AD-A142 853 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS SAMP MORTAR RESERVOIR..(U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV MAY 79 1/2

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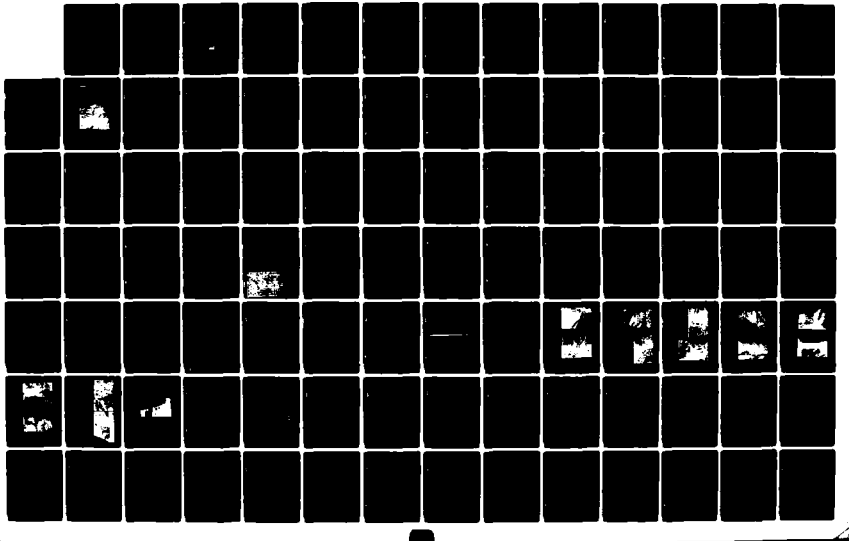

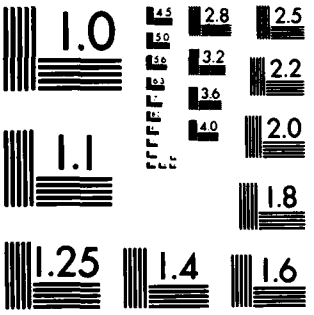

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7. AUTHOR(s): U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION	8. CONTRACT OR GRANT NUMBER(s):
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11. CONTROLLING OFFICE NAME AND ADDRESS: DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254	12. REPORT DATE: May 1979 13. NUMBER OF PAGES: 110
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18. SUPPLEMENTARY NOTES

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

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

DAMS, INSPECTION, DAM SAFETY,

Samp Mortar Reservoir Dam

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

Samp Mortar Reservoir Dam is a 320 ft. long concrete earth embankment dam and has a maximum height of 29 ft. The major portion of the dam is an ogee-shaped overflow spillway section which is abuted by concrete and earth embankment sections which are connected to original ground as shown in photo's I and II. The top width of the ogee spillway sect. is 8 ft. The top width of the outer sections is 7.5 ft. The spillway is located on the center portion of the embankment and is 185 ft. long.

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MILL RIVER BASIN
FAIRFIELD, CONNECTICUT

SAMP MORTAR RESERVOIR DAM
CT 00017

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

MAY 1979

APPENDIX B

ENGINEERING DATA

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

REPLY TO
ATTENTION OF:
NEDED-E

OCT 15 1979

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

Dear Governor Grasso:

Inclosed is a copy of the Samp Mortar Reservoir Dam 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 Samp Mortar Reservoir Dam would likely be exceeded by floods greater than 32 percent of the Probable Maximum Flood (PMF), the test flood for spillway adequacy. 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.

NEDED-E
Honorable Ella T. Grasso

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, the Lake Hills Association, Inc., Fairfield, Connecticut.

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,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

NATIONAL DAM INSPECTION PROGRAM
PHASE I - INSPECTION REPORT
BRIEF ASSESSMENT

Identification No.: CT 00017

Name of Dam: Samp Mortar Reservoir Dam

Town: Fairfield

County and State: Fairfield, Connecticut

Stream: Mill River

Date of Inspection: December 20, 1978

Samp Mortar Reservoir Dam is a 320 foot long concrete and earth embankment dam and has a maximum height of 29 feet. The major portion of the dam is an ogee-shaped overflow spillway section which is abutted by concrete and earth embankment sections which are connected to original ground as shown in Photos 1 and 11. The top width of the ogee spillway section is 8 feet. The top width of the outer sections is 7.5 feet. The spillway is located on the center portion of the embankment and is 185 feet long.

Engineering data available consisted of a cross section through the gate chamber and one half of a plan. No construction specifications or design calculations were available.

The visual inspection of Samp Mortar Reservoir Dam indicated that the dam is in fair condition. The inspection revealed some soil erosion on both abutments as seen in Photos 2, 3, 4 and 14. Trees are growing from both abutments as seen in Photos 1, 2, 3 and 5. Several seepage zones were observed on both abutments as can be seen in Photos 6, 9, 13 and 15. Water from 24 and 30 inch pipes along the toe of the left abutment has eroded the left abutment as shown in Photo 8. Also, there are numerous trees in the downstream spillway channel as seen in Photos 10 and 12.

Based on its small size and high hazard classification and in accordance with the Corps guidelines the test flood is equal to the Probable Maximum Flood. The spillway will discharge 5270 cfs or 32% of the test flood with the pool level at the top of the dam. The test flood flow of 16,500 cfs will overtop the dam by 3.9 feet.

Based on the findings of the visual inspection and hydrologic and hydraulic analysis, additional hydrological studies are required (the spillway passes only 32% of the test flood). In addition, provisions should be made by the owner to implement a seepage monitoring program. Trees, bushes and stumps should be removed from the abutments. Riprap should be placed in areas of seepage on the abutments and at the toe of the left abutment where soil erosion has occurred. Grass should be planted and maintained where trees are removed from abutments. Trees growing in the downstream channel should be removed. Trespassing on abutments should be prevented.

The recommendations and remedial measures are described in Section 7 and should be addressed within one year after receipt of this Phase I - Inspection Report by the owner.

Philip W. Genovese
President

Philip W. Genovese & Associates, Inc.
Hamden, Connecticut

SAMP MORTAR RESERVOIR DAM

CT 00017

MILL RIVER BASIN
FAIRFIELD, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

Joseph A. McElroy

JOSEPH A. MCELROY, MEMBER
Foundation & Materials Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Joseph W. Finegan, Jr.

JOSEPH W. FINEGAN, JR., CHAIRMAN
Chief, Reservoir Control Center
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

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

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

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

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that 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.

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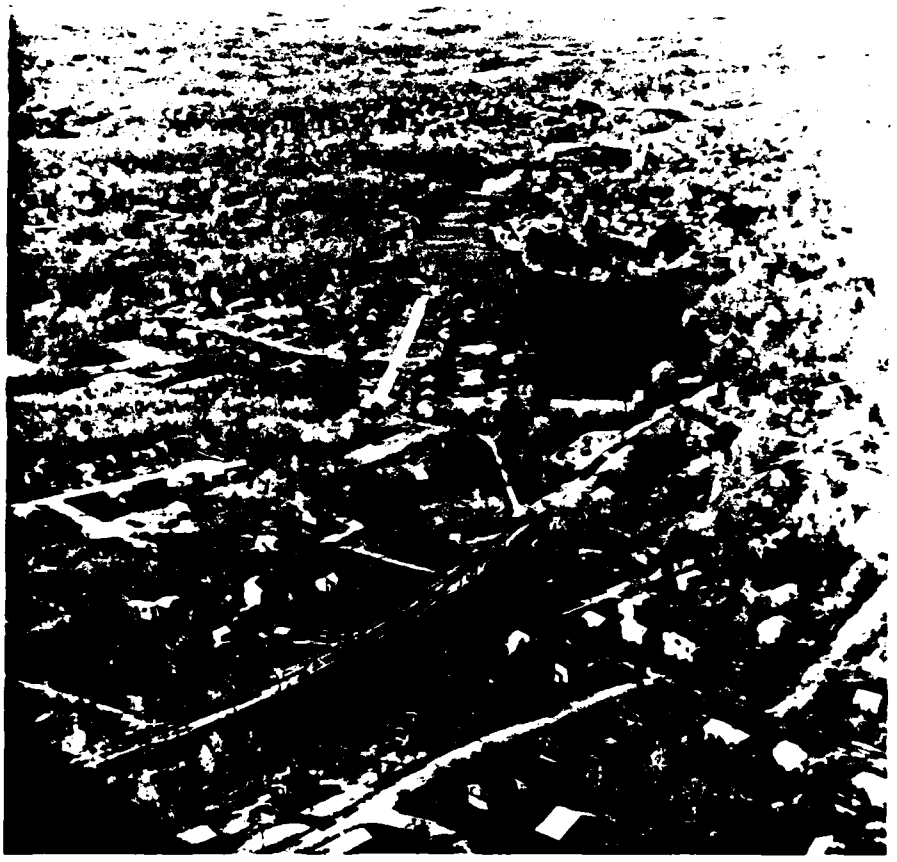
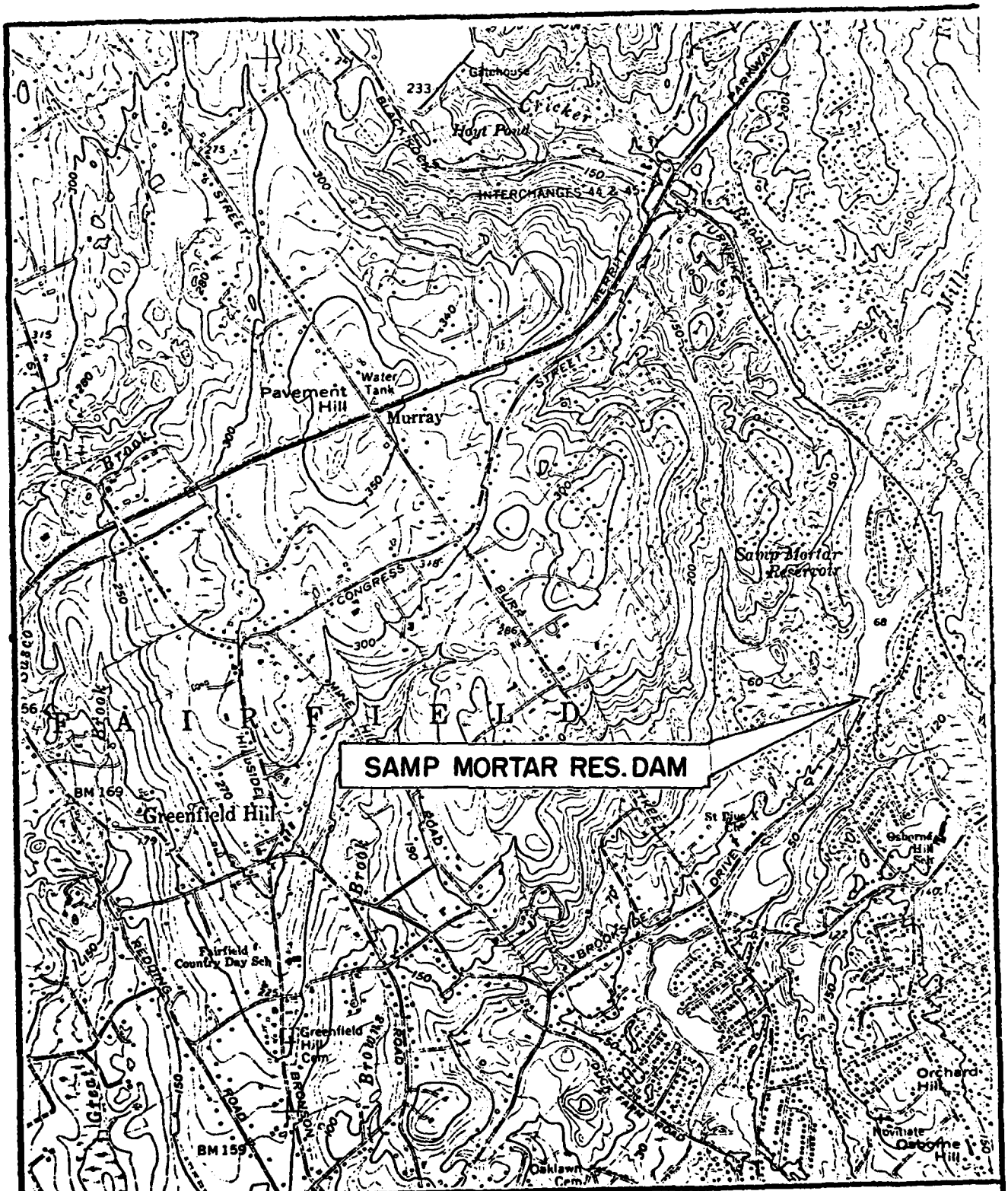


U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS	OVERVIEW PHOTO MARCH, 1979 SAMP MORTAR RES. DAM MILL RIVER FAIRFIELD, CT.
PHILIP W. GENOVESE AND ASSOCIATES, INC. ENGINEER HAMDEN, CT.		



PHILIP W. GENOVESE AND ASSOCIATES, INC.
ENGINEERS–HAMDEN, CT.

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

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS
LOCATION MAP

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Philip W. Genovese and Associates, Inc., has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Philip W. Genovese and Associates, Inc., under a letter of November 28, 1978 from Max B. Scheider, Colonel, Corps of Engineers. Contract No. DACW33-79-C0019 has been assigned by the Corps of Engineers for this work.

b. Purpose

(1) To 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) To 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. Samp Mortar Reservoir Dam is located in the Town of Fairfield, Connecticut. The dam is approximately 1 1/2 miles downstream of Hemlock Reservoir and 2.5 miles upstream of the Connecticut Turnpike (I-95) in a heavily populated residential area of Fairfield, Connecticut with coordinates approximately N 41° 11', W 73° 15.7', Fairfield County, Connecticut. The location of the dam is shown on the Location Map immediately preceding this page.

b. Description of Dam and Appurtenances

Samp Mortar Reservoir Dam consists of concrete and earth embankment structure with a total length of 320 feet including a 185 foot long ogee-shaped overflow spillway.

The maximum structural height, according to existing plans is 29 feet for the concrete sections abutting the spillway. The existing plans do not indicate the existence of bedrock. State of Connecticut files indicate the foundation is located on bedrock.

Appurtenant structures consist of a concrete spillway, spillway channel and an outlet works structure. The spillway section consists of a 185 foot wide ogee-shaped overflow weir with crest elevation of 68 feet.

The outlet works consist of a service gate chamber containing two 24 inch gates which control intake. Intake gates are approximately at elevations 56 and 39 feet and the discharge pipe from the chamber is approximately at elevation 39 feet. A 30 inch gated pipe which appears to be a blow-off passes through the dam under the gate chamber at elevation 35 feet. All gates are reported to be in operating condition.

Figure 1, located in Appendix B, shows the plan of the dam and its appurtenant structures. Photographs of each structure are shown in Appendix C. Sketches of the dam and its appurtenances are in Appendix D.

c. Size Classifications. Small (hydraulic height - 29 feet high, storage 588 acre-feet) based on storage ($\leq$1,000 to $>$50 acre-feet) as given in Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification. The dam's potential for damage rates it as a high hazard classification. A major breach could result in discharge into Mill River which flows approximately four miles through heavily developed residential areas of Fairfield, Connecticut before entering Long Island Sound. From approximately 5000 to 7000 feet downstream 2 or 3 housing developments are within 5 to 10 feet of the normal flow level on Mill River. A major breach would also cause a flood wave approximately 11 feet high, 2500 feet downstream, 8 feet high for the next 1400 feet downstream and 6 feet for at least the next 1400 feet downstream.

e. Ownership. The dam is owned by:
The Lake Hills Association, Inc.
c/o President
Fairfield, Connecticut

f. Operator. This dam is maintained and operated by the Lake Hills Association, Inc. There is no designated operator.

g. Purpose of Dam. This dam is used for recreation.

h. Design and Construction History. According to available records the dam was constructed in 1901 by the Bridgeport Hydraulic Company. Plans contain the name of S.G. Stoddard, Jr., Engineer.

i. Normal Operating Procedure. No data was disclosed for maintenance of reservoir water levels. Under normal operation the water level of the dam is lowered every three years to elevation 39 feet for maintenance purposes. However, on occasion it is reported that the reservoir has been lowered through the blow-off pipe to elevation 35 feet.

1.3 Pertinent Data

a. Drainage Area. The drainage area tributary to Samp Mortar Reservoir consists of approximately 24.2 square miles of flat and coastal to rolling terrain. In addition to the reservoir, 5 percent of the basin is made up of lake and swamp area. Elevations in the basin range from about 50 feet to 620 feet MSL. Two large water supply reservoirs, Easton and Hemlock,are located within the drainage area. These reservoirs would have an attenuating effect on storm flows.

The reservoir consists of about 40 acres at the normal (top of spillway) pool elevation. Many dwellings are located along the reservoir shores.

b. Discharge at Dam Site

(1) The outlet works for the reservoir consists of two 24 inch intake lines to the service gate chamber at elevations 39.2 and 56.7 feet. Water from the service gate chamber is discharged to the downstream channel from a 24 inch ungated outlet pipe at elevation 39' feet. See plan in Appendix B and sketches in Appendix D.

(2) There are no records of maximum discharge at the dam site, however, in October 1955, a depth of flow of 3.5 feet was measured at the crest of the spillway. This would give a discharge of approximately 3600 CFS.

(3) The spillway capacity with a water surface at the top of dam elevation (72.2') would be approximately 5269 CFS.

(4) The total project discharge at the test flood elevation of 76.1 feet is 16,500 cfs.

c. Elevation (feet above MSL)

(1) Streambed at centerline of dam - 43.2

(2) Maximum tailwater - N/A

(3) Upstream portal invert diversion tunnel - N/A

(4) Recreation pool - N/A

(5) Full flood control pool - N/A

(6) Spillway crest (permanent spillway) -68.0

(7) Design surcharge - unknown

(8) Top dam - 72.2

(9) Test flood surcharge - 76.1

d. Reservoir (miles)

(1) Length of maximum pool - 1.9

(2) Length of recreational pool - 1.9

(3) Length of flood control pool - N/A

e. Gross Storage (acre-feet)

(1) Recreation pool - 333

(2) Flood control pool - N/A

(3) Spillway crest pool - 333

(4) Top of dam - 588

f. Reservoir Surface (acres)

(1) Recreation pool - N/A

(2) Flood control pool - N/A

(3) Spillway crest - 40

(4) Test flood pool - 92

(5) Top dam - 59

g. Dam

(1) Type - Concrete and earth embankment.

(2) Length - 320 feet

(3) Height - 29 feet

(4) Top width - 8 feet- spillway section, 7.5 feet- abutment section.

(5) Side slopes - Upstream: Vertical
Downstream: Variable

Downstream:

(6) Zoning - Unknown

(7) Impervious core - Unknown

(8) Cutoff - Unknown

(9) Grout curtain - Unknown

(10) Other - Unknown

h. Diversion and Regulating Tunnel. A 30 inch gated pipe passes through the dam below the gate chamber at approximately elevation 35 feet.

i. Spillway

(1) Type - Ogee-shaped concrete overflow weir

(2) Length of weir - 185 feet

(3) Crest elevation - 68.0

(4) Gates - None

(5) Upstream channel - Underwater

(6) Downstream channel - Concrete with concrete training walls.

j. Regulating Outlets. The reservoir can be drained by an ungated 24 inch valve from the gate chamber at elevation 39.2 feet. It can also be drained by a 30 inch pipe that passes below the gate chamber set at approximately elevation 35 feet. This pipe is controlled by a gate valve located in the embankment with controls in the gate chamber house.

SECTION 2
ENGINEERING DATA

2.1 Design

This dam was constructed in 1901 for water supply purposes. Two drawings dated 1901 and bearing the name S.G. Stoddard, Jr., engineer show plan and cross section through the gate chamber. No in-depth engineering data were found for this dam.

2.2 Construction

No construction records were available for use in evaluating the dam.

2.3 Operation

No engineering operational data were disclosed.

