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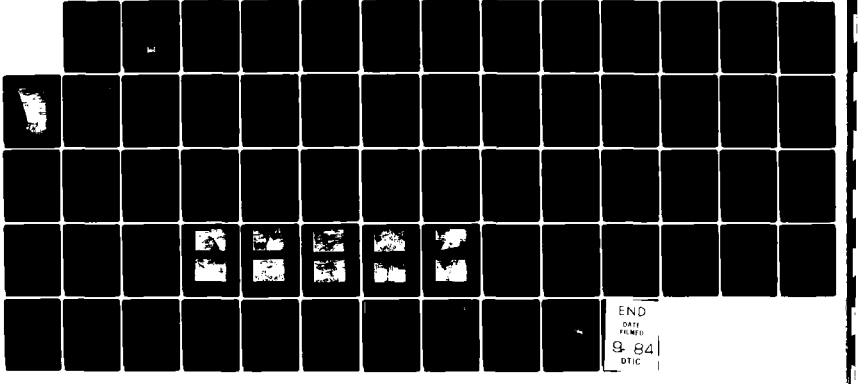

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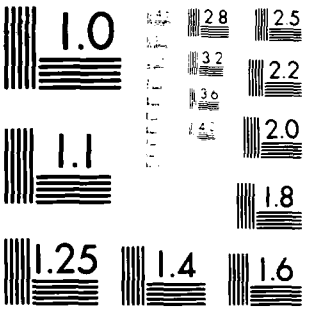

QUINNIPIAC RIVER BASIN
CHESHIRE, CONNECTICUT

MIXVILLE POND DAM
CT 00302

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

FEBRUARY, 1981

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Quinnipiac River Basin
Cheshire, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Mixville Pond Dam is an earth embankment with a vertical stone masonry downstream face that is approximately 290 ft. long and 16.5 ft. high. The assessment of the dam is based on a visual inspection, available information and hydraulic/hydrologic computations. The dam is judged to be in fair condition with several area that require attention. The dam is classified as SMALL and has a HIGH hazard potential in accordance with guidelines established by the Corps of Engineers. The test flood according to these guidelines ranges from ½ the PMF to the PMF.

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OF THE ARMY
DIVISION, CORPS OF ENGINEERS
RIPLEY ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

MAR 18 1981

NEDED-E

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 Mixville Pond Dam (CT-00302) Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. The report is based upon a visual inspection, a review of past performance, and a preliminary hydrological analysis. A brief assessment is included at the beginning of the report.

The preliminary hydrologic analysis has indicated that the spillway capacity for the Mixville Pond Dam would likely be exceeded by floods greater than 7 percent of the Probable Maximum Flood (PMF). Our screening criteria specifies that a dam of this class which does not have sufficient spillway capacity to discharge fifty percent of the PMF, should be adjudged as having a seriously inadequate spillway and the dam assessed as unsafe, non-emergency, until more detailed studies prove otherwise or corrective measures are completed.

The term "unsafe" applied to a dam because of an inadequate spillway does not indicate the same degree of emergency as that term would if applied because of structural deficiency. It does indicate, however, that a severe storm may cause overtopping and possible failure of the dam, with significant damage and potential loss of life downstream.

It is recommended that within twelve months from the date of this report the owner of the dam engage the services of a professional or consulting engineer to determine by more sophisticated methods and procedures the magnitude of the spillway deficiency. Based on this determination, appropriate remedial mitigating measures should be designed and completed within 24 months of this date of notification. In the interim a detailed emergency operation plan and warning system should be promptly developed. During periods of unusually heavy precipitation, round-the-clock surveillance should be provided.

MAR 1 8 1981

NEDED-E
Honorable William A. O'Neill

I have approved the report and support the findings and recommendations described in Section 7, with qualifications as noted above. I request that you keep me informed of the actions taken to implement these recommendations since this follow-up is an important part of the non-Federal Dam Inspection Program.

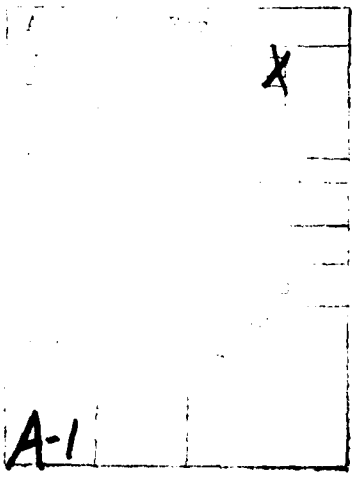
A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. This report has also been furnished to the owner of the project, Town of Cheshire, Cheshire, CT.

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

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

Sincerely,

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



MIXVILLE POND DAM

CT 00302

QUINNIPIAC RIVER BASIN

CHESHIRE, CONNECTICUT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification Number:	CT 00302
Name:	Mixville Pond Dam
Town:	Cheshire
County and State:	New Haven County, Connecticut
Stream:	Tenmile River
Date of Inspection:	October 23, 1980

BRIEF ASSESSMENT

Mixville Pond Dam is an earth embankment with a vertical stone masonry downstream face that is approximately 290 feet long and 16.5 feet high. The crest of the dam is approximately 14 feet wide and is covered with mowed grass to the west of the spillway and thick brush to the east of the spillway. The spillway is 2 feet lower than the crest and is located near the center of the dam. At the west end of the spillway, there is a simple masonry gate inlet structure. The gate controls a 30-inch cast iron low-level discharge pipe that passes through the base of the dam. The gate is operable. The pond is presently used for recreational purposes. The drainage area is 2.75 square miles and the pond has 87 acre-feet of storage capacity.

The assessment of the dam is based on a visual inspection, available information and hydraulic/hydrologic computations. The dam is judged to be in fair condition with several areas that require attention. These areas include seepage through the dam, below and adjacent to the spillway, bulging stones in the downstream masonry face and thick brush covering the crest of the dam to the east of the spillway.

The dam is classified as SMALL and has a HIGH hazard potential in accordance with guidelines established by the Corps of Engineers. The test flood according to these guidelines ranges from 1/2 the Probable Maximum Flood (PMF) to the PMF. The test flood for this dam is 1/2 the PMF and is calculated to be 2,670 cfs. The

spillway capacity at the top of the dam is 370 cfs or 14 percent of the test flood outflow. The test flood outflow will overtop the dam by 1.9 feet.

It is recommended that the Owner engage the services of a qualified registered engineer experienced in the design of dams to investigate the seepage through the dam, investigate the bulging stones in the downstream face, and prepare a detailed hydraulic/hydrologic study to determine the spillway's adequacy. It is also recommended that the Owner remove the brush from the crest of the dam and the trees from the toe of the dam, repair the discharge valve so that it opens and closes readily, establish a formal warning system and initiate an annual technical inspection.

The Owner should implement the recommendations and remedial measures described above and in greater detail in Section 7 within one year after receipt of this Phase I Inspection Report.

Joseph F. Merluzzo
Connecticut P.E. #7639
Project Manager

Gary J. Giroux
Connecticut P.E. #11477
Project Engineer

This Phase I Inspection Report on Mixville Pond Dam (CT-00302) 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.

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

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

ARAMAST MAHTESIAN, CHAIRMAN
Geotechnical Engineering 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 Inspections. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Inspection 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 investigations and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Inspection; 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 variety 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 Inspection 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 Occupational Safety and Health Administration's (OSHA) rules and regulations is also excluded.

