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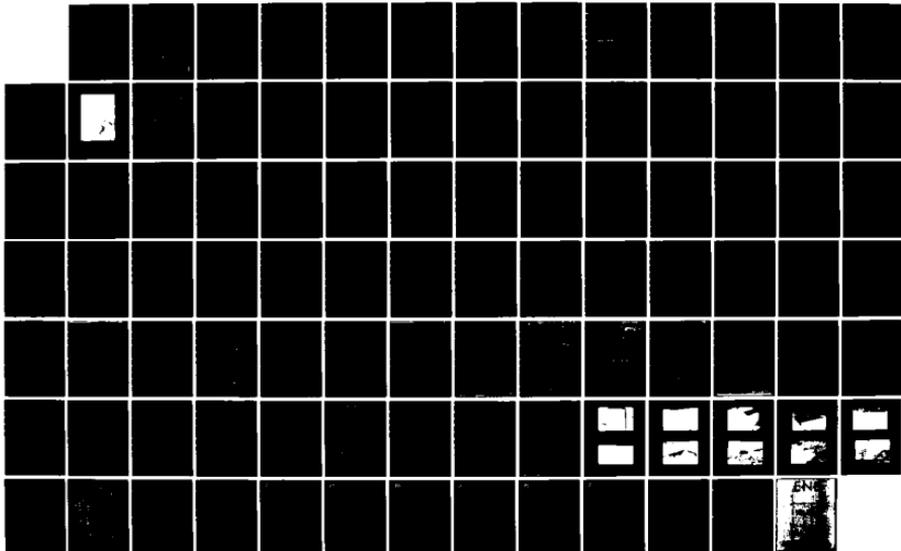
NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
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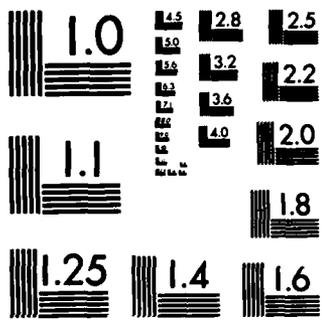
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THAMES RIVER BASIN
STAFFORD, CONNECTICUT

AD-A144 586

WHITNEY DAM
CT 00477

PHASE I INSPECTION REPORT NATIONAL DAM INSPECTION REPORT

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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) Whitney Dam consists of a 1,400 foot long earth embankment and a 120 foot wide grassed emergency spillway. Maximum height of dam is 52 feet with a maximum storage capacity of 1,960 acre-feet. Therefore, the size classification is intermediate. Corps of Engineers Guidelines recommend a test flood of PMF for a dam with this size and hazard classification. Based on visual inspection, Whitney dam appears to be in good condition.		



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

SEP 04 1981

REPLY TO
 ATTENTION OF:

NEDED

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 Whitney Dam (CT-00477) 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, and to the owner, State of Connecticut, 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
 Commander and Division Engineer

Incl
 As stated

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THAMES RIVER BASIN
STAFFORD, CONNECTICUT

WHITNEY DAM

CT 00477

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification No:	CT 00477
Name of Dam:	Whitney Dam
Town:	Stafford
County and State:	Tolland, Connecticut
Stream:	Patten Brook
Date of Inspection:	29 December, 1980

BRIEF ASSESSMENT

Whitney Dam consists of a 1,400 foot long earth embankment and a 120 foot wide grassed emergency spillway. The outlet consists of a concrete riser with 7.5 foot long weirs on each side and a 30-inch reinforced concrete outlet pipe discharging into Patten Brook at the toe of dam.

This dam was constructed in 1962 for the Connecticut Department of Agriculture and Natural Resources (now the Department of Environmental Protection). The dam was constructed for the purpose of flood control.

Maximum height of dam is 52 feet with a maximum storage capacity of 1,960 acre-feet. Therefore, the size classification is intermediate. The area of probable dam failure impact includes a private swim club

with camping facilities about 500 feet downstream of the Dam. Hazard classification for Whitney Dam is high.

Corps of Engineers Guidelines recommend a test flood of Probable Maximum Flood (PMF) for a dam with this size and hazard classification. Probable maximum rainfall for this area is 24" in 6 hours for 10 square miles. The recommended reduction for imperfect fit is 20% which reduces the rainfall to 19.2 inches. Based on Corps of Engineers charts, the PMF results in a peak flow of 5,800 cfs. The Soil Conservation Service design for this dam used a rainfall of 15 inches and a runoff of 13.5 inches. Calculations by the Soil Conservation Service show a peak inflow of 6,500 cfs. and a peak outflow of 1,930 cfs. with a maximum water surface elevation 2.0 feet below the crest of dam, which was used as the test flood.

Based on the visual inspection, Whitney dam appears to be in good condition. Only one small cedar tree is growing on the embankment and there is evidence of recreational vehicles climbing the embankment in three locations. The rodent screen on one foundation drain outlet is partially missing and the slide gate stem at the principal spillway outlet is bent and appears to be inoperative.

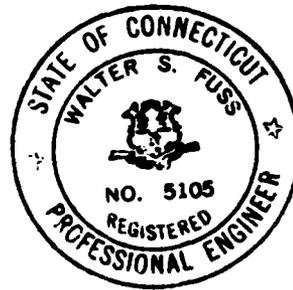
It is recommended that the Owner accomplish the following: remove the one tree growing on the slopes; during routine inspections, monitor

the recreational vehicle use and repair paths on the embankment when erosion starts to occur; repair the rodent screen; repair slide gate control and attempt to make it vandal resistant by using a heavier rod and making it shorter; prepare and implement a downstream warning system in case of an emergency.

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



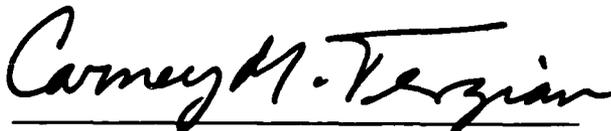
This Phase I Inspection Report on WHITNEY DAM (CT-00477) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.



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

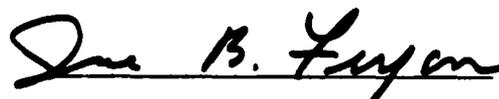


ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division



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.

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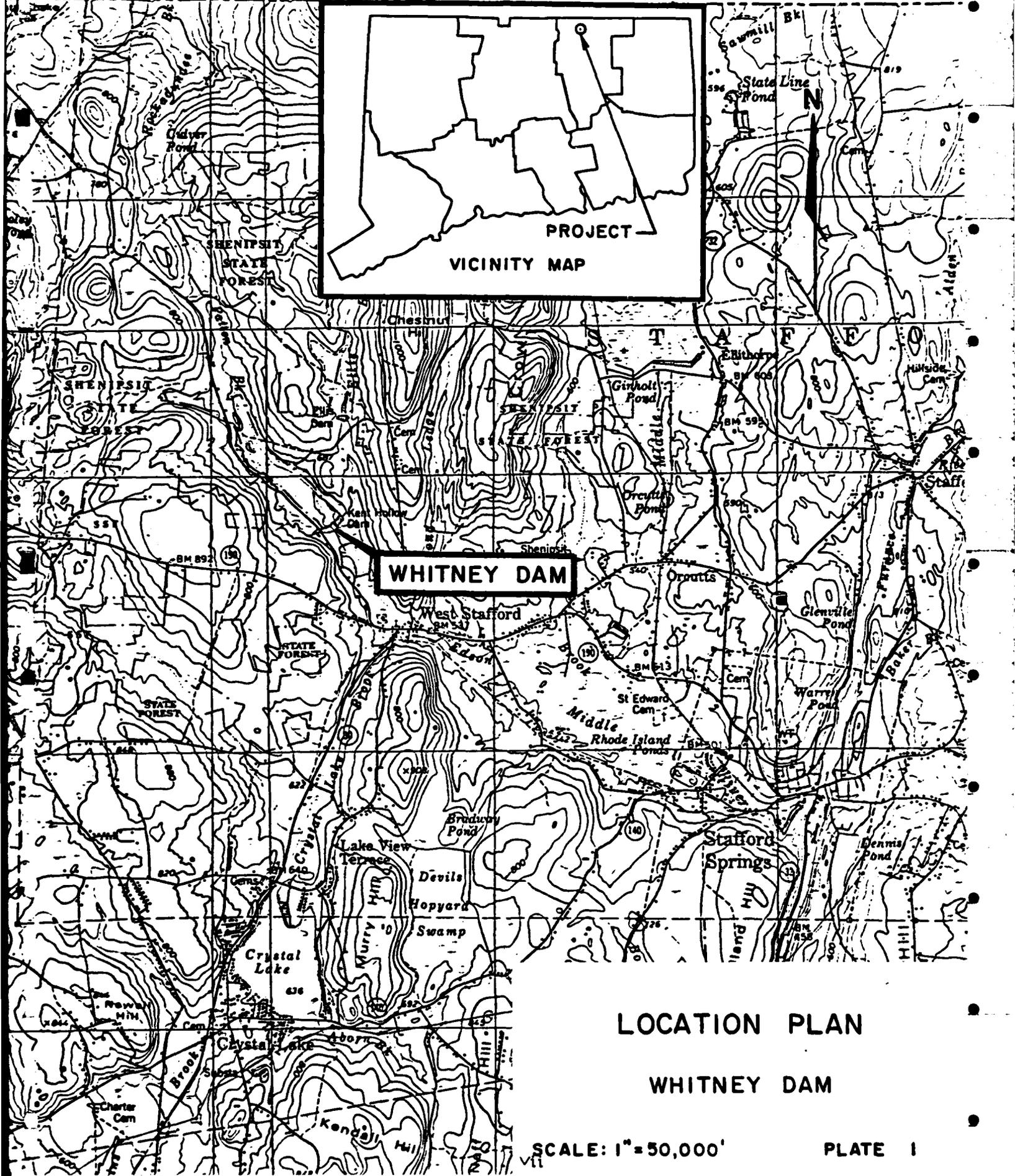
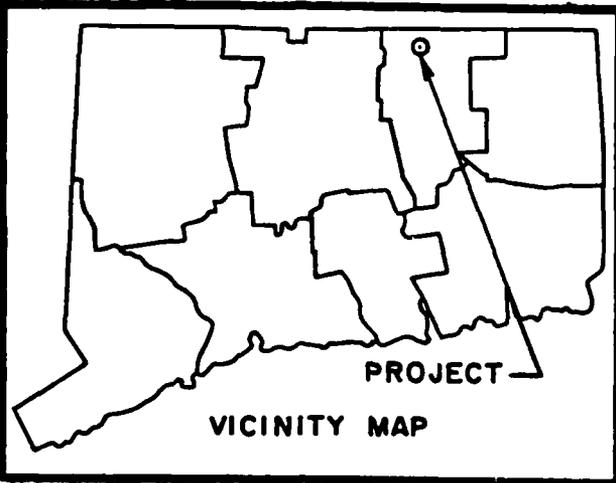
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<u>Appendix</u>	<u>Description</u>
A	INSPECTION CHECKLIST
B	ENGINEERING DATA
C	PHOTOGRAPHS
D	HYDROLOGIC AND HYDRAULIC COMPUTATIONS
E	INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS



OVERVIEW PHOTO



WHITNEY DAM

LOCATION PLAN

WHITNEY DAM

SCALE: 1" = 50,000'

PLATE I

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
WHITNEY DAM CT 00477

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. Whitney Dam is located in the Town of Stafford, County of Tolland, State of Connecticut and is also known as Kent Hollow Dam. The dam is located at Latitude 41°-58'-50" and Longitude 72°-22'-00". Whitney Dam impounds flow in Patten Brook, with a 2.9 square mile watershed. About 0.7 miles downstream of the dam, Patten Brook joins Edson Brook. About 1.6 miles below this point, Edson Brook flows into Middle River which joins with Furnace Brook to form the Willimantic River approximately 4.8 miles below Whitney Dam. Whitney Dam is located east of Old Springfield Road about 0.75 miles north of Route No. 190. This structure is for flood control. Except during storms, the pool is dry except for a small excavated sediment storage area. Generally, the detention pool is along the easterly side of Old Springfield Road with some backup on the westerly side near the dam.
- b. Description of Dam and Appurtenances. Whitney Dam is about 1,400 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 52 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 596.5.

The emergency spillway is grass lined with a crest 5.5 feet below the top of dam (Elevation 591.0). Spillway bottom width is 120 feet with side slopes of 1.0 vertical to 3.0 horizontal and is located at the east end of the dam. Slopes along the 260 foot long emergency spillway channel vary from 1.0% to 4.1% with an 80 foot level area at the upstream end.

The principal spillway consists of a reinforced concrete riser with 7.5 foot long weirs on each side parallel to the stream flow and at elevation 551.0. A 24-inch metal slide gate at the upstream end of the riser with invert elevation 546.5 provides for draining the sedimentation pool. A 30-inch reinforced concrete water pipe 265 feet long discharges from the riser to a 12 foot wide channel with 1.0 vertical to 2.0 horizontal side slopes. The invert of the entrance to the 30-inch pipe is 546.5.

The main portion of the embankment runs easterly from Old Springfield Road with a little over 300 feet of dam west of the road. Flooding west of the road is caused by a backup of water through a 24-inch culvert under the road. In this area, the original road was raised a maximum of about 26 feet to top of dam. The roadway

embankment isolates a small area that is contained by the 300 feet of dam west of the road. Old Springfield Road is a paved road carrying light traffic and is maintained by the Town of Stafford.

- c. Size Classification. Height of dam is 52 feet from crest of dam to bed of outlet channel and the total storage volume to top of dam is 1,960 acre-feet. The dam is therefore classified as an INTER-MEDIATE 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 1,000 to 50,000 acre-feet.

- d. Hazard Classification. Whitney Dam is classified as having a HIGH hazard potential because it is located in a rural area about 4,500 feet upstream of the village of West Stafford and 500 feet upstream of a private swim club with camping facilities. A failure discharge could cause the loss of more than a few lives at the camping area. Estimated water depth due to the possible dam failure discharge of 160,000 cfs. may range from 40.5 feet at the dam to 20.2 feet at a distance of 2,000 feet downstream. In the camping area, water depths before failure range from 3.2 feet to 6.0 feet. After failure, depths range from 19.7 to 25.9 feet.

e. Ownership. Whitney 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. Whitney 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 with only a small pool for sediment storage, flood control is the only present use.

h. Design and Construction History. Construction of this facility was completed in 1962. 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.

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 594.5	1930 cfs.
8.	Total project discharge at top of dam elevation 596.5	4300 cfs.
9.	Total project discharge at test flood elevation 594.5	1930 cfs.
c. <u>Elevation.</u> (feet above N.G.V.D.)		
1.	Streambed at toe of dam	544.5
2.	Bottom of cutoff	N/A
3.	Maximum Tailwater	Unknown
4.	Normal Pool	551.0
5.	Full Flood control pool	591.0
6.	Emergency spillway crest	591.0
7.	Design surcharge	594.5
8.	Top of dam	596.5
9.	Test flood surcharge	594.5
d. <u>Reservoir.</u> (Length in feet)		
1.	Normal pool	300'
2.	Flood control pool	5400'
3.	Emergency spillway crest pool	5400'

d. Reservoir (continued)

- | | | |
|----|-----------------|-------|
| 4. | Top of dam pool | 5950' |
| 5. | Test flood pool | 5750' |

e. Storage. (acre-feet)

- | | | |
|----|-------------------------------|------|
| 1. | Normal pool | 5 |
| 2. | Flood control pool | 1070 |
| 3. | Emergency spillway crest pool | 1070 |
| 4. | Top of dam pool | 1960 |
| 5. | Test flood pool | 1360 |

f. Reservoir Surface. (acres)

- | | | |
|----|-------------------------------|------|
| 1. | Normal pool | 9 |
| 2. | Flood control pool | 80 |
| 3. | Emergency spillway crest pool | 80 |
| 4. | Test flood pool | 87 |
| 5. | Top of dam | 115± |

g. Dam.