2.4 Evaluation

a. Availability. Other than the set of plans described above, no additional engineering data was found to be available except for periodic inspection reports.

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, past performance history and sound engineering judgment.

c. Validity. The field investigation indicated that the external features of Samp Mortar Reservoir Dam substantially agree with those on the available plans.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The field inspection of Samp Mortar Reservoir Dam was made on December 20, 1978. The inspection team consisted of personnel from Philip W. Genovese & Associates, Inc. and Geotechnical Engineers, Inc. Representatives of the Lake Hills Associates, Inc. were also present during portions of the inspection. Inspection checklists, completed during the visual inspection are included in Appendix A. At the time of the inspection, the water level was approximately 0.14 feet above the permanent spillway elevation. Water was passing over the spillway. The upstream face of the dam could only be inspected above this water level.

b. Dam. The dam consists of an ogee-shaped overflow spillway section about 185 feet long abutted by concrete and earth embankment sections with a total length of approximately 135 feet. The crest is at elevation 72.2 feet according to field surveys.

According to the records, the foundation is on bedrock. The appearance of bedrock outcrops at several locations is consistent with the records in this respect.

Left Abutment - The left side of the dam consists of a concrete abutment section bordered downstream by an earth embankment that intersects the natural ground. It is difficult to determine the junction of the earth embankment and natural ground. The earth embankment and natural ground will be referred to as the left abutment in the following descriptions. The right side of the left abutment is formed by the left concrete training wall of the spillway (Photo 8).

The left abutment is generally covered by grass, trees, and tall weeds, but soil is exposed in some areas. (Photos 2 and 3). As shown in Photos 4 and 5, several pedestrian paths have been eroded in the left abutment. Considerable erosion has occurred at the junction of the concrete section and left abutment.

At the toe of the left abutment next to the training wall, there is a 24 inch and 30 inch exit pipe (Photo 7). A seepage zone was also observed at the end of a short masonry wall located left of the training wall. (Photo 6). These two seepage areas had a rust-colored appearance, but no fines were observed in the water. Several seepage areas were observed in the left abutment left of the training wall and about 4 - 5 feet above the toe of the left abutment. The ground was wet and soft in these areas, and water was flowing. Some erosion has occurred in these seepage areas.

Right Abutment - Similar to the left side of the dam, the right side of the dam consists of a concrete abutment section bordered downstream by an earth embankment and natural ground (Photo 9). The earth embankment and natural ground will be referred to as the right abutment in the following descriptions. The left side of the right abutment is formed by the right concrete training wall of the spillway (Photo 8).

The right abutment is generally covered with grass and tall weeds and a few trees (Photo 1). Some paths have been eroded in the right abutment, and considerable erosion has occurred at the junction of the concrete section and the right abutment. As shown in Photos 14 and 16, soil has eroded and sloughed from the right abutment onto the top of the training wall.

A seepage zone was observed in the right abutment about 25 feet downstream of the right training wall (Photo 13). The area had a rust colored appearance. As shown in Photos 9 and 15, seepage is occurring through the right training wall at an apparent construction joint.

c. . Appurtenant Structures. Visual inspection of the concrete spillway, spillway channel and outlet works did not reveal any evidence of stability problems. The spillway section was under water and could not be observed. The concrete surface of the spillway training walls is cracked and showed some staining and florescence. The horizontal section of the right training wall has been capped with concrete to a height of approximately 18 inches as seen in Photo 9.

The spillway shown in Photos 1 and 11 consists of an ogee-shaped overflow concrete structure with concrete training walls. The concrete spillway surface was under water and not visible. A protective fence is located on the weir crest (as shown in Photo 1), to protect recreational users from being swept over the spillway.

The outlet works consists of a service gate chamber with two gate valves on the intake conduits. As the intake structure was below water, it was not inspected. The intake conduits are located at elevations 39.2 feet and 56.7 feet. The discharge conduit from the gate chamber is located at elevation 39.2 feet. All parts of the gate chamber that could be inspected appeared to be in good condition. A 30 inch conduit passes under the gate chamber at elevation 35.7 feet and is gated. This pipe appears to be a blow-off. The spillway discharge channel was under water and was not visible. All gates were reported to be in operating condition.

d. Reservoir Area. The reservoir area has flat and coastal to rolling terrain, partially wood covered. A more detailed description of the drainage area is included in Section 1.3 of this report. There is development observed along the shoreline as seen in the overview photo.

e. Downstream Channel. The downstream channel from the spillway is as wide as the spillway for a distance of about 50 feet downstream of the spillway as shown in Photo 1. From this point, the channel consists of a stream channel and contains rocks and fallen trees. Numerous trees and bushes are growing in the channel as seen in Photos 10 and 12.

Water from the 24 inch and 30 inch pipes exits along the toe of the left abutment. Some erosion has evidently been caused by the water flowing along the abutment.

3.2 Evaluation

Visual examination indicates that the dam is in fair condition. The inspection revealed the following:

a. There are erosion paths and zones on the left and right abutments.

b. Trees growing on the left and right abutments can create a future seepage problem. The tree roots can provide seepage paths if the trees are allowed to grow without limit.

c. Several seepage zones were observed on the left and right abutments including the right training wall.

d. Water from the 24 and 30 inch pipes exits along the toe of the left abutment causing erosion of the left abutment.

e. Numerous trees are growing in the downstream channel of the spillway which could increase tailwater.

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedure

The dam creates an impoundment of the water which is used primarily for recreational purposes.

4.2 Maintenance of Dam

According to the Lake Hills Associates, Inc. the water level is lowered every three years for the purpose of maintenance. Maintenance of the embankment is inadequate.

4.3 Maintenance of Operating Facilities

Maintenance on the operating facilities is done on an as required basis.

4.4 Description of Warning Systems

There are no warning systems in effect at this facility.

4.5 Evaluation

The current operating and maintenance procedures for the dam are inadequate.

SECTION 5
HYDROLOGY AND HYDRAULIC ANALYSIS

5.1 Evaluation of Features

Samp Mortar Reservoir Dam consists of a 320 foot long concrete and earth embankment dam including a 185 foot long ogee-shaped concrete overflow spillway. The maximum structural height of the dam is 29 feet. Appurtenant structures other than the spillway include the spillway channel and an outlet works. The spillway weir is located at elevation 68 feet. The outlet works consists of a gate chamber, two intake conduits and one outlet conduit. The intakes are gated and located at elevations 39.2 and 56.7 feet. The outlet conduit to the gate chamber is ungated and located at elevation 39 feet.

Also, a 30 inch gated conduit which appears to be a blow-off runs through the embankment below the gate chamber at approximately elevation 35.7 feet. Control for the valve is in the gate house.

Samp Mortar Reservoir Dam is classified as being small in size having a maximum storage of 588 acre-feet.

Two large water supply reservoirs, Easton and Hemlock, are located in the drainage area of Samp Mortar Reservoir and would have an attenuating effect on storm flows in this area.

a. Design Data. No hydrologic or hydraulic design data were disclosed for this dam.

b. Experience Data. The maximum discharge at this dam site is unknown. The maximum observed condition was reported to be 3.5 feet over the spillway or about 3600 cfs.

c. Visual Observations. No evidence of damage to any portion of the project from overtopping was visible at the time of the inspection.

d. Test Flood Analysis. As no detailed design and operational information are available, hydrologic evaluation was performed using dam information gathered by field inspection, watershed size and an estimated test flood equal to the Probable Maximum Flood (PMF) as determined by guide curves issued by the Corps of Engineers. Based on a drainage area of 24.2 square miles, it was estimated that the test flood flow at this dam would be 16,940 cfs. Following the guidance for Estimating Effect of Surcharge Storage on Maximum Probable Discharges results in a test flood discharge of 16,500 cfs. The maximum spillway capacity with the reservoir at the top of the dam is 5270 cfs or 32% of

the test flood discharge. A full test flood would overtop the dam by 3.9 feet. A test flood equal to 1/2 PMF would have an inflow of 8470 cfs and a peak outflow of 8220 cfs overtopping the dam by 1.2 feet.

e. Dam Failure Analysis. The impact of failure of the dam at maximum pool (top of dam) was assessed using the "Rule of Thumb" Guidance for Estimating Downstream Dam Failure Hydrographs issued by the Corps of Engineers.

A major breach of dam would result in discharge into Mill River which flows approximately four miles through a high density suburban area of Fairfield, Connecticut before entering Long Island Sound. Between 5000 and 7000 feet downstream of the dam are 2 to 3 residential developments that are within 5 to 10 feet of normal Mill River level.

Downstream flood stages for various distances that probably would result from a major breach are as follows:

Downstream Reach (in feet downstream of dam)	Flood Stage in feet
1700	11.25
2500	11.0
3900	8.0
5300	6.0

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations. The visual examination did not disclose any immediate stability problems. Routine maintenance should be sufficient to prevent any long-term problems. Areas where erosion occurs should be maintained to avoid potential future problems.

b. Design and Construction Data. Limited design drawings are available for the dam. They include general information regarding the dam and the appurtenances. This information is not sufficient to assess the stability of the dam and the safety must be judged primarily from visual observations.

c. Operating Records. No operating records pertinent to the structural stability of the dam were available.

d. Post Construction Changes. Since original construction was completed in about 1901, no changes or additions have been made to the site other than increasing the height of the right training wall which has increased the stability of the right abutment.

e. Seismic Stability. The dam is located in Seismic Zone 1, and in accordance with recommended Phase I guidelines does not warrant seismic analysis.

SECTION 7
ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. The visual examination indicates that the dam is in fair condition. The inspection revealed:

(1) There are erosion paths and zones on the left and right abutments.

(2) Trees growing on the left and right abutments can create a future seepage problem. The tree roots can provide seepage paths if the trees are allowed to grow without limit.

(3) Several seepage zones were observed on the left and right abutments.

(4) Water from the 24 inch and 30 inch pipes exits along the toe of the left abutment resulting in erosion of the left abutment.

(5) Numerous trees are growing in the downstream channel of the spillway.

b. Adequacy of Information. 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, past performance history and sound engineering judgment.

c. Urgency. This dam is in fair condition. The recommendations and remedial measures described in Sections 7.2 and 7.3 should be accomplished within one year after receipt of this Phase I Inspection Report by the owner.

d. Need for Additional Investigation. The findings of this inspection indicate that there is no need for additional investigations.

7.2 Recommendations

Based on the findings of the visual inspection and hydrologic and hydraulic analysis, additional hydrological studies are required as the existing spillway passes only 32% of the test flood. In addition, some of the remedial measures recommended will require engineering input, analysis and design.

a. A program for monitoring of the seepage observed along the left and right abutments of the dam should be implemented. Monitoring should be visual to evaluate the turbidity of the water and also photographic evidence would provide a record to suggest whether there are substantial changes in the volume or in the size of the wet areas from one inspection to another. Presence of suspended solids in the water or substantial changes in flow not related to changes in reservoir level should be considered as indications of a critical condition.

b. Trees and bushes on the left and right abutments should be cut. The stumps of the trees should be removed after a procedure has been developed for removing these stumps by a professional engineer. Tree roots should be replaced with proper backfill.

c. Suitable riprap protection should be placed in the areas of the abutments where seepage is occurring. Riprap protection should also be placed along the toe of the left abutment to prevent erosion of the abutment when water is discharged through the two exit pipes.

d. The spillway section should be inspected at low-flow or draw down condition.

7.3 Remedial Measures

a. Grass should be planted on the abutments after the trees have been removed and the surfaces repaired. Also, eroded areas should be properly filled and grass planted on abutments.

b. The owner should properly maintain the areas of the abutments.

c. The trees, brush and debris in the downstream channel should be removed.

d. Provisions should be taken to prevent trespassing on the left and right abutments.

e. An operational procedure and formal warning system for emergency conditions should be established.

f. An annual technical inspection program should be developed.

7.4 Alternatives

There are no practical alternatives to the recommendations in Sections 7.2 and 7.3

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT Samp Mortar Reservoir Dam

DATE December 20, 1978

TIME 0900

WEATHER 25° and cloudy

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

PARTY

1. Bob Jones Party Chief
2. Don Ballou Hydraulics/Hydrology
3. Richard Murdock Geotechnical
4. Steve Whiteside "

PROJECT FEATURE	INSPECTED BY	REMARKS
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

PERIODIC INSPECTION CHECKLIST

PROJECT: Samp Mortar Reservoir Dam DATE December 20, 1978

PROJECT FEATURE Concrete Structure NAME

DISCIPLINE NAME

	AREA EVALUATED	CONDITION
	CONCRETE STRUCTURE	Ogee Weir
	Crest Elevation	
	Current Pool Elevation	
	Maximum Impoundment to Date	
GEI	Surface Cracks	Underwater, none observed
GEI	Pavement Condition	N/A
GEI	Movement or Settlement of Crest	Underwater, none observed
GEI	Lateral Movement	None observed
GEI	Vertical Alignment	None observed
GEI	Horizontal Alignment	None observed
GEI	Condition at Abutment and at Concrete Structures	Erosion at junction of concrete abutment and natural ground abutment
GEI	Indications of Movement of Structural Items on Slopes	None observed
GEI	Trespassing on Slopes	N/A
GEI	Sloughing or Erosion of Slopes or Abutments	Erosion evident on downstream side of abutment. Steep-sided abutment.
GEI	Rock Slope Protection- Riprap Failures	No riprap observed
GEI	Unusual Movement or Cracking at or Near Toe	Underwater, not observed
GEI	Unusual Embankment or Downstream Seepage	Several Seepage zones on banks of left and right abutments downstream of dam.
GEI	Piping or Boils	None observed
GEI	Foundation Drainage Features	None observed
GEI	Toe Drains	None observed
GEI	Instrumentation System	None observed
GEI	Vegetation	Trees, bushes and grass on left and right abutments

PERIODIC INSPECTION CHECKLIST

PROJECT: Samp Mortar Reservoir Dam DATE December 20, 1978

PROJECT FEATURE Dike Embankment NAME

DISCIPLINE NAME

	AREA EVALUATED	CONDITION
	DIKE EMBANKMENT	
	Crest Elevation	Not applicable
	Current Pool Elevation	
	Maximum Impoundment to Date	
GEI	Surface Cracks	
GEI	Pavement Condition	
GEI	Movement or Settlement of Crest	
GEI	Lateral Movement	
GEI	Vertical Alignment	
GEI	Horizontal Alignment	
GEI	Condition at Abutment and at Concrete Structures	
GEI	Indications of Movement of Structural Items on Slopes	
GEI	Trespassing on Slopes	
GEI	Sloughing or Erosion of Slopes or Abutments	
GEI	Rock Slope Protection-Riprap Failures	
GEI	Unusual Movement or Cracking at or Near Toes	
GEI	Unusual Embankment or Downstream Seepage	
GEI	Piping or Boils	
GEI	Foundation Drainage Features	
GEI	Toe Drains	
GEI	Instrumentation System	
GEI	Vegetation	

PERIODIC INSPECTION CHECKLIST

PROJECT: Samp Mortar Reservoir Dam DATE December 20, 1978

PROJECT FEATURE Outlet Works - Intake NAME

DISCIPLINE NAME

	AREA EVALUATED	CONDITION
	OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
	a. Approach Channel	Underwater - Not observed
GEI	Slope Conditions	
GEI	Bottom Conditions	
GEI	Rock Slides or Falls	
	Log Boom	
	Debris	
	Condition of Concrete Lining	
GEI	Drains or Weep Holes	
	b. Intake Structure	
	Condition of Concrete	
	Stop Logs and Slots	

PERIODIC INSPECTION CHECKLIST

PROJECT: Samp Mortar Reservoir Dam DATE December 20, 1979

PROJECT FEATURE Outlet Works-Control Tower 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	
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System	

PERIODIC INSPECTION CHECKLIST

PROJECT: Samp Mortar Reservoir Dam DATE December 20, 1978

PROJECT FEATURE Outlet Works- Transition NAME

DISCIPLINE NAME

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

PERIODIC INSPECTION CHECKLIST

PROJECT: Samp Mortar Reservoir Dam DATE December 20, 1978

PROJECT FEATURE Outlet Works - Channel NAME

DISCIPLINE NAME

	AREA EVALUATED	CONDITION
	OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
	General Condition of Concrete	
	Rust or Staining	
	Spalling	
	Erosion or Cavitation	
	Visible Reinforcing	
	Any Seepage or Efflorescence	
	Condition at Joints	
GEI	Drain Holes	None observed
GEI	Channel	
GEI	Loose Rock or Trees Overhanging Channel	Trees overhanging channel
GEI	Condition of Discharge Channel	Fair. Water exits close to left abutment.

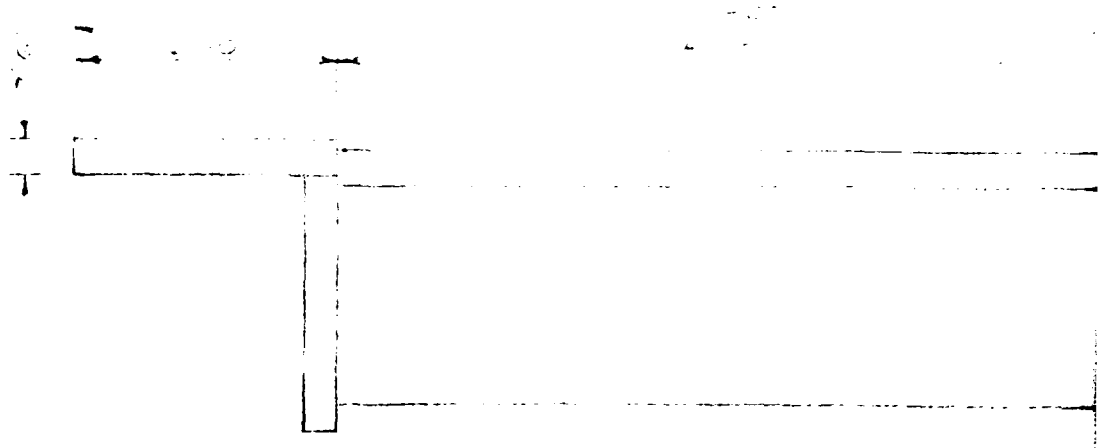
PERIODIC INSPECTION CHECKLIST

PROJECT: Samp Mortar Reservoir Dam DATE December 20, 1978

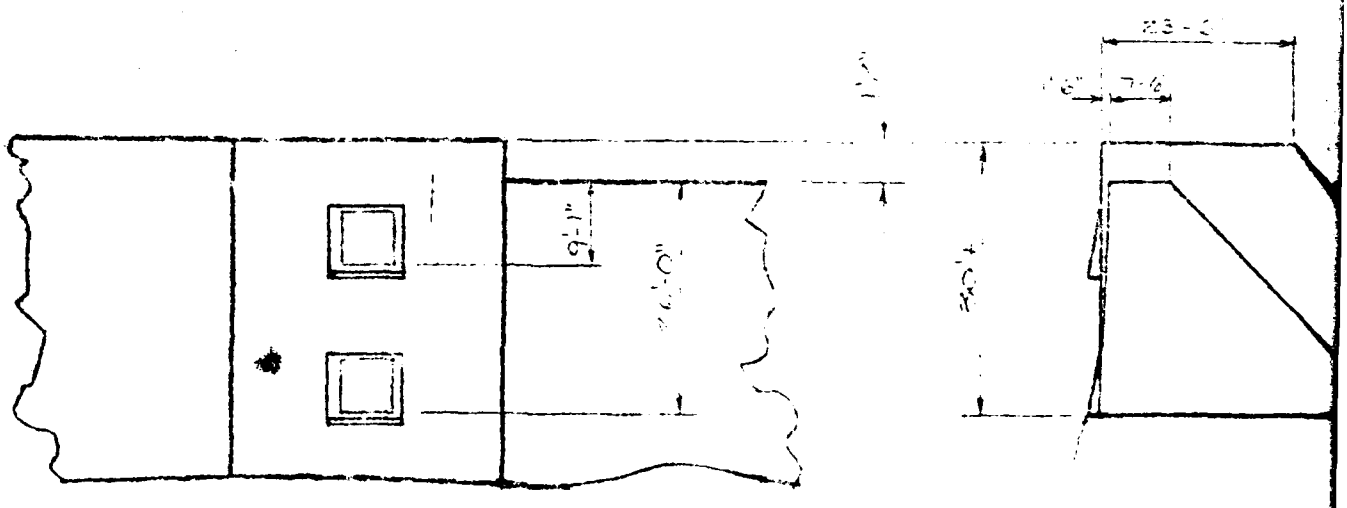
PROJECT FEATURE Outlet Works - Spillway NAME

