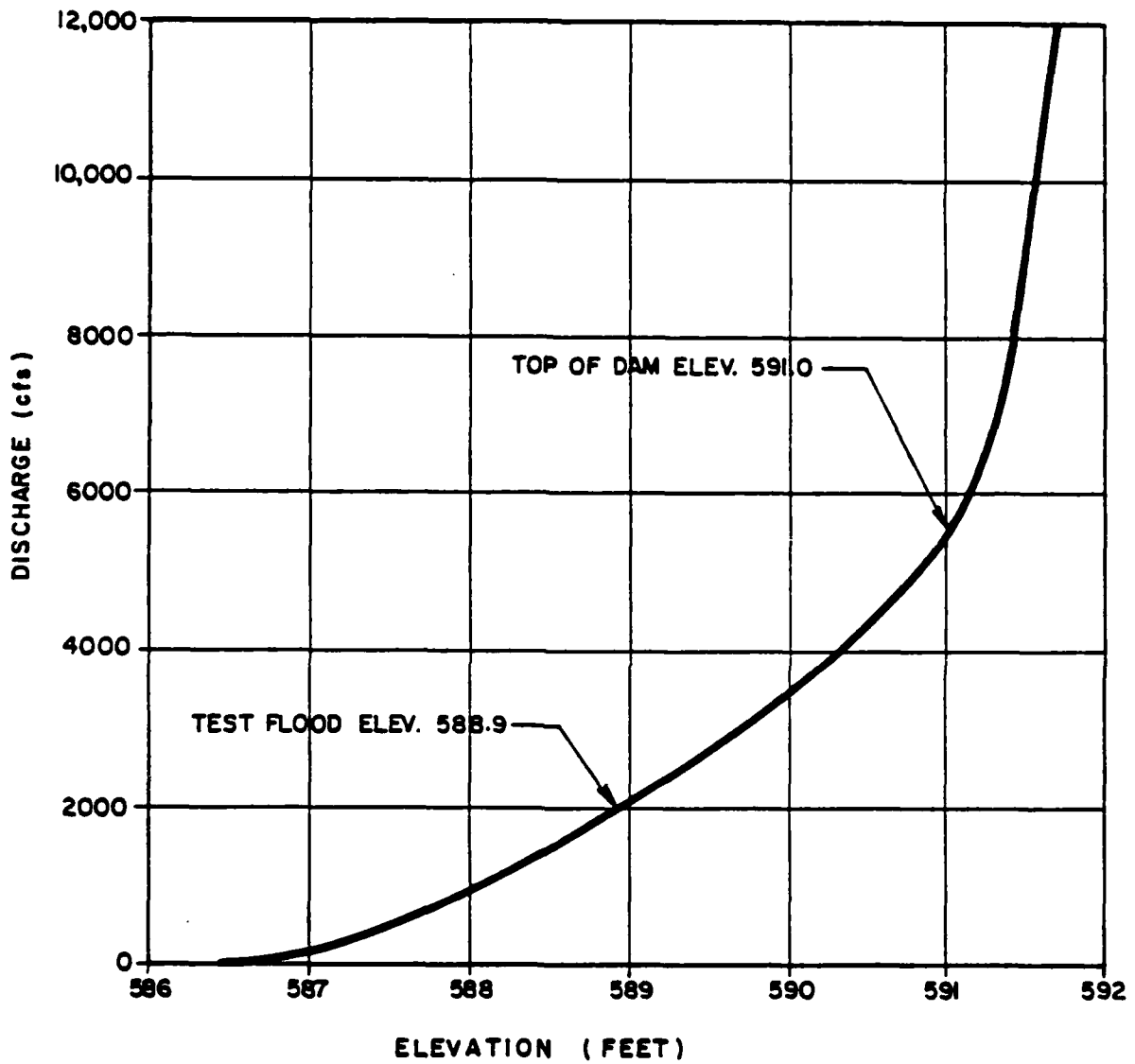
DAM FAILURE  
IMPACT AREA  
ELLITHORPE DAM

SCALE 1" = 2000'

PLATE D-2



ELLITHORPE DAM  
RATING CURVE  
PRINCIPAL SPILLWAY  
PLATE D-3



ELLITHORPE DAM  
RATING CURVE  
EMERGENCY SPILLWAY  
PLATE D-4



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consulting engineers

PREPARED  
BY  
G-JM

DATE  
7/22/81

CHECKED  
BY

DATE

PROJECT NO.

30-157

SUBJECT: Ellithorpe Dam - Test Flood

SHEET NO.  
1 of 2

Drainage Area = 10.3 sq. Mi.