- | | | |
|----|-------------|------------------------------------|
| 1. | Type | Earth Embankment |
| 2. | Length | 1400' |
| 3. | Height | 52' |
| 4. | Top width | 14' |
| 5. | Side slopes | Upstream 3H:1V
Downstream 2H:1V |

g. Dam (continued)

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	2 @ 7.5' = 15"
3. Crest elevation	551.0
4. Gates	None
5. U/S Channel	Natural Bed
6. D/S Channel	Natural Bed
7. Design Surcharge	594.5

Emergency Spillway

1. Type	Grass with 3H:1V side slopes
2. Length of weir	120' bottom width
3. Crest elevation	591.0
4. Gates	None

Emergency Spillway (continued)

5.	U/S Channel	Grass
6.	D/S Channel	Grass
7.	Design Surcharge	594.5
j. <u>Regulating Outlet.</u>		
1.	Invert	546.5
2.	Size	30" pipe
3.	Description	Pipe from bottom of spillway riser with gate to drain sediment pool
4.	Control Mechanism	24" slide gate
5.	Other	None

SECTION 2 - ENGINEERING DATA

2.1 DESIGN DATA:

Whitney 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	2.9 square miles
Principal Spillway Design Flood	Hurricane "Diane"
Emergency Spillway Design Flood	15" in 6 hours
Total Precipitation Loss	1.5"
Net Runoff	13.5"
Design Peak Flow	6,500 cfs.
Per Square Mile	2,145 cfs.
Drawdown Time from Principal Spillway Design Storm High Water	5.5 days
Maximum Discharge	2,140 cfs.
Emergency Spillway Construction	Earth Channel
Emergency Spillway Discharge	2,010 cfs.
Emergency Spillway Width	120' (bottom)
Dc at Control Section	1.90'
Vc at Control Section	8.4 fps
Max V in Emergency Spillway	9.2 fps
Freeboard	2.0'

2.2 CONSTRUCTION DATA:

An application for Construction Permit For Dam dated July 10, 1961 was submitted to the State. The Construction Permit was approved on October 2, 1961 by the Connecticut Water Resources Commission. Construction was completed in 1962. A final inspection was held on October 5, 1962 by the Soil Conservation Service and the Contractor. The Con-

sultant to the Water Resources Commission held a final inspection on October 8, 1962.

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 was 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 judgment.
- c. Validity. There is no reason to question the validity of the available data.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS:

- a. General. Based on the visual inspection and a review of the design criteria and construction plans, Whitney Dam and its appurtenances are judged to be in good condition. At the time of the inspection, the dam was essentially dry with only a small sediment storage pool containing water.

The dam consists of an earth embankment with underlying soils consisting mainly of gravel and sandy gravel with some rock in the area of the emergency spillway. 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 essentially a dry dam with a small sediment storage pond. The depth of the storage pond is approximately 4 feet.

b. Dam.

1. Upstream Face - The original design called for the entire upstream slope to be faced with rock removed from the fill material. However, due to a shortage of rocks 12 inches and larger, the rock face ended about 14 feet below the crest of dam as shown in Photo No. C-2. This lack of stone face does not appear to be a problem since water levels above the

protection will be rare and of short duration.

The remainder of the upstream face is grass covered with a very dense mat on most of the surface. There are no trees growing on this slope.

There is a narrow concrete path running up the slope about 120 feet east of Old Springfield Road as shown in Photo No. C-3. This path was constructed for use as a staff gauge but has not been maintained as such. This section of dam connects to a high knoll of existing ground and has no rock face. Therefore, motorcycles using the area are more or less required to climb the embankment in the vicinity of the concrete path and appear to be using it as an access route to the crest of the dam.

2. Crest - The crest is grass covered (sparse in some areas) as shown in Photo C-4. It is relatively level with vehicle tracks, but no significant rutting. Because of the limited use, there are no apparent problems.
3. Downstream Face - Like the upstream face, the original design included a rock facing for the downstream face. However, no rock facing was used.

The entire face is grass covered with a dense grass mat on most of the downstream face. Grass is thin in some areas, but there is no evidence of erosion in these areas. There are no signs of sloughing or seepage.

There are three areas where recreational vehicles have been running up the dam face. There is some erosion in these areas, but it does not appear to be severe at this time. However, the trails on the slope should be checked for changes during routine maintenance visits. Two of the areas where recreational vehicles are using the slopes are shown in Photos C-5 and C-6. One bar is missing from the rodent screen at the outlet on the foundation drain as shown in Photo No. C-7. There appeared to be a small flow of clear water from the foundation drain at the time of the inspection. It could not be quantified due to tailwater.

c. Appurtenant Structures.

1. Principal Spillway - The inlet to the principal spillway is shown in Photos No. C-8 and C-9. A slide gate controlling the sediment storage pool is closed and the water flows over the side weirs in the riser. As shown in Photo No. C-8, the control stem for the slide gate has been bent, making

operation difficult. The concrete, trash racks and other appurtenances are in good condition. There does not appear to be a significant buildup of sediment in the pool that would require the draining of the pool for cleaning.

There is a 30-inch concrete water pipe from the riser through the embankment to the outlet. The portion of the pipe that is visible is in good condition and is shown in Photo No. C-10. The last pipe at the outlet is 16 feet in length and is supported at mid-point by a reinforced concrete bent 8 feet deep and the remainder of the pipe is supported on a reinforced concrete cradle. A bent and cradle are not visible, but there are no outward signs of any problems. The discharge end of the pipe is in good condition with no erosion in the stream bed.

2. Emergency Spillway - The emergency spillway is grass lined with a 120 foot bottom width and is shown in Photo No. C-11. The side slopes are 1.0 vertical to 3.0 horizontal. The first 80 feet of the spillway is level with the next 50 feet on a slope of 4.1% and the remaining 130 feet on a slope of 1.0%. There is a good mat of grass except in areas where bedrock is exposed. Before construction, it was estimated that 1,500 c.y. of rock would be excavated when constructing the

emergency spillway. The spillway is in good condition with very little chance of erosion due to the underlying bedrock.

- d. Reservoir Area. The first 1,700 feet of the reservoir area is partly cleared with the remainder of the area wooded as shown in the overview photo. Parts of the flood impoundment area extend west of Old Springfield Road and north of Tetrault Road.

No detrimental features in the reservoir area were observed.

Banks in the cleared area appeared to be stable.

- e. Downstream Channel. The downstream channel for Whitney Dam is a natural stream called Patten Brook as shown in Photo No. C-12. There is some brush and trees along the channel downstream of the dam but there does not appear to be any need for removal. About 700 feet downstream, Patten Brook enters a pond about 8 acres in size. This pond has a low dam and is a part of a private swim club and recreation area. It appears that camp trailers are parked in the area during the summer season. Patten Brook is then joined by Crystal Lake Brook about 1,000 feet upstream from Connecticut Route 190 in the village of West Stafford.

3.2 EVALUATION:

Based on the visual inspection, the overall condition of the dam is good with some minor items that require attention. None of the items need

prompt action and can be accomplished during routine maintenance inspections.

- a. The one small cedar tree should be removed before it develops a large root system.
- b. The recreation vehicle trails on the downstream face should be repaired and an attempt made to reduce the use of the area by unauthorized vehicles.
- c. The stem on the slide gate at the principal spillway should be straightened or replaced with thought given to making it more vandal resistant. This could be done by using a heavier rod, additional bracing or by the use of a removable section.
- d. The rodent screen should be repaired.
- e. Since the reservoir was dry during the inspection, except for the small sediment pool, 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 very good at the 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:

Whitney Dam consists of a 1,400 foot long earth dam with a maximum height of 52 feet. There is a principal spillway consisting of a reinforced concrete riser with a 30 inch concrete pipe outfall. The emergency spillway is a 120 foot wide grass spillway with a maximum surcharge of 5.5 feet before overtopping the dam.

Patten Brook, Mitchells Brook and four unnamed streams are impounded by this structure. The watershed is rolling and predominately wooded and rural. Except for swampy areas along Patten Brook, there are no significant storage areas in the watershed.

5.2 DESIGN DATA: Whitney Dam was designed by the Soil Conservation Service. The weighted curve number for the watershed was computed to be 66.36 with a time of concentration of 3.3 hours.

The rainfall resulting from Hurricane "Diane" in 1955 was used for the principal spillway design. This storm resulted in 6 to 9 inches of runoff in the area. Routing this storm through the reservoir resulted in a peak elevation that was then used as the elevation of the emergency spillway. The emergency spillway design flood used a rainfall of 15 inches in 6 hours with AMC III. A total precipitation loss of 1.5

inches resulted in a net runoff of 13.5 inches.

The drawdown time for the principal spillway design storm is calculated to be 5.5 days. Discharge conditions for the emergency spillway design storm were obtained by routing the storm through the reservoir starting after 5.0 days drawdown from the "Diane" storm.

The critical depth at the control section in the emergency spillway was calculated to be 1.90 feet and the maximum velocity to be 9.2 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". Whitney Dam is classified as intermediate in size with HIGH hazard potential. Guidelines for these classifications recommend that an event equal in magnitude to the Probable Maximum Flood be used. Probable maximum rainfall for this area is 24 inches in 6 hours for 10 square miles. The recommended reduction for imperfect fit is 20% which results in a PMP of 19.2 inches. When designing this facility, the Soil Conservation

Service (SCS) used a 6 hour rainfall of 15 inches and a runoff of 13.5 inches.

The design flood was calculated by the SCS to be 6,500 cfs. which is 2,145 CSM. The peak outflow for the design flood inflow was computed to be 1,930 cfs by the Soil Conservation Service. This outflow results in a water surface elevation 2.0 feet below the crest of dam with a maximum depth of flow in the emergency spillway of 3.5 feet.

Using Corps of Engineers methods, the PMF was calculated to be 5,800 cfs. The SCS design flood of 6,500 cfs is used as the "Test Flood" for this report.

The capacity of spillways at the top of dam elevation is 4,300 cfs. which is 223 percent of the calculated test flood discharge.

5.5 DAM FAILURE ANALYSIS:

Applying the calculated dam failure discharge of 160,400 cfs. when the impounded water level in the reservoir is at elevation 594.5 (Test Flood Surchage) will produce an approximate water surface elevation of 585 just downstream of the dam. At the peak discharge rate of 1,930 cfs for the test flood, the approximate water surface elevation would be 552 just downstream of the dam. The depths of flow would range from 40.5 feet at the dam to 20.2 feet approximately 2,000 feet downstream.

From 500 feet to 2000 feet downstream of the dam, a private swim club maintains several facilities including areas for camping vehicles. The following table shows the pre and post-failure water elevations along with the increased depth of water due to the assumed failure in the area where campers could be located:

<u>Station</u>	<u>Elev. Pre-Failure</u>	<u>Elev. Post-Failure</u>	<u>Difference</u>
5+0	545.2	568.0	22.8'
10+0	545.0	561.8	16.8'
15+0	540.0	558.1	18.1'
20+0	538.5	553.2	14.7'

These increases in water elevations could cause the loss of more than a few lives which establishes the hazard classification as HIGH. Therefore, water depths at specific structures downstream of this area were not determined.

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:

Whitney 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, Whitney 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. The small cedar tree should be removed before a large root system develops.
2. The recreation vehicle trails should be monitored and repaired when erosion occurs with well compacted suitable material and seeded.
3. The stem on the slide gate at the principal spillway should be straightened or replaced with thought given to making it more vandal resistant.
4. The rodent screen should be repaired.
5. Develop an "Emergency Action Plan" that will include an effective preplanned downstream warning system, location of emergency equipment, materials and manpower, authorities to contact and potential areas that require evacuation.
6. Maintain a record of maximum water levels during flood events for future evaluation studies.
7. During flood events, check dam for evidence of seepage.
8. 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

PERIODIC INSPECTION CHECK LIST

PROJECT Whitney Dam DATE 12-29-80
 PROJECT FEATURE _____ NAME _____
 DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>DIKE EMBANKMENT</u>	
Crest Elevation	596.5
Current Pool Elevation	551.1
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 Whitney Dam DATE 12-29-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>DIKE EMBANKMENT (cont)</u>	
Trespassing on Slopes	Apparent recreational vehicle tracks at three locations
Sloughing or Erosion of Slopes or Abutments	Minor erosion at recreational vehicle tracks.
Rock Slope Protection - Riprap Failures	None
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	None
Piping or Boils	None
Foundation Drainage Features	Appear functional. Rodent screen partially missing at one outlet
Toe Drains	Good
Instrumentation System	None
Vegetation	Good grass cover, one small cedar on D.S. slope

PERIODIC INSPECTION CHECK LIST

PROJECT Whitney Dam DATE 12-29-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u>	
a. Approach Channel	Ponded
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	Good
Stop Logs and Slots	Slots good, slide gate operating stem bent and inoperative.