DISCIPLINE NAME

	AREA EVALUATED	CONDITION
	OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	See page 2
	a. Apprach Channel	Underwater, not observed
GEI	General Condition	
GEI	Loose Rock Overhanging Channel	
GEI	Trees Overhanging Channel	
GEI	Floor of Approach Channel	
	b. Weir and Training Walls	
	General Condition of Concrete	
	Rust or Staining	
	Spalling	
	Any visible Reinforcing	
	Any Seepage or Efflorescence	
GEI	Drain Holes	Weep holes in right training wall of spillway. Seepage observed through weep holes and construction joint in concrete.
	c. Discharge Channel	
GEI	General Condition	Fair
GEI	Loose Rock Overhanging Channel	Yes
GEI	Floor of Channel	Rocks, fallen trees. Trees and bushes growing in channel.
GEI	Other Obstructions	
GEI	Trees Overhanging Channel	Yes

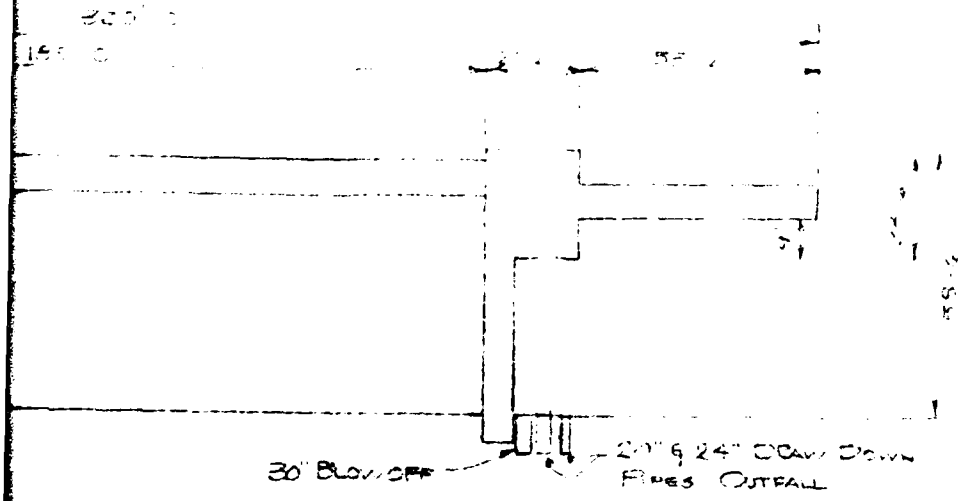


PLAN OF DAM
1" = 40'

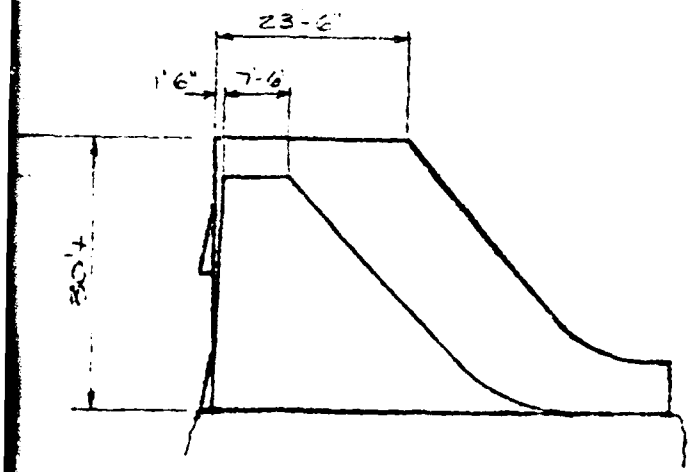


UPSTREAM ELEVATION OF CONTROL HOUSE SHOWING SCREENS (SCREENS 6' SQUARE)

CROSS SECTION



N OF DAM
1" = 40'



NOTES:
1. DRAWING OBTAINED FROM OWNER.
2 DATUM UNKNOWN.

CROSS SECTION THRU SPILLWAY
ENCLOSING ABUTMENT WALL

PHILIP W. GENOVESE & ASSOCIATES, INC. ENGINEERS HAMDEN, CONNECTICUT	U.S. ARMY ENGR DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS SAMP MORTAR RES. DAM	
	DATE 1979

2

CLARENCE BLAIR ASSOCIATES, INC.

Civil and Sanitary Engineers and Surveyors

P. O. Box 236 93 Whitney Avenue New Haven, Conn. 06502

Telephone (203) 777-7379

JOHN M. BREST
NICHOLAS PIPERAS, JR.
ROBERT H. MANSFIELD
THOMAS M. KEYES
STANLEY R. GOLEBIEWSKI
MICHAEL H. HORBAL

June 25, 1976

Mr. Ralph Cafiero, President
Lake Hills Association, Inc.
462 Nonopage Road
Fairfield, Conn. 06430

Re: Samp Mortar Lake Dam

Dear Mr. Cafiero:

On May 14,1976 I inspected the Samp Mortar Lake Dam in Fairfield, Connecticut in the company of Mr. Roger C. Brown. Mr.Brown had inspected the dam and written a report on its condition in January of 1965. Although Mr. Brown is retired, he consented to go along with me, and he was a great help.

At the time of our inspection of the dam, the blowoff was open and the level of the lake was approximately 5 feet below the top of the spillway. Thus it was possible to see the entire downstream face of the dam.

The concrete surface of the spillway appeared to be in good condition. There was a very small amount of seepage from one or two horizontal construction joints near the east end of the dam, but there was no evidence of erosion. In my opinion the seepage would pose no threat to the safety of the structure.

Mr. Brown had reported on a leak which was located near the west end of the spillway about half way up from the toe. This leak had caused some erosion of the concrete face of the dam. The concrete has been patched in this area and leakoffs have been installed. The patch appears to be in good conditon, and the leakoffs seem to be working.

The west wing wall of the dam has been raised approximately 24 inches, and weepholes have been installed. This added height serves to halt any erosion along this embankment.

The east wing wall was in good condition except for a small amount of seepage which was emerging from a crack near the junction of the wing wall and the gate house. Again, I feel that this slight seepage will not harm the structure.

Due to the fact that the blowoff pipe was running full, I was not able to check on any seepage which might have been coming out below this pipe. There was no visible seepage from the bank above this pipe.

The concrete work over the rest of the structure was in good condition. The few cracks which were visible appeared to be surface cracks, and do not affect the safety of the structure.

Mr. Brown had reported in 1965 that the spillway capacity had been adequate for the October, 1955 flood and that he thought it was still adequate. I see no reason to dispute his conclusion.

I would summarize the results of our inspection as follows-----

The dam is reported to be 75 years old and shows no evidence of appreciable leakage through the concrete or embankments.

The repairs which have been made since 1965 were well done and have improved the condition of the dam.

The seepage which was observed at the east wing wall is not of sufficient volume to be significant.

I personally inspected the Samp Mortar Dam on May 14,1976 and it is my professional opinion that it is in a safe condition.

Very truly yours,

CLARENCE BLAIR ASSOC., Inc.

Robert H. Mansfield

Robert H. Mansfield

RHM/lm
cc: Damen Assoc., Inc.

INTERDEPARTMENT MAIL

DATE: April 5, 1

TO: File

DEPARTMENT: Water & Related Resources

FROM: Victor F. Galgowski, Supt. of Dam Maintenance

DEPARTMENT: Water & Related Resources

SUBJECT: Swamp Mortor Reservoir, Fairfield 3 ML4.9

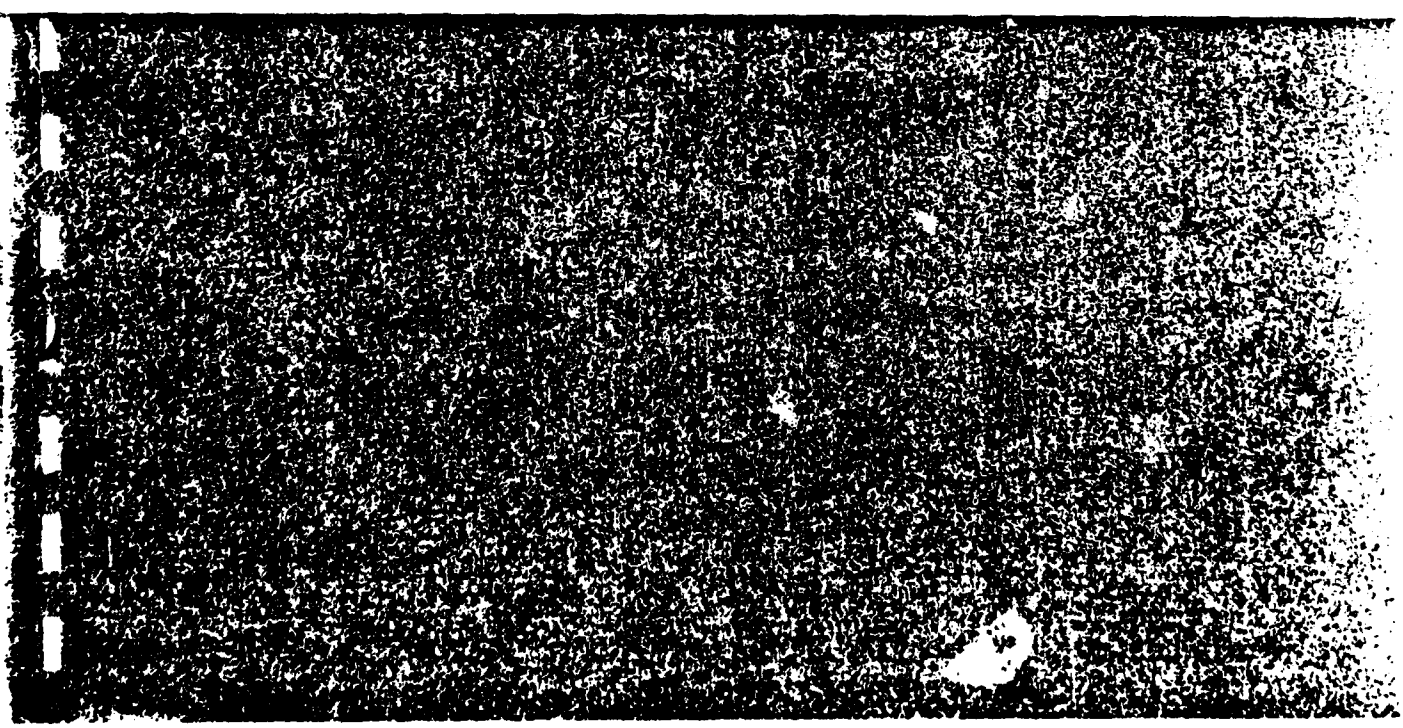
This site was inspected on March 7, 1972 by the undersigned. Numerous checks and cracks with a calciforous type of material oozing from them were noted on the spillway abutments. This condition does not appear to be very serious at the present time.

Slight eroding of the embankment was taken place at the west end of the dam.

Approximately 3 inches of water was flowing over the dam.

Victor F. Galgowski
Supt. of Dam Maintenance

VFG:ljg



MUESER · RUTLEDGE · WENTWORTH · & · JOHNSTON
Consulting Engineers
415 MADISON AVENUE
NEW YORK, N. Y. 10017
212-ELDORADO 5-4800
DANAROMIEL, NEW YORK

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ROBERT C. JOHNSTON
SALVATORE V. DESIMONE
Partners

JAMES D PARSONS
Senior Associate
JAMES P. GOULD
NICHOLAS W. KOZIAKIN
ELMER A. RICHARDS
MAX BERNHEIMER
GEORGE L. MOORE
Associates

October 23, 1968

Mr. Leonard C. Prentice, President
Lake Hills Association, Inc.
P.O. Box 1011
Fairfield, Connecticut 06430

RE: SAMP MORTAR LAKE DAM

Dear Mr. Prentice:

In accordance with your acceptance on August 15, 1968 of our proposal letter dated July 23, 1968, we have made a general examination of the Samp Mortar Lake Dam. We report herein our findings and conclusions.

The dam site was visited by Dr. Philip C. Rutledge on May 13, 1967 and a detailed inspection was made by our Mr. Peter H. Edinger on September 17, 1968. Though this report is primarily concerned with the latter inspection, we have appended a copy of Dr. Rutledge's letter to the Lake Hills Association dated May 15, 1967 covering his observations and recommendations in order to furnish a complete record of our work. To illustrate this report, six photographs selected from a group taken on September 17, 1968 are included on Plate No. 1.

You had furnished us with prints of two old drawings of the dam and a copy of a letter report from Clarence Blair Associates, Inc. to the Lake Hills Association dated January 6, 1965 covering a dam inspection made by that organization. We contacted Mr. Loiselle of the Bridgeport Hydraulic Company to inquire if they had further data on the dam, particularly on foundation conditions. Mr. Loiselle informed us that all data in their files has been turned over to the Lake Hills Association. It is his recollection that these included a drawing on which notes concerning foundation conditions encountered during construction had been made. We understand that you have been unable to locate that document, or reports on dam inspections made in 1957 and 1963 mentioned in the Clarence Blair Associates' letter.

Prior to our inspection of September 17, 1968 you had drawn the lake level down to about 10 feet below the spillway crest to facilitate the inspection. Drawdown had been accomplished and was being maintained by opening the upper gate into the well of the gatehouse, which drains into the tailwater pool through a 24" pipe. Observations made on September 17, 1968 are summarized in the following paragraphs.

OBSERVED CONDITIONS

The east abutment wall of the dam includes the gatehouse structure. There are a few vertical cracks in the gatehouse structure on the upstream side and at the crest of the dam which are up to 1/4 inch wide. These were patched above normal water level at one time, but the cracks now show through the patching. A view of the upstream side of the gatehouse is included on Plate No. 1. The east abutment wall below the gatehouse has some surface cracks and minor seepage through these is evidenced by damp spots and calcium deposits.

Conditions at the toe of the east abutment were masked by flow from the discharge pipe. A portion of the natural earth slope adjacent to the toe of the abutment has sloughed back to a near vertical face 5 or 6 feet high over a small area, which may be the result of seepage at the toe. Some distance downstream runoff has cut a gully up to about 2 feet deep down the slope. Neither the sloughing nor the gully represent an immediate threat to the safety of the dam, but they are conditions that could become progressively worse with the passage of time.

The upstream face of the dam, where it could be observed above the pool water level, and the crest of the spillway are in excellent condition. Two photographs taken along the spillway crest are included on Plate No. 1. The spillway crest and downstream face show no significant erosion of the concrete except at a point in the face immediately adjacent to the west abutment. At this point, there is leakage through a horizontal crack, apparently a construction joint, for a width of about eight feet. The crack is located at about the midpoint of the dam height, and erosion of the concrete below the crack has occurred to a maximum width of about one foot and to a maximum depth of about six inches. A photograph of the crack is included on Plate No. 1. The actual flow of water through the crack is small. This crack was noted in Clarence Blair Associates' 1965 report, and it appears to have enlarged since that date.

Some very minor leakage through joints in the downstream face at a few scattered locations is indicated by dampness or calcium deposits on the face; and there is minor erosion along joints at some locations. These are not significant defects.

There is a horizontal crack in the west abutment wall at the same elevation as the eroded crack in the spillway face mentioned previously. At one point along this crack sufficient concrete has spalled off and exposed what appears to be mesh reinforcing. There are some additional minor surface cracks in the wall similar to those in the east abutment wall.

Seepage from the west slope exists just above tailwater level at the toe of the west abutment, and at a point adjacent to the abutment wall at a somewhat higher elevation. The latter seep spills over the foot of the abutment wall as shown in a photograph on Plate No. 1. At the toe of the west abutment, the soil through which the seepage occurs is slightly quaky and most of the fines have been washed out leaving a pavement of gravel. A photograph of the seep at the toe is also included on Plate No. 1. The seepage at the west abutment does not appear to be causing significant erosion of the soil at this time.

The tailwater pool bottom is paved with boulders and there is no apparent erosion below the spillway or undermining of the apron. Any underseepage that might exist is masked by the tailwater pool and the character of the bottom.

RECOMMENDED REPAIRS

Neither the seepage and sloughing noted at the abutments of the dam nor the eroded crack in the spillway face represent any immediate threat to the safety of the dam. However, those conditions should be treated as soon as practicable in order to prevent continued deterioration.

The more important and most easily accomplished corrective work is at the earth abutments. Where seepage or sloughing of soil has been noted in the earth abutments, each location should be cleared and surface soils scraped off to determine the extent of the area affected. The affected area should be covered by a filter layer of a clean bank-run sand and gravel one to two feet thick in turn covered by a two or three foot thick layer of rock in sizes ranging from about 3 inches to about 18 inches. Such treatment will permit the seepage to continue but should halt any potential future deterioration from seepage effects.

The eroded crack in the spillway face may be difficult to repair permanently since seepage through the dam at this point will tend to build up behind any patch and this pressure combined with possible freezing effects could destroy the patch. We suggest that the water level behind the dam be drawn down to a level below the elevation of the crack

and the upstream end of the construction joint at which the crack occurs caulked. We believe that the best material for patching the eroded portion of the crack on the downstream side would be an epoxy cement compound. We believe that this work can best be done by a firm specializing in the application of epoxy compounds in concrete work. We will be pleased to suggest the names of firms that might be equipped to perform the work if you so desire.

Regarding the condition of the dam foundation, the fact that the dam has performed satisfactorily for 67 years with so little evidence of deterioration is strong, though indirect, evidence that the foundation is sound. We could observe no evidence of effects of settlements or other foundation motions or of detrimental underseepage, except in the abutments previously mentioned. We believe it safe to assume that the foundation for the dam is completely safe.

In conclusion, our visual inspection of the Samp Mortar Lake dam has disclosed no evidence of defects in the dam itself that threaten its immediate safety. The defects that were noted are presently of only minor concern, and will become dangerous only if allowed to deteriorate over a relatively long period of time without treatment. Seepage through and sloughing of soils in both abutments is somewhat more serious and should be corrected as recommended herein within the next year or two.

Very truly yours,

MUESER, RUTLEDGE, WENTWORTH & JOHNSTON

By Philip C. Rutledge
Philip C. Rutledge

PHE/
PCR:lb

A. M. McKENZIE
CIVIL ENGINEER
M. AM. SOC. C. E.

HYDRAULIC
WATER SUP
LAND DEVELO

1300 MAIN S
SOUTH MERIDEN.

May 19, 1965.

Water Resources Commission,
State of Connecticut,
State Office Building,
Hartford, 15,
Connecticut.

Ref: Samp Mortar Reservoir,
Town of Fairfield.

Gentlemen:

As instructed in your letter of May 10 I have looked over the dam forming the above reservoir and have the following comments to make.

As of this date there was just enough water going over the spillway to wet the entire surface so that the cracks visible are at the west end where a chunk of concrete about 5' long, some 12" wide and 4" to 5" deep has fallen out. The only repairs to be seen are a few very small patches on the surface of the spillway toward the west end.

All of the concrete seems to be of not the best quality as evidenced by the many cracks thru some of which water is seeping enough to bring laitance to the surface. There are a number of what appear to be construction joints in the wing walls.

At both ends of the dam there are wing walls about 5' thick extending into the earth fill. Downstream from these wing walls, at about the pool level or just above it, there is considerable seepage coming thru the earth fill, in fact, at the west end there is one small stream coming thru the fill. This is the only item about which I would be concerned. The seepage may be of long standing but I believe it could be stopped by a grout curtain put down against and to an elevation sufficiently below the bottom of the wing walls.

