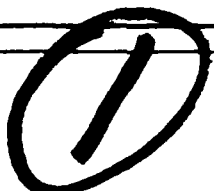


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THAMES RIVER BASIN
COVENTRY-MANSFIELD, CONNECTICUT

EAGLEVILLE LAKE DAM
CT 00161

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

JUNE 1979

DISTRICT OF COLUMBIA
APR 1980

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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4. TITLE (and Subtitle) Eagleville Lake Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) DAMS, INSPECTION, DAM SAFETY, Thames River Basin Coventry - Mansfield, Conn. Eagleville Lake Dam		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Eagleville Lake Dam is an earth embankment structure with a masonry spillway. The dam is 22 ft. in height and approx. 350 ft. in length. There are areas of concern which must be corrected to assure the long-term performance of this dam. The dam is considered to be in FAIR condition. The dam is classified as SMALL in size and a significant hazard structure in accordance with the recommended guidelines established by the corps of engineers. The test flood is equal to 1/2 the PMF.		



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

REPLY TO
ATTENTION OF
NEDED

AUG 16 1979

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

Dear Governor Grasso:


I am forwarding to you a copy of the Eagleville Lake Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Department of Environmental Protection, State of Connecticut, Hartford, Connecticut 06115.

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

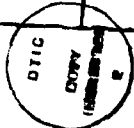
I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely yours,


MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

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THAMES RIVER BASIN
 COVENTRY - MANSFIELD, CONNECTICUT

EAGLEVILLE LAKE DAM
 CT 00161

PHASE I INSPECTION REPORT
 NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

Identification No.: 00161
Name of Dam: Eagleville Lake Dam
Town: Coventry, Mansfield
County and State: Tolland County, Connecticut
Stream: Willimantic River
Date of Inspection: April 17, 1979

BRIEF ASSESSMENT

Eagleville Lake Dam is an earth embankment structure with a masonry spillway. The impoundment, Eagleville Lake, was formerly used for industrial power and process water but is now used for recreation only. The dam was constructed around 1860. Records indicate failure of the right embankment by overtopping from storms in 1938 and 1955. Reconstruction followed each failure. The dam is 22 feet in height and approximately 350 feet in length (including the spillway). The masonry spillway has a crest length of 170 feet. The outlet works is located at the left abutment of the spillway and is constructed of mortared stone masonry. A recently installed 42 inch square gate (1970) is the outlet works for the reservoir. Due to its age, Eagleville Lake Dam was neither designed nor constructed by present state-of-the-art procedures.

Based upon the visual inspection at the site and the lack of engineering, operational and maintenance data, there are areas of concern which must be corrected to assure the long-term performance of this dam. The dam is considered to be in FAIR condition. Deficiencies include trees growing on the dam embankment, the potential for overtopping due to the limited discharge capacity of the overflow spillway, and erosion areas on the embankments. All these deficiencies can cause failure of the dam.

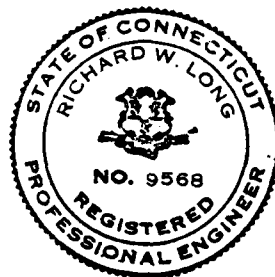
The dam is classified as SMALL in size and a SIGNIFICANT hazard structure in accordance with the recommended guidelines established by the corps of Engineers. The test flood outflow for this dam is equal to one-half the Probable Maximum Flood (PMF) or approximately 34,800 CFS (316 CSM) and would overtop the dam by about 8.3 feet; therefore, the existing spillway capacity is considered to be inadequate. The maximum spillway discharge of 11,300 CFS represents only 31 percent of the test flood outflow. Overtopping could result in the failure of this earth embankment.

It is recommended that the Owner engage the services of an engineer experienced in the design of dams to accomplish the following: repair erosion areas and gullies on the embankment and its slopes, establish a procedure for removal of large trees and roots from the dam embankment; repair the riprap at the right abutment; repair the outlet works to reduce or eliminate seepage, perform more detailed hydrologic studies to evaluate the impact of the test flood on the existing facilities and improve the capacity of the dam to pass the flood flows and reduce the overtopping potential; riprap the upper portion of the embankment.

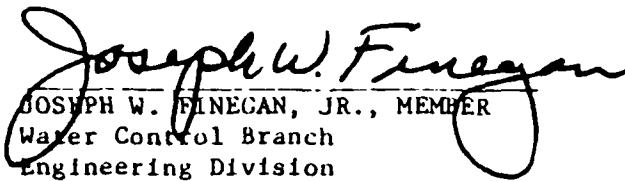
Additional recommendations and remedial measures are detailed in Section 7 and should be implemented by the Owner within one year after receipt of this Phase I Inspection Report.

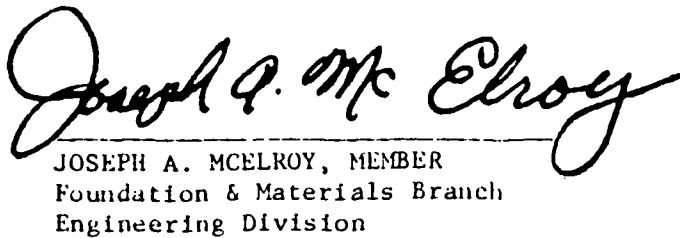
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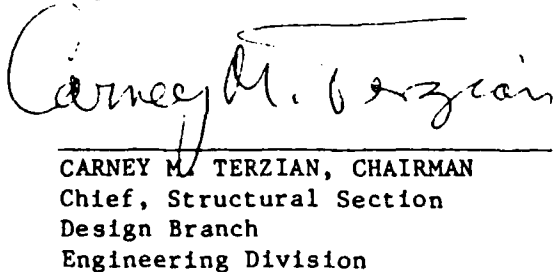
BY: Richard W. Long
Richard W. Long, P.E.
Vice President



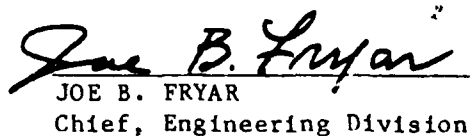
This Phase I Inspection Report on Eagleville Lake Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and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


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


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


CARNEY M. TERZIAN, CHAIRMAN
Chief, Structural Section
Design Branch
Engineering Division

APPROVAL RECOMMENDED:


JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, DC 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or to 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 opportunity to detect unsafe conditions.

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 reasonable possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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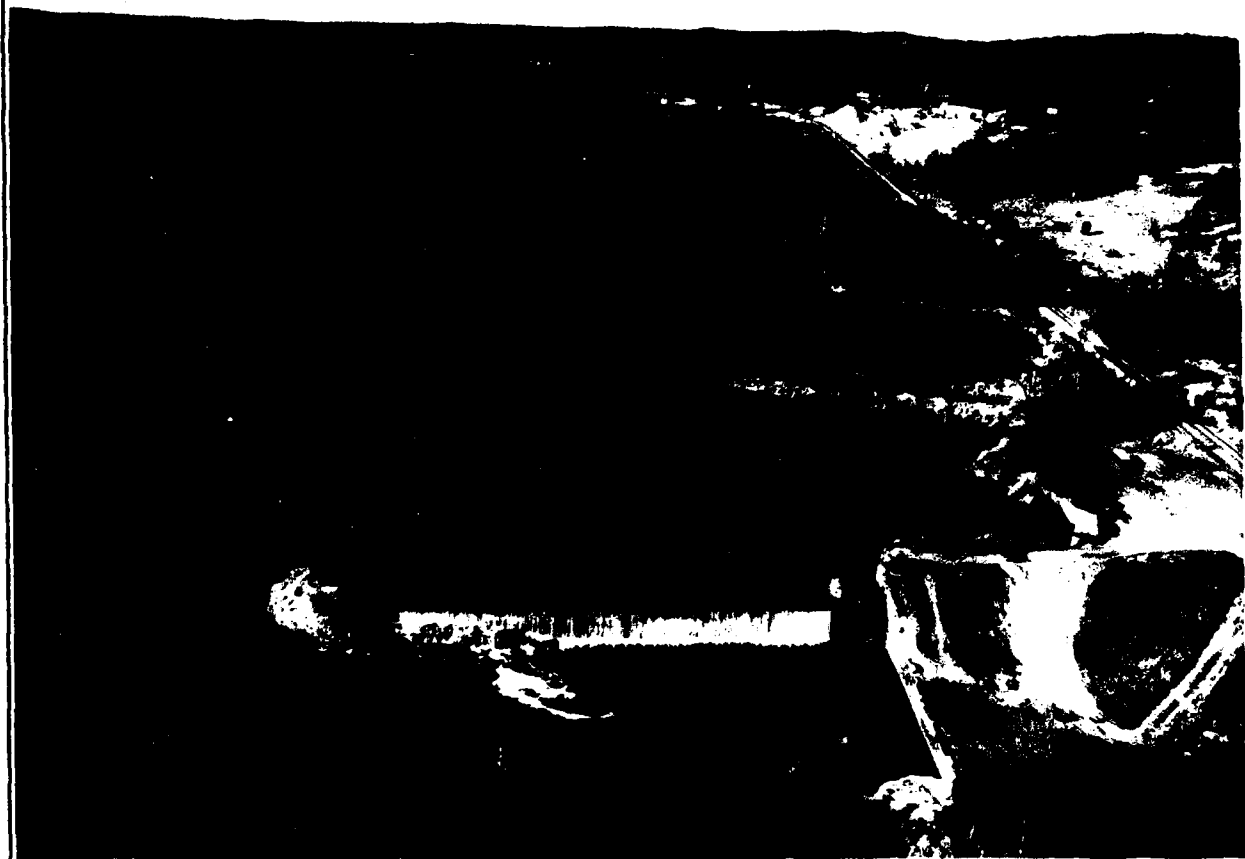
APPENDIX A - Inspection Check List