PERIODIC INSPECTION CHECK LIST

PROJECT Whitney Dam DATE 12-29-80
 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 Whitney Dam DATE 12-29-80
 PROJECT FEATURE _____ NAME _____
 DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	Not Applicable
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 Whiney Dam DATE 12-29-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u> (cont)	Not Applicable
<p>b. Mechanical and Electrical</p> <p>Air Vents</p> <p>Float Wells</p> <p>Crane Hoist</p> <p>Elevator</p> <p>Hydraulic System</p> <p>Service Gates</p> <p>Emergency Gates</p> <p>Lightning Protection System</p> <p>Emergency Power System</p> <p>Wiring and Lighting System</p>	

PERIODIC INSPECTION CHECK LIST

PROJECT Whitney Dam DATE 12-29-80
 PROJECT FEATURE _____ NAME _____
 DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u>	
General Condition of Concrete	Concrete pipe good
Rust or Staining	None
Spalling	None
Erosion or Cavitation	None
Visible Reinforcing	None
Any Seepage or Efflorescence	None
Condition at Joints	Not Applicable
Drain Holes	Not Applicable
Channel	Good
Loose Rock or Trees Overhanging Channel	None, apparently recently trimmed
Condition of Discharge Channel	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Whitney Dam DATE 12-29-80

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	Generally ledge with shallow soil layer in some areas - good
b. Weir and Training Walls	Not applicable
General Condition of Concrete	
Rust of Staining	
Spalling	
Any Visible Reinforcing	
Any Seepage or Efflorescence	

PERIODIC INSPECTION CHECK LIST

PROJECT Whitney Dam DATE 12-29-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
b. Weir and Training Walls	Not applicable
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 Whitney Dam DATE 12-29-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
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<p><u>OUTLET WORKS - SERVICE BRIDGE</u></p> <p>a. Super Structure</p> <p style="padding-left: 40px;">Bearings</p> <p style="padding-left: 40px;">Anchor Bolts</p> <p style="padding-left: 40px;">Bridge Seat</p> <p style="padding-left: 40px;">Longitudinal Members</p> <p style="padding-left: 40px;">Under Side of Deck</p> <p style="padding-left: 40px;">Secondary Bracing</p> <p style="padding-left: 40px;">Deck</p> <p style="padding-left: 40px;">Drainage System</p> <p style="padding-left: 40px;">Railings</p> <p style="padding-left: 40px;">Expansion Joints</p> <p style="padding-left: 40px;">Paint</p>	<p>Not applicable</p>
---	-----------------------

PERIODIC INSPECTION CHECK LIST

PROJECT Whitney Dam DATE 12-29-80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

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

<p><u>OUTLET WORKS - SERVICE BRIDGE</u> (cont)</p> <p>b. Abutment & Piers</p> <p style="padding-left: 40px;">General Condition of Concrete</p> <p style="padding-left: 40px;">Alignment of Abutment</p> <p style="padding-left: 40px;">Approach to Bridge</p> <p style="padding-left: 40px;">Condition of Seat & Backwall</p>	<p>Not applicable</p>
---	-----------------------

APPENDIX B

ENGINEERING DATA

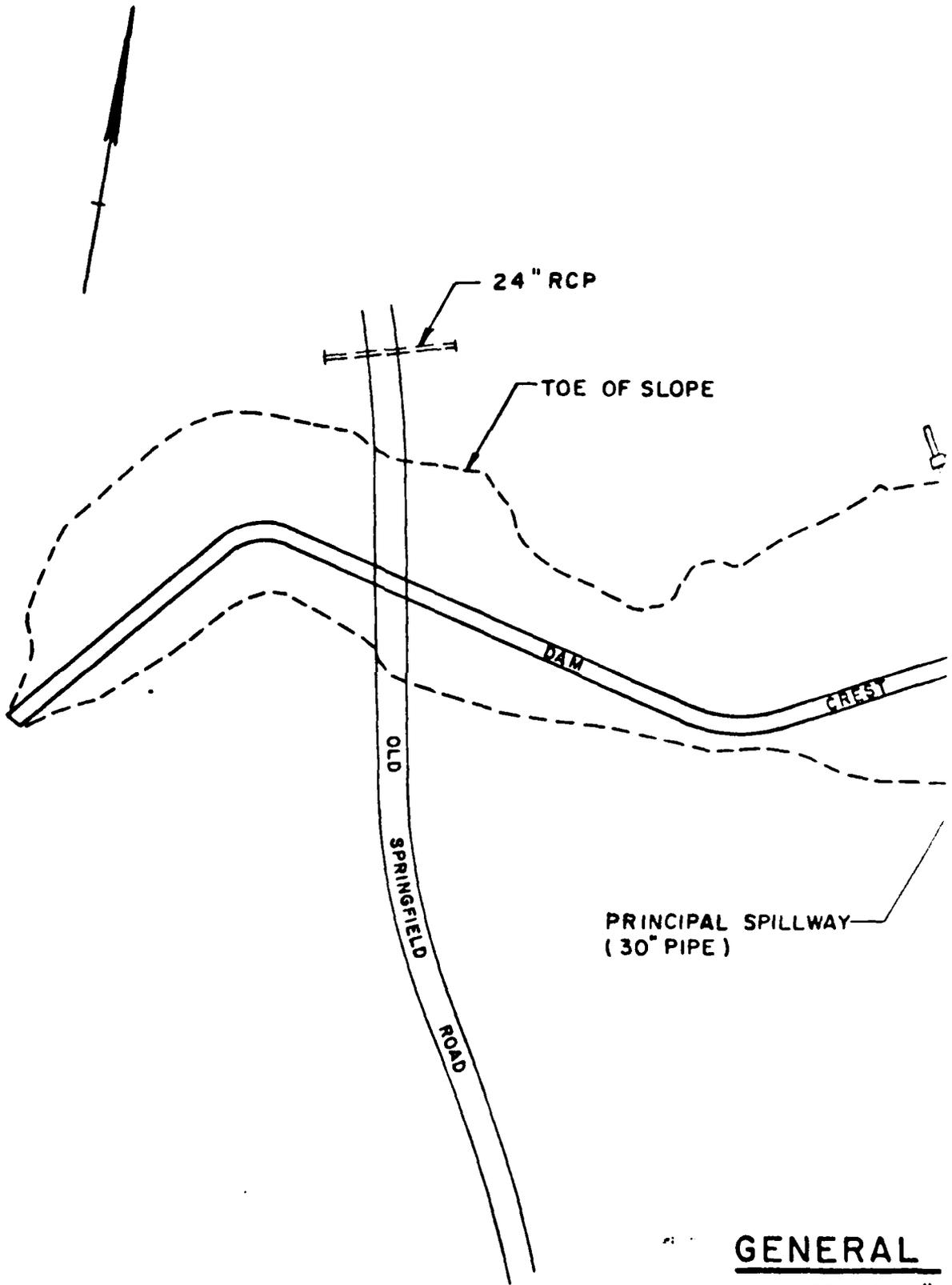
ENGINEERING DATA

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

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

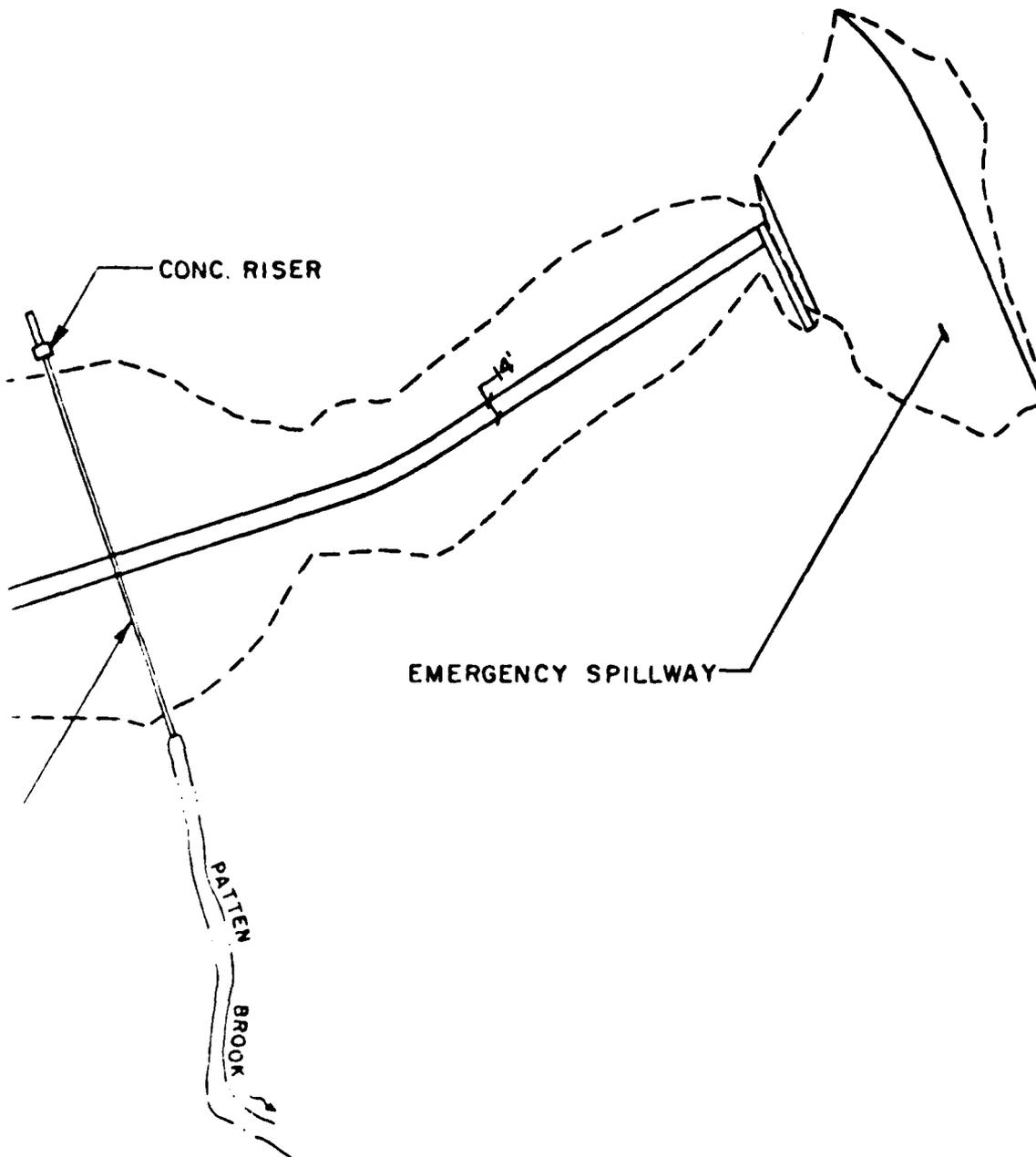
2. Work Plan, Design Report and access to original calculations are available at:

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



GENERAL

SCALE: 1" = 10'

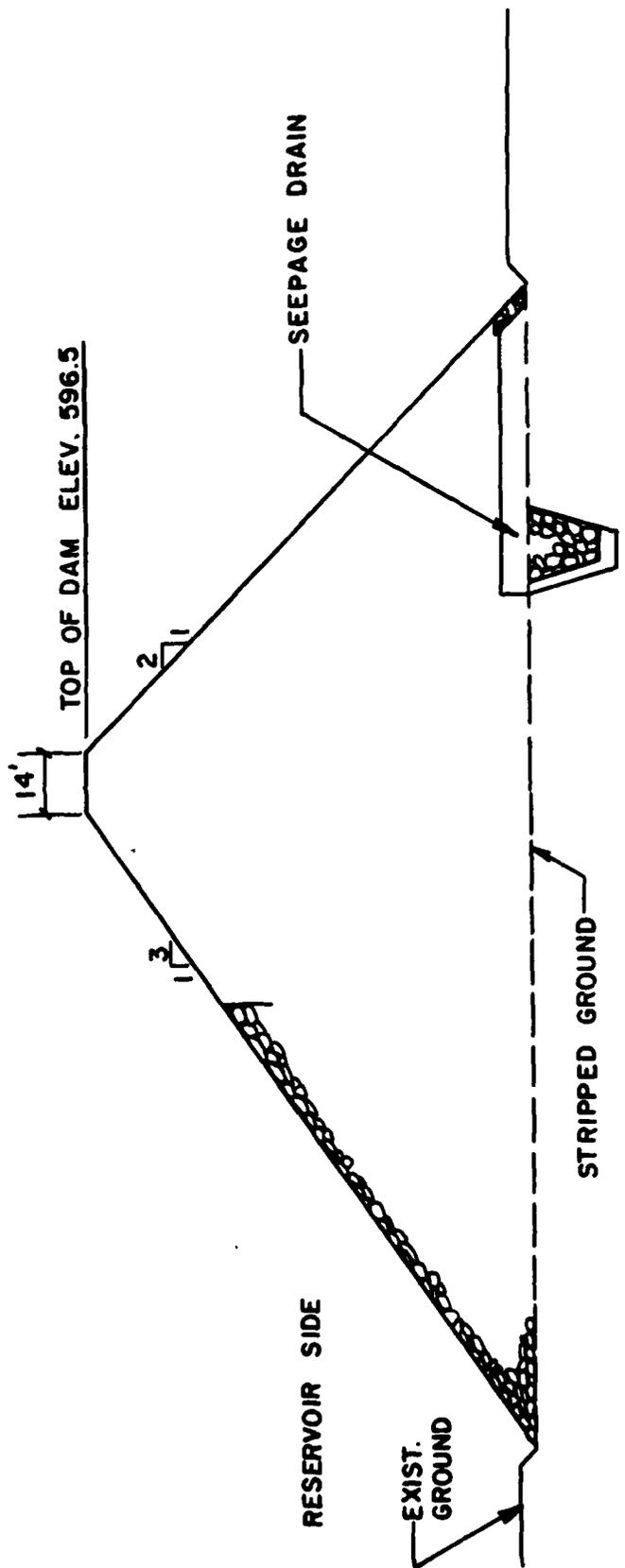


PLAN

1" = 120'