On the upstream side of the dam there is a vertical crack in the wall under the gate house which has been filled with some sort of mastic to within a couple of inches of the water line. This should be filled all the way down.

In my opinion the dam is in reasonably good condition. If the seepage is not stopped that area of the dam should be looked over at least once a year. There will be some photographs in a few days.

Yours very truly

A. M. McKenzie

CLARENCE BLAIR ASSOCIATES
Civil and Sanitary Engineers
93 WHITNEY AVENUE
P. O. BOX 236
NEW HAVEN 2, CONNECTICUT
TEL. 777-7379

ROGER C. BROWN
JAMES C. BEACH
FRANK RAGAINI

CLARENCE M. BLAIR
(1904-1964)

CHARLES E. AUGUR
GORDON BILIDES
JOHN M. BREST
DONALD L. DISBROW
NICHOLAS PIPERAS

January 6, 1965

Mr. John D. Dreyer, President
Lake Hills Association, Inc.
P. O. Box 1011
Fairfield, Connecticut

In Re: SAMP MORTAR LAKE DAM

Dear Sir:

At your request we have made inspections of the Samp Mortar Lake Dam, and report as follows . . .

Samp Mortar Lake Dam is located in the town of Fairfield, on Mill River, about 1.2 miles southerly of the Merritt Parkway and about 0.3 miles westerly of the Black Rock Turnpike. It was formerly a part of the public water supply of the Bridgeport Hydraulic Company and is now owned by the Lake Hills Association, Inc.

Mr. Dreyer made available to us reports on the dam made in 1957 by Dean Clark and in February 1963 by S. E. Muchemore, also a letter from Mr. Loiselle of the Bridgeport Hydraulic Company giving some information from their records concerning the dam.

According to Mr. Loiselle's letter the dam was constructed in 1901, has a spillway 186 feet long and 4 feet deep and impounds 195 million gallons. Bridgeport Hydraulic Company's Hemlocks Reservoir and Easton Reservoir are both on tributaries of Mill River above this dam and overflow from these two reservoirs flows into Samp Mortar Lake. The drainage area tributary to Samp Mortar Lake Dam and below Hemlocks and Easton dams is 7.9 square miles.

Donald Disbrow of our staff inspected the dam on December 18, 1964, accompanied by Mr. Dreyer, and the writer inspected the dam on December 30th 1964 accompanied by Mr. Disbrow.

On December 30th, at the time of our inspection, water was going over the entire length of the spillway crest approximately one half inch deep.

Mr. John D. Dreyer, President
Lake Hills Association, Inc. January 6, 1965

Due to this flow of water over the crest and down the face of the spillway it was not possible to tell whether there were any small leaks emerging from the downstream face of the spillway. However, it was evident that there was no leakage of importance from the spillway face.

At the time of the previous inspection by Mr. Disbrow, less water was going over the crest and leakage was observed at the west end of the spillway. This leakage was emerging from a horizontal opening or crack which evidently was along a horizontal construction joint. The crack extends three or four feet easterly from the westerly abutment and vertically is about midway between the toe and the crest of the spillway. There is some erosion of the concrete face of the spillway along this opening particularly in the area immediately below it.

The amount of water emerging from the opening or crack is only a trickle and although it is unsightly, it constitutes no threat to the safety of the structure.

At the westerly end of the dam there was also some seepage from the bottom of the embankment a few feet south of the dam. This seepage shows up over the top and around the lower end of the low retaining wall which serves as a training wall for the spillway channel at this point.

Some seepage was observed emerging from the toe of the slope of the embankment near the outlet pipes at the easterly end of the dam.

There was also a small trickle of water emerging directly below the 24 inch outlet pipe. This may be leakage from the gate chamber or from a joint in the pipe line. This was the only seepage observed which had any appreciable volume.

Other seepages observed showed no visible velocity or evidence of erosion and in my opinion are no threat to the safety of the structure.

The concrete work in general over the entire structure was in very good condition.

The overflow section appeared to be in good sound condition except for the erroded spot near the west abutment which has been discussed previously in this report. Apparently, some patching work had been done on the downstream face of the spillway as recommended by Mr. Muchemore in his report of February 1963.

Mr. John D. Dreyer, President
Lake Hills Association, Inc.

January 6, 1965

The concrete facing on the spillway abutment walls and on the top of dam was for the most part in very good condition. There was some surface cracking on the exposed face of the westerly abutment wall. These cracks are unsightly but do not affect the safety of the structure.

The spillway according to the Bridgeport Hydraulic Company is 186 feet long by 4 feet deep. We measured the depth at 4'-2". This spillway running full has an estimated discharge of 4800 cubic feet per second.

Previous reports state that during the flood of October 1955, which was the maximum flood of record in that area, the depth over the spillway was 3.5 feet according to Clark and 3 inches below the top of the abutments according to Muchemore.

Regardless of the exact depth over the spillway, it appears that the 1955 flood passed over the spillway with a comfortable margin of safety below the top of the dam. Even if the discharge were such that a few inches of water went over the top of the dam, the condition of the dam and the abutments is such that the safety of the structure would not be threatened.

In summary, the results of our inspection are as follows . . .

The dam is reported to be 63 years old but shows no evidence of appreciable leakage through the concrete.

Seepage which shows below the dam at both ends is not unusual or significant.

I personally inspected the Samp Mortar Lake Dam on December 30th, 196[illegible] and it is my professional opinion that it is in a safe condition.

Very truly yours,

CLARENCE BLAIR ASSOCIATES

Roger C. Brown

Roger C. Brown

RCB:aw

The Lake Hills Association, Inc.

FAIRFIELD, CONN.

September 25, 1963

Stephen E. Muchemore, C.E.
Putnam Road
Greenwich, Connecticut

Dear Mr. Muchemore,

To bring you up to date on the work on our dam, the boys have been diving and using Perma-cement each Sunday and holiday.

The flow through the main pipe is now down to a minute trickle. They have been applying the cement in a very thin solution to fill the walls of the apeture. Then the normal procedure of using the material at a putty-like consistency has been followed.

They plan to take underwater photographs of the area worked on.

They have told me that where the hydrostatic pressure has been greatest, the Perma-cement is breached. This shows as a hole which appears as though a 32 caliber slug has been fired into.

After studying the photographs, they plan to continue the aforementioned processes.

Our Planning Committee has been instructed to arrange for the immediate clearing of both overgrown slopes adjacent to the wing walls.

A prolific infusion of dye marker along the far end of the dam was not discernible on the spillway side. Once the overgrowth is cleared, we will then be able to tell if there is a spring farther down the slope.

A copy of the photographs will ofcourse be sent to you.

Sincerely yours,

Bertram L. Bernstein
Vice-President

BLB:pvb

May 28th 1963

Mr. Bertram L. Bernstein V. P.
Lake Hills Association
85 Tahmore Drive
Fairfield, Connecticut

Re: Samp Mortar Lake Dam
Fairfield Conn.

Dear Mr. Berstein:

On our inspection of the work being done on the upstream face of the above dam on last Saturday May 25th 1963, by the Divers Club of Westport Conn. kindly be advised that this work is approved for proceedure and materials in applying the Perma Cement to the open seams.

The downstream face repairs present a problem of properly filling the open seams in a permanent manner for the full depth of the seam.

In the opinion of the writer the best and most permanent method of sealing the open seams is by using the pressure grout process.

Therefore we recommend that before work is started on the downstream face a meeting be held by all parties concerned to discuss the proceedures for repair of the open seams in this face that will meet with the approval of the Water Resources Commission.

Respectfully submitted
Steve Muchemore
Steve Muchemore C. E.

SEM/af
cc
Water Resources Commission
Extra copy for the Contractor

te of Connecticut
ater Resources Commission
State Office Building
Hartford 15 Connecticut

Feb 21 1963

REPORT ON
SAMP MORTAR LAKE DAM M. L. 4. 9
TOWN OF FAIRFIELD CONNECTICUT

In compliance with your instructions of Feb 5th 1963 the writer on Feb. 15th 1963 and made a complete inspection of the Samp Mortar Lake Dam.

Dam: Concrete O. G. overflow design gravity dam. with masonry facing, 26'-0" high, 185'-0" between abutments with a 4'-2" freeboard at the abutmants.

Foundation: Ends of dam anchored into ledge rock with a stream bed of sand and gravel.

Pond Data: Area 48 acres, width 200'-0" , length 10, 000 feet.

History: The 1955 flood was 3" below topof abutments at peak of flood estimated at 3, 600 c. f. s., estimated 100 year flood 3, 740 c. f. s. estimated capacity of spillway 4, 400 c. f. s.

Water shed : slightly populated Area 7. 91 sq. miles

Drainoff : One - 30 inch and one 42 inch pipe with valve controls

Pond use : Recreation

Location Dam : 1/4 mile west of Conn. Route 58 on Samp Mortar Drive. One mile south of Merritt Parkway

Owner of Dam : Lake Hills Association
Att. Mr. Robert Norton President
236 Nonopage Road
Fairfield, Connecticut

REPORT ON
SAMP MORTAR LAKE DAM M. L. 4.9
FAIRFIELD, CONNECTICUT

Inspection requested by: Mr. Earl Rush Planning Director
Town Planning & Zoning Commission
Town of Fairfield Connecticut

Reason for inspection of Dam : No 1, structural condition of the dam. No. 2 Proposed large land development on the west shore of Samp Mortar Lake on a very irregular terrain with outcroppings of ledge rock that would have to be blasted for construction, One new bridge about 300'-0" below spillway of Dam.

Observations : There was about 1/10 th of an inch of water going over the spillway, however we were able to observe the downstream fac of the Dam and the abutments as well as the river bed below the Dam. There are indications of minor deterioration on the face of the Dam and abutments, We could not ascertain any leaks in the concrete Dam/ The river bed below the dam and spillway showed no signes of percolation this was also true at the abutments. The Drawoff Screens were completely closed with ice and we could not ascertain their condition.

Recommendations : This Dam should be inspected with the water height is about 15or 20 feet.

1. Maintenance work should be started this spring on sealing up the crackes and joints of the downstream face and the spillway of the Dam.

2. We would recommend that the drawoff screens be carefully checked and repainted.

3. The downstream channel should be cleared of debris and shrub growth.

REPORT ON
SAMP MORTAR LAKE DAM M. L. 4.9
TOWN OF FAIRFIELD CONNECTICUT

An estimated cost of repair and maintenance work on this Dam is $ 525.00 Dollars. 85 % of the noted cost is for cutting out cracks and joints and repointing.

In regard the possibility of blasting on construction on the proposed construction in the vicinity of the Dam I informed Messrs Rush and Bakshi of the Town Plan & Zoning Comm. of Fairfield Conn. whom I visited after the inspection that care would have to be taking to prevent disturbing the Dam foundations and that we would recommend that all blasting to be kept at least 100.00 feet from the Dam and that a qualified blasting engineer supervise the work to prevent damage to the Dam.
The proposed bridge would have to meet the requirements of the Water Resources Commission for size of the channel.

Respectfully submitted.
Steve Muchemore C. E.

STATE OF CONNECTICUT

STATE BOARD FOR THE SUPERVISION OF DAMS

STATE OFFICE BUILDING · HARTFORD 15, CONNECTICUT

Report for Dam Construction

April 15, 1957
2 Sachem Road
Greenwich, Conn.

R. H. Cunningham, Jr., President
The Lake Hills Association
Fairfield, Conn.

Dear Mr. Cunningham:

As promised you sometime ago I made an inspection of the Samp Mortor dam on February 23. Enclosed is a print showing general dimensions of the dam and a print giving other pertinent data.

This dam, built by the Bridgeport Hydraulic Company in 1901, is a very heavy section. The spillway portion is all on solid rock and there is reason to believe that the structure is entirely safe. Periodic inspection and routine maintenance should be made to keep in proper repair spalled areas to prevent damage to the concrete structure. There was no visable percolation at the base or around abutment walls. The draw off screens were completely closed by debris and these should be kept clear.

You may be interested in the following comments. The spillway has a 4'x2" freeboard which provides a capacity of about 4800 cubic feet per second. At the time of the October 1955 flood it was reported that about 3.5 feet of water was passing over the dam which is equivalent to a volume of around 3600 c.f.s. Consideration of the watershed identified with the Samp Mortor dam itself plus certain portions of observed flows during the 1955 flood passing over both Hemlock and Easton dams, which also pass your dam, indicates an estimated 100 year flood frequency of about 3740 c.f.s. This estimate is close to the volume of the October flood. The mean annual flow at this point is about 1000 c.f.s.

Yours very truly,

Dean Clark

Dean Clark,
Member of the Board

DC:mm
2 encl.

iV

BRIDGEPORT HYDRAULIC COMPANY
BRIDGEPORT 1, CONNECTICUT

Auhust 8, 1956

8/9

Mr. Dean Clark,
2 Sachem Road,
Greenwich, Conn.

Dear Mr. Clark:

You will find on the attached listing information desired covering Samp Mortar Dam and Hemlocks Dam.

If you require any additional information, please feel free to call on us.

Very truly yours,

FRED B. SILLIMAN
President

FBS/mm

Enc.

BRIDGEPORT HYDRAULIC COMPANY

Data relative to Dams and Reservoirs in the Town of Fairfield

		Samp Mortar	Hemlocks
Year Const.		1901	1914
Elev. Dam (M.H.W.)		68.5	230.0
Elev. Spillway (M.H.W.)		64.5	225.0
Area Pond (Acres)		48	437
Storage (M.G.)		195	~~380.1~~ 3
Height -Dam (Ft.)		42	90
Length- Dam (Ft.)		134 *	1100 *
Length -Spillway (Ft.)		186	117
Watershed - Sq. Mi.		7.9 **	4.8 **
	Hemlocks	4.8	Aspetuck 17.0
	Aspetuck	17.0	
	Easton	13.2	
	W. Pequonnock	4.5	
		47.4	

* Figure does not include length of spillway

** Figures represent direct watershed area. To these should be added other areas as shown which may at times be contributory in whole or part

Hemlock - Cribbe Brook to Samp Mortar
Samp Mortar to Mill River - 5.0 sq

A/20/51

The Samp Mortar Reservoir was sold to

Present owner —June 22 , 1951 to The Samp Mortar Lake Co.

Mr. E. F. Lenhart was President of The Samp Mortar Lake Co

Mr. E. F. Lenhart is with the MacDarlen Construction Co. I
Contractors, 452 Brookside Drive, Fairfield, Conn

Fred Silliman – V P – Bpt Hydraulic Co

Send Greenwich School Board report

A/2/51

DATA RELATIVE SAMP MORTAR RESERVOIR

CONST.	1901
ELEV.	64.5 MHW
STORAGE	195 M.G.
WATERSHED	7.91 SQ. MI.
LENGTH	320 FT.
LENGTH SPILLWAY	186'
HEIGHT DAM	42'
DEPTH SPILLWAY	4'
RELEASE PND	48.

4/25/67 – FR

APPENDIX C

PHOTOGRAPHS

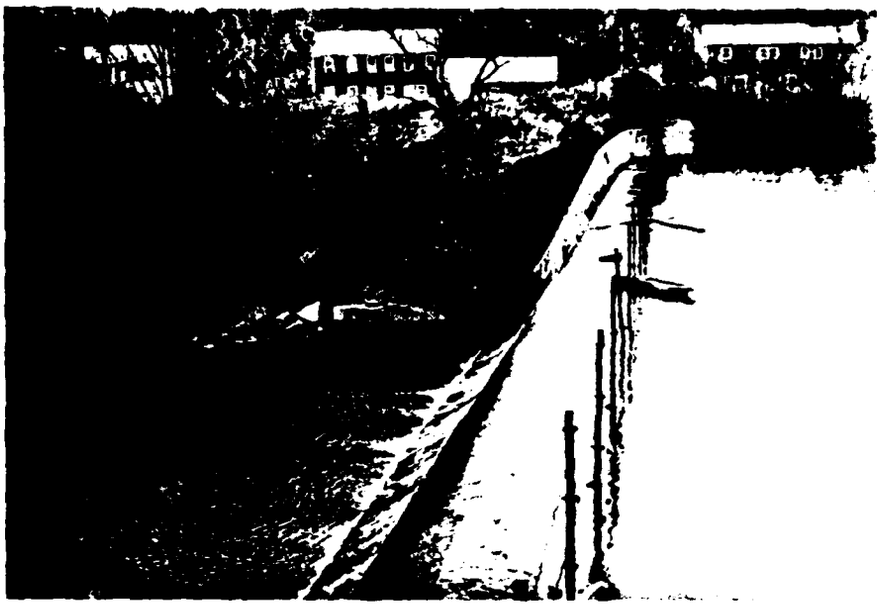


PHOTO NO. 1 - Looking right (west) across spillway from gatehouse.

PHOTO NO. 2 - Downstream of dam looking left (east) at abutment.

PHOTO NO. 3
Downstream of dam looking at left (east) abutment.

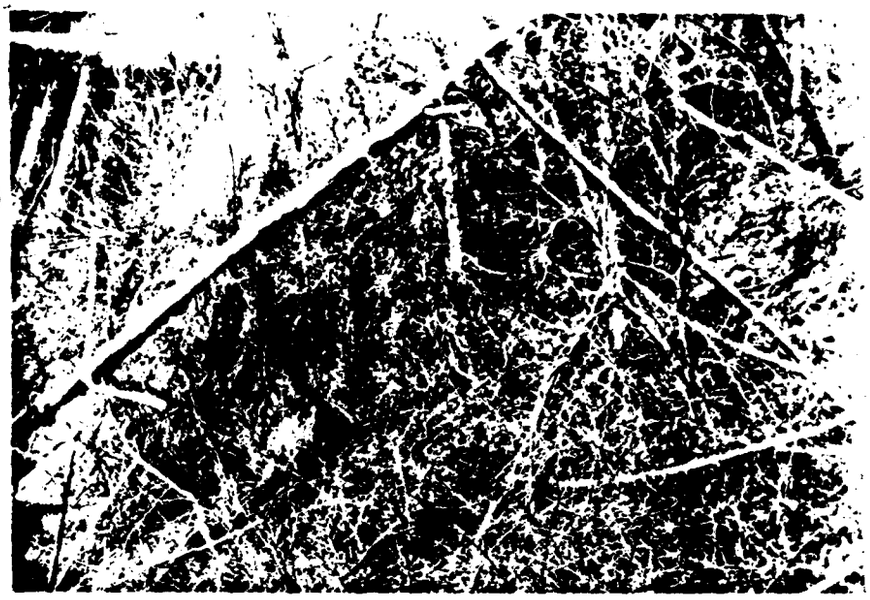


PHOTO NO. 4
Erosion path on left (east) abutment, looking downstream.

PHOTO NO. 5
At base of erosion path looking toward crest of dam.

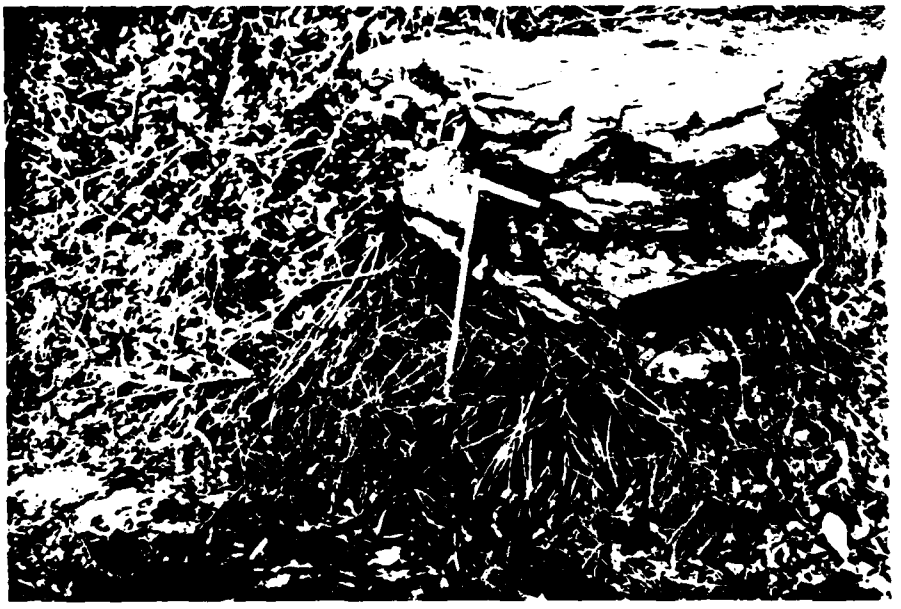


PHOTO NO. 6 - Small seepage area approximately 10' upstream from end of left (east) training wall. Rule extended 2 feet.