APPENDIX B - Engineering Data

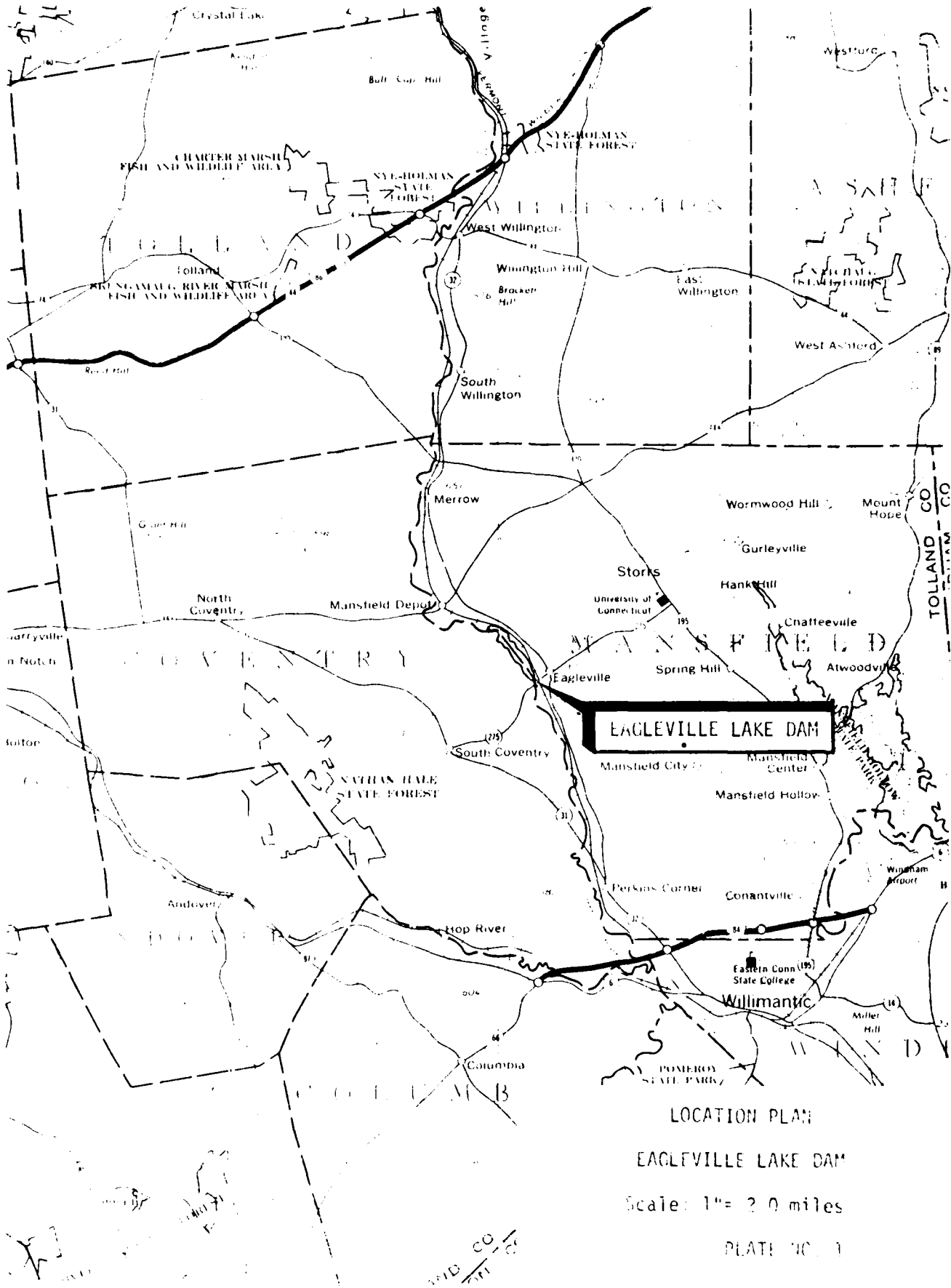
APPENDIX C - Photographs

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Inventory of Dams



Eagleville Lake Dam - Overview Photo



EAGLEVILLE LAKE DAM

LOCATION PLAN
 EAGLEVILLE LAKE DAM
 Scale: 1" = 2.0 miles
 PLATE NO. 1

NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

NAME OF DAM: EAGLEVILLE LAKE DAM

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. C-E Maguire, Inc., has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to C-E Maguire, Inc., under a letter from Ralph T. Garver, Colonel, Corps of Engineers. Contract No. DACW33-79-C-0015 has been assigned by the Corps of Engineers for this work.
- b. Purpose of Inspection.
 1. Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.
 2. Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.
 3. To update, verify and complete the National Inventory of Dams.

1.2 Description of the Project

- a. Location. Eagleville Lake Dam is located on the common border of the Towns of Coventry and Mansfield in Tolland County, Connecticut. Coordinates of the dam are about 41° 47.1'N Latitude and 72° 16.9'W Longitude. The boundary between the two towns is defined by the Willimantic

River. See Plate No. 1 for Location Plan. The dam is about 200 feet north of the Rt. 275 Bridge over the Willimantic River. The dam impounds water from the Willimantic River for recreational use. The general orientation of the reservoir is northwest - southeast with the dam at the southeast extremity. The dam has a surface area of about 83 acres and impounds water from a watershed of 110 square miles.

- b. Description of Dam and Appurtenances. The dam at Eagleville Lake is approximately 350 feet in length with a spillway crest length of 170 feet. The maximum height of the dam is about 22 feet at the outlet works near the left spillway training wall. The typical slopes of the embankments are 3H to 1V on the downstream slope and variable on the upstream slope, with the embankments being quite irregular in cross section. The outlet control gate is located at the left abutment of the spillway. The spillway, training walls and outlet works are all constructed of stone masonry. The control gate is manually operated.

Normal discharge from Eagleville Lake is by flow over the spillway crest.

- c. Size Classification. The impoundment capacity of Eagleville Lake Dam is 900 acre feet and the height of 22.0 feet places the dam in the SMALL category as defined in the Corps of Engineers Guidelines.
- d. Hazard Classification. This dam is classified as a SIGNIFICANT hazard structure because it is located in an area where its failure discharge can cause damage due to high velocity, impact from debris and flooding to secondary or primary roadways (Route 52), interruption of utility service (those utilities adjacent to Rt. 52) and bridges (Rt. 52 highway bridge). The estimated water depth due to the possible dam failure discharge of 16150 CFS may range from 17.0 feet at the dam to 15.0 feet at a distance of 14000 feet downstream.
- e. Ownership. The Eagleville Lake Dam is owned by the State of Connecticut and is operated and maintained by the Department of Environmental Protection.

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

Mr. Robert Jones, Acting Chief
Fisheries Unit
State of Connecticut D.E.P.
Hartford, Connecticut
(203) 566-2287

The individual charged with gate operation is:

Mr. C. Phillips
Region 3 D.E.P.
Marlborough, Connecticut
(203) 295-9523

- g. Purpose of Dam. The Eagleville Lake impoundment is used for recreation.

- h. Design and Construction History. Eagleville Lake Dam was reportedly constructed about 1860. The first recorded correspondence obtainable is dated 1938 and consists of a series of photographs that show the failure of the embankment in the September, 1938 hurricane (See the photos in Appendix B). In this storm, the right embankment was washed out. Much of the correspondence on file pertains to the reconstruction of this portion of the embankment. During the period from 1938 to 1945, when repairs to the embankment were complete, the dam was owned by the Sterling Shoe Fiber Company. The repairs performed at this time included construction of a masonry corewall within the embankment.

Records also indicate that the embankment again failed by wash out in September of 1955. The embankment was rebuilt however no records of the reconstruction are available. Spillway length kept the same 170 feet during these repairs.

Correspondence dated May 19, 1961 declared the dam unsafe, however, the deficiencies are not indicated. Correspondence dated from March 27, 1963 indicates several of the cap stones were dislodged from the spillway crest, apparently by ice pressure. A report on the condition of Eagleville Lake Dam was prepared in January 1966 by Anderson Nichols Associates, Engineers, with recommendations for repair work. This report is included in Appendix B.

Contract drawings were issued in July of 1969 for repair of the Eagleville Lake Dam. The scope of work consisted of the following items.:

1. Construction of a concrete crest.
2. Outlet Works (rebuild)
3. Regrading of the general area and embankments
4. Stone Slope Paving

The work was completed and samples of the "As Built" drawings have been included in Appendix B of this report. The "As Built" drawings are dated May 1971.

Erosion problems with the right embankment occurred in May of 1973, when a section of the embankment became undermined downstream of the spillway leaving a cavity below the mortared stone slope paving. This erosion was repaired by filling the cavity with concrete and replacing the mortared riprap. No further correspondence, nor record, is available after 1973 of subsequent repair work at the dam.

- i. Normal Operating Procedures. The water level is normally uncontrolled. There are no operating procedures, therefore, for this dam.

1.3 Pertinent Data

- a. Drainage Area. Eagleville Lake is located on the common borders of Coventry and Mansfield in southeastern Connecticut. Most of the drainage area is within the limits of Tolland County, Connecticut. The basin is elongated in shape with a length of about 17 miles and an average width of about 6.5 miles and a total drainage area of about 110 square miles (see the drainage basin map in Appendix D.) The topography consists of generally rolling terrain which is moderately hilly in areas. The terrain varies in elevation from 800 feet NGVD to 277 feet NGVD at the spillway crest. The basin slopes range from about 0.02 to 0.04 feet/feet and are considered flat to moderate. The average time of concentration for the basin is estimated to be 15 to 18 hours which, considering the large area, results in the improbability of runoff peaking simultaneously at the reservoir site. The reservoir drainage area contains about 10% swampland which aids in the dampening of the surface runoff peaks.

4.	Top of Dam	284.0		
5.	Test Flood Pool Elevation	292.3		
6.	Flood Control Pool	Not Applicable		
7.	Recreation Pool (spillway crest)	277.0		
8.	Spillway Crest	277.0		
d.	<u>Reservoir Length. (Feet Scaled).</u>			
1.	Maximum Pool	5500		
2.	Recreation Pool	5500		
3.	Flood Control Pool	Not Applicable		
e.	<u>Storage (Acre-Feet) .</u>			
1.	Recreation Pool (spillway crest)	320		
2.	Flood Control Pool	Not Applicable		
3.	Test Flood (elevation 292.3)	1590		
4.	Top of Dam	900		
5.	Net storage between top of dam and spillway crest is 580 Ac-Ft. and represents 0.10 inches of runoff from the drainage area of 110 square miles.			
6.	Each foot of surcharge storage above spillway crest to top of dam equals 0.014 inches of runoff from the drainage area of 110 square miles.			
f.	<u>Reservoir Surface (acres).</u>			
1.	Top of Dam	83		
2.	Maximum Pool	83		
3.	Flood Control Pool	Not Applicable		

	4.	Recreation Pool (spillway crest)	83		
	5.	Spillway Crest	83		
g.		<u>Dam</u>			
	1.	Type (based on visual inspection and records)	Earth embankment		
	2.	Length (including spillway)	520 feet		
	3.	Height	22.0 feet		
	4.	Top Width	20.0		
	5.	Side Slopes	3H to 1V		
	6.	Zoning	Unknown		
	7.	Impervious Core	Unknown (at one time a masonry core was present)		
	8.	Cutoff	Unknown		
	9.	Grout Curtain	Unknown		
h.		<u>Spillway.</u>			
	1.	Type	Overflow, sharp crest, stone and concrete, vertical fall.		
	2.	Length of weir	170 feet		
	3.	Crest Elevation	277.0 NGVD		
	4.	Gates	None		
	5.	Upstream Channel	Natural Bed		
	6.	Downstream Channel	Natural Bed with stone apron.		
i.		<u>Regulating Outlet.</u>			
		Refer to Paragraph 1.2b,			

"Description of Dam and Appurtenances", Page 3 for description of outlet works.