WHITNEY DAM

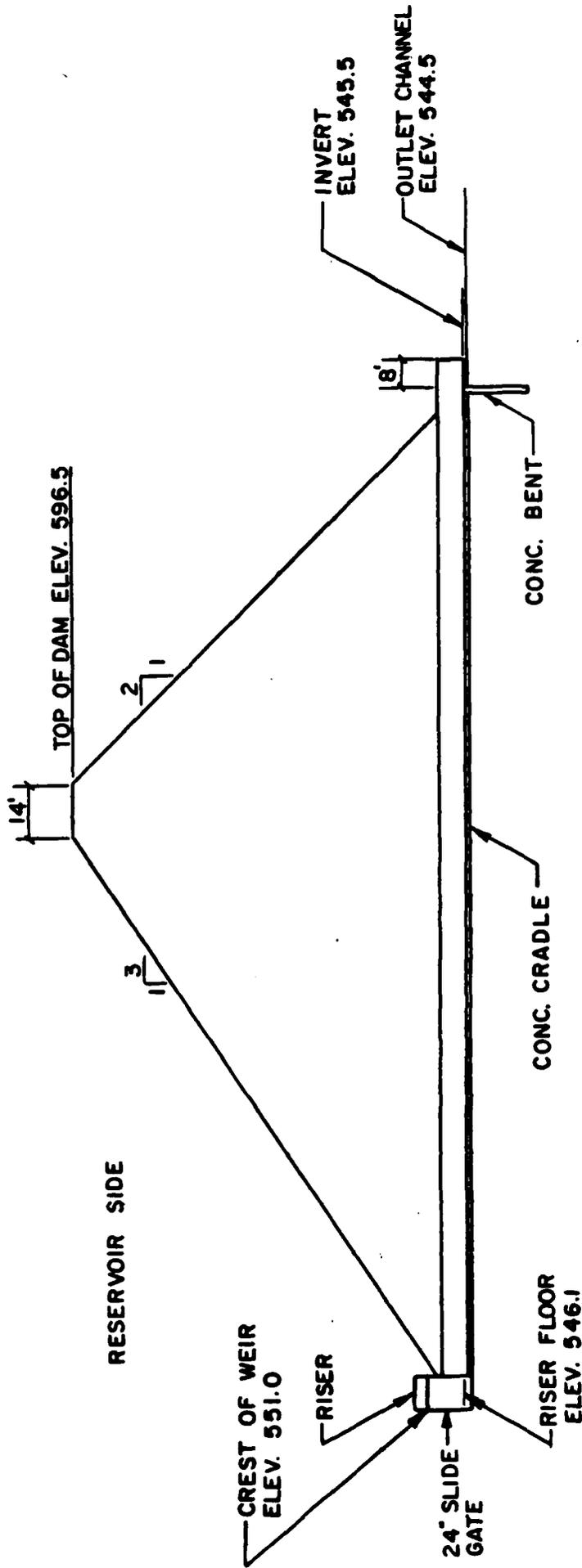
PLATE B-1



TYPICAL CROSS SECTION OF DAM

HORIZ. 1" = 40'±
SCALE: VERT. 1" = 20'±

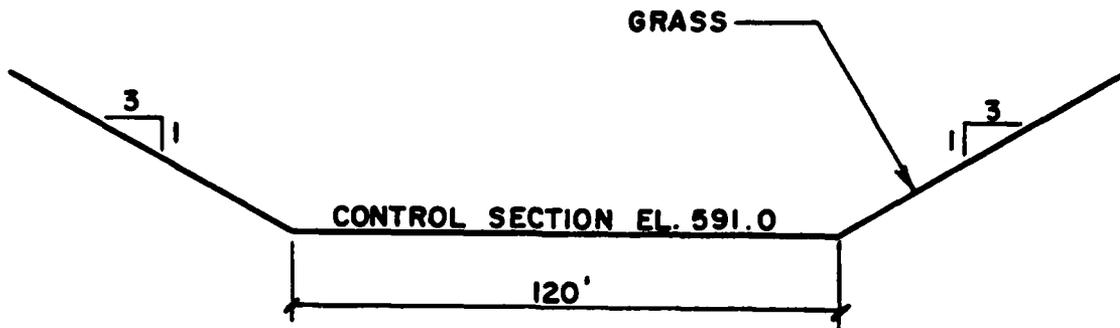
WHITNEY DAM



PROFILE ALONG C OF PRINCIPAL SPILLWAY

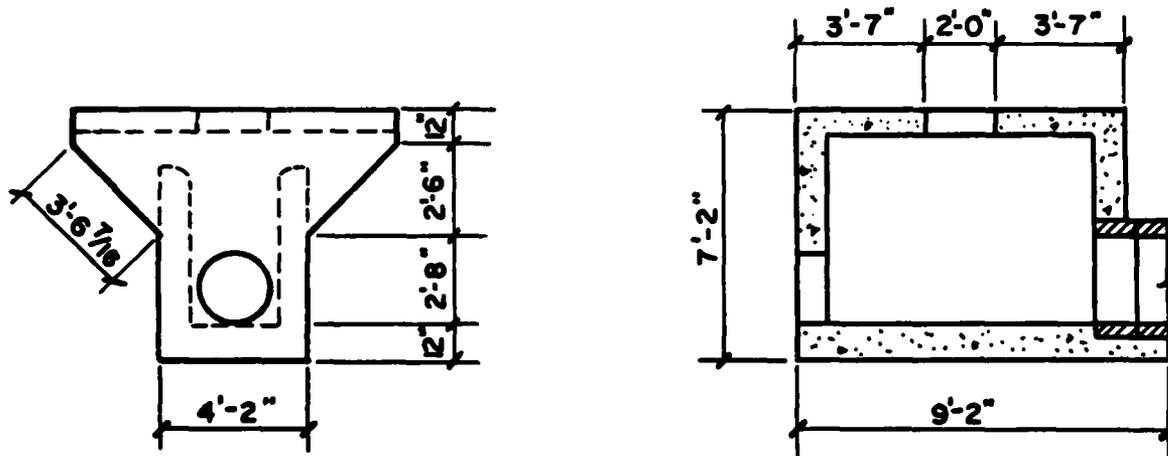
SCALE: HORIZ. 1" = 40' ±
 VERT. 1" = 20' ±

WHITNEY DAM



**TYPICAL SECTION
EMERGENCY SPILLWAY**

NOT TO SCALE



UPSTREAM ELEVATION

SECTION ON $\text{\textcircled{C}}$

DETAIL - CONCRETE RISER

NOT TO SCALE

WHITNEY DAM

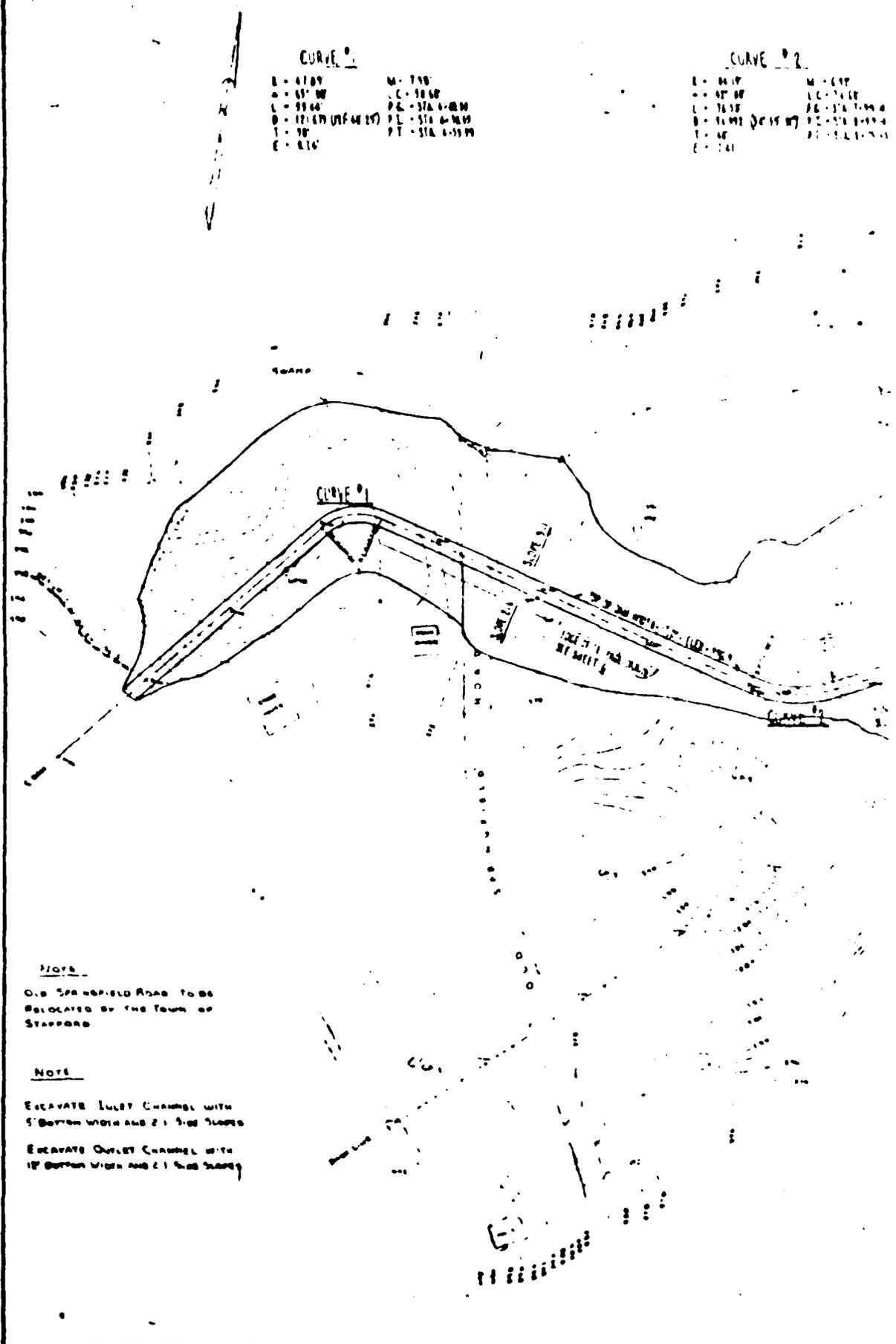
PLATE B-4

CURVE #1

B - 4100
 P - 45' 00"
 L - 99.60
 D - 121.670 (174.44 1/2)
 T - 30°
 E - 4.16
 M - 190
 C - 30.60
 P.C. - STA 4+00.00
 P.E. - STA 4+99.60
 P.T. - STA 5+00.00

CURVE #2

B - 4100
 P - 45' 00"
 L - 99.60
 D - 121.670 (174.44 1/2)
 T - 30°
 E - 4.16
 M - 190
 C - 30.60
 P.C. - STA 5+00.00
 P.E. - STA 5+99.60
 P.T. - STA 6+00.00



NOTE

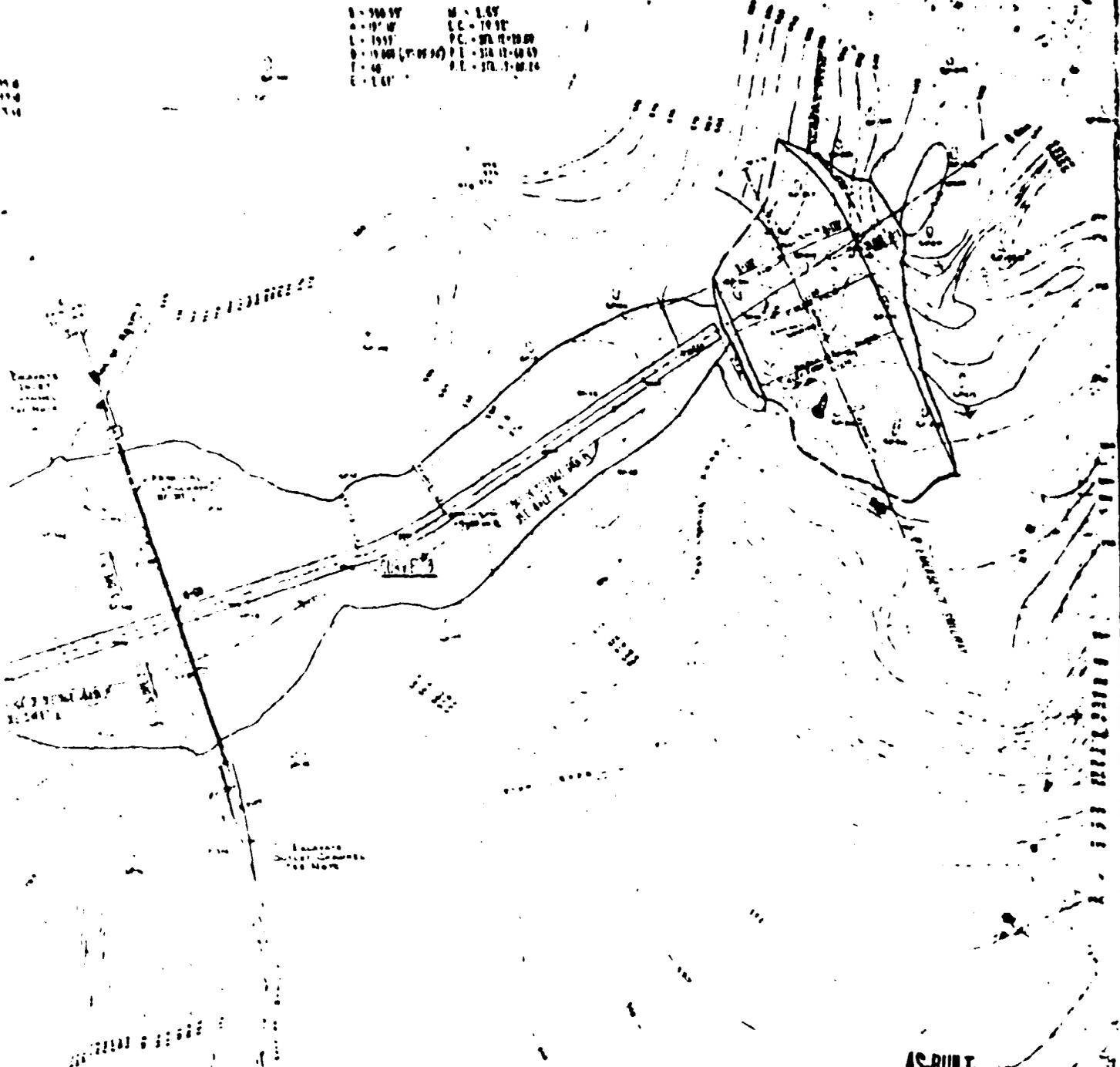
Old Springfield Road to be
 Relocated by the Town of
 Stafford

NOTE

Excavate Inlet Channel with
 5' Bottom Width and 2:1 Side Slopes
 Excavate Outlet Channel with
 12' Bottom Width and 2:1 Side Slopes