PHOTO NO. 7 - Water seepage from below 24" diameter discharge pipe. Rule extended 2 feet.

PHOTO NO. 8 - From middle of downstream edge of spillway pool looking toward left (east) abutment.

PHOTO NO. 9 - Downstream of spillway weir looking at right (west) abutment.

PHOTO NO. 10 - Downstream of dam looking up spillway channel

PHOTO NO. 11 - Looking toward spillway structure from right (west) abutment.

PHOTO NO. 12 - Looking downstream along spillway channel from right (west) abutment.

PHOTO NO. 13
Seepage from right (west) bank of channel approximately 25' downstream of right (west) training wall.

PHOTO NO. 14
Erosion at the end of right (west) training wall, top of wall approximately 4 feet above downstream pool surface.

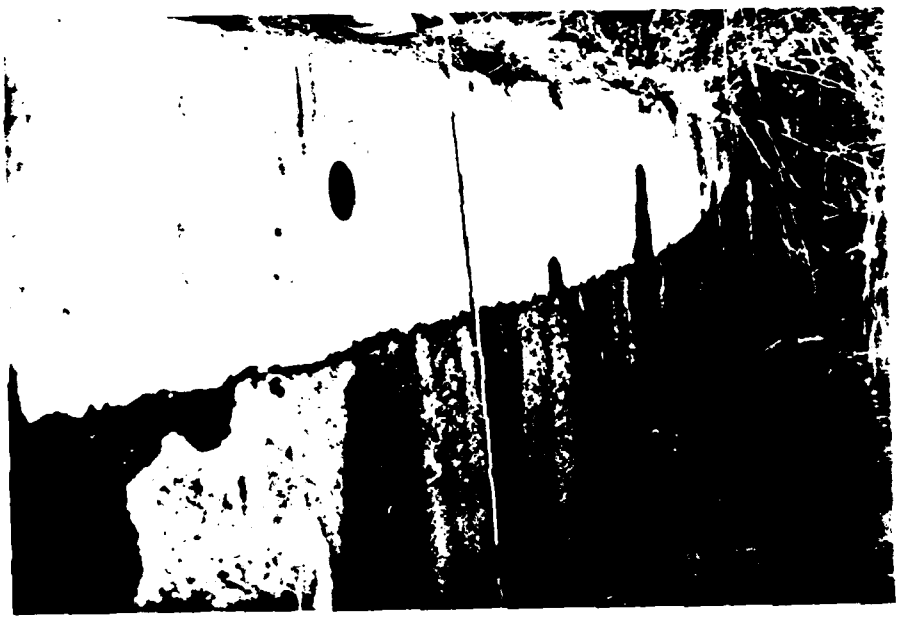
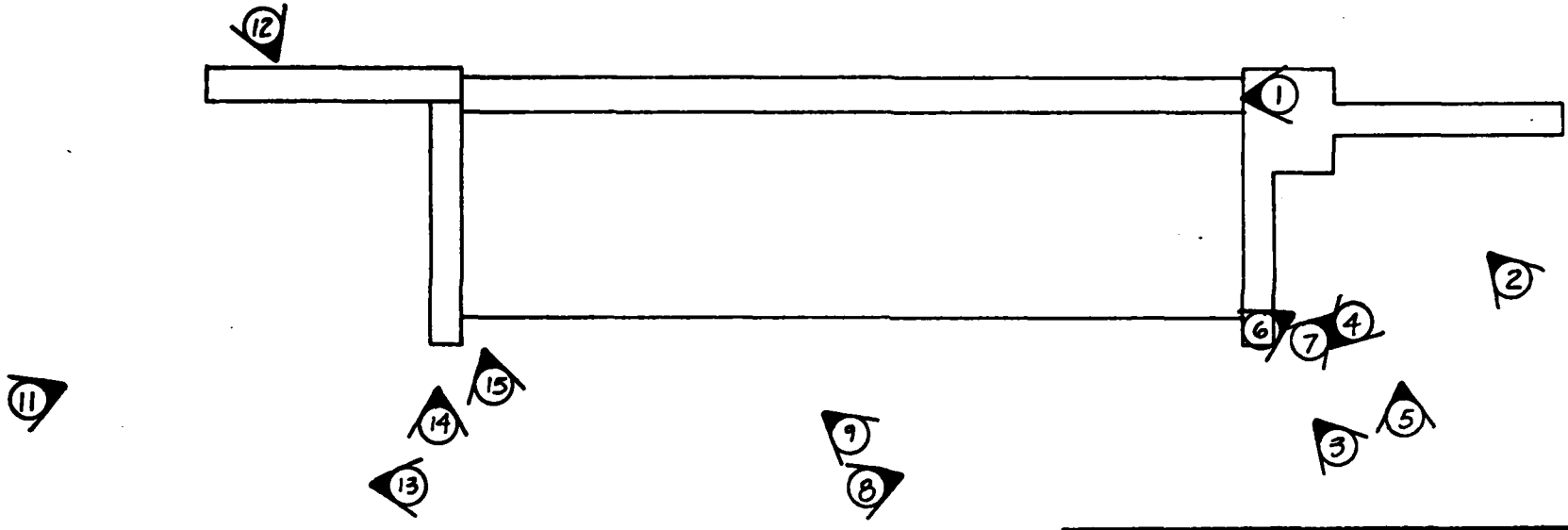


PHOTO NO. 15 - At end of right (west) training wall looking upstream, seepage along joint surface; weep holes 4" in diameter, rule extended 4 feet from top of wall.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS



PHILIP W. GENOVESE & ASSOCIATES, INC. ENGINEERS HAMDEN, CONNECTICUT	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORP OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

SAMP MORTAR RES. DAM

DWN. BY	CKD BY	APP BY	DATE	SCALE
A.J.S.				

LEGEND

(4) NUMBER REFERS TO CAPTION. ARROW INDICATES DIRECTION OF PHOTOGRAPH.

Name	Samp Mortar Dam
Location	Fairfield, Conn.
Dramage Area	24.2 sq-miles / 15,498 acres
Flow Line	Elev. 68.0 (USGS)
Top of Dam	Elev 72.2
Dam Height	29.0 feet
Size & Hazard	Small & High
Test Flood (TF)	PMF
TF Runoff	19 inches
TF Peak Discharge	16,940 cfs
TF Volume	24,507 Ac-Ft
Spillway Storage	255 Ac-Ft
Q_{TF} Outflow	16,500 cfs
Stage @ Q_{TF} Outflow	Elev 76.1
Spillway Type	Broad Crested — Ogee
Breaching Q_p	24,138 cfs
Reach Outflow	6,990 cfs
Reach Outflow Flood Stage	Elev 31.0

Samp Mortar Dam

Evaluate size & hazard classification for use in selecting test flood.

Size Classification

Top of Dam =	elev	72.2
Downstream Low point =	elev	43.2
Height of Dam =		29 feet

Reservoir area @ flow line = 40 acres
∴ estimated volume below the flow line
= ⅓ bh = ⅓ × 40 × 25 = 333 Ac-Ft

Volume between the flow line & top of dam = 255 Ac-Ft which yields a total of 588 Ac-Ft storage to top of Dam.

From table #1 of O.C.E. guides the size classification is "Small"

Hazard Potential

The dam outlets to the Mill River which flows thru high density suburban areas before discharging about 4 miles downstream into Long Island Sound. There are houses within the flood plain along the entire length of the Mill River. About 5000' to 7000' below the dam there exist 2 → 3 high density housing development that are within 5 to 10 feet of normal river level. In view of this development a hazard classification "High" is selected. There is also residential development adjacent to Samp Mortar Reservoir.

Spillway Design Storm

From table #3 of O.C.E. guides entering with "small" & "High" a S.D.F. of ½ PMF → PMF is recommended.

Drainage Area = 24.2 sq-miles = 15,498 acres

There are 2 large water supply reservoirs within the D.A. of 24.2 mi, namely Hemlock & Easton Reservoirs. Both of these would serve an attenuating effect on any storm that passed thru the area.

Utilizing curve data furnished by the Corp N.E.D. select a value of cfs/mi somewhere between Flat & Coastal and Rolling.

Select 700 cfs per square mile

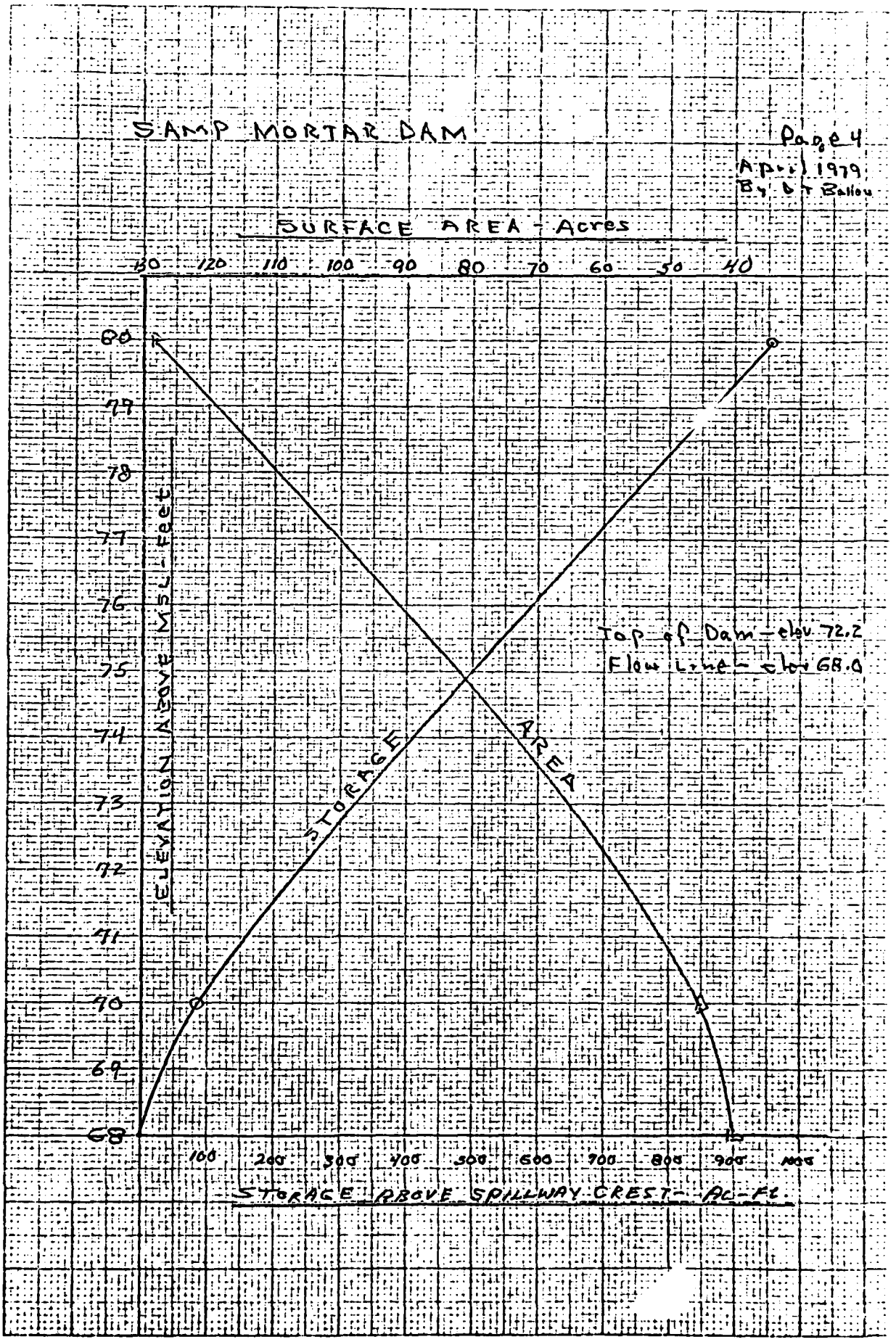
Due to highly developed area downstream select the PMF as the test storm

∴ S.D.F. = 24.2 x 700 cfs/mi = 16,940 cfs

Volume of PMF = 53.3 x 24.2 x 19" = 24,507 AC-Ft
note that there is 255 ac-Ft between the flow line & the top of dam

SAMP MORTAR DAM

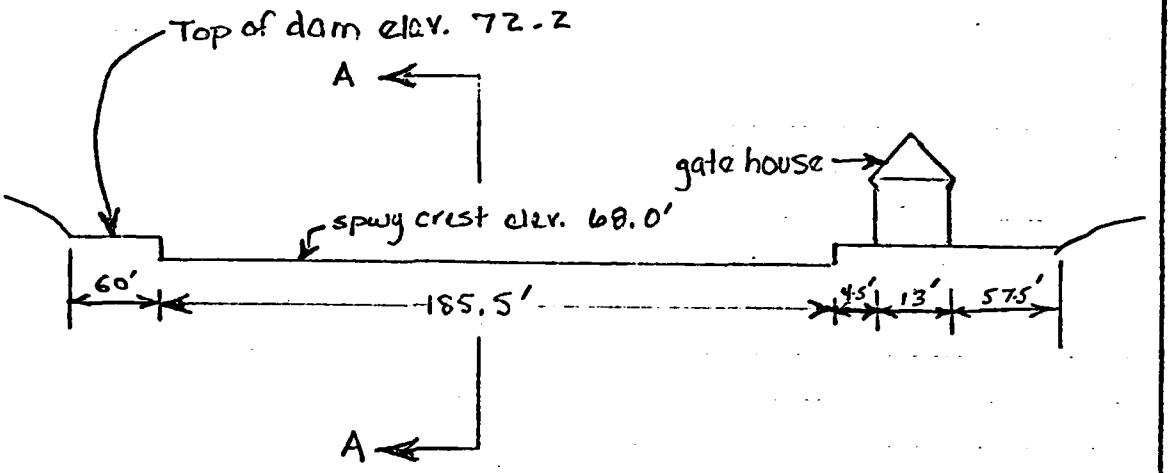
April 1979
By D T Ballou



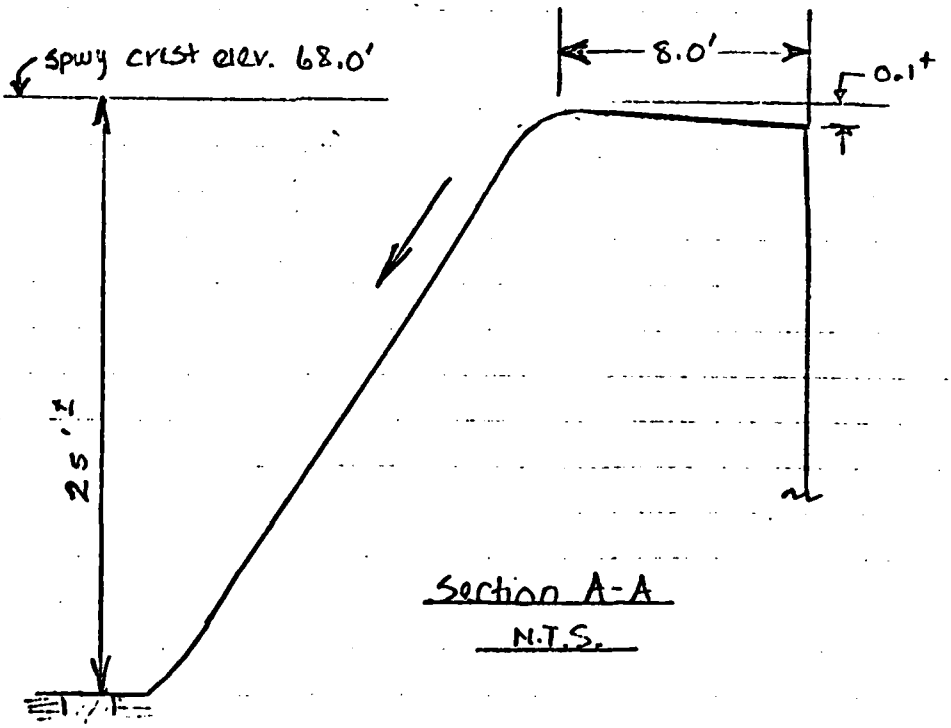
April 1979

Samp Mortar Reservoir Dam, Fairfield, Conn.

Service Spillway



Elevation View
LOOKING UPSTREAM
N.T.S.



Section A-A
N.T.S.

Samp Mortar Dam

April 1979
By DT Ballou

Work up rating curve for service spillway & for overtopping the dam.