- | | | |
|----|-------------------|---|
| 1. | Downstream invert | 264.3 NGVD |
| 2. | Size | 42" x 42" |
| 3. | Descriptions | Rectangular stone masonry structure |
| 4. | Control Mechanism | Hand-operated gear mechanism vertical hoist |
| 5. | Other | Outlet to former mill is abandoned and sealed with precast concrete slabs and earth fill. |

SECTION 2

ENGINEERING DATA

- 2.1 Design. No design data is available for this dam.
- 2.2 Construction Data. No record of original construction is available for this dam. Some records pertaining to repair work since 1939 are available. These records consist of correspondence and visual inspection reports. As-built drawings for repair work performed in 1970 as well as other selected inspection reports have been included in Appendix B of this report. Boring logs for 1970 modifications are on file at the Connecticut Department of Environmental Protection in Hartford. See Appendix B.
- 2.3 Operation Data. No records are maintained of gate operation.
- 2.4 Evaluation of Data.
- a. Availability. There are no plans, specifications or computations available from the Owner regarding the design of this dam. Limited correspondence pertaining to repair work and field inspections, and certain contract documents were available from the Owner (State of Connecticut, Department of Environmental Protection).
 - 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, and sound engineering judgment.
 - c. Validity. The validity of the limited data must be verified.

SECTION 3
VISUAL INSPECTION

3.1 Findings

- a. General. Based on the visual inspection, a review of the correspondance on file, and its general appearance, Eagleville Lake Dam is judged to be in FAIR condition.

Portions of the embankment consist of grassed surfaces, other portions are without grass cover. Extensive erosion areas exist in some of the ungrassed areas of embankment crest and downstream slope. No riprap is present along the upstream slope of the embankment and this has contributed to the erosion problems.

The outlet works appeared to be in generally fair condition. Records indicate that the gate mechanism was installed in 1970 and at the present time appears to be in good working order.

The masonry spillway, at the time of inspection, was not visible due to the large discharge of water flowing over the crest.

- b. Dam. The dam consists of a central stone masonry spillway weir section with short earth embankment sections on either side. The locations of the abutments are not well-defined. The earth embankment section on the right side of the spillway is very broad and has a lower crest elevation than the section to the left of the spillway. According to available plans and records, the section on the right side of the spillway is designed to act as an emergency spillway during periods of high flow.

1. Upstream Slope. The upstream slope in the vicinity of the left abutment is overgrown with brush and trees up to 16 inches in diameter. There is no riprap protection on the slope, and extensive erosion has occurred. Erosion gullies 2 to 3 feet wide and 1 foot deep were observed in this area.

To the right of the left abutment area, the upstream slope makes a 90° bend and runs parallel to the riverbank for a distance of about 100 feet. A vertical stone masonry wall, with unmortared joints, forms the upstream face in this section. A 12-foot

section of the wall has fallen, resulting in erosion of the soil behind the wall.

An abandoned intake is located at the downstream end of the stone masonry wall section that runs parallel to the riverbank. To the right of the intake structure, the upstream slope makes another 90° bend and resumes its course perpendicular to the riverbank. There is no riprap protection on the slope and extensive erosion has occurred. An erosion scarp extends about 2 to 3 feet up from the waterline, and the slope is cut by a number of erosion gullies. Erosion gullies about 6 feet wide and 2 feet deep adjacent to the old intake structure and left spillway training wall were observed. The old intake structure is shown in Photo C-9.

The upstream slope to the right of the spillway is generally gentle, as shown in Photo C-3. There is no riprap protection on the slope and some erosion has occurred. An erosion scarp near the spillway approach channel and an eroded area about 15 to 20 feet wide were observed near the right abutment. The slope in this vicinity is overgrown with brush and small trees.

2. Crest. To the left of the spillway, the crest is rutted by vehicular traffic and grass cover is sparse or missing. The crest to the right of the spillway is grass covered and reasonably well maintained.

The embankment to the right of the spillway is designed to act as an emergency spillway during periods of high flow. The crest in this section slopes down from a high point at the right abutment to a low point about 50 feet to the right of the spillway and then back up to the right end of the spillway. The low point in the crest forms part of a swale or saddle and is designed to channel flow around the right end of the spillway. The crest of the right end of the spillway is covered with a concreted-riprap apron, shown in Photos C-2 and C-4. The crest is very broad and the transition between the crest and slopes is not well-defined.

3. Downstream Slope. To the left of the spillway, the downstream slope shows signs of extensive trespass-

ing (foreground of Photo C-1). Grass cover is largely missing and the slope is rutted with numerous vehicular tracks up to 6 inches deep. An erosion gully about 2 feet wide was observed adjacent to the left spillway training wall, shown in Photo C-1 near the spillway and in C-11 downstream of the spillway. Several large bushes are growing in one area of the slope.

To the right of the spillway, the downstream slope is extremely gentle, grass covered and reasonably well-maintained, as shown in Photo C-2. The downstream end of the concreted-riprap apron at the right end of the spillway is cracked and broken, and erosion is occurring along the downstream edge of the apron, as shown in Photo C-10.

c. Appurtenant Structures. These structures include the spillway, outlet works, and the abandoned mill intake.

1. Spillway. The general configuration of the spillway is shown in Photos C-1 and C-2. Water was overflowing the spillway at the time of inspection and the structure was not observable in detail.

A vertical stone masonry training wall with mortared joints is located at the left side of the spillway. Much of the mortar is missing from between the stones, and some of the capstones are missing. The right side of the spillway is bordered by an earth slope and by the concreted-riprap apron which forms the right abutment of the spillway. There is no riprap protection on the earth slope, and an erosion scarp has formed above the waterline.

The left spillway training wall is a vertical stone masonry wall with mortared joints to a distance of about 50 feet upstream from the spillway crest. At this point the wall changes to unmortared stone masonry. Much of the pointing is missing from between the stones in the vertical masonry section, and a large stone is missing from the wall about 2 feet above the channel floor and 5 feet downstream from the spillway crest. There are trees growing in and overhanging the downstream spillway channel along the left training wall about 100 feet downstream from the spillway crest, as shown in the extreme left of Photo C-7.

The right spillway training wall, shown in Photo C-10, consists of a short vertical stone masonry wall with mortared joints at the spillway crest and the concrete-riprap apron which extends about 20 feet downstream from the spillway crest. There is no training wall in a section extending about 60 to 70 feet downstream from the edge of the apron where the swale in the embankment, described previously, intercepts the downstream channel. There is some riprap in this section, but the cover is only partial and much of the slope is unprotected, as shown in Photo C-10. Downstream from this section the channel is bordered by a dry stone masonry wall.

2. Outlet Works. The outlet works consists of a mortared stone masonry structure located at the left abutment of the spillway. The structure has one 42-inch square vertical lift operable gate which was installed in 1970. This gate is shown on the as-built drawings in Appendix B and in Photos C-5 and C-6.

Prior to the rehabilitation work in 1970, the outlet works had a large diameter circular pipe outlet in addition to the rectangular opening. This pipe is visible in the old photographs and appears to have been about 50 to 60 inches in diameter. The cradle which formerly supported this pipe as well as the sealed opening in the face of the outlet works are both visible in Photo C-6.

Considerable seepage was observed emerging from the downstream face of the outlet works structure through open joints in the stone masonry. The open joints in the structure are also harboring significant growth of grass and vegetation. This vegetation as well as the seepage cascading over the face of the structure are visible in Photo C-6.

3. Abandoned Mill Intake. This structure is shown in Photos C-9 and C-3 (background). This intake was of no further use when the mill facility ceased to exist. It was sealed with concrete panels as part of the repair work in 1970. The downstream end of this water course through the old mill is filled with earth.

The tailrace for this abandoned intake was visible at the highway bridge (CT Rt. 275).

- d. Reservoir Area. No specific detrimental features in the reservoir area were noted during the inspection. The slopes and banks of the reservoir appear to be well covered with vegetation. See the overview photograph at the beginning of this report.
- e. Downstream Channel. The downstream channel is shown in Photographs C-7 and C-8. The channel consists of the natural streambed of the Willimantic River. The channel is clear of overhanging trees to a distance of about 100 feet downstream of the spillway at which point the streambanks became wooded.

3.2 Evaluation. Based on the visual inspection, the dam appears to be in fair condition. The inspection disclosed the following items which require attention.

- a. Trees and brush are growing on the upstream slope in the vicinity of the abutments.
- b. There is no riprap protection on the upstream slope and the right bank of the spillway approach channel, and extensive erosion has occurred.
- c. There is evidence of extensive trespassing on the embankment section to the left of the spillway. The crest and downstream slope are rutted with numerous vehicular tracks and grass cover is mostly missing.
- d. Extensive seepage is occurring through the outlet works structure.

SECTION 4

OPERATIONAL PROCEDURES

- 4.1 Procedures. The water level for Eagleville Lake Dam is generally uncontrolled. Normal operating procedures allow all discharges to pass over the uncontrolled spillway with the outlet works closed. The sluice gate for the outlet is tested usually twice annually to insure that it remains operable. As a rule, the outlet gate has been opened only for maintenance and repair work. No formal contingency plan for emergency operation or standby activity exists. The gate operation handle is kept in the possession of the gate tender, Mr. C. Phillips, Region 3, D.E.P., Marlborough, Connecticut. Any orders directing gate operation would come from the Department of Environmental Management in Hartford.
- 4.2 Maintenance of the Dam. Maintenance of the facilities has occurred on an as-needed basis by the State of Connecticut through the regional personnel of the Department of Environmental Protection. The site is visited by D.E.P. personnel weekly.
- 4.3 Maintenance of Operating Facilities. A program for testing the operation of the sluice gate twice annually is in effect by the regional staff of the Department of Environmental Protection.
- 4.4. Description of Any Warning System in Effect. Emergency action would be coordinated through Mr. C. Phillips, Region 3, D.E.P., Marlborough, Connecticut (203)295-9523.

Emergency notification would be directed to the State Police.

- 4.5 Evaluation. Deficiencies exist in the dam maintenance program as it now exists.
- a. Erosion on the upstream slopes of the dam should be repaired and protected.
 - b. Trees are taking hold on the slopes and the growth should be checked before they reach excessive size.
 - c. An emergency action plan should be developed to prevent or minimize the impact of failure. Such a plan would list the expedient actions to be taken and authorities to be notified.

SECTION 5

HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

- a. General. Eagleville Lake Dam is located on Willimantic River and has a history of failure which occurred during 1938 and 1955 floods. There was damage to the dam in other storms. Repairs have been carried out following each period of damage. This dam has a spillway length of 170 feet and surcharge height of 7.0 feet between top of dam and spillway crest. The total length of the dam is approximately 520 feet. Eagleville Lake has a total storage capacity of 320 AC-ft. at the spillway crest elevation of 277.0 ft. NGVD, and can accommodate 0.05 inches of runoff from its drainage area of 110 square miles. Every foot of depth in the reservoir above the spillway crest to the top of dam can accommodate 83 AC-ft. of water, which is equivalent to 0.014 inches of runoff.

The 170-foot long spillway constitutes 33 percent of the dam length.

The surcharge storage of 580 AC-ft. (equivalent to 0.10 inches of runoff) makes this dam a low storage facility. A maximum spillway capacity of 11,300 CFS is 30.7 percent of test flood. Since the dam is an earth embankment, it is considered less stable against overtopping and erosion.

- b. Design Data. Limited design data is available for the watershed and structures of Eagleville Lake Dam. To supplement the existing information, U.S.G.S. Topographic Maps (Scale 1" = 2,000') were utilized to develop hydrologic parameters such as drainage areas, reservoir surface areas, basin slopes, time of concentration and other runoff characteristics. Elevation - storage relationships for the reservoir were approximated. Surcharge storage was computed assuming that the surface area remained constant above the spillway crest.

Outflow values (routing procedures) and dam failure profiles were computed in accordance with the guidelines developed by the Corps of Engineers. Final values used in this report are quite approximate, and should not be considered a substitute for actual detailed analysis.

- c. Experience Data. Certain historical data for recorded discharges and water surface elevations are available for this dam site and at a U.S.G.S. gaging station (01119500) located 2.7 miles downstream. These historical recorded data is listed below.

Location	Mile Above Mouth	Date	Discharge in CFS	W.S.E. (NGVD)
i) U.S.G.S. gage (01119500)	39.0	Aug., 1955	24200	257.70 with 18.66 gage height
ii) Eagle-ville Pond Dam Site	41.7	Aug., 1955	22000	284.90/282.0
		Sept., 1938	12900	---
		March, 1936	7600	---

Records indicate that failure of the right embankment of the dam occurred in September 1938 and in September 1955. A photographic record of the 1938 failure included in Appendix B of this report. The dam was repaired following each failure.

- d. Visual Observations. Visual observations at this dam indicate the following areas of concern:

1. Erosion of the backfill is taking place through the spillway training walls.
2. There is limited freeboard (height of spillway crest to top of dam) of 7.0 feet available for this dam.
3. The outlet structure masonry is not well maintained and the gate control is subject to vandalism.
4. Considerable seepage is occurring through the stone masonry joints of the outlet works.
5. High floods may damage the South Eagleville Road bridge (CT Rt 275) and erode the railroad embankment adjacent to the dam site.

- e. Test Flood Analysis. Recommended guidelines for the Safety Inspection of Dams by the Corps of Engineers were used for selection of the "Test Flood." This dam is classified as a significant hazard and small in size. Guidelines indicate that a one-half P.M.F. to 100-year frequency event be used as the range of test flood for such classifications. This watershed has a total drainage area of 110 sq. miles and of this 110 sq. miles, about 11.0 sq. miles (10%) is swampy or covered by storage reservoirs. The basin slopes vary from approximately 0.02 - 0.04 feet/foot which can be considered as flat to moderate and the general terrain is rolling. A "test flood" equal to the one-half P.M.F. was calculated to be 350 CSM, equal to 34,800 CFS for a drainage area of 110 sq. miles. Outflow discharges were developed for approximate routing using the Corps of Engineers criteria. Outflow discharge for the test flood inflow was 38,500 CFS. Additional design data developed for this investigation is tabulated at the end of this section.

The spillway capacity is hydraulically inadequate to pass the "test flood" (one-half PMF) and would overtop the dam approximately 8.3 ft assuming overflow length of dam to be approximately 350 feet. The inflow and outflow discharge value for this test flood are 38,500 CFS and 34,800 CFS, respectively. The maximum outflow capacity of the spillway, in a still reservoir, without overtopping of the dam is 11,300 CFS which is 32.5 percent of the test flood overflow discharge. Overtopping potential for discharges of lesser magnitude and frequency computed approximately, are listed in the table at the end of this section. The spillway, tailwater and outlet rating curves are also in Appendix D.

At the spillway crest (elevation 277) the capacity of the outlet structure is 203 CFS. It would require 4.9 hours to lower the reservoir level the first foot assuming a surface area of 83 acres.

Each foot depth of reservoir above the spillway crest can accommodate about 0.014 inches of effective rainfall.

Overtopping of the dam by the test flood cannot be eliminated even if the water level is maintained several feet lower than the spillway crest elevation.

- f. Dam Failure Analysis. This dam is classified as a SIGNIFICANT hazard structure because it is located in an

area where its failure discharge can cause damage due to high velocity, impact from debris and flooding to secondary or primary roadways (Route 52), interruption of utility service (those utilities adjacent to Rt. 52), and bridges (Rt. 52 highway bridge). The estimated water depth due to the possible dam failure discharge of 16154 CFS may range from 17.0 feet at the dam to 15.0 feet at a distance of 14000 feet downstream.

The calculated dam failure discharge of 16154 CFS with the impounded water level at the top of the dam will produce an approximate water surface elevation of 279.0 immediately downstream from the dam. This will raise the water surface approximately 2.0 feet over and above the depth just prior to failure when the discharge is 11,300 CFS. Normal uniform flow, based on Manning's formula will occur approximately 14,000 feet downstream from the dam with a depth of flow equal to 15.0 feet. For a distance of 14,000 feet from the dam, the depth of flow will decrease from 17.0 feet to 15.0 feet. Water surface elevations due to dam failure and tailwater rating curves are in Appendix D.

Probable consequences, including the prime impact areas, if the dam were to fail are also listed at Appendix D.

Eagleville Lake Dam

Inflow, Outflow and Surge Data

FREQUENCY IN YEARS	24-HOUR TOTAL RAINFALL IN INCHES	24-HOUR* EFFECTIVE RAINFALL IN INCHES	MAXIMUM INFLOW IN C.F.S.	MAXIMUM** OUTFLOW IN C.F.S.	SURCHARGE HEIGHT IN FEET	SURCHARGE STORAGE ELEVATION
10	5.0	2.6	8,500	6,000	4.9	281.9
50	6.5	4.1	16,600	14,400	9.0	286.0
100	7.0	4.6	18,500	16,800	9.9	286.9
1/2 PMF	11.9	9.5	38,500	34,800	15.30	292.3

= Test Flood

*Infiltration assumed as 0.1"/hour.

**Lake assumed initially full at spillway crest elevation 277.0.
(top of dam = 284.0).

NOTES:

1. Q_{10} ; Q_{50} ; Q_{100} ; inflow discharges were computed by the approximate methodology of the Soil Conservation Service.
2. One-half MPF and "test flood" computation based on COE instructions and guidelines.
3. Maximum capacity of spillway without overtopping the top of the dam (elevation 284.0) is equal to 11,300 C.F.S.
4. All discharges indicated are dependent upon the continued integrity of upstream storage reservoirs.
5. Surge storage is allowed to overtop the dam when exceeding the spillway capacity.
5. Test flood = Half PMF = 350 CSM = 38,500 CFS
(D.A. = 110.0 square miles).

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

- a. Visual Observations. The visual inspection did not disclose any immediate stability problems.
- b. Design and Construction Data. There is not sufficient design and construction data to permit a formal evaluation of stability.
- c. Operating Records. Available records indicate that the earth embankment to the right of the spillway was breached in 1938 and again in 1955. There are no operating records available.
- d. Post Construction Changes. Major repairs were made to the dam in 1970, including: regrading of the earth embankment sections, repair of the spillway and outlet gates, sealing of the intake structure located in the left earth embankment section, installation of a toe drain trench in the right embankment section and construction of the concreted-riprap apron at the right end of the spillway. According to the available records, a decision was made at this time to design the earth embankment section to the right of the spillway to act as an emergency spillway during periods of high flow. The records indicate that the likelihood of periodic overtopping and "washout" of the right earth embankment was recognized. The following excerpt is taken from a letter by Anerson-Nichols Associates to the State Water Resources Commission, dated October 19, 1965:

"We note that the river valley for several miles downstream from Eagleville Dam is virtually unoccupied except for the railroad which is reasonably high. It is probable that nearly all the dollar damage sustained by structures due to overtopping the embankment at Eagleville Dam occurs at the highway below the dam and at the dam itself. The cost of repairing these structures after flood is much less than the cost of modifying the dam. Restoration of the original design with a low spot in the west abutment may be the most practical solution and should be considered."

The following excerpt is taken from a report prepared by Anderson-Nichols Associates, dated January 17, 1966:

"In effect, the west abutment (right earth embankment section) has been serving as a safety plug for the dam during major flood flows. This procedure is seldom followed in present day design practices. It is suggested that the Water Resources Commission be consulted to determine whether or not they would continue to permit it. Existing up and downstream conditions are, in our opinion, such that the "wash-out" of the west abutment will not materially contribute to flood damage."

The following excerpt is taken from a State Water Resources Commission interdepartment memo, dated October 31, 1967:

"The proposed work can best be described as major maintenance. It is expected that future floods in excess of 4000 to 5000 CFS will overtop the dam and that washouts will occur. This situation is probably acceptable considering present downstream conditions."

The following excerpt is taken from a State Water Resource Commission memo containing review comments on the preliminary design of repairs, dated November 26, 1968:

"As designed, there would be overtopping of the west abutment approximately every 15 years which would probably cause a washout of this abutment. It would therefore be better to direct this flow in a controlled manner to keep such erosion away from the masonry spillway section. The proposed contours would not provide for this. Consideration should be given to providing a channel (similar to an emergency spillway) in this fill so that if it does fail thru erosive flow, it will fail in a more desirable and predictable area."

Consideration was apparently given to protecting the emergency spillway channel with riprap, but this way apparently eliminated due to cost considerations. The following excerpt is from a State Water Resources Commission memo-to-file, dated May 6, 1969, describing the decisions made at a meeting held on May 5, 1969:

"The preliminary plan of extensive riprapping of an emergency spillway at the west abutment was eliminated, in preference to an earth abutment with a channel defined therein, the upper end of which would have a berm with elevation 281+. (The spillway crest is at 277.)"

- e. Seismic Stability. Eagleville Dam is located in Seismic Zone 1 and in accordance with the recommended Phase I guidelines does not warrant a seismic analysis.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, AND REMEDIAL MEASURES

7.1 Dam Assessment.

- a. Condition. The visual inspection indicated that the Eagleville Lake Dam is in FAIR condition. The major concerns regarding this dam and its continued long term performance are the following:
 1. Remove tree and brush growth on the upstream slopes.
 2. Provide riprap protection for the upstream slopes.
 3. Evaluate the causes of failure of the right embankment and take necessary corrective steps.
 4. Repair erosion gullies and install cover material to prevent further erosion on dam embankment crest and downstream slope.
 5. Repair the concreted riprap at the right spillway abutment.
 6. Evaluate spillway surfaces at a period of flow when the structure is visible. Repair spillway if needed. Perform more detailed hydrological studies of spillway adequacy.
- 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 the visual inspection, past performance history and sound engineering judgment.
- c. Urgency. The recommendations and remedial measures described below should be implemented by the Owner within one year after receipt of this Phase I Inspection Report.
- d. Need For Additional Investigation. No data was recovered for this inspection that indicates that formal engineering analyses were ever performed for the construction of this dam. The visual inspection and operational history indicate that attention should be given to the collection

of current data in order that the recommendations listed below may be implemented.

7.2 Recommendations. The Owner should engage the services of an engineer experienced in the design of dams to accomplish the following:

- a. The maximum discharge capacity of the dam is not considered adequate. Further hydrologic studies are necessary to determine alternative measures necessary to increase the discharge capabilities at the dam and reduce the overtopping potential.
- b. Suitable riprap protection should be designed and installed on the upstream slope, the right bank of the spillway approach channel, and the area where the swale in the right embankment intercepts the downstream spillway channel.
- c. As noted previously, the right earth embankment section could be overtopped and washed out during periods of high flow. The decision to design the embankment to act as an emergency spillway was based on an evaluation of the then existing downstream conditions and probable consequences of failure of the embankment. An engineering study should be performed to determine whether the present downstream conditions are such that this design is still acceptable.
- d. Trees and brush growing on the upstream slope in the vicinity of the abutments should be removed, the stumps removed, and the holes compacted with proper backfill.
- e. Evaluate the condition of the spillway surfaces and joints under low flow conditions when these features are visible and develop a program for rehabilitation if required.

7.3 Remedial Measures.

- a. Operation and Maintenance Procedures
 1. Existing erosion gullies should be filled and grass planted where unprotected soil is exposed.
 2. The concreted-riprap apron at the right end of the spillway should be repaired where it is cracked and broken.

3. Provisions should be taken to prevent trespassing on the downstream slope and crest of the dam.
4. Develop a system for the recording of data with regard to water levels, discharges, time and draw-down characteristics. This will assist those responsible for the monitoring of the structure.
5. Implement and institute a program to clear and rehabilitate the spillway discharge channel of vegetation in order to increase the efficiency of discharges downstream of South Eagleville Road (CT Rt. 275).
6. Modify the outlet structure by providing a covered and locked enclosure for protection of the gate mechanism against vandalism. Repair the outlet structure such that seepage is reduced or eliminated.
7. Training walls require repair to replace dislodged stonework and repair of eroded backfill.
8. The toe of the railroad embankment needs protection against erosion during high floods.
9. Institute a program of annual periodic technical inspection.
10. Develop and post an emergency action plan including a warning system in order to prevent or minimize the impact of dam failure.
11. Surveillance during high intensity rainfall should be performed to monitor erosion and possible overtopping.

7.4 Alternatives

None.

APPENDIX A
INSPECTION CHECK LIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Eagleville Lake Dam DATE April 17, 1979

TIME AM

WEATHER Partly Cloudy - Cool

W.S.ELEV. _____ U.S. _____ D.S.

PARTY :

- | | |
|----------------------|----------------------------------|
| 1. <u>A. Reed</u> | 6. <u>J. Smutnick CT. D.E.P.</u> |
| 2. <u>S. Khanna</u> | 7. _____ |
| 3. <u>R. Brown</u> | 8. _____ |
| 4. <u>R. Murdock</u> | 9. _____ |
| 5. <u>D. Shields</u> | 10. _____ |

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

PERIODIC INSPECTION CHECK LIST

PROJECT Eagleville Lake Dam DATE April 17, 1979
 INSPECTOR _____ DISCIPLINE _____
 INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>DAM EMBANKMENT</u>	
Crest Elevation	277.0 NGVD
Current Pool Elevation	277.7
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed.
Pavement Condition	Right embankment is grassed; left embankment has no grass cover and is rutted by vehicular traffic.
Movement or Settlement of Crest	None observed.
Lateral Movement	None observed.
Vertical Alignment	Irregular (by design) Portion of right embankment lower than left.
Horizontal Alignment	Left embankment good, right embankment irregular.
Condition at Abutment and at Concrete Structures.	Erosion of slopes at spillway and control gate contacts.
Indications of Movement of Structural Items on Slopes.	None observed.
Trespassing on Slopes	Extensive damage from vehicular traffic on left embankment section.
Sloughing or Erosion of Slopes or Abutments.	Extensive erosion gullies and scarps on upstream slopes, some gullies on downstream slope.
Rock Slope Protection - Riprap Failures	No riprap, erosion scarp extending 2 - 3 ft. above water line on upstream slope.
Unusual Movement or Cracking at or Near Toes	None observed.
Unusual Embankment or Downstream Seepage	None observed.

PERIODIC INSPECTION CHECK LIST

PROJECT Eagleville Lake Dam DATE April 17, 1979
 INSPECTOR _____ DISCIPLINE _____
 INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<p><u>DAM EMBANKMENT</u></p> <p>Piping or Boils</p> <p>Foundation Drainage Features</p> <p>Toe Drains</p> <p>Instrumentation System</p> <p>Vegetation</p>	<p>None observed.</p> <p>Plans show toe drain trench in right embankment - outlet not observed.</p> <p>None observed.</p> <p>None observed</p> <p>Partial grass cover on slopes, some brush and small trees on upstream slope.</p>

PERIODIC INSPECTION CHECK LIST

PROJECT Eagleville Lake Dam DATE April 17, 1979

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>DIKE EMBANKMENT</u>	Not Applicable.

PERIODIC INSPECTION CHECK LIST

PROJECT Eagleville Lake Dam DATE April 17, 1979
 INSPECTOR _____ DISCIPLINE _____
 INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<p><u>OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u></p> <p>a. Approach Channel</p> <p style="padding-left: 20px;">Slope Conditions</p> <p style="padding-left: 20px;">Bottom Conditions</p> <p style="padding-left: 20px;">Rock Slides or Falls</p> <p style="padding-left: 20px;">Log Boom</p> <p style="padding-left: 20px;">Debris</p> <p style="padding-left: 20px;">Drains or Weep Holes</p> <p>b. Intake Structure</p> <p style="padding-left: 20px;">Condition of stone masonry</p> <p style="padding-left: 20px;">Stop Logs and Slots</p>	<p>Straight, unobstructed approach</p> <p>Not observable</p> <p>Not observable</p> <p>Not observable</p> <p>None</p> <p>Not observable</p> <p>Not observable</p> <p>Mortared Stone Masonry structure which is part of control tower.</p> <p>Fair</p> <p>None.</p>

PERIODIC INSPECTION CHECK LIST

PROJECT Eagleville Lake Dam DATE April 17, 1979
 INSPECTOR _____ DISCIPLINE _____
 INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	
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	Mortared stone masonry structure Fair Open and leaking, filled with grass and poison ivy. Minor None observed. None observed Yes, considerable seepage Joints in stone masonry poorly aligned. Not Applicable Open joints in stonework Yes
b. Mechanical and Electrical	Gear-operated rising stem vertical lift gate.

PERIODIC INSPECTION CHECK LIST

PROJECT Eagleville Lake Dam DATE April 17, 1979

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u>	Conduit consists of rectangular opening through control tower.

PERIODIC INSPECTION CHECK LIST

PROJECT Eagleville Lake Dam DATE April 17, 1979
 INSPECTOR _____ DISCIPLINE _____
 INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<p><u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u></p> <p>Channel</p>	<p>See control tower.</p> <p>Outlet channel is the same as the spillway discharge channel. See spillway discharge channel.</p>

PERIODIC INSPECTION CHECK LIST

PROJECT Eagleville Lake Dam DATE April 17, 1979
 INSPECTOR _____ DISCIPLINE _____
 INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<p><u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u></p> <p>a. Approach Channel</p> <p> General Condition</p> <p> Loose Rock Overhanging Channel</p> <p> Trees Overhanging Channel</p> <p> Floor of Approach Channel</p> <p>b. Weir</p> <p>b' Training Walls</p> <p> General Condition of Stone Masonry</p> <p> Rust or Staining</p> <p> Spalling</p> <p> Any visible Reinforcing</p> <p> Any Seepage or Efflorescence</p> <p> Drain Holes</p> <p>c. Discharge Channel</p> <p> General Condition</p> <p> Loose Rock Overhanging Channel</p> <p> Trees Overhanging Channel</p> <p> Floor of Channel</p> <p> Other Obstructions</p>	<p>Straight, unobstructed</p> <p>Face of masonry not visible due to water flow.</p> <p>None observed.</p> <p>Few</p> <p>Not observable, underwater</p> <p>Weir not visible due to water flow.</p> <p>Mortared stone masonry walls, left training wall is control tower.</p> <p>Fair.</p> <p>None observed.</p> <p>Minor</p> <p>Not applicable</p> <p>Considerable seepage noted</p> <p>None observed.</p> <p>Good</p> <p>None observed</p> <p>Yes</p> <p>Natural river bed.</p> <p>Bridge two hundred feet downstream from spillway.</p>

PERIODIC INSPECTION CHECK LIST

PROJECT Eagleville Lake Dam DATE April 17, 1979

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SERVICE BRIDGE</u>	None.

APPENDIX B
ENGINEERING DATA

APPENDIX B-1

OPERATING, CONSTRUCTION AND MAINTENANCE
RECORD LOCATIONS

Mr. Victor J. Galgowski, Dam Safety Engineer
and

Mr. Robert Jones, Acting Chief, Fisheries Unit.

Both are located at:

Department of Environmental Protection
State of Connecticut
State Office Buildings
Hartford, Connecticut 06115

APPENDIX B-2

SELECTED COPIES OF PAST INSPECTION REPORTS
AND PHOTOGRAPHS

1. Four photographs showing failure of dam embankment September, 1938.
2. Inspection Report April 10, 1963. John J. Mozzocki and Assoc. to Water Resources Commission, State of Connecticut.
3. Report from Anderson Nichols Assoc. to Water Resources Commission, State of Connecticut, October 19, 1965.
4. Report from Anderson Nichols Assoc. to Board of Fisheries and Game, State of Connecticut, January 17, 1966.
5. Inspection Report from Morgan S. Ely (Water Resources) to Samuel Suffern, Water Resources (May 14, 1973).



EAGLEVILLE LAKE DAM

Photographs taken during and after flooding from the September, 1938 Hurricane.

JOHN J. MOZZOCHI AND ASSOCIATES

CIVIL ENGINEERS

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

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

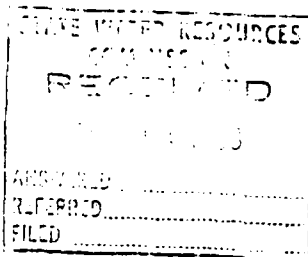
April 10, 1963

JOHN J. MOZZOCHI

ASSOCIATES

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

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



REPLY TO: Glastonbury

Our File 57-73-39
Re: Eagleville Lake Dam
Coventry - Mansfield, Connecticut

Dear Sir:

As per your instructions of April 3rd, Mr. Joseph C6ne and the undersigned inspected the referenced dam on Monday April 8, 1963.

This dam is a masonry faced dam with unmortared joints, about 215 ft. long with an effective spillway length of about 153 ft. It appears that the westerly 85' of the spillway was constructed about 1' higher than the easterly 110 ft. and it was noted that about 50 ft. of this westerly section (nearer the center) had the top layer of spillway cap stones moved outward to overhang the spillway face about 12 inches. About 4' further down, the spillway face in this area appeared to have been bulged, or pushed out, about 4" - 6". The easterly 110' of the spillway does not show any noticeable bulging or shifting of the capstones. About in the midsection of the spillway, capstones have been lost for a distance of about 25 feet. Inconsequential leakage throughout the face of the spillway was noted.

A perusal of the lengthy records of this dam, on file in the Commission's office, reveal that the western embankment was breached in the 1938 flood, finally rebuilt about 1945 and again breached in 1955. There appears to be no record of any plans or permit for the 1955 repairs and it is assumed that the entire present westerly embankment was made from whatever material was readily available. For some unknown reason, this embankment was carried into the pond in front of the spillway to make the westerly 31 feet of the spillway inoperative. Since the easterly embankment and abutment appear to be about 2 feet higher than the westerly abutment, there is no references in the record of this easterly embankment having been breached. However, we did find that a section of the dismantled mill, adjacent to the sluiceway, is now only 4 feet above the spillway and could be readily breached.

We calculate that a 6 ft. head on the spillway will carry a discharge of about 12,500 C.F.S. as compared to the 1938 flood discharge of 13,600 C.F.S. and a 1955 flood discharge of 21,000 C.F.S. (Based on the South Coventry Gage Station No. 43 records and pro-rated for upstream location of dam.)

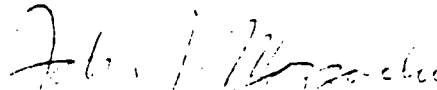
Based upon the limited field data obtained during our inspection, and on our rough calculations, we recommend that a full and detailed survey of the existing conditions be made and that modifications of this dam be required to accommodate safely the expected flood. Although we feel that the dam is in no immediate danger of collapse, we do believe that, in the event of a flood of the magnitude of the 1938 flood, this dam would be in danger and could cause damage to life and property.

In addition to the above general recommendations, we specifically recommend:

1. That the westerly section of the spillway be re-built to eliminate the bulge in the downstream face, reset the capstones to proper alignment and lower them to match the level of the easterly section;
2. Remove the embankment from in front of the westerly end of the spillway;
3. Provide additional discharge capacity by utilizing the existing penstock and flume; and
4. Build up the east embankment and low section in the mill area.

Although compiled by the undersigned, this report has been read to Mr. Cone and has received his approval.

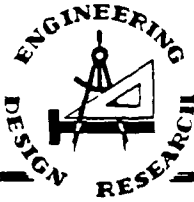
Very truly yours,



John J. Mozzochi and Associates
Civil Engineers

JJM:hk

cc: Mr. Joseph Cone



ANDERSON-NICHOLS ASSOCIATES

A CO-ORDINATED ENGINEERING SERVICE

303 CORNING BUILDING 11 ABYLUK STREET HARTFORD 3, CONN.

19 October 1965

Mr. John Curry,
Chief Engineer
Water Resources Commission
State Office Building
Hartford, Connecticut

STATE WATER RESOURCES COMMISSION RECEIVED OCT 21 1965 ANSWERED _____ REFERRED _____ FILED _____

Dear Mr. Curry:

Under our Contract with the Connecticut Board of Fisheries and Game we are investigating the condition of the Eagleville Dam on the Willimantic River in Coventry and Mansfield, Connecticut. Our review of the hydrologic record at this dam shows that the full spillway capacity with water at the top of the non-overflow sections of about 4000 cfs was exceeded by the 1936, 1938 and 1955 floods. Flows at the dam site for these floods were approximately as follows:

March 1936	7,600 cfs
September 1938	12,900 cfs
August 1955	22,000 cfs

Funds available for restoration of the dam are strictly limited. Restoration of the dam to its original condition will require repair of the spillway, reshaping the westerly abutment to make the entire spillway section available for flood flow, replacing the gates, and minor seepage control in the west abutment. These measures would restore the original spillway capacity of about 4000 cfs.

We have given some thought to provisions for larger floods. Raising the abutments one or two feet would be inexpensive but would provide only a small capacity increase. A one foot raise would increase discharge before overtopping to 5500 cfs and a two foot raise would increase to 7300 cfs about the flow of the 1936 flood. To pass the 1955 flood with the gates closed would require a nine foot abutment raise and with the gates open one foot less. The spillway structure itself is not capable of handling such surcharge without major structural changes which would involve a very large expenditure. Extensive flowage rights would also be necessary. Need to raise part of the Central Vermont Railroad may also be involved.

ANDERSON-NICHOLS ASSOCIATES

Mr. John Curry
Water Resources Commission
19 October 1965
Page Two

Increasing spillway length as a solution to the flood problem would be just as expensive as modifying the existing structure. Any saving in flowage rights would be needed for downstream channel excavation.

Passing the 1955 flood without overtopping the embankment can be accomplished only at major expense.

We note the existing west abutment is of earth. All large floods have washed this abutment out with very low cost repairs. The total area of Eagleville Pond at top of dam is about 300 acres. How much stored water has been released into any flood can only be a guess. It is quite certain however that the failure in August 1955 must have been long before the flood crest arrived and such damage as resulted from the failure would have been caused by the flood even if the failure had not occurred. The same is probably true for the 1938 flood.

We note that the river valley for several miles downstream from Eagleville Dam is virtually unoccupied except for the railroad which is reasonably high. It is probable that nearly all the dollar damage sustained by structures due to overtopping the embankment at Eagleville Dam occurs at the highway below the dam and at the dam itself. The cost of repairing these structures after flood is much less than the cost of modifying the dam. Restoration of the original design with a low spot in the west abutment may be the most practical solution and should be considered. Disruption of present private property usage and possible need to raise the Central Vermont Railroad would be eliminated. Existing land usage would be almost unchanged. The principal objection is the loss of the use of the highway after major floods until repairs are made. We note that the highway was inundated by tail-water during 1938 and 1955 so that loss of access during flood is not involved. We understand that a river crossing at high level is being considered for this road.

It is requested that we be informed of any spillway design criteria which your department will require for the restoration measures at Eagleville Dam.

Very truly yours,

ANDERSON-NICHOLS ASSOCIATES


W.F. Restall

WFR:sji



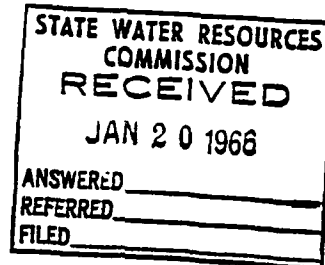
ANDERSON-NICHOLS
ASSOCIATES

A CO-ORDINATED ENGINEERING SERVICE

305 CORNING BUILDING 11 ABYLUM STREET HARTFORD 3, CONN.

January 17, 1966

Mr. Theodore Bampton, Director
Board of Fisheries and Game
State Office Building
Hartford, Connecticut



Dear Mr. Bampton:

This report on the condition, character and cost of restoring Eagleville Dam, is submitted in accordance with our contract dated September 29, 1965.

Summary - The Eagleville Dam is located on the Willimantic River in the Towns of Mansfield and Coventry. It consists of a stone masonry spillway, about 160 feet long with earth abutments tying into high ground on each bank. About ten feet of the crest near the center of the spillway and many of the chinking stones have been washed away. These will have to be replaced. The westerly abutment appears to be of random fill placed after washouts. It will require regrading and compaction. The easterly abutment appears to be in reasonably good condition. We estimate it will cost about twenty five thousand dollars (\$25,000) to restore the structure. The additional cost of providing a gate house with internal stop logs for reservoir regulation is estimated to be six thousand dollars (\$6,000).

Existing Conditions - Several field inspections were made to determine the condition of the dam, necessary repairs and the details for constructing a gate and stop log structure to facilitate reservoir operations. The findings are described herein.

West Abutment - Historical records and field inspections indicate the west abutment has been breached by past floods. Repairs apparently were made by bulldozing material from high ground into the breach. The material does not appear to have been selected and is very fine gravel mixed with topsoil. Indications are that the abutment thickness is wide enough to avoid piping or shear failure. Minor seepage along the downstream toe was visible. This might well increase during high runoff stages. Earth placed during abutment repairs extends well into the reservoir. It is so placed that the westerly

- 2 - Board of Fisheries and Game
State of Connecticut
January 17, 1966

fifty feet of the spillway is blocked and would be ineffective during flood flows. A masonry training wall near the end of the spillway protects the abutment from spillway flow and guides the water through the downstream bridge at Eagleville Road.

East Abutment - The abutment appears to be in good condition except for a heavy growth of brush which should be removed. Foundations for a stone masonry building are immediately downstream of the earth abutment. No evidence of leakage was found. However, with a relatively thin earth section, leakage may be experienced during high flow. Stagnant water was noted in the building basement.

Spillway - The spillway is of dowelled stone construction with a vertical downstream face rising about twelve feet above normal tailwater. Cap stones are about six feet wide, sloping toward the reservoir. The visible masonry appears to have been well constructed. Time and floods have removed about ten feet of crest near the center of the dam and many chinking stones are gone. About fifty feet of spillway at the westerly end is a few inches higher than the remainder of the crest. The downstream face of this fifty foot section is continuously buttressed with dowelled stone three to four feet above tailwater and about five feet wide. It is not evident why this portion was buttressed. It is possibly an old flood failure which was very well repaired. At least one half the face of the dam was leaking. Leakage was general and not concentrated in any area. Most of the leakage, which does not constitute a large volume of water, is due probably to loss of chinking stone. There is no evidence of mortar in the spillway. Stumps and debris have collected near the damaged section of spillway crest and retard low flows.

East Penstock - The east headworks and penstock are located in the east abutment. The intake structure is ungated and consists of three stop log openings each about four feet wide which serve as weirs. Two openings had about four feet of stop logs to reservoir level and the third had about three feet of logs with water overflowing through a fish screen. The east penstock runs from the building wall at the lower end of the headrace to the original location of the water wheel. It appears to have been about 48 inches in diameter. The penstock has completely disintegrated and considerable debris has accumulated in the headrace below the intake structure.

West Penstock - The west penstock is located in the east end of the spillway section. It is controlled by a gate which is submerged. A wooden gate stem of the rack type located close to the spillway structure was in poor condition. The penstock, about 48 inches in diameter, is in poor condition. Leakage emerging from the end of the penstock was about three inches deep.

Discharge Conduit - The discharge conduit about thirty inches square is located adjacent to the west penstock in the spillway section. The conduit is controlled by a gate which was submerged. Leakage was negligible.

Discussion - This discussion is intended to give a broader picture of the problems related to the restoration of the structure.

Spillway - Review of recorded flood information shows the relative magnitude of the following floods which occurred in recent years.

August 1955	22,000 cfs (maximum of record)
September 1938	12,900 cfs
March 1936	7,600 cfs

Spillway capacity as originally constructed was about 4,000 cfs. The earth fill blocking the westerly end of the spillway probably reduces the capacity to less than 3,000 cfs. Removing this fill and raising the abutments one foot would increase discharge capacity to 5,500 cfs. A two-foot raise would provide 7,300 cfs. of capacity. Raising the abutments to pass the August 1955 flood would require a nine-foot raise to a total surcharge above spillway crest elevation of about 13 feet. As presently constructed, the dam should operate well under minor to moderate flood flows. When high flows are experienced, downstream conditions cause flooding of Eagleville Road before a flow of 4,000 cfs occurs at the spillway. With failure of the west abutment, the volume of water released is relatively small and no significant damage occurs except at or near the dam. This damage is loss of fill in the west abutment and loss of Eagleville Road pavement. Cost of repairs is very small in comparison with cost of altering the dam to pass major flood flows without abutment failure.

Raising the dam to pass the flood of record would essentially require a new structure. Neither the existing spillway nor the abutments could withstand the hydraulic forces that would be experienced. Raising the dam one or two feet, which might be accomplished without excessive expenditure, would provide less than 25% of the capacity required for the flood of record. More important,

increasing the spillway capacity would delay abutment failure during major floods until the volume of water released would be larger and more dangerous.

The fill presently blocking the westerly portion of the spillway should be excavated to provide an unimpeded approach. Excavation should be to a depth of about two feet below spillway crest. Debris along the spillway should also be removed. Present deterioration of the spillway crest should be repaired. The missing cap stones should be replaced. The remainder of the crest should be mortared or grouted to refill the voids near the crest, and tightly seat the remaining cap stones.

West Abutment - Materials in the west abutment are unknown and with the failures which have occurred, several different soils might be found. Presently the surface is rough and covered with hay, weeds and brush. The surface should be bulldozed smooth to minimize likelihood of accidents with public access and the surface grassed. When this operation is undertaken, a trench should be bulldozed to water level near the downstream toe and refilled with coarse bank-run gravel free from clay and silt. This inexpensive operation will insure the safe discharge of leakage seeping through the abutment.

In effect, the west abutment has been serving as a safety plug for the dam during major flood flows. This procedure is seldom followed in present day design practices. It is suggested that the Water Resources Commission be consulted to determine whether or not they would continue to permit it. Existing up and downstream conditions are, in our opinion, such that the "washout" of the west abutment will not materially contribute to flood damage.

East Abutment - The remains of the building at the east abutment are unsightly in their present condition. In addition, the cellar hole is deep and hazardous to children and others walking in close proximity to it. The building area should be cleaned and the cellar hole filled. Gravel similar to the material used for the trench at the west abutment should be placed against the westerly cellar hole foundation wall to insure safe seepage emergence and minimize draw-down loadings on the wall.

The brush on the easterly abutment has not reached a dangerous condition. Some of the young trees if allowed to grow larger, will develop massive root systems in the abutment. If these trees fall with hurricane winds or due to flood flows, the deep holes for the roots will seriously weaken the abutment. The larger brush should be removed and any scarred spots seeded with grass. Stumps need not be removed. Trees, if desired, can be planted in the fill for the building foundation.

Board of Fisheries and Game
State of Connecticut
January 17, 1966

Penstocks - The easterly penstock intake or headworks could be retained without modification, for regulating reservoir levels below the spillway crest during dry weather. If the intake is retained, fencing should be installed along the headrace and forebay for safety of the public. This penstock could be abandoned and the headrace, forebay, wheel pit and tailrace filled with appropriate materials without hazard to the dam, if desired. The westerly penstock should be removed and the opening sealed. The present rusty penstock and old wooden gate can not last much longer.

Gate - The present gate in the discharge conduit should be replaced. Although there is no leakage, the gate is old and the hoist is a type which is difficult for one man to operate. Failure of the existing unit is imminent and replacement while the reservoir is drawn down for other items of work, will be most economical.

New Gate Control - Construction of a reservoir regulating gatewell on the upstream face of the dam with provisions for stop logs, as requested by your staff, has been considered. It is our understanding the desired gate stop log structure would be constructed against the existing spillway, be rectangular in shape, have a wedge type gate on the inside of the upstream wall and a stop log weir to regulate water level. The superstructure would be above the level of minor floods and the gate house would provide storage for stop logs.

Eagleville Dam has a drainage area of 110 square miles. The closest recording gage, located downstream at South Coventry, has a drainage area of 121 square miles. The average flow for the 33 years of record is 209 cfs with a low flow of 14 cfs. Average flow at Eagleville is estimated to be 188 cfs. The existing spillway with gate closed would pass the average flow with a depth of about six inches.

A stop log structure approximately 50 feet long would be required to provide the desired reservoir regulation. It would be necessary to construct a new conduit through the dam along with the gate, stop log structure and gate house. It is estimated this would cost between twenty thousand dollars (\$20,000) and thirty thousand dollars (\$30,000). No firm figure can be determined until the reservoir is unwatered and foundation conditions explored.

Reasonable flow and reservoir regulation during the lower flow periods can be provided by the use of the existing conduit which is 30 inches square. This would permit the use of five-foot stop logs and serve to regulate flows up to about 100 cfs with the reservoir level at spillway crest. This regulation could be supplemented by the existing east penstock intake which has about twelve feet of stop log openings.

- 6 - Board of Fisheries and Game
State of Connecticut
January 17, 1966

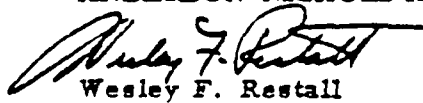
Construction Costs - Estimated costs are predicated on 1966 price index.
It is assumed that the work would be accomplished during low flow periods.

<u>Spillway</u> - grouting, replacement of cap stones	\$4,000
<u>West Abutment</u> - grading, seeding, seepage control excavating spillway approach	2,000
<u>West Penstock</u> - removal of pentstock, gate, seal opening.	800
<u>East Abutment</u> - clean up, fill cellar hole, training walls	3,200
<u>East Penstock</u> - clean up, fencing	1,600
<u>Gate</u> - replace existing gate and hoist	5,500
<u>Contingencies, Insurance, Miscellaneous</u>	2,500
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TOTAL	\$19,600
<u>Administration, Surveys, Engineering, Inspection</u>	5,000
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	\$24,600
<u>Additional cost for unseating gate, stop logs, gate house, catwalk, to provide regulation for lower flows</u>	6,000
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	\$30,600
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Completion of the recommended measures would place the dam in reasonably good condition. However, continued maintenance will be required. The west abutment will have to be reconstructed after large flood. Brush should be cut annually and equipment serviced periodically.

Very truly yours,

ANDERSON-NICHOLS ASSOCIATES


Wesley F. Restall

WFRccc

INTERDEPARTMENT MESSAGE

SAVE TIME: *Handwritten messages are acceptable.*

FD-201 6-72

Use carbon if you really need a copy. If typewritten, ignore faint lines.

TO	Samuel Suffern	AGENCY	Water and Related Resources	DATE	14 May 1973
	Deputy Director				
FROM	Morgan S. Ely	AGENCY	Water and Related Resources	TELEPHONE	
	Sr. Civil Engineer				
SUBJECT	Eagleville Dam				

SITUATION

On 7 May 1973 Victor Galgowski, Supt. of Dam Maintenance received a call from John Spencer, Region III Director, Department of Environmental Protection, indicating there was an erosion problem on the west abutment on subject dam.

On 8 May 1973 Victor Galgowski and the undersigned visited the dam and found the concreted rip-rap at the west end of the spillway had been undermined to the extent that it was possible to stand up under the shell and not be able to touch the top. The distance from the edge of the shell to the bank which was sluffing off was about 10'. We noted a small leak (approximately 3/4 inch in diameter) in the downstream face of the dam and below the rip-rap concrete roof. This had caused a portion of the erosion. Other erosion was caused by the pool that develops at the dam face during periods of high flow. At the same time we noted a void (about 10 cubic feet) at the base of the dam in the same general area. There was considerable evidence that children had played in this "cave". If the cement grout between the rocks cracked, the roof would fall in killing anyone who was under it.

ACTION TAKEN

Upon returning to the office on 8 May 1973 arrangements with Edward Milke, Area III Manager to get some sand bags to divert part of the flow ~~and~~ a closer inspection of the void under the dam and the leak in the dam face. Public Works (construction) was requested to send Mr. Rothal, who had been the resident inspector 2 years ago when the rip-rap was placed, to the dam on 9 May 1973. Victor Galgowski, Stephen Tibbetts, Environmental Field Inspector, and the undersigned went to the dam at 10:00 a.m. Edward Milke, Department of Environmental Protection Region III Maintenance had some sand bags filled and placed. We then inspected the portion of the dam involved in "the dry". As a result of this, we found that the void under the dam was an old penstock or flume and was lined with a large steel pipe. This pipe is now filled in.

The Department of Environmental Protection maintenance people were told to break the concrete rip-rap dome so it wouldn't fall on any one and to plug the "3/4 inch hole" with "waterstop/waterplug".

RECOMMENDATION

Permanent measures must be taken along the west bank to stabilize the embankment.

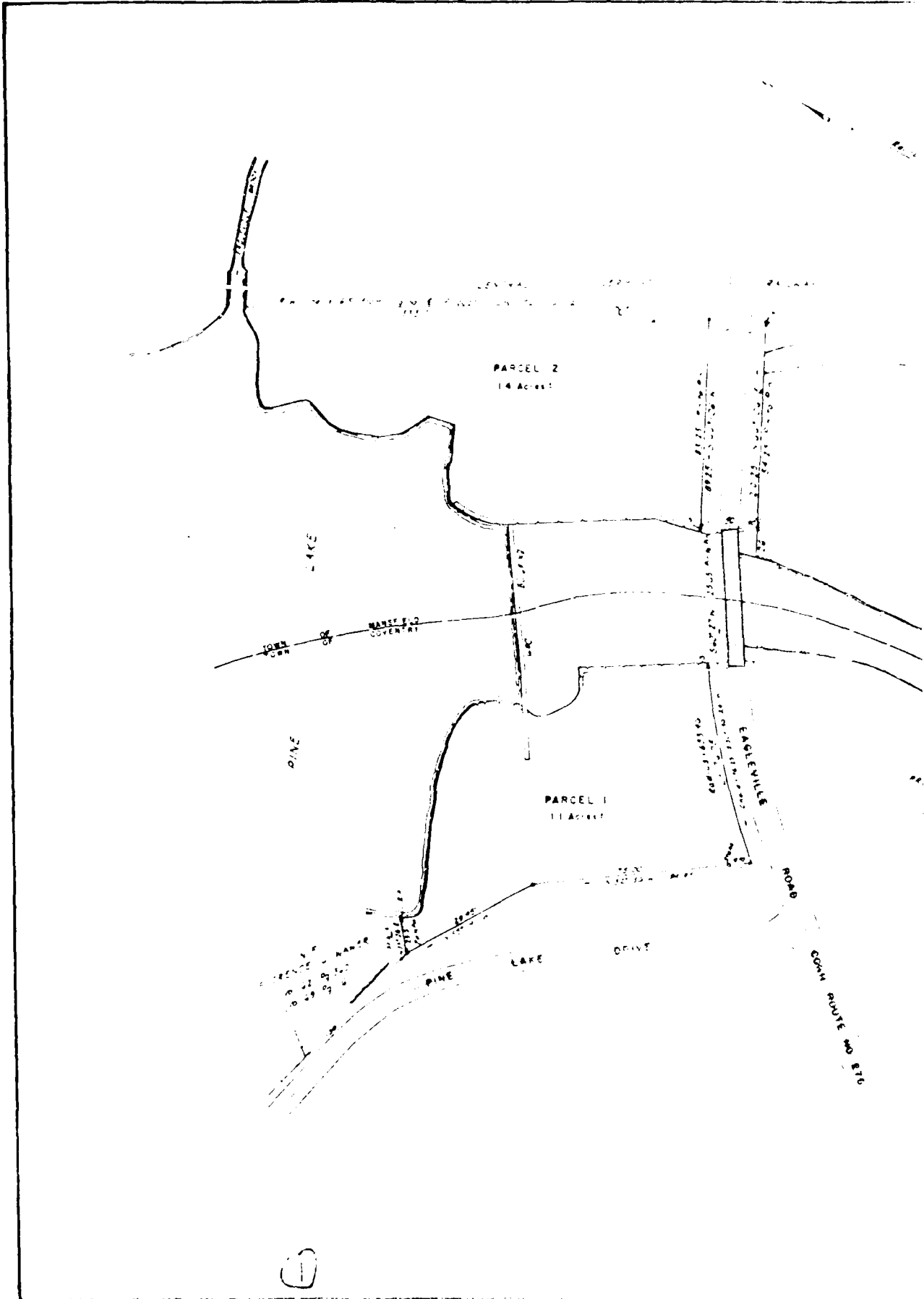
The following action is recommended:

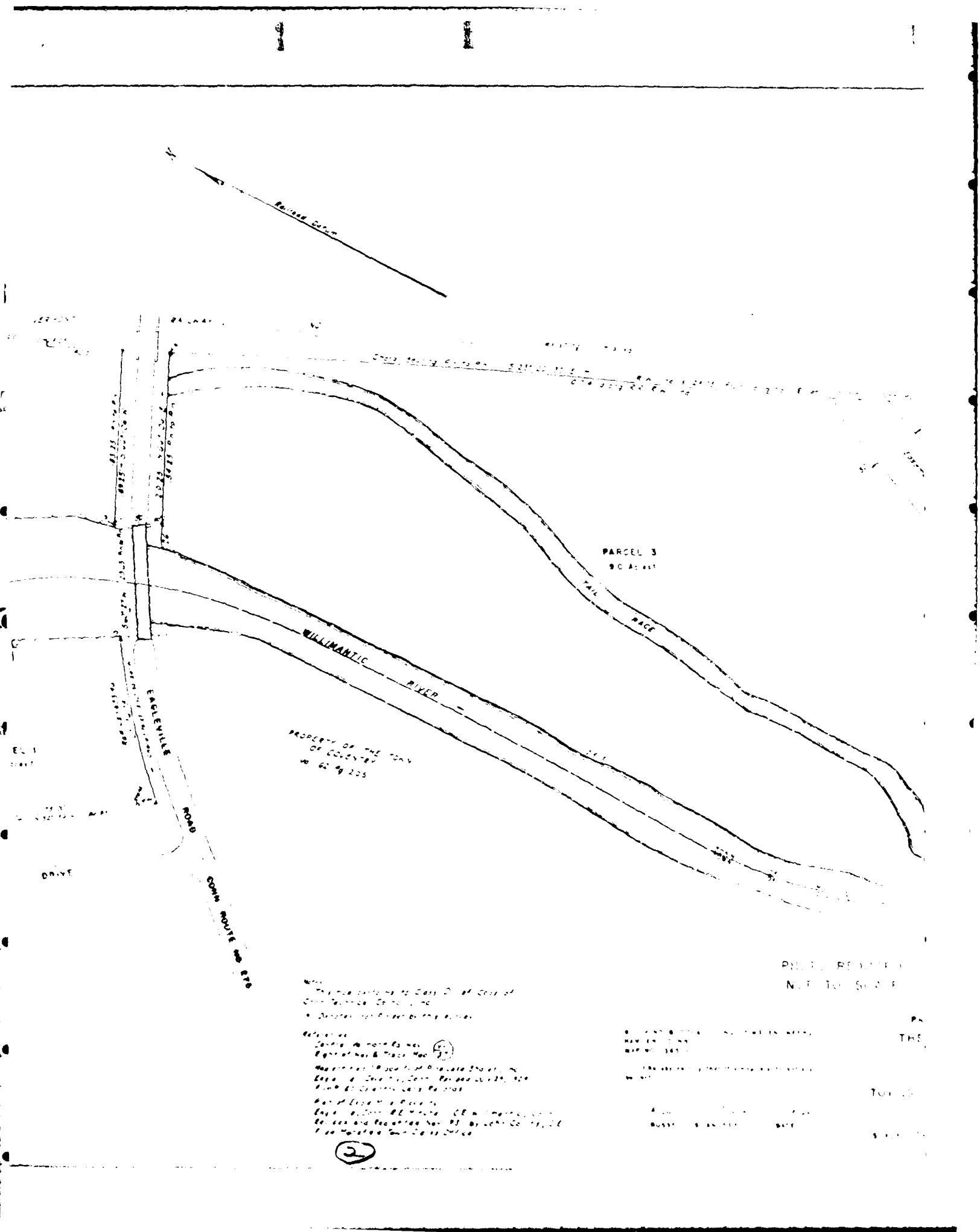
After the dome is broken, the area should be filled with large rocks and these should be grouted with several yards of rich concrete. This concrete work should be done during the summer during the low flow period.

The area of the emergency spillway should be completed as designed (with a dip), spread some top soil and seeded.

SAVE TIME: *If convenient, handwrite reply to sender on this same sheet.*

APPENDIX B-3
RECORD DRAWINGS AND SKETCHES





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OF COLCHESTER
IN 62 79 205

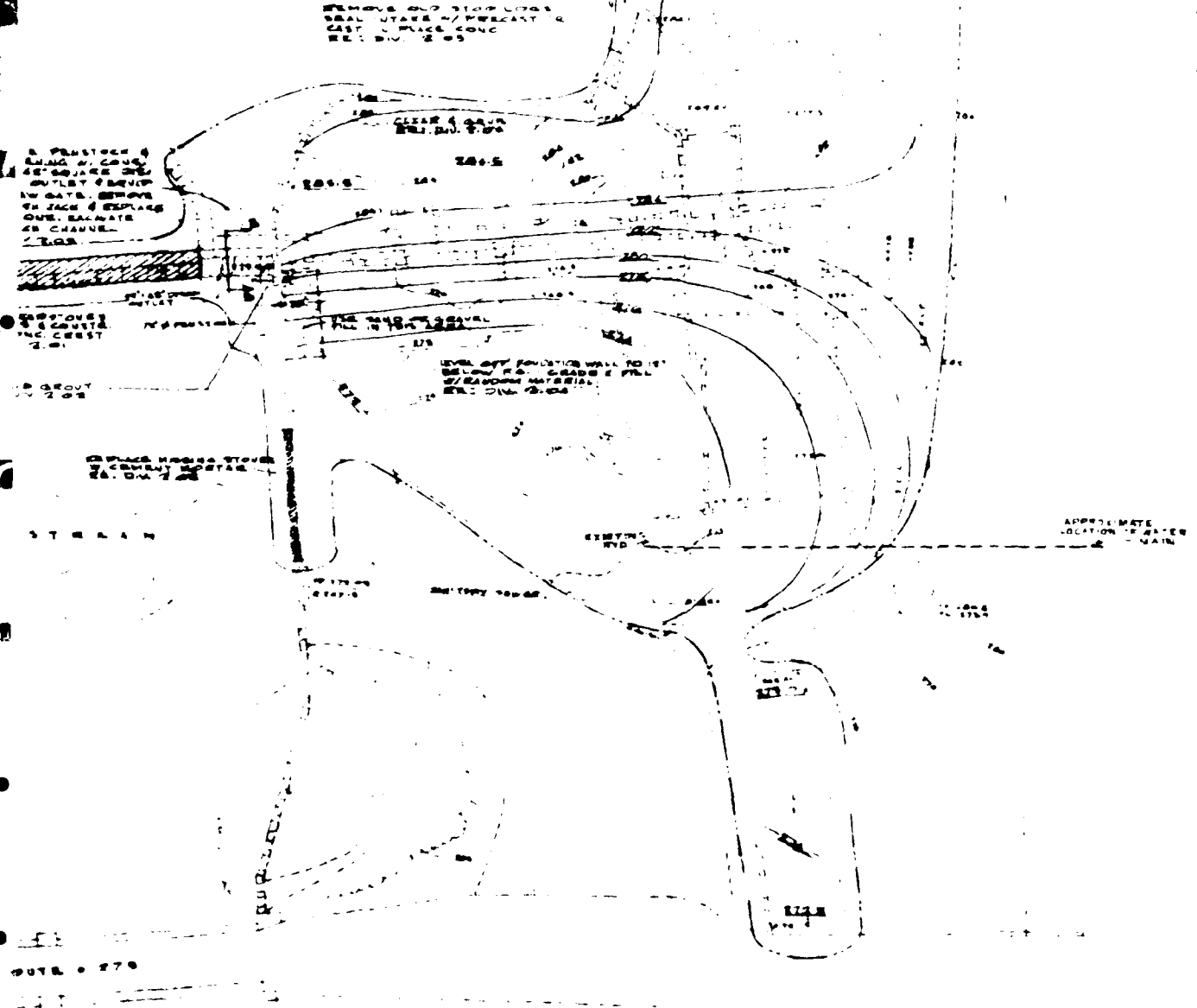