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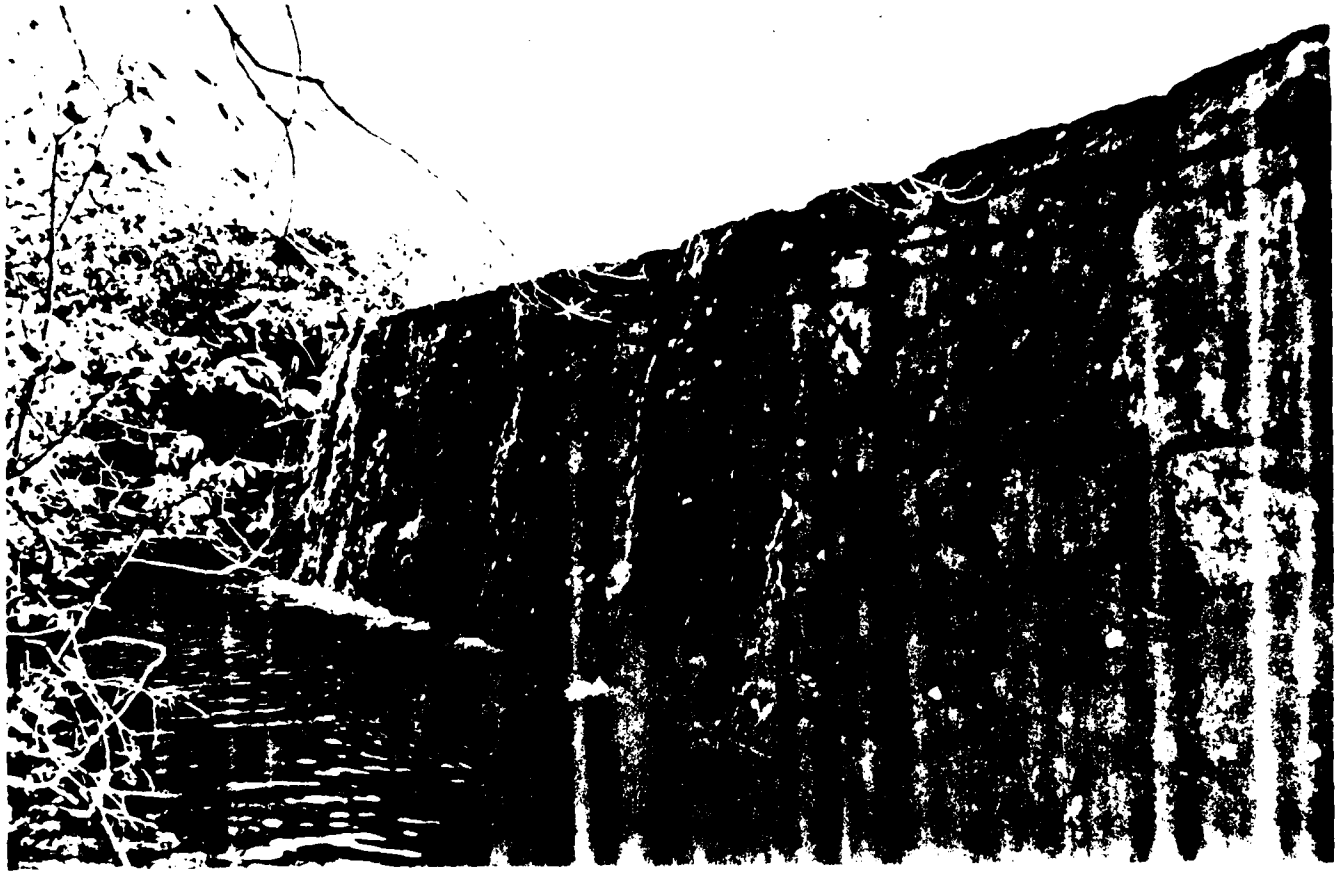
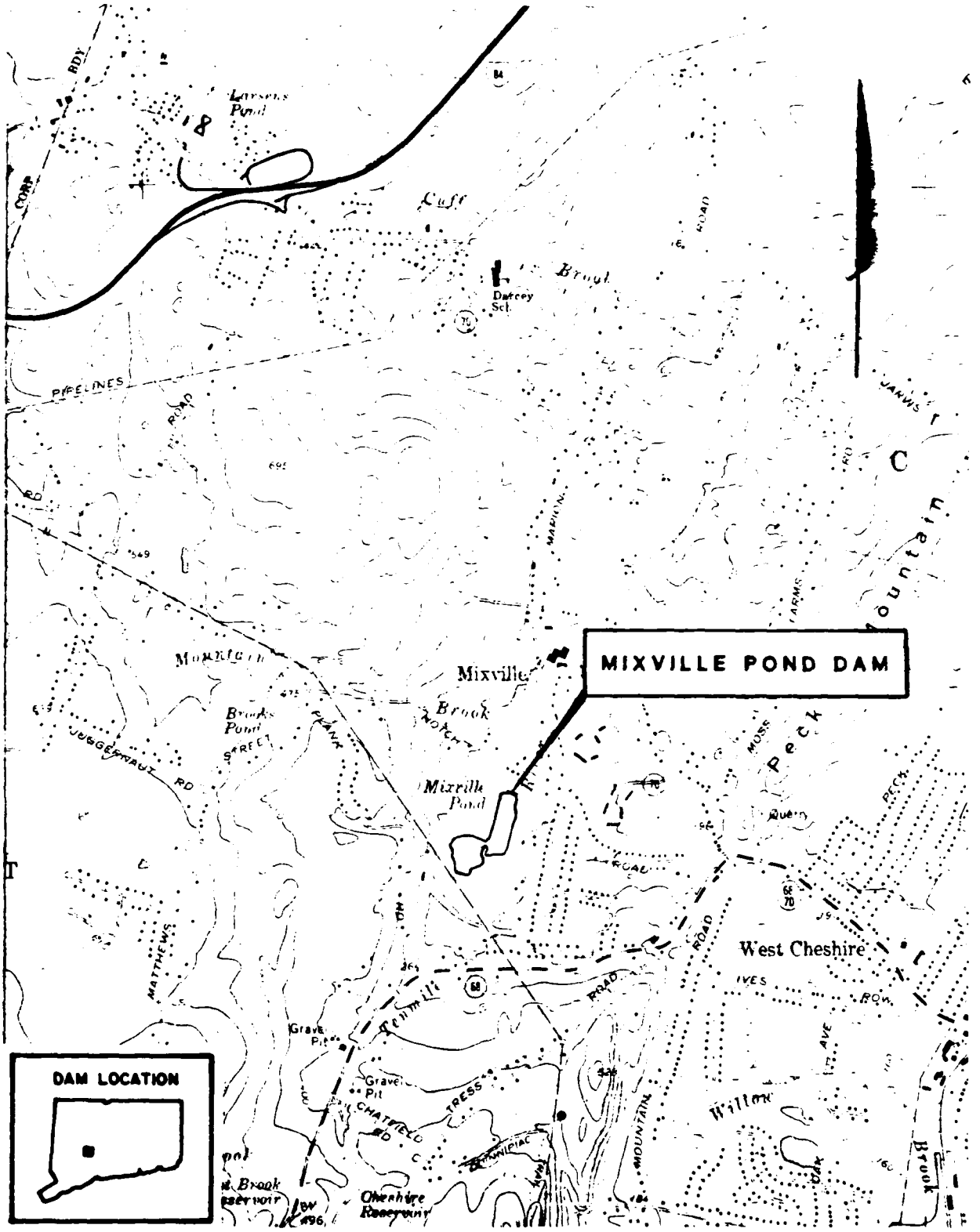


MIXVILLE POND DAM



QUADRANGLE: SOUTHINGTON, CT

US ARMY, CORPS OF ENGINEERS
NEW ENGLAND DIVISION
WALTHAM, MASS.

SCALE IN FEET
2000' 0 2000' 4000'
1" = 2000'

LOCATION MAP

PHASE I INSPECTION REPORT

MIXVILLE POND DAM CT 00302

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 Inspections throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Storch Engineers 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 were issued to Storch Engineers under a letter of October 30, 1980 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW-33-80-C-0035 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection -

(1) Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) Encourage and prepare the states to initiate quickly effective dam safety programs for non-Federal dams.

(3) To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location - Mixville Pond Dam is located in the Town of Cheshire, New Haven County, Connecticut. It is approximately 2 miles west of downtown Cheshire. Notch Road crosses the stream 340 feet downstream and north of the

dam. The coordinates of the dam are approximately 41°-31.04' north latitude and 72°-56.32' west longitude. The dam is located on the Tennile River in the Quinnipiac River Basin.

b. Description of Dam and Appurtenances - Mixville Pond Dam is an earth embankment with a stone masonry downstream face. It is 290 feet long and 16.5 feet high. The downstream stone face is vertical and the upstream earth embankment is primarily below the pond surface so its slope cannot be determined. The top of the dam is approximately 14 feet wide.

The spillway is located slightly west of the center of the dam and consists of a 50-foot long stone weir.

There is a stone masonry gate inlet structure at the west end of the spillway. The gate controls a 30-inch cast iron discharge pipe that passes through the base of the dam. The gate is operable although it is difficult to reset once it has been opened.

c. Size Classification - Mixville Pond Dam has a maximum height of 16.5 feet and a maximum storage of 87 acre-feet at the top of the dam. In accordance with the Recommended Guidelines for Safety Inspection of Dams established by the Corps of Engineers, the dam is classified as SMALL (height less than 40 feet and storage less than 1,000 acre-feet).

d. Hazard Classification - Mixville Pond Dam is classified as having a HIGH hazard potential. Failure of the dam could result in the loss of more than a few lives and cause significant property damage. Approximately 270 and 470 feet downstream (Notch Road), the flood wave would strike two houses. The first floor sills of the houses are approximately 10 feet and 6 feet above the streambed respectively. Estimated flow and water depth at these locations just prior to dam failure is 375 cfs and 3.5 feet at both locations and just after dam failure is 6,460 cfs and 12.4

feet and 5,710 cfs and 12.7 feet respectively. Therefore, the water level would rise approximately 2.4 feet and 6.7 feet above each first floor sill.

e. Ownership - Mixville Pond Dam is owned by:

Town of Cheshire
559 South Main Street
Cheshire, Connecticut 06410
(203) 272-2743

f. Operator - The person in charge of day-to-day operation of the dam is:

Mr. Richard Bartlem, Director
Parks and Recreation Department
559 South Main Street
Cheshire, Connecticut 06410
(203) 272-2743

g. Purpose of Dam - The dam impounds Mixville Pond which is used for recreational purposes. Originally, the dam was used for water power.

h. Design and Construction History - The dam was constructed around 1870. There are no original design computations or construction drawings. In 1971, however, the pond was dredged. At this time the contractor accidentally removed a portion of the upstream face of the dam and was ordered to repair it under the direction of the Engineer in charge. The repairs where made to the Engineers satisfaction.

1.3 Pertinent Data

a. Drainage Area - The Mixville Pond drainage basin is located in the Towns of Cheshire and Prospect and is irregular in shape. The area of the drainage basin is 2.75 square miles (Appendix D - Plate 4). Approximately 5 percent of the drainage basin is natural storage and about 10 percent is developed. The topography is rolling with elevations ranging from 840 (NGVD) to 228 (NGVD) at the spillway crest.

b. Discharge at Damsite - There are no records available for discharge at the dam.

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b. Discharge at Damsite - There are no records available for discharge at the dam.

(1)	Outlet works (conduit size):	30 inches
	Invert elevation (feet above NGVD):	219.5
	Discharge capacity at top of dam:	95 cfs
(2)	Maximum known flood at damsite:	unknown
(3)	Ungated spillway capacity at top of dam:	375 cfs
	Elevation (NGVD):	230.0
(4)	Ungated spillway capacity at test flood elevation:	1,040 cfs
	Elevation (NGVD):	231.5
(5)	Gated spillway capacity at normal pool elevation:	N/A
	Elevation (NGVD):	N/A
(6)	Gated spillway capacity at test flood elevation:	N/A
	Elevation (NGVD):	N/A
(7)	Total spillway capacity at test flood elevation:	1,040 cfs
	Elevation (NGVD):	231.5
(8)	Total project discharge at top of dam:	470 cfs
	Elevation (NGVD):	230.0
(9)	Total project discharge at test flood elevation:	2,670 cfs
	Elevation (NGVD):	231.5

c. Elevation (feet above NGVD)

(1)	Streambed at toe of dam:	213.5

(2)	Bottom of cutoff:	unknown
(3)	Maximum tailwater:	217.0
(4)	Normal pool:	228.0
(5)	Full flood control pool:	N/A
(6)	Spillway crest (ungated):	228.0
(7)	Design surcharge (original design):	unknown
(8)	Top of dam:	230.0
(9)	Test flood surcharge:	231.5
d.	Reservoir (length in feet)	
(1)	Normal pool:	1,200
(2)	Flood control pool:	N/A
(3)	Spillway crest pool:	1,200
(4)	Top of dam:	1,300
(5)	Test flood pool:	1,420
e.	Storage (acre-feet)	
(1)	Normal pool:	68
(2)	Flood control pool:	N/A
(3)	Spillway crest pool:	68
(4)	Top of dam:	87
(5)	Test flood pool:	108
f.	Reservoir Surface (acres)	
(1)	Normal pool:	8
(2)	Flood control pool:	N/A
(3)	Spillway crest:	8
(4)	Test flood pool:	12
(5)	Top of dam:	10

g.	Dam	
	(1) Type:	earth embankment; stone masonry downstream face
	(2) Length:	290 feet
	(3) Height:	16.5 feet
	(4) Top width:	14 feet
	(5) Side slopes:	U/S - unknown D/S - vertical
	(6) Zoning:	unknown
	(7) Impervious core:	unknown
	(8) Cutoff:	unknown
	(9) Grout certain:	unknown
	(10) Other:	N/A
h.	Diversion and Regulating Tunnel:	N/A
i.	Spillway	
	(1) Type:	stone-broad crested weir
	(2) Length of weir:	50 feet
	(3) Crest elevation	228.0
	(4) Gates:	N/A
	(5) U/S Channel:	none
	(6) D/S Channel:	solid apron and natural channel
	(7) General:	N/A
j.	Regulating Outlets	
	(1) Invert elevation (NGVD):	219.5
	(2) Size:	30 inches

(3)	Description:	cast iron pipe
(4)	Control mechanism:	manually operated gate
(5)	Other:	gate operable

SECTION 2 - ENGINEERING DATA

2.1 Design Data

There are no original design computations or drawings available.