For Spillway

$Q_{spwy} = C L H^{3/2}$

let $C = 3.3$

$L = 185.5$

$Q_{spwy} = 612.15 H^{3/2}$

crest @ elev 68.0

For overtopping Dam

$Q_{dam} = C L H^{3/2}$

let $C = 2.7$

$L = 122'$

$Q_{dam} = 329.4 H^{3/2}$

Top @ elev 72.2

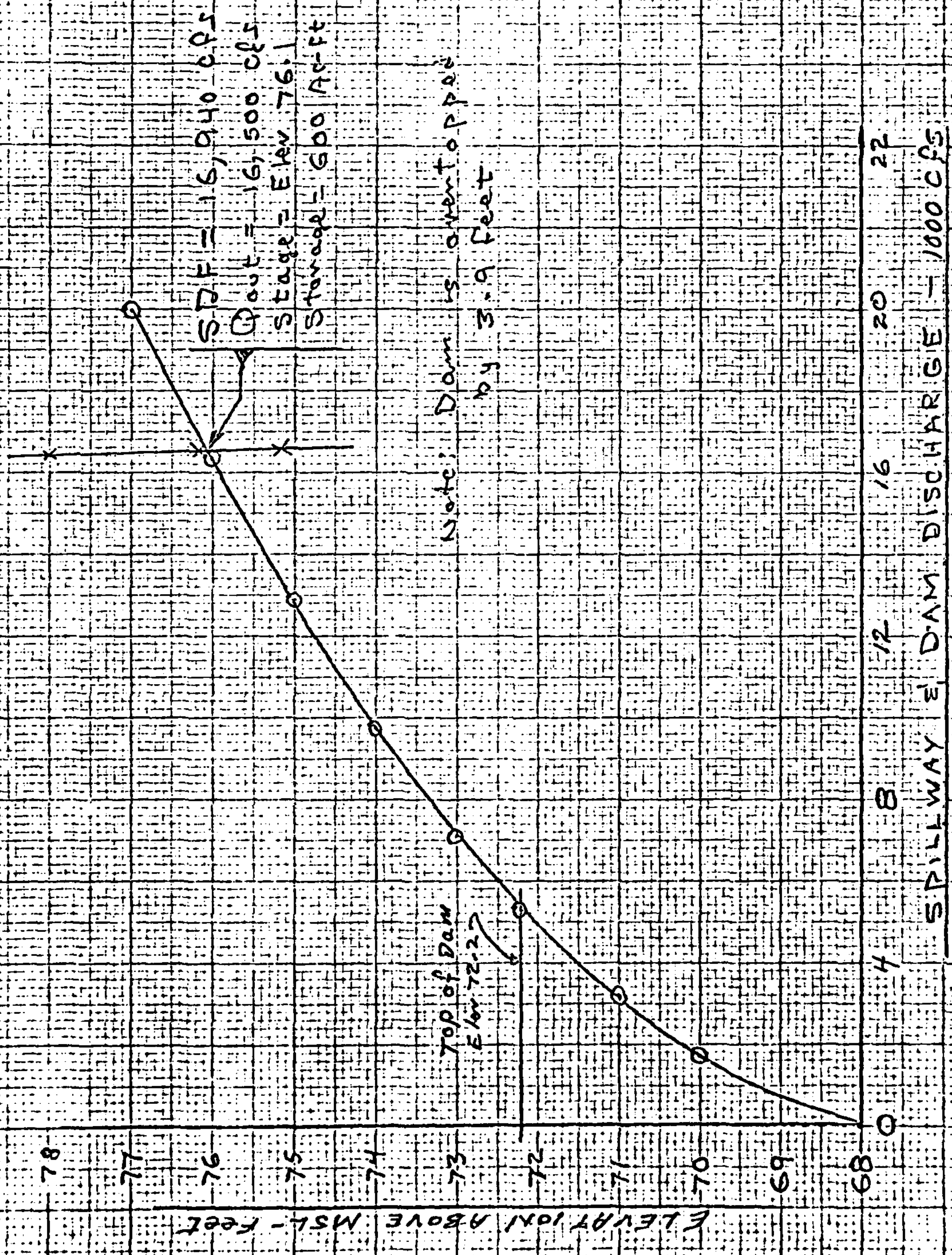
Compute

Elev	H_{spwy} ft	Q_{spwy} cfs	H_{dam} ft	Q_{dam} cfs	Q_{Total} cfs
68.0	—	—	—	—	—
69.0	1	612	—	—	612
70.0	2	1731	—	—	1,731
71.0	3	3181	—	—	3,181
*72.2	4.2	5269	—	—	5,269
73	5.0	6844	0.8	236	7,080
74	6	8997	1.8	795	9,792
75	7	11337	2.8	1543	12,880
76	8	13851	3.8	2440	16,291
77	9	16,528	4.8	3464	19,992

* Top of Dam

Samp Mortar Dam

Page 7
April 1979
By D T Ballou



Samp Mortar Dam

Short-cut routing of PMF, 16,940 cfs

Select surcharge storage associated with
Q_{p_1} = 16,940 cfs
From page 7 for Q_{p_1} we obtain elev 76.18
From page 4 for elev 76.18 we get 605 Ac-ft

$$\frac{605 \text{ Ac-ft}}{15,498 \text{ Acres}} \times 12 \text{ in/ft} = 0.47 \text{ inches of R.O.} = \text{Stor}_i$$

(15,498 Acres ← watershed area)

$$Q_{p_i} = Q_{p_1}\left(1 - \frac{\text{Stor}_{(i)}}{19"}\right)$$

(19" ← R.O. for PMF)

①	②	③	④	⑤
$\text{Stor}_{(i)}$ inches	$\left(1 - \frac{\text{Stor}_{(i)}}{19"}\right)$	$\text{Stor}_{(i)}$ Ac-Ft ① x Area	Q_{p_i} cfs ② x 16,940	Elev. From page 4 for col. ③
0.47	0.975	605	16,522	76.18
0.70	0.963	904	16,313	79.40
0.60	0.968	775	16,405	78.00
0.40	0.979	517	16,583	75.18

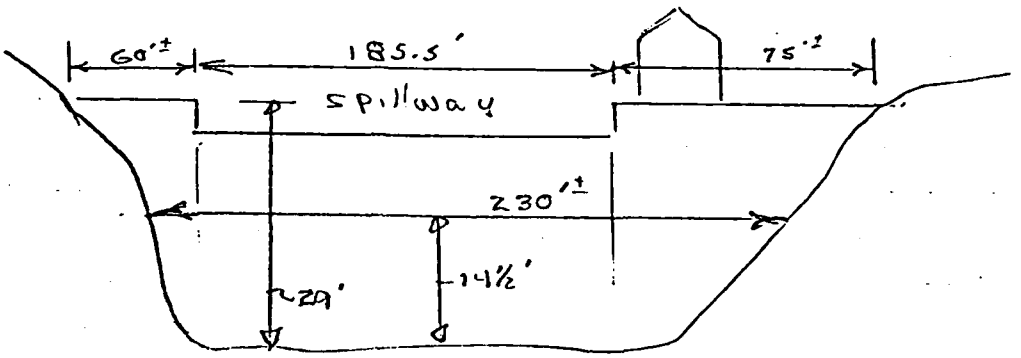
Plots of Column ④ & ⑤ may be found on page 7 with results of routing.

Samp Mortar Dam

April 1979
By D.T. Ballou

Estimate Dam Breaching Hydrograph

Effective top width of dam ≅ 320'



Vertical Section
Looking Upstream

Dam width @ midheight ≅ 230'
Failure width ≅ 40% x 230 = 92' = W_b
Y_o = 29'

Peak Failure Outflow = $\frac{8}{27} \cdot W_b \sqrt{g}\, Y_o^{3/2} = Q_{P_1}$

$Q_{P_1} = \frac{8}{27} \times 92 \times \sqrt{32.2} \times 29^{3/2}$
(5.67)

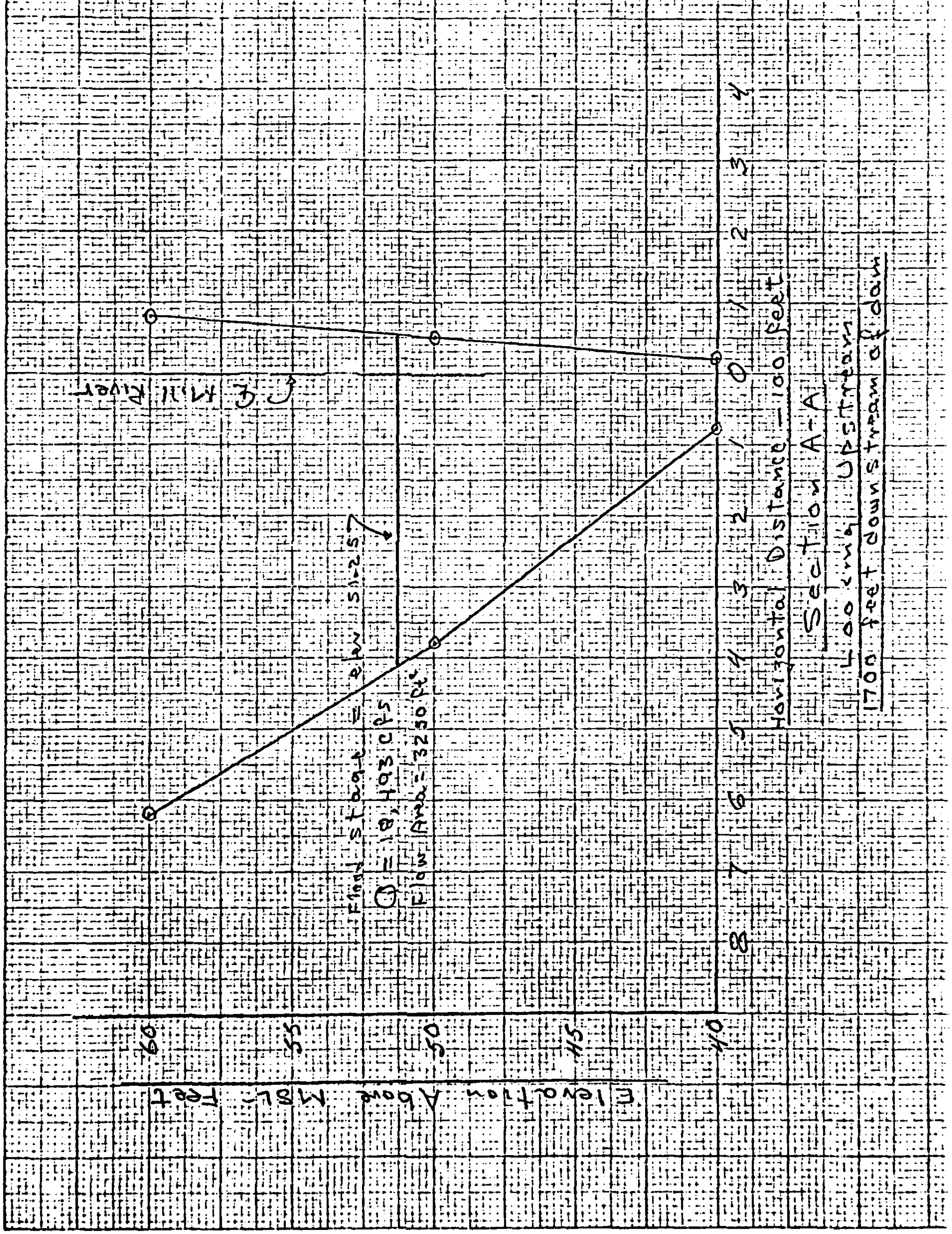
= 24,138 cfs

Reservoir storage to top of Dam = 588 Acft

Failure wave a dam has height ≅ ½ Y_o = 20 feet

Samp Mortar Dam

April 1979
By D.T. Ballou



Samp Mortar Dam

April 1979
By D T Bellew

Work up rating curve for Section A-A which is 1700' downstream of the dam.

$$Q = A \frac{1.49}{n} R^{2/3} S^{1/2}$$

where $n = 0.060$

$S \simeq 10/2300 = 0.00435$

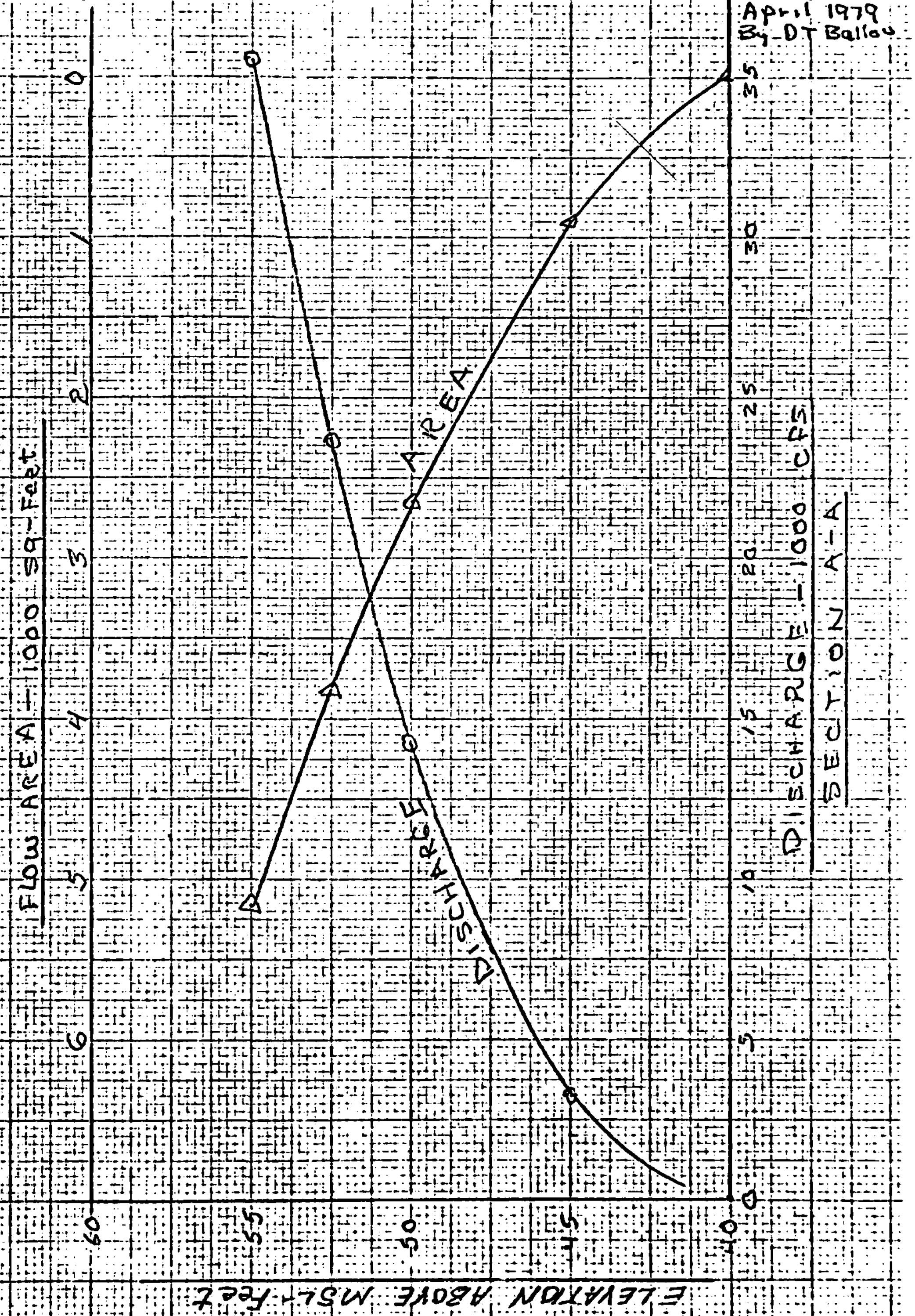
$S^{1/2} = 0.066$

$$Q = 1.64 A R^{2/3}$$

Elev	Area ft^2	WP ft	R ft	$R^{2/3}$	Q cfs
40	—	—	—	—	-
45	900	280	3.21	2.18	3,214
50	2650	450	5.89	3.26	14,156
52.5	3825	525	7.29	3.76	23,572
55	5163	600	8.60	4.19	35,503

Samp Mortar Dam

Page 12
April 1979
By DT Ballou



Samp Mortar Dam

Routing of breaching flood wave from the dam to section A-A,

From page 9 Q_{p_1} = 24,138 cfs ε'_1 storage behind dam = 588 Ac-Ft

From page 12 for Q_{p_1} we obtain elev 52.6 ε'_1 for 52.6 we obtain 3,900 ft²

Reach length = 1700', $\therefore V_1 = 1700' \times 3{,}900 / 43560 = 152$ Ac-Ft

Trial $Q_{p_2} = Q_{p_1}\left(1 - \frac{V_1}{S}\right) = 24{,}138\left(1 - \frac{152}{588}\right) = 17{,}895$ cfs

Using Q_{p_2} ε'_2 going to page 12 we obtain elev 51.1 ε'_2 Area = 3,150 ft²

$V_2 = 1700 \times 3150 / 43560 = 123$ Ac-Ft

Recomputed $Q_{p_2} = 24{,}138\left(1 - \frac{137.5}{588}\right) = 18{,}493$ cfs

and flood stage = 51.25

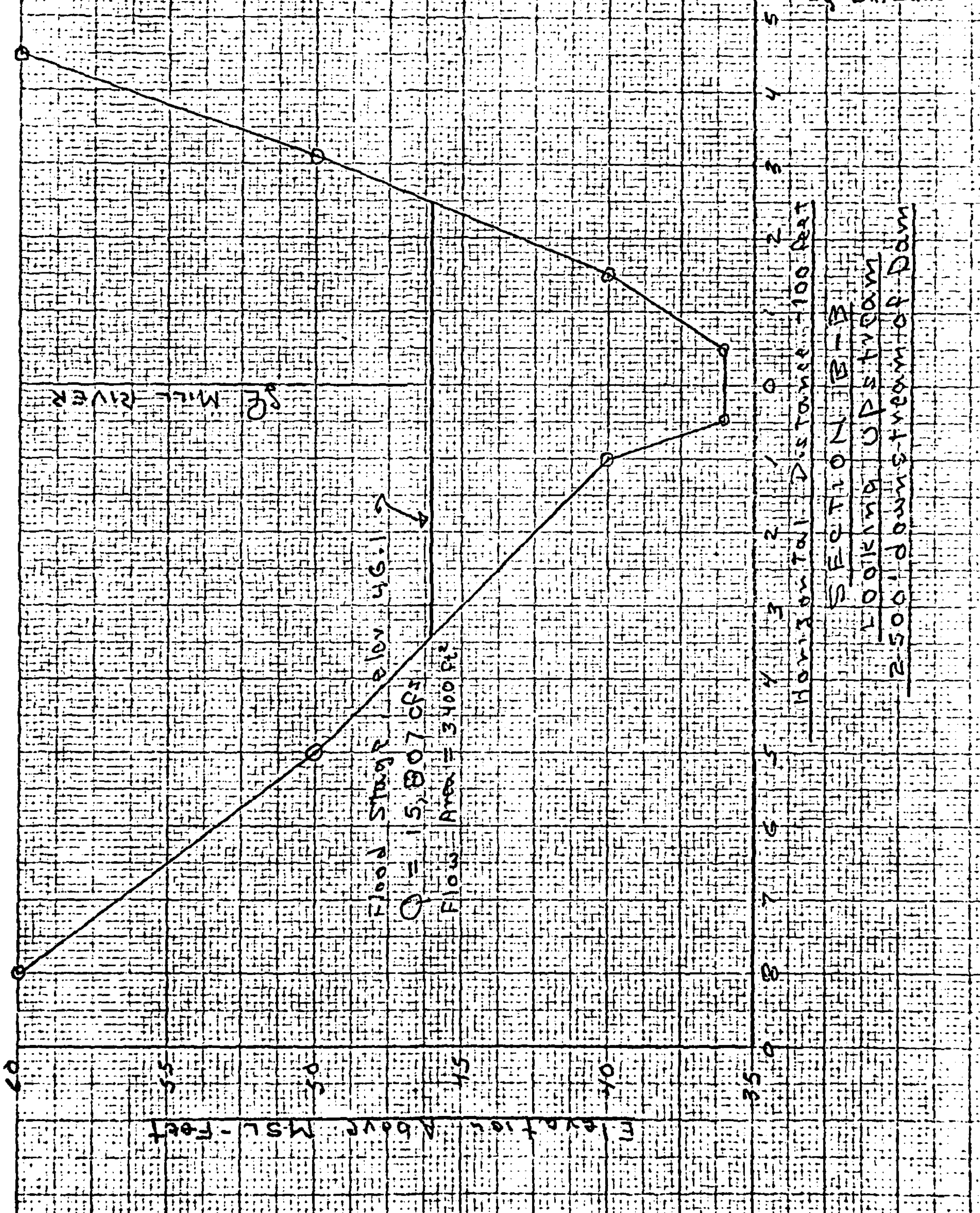
Select another section downstream use:

$Q_{p_1} = 18{,}493$ cfs

'S' = 451 Ac-Ft

Samp Mortar Dam

Page 14
April 1979
By D.T. Bailey



Samp Mortar Dam

Work up rating data & curve for Section B-B which is 2500' downstream of dam & 800' downstream of A-A

$$Q = A \frac{1.49}{n} R^{2/3} S^{1/2}$$

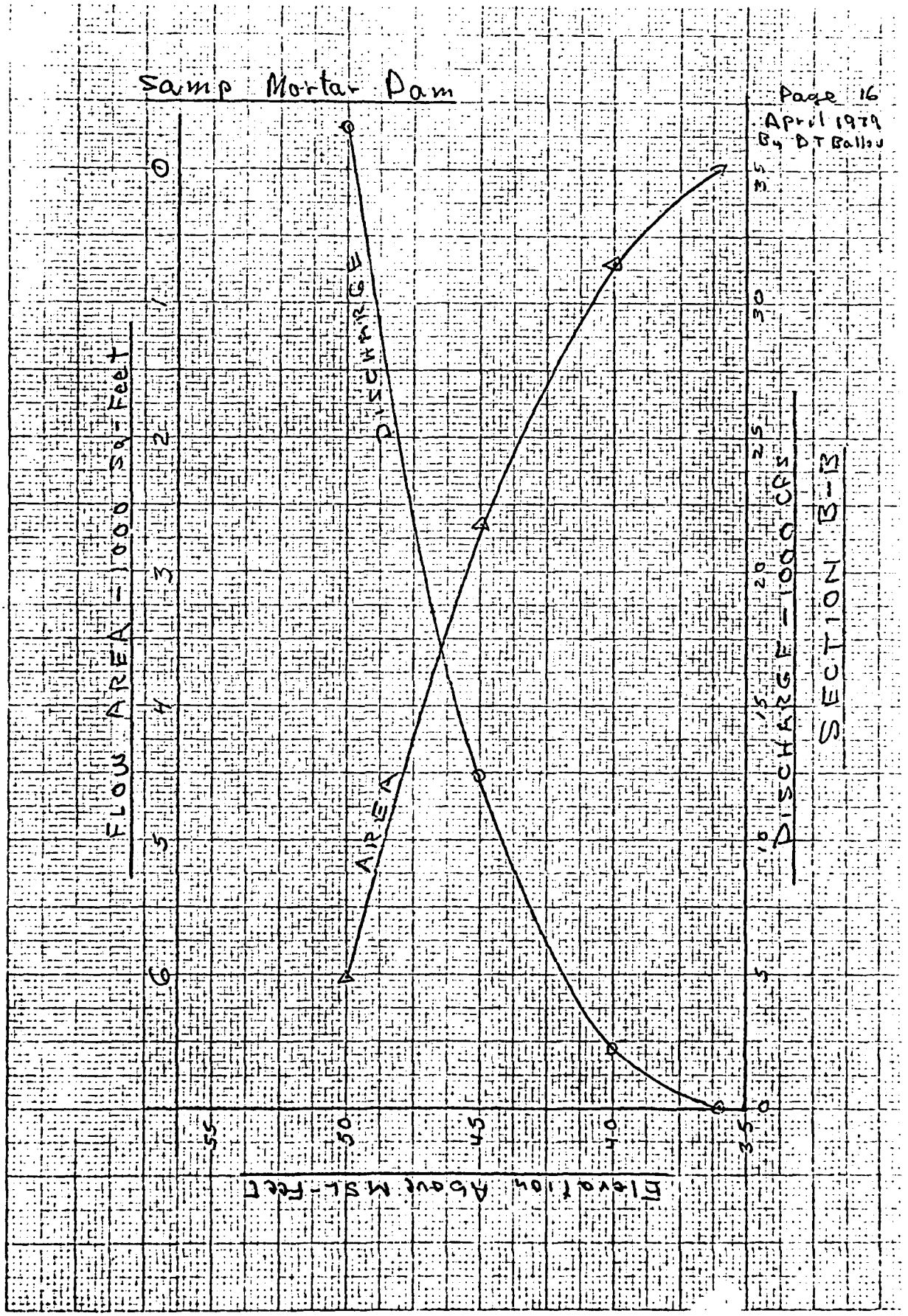
where $n = 0.060$

$S \simeq {}^{6}/_{2300} = 0.00435$

$S^{1/2} = 0.066$

$$Q = 1.64 A R^{2/3}$$

Elev	Area ft^2	WP ft	R ft	$R^{2/3}$	Q cfs
36	—	—	—	—	—
40	700	258	2.71	1.94	2232
45	2650	548	4.84	2.86	12,415
50	6025	843	7.15	3.71	36,614


Samp Mortar Dam
Page 16
April 1979
By DT Ballou
SECTION B-B
DISCHARGE - 1000 CFS
FLOW AREA - 1000 Sq-Feet
Elevation About MSL-Feet
AREA
DISCHARGE

Samp Mortar Dam

Apr. 1 1979
By D T Ballou

Routing of breaching floodwave from Section A-A → Section B-B

From page 13 Q_{p_1} = 18,493 cfs & S = 451 Ac-ft

From page 16 for Q_{p_1} we obtain elev 46.75
E' for elev 46.75 we obtain 3750 ft² of flow area

Reach length = 800', ∴ V_1 = 800 × 3750/43560 = 69 Ac-ft

Trial $Q_{p_2} = Q_{p_1}\left(1 - \frac{V_1}{S}\right) = 18{,}493\left(1 - \frac{69}{451}\right)$ = 15,664 cfs

Using Q_{p_2} E', entering page 16 we obtain
elev 46.0 E'. Area = 3350 ft², ∴
V_2 = 800 × 3350/43560 = 62 Ac-ft
and:

$$\text{Recomputed } Q_{p_2} = 18{,}493\left[1 - \frac{(69+62)/2}{451}\right] = 15{,}807 \text{ cfs}$$

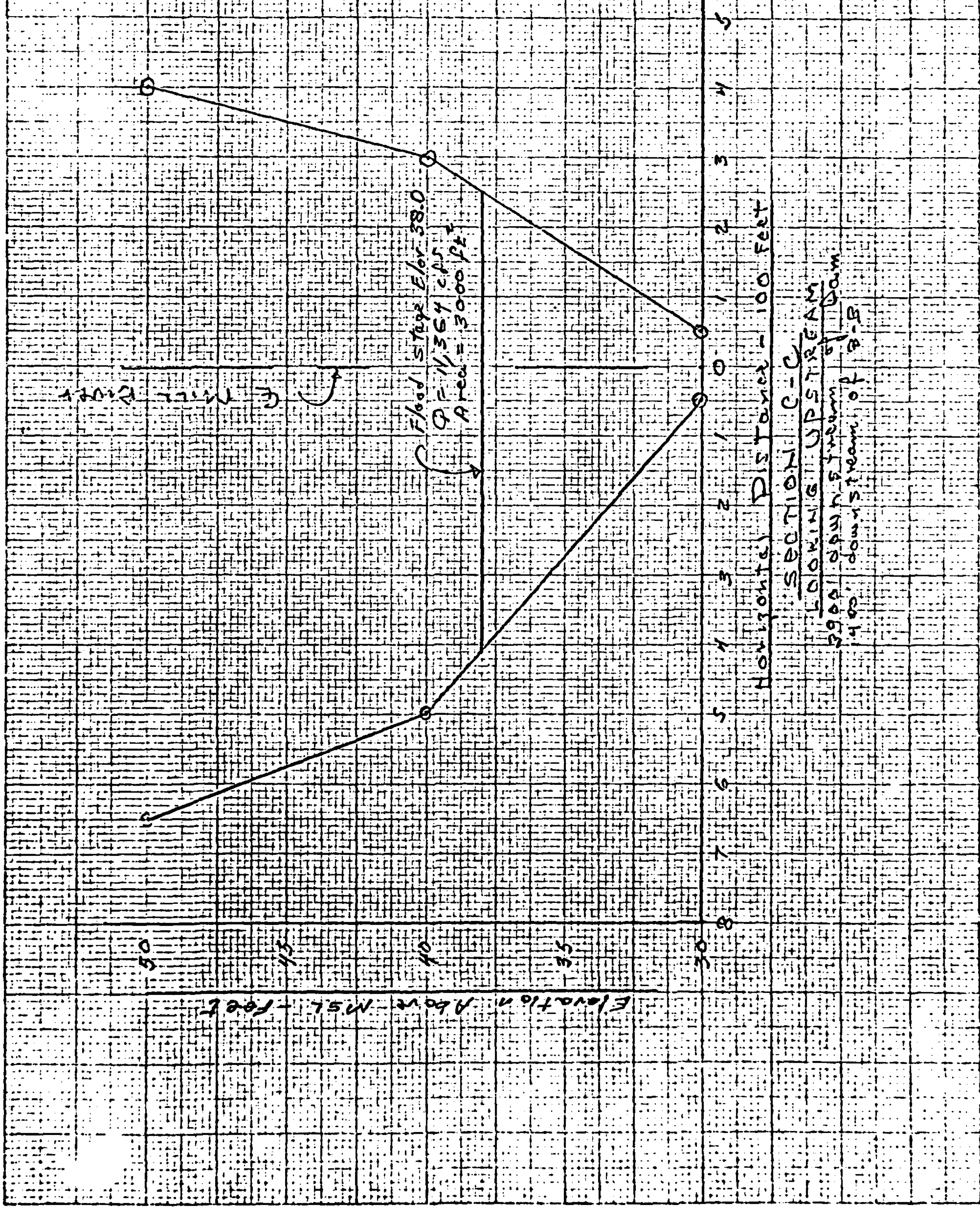
and Flood Stage = elev 46.1

Select another section downstream
use:

Q_{p_1} = 15,807 cfs
S = 386 Ac-ft

Samp Mortar Dam

April 1979
By D T Ballou



Samp Mortar Dam

Work up rating data & curve for Section C-C

$$Q = A\frac{1.49}{n} R^{2/3} S^{1/2}$$

$$n = 0.070$$

$$S = 0.00435$$

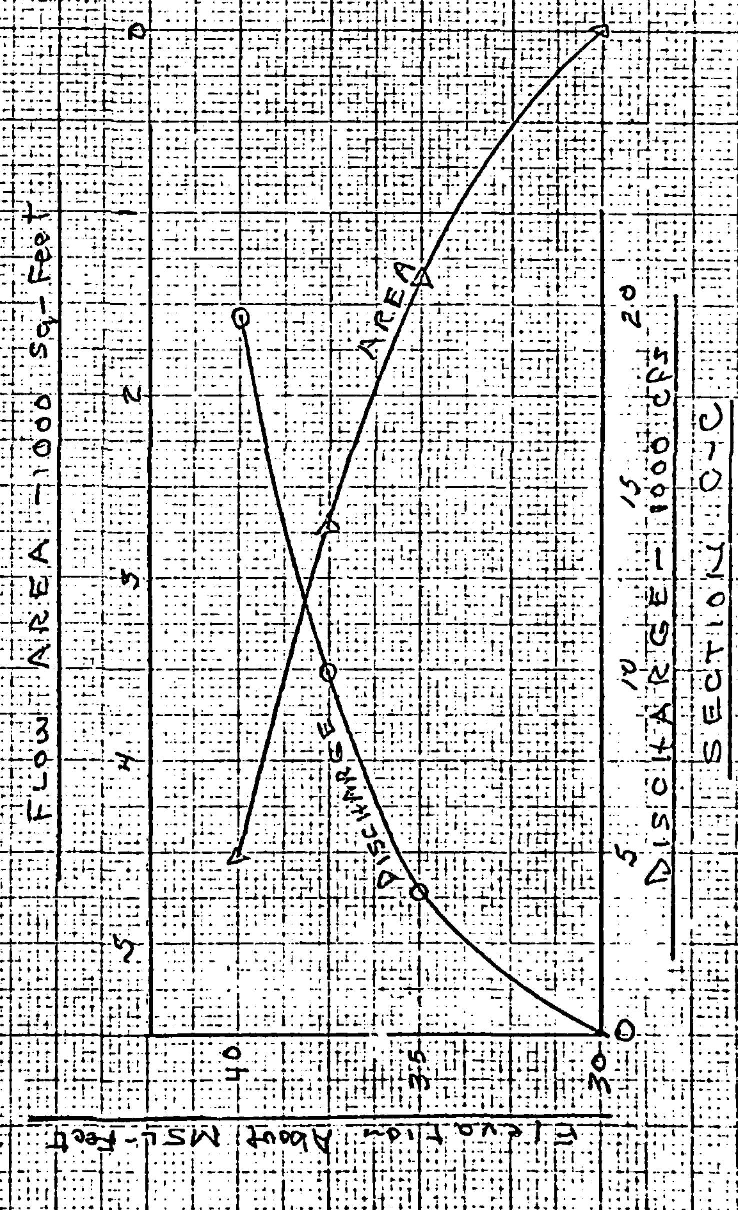
$$S^{1/2} = 0.066$$

$$Q = 1.40\, A R^{2/3}$$

Elev	Area ft^2	WP ft	R ft	$R^{2/3}$	Q cfs
30	—	—	—	—	—
35	1375	460	2.99	2.07	3,992
37.5	2725	645	4.22	2.61	9,961
40.0	4513	820	5.50	3.11	19,671

Samp Mortar Dam

Page 20
April 1979
By D T Ballou



Squares to the Inch

Samp Mortar Dam

April 1979
By D T Ballou

Routing of breaching floodwave from Section B-B → Section C-C

From page 17 Q_{p_1} = 15,807 cfs & S = 386 Ac-Ft

From page 20 for Q_{p_1} we obtain elev 39.2 ft for elev 39.2 we obtain Area = 3900 ft²

Reach length = 1400', ∴ V_1 = 1400 x 3900/43560 = 125 Ac-Ft

Trial Q_{p_2} = 15,807 (1 − 125/386) = 10,688 cfs

using Q_{p_2} & entering page 20 we obtain elev 37.75 ft Area = 2850 ft², ∴
V_2 = 2850 x 1400/43560 = 92 Ac-Ft

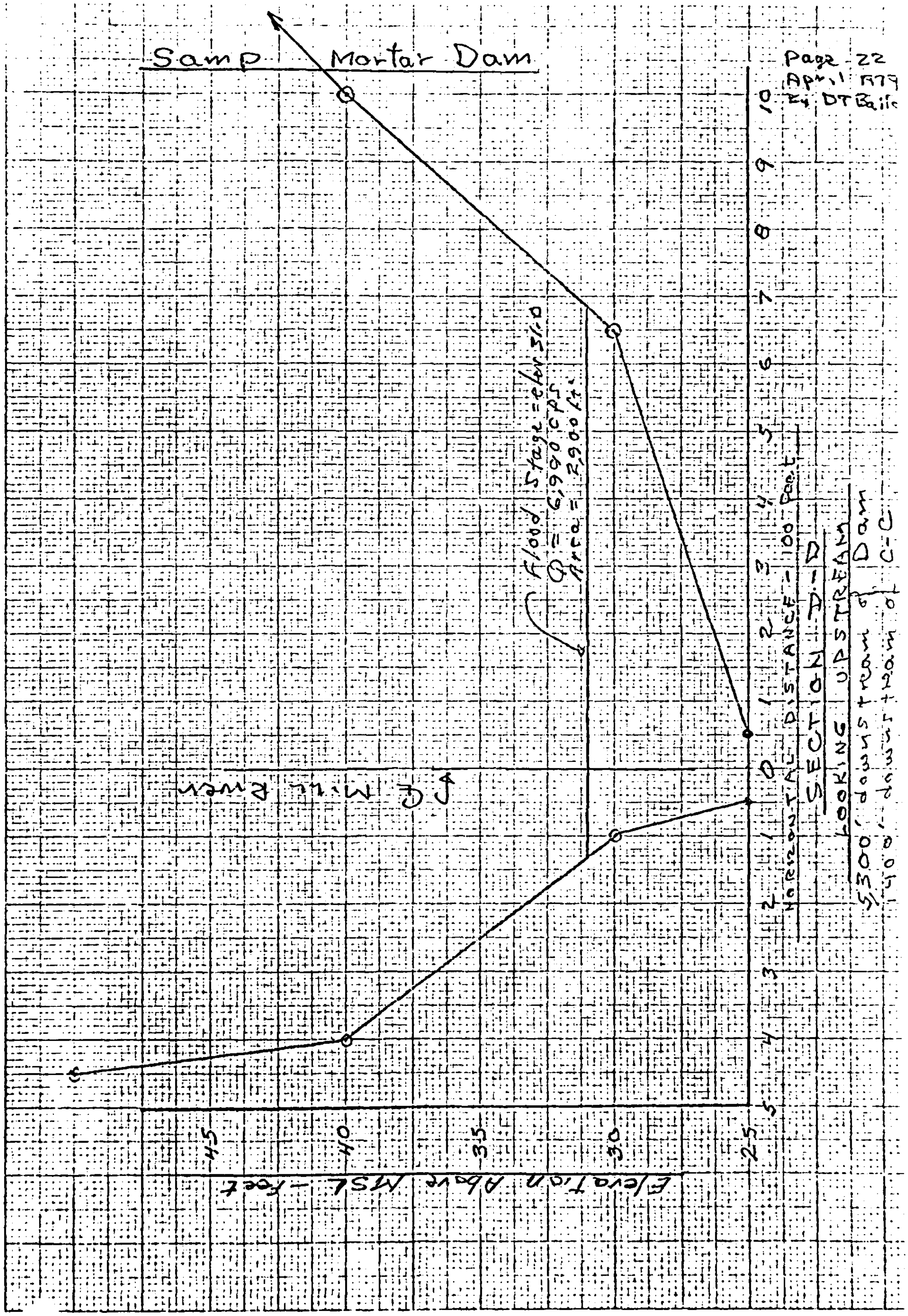
Recomputed $Q_{p_2} = 15807\left[1 - \frac{(125+92)/2}{386}\right]^{108.5}$ = 11,364 cfs
and associated Flood stage = elev 38.0
Flow area = 3000 ft²

Select another section downstream use:

Q_{p_1} = 11,364 cfs
S = 278 Ac-Ft

Samp Mortar Dam

Page 22
April 1979
By DT Bailey



Squares to

Samp Mortar Dam

Page 23
April 1979
By D. T. Bellow

Work up rating data & curve for section D–D

$$Q = A \frac{1.49}{n} R^{2/3} S^{1/2}$$

$n = 0.070$

$S = 15/3900 = 2.56 \times 10^{-3}$

$S^{1/2} = 0.051$

$$Q = 1.09 A R^{2/3}$$

Elev	Area ft^2	WP ft	R ft	$R^{2/3}$	Q cfs
25	—	—	—	—	—
27.5	650	425	1.53	1.33	940
30	2113	760	2.78	1.98	4,550
32.5	4213	925	4.55	2.74	12,605
35.	6688	1095	6.11	3.34	24,329

AD-A142 853 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS SAMP MORTAR RESERVOIR..(U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV MAY 79 2/2

UNCLASSIFIED F/G 13/13 NL

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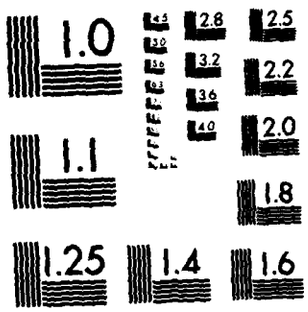
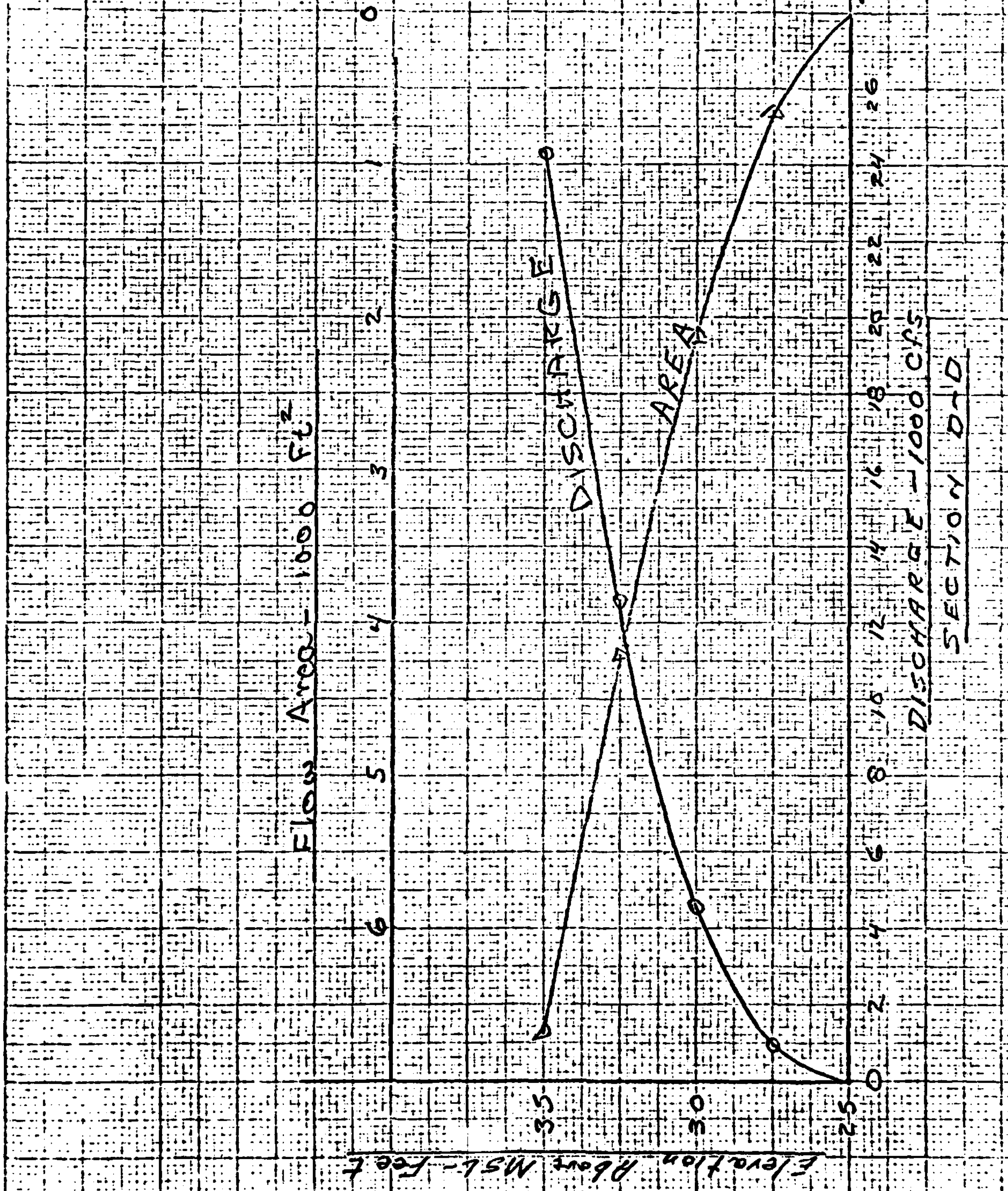


Samp Mortar Dam

page 24
April 1979
By D T Balloo



Samp Mortar Dam

April 1979
By: D T. Ballou

Routing of breaching floodwave from section C-C → section D-D

From page 21, Q_{p_1} = 11,364 cfs & S = 278 Ac-Ft

From page 24 for Q_{p_1} we obtain elev 32.3, & for elev 32.3 we get a flow area = 4,100 ft²

Reach length = 1400'; ∴ $V_1 = 1400 \times 4100 / 43560 = 132$ Ac-Ft

Trial $Q_{p_2} = 11,364\left(1 - \frac{132}{278}\right) = 5,968$ cfs

Using trial Q_{p_2} & re-entering page 24 we obtain elev 30.6 &, Area = 2550 ft²

$V_2 = 1407 \times 2550 / 43560 = 82$ Ac-Ft

Recomputed $Q_{p_2} = 11,364\left(1 - \frac{(132+82)/2}{278}\right] = 6,990$ cfs

and associated flood stage = elev 31.0

Flow area = 2900 ft²

See next page for routing summary

There would appear no reason to continue the routing as flooding to about 50 homes would certainly justify the High Hazard rating of Samp Mortar Dam.