CURVE #9

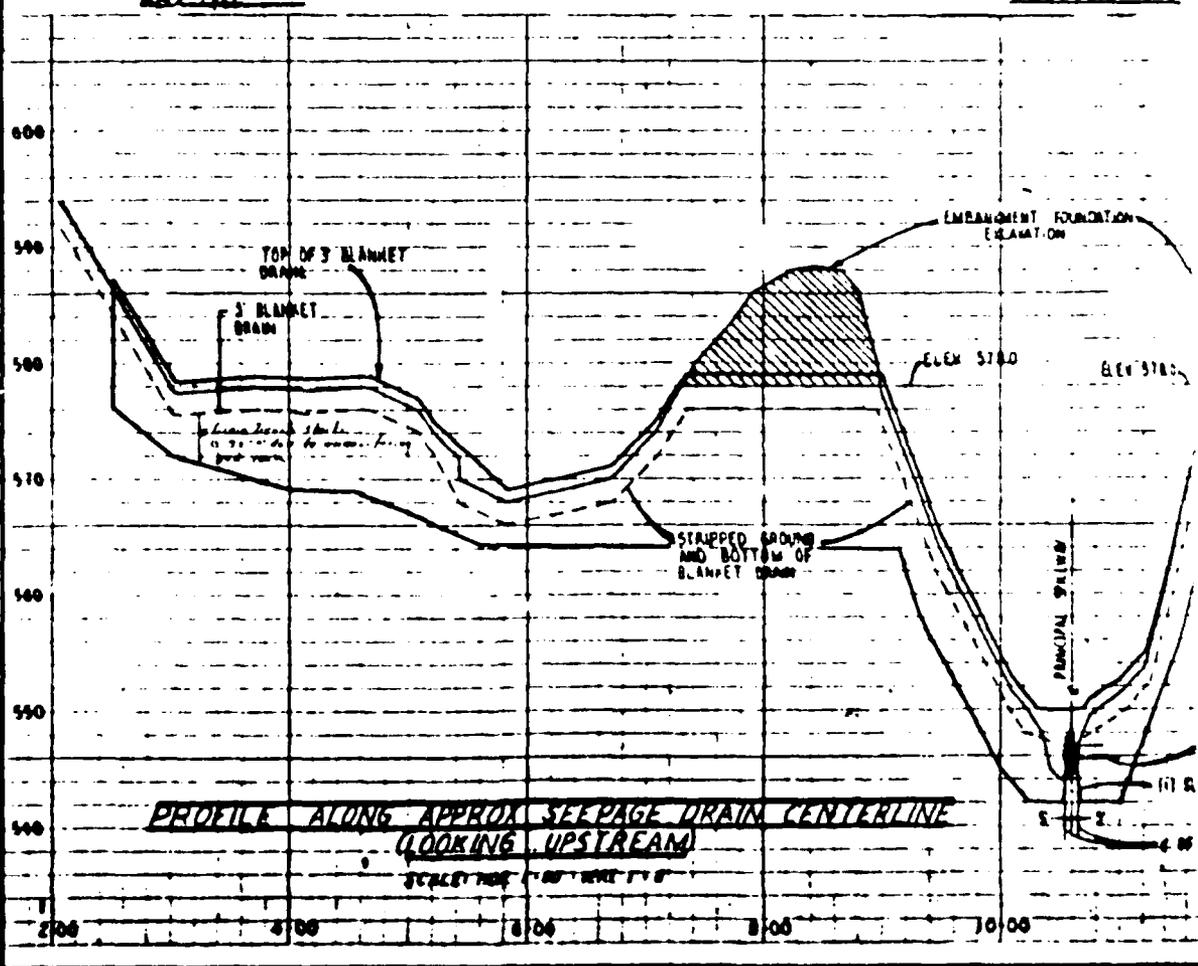
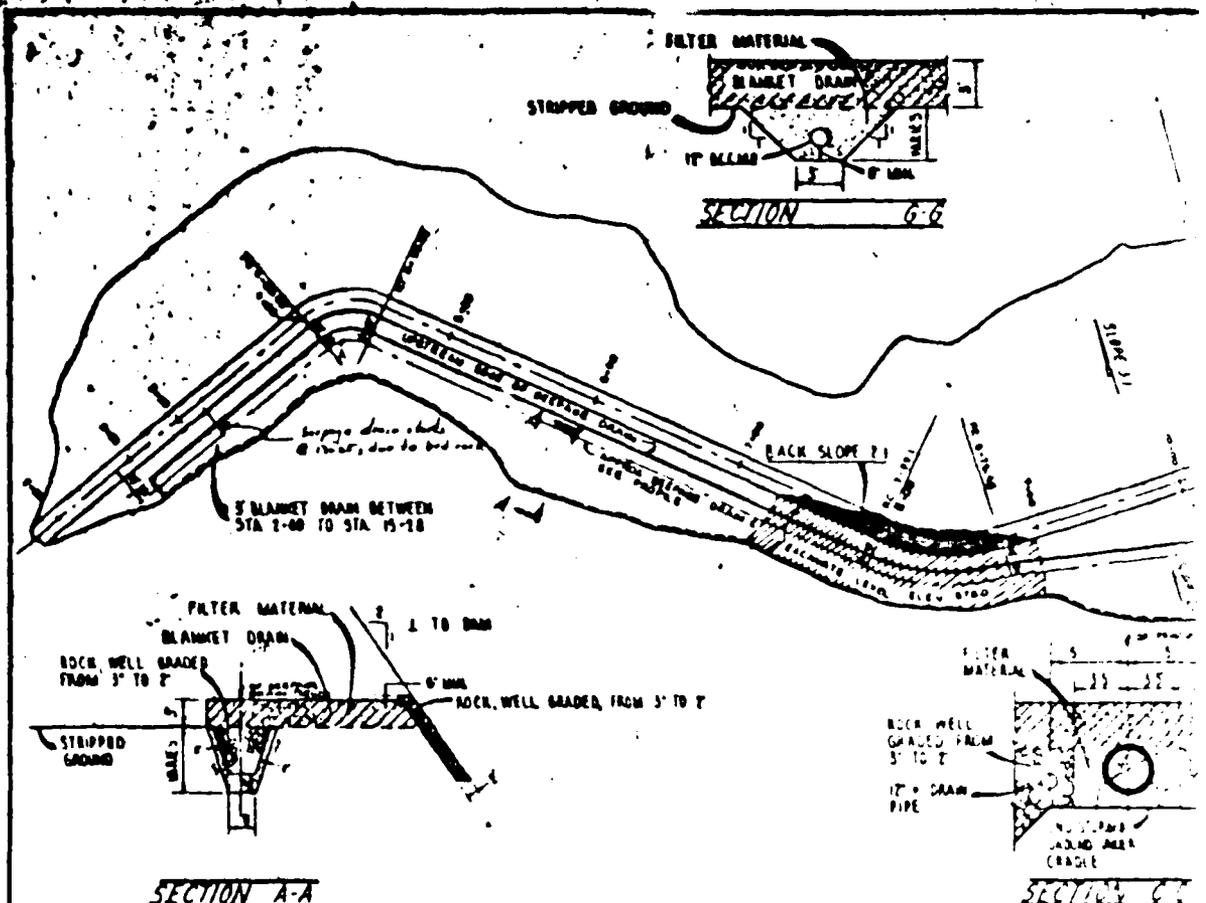
B - 500.00' M - 8.50'
 C - 197' 00" S.E. - 70.00'
 L - 1955' P.C. - 378.17-10.00'
 D - 15000' (7-20-60) P.T. - 324.17-10.00'
 T - 40' P.L. - 378.17-10.00'
 E - 1.60'

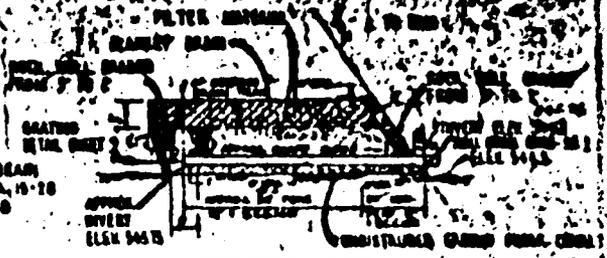
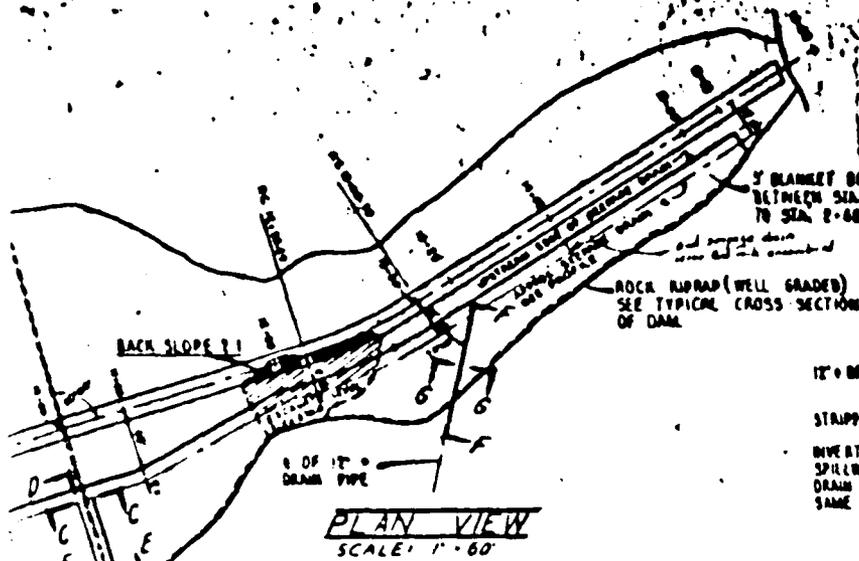


AS-BUILT

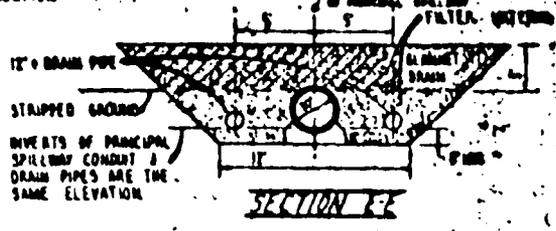
SCALE 1" = 60'

DAM SITE FURNACE BROOK-MIDDLE RIVER WATERSHED PROTECTION WITH STAFFORD FEDERAL SITE STAFFORD CONNECTICUT	
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
Approved by W. F. ... District Engineer	Date ...
Prepared by FERNAND GREENMAN District Engineer	Date ...
Checked by L. J. GREENMAN District Engineer	Date ...
Drawn by A. A. ...	Date ...
CN 406	



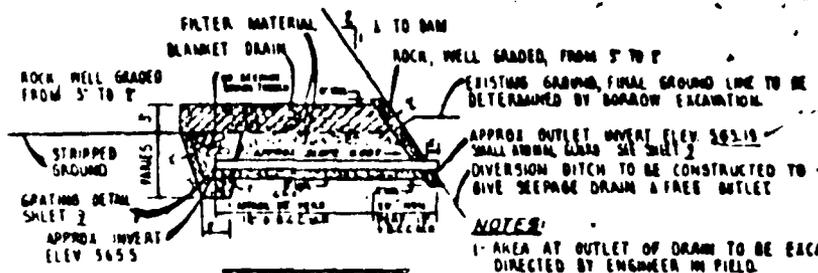


SECTION D-D



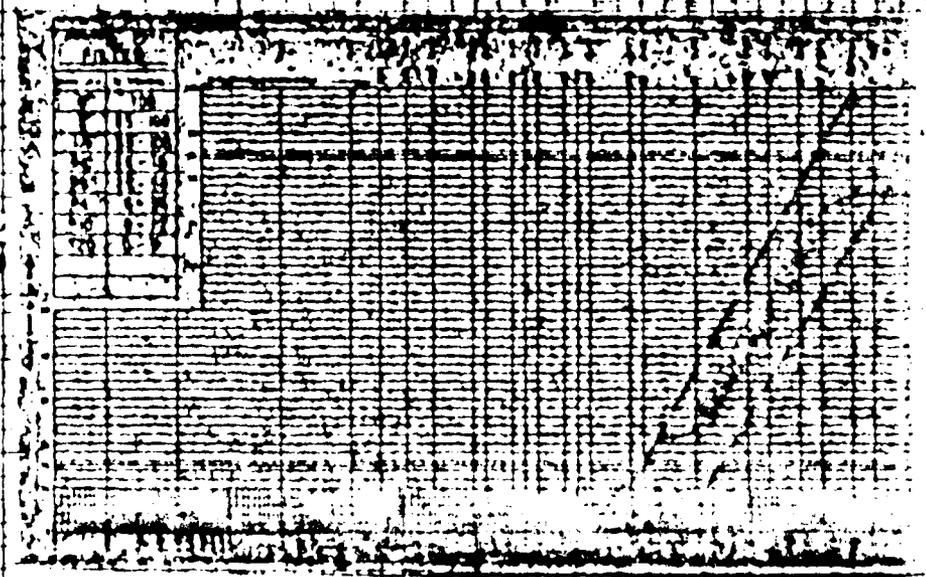
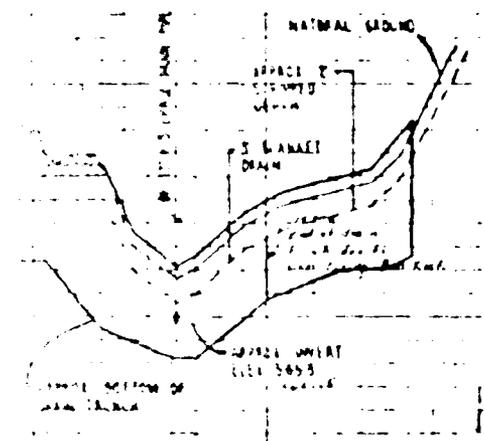
SECTION E-E

1' OF 12" DRAIN PIPES
 1' OF PRINCIPAL SPILLWAY
 ROCK RIPRAP (WELL GRADED) FROM 5' TO 7'
 12" DRAIN PIPE
 APPROX. INVERT ELEV. 5453
 DIVERSION DITCH TO BE CONSTRUCTED TO GIVE SEEPAGE DRAIN A FREE OUTLET



SECTION F-F

- NOTES:**
- 1- AREA AT OUTLET OF DRAIN TO BE EXCAVATED AS DIRECTED BY ENGINEER IN FIELD.
 - 2- FINAL DRAIN PIPE INVERT ELEVATIONS & GRADES TO BE DETERMINED BY ENGINEER IN FIELD.



APPROX. INVERT ELEV. 5453 - PRINCIPAL SPILLWAY
 DRAIN PIPES ARE AT SAME ELEVATION
 WITH WELLS

SEEPAGE DRAIN 4053

DETAILS OF SEEPAGE DRAIN
 FURNACE BROOK - MIDDLE RIVER WATERSHED PROTECT
 FLOODWATER RETARDING STRUCTURE - SITE #1
 STAFFORD, CONN.

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

Designed by W. S. ROSSITER	Date 0-58	Drawn by C. B. FORD	Date 2-61
Checked by W. S. ROSSITER	Date 3-61	Project No. CN-408-D	

CT 477

No. _____

WATER RESOURCES COMMISSION
SUPERVISION OF DAMS
INVENTORY DATA

Inventoried By _____

Date _____

Name of Dam or Pond SCS #1 Whitney 926 (Kent Holbrook)

Code No. W 2.4 MR 2.4 ED 1.6 PT 0.7

Nearest Street Location _____

Town Stafford

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

LAT. 41° 58.9'

Name of Stream Patton Br

LONG. 72° 22.0'

Owner State Comm of Agric

Address _____

DA 1939 AC

Pond Used For FLOOD CONTROL DA 5035M

Dimensions of Pond: Width _____ Length _____ Area 121.

Total Length of Dam 1559' Length of Spillway 150'

Location of Spillway Separate

Height of Pond Above Stream Bed 5 ft 46.5'

Height of Embankment Above Spillway 5' 5.5'

Type of Spillway Construction overland grass

Type of Dike Construction f. 11

Downstream Conditions village

Summary of File Data design approved Oct 61

Remarks FLOODWATER RETAINING CAPACITY - 1360 AC-FT

TOTAL RESERVOIR CAPACITY - 1960 AC-FT

1962

STAFFORD

JOHN J. MOZZOCHI AND ASSOCIATES
CIVIL ENGINEERS

GLASTONBURY, CONN.
217 HEBRON AVENUE
PHONE MEDFORD 3-9401

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

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

July 18, 1961

REPLY TO: Glastonbury

William S. Wise-Director
State Water Resources Commission
State Office Building
Hartford 15, Connecticut

Re: Our File 57-73-19-1
Stafford Springs
Detention Reservoirs
Site No. 1 - Whitney

Dear Mr. Wise:

In accordance with your authorization dated August 28, 1958 and as requested in your letter of July 13, 1961, we have reviewed the design of the referenced project submitted for approval by the State Department of Agriculture.

Design criteria established in letter dated April 30, 1959 from Mr. Charles J. Pelletier, Hydraulic Engineer, are tabulated herewith for comparison with actual design data.

	<u>Design Data</u>	<u>Established Criteria</u>
Drainage Area	3.03 Sq. Mi.	
Principal Spillway Design Flood	Hurricane "Diane"	
Emergency Spillway Design Flood	15" in 6 hrs	15" in 6 hrs.
Total Precipitation Loss	1.5"	1.5" Max.
Net Run-off	13.5"	13.5 Min.
Design Peak Flow	6500 c.f.s.	
Per Sq. Mile	2145 c.f.s.	
Drawdown Time from Principal Spillway Design Storm High-water	5.5 da.*	5.0 da. Max.
Maximum Discharge	2140 c.f.s.	
Emergency Spillway Construction	Earth Channel	
Emergency Spillway Discharge	2010 c.f.s.	
Emergency Spillway Width	120' (bottom)	
Dc at Control Section	1.90'	
Vc at Control Section	8.4 f.p.s.	9.0 f.p.s.
Max. V in Emergency Spillway	9.2* f.p.s.	9.0 f.p.s.
Freeboard	1.8'*	2.0'

Three items listed above (marked with *) do not quite come up to the established design criteria. The drawdown time from the principal spillway design flood (Diane" storm) highwater is 5.5 days, slightly greater than the established criteria of 5.0 days.