From C. of S. Chart for Rolling Terrain,

PMF = 1640 csm

$10.3 \times 1640 = 16,900 \text{ cfs} = \text{Test Flood}$   
 $= Q_{PI}$

Effect of Surchage Storage

Elev. / Storage

<u>Elev.</u>	<u>Storage (Ac. Ft.)</u>
575	830
580	1950
585	3540
590	5450
591	5860
592	6280

Elevation / Discharge

<u>Elev.</u>	<u>Principal Spillway</u>	<u>Emergency Spillway</u>	<u>Total</u>
589	310 cfs	2040 cfs	2350 cfs
590.4	320	4140	4460
591	330	5400	5730
591.5	340	9300	9640
592	340	16,450	16,800

Top of Dam



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PROJECT NO.

80-157

SUBJECT: Ellipton Dam - Test Flood

SHEET NO.

2 of 2

Stage to Pass Test Flood = 592.0

Volume of Surcharge = 6280 Ac.-Ft.

$$= 10.3 \times 640 \div 12 = 549 \text{ Ac.-Ft./inch run}^2$$

Volume of Surcharge = 6280  $\div$  549 = 11.4 inches of run<sup>2</sup>

= STOR<sub>1</sub>

PMF Runoff in New England = 19'

$$Q_{p2} = Q_{p1} \left(1 - \frac{\text{STOR}_1}{19}\right)$$

$$= 16,900 \left(1 - \frac{11.4}{19}\right)$$

$$= 6725 \text{ cfs}$$

Stage for  $Q_{p2}$  = 591.6

STOR<sub>2</sub> = 5970 Ac.-Ft.

$$= 5970 \div 549 = 10.9 \text{ inches}$$

$$\text{Ave. STOR}_1 \text{ \& STOR}_2 = \frac{11.4 + 10.9}{2} = 11.15 \text{ inch}$$

$$= 11.15 \times 549 = 6120 \text{ Ac.-Ft.}$$

Stage = 591.6

Peak Outflow = 10,300 cfs



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80-157

SUBJECT: Dam Failure Hydrograph - Ellithorpe Dam

SHEET NO.  
1 of 8

STAGE - DISCHARGE RATINGS

STATION	SLOPE	n	ELEV.	AREA	P	Q
1+0	0.2%	.080	575	12,950	1560	44,600
			580	21,050	1710	94,300
			585	30,150	1950	157,200
5+0	0.2%	.080	575	7,800	1050	24,900
			580	13,700	1300	55,300
			585	24,500	2300	119,300
10+0	0.2%	.060	570	3,150	700	9,600
			575	7,100	870	33,200
			580	11,900	1040	67,700
			585	18,350	1520	108,200
15+0	0.2%	.080	570	3,000	500	8,300
			575	6,150	760	20,800
			580	10,600	1030	42,100
			585	16,300	1270	75,100
			590	23,200	1510	120,400
20+0	0.33%	.100	570	4,380	530	15,400
			575	7,220	630	31,600
			580	10,490	710	54,300
			585	15,540	1320	69,200
			590	23,890	2000	107,400
25+0	0.33%	.100	565	3,180	430	5,500
			570	4,730	600	16,100
			575	17,730	2140	45,800
			580	26,720	2220	120,800
30+0	0.33%	.100	560	1,275	850	1,400
			565	8,225	1480	23,200
			570	16,030	1650	62,800
			575	24,530	1750	123,600



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SUBJECT: Dam Failure Hydrograph - Ellithorpe Dam

SHEET NO.  
2 of 8

STATION	SLOPE	n	ELEV.	AREA	P	Q
35+0	0.33%	.100	560	850	450	1,100
			565	5,920	670	21,800
			570	12,120	900	71,800
40+0	0.33%	.100	560	1,200	480	1,900
			565	3,580	940	7,500
			570	9,430	1400	28,900
			575	17,680	1740	71,300
			576	19,420	1760	82,800
			577	25,230	1780	95,300
45+0	0.20%	.080	555	1,100	290	2,200
			560	2,900	440	8,600
			565	9,220	1330	28,200
			570	16,130	1450	67,500
55+0	0.20%	.060	560	4,900	620	21,500
			565	10,400	1200	49,100
			570	17,000	1440	98,700
60+0	0.2%	.050	560	3,950	490	21,300
			565	6,850	680	42,800
			570	10,910	1290	60,700
65+0	0.2%	.050	560	7,650	1180	35,600
			565	14,250	1470	86,800
75+0	5.0%	.060	535	1,440	480	16,700
			540	4,740	860	82,700
80+0	0.26%	.050	535	4,460	960	19,000
			540	10,490	1360	62,700