If a more refined and extensive analysis is required I suggest that it be accomplished under phase II investigation.

Samp Mortar Dam

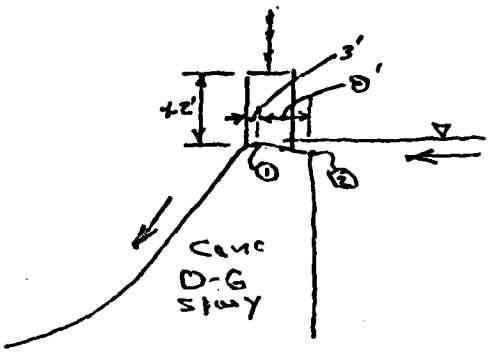
April 1970
By BT Bolka

Routing Summary (see pages 9 → 25)

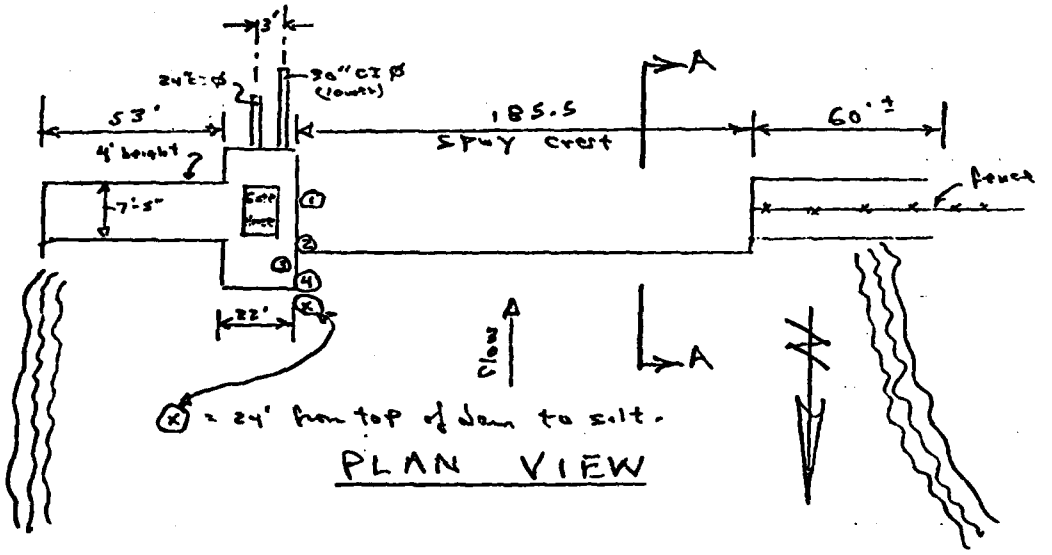
Point	Discharge	Flood Stage	Comment
Dam	16,500 cfs	76.1	Before breaching – 1.9' over top of Dam
Dam	24,138	52	Estimated based on Corp recommendations
A–A	18,493	51.3	Sta 17+00
B–B	15,807	46.1	Sta 25+00
C–C	11,364	38.0	Sta 39+00
D–D	6,990	31.0	Sta 53+00

Field Data

Dec 20 1978
Damp Mortar Res.
8 AM → 11 AM
Item Whitehead
Dick Murdock

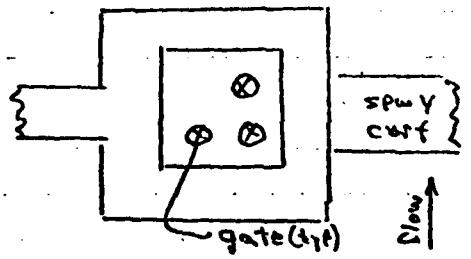


SECTION A-A



PLAN VIEW

Item		BS	FS	Elev
		NI = 74.53		
crest	①	6.53		68.0
backsight	②		6.63	67.9
Top dam	③		2.30	72.23
water	④		6.29	68.14



Gate House
Plan

APPENDIX E

INFORMATION AS CONTAINED IN THE INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTITY NUMBER	DIVISION	STATE	COUNTY	CONGR DIST	OTHER	COUNTY	CONGR DIST	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY	MO	YR
CT	17	NED	CT	001	04				CAMP MORTAR RESERVOIR DAM	4111.0	7315.7	11	JUL	79

POPULAR NAME	NAME OF IMPOUNDMENT
	CAMP MORTAR RESERVOIR

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	DIST FROM DAM (MI.)	POPULATION
01	07	MILL RIVER	FAIRFIELD	0	56487

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT.)	HYDRAULIC HEIGHT (FT.)	IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)	INSPECTION DIST	OWN	FED REG	PRV/FED	SCS AGR	VER/DATE
RECTPG	1901	R	29	29	588	333	NED	N	N	N	N	

REMARKS

D/S HAS	SPILLWAY CREST LENGTH	SPILLWAY TYPE	SPILLWAY WIDTH (FT.)	MAXIMUM DISCHARGE (FT.)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
1	320	U	185	5269												

OWNER	ENGINEERING BY	CONSTRUCTION BY
LAKE HILLS ASSOCIATION	S.G. STODDARD JR	BRIDGEPORT HYDRAULIC CO

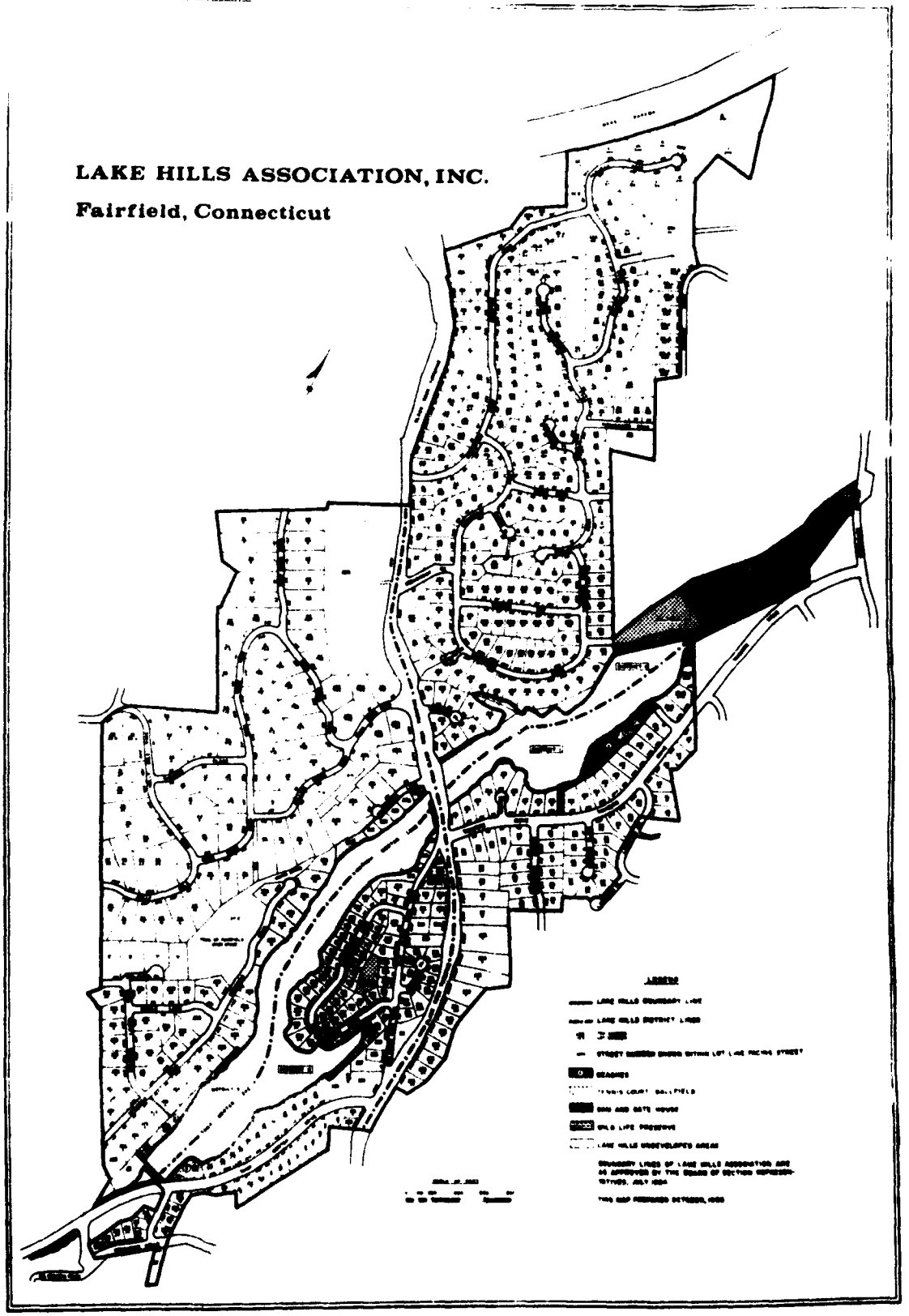
REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
CT WATER RESOURCES	CT WT RESOURCES	CT W R	CT W R

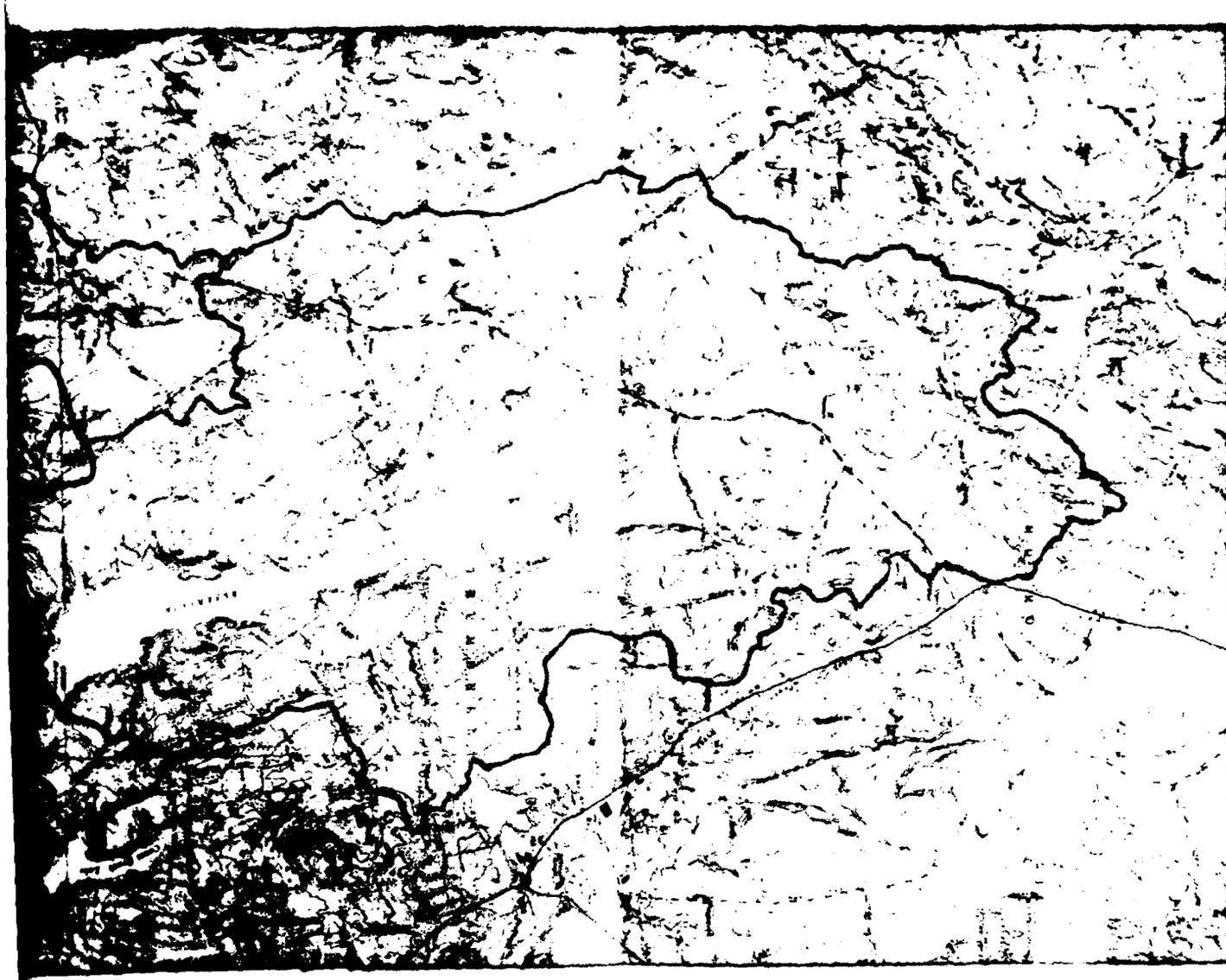
INSPECTION BY	INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
PHILIP W GENOVESE AND ASSOCIATES	20	DEC	78	PUBLIC LAW 92-367 8AUG1972

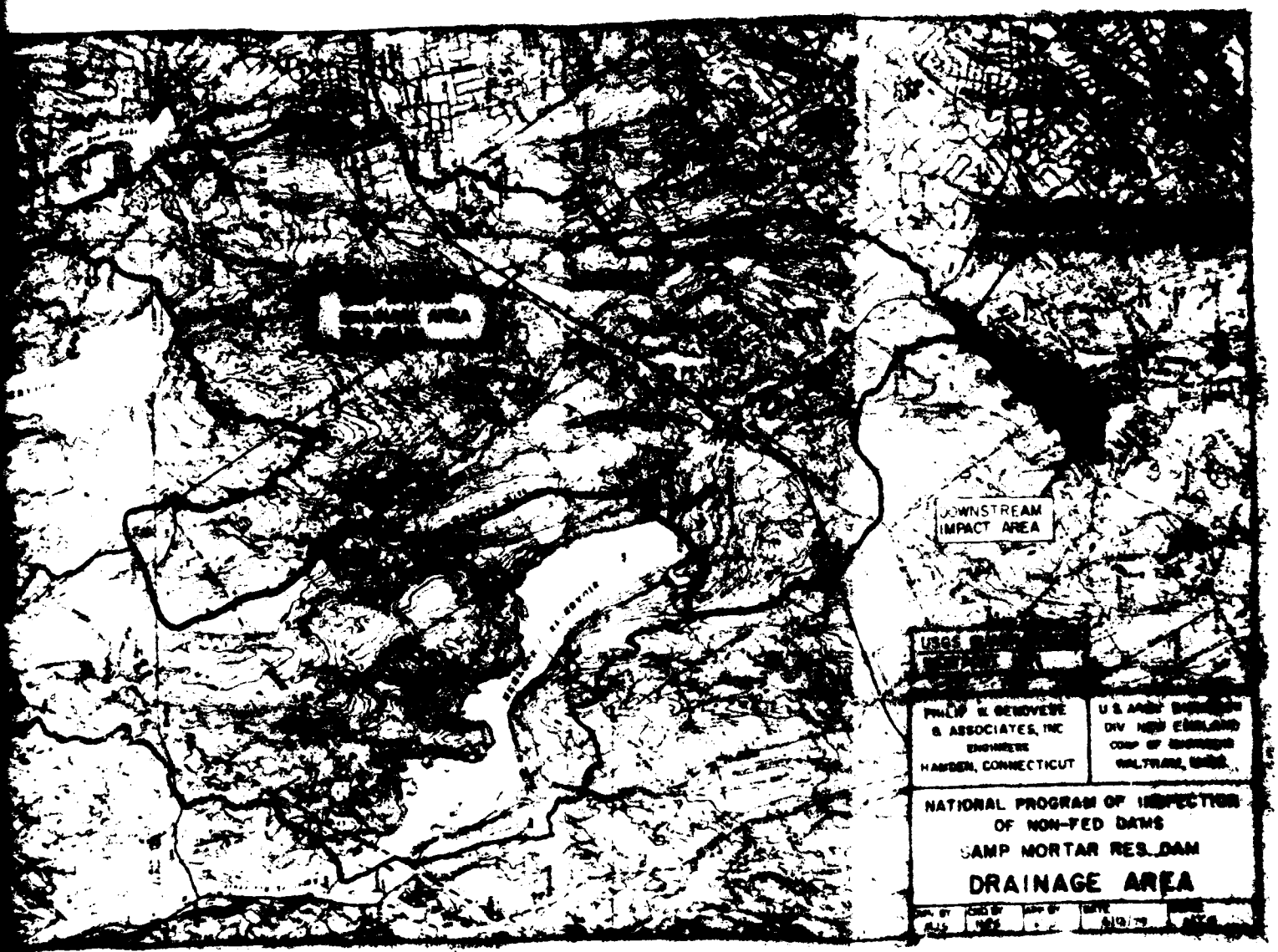
REMARKS

LAKE HILLS ASSOCIATION, INC.

Fairfield, Connecticut






DOWNSTREAM
IMPACT AREA
USGS
PHILIP W. BENOVESE
& ASSOCIATES, INC
ENGINEERS
HAMDEN, CONNECTICUT
U.S. ARMY
DIV NEW ENGLAND
CORP OF ENGINEERS
WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION
OF NON-FED DAMS
CAMP MORTAR RES. DAM
DRAINAGE AREA