2.2 Construction Data

The dam was constructed around 1870. No records of the original construction are available. The pond was dredged in 1971. Drawings for this project are available at the Cheshire Engineering Department.

2.3 Operation Data

The dam was originally used for water power. Presently, the pond is used for recreation. A low-level discharge gate is operable although it is difficult to reset.

2.4 Evaluation of Data

a. Availability - There are no original computations or drawings available. Drawings from the dredging project are available.

b. Adequacy - Since no information is available, a visual inspection and hydraulic/hydrologic computations were used to assess the condition of the facility.

c. Validity - The conclusions and recommendations found in this report are based on a visual inspection and the hydraulic/hydrologic computations.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General - A visual inspection was conducted on October 23, 1980 by members of the engineering staff of Storch Engineers, D. Baugh and Associates, Inc. and Matthews Associates. A copy of the visual inspection check list is contained in Appendix A of this report. Selected photos of the dam and appurtenant structures are contained in Appendix C.

In general, the overall appearance and condition of the facility and its appurtenant structures is FAIR.

b. Dam - The dam is an earth embankment with a vertical stone masonry face that gradually tapers off toward the ends of the dam. There is trimmed grass on the crest to the west of the spillway and there is thick brush on the crest to the east of the spillway (Photos 1 and 2). The crest of the dam is 2 feet above the spillway. The upstream earthen face is largely below the pond surface so its slope cannot be determined. The downstream stone masonry face is mortared in some areas but is generally dry (Photo 5). A stone has fallen out of the base of the wall to the east of the spillway (Photo 4) and several stones below the spillway are bulging out. There is a solid stone apron at the toe below the spillway. The horizontal and vertical alignment of the dam is good.

There are a number of seepage locations in the vicinity of the spillway (See Photo Location Plan - Plate 3 for location). There is seepage in two locations to the east of the spillway and along a large boulder just to the west of the spillway (Photos 6 and 7). The seepage in these locations is small and could not be measured. There is also seepage occurring under the capstones on the west side of the spillway as well as through several other joints in the downstream face below the spillway

(Photo 8). The flow in these locations is approximately 10 to 20 gpm. At all locations the water is clear and shows no sign of particle movement.

c. Appurtenant Structures - There is a masonry gate inlet structure at the west end of the spillway (Photos 3 and 9) that controls a 30-inch low-level discharge pipe passing through the base of the dam (Photo 8). The gate is operable although it is difficult to reset. The masonry for the gate inlet structure is out of alignment.

The spillway is a stone weir that is slightly bulging (Overview Photo). The approach channel is not well defined and is the natural slope of the bottom of the pond. The spillway is located near the center of the dam and is 50 feet long. The crest of the dam is 2 feet above the spillway (Photo 2). At the toe below the spillway, is a solid stone apron which is below the pool surface.

d. Reservoir Area - The area immediately adjacent to the facility is gently sloped and in a natural state. The shoreline shows no signs of sloughing or erosion and there is no development adjacent to the reservoir. A rapid rise in the water level of the reservoir will not endanger any life or property.

e. Downstream Channel - The downstream channel is a natural channel with heavily wooded gently sloping banks (Photo 10). Approximately 180 feet downstream, the channel is bounded by stone walls and about 340 feet downstream there is a bridge.

3.2 Evaluation

Overall, the general condition of the dam is FAIR. The visual inspection revealed items that lead to this assessment such as:

a. Seepage through the masonry below and adjacent to the spillway;

b. Bulging of the masonry below the spillway;

c. Vegetation on the crest of the dam to the east of the spillway;

d. Trees and vegetation along the toe of the dam.

SECTION 4 - OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

a. General - The operation of this facility was for water power but this purpose was abandoned sometime ago. Presently, the pond is used for recreation. A low-level discharge gate can be opened with a front-end loader to lift the stem. To reset the gate it must be repacked by hand to close it tightly.

b. Description of any Warning System in Effect - There is no formal warning system in effect for this dam.

4.2 Maintenance Procedures

a. General - Maintenance consists of mowing the lawn along the crest of the dam.

b. Operating Facilities - The gate to the discharge pipe is operable but is difficult to open and reset.

4.3 Evaluation

There is no regularly scheduled maintenance program, however, there is periodic grass cutting. A systematic and complete maintenance program should be instituted and a formal warning system should be developed. Also, the discharge gate should be made to open and close easily.

SECTION 5 - EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

Mixville Pond Dam is an earth embankment with a vertical stone masonry downstream face. The dam is approximately 290 feet long and 16.5 feet high. The spillway is a stone weir, 50 feet long. The approach channel is the natural pond floor and the downstream channel is approximately 25 feet wide with gently sloping, heavily wooded banks. There is a gate inlet that controls a low-level discharge pipe. The gate is operable.

The watershed encompasses 2.75 square miles and is approximately 10 percent developed. The topography is rolling with the terrain rising 612 feet from the spillway crest.

The pond has a total capacity of approximately 68 acre-feet at the spillway crest and approximately 87 acre-feet when the pond is at the top of the dam.

5.2 Design Data

No design data for the original dam is available.

5.3 Experience Data

Mixville Pond Dam has experienced flooding from past major storms such as March 1936, September 1938, August 1955 as well as January and February 1978 and January 1979. According to USGS records, the flood of record in the Cheshire area resulted from the storm of September, 1938.

5.4 Test Flood Analysis

Based on the guidelines found in the Recommended Guidelines for Safety Inspection of Dams, the dam is classified as a SMALL structure with a HIGH hazard potential. The test flood for these conditions ranges from 1/2 the probable maximum flood (PMF) to the PMF. One half of the PMF was used for this dam because of the dam's small size.

Using guide curves established by the Corps of Engineers (rolling terrain), the test flood inflow is 2,750 cfs. The routing procedure established by the Corps' guidelines gives an approximate outflow of 2,670 cfs. The spillway capacity of the dam is approximately 375 cfs or 14 percent of the routed test flood outflow. The test flood will overtop the dam by 1.9 feet.

The water level in the pond is basically uncontrolled and therefore the storage behind the dam is assumed to begin at the spillway crest. Storage is determined by an average area depth analysis. Capacity curves for the spillway assume a broad crested weir.

5.5 Dam Failure Analysis

A dam failure analysis was performed using the Rule of Thumb method in accordance with guidelines established by the Corps of Engineers. Failure is assumed to occur when the water level in the pond is at the top of the dam.

The spillway discharge just prior to dam failure is 375 cfs and the calculated dam failure discharge is 7,665 cfs.

Failure of Mixville Pond dam could result in the loss of more than a few lives and cause significant property damage. Approximately 270 feet and 470 feet downstream, the flood wave would strike two houses. The first floor sills of the houses are approximately 10 feet and 6 feet above the streambed respectively. Estimated flow and water depth at these locations just prior to dam failure is 375 cfs and 3.5 feet at both locations and just after dam failure is 6,460 cfs and 12.4 feet and 5,710 cfs and 12.7 feet respectively. Therefore, the water level would rise approximately 2.4 feet and 6.7 feet above each first floor sill.

SECTION 6 - EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations

The vertical, horizontal and lateral alignments are generally good although several stones in the downstream face below the spillway are bulging. Many of the stones in the masonry face are irregular in shape with space between the joints. There are several areas of substantial seepage through the masonry below the spillway (Photo 8). A stone has fallen out of the masonry face on the east side of the spillway (Photo 4).

6.2 Design and Construction Data

No original design data or construction drawings are available.

6.3 Post-Construction Changes

Drawings from a 1971 pond dredging project are available from the Cheshire Engineering Department. During the dredging operation, the contractor removed a portion of the upstream embankment and was ordered to replace the excavated material under the direction of the Engineer in charge.

6.4 Seismic Stability

The dam is located in Seismic Zone 1 and in accordance with Recommended Phase I Guidelines does not warrant a seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition - After considering the available information, the results of the inspection and hydraulic/hydrologic computations, the general condition of the Mixville Pond Dam is FAIR.

b. Adequacy of Information - The information available is such that an assessment of the safety of the dam was based on available data, the visual inspection results and computations developed for this report.

c. Urgency - It is considered that the recommendations and remedial measures, suggested below should be implemented within one year after receipt of this Phase I Inspection Report.

7.2 Recommendations

The following recommendations should be carried out under the direction of a qualified registered engineer.

a. Seepage through the dam below and adjacent to the spillway should be investigated further to determine its origin and monitored to determine any the changes.

b. The masonry face should be studied where stones are bulging or in order to more thoroughly assess the structural stability.

c. Perform a detailed hydraulic/hydrologic investigation to assess further the potential of overtopping the dam and the need for and the means to increase the project discharge capacity.

d. Trees including stumps and root system should be removed from within 20 feet of the toe of the dam and the holes backfilled with proper material.

7.3 Remedial Measures

a. Operation and Maintenance Procedures -

(1) Brush on the crest of the dam to the east of the spillway and along the toe of the dam should be removed.

(2) The discharge valve should be repaired so that it can be readily opened and closed.

(3) Plans for a regular program of maintenance of the dam should be initiated.

(4) Plans for around-the-clock surveillance should be developed for periods of unusually heavy rains and a formal downstream warning system should be put into operation for use in the event of an emergency.

(5) A program of annual technical inspection should be established.

7.4 Alternatives

There are no practical alternatives to the above recommendations.

APPENDIX A

INSPECTION CHECK LIST

INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Mixville Pond Dam

DATE 10/23/80

TIME 1:00 p.m.

WEATHER Sunny, 50's

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

PARTY:

1. Gary Giroux, SE, Hyd./Struct.
2. Hermann Hani, SE, Technician
3. Ben Cohen, SE, Civil
4. Floyd Austin, DBA, Civil
5. Peter Austin, DBA, Civil
6. Michael Pozzato, MA, Mech.
7.
8.
9.
10.

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Dam Embankment	F. Austin P. Austin	Fair
2.	Mechanical	M. Pozzato	Fair
3.	Spillway	G. Giroux B. Cohen	Good
4.	Discharge Channel	G. Giroux H. Hani	Fair
5.			
6.			
7.			
8.			
9.			
10.			