It was found that 95% of the drawdown was accomplished within the required 5 day period. Discharge conditions for the emergency spillway design storm were obtained by routing the storm through the reservoir starting after 5.0 days drawdown from the "Diane" storm. This created conditions slightly in excess than the established criteria. If the emergency spillway design flood is routed through the reservoir without the antecedant "Diane" storm, all established design criteria will be met.

We feel that the excess drawdown time and maximum velocity can be accepted, but that the required freeboard of 2.0 ft. should be provided. This matter has been discussed with The Soil Conservation Service and they have agreed to provide sufficient overfill to give a freeboard of 2.0 feet after settlement. It is proposed to make this revision in the field, therefore the requirement of 2.0 foot freeboard should be made a condition of the permit.

We have reviewed the design report and plans for this project and have found them to be substantially correct and acceptable.

It is recommended that a Construction Permit for the construction of this dam be issued.

Very truly yours,



John J. Mozzochi and Associates
Civil Engineers

WWF:hk

October 2, 1961

CONSTRUCTION PERMIT FOR DAM

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

Attention: Mr. Joseph L. Hill, Commissioner

Contains:

Your application for Construction Permit dated July 10, 1961, for the construction of an earth dam on Watten Brook in the Town of Stafford in accordance with plans and specifications marked Floodwater Retarding Structure Site No. 1, Furnace Brook - Middle River Watershed Protection Project, prepared by the U. S. Department of Agriculture, Soil Conservation Service, copy of which is attached hereto, has been considered and the construction described therein is hereby approved only under the following conditions:

1. The Commission shall be notified
 - A) When construction is started
 - B) When foundation is excavated
 - C) When the dam is completed and before water is impounded
 - D) When project is completed and ready for final inspection

This permit, with the attached application form and other enclosures, must be kept at the site of the work and made available to the Commission at any time during the construction. This permit covers the construction as described in the attached documents. If any changes are contemplated the Commission must be notified and supplementary approval obtained.

If the construction authorized by this construction 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.

Your attention is directed to Section 25-115 of the 1953 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

October 2, 1961

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 1953 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 fall, 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 15, Connecticut.

Very truly yours,

By:

William S. Wise

William S. Wise
Director

WJS:js

Enclosures

cc: Town Clerk, Stafford

Mr. T. R. Hise

Mr. John J. Mazzochi

STATE OF CONNECTICUT
WATER RESOURCES COMMISSION
Room 317, State Office Building
Hartford, Connecticut

RECEIVED
JUL 11 1961
State Water Resources Commission

APPLICATION FOR CONSTRUCTION PERMIT FOR DAM

Owner Dept. of Agriculture, Conservation
and Natural Resources
P. O. Address State Office Building
Hartford, Connecticut

Date July 10, 1961

Tel. No. JA 76341 - Ext. 435

Location of Structure:

Town Stafford Shown on USGS Quadrangle _____

Name of Stream Patten Brook at _____ inches south of Lat. _____
north
and _____ inches east of Long. _____
west

Directions for reaching site from nearest village or route intersection:
(see sketch on reverse side)

Old Springfield Road

This is an application for: (New Construction) (Alteration) (Repair) (Removal)
(check one or more of above)

This pond is to be used for: Flood Control

Dimensions of Pond: width _____ length _____ area _____

Maximum depth of water immediately above dam: _____

Total length of dam: _____

Length of spillway: _____

Height of abutments above spillway: _____

Type of spillway construction: _____

Type of dike construction: _____

Spillway section will be set on: (Bedrock) (Gravel) (Clay) (Till)
(check one of above)

Remarks: _____

Signed: _____

Joseph N Hill
(owner)

Name of Engineer, if any Soil Conservation Service

Note: Show details of construction on reverse side.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Mansfield Professional Park
Storrs, Connecticut 06268

January 6, 1969

Mr. Joseph W. Voboril, Jr.
Soil Conservation Division
Department of Agriculture and
Natural Resources
State Office Building
Hartford, Connecticut 06115

Dear Mr. Voboril:

Final inspection of the Whitney (Kent Hollow) site was scheduled and held with only the Contractor and a Soil Conservation Service representative present on October 3, 1962. The weather was not good on October 3 which may have been the reason no others were present.

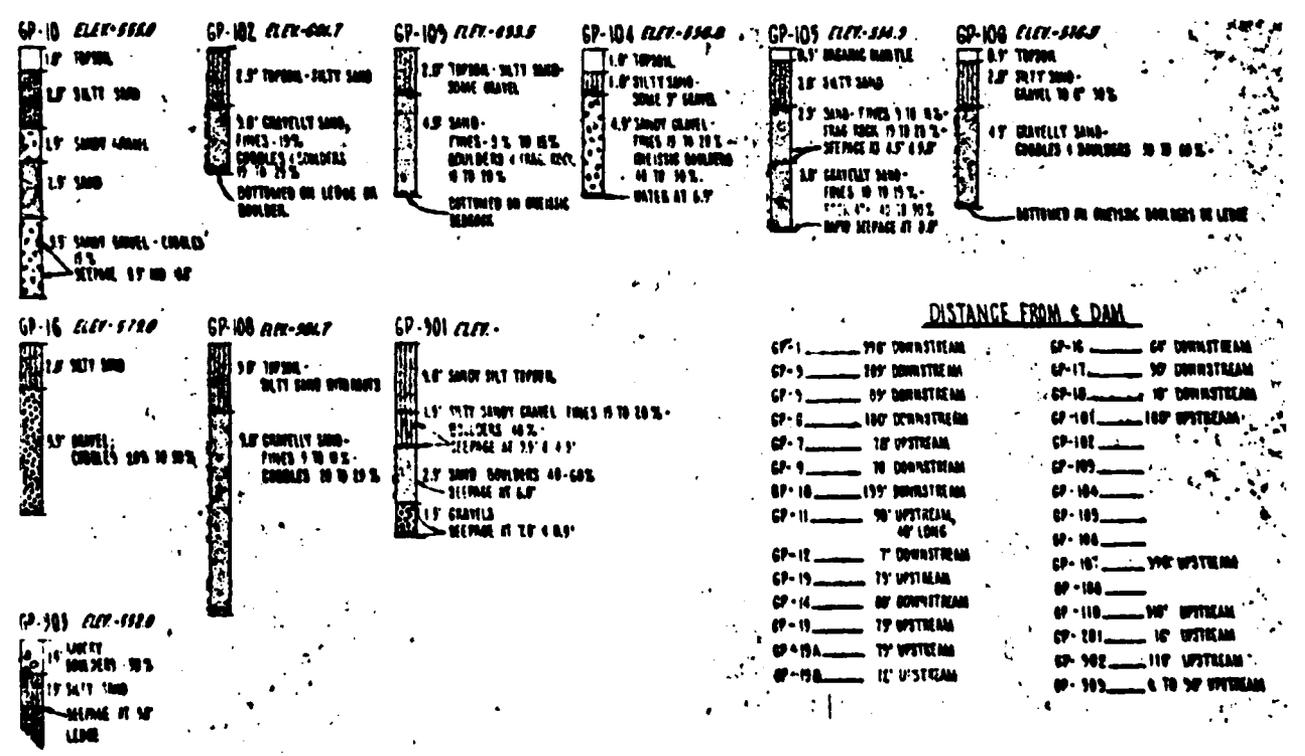
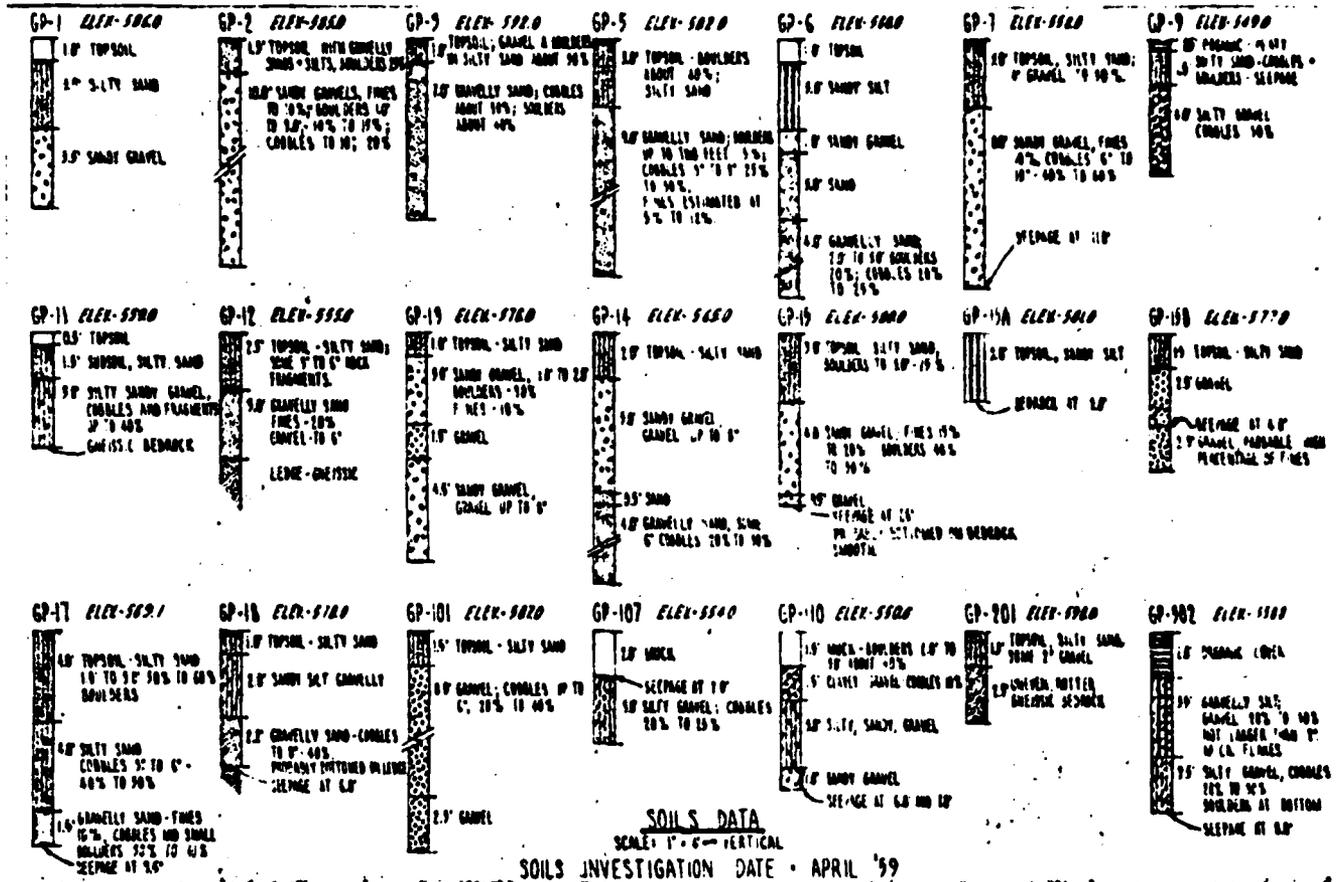
Mr. Mozsochi made his inspection on October 8, 1962 and had only minor comments regarding grading on the waste area.

Vegetation has been established since the above dates.

At your request we will make any further inspections that are required.