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SUBJECT: Dam Failure Hydrograph - Ellithorpe Dam

SHEET NO.  
3 of 8

STATION	SLOPE	n	ELEV.	AREA	P	Q
90+0	0.26%	.040	535	1,580	300	9,100
			540	3,230	370	26,200
			545	5,230	440	52,000
100+0	0.26%	.080	535	1,340	250	3,900
			540	2,890	380	10,700
			545	6,040	730	23,700
			550	10,190	930	48,400
			554	17,910	2,040	73,200
110+0	0.26%	.090	530	2,190	350	6,300
			535	4,540	530	16,200
			540	7,490	650	32,500
			545	11,190	830	53,900
120+0	1.25%	.070	512	2,180	1110	8,200
			515	6,000	1180	42,600
			520	12,200	1300	132,300



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PROJECT NO.

80-157

SUBJECT: Dam Failure Hydrograph - Ellithorpe Dam

SHEET NO.

4 of 8

Storage =  $S = 5860$  Ac.Ft. at Top of Dam

Top of Dam Elevation = 591.0

Riverbed Elev. at Sta. 1+0 (at Dam = 0+0) = 562

Main Dam Length at Mid Height = 1600'

Use Breach Width = 400' =  $W_b$

$Y_0 = 29'$

$$Q_{P1} = \frac{8}{27} W_b \sqrt{g} Y_0^{3/2}$$

$$= 105,000 \text{ cfs}$$

STA 1+0

Stage = 580.9

Area = 22,600 S.F.

Vol. = 52 Ac.Ft.

$$Q_{P2} \text{ Trial} = 105,000 \left(1 - \frac{52}{5860}\right) = 104,100 \text{ cfs}$$

Stage = 580.8

Area = 22,500

Vol. = 52 Ac.Ft.

$$Q_{P2} = 104,100 = \frac{25}{25}$$

Stage = 580.8

Depth = 18.8'



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PROJECT NO.

80-157

SUBJECT: Dam Failure Hydrography

SHEET NO.  
5 of 8

STA. 10+0

$$Q_{p2} = 104,100 \text{ cfs}$$

Streambed Elev. = 561  
 $S = 5860 \text{ Ac. Ft.}$

$$\text{Stage} = 584.5$$
$$\text{Area} = 17,700 \text{ S.F.}$$
$$\text{Vol.} = 366 \text{ Ac. Ft.}$$

$$Q_{p3} \text{ Trial} = 104,100 \left(1 - \frac{366}{5860}\right) = 97,600 \text{ cfs}$$

$$\text{Stage} = 583.7$$
$$\text{Area} = 16,700 \text{ S.F.}$$
$$\text{Vol.} = 344 \text{ Ac. Ft.}$$

$$Q_{p3} = 104,100 \left(1 - \frac{355}{5860}\right) = 98,000 \text{ cfs}$$

$$\text{Stage} = 583.7$$

$$\text{Depth} = 22.7'$$

STA. 20+0

$$Q_{p3} = 98,000 \text{ cfs}$$

Streambed Elev. = 558  
 $S = 5860 \text{ Ac. Ft.}$

$$\text{Stage} = 582.8$$
$$\text{Area} = 21,800 \text{ S.F.}$$
$$\text{Vol.} = 501 \text{ Ac. Ft.}$$

$$Q_{p4} \text{ Trial} = 98,000 \left(1 - \frac{501}{5860}\right) = 89,600 \text{ cfs}$$

$$\text{Stage} = 587.7$$
$$\text{Area} = 20,000 \text{ S.F.}$$
$$\text{Vol.} = 459$$

$$Q_{p4} = 98,000 \left(1 - \frac{480}{5860}\right) = 90,200 \text{ cfs}$$

$$\text{Stage} = 587.7$$

$$\text{Depth} = 29.7'$$



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SUBJECT: Dam Failure Hydrography