INSPECTION CHECK LIST

PROJECT Mixville Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	230.0 (NGVD)
Current Pool Elevation	228.1 (NGVD)
Maximum Impoundment to Date	Unknown
Surface Cracks	None
Pavement Condition	N/A
Movement or Settlement of Crest	None
Lateral Movement	Isolated rocks protruding from downstream embankment below spillway
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Problem
Vegitation on Slopes	top of embankment nearly overgrown with brush
Sloughing or Erosion of Slopes or Abutments	None
Rock Slope Protection - Riprap Failures	None
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	Seepage through stones below spillway minor seepage through two areas in east embankment wall. Evidence of minor seepage on west side of spillway
Piping or Boils	None
Foundation Drainage Features	None Observed
Toe Drains	None Observed
Instrumentation System	None

INSPECTION CHECK LIST

PROJECT Mixville Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Underwater
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	Consists of stone
Condition of Concrete	Poor - stones out of alignment
Stop Logs and Slots	

INSPECTION CHECK LIST

PROJECT Mixville Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	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	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	Operable
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System in Gate Chamber	

INSPECTION CHECK LIST

PROJECT Mixville Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	N/A
General Condition of Concrete	
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

INSPECTION CHECK LIST

PROJECT Mixville Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Unknown - underwater
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None Observed
Floor of Approach Channel	Underwater
b. Weir and Training Walls	
General Condition of Concrete	Good (stone)
Rust or Staining	N/A
Spalling	N/A
Any Visible Reinforcing	N/A
Any Seepage or Efflorescence	Along spillway face especially under cap stones on easterly side
Drain Holes	None
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Many
Floor of Channel	Natural channel with rock and vegetation
Other Obstructions	Many filled trees

INSPECTION CHECK LIST

PROJECT Mixville Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	N/A
General Condition of Concrete	
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain holes	
Channel	Outlet pipe discharges into spillway channel
Loose Rock or Trees Overhanging Channel	
Condition of Discharge Channel	

INSPECTION CHECK LIST

PROJECT Mixville Pond Dam DATE 10/23/80

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	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	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

APPENDIX B

ENGINEERING DATA

Any information pertaining to the history, maintenance and past inspection reports are located at:

State of Connecticut
Department of Environmental
Protection
Water Resources Unit
State Office Building
Hartford, Connecticut 06115

APPENDIX C

PHOTOGRAPHS

PHOTO 1

TOP OF DAM LOOKING WEST

PHOTO 2

SPILLWAY - TOP OF DAM LOOKING EAST

PHOTO 3

WEST SPILLWAY ABUTMENT

PHOTO 4

DOWNSTREAM FACE OF DAM

PHOTO 5

DOWNSTREAM FACE OF DAM

PHOTO 6

SEEPAGE - DOWNSTREAM FACE OF DAM

PHOTO 7

SEEPAGE - DOWNSTREAM FACE OF DAM

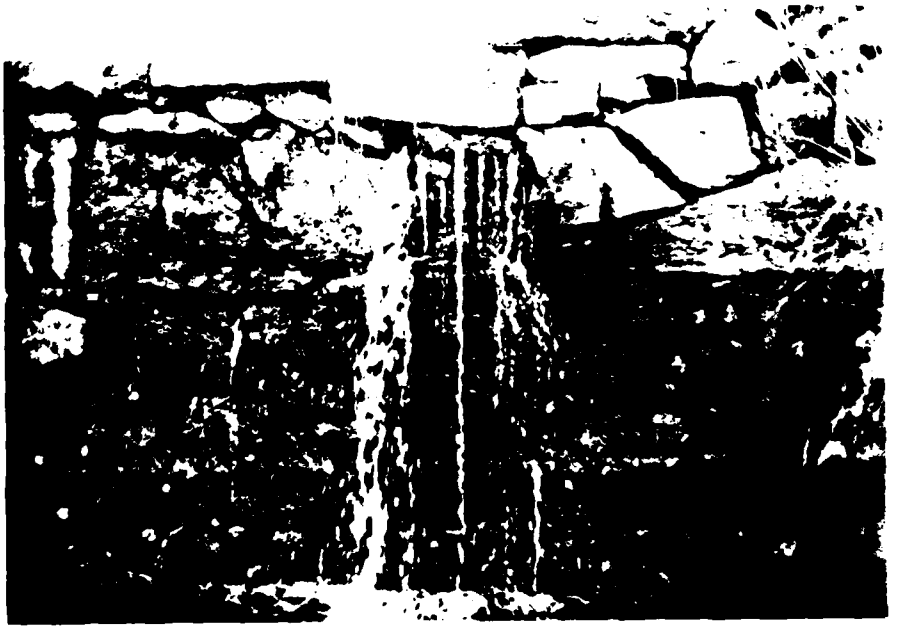

PHOTO 8

SEEPAGE - LOW LEVEL DISCHARGE OUTLET

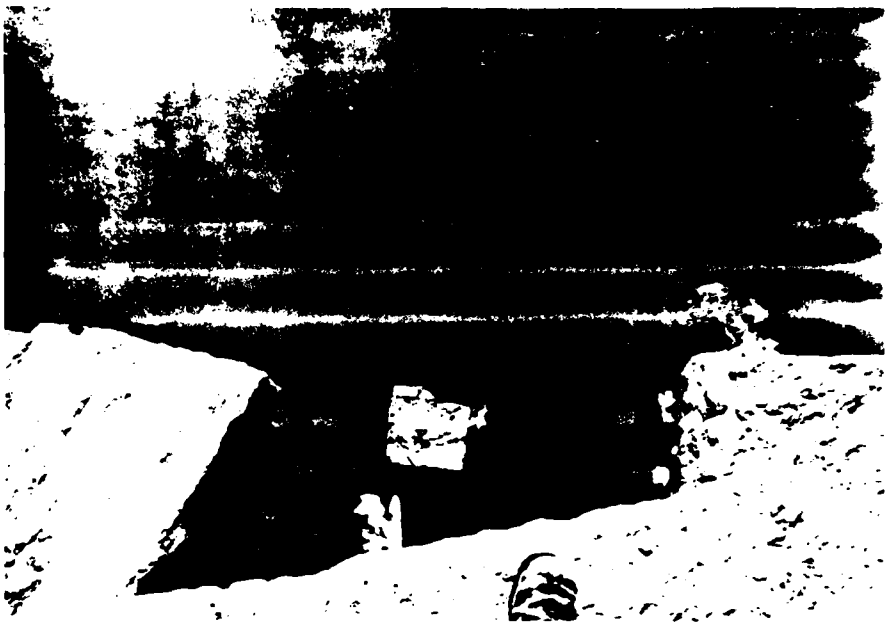

PHOTO 9

INLET - STEM - LOW LEVEL DISCHARGE

PHOTO 10

DOWNSTREAM CHANNEL

APPENDIX D

HYDRAULIC AND HYDROLOGIC COMPUTATIONS

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JOB Phase I Dam Inspection - #4463
SHEET NO _____ OF _____
CALCULATED BY GJG DATE 12/8/80
CHECKED BY BDC DATE 12/10/80

Determination of Test Flood

NAME OF DAM Mixville Pond Dam

DRAINAGE AREA 1765 acres 2.75 SM

INFLOW Size: Small Hazard: High Test Flood: ½PMF

Inflow = 2000/2 = 1000 cfs/SM

$Q = 1000(2.75) = 2750$ cfs

Estimating the effect of surcharge storage on the Maximum Test Flood

1. Q_{P1} = 2750 cfs
2a. H_1 = 4.0' (elev.)
b. $STOR_1$ = .27"
c. $Q_{P2} = Q_{P1}(1 - STOR_1/9.5)$ = 2670 cfs
3a. H_2 = 3.9' $STOR_2$ = .26"
b. $STOR_A$ = .265"

$Q_{PA} = 2750(1 - .265/9.5) = 2673$ cfs

H_A = 3.9' $STOR_A$ = .26"

Test Flood = 2670 cfs

Capacity of the spillway when the pond elevation is at the top of the dam

Q = 375 cfs or 14 % of the Test Flood

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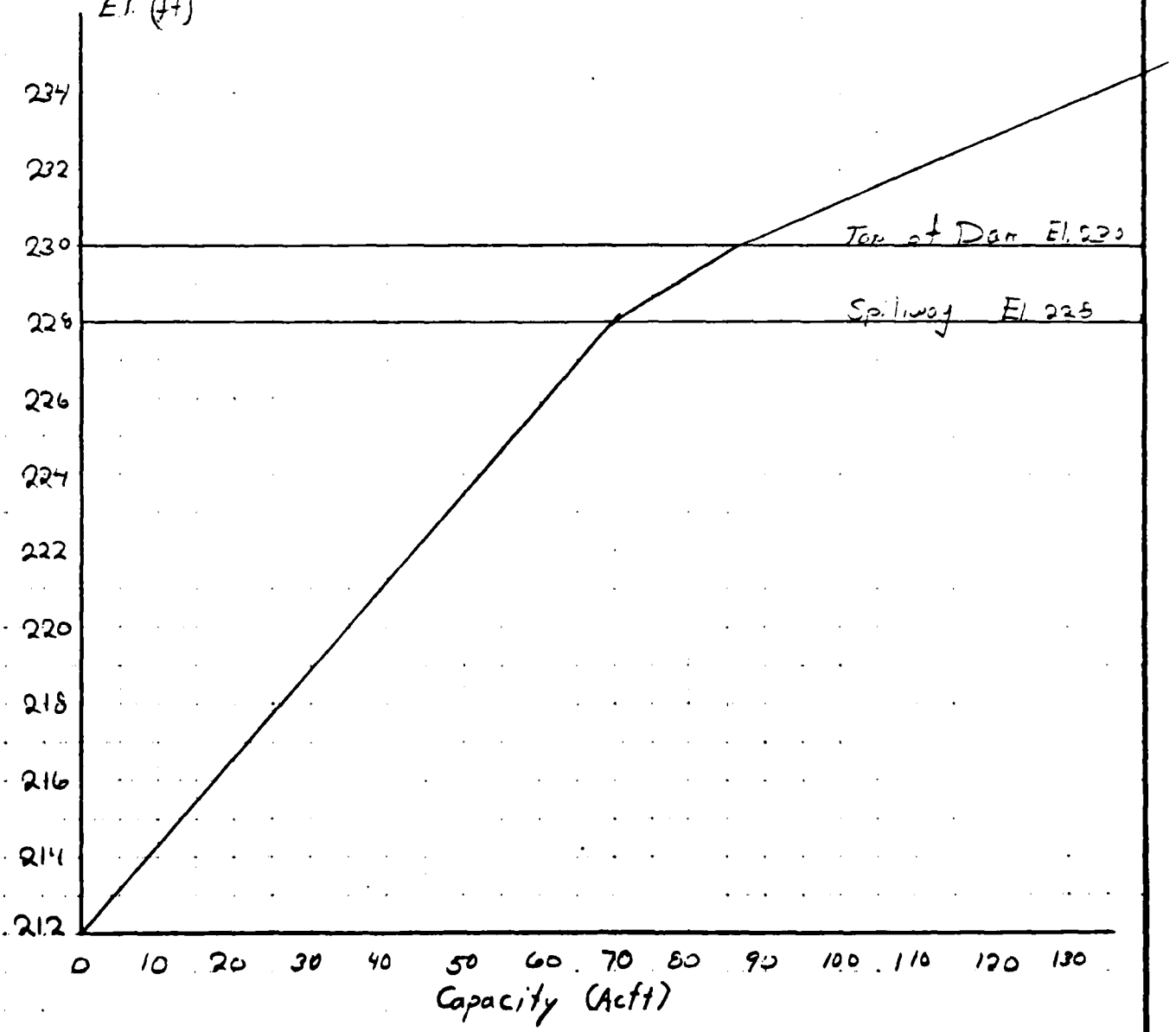
Planners · Environmental Consultants