Sincerely,

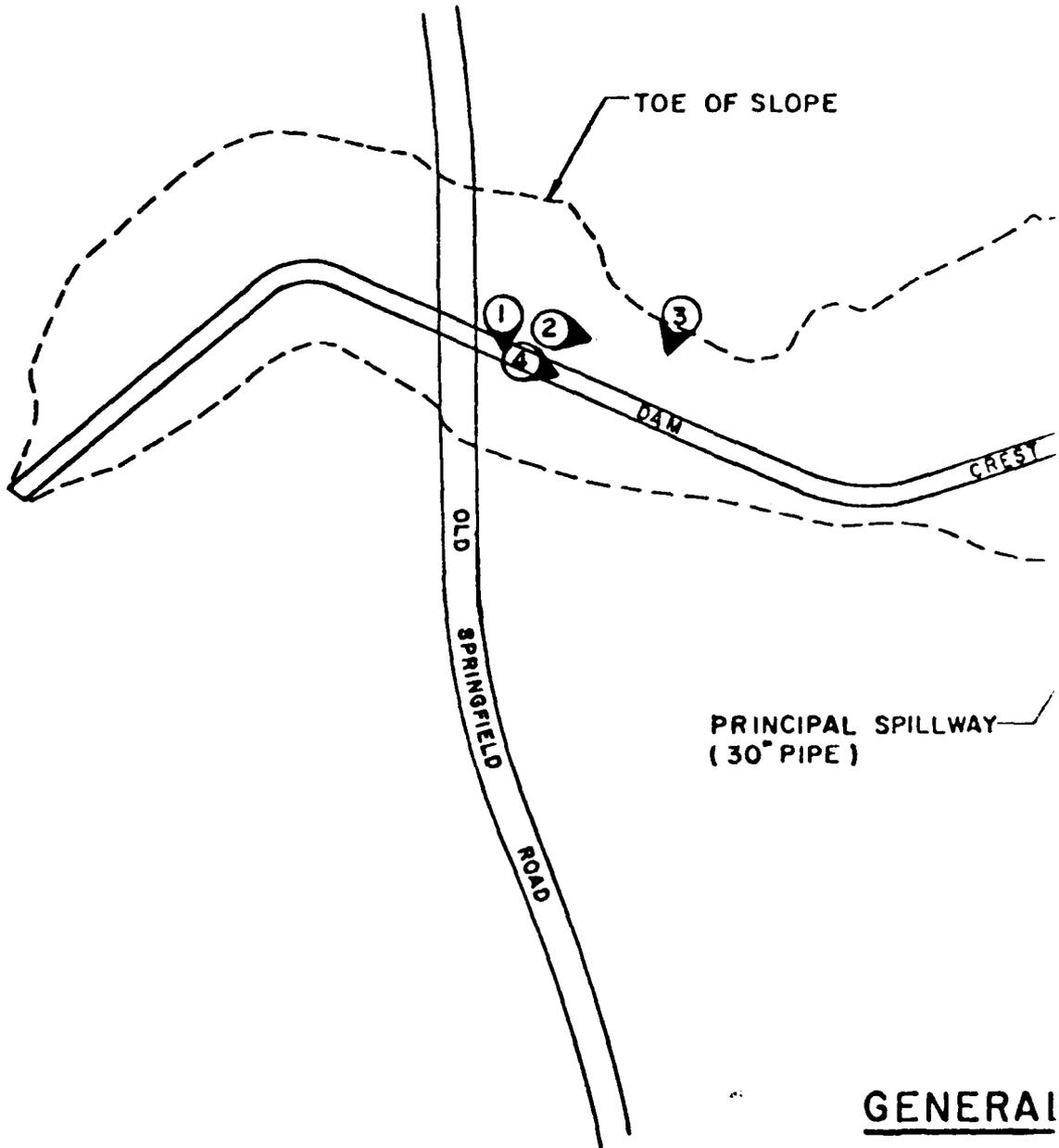

T. R. Wise
State Conservation Engineer



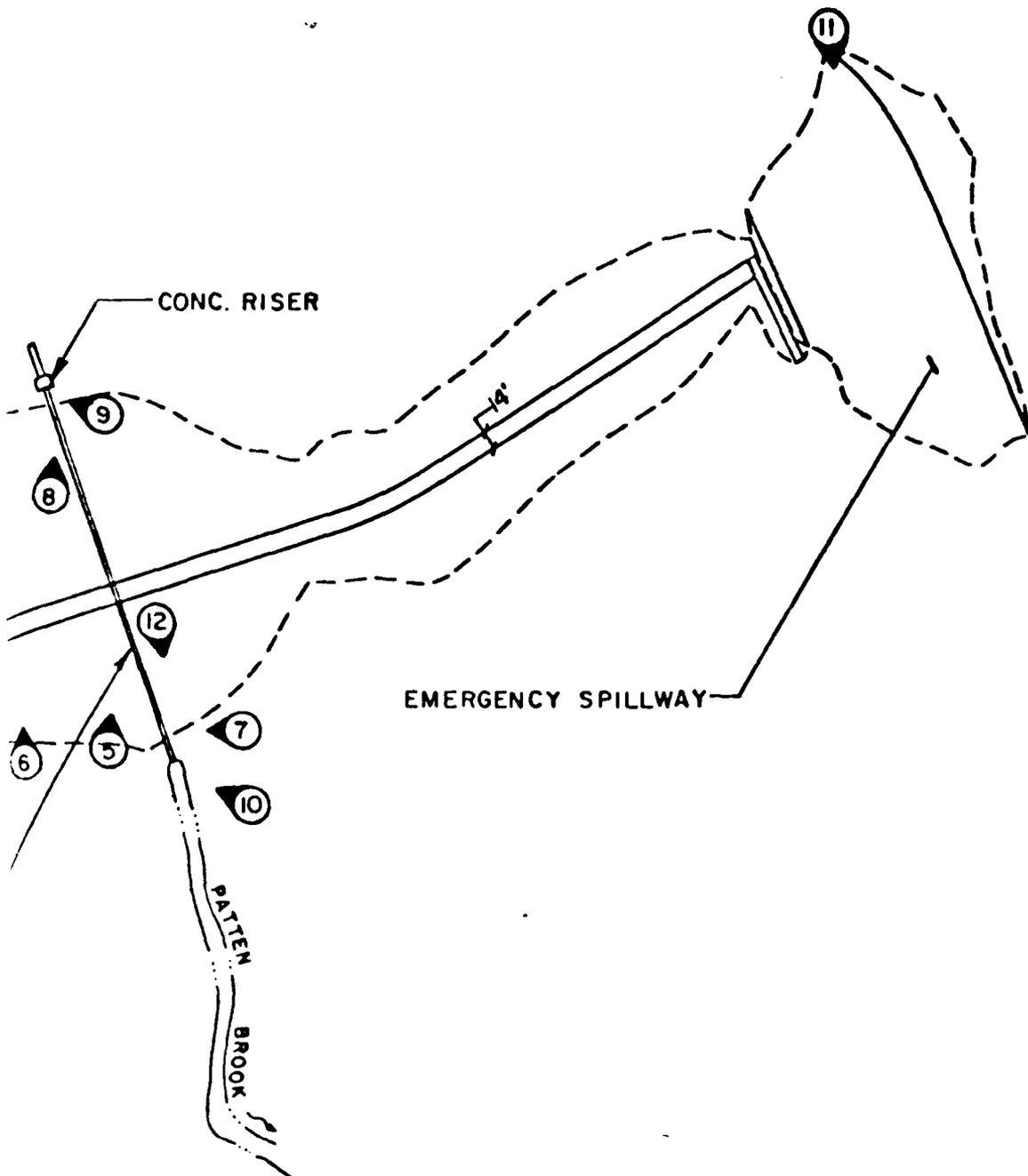
SOIL BORING LOGS

APPENDIX C

PHOTOGRAPHS



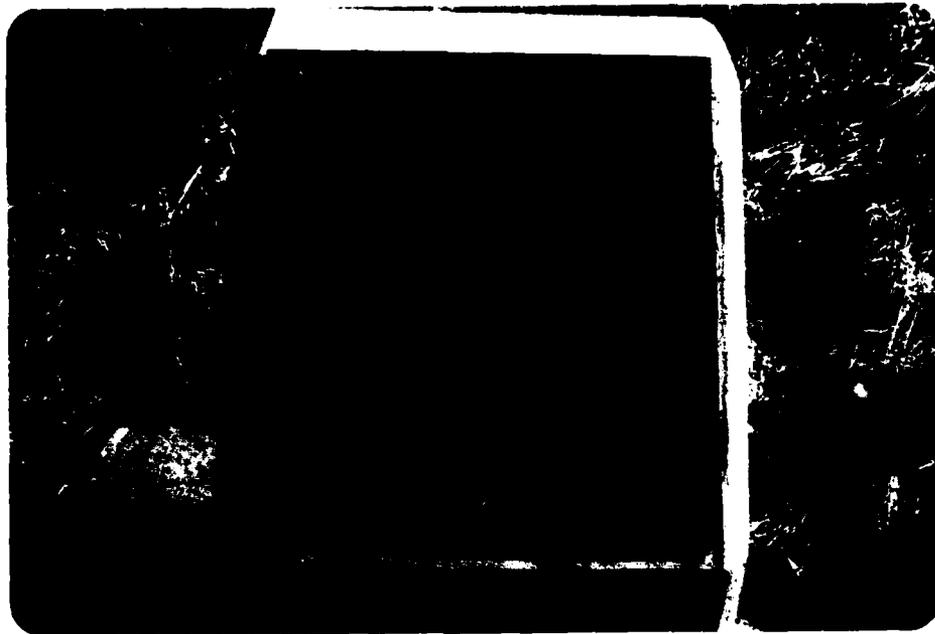
GENERAL
SCALE:



L PLAN

1" = 120' ±

**PHOTO INDEX
WHITNEY DAM**



C-1 IDENTIFYING MONUMENT



C-2 UPSTREAM SLOPE



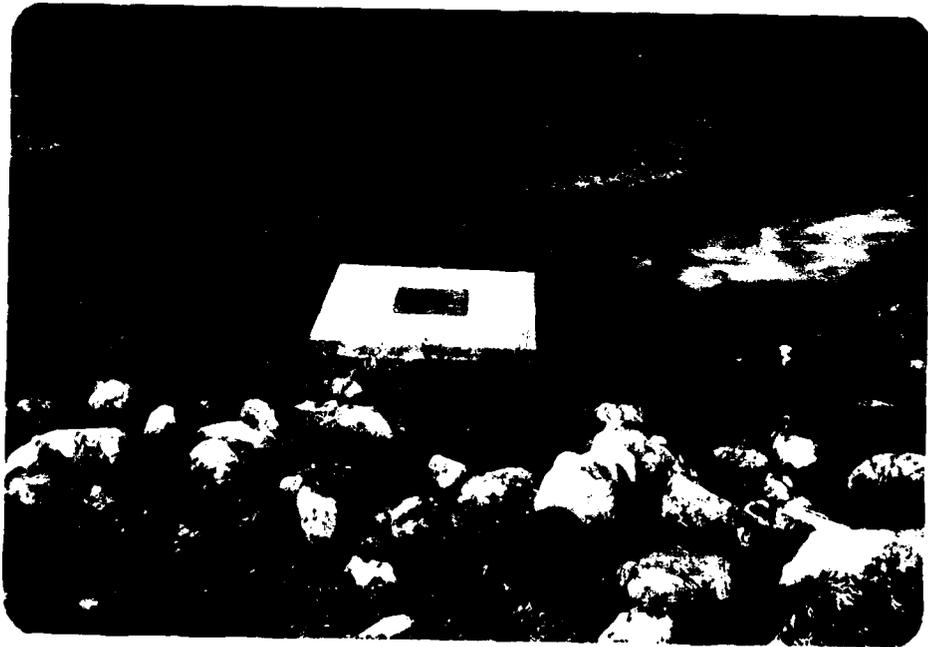
C-3 CONCRETE PATH - UPSTREAM SLOPE



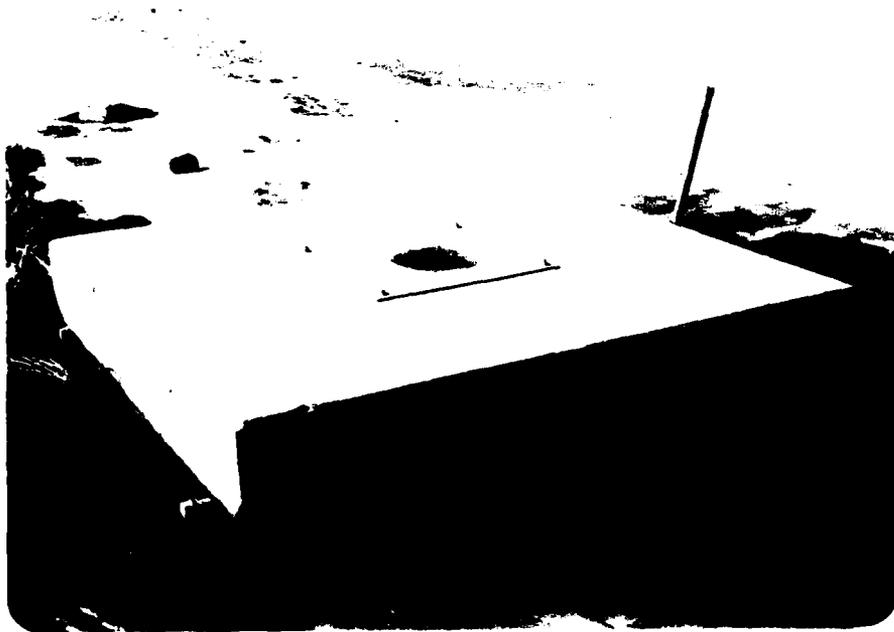
C-4 ROADWAY ON CREST



C-7 FOUNDATION DRAIN OUTLET



C-8 PRINCIPAL SPILLWAY INLET RISER



C-9 PRINCIPAL SPILLWAY INLET RISER



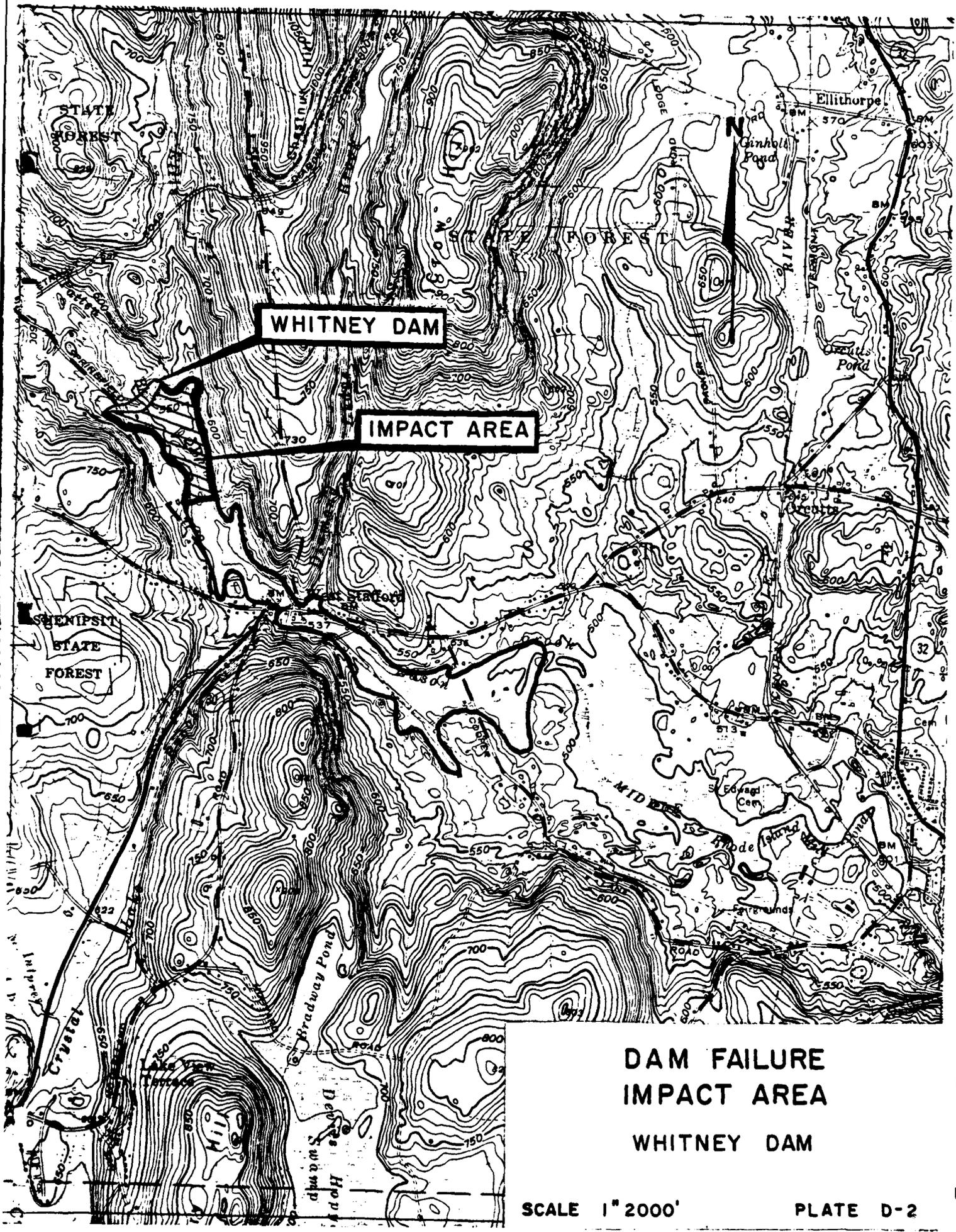
C-10 PRINCIPAL SPILLWAY OUTLET PIPE



C-11 EMERGENCY SPILLWAY LOOKING DOWNSTREAM



C-12 PATTEN BROOK DOWNSTREAM OF DAM



WHITNEY DAM

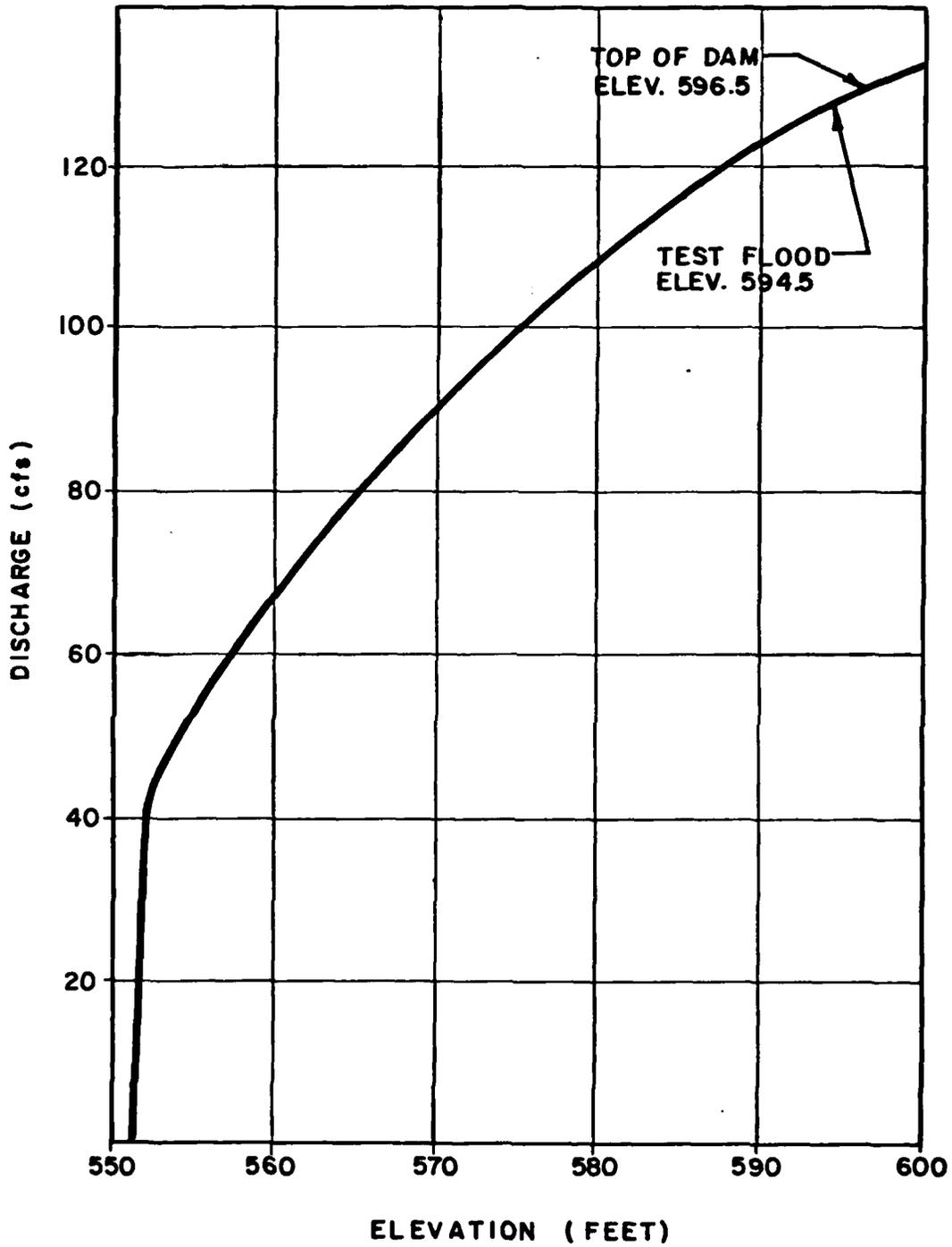
IMPACT AREA

**DAM FAILURE
IMPACT AREA**

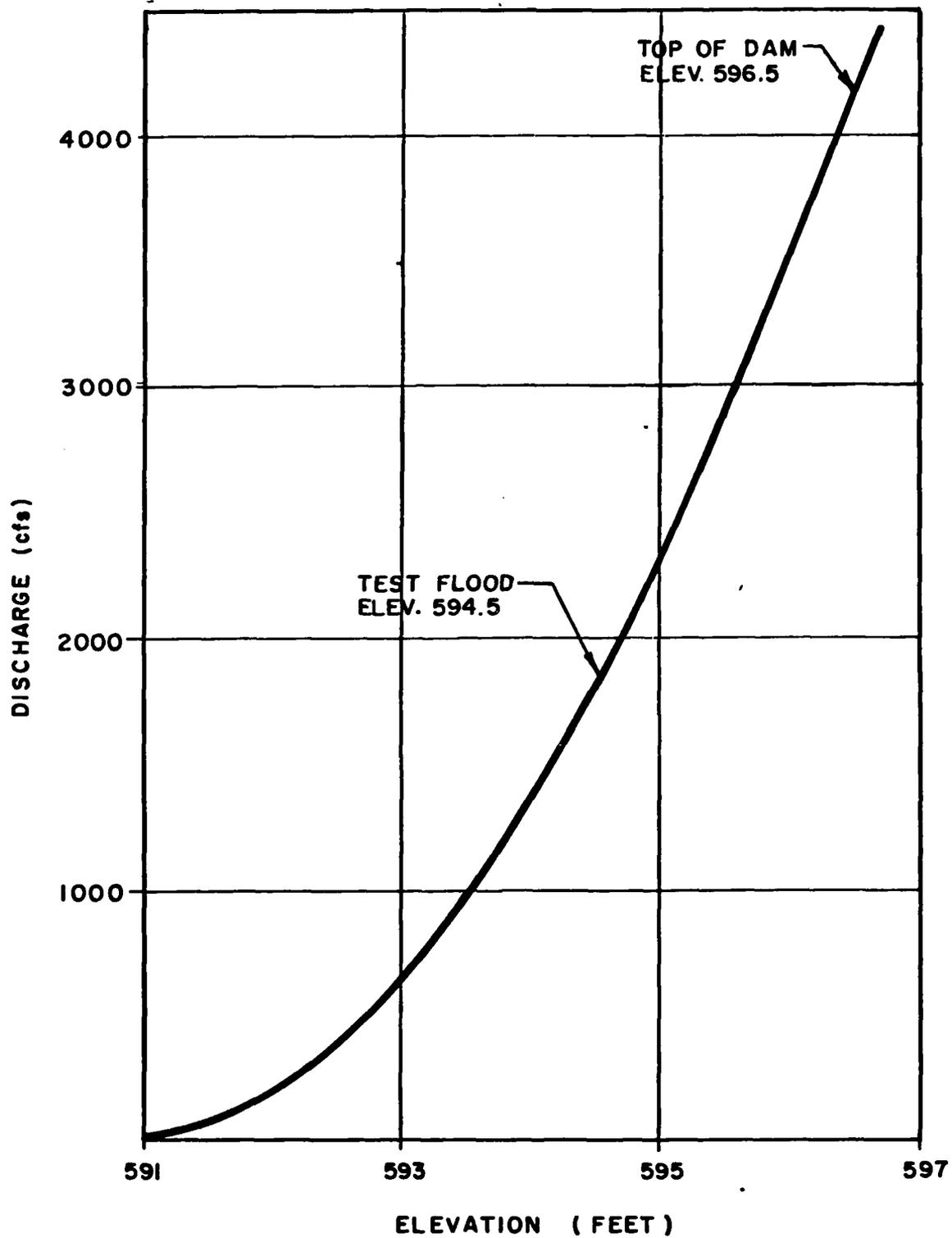
WHITNEY DAM

SCALE 1" 2000'

PLATE D-2



WHITNEY DAM
RATING CURVE
PRINCIPAL SPILLWAY
PLATE D-3



**WHITNEY DAM
RATING CURVE
EMERGENCY SPILLWAY
PLATE D-4**



FUSS & O'NEILL
consulting engineers

PREPARED
BY
GJM

DATE
5/5/81

CHECKED
BY

DATE

PROJECT NO.

80-157

SUBJECT: Whitney Dam - Test Flood Computations

SHEET NO.
1 of 1

Watershed - Rolling Terrain

Drainage Area = 2.9 Sq. Mi.

Per C. of E. Chart P.M.F. = 2000 CSM

Peak Flow = $2.9 \times 2000 = 5800$ cfs.

Peak Flow as calculated by S.C.S. = 6500 cfs.

TEST FLOOD = 6500 cfs



FUSS & O'NEILL
consulting engineers

PREPARED
BY
GJM

DATE
3/5/81

CHECKED
BY

DATE

PROJECT NO.

80-157

SUBJECT: Dam Failure Hydrograph

SHEET NO.
1 of 5

STAGE-DISCHARGE RATINGS

STA. 0+0 = ϕ DAM

STA. 1+20

$$S = .006 \text{ ft./ft.}$$

$n = 50\% \text{ Woods, } 50\% \text{ Grass } n = .08$

<u>Elev.</u>	<u>Area</u>	<u>P</u>	<u>Q</u>
570	5850	510	43,100 cfs
575	8525	580	74,200
580	11,525	650	113,600
585	15,125	820	153,100
590	20,500	1410	271,600

STA. 5+0

$$S = .006 \text{ ft./ft.}$$

$n = 70\% \text{ Woods, } 30\% \text{ grass } n = .10$

<u>Elev.</u>	<u>Area</u>	<u>P</u>	<u>Q</u>
560	10,160	855	61,400
565	14,510	940	104,300
570	19,095	985	159,800
575	25,080	1285	210,900

STA. 10+0

$$S = .006 \text{ ft./ft.}$$

$n = \text{Grass with some trees } n = .04$

<u>Elev.</u>	<u>Area</u>	<u>P</u>	<u>Q</u>
555	3940	615	39,400
560	7190	715	97,100
565	11,696	955	180,000



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PREPARED
BY
GJM

DATE
3/6/81

CHECKED
BY

DATE

PROJECT NO.

80-157

SUBJECT: Dam Failure Hydrograph

SHEET NO.
2 of 5

STAGE - DISCHARGE RATINGS

<u>STATION</u>	<u>SLOPE</u>	<u>n</u>	<u>ELEV.</u>	<u>AREA</u>	<u>P</u>	<u>Q</u>
15+0	.006	.046	545	1720	3.10	15,600
			550	3470	4.10	41,800
			555	5770	5.30	82,200
			560	8720	6.60	141,300
20+0	.006	.035	550	4770	4.90	72,200
			555	7390	5.30	133,600
			560	10460	6.80	214,800
25+0	.006	.035	540	2200	4.40	21,400
			545	4600	5.20	65,300
			550	7400	6.00	131,100
			555	12300	10.50	210,600
30+0	.004	.035	540	4360	6.90	40,400
			545	7960	7.70	102,400
			550	11960	8.60	157,400
35+0	.004	.035	535	1210	2.60	9,100
			540	3390	8.00	24,100
			545	7570	8.80	53,100
			550	12120	9.60	178,100
40+0	.004	.035	535	1500	4.00	9,800
			540	4150	6.80	37,600
			545	8250	7.60	93,800
50+0	.008	.035	525	1910	3.50	22,700
			530	3750	3.90	64,900
			535	5980	5.00	119,500
			540	8730	6.20	199,000



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DATE

PROJECT NO.

80-157

SUBJECT: Dam Failure Hydrograph

STA. 1+20

SHEET NO.
3 of 5

Storage = $S = 1360$ Ac.-Ft. at Test Flood Peak

Test Flood Pool Elev. = 594.5

River Bed Elev. at Sta. 1+20 (\neq Dam = 0+0) = 544.5

Main Dam Length at Mid Height = 900'

Use Breach Width = 270' = W_b

$Y_0 = 50'$

$$Q_{p1} = \frac{8}{27} W_b \sqrt{g} Y_0^{3/2}$$
$$= 160,400 \text{ cfs}$$

Stage at 1+20 = 585.3

Area = 18,500 S.F.

$$Vol. = $V_1 = 120 \times 18,500 \div 43,560 = 50$ Ac.-Ft.$$

$$Q_{p2 \text{ Trial}} = Q_{p1} \left(1 - \frac{V_1}{S}\right)$$
$$= 154,500 \text{ cfs}$$

Stage = 585.0

Area = 15,125 S.F.

$$V_2 = 120 \times 15,125 \div 43,560 = 42 \text{ Ac. Ft.}$$

$$Q_{p2} = 160,400 \left(1 - \frac{42}{1360}\right)$$
$$= 155,000 \text{ cfs}$$

Depth = 40.5'



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PROJECT NO.

80-157

SUBJECT: Dam Failure Hydrograph

SHEET NO.
4 of 5

STA. 5+0

$$Q_{p2} = 155,000 \text{ cfs}$$

$$\text{Stream Bed Elev.} = 542.0$$

$$S = 1360 \text{ Ac-Ft.}$$

$$\text{Stage} = 567.7$$

$$\text{Area} = 18,700 \text{ S.F.}$$

$$\text{Vol.} = 161 \text{ Ac-Ft.}$$

$$Q_{p3} \text{ Trial} = 155,000 \left(1 - \frac{161}{1360}\right) = 136,700 \text{ cfs}$$

$$\text{Stage} = 567.9$$

$$\text{Area} = 17,100 \text{ S.F.}$$

$$\text{Vol.} = 149 \text{ Ac-Ft.}$$

$$Q_{p3} = 155,000 \left(1 - \frac{155}{1360}\right) = 137,300 \text{ cfs}$$

$$\text{Stage} = 568.0$$

$$\underline{\text{Depth} = 2.6.0}$$

STA. 10+0

$$Q_{p3} = 137,300 \text{ cfs}$$

$$\text{Stream Bed Elev.} = 539.0$$

$$S = 1360 \text{ Ac-Ft.}$$

$$\text{Stage} = 562.4$$

$$\text{Area} = 9400 \text{ S.F.}$$

$$\text{Vol.} = 108 \text{ Ac-Ft.}$$

$$Q_{p4} \text{ Trial} = 137,300 \left(1 - \frac{108}{1360}\right) = 126,400 \text{ cfs}$$

$$\text{Stage} = 561.8$$

$$\text{Area} = 8780 \text{ S.F.}$$

$$\text{Vol.} = 100 \text{ Ac-Ft.}$$

$$Q_{p4} = 137,300 \left(1 - \frac{104}{1360}\right) = 126,800 \text{ cfs}$$

$$\text{Stage } 561.8$$

$$\underline{\text{Depth} = 22.8}$$



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BY

DATE

PROJECT NO.

80-157

SUBJECT: Dam Failure Hydrograph

SHEET NO.
5 of 5

STA. 15+0

$$Q_{p4} = 126,800 \text{ cfs}$$

$$\text{Stream Bed Elev.} = 536.0$$

$$S = 1360 \text{ Ac.-Ft.}$$

$$\text{Stage} = 558.8$$

$$\text{Area} = 8000 \text{ S.F.}$$

$$\text{Vol.} = 92 \text{ Ac.-Ft.}$$

$$Q_{p5} \text{ Trial} = 126,800 \left(1 - \frac{92}{1360}\right) = 118,200 \text{ cfs}$$

$$\text{Stage} = 558.0$$

$$\text{Area} = 7600 \text{ S.F.}$$

$$\text{Vol.} = 87 \text{ Ac.-Ft.}$$

$$Q_{p5} = 126,800 \left(1 - \frac{87}{1360}\right) = 118,700 \text{ cfs}$$

$$\text{Stage} = 558.1$$

$$\underline{\text{Depth} = 22.1'}$$

STA. 20+0

$$Q_{p5} = 118,700 \text{ cfs}$$

$$\text{Stream Bed Elev.} = 533.0$$

$$S = 1360 \text{ Ac.-Ft.}$$

$$\text{Stage} = 553.8$$

$$\text{Area} = 6800 \text{ S.F.}$$

$$\text{Vol.} = 78 \text{ Ac.-Ft.}$$

$$Q_{p6} \text{ Trial} = 118,700 \left(1 - \frac{78}{1360}\right) = 111,900 \text{ cfs}$$

$$\text{Stage} = 553.2$$

$$\text{Area} = 6500 \text{ S.F.}$$

$$\text{Vol.} = 75 \text{ Ac.-Ft.}$$

$$Q_{p6} = 118,700 \left(1 - \frac{75}{1360}\right) = 112,200 \text{ cfs}$$

$$\text{Stage} = 553.2$$

$$\underline{\text{Depth} = 20.2'}$$

APPENDIX E

INFORMATION AS CONTAINED IN
THE NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME

END

FILMED

9-84

DTIC