SHEET NO.  
6 of 7

STA. 30+0

$$Q_{p4} = 90,000 \text{ cfs}$$

Streambed Elev. = 556  
 $S = 5860 \text{ Ac. Ft.}$

$$\text{Stage} = 572.3$$
$$\text{Area} = 19,900 \text{ S.F.}$$
$$\text{Vol.} = 457 \text{ Ac. Ft.}$$

$$Q_{p5} \text{ Trial} = 90,000 \left(1 - \frac{457}{5860}\right) = 83,000 \text{ cfs}$$

$$\text{Stage} = 571.7$$
$$\text{Area} = 18,900 \text{ S.F.}$$
$$\text{Vol.} = 434$$

$$Q_{p5} = 90,000 \left(1 - \frac{446}{5860}\right) = 83,200 \text{ cfs}$$

$$\text{Stage} = 571.7$$

$$\text{Depth} = 15.7'$$

STA. 40+0

$$Q_{p5} = 83,200 \text{ cfs}$$

Streambed Elev. = 552  
 $S = 5860 \text{ Ac. Ft.}$

$$\text{Stage} = 576.0$$
$$\text{Area} = 19,480 \text{ S.F.}$$
$$\text{Vol.} = 447 \text{ Ac. Ft.}$$

$$Q_{p6} \text{ Trial} = 83,200 \left(1 - \frac{447}{5860}\right) = 76,900 \text{ cfs}$$

$$\text{Stage} = 575.5$$
$$\text{Area} = 18,500 \text{ S.F.}$$
$$\text{Vol.} = 425 \text{ Ac. Ft.}$$

$$Q_{p6} = 83,200 \left(1 - \frac{430}{5860}\right) = 77,000 \text{ cfs}$$

$$\text{Stage} = 575.5$$

$$\text{Depth} = 23.5'$$



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SUBJECT: Dam Failure Hydrographs

SHEET NO.  
7 of 3

STA. 55+0

$$Q_{p6} = 72,000 \text{ cfs}$$

Streambed Elev. = 550  
 $S = 5860 \text{ Ac. Ft.}$

$$\text{Stage} = 567.8$$
$$\text{Area} = 14,100 \text{ S.F.}$$
$$\text{Vol.} = 486 \text{ Ac. Ft.}$$

$$Q_{p7} \text{ Trial} = 77,000 \left(1 - \frac{436}{5860}\right) = 70,600 \text{ cfs}$$

$$\text{Stage} = 567.2$$
$$\text{Area} = 13,260 \text{ S.F.}$$
$$\text{Vol.} = 457$$

$$Q_{p7} = 77,000 \left(1 - \frac{471}{5860}\right) = 70,800$$

$$\text{Stage} = 567.2$$

$$\text{Depth} = 17.2'$$

STA. 65+0

$$Q_{p7} = 70,800 \text{ cfs}$$

Streambed Elev. = 550  
 $S = 5860 \text{ Ac. Ft.}$

$$\text{Stage} = 563.4$$
$$\text{Area} = 12,190 \text{ S.F.}$$
$$\text{Vol} = 280 \text{ Ac. Ft.}$$

$$Q_{p8} \text{ Trial} = 70,800 \left(1 - \frac{280}{5860}\right) = 67,400 \text{ cfs}$$

$$\text{Stage} = 563.1$$
$$\text{Area} = 11,750 \text{ S.F.}$$
$$\text{Vol.} = 270$$

$$Q_{p8} = 70,800 \left(1 - \frac{275}{5860}\right) = 67,500$$

$$\text{Stage} = 563.1$$

$$\text{Depth} = 13.1'$$



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SUBJECT: Dam Failure Hydrography

SHEET NO.  
8 of 8

STA. 75+0

$Q_{ps} = 67,500 \text{ cfs}$   
Stream bed Elev = 527  
 $S = 53.00 \text{ Ac. Ft.}$

Stage = 538.8  
Area = 3980  
Vol. = 9146 Ft.

$Q_{pq} \text{ Trial} = 67,500 \left(1 - \frac{91}{5860}\right) = 66,400 \text{ cfs}$

Stage = 538.8  
Area = 3980  
Vol. = 9146 Ft.

$Q_{pq} = 66,400 \text{ cfs}$

Stage = 538.8

Depth = 9.8'

STA. 80+0

$Q_{ps} = 66,400 \text{ cfs}$   
Stream bed Elev = 528  
 $S = 58.60 \text{ Ac. Ft.}$

Stage = 539.8  
Area = 10,200 S.F.  
Vol. = 117 Ac. Ft.

$Q_{p10} \text{ Trial} = 66,400 \left(1 - \frac{117}{5860}\right) = 65,100 \text{ cfs}$

Stage = 539.6  
Area = 10,050 S.F.  
Vol. = 115 Ac. Ft.

$Q_{p10} = 66,400 \left(1 - \frac{115}{5860}\right) = 65,100 \text{ cfs}$

Stage = 539.6

Depth = 11.6'

HIGH HAZARD ESTABLISHED AT THIS POINT.

APPENDIX E

INFORMATION AS CONTAINED IN  
THE NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME

**ATE  
LME**