JOB Phase I Dam Inspection 4463
CALCULATED BY GVS DATE 12/8/80
CHECKED BY BDC DATE 12/10/80

AREA - CAPACITY

Name of Dam:

ELEV	DEPTH	AREA	AVG. AREA	VOL	Σ VOL
228		8.44			0
	2		9.22	18.44	
230		10.0			18.44
	5		11.72	58.6	
235		15.00			75.0



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Engineers - Landscape Architects
Planners - Environmental Consultants

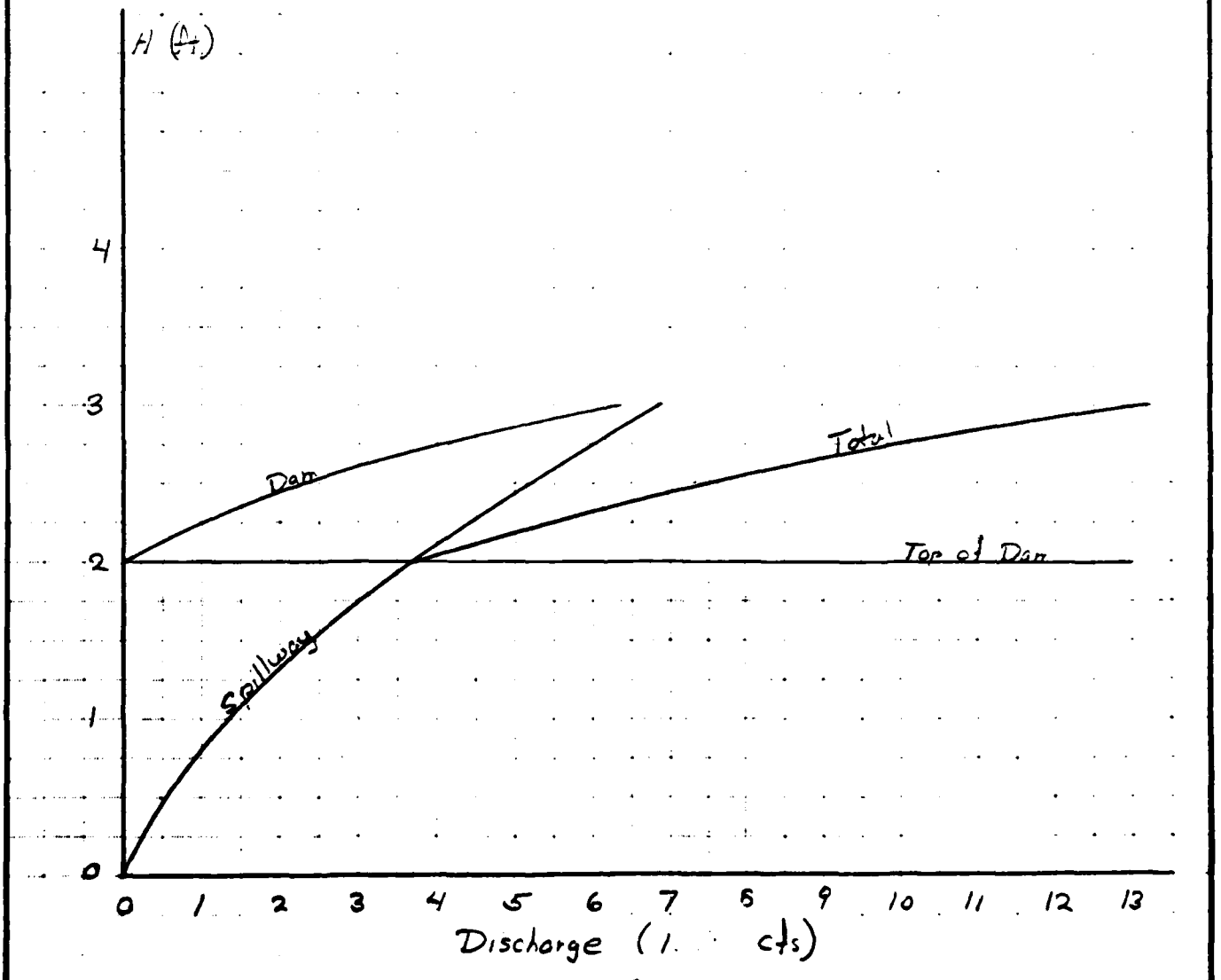
JOB Phase I Dam Inspection 4463
SHEET NO _____ OF _____
CALCULATED BY GJG DATE 11/7/90
CHECKED BY BDC DATE 12/10/90

Stage Discharge

NAME OF DAM Mixville Pond Dam

$Q = CLH^{3/2}$

	Spillway I				Spillway II				Dam				
Elev	C	L	H	Q	C	L	H	Q	C	L	H	Q	QT
	2.63	50	0	0									0
	2.63	↓	.5	47									47
	2.63		1.0	135									135
	2.65		1.5	245									245
	2.64		2.0	375					2.70	240	0	0	375
	2.64		2.5	520					2.70	↓	.5	230	750
	2.64		3.0	685					2.63		1.0	630	1315



Downstream Hydrographs

"Rule of Thumb" Guidance for Estimating Downstream Failure Hydrographs

NAME OF DAM

Section I at Dam

1. $S = \frac{86.6}{\text{Acft}}$
2. $Q_{P1} = 8/27\ W_b \sqrt{g}\ Y^{3/2} = 8/27\,(68)\sqrt{32.2}\,(16.5)^{1.5} = 7{,}663$
3. See Sections

Section II at

4a. $H_2 =$ 13.4' $A_2 =$ 2,600 $L_2 =$ 245 $V_2 =$ 14.6 Acft

b. $Q_{P2} = Q_{P1}\,(1-V_2/S) =$ 6,369 cfs

c. $H_2 =$ 12.4' $A_2 =$ 2,240

$A_A =$ 2,420 $V_2 =$ 13.6 Acft

$Q_{P2} = 7{,}663\,(1-13.6/86.6) = 6{,}459$ cfs $H =$ 12.4'

Section III at

4a. $H_3 =$ 13.2' $A_3 =$ 1,920 $L_3 =$ 200 $V_3 =$ 8.8 Acft

b. $Q_{P3} = Q_{P2}\,(1-V_3/S) =$ 679 cfs

c. $H_3 =$ 12.7' $A_3 =$ 1,760

$A_A =$ 1,840 $V_3 =$ 8.4 Acft

$Q_{P3} = 6{,}459\,(1-8.4/73.0) = 5{,}712$ $H =$ 12.7'

Section IV at $(3{,}900+1{,}840)/2 = 2{,}870$

4a. $H_4 =$ 11.7' $A_4 =$ 2,870 $L_4 =$ 370 $V_4 =$ 24.4 Acft

b. $Q_{P4} = Q_{P3}(1-V_4/S) =$ 3,556 cfs

$(2{,}800+1{,}840)/2 = 2{,}320$

c. $H_4 =$ 9.6' $A_4 =$ 2,320

$A_A =$ 2,595 $V_4 =$ 22.0 Acft

$Q_{P4} = 5{,}712\,(1-22.0/64.6) = 3{,}763$ $H =$ 9.8'

Downstream Hydrographs (Continued)

Section V at

4a. H_5 = 9.8' A_5 = 2,950 L_5 = 300 V_5 = 20.3 Acft

b. $Q_{P5} = Q_{P4}(1-V_5/S)$ = 1,968 cfs

c. H_5 = 7.4' A_5 = 1,850

A_A = 2,700 V_5 = 16.5 Acft

$Q_{P5} = 3,763(1-16.5/42.6) = 2,302$ H = 8.0'

Section VI at

4a. H_6 = 8.0' A_6 = 2,100 L_6 = 130 V_6 = 6.3 Acft

b. $Q_{P6} = Q_{P5}(1-V_6/S)$ = 1,749 cfs

c. H_6 = 7.0' A_6 = 1,700

A_A = 1,900 V_6 = 5.7 Acft

Section VII at $2,302(1-5.7/26.1) = 1,802$ H = 7.2'

4a. H_7 = ____ A_7 = ____ L_7 = ____ V_7 = ____ Acft

b. $Q_{P7} = Q_{P6}(1-V_7/S)$ = ____ cfs

c. H_7 = ____ A_7 = ____

A_A = ____ V_7 = ____ Acft

Q_{P7} =

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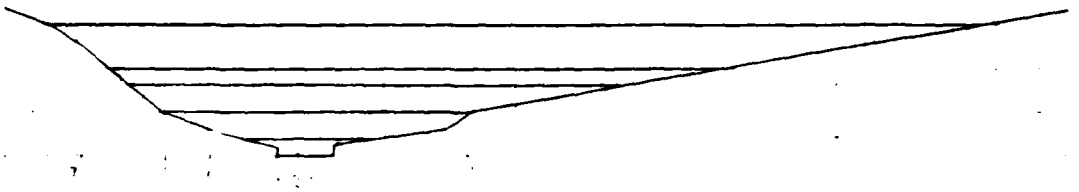
Planners - Environmental Consultants

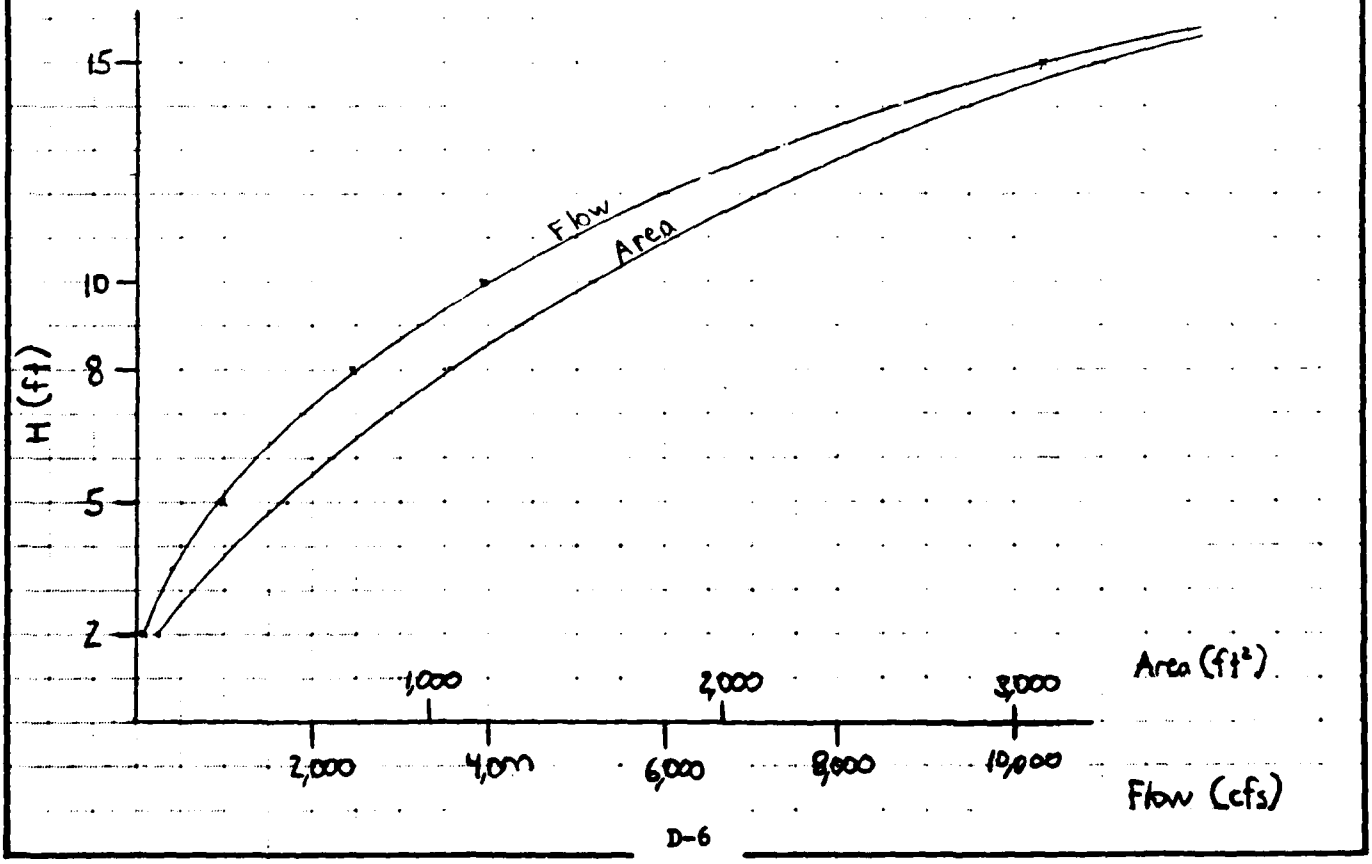
JOB
SHEET NO OF
CALCULATED BY CJC DATE 12/7/80
CHECKED BY GJL DATE 12/8/80
SCALE

$s = 0.41\%$
$n = 0.12$

5' / 20'



D	WP	A	R	$R^{2/3}$	$S^{1/2}$	V	Q
2	56	67	1.20	1.13	0.064	0.90	60
5	140	511	3.65	2.37	"	1.88	963
8	224	1,057	4.72	2.81	"	2.24	2,364
10	276	1,557	5.64	3.17	"	2.52	3,923
15	424	3,307	7.80	3.93	"	3.13	10,341



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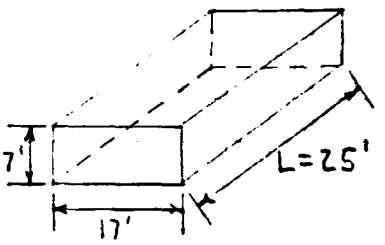
JOB
SHEET NO ____ OF ____
CALCULATED BY BDC DATE 12/28/80
CHECKED BY [illegible] DATE [illegible]
SCALE

HEAD CALCULATIONS FOR CULVERT FLOWING FULL

$$H = \left[\frac{1.555(1+Ke)}{D^4} + \frac{287.64\,n^2L}{D^{16/3}}\right]\left(\frac{Q}{10}\right)^2$$

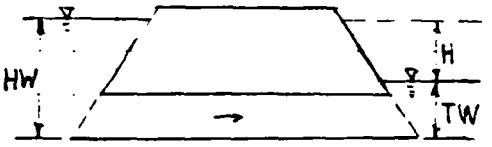
$n_1 = 0.012$
$ke = 0.25$



$D = \sqrt{7 \times 17} = 10.91'$

$Y_c = 0.315\sqrt[3]{q^2/g}$, $q = Q/17'$

$TW = \frac{7' + Y_c}{2} \leq 7'$



$HW = H + TW$

Q	$(Q/10)^2$	H	TW	HW
250	625	0.0876	3.797	3.885
500	2500	0.351	3.972	4.323
1000	10,000	1.402	4.249	5.651
2500	62,500	8.764	4.879	13.643
3,750	140,625	19.718	5.307	25.025
5,000	250,000	35.054	5.689	40.743
10,000	1,000,000	140.22	6.951	147.17

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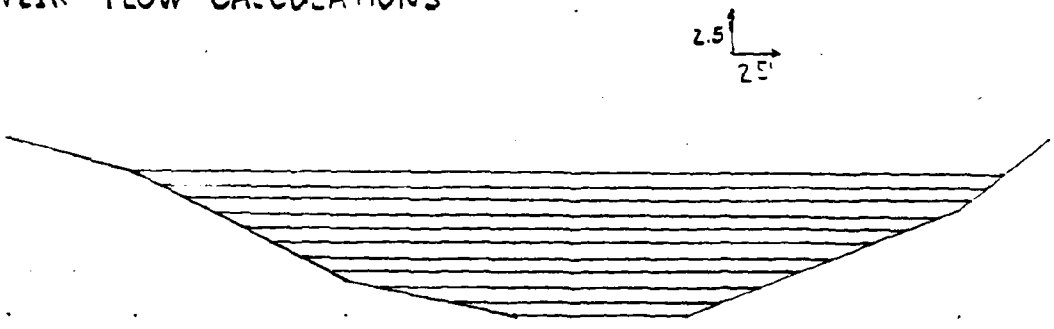
JOB
SHEET NO ____ OF ____
CALCULATED BY RJC DATE 10/22/80
CHECKED BY GJG DATE 10/23/80
SCALE

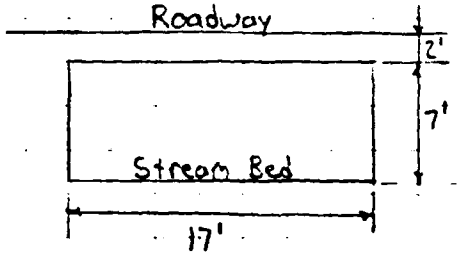
WEIR FLOW CALCULATIONS



NOTCH ROAD PROFILE at CULVERT

$Q = C L H^{3/2}$, $C = 2.65$

H	L	Q
1	150	398
2	215	1,611
3	265	3,649
4	300	6,360
5	340	10,073
6	375	14,605
7	410	20,122
8	445	26,683
9	470	33,629
10	495	41,481



CULVERT

STORCH ENGINEERS/STORCH ASSOCIATES
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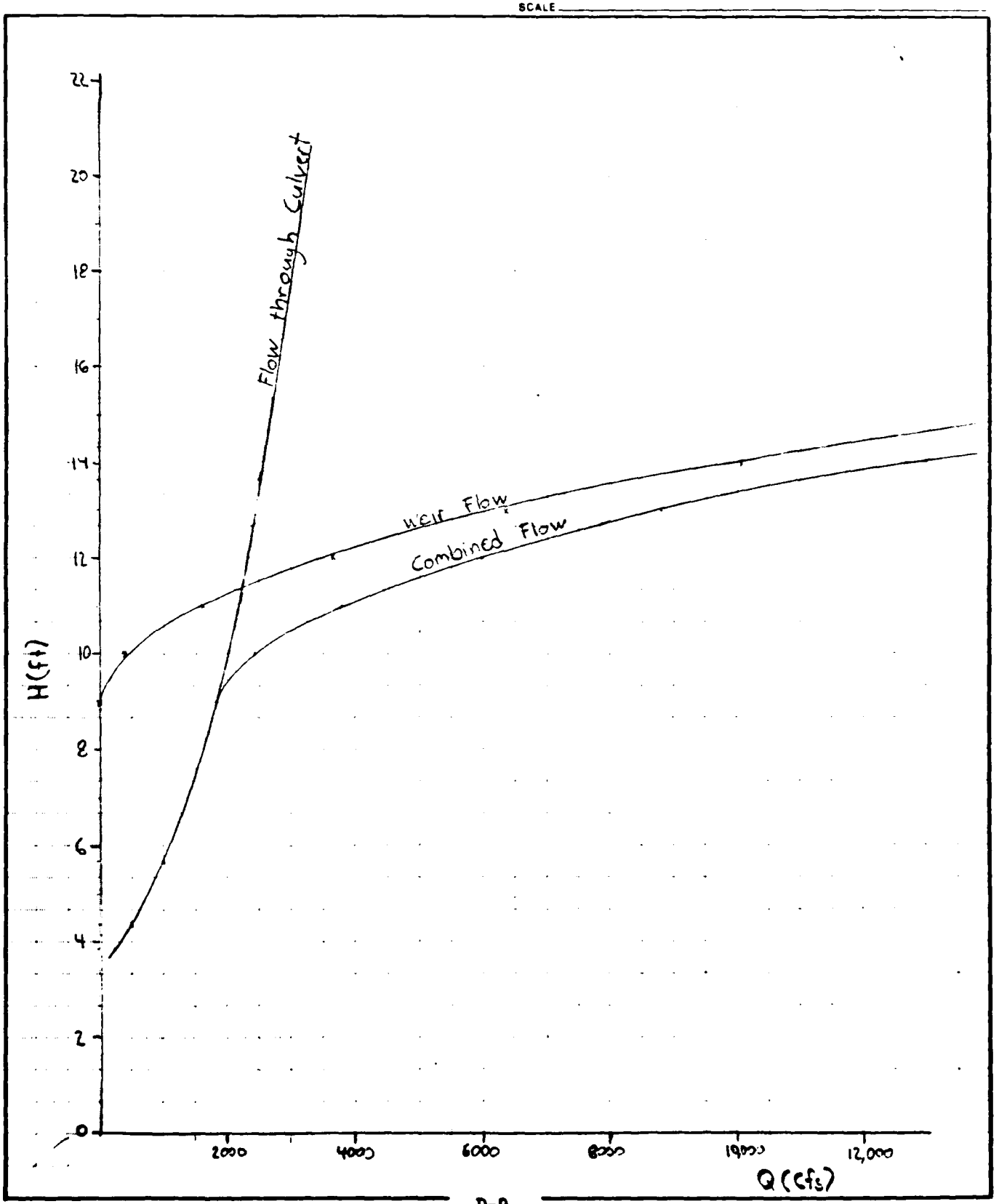
JOB _____
SHEET NO _____ OF _____
CALCULATED BY SDC DATE 12.28.22
CHECKED BY C.C.G DATE 12.28.22
SCALE _____



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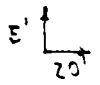
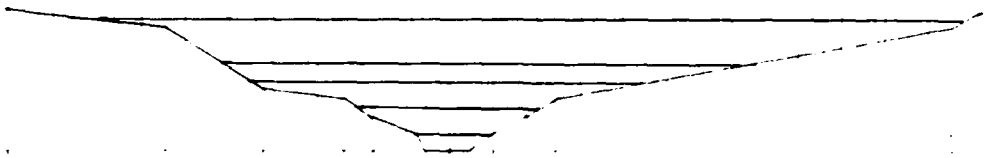
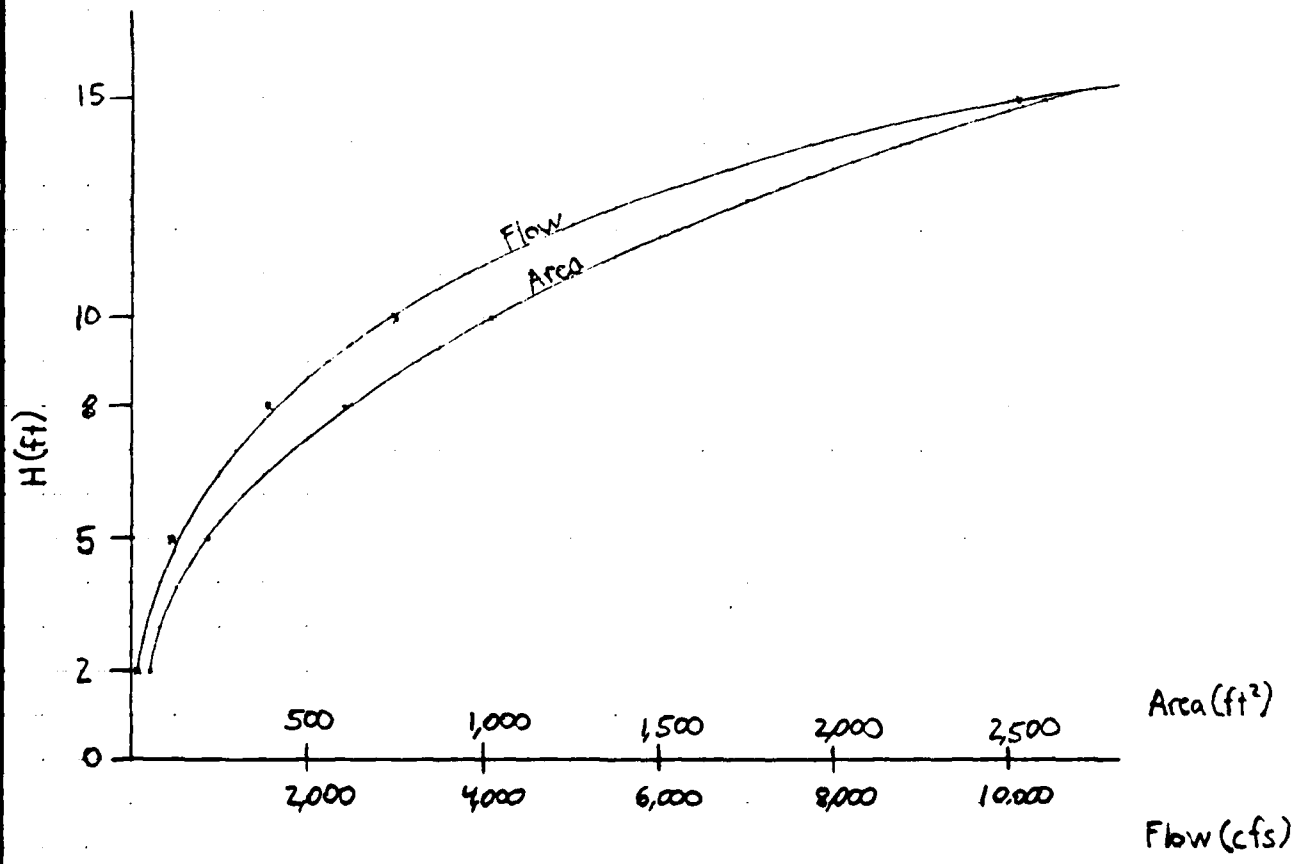
JOB
SHEET NO OF
CALCULATED BY BDC DATE 11/17/80
CHECKED BY GJG DATE 12/5/80
SCALE

$s = 0.31\%$
$n = 0.075$





D	WP	A	R	$R^{2/3}$	$S^{1/2}$	V	Q
2	32	52	1.63	1.38	0.056	1.53	80
5	82	223	2.72	1.95	"	2.16	481
8	176	610	3.47	2.29	"	2.53	1,545
10	236	1,022	4.33	2.66	"	2.94	3,003
15	394	2,597	6.59	3.52	"	3.89	10,099



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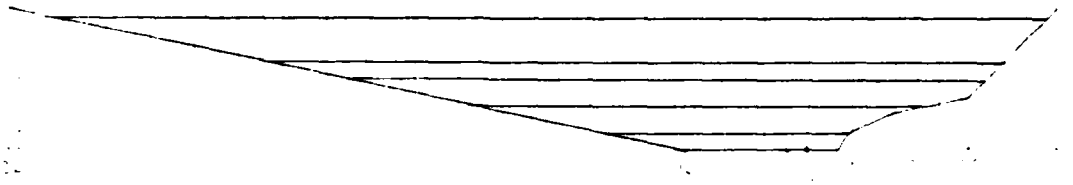
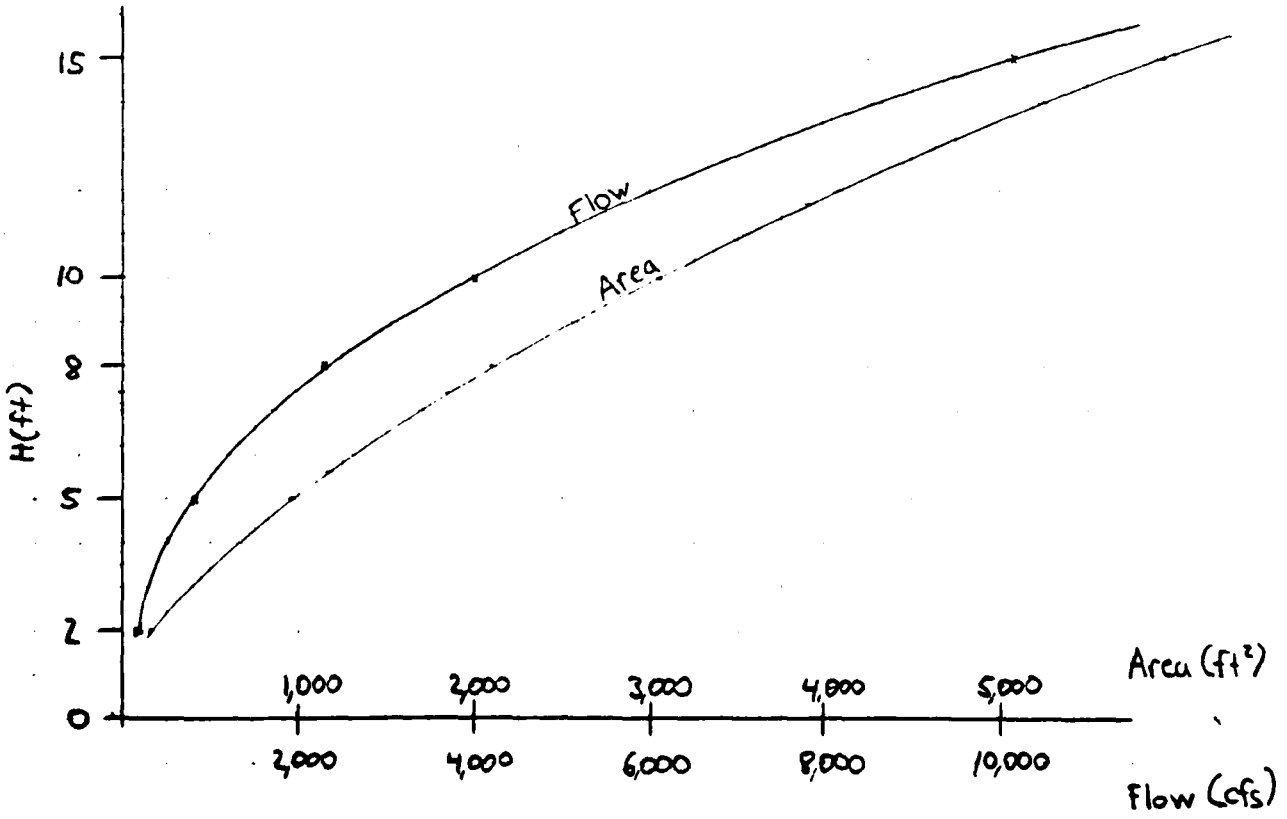
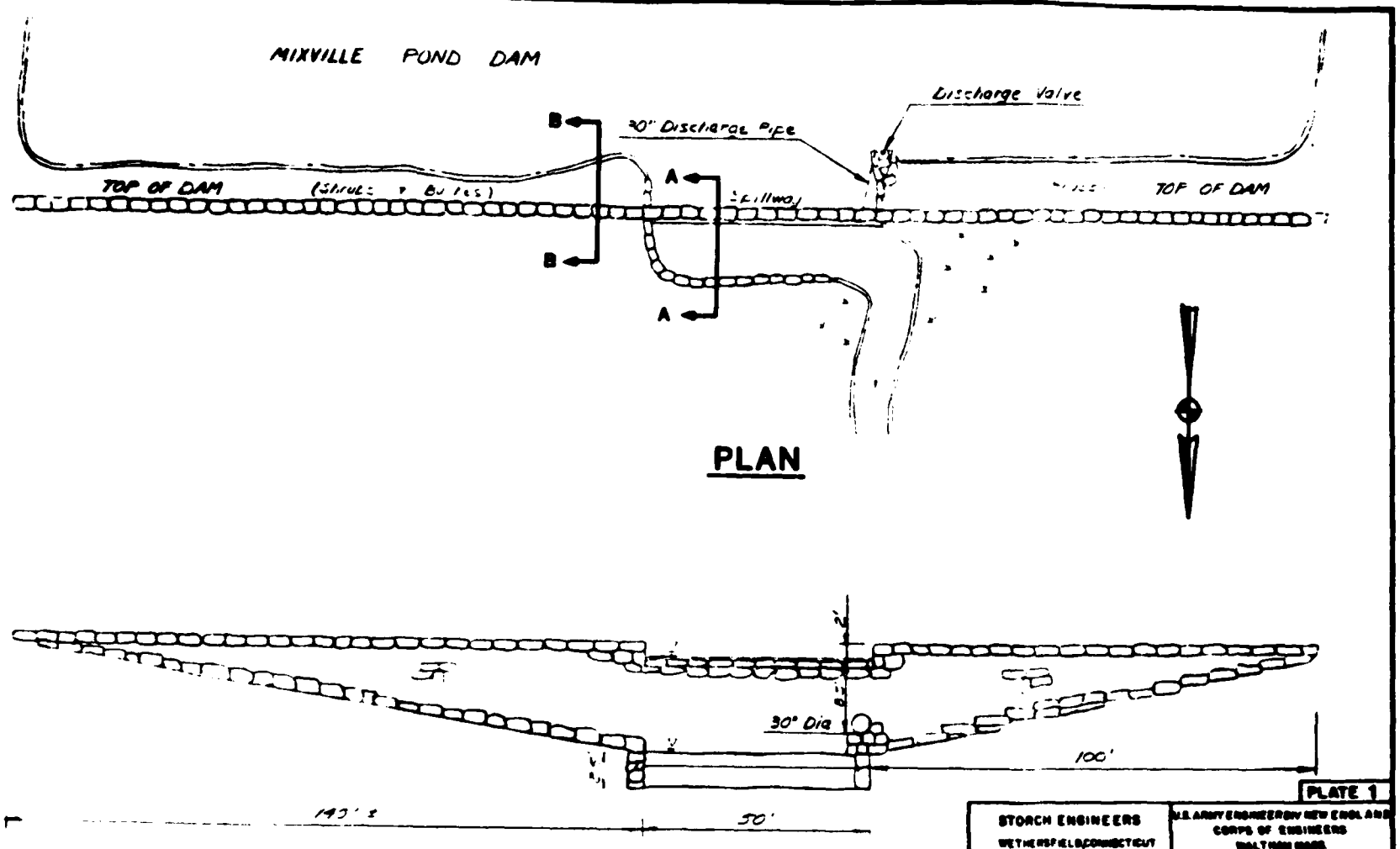
JOB
SHEET NO ____ OF ____
CALCULATED BY PDC DATE 11/14/80
CHECKED BY G.J.H DATE 12/8/80
SCALE

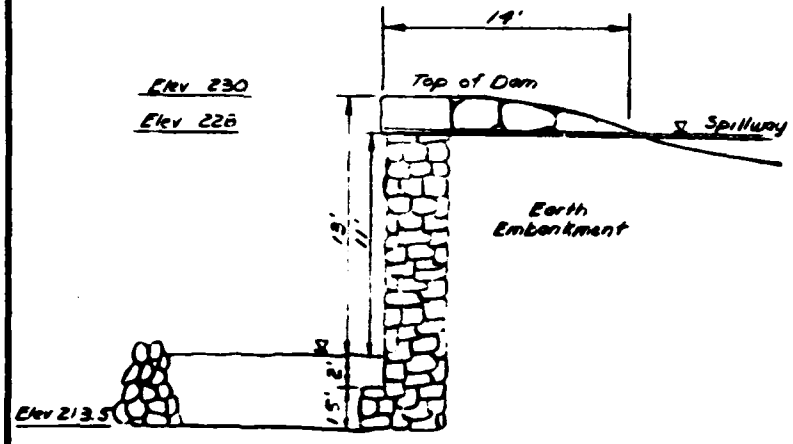
$S = 0.10\%$
$n = 0.12$



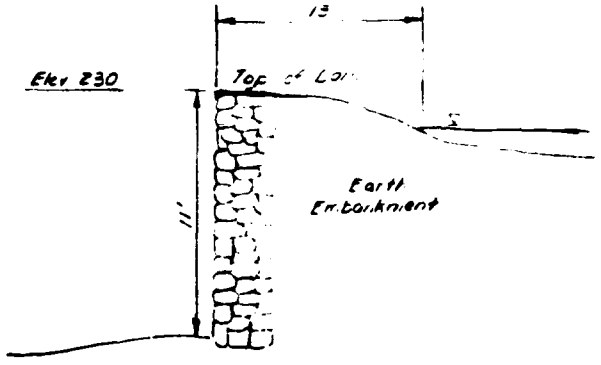
D	WP	A	R	$R^{2/3}$	$S^{1/2}$	V	Q
2	164	268	1.63	1.39	0.032	0.54	146
5	304	970	3.19	2.17	"	0.85	825
8	452	2,104	4.65	2.79	"	1.09	2,303
10	500	3,056	6.11	3.34	"	1.31	4,011
15	652	5,936	9.10	4.36	"	1.71	10,162




MIXVILLE POND DAM
Discharge Valve
30" Discharge Pipe
B
A
TOP OF DAM
TOP OF DAM
B
A
PLAN
30" Dia
100'
193'±
50'
ELEVATION
NOT TO SCALE
PLATE 1
STORCH ENGINEERS
WETHERSFIELD, CONNECTICUT
U.S. ARMY ENGINEER DIV NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
MIXVILLE POND DAM
SCALE AS SHOWN
DATE FEBR. JULY 1981



SECTION A-A



SECTION B-B

NOT TO SCALE

PLATE 2

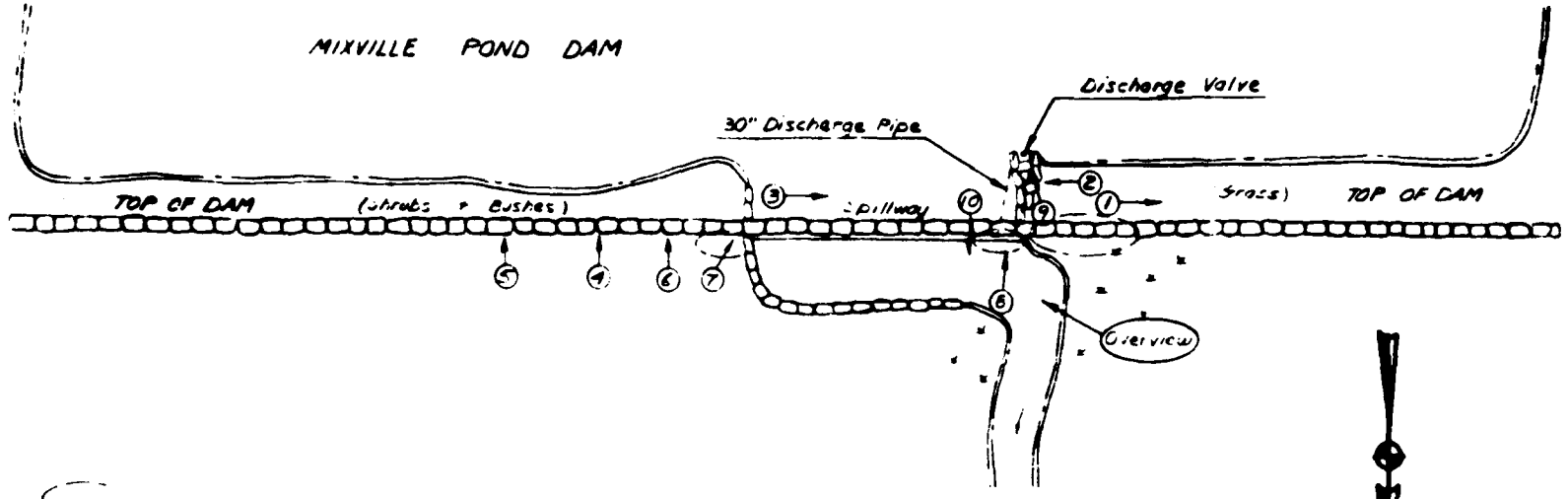
STORCH ENGINEERS WETHERSFIELD CONNECTICUT	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

MIXVILLE POND DAM

SCALE: AS SHOWN

DATE: FEBRUARY 1981



PLAN

NOT TO SCALE

PHOTO LOCATION PLAN

PLATE 8

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

MIXVILLE POND DAM

SCALE: AS SHOWN

DATE: FEBRUARY 1981

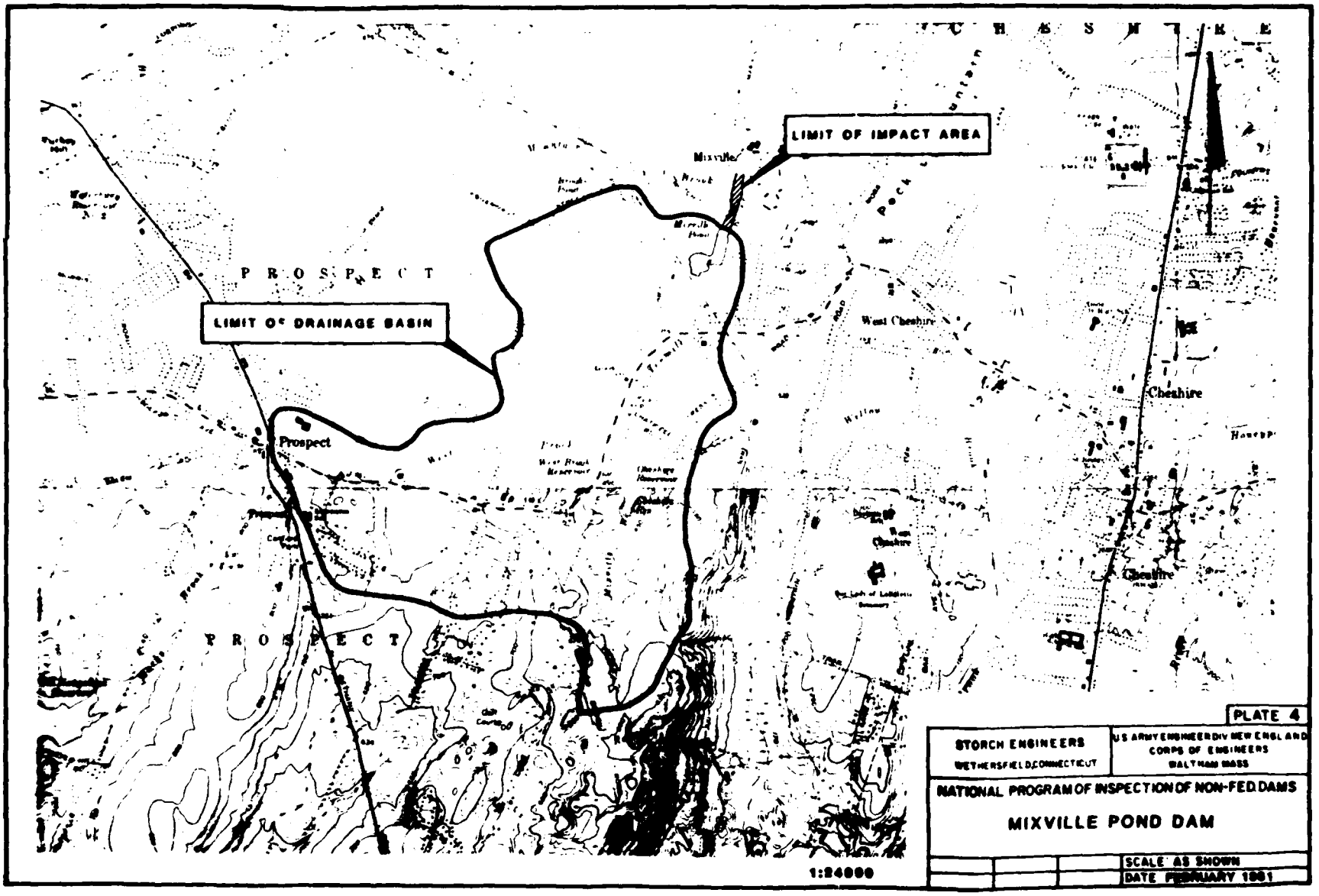


PLATE 4

STORCH ENGINEERS WETHERSFIELD, CONNECTICUT	US ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

MIXVILLE POND DAM

			SCALE AS SHOWN
			DATE FEBRUARY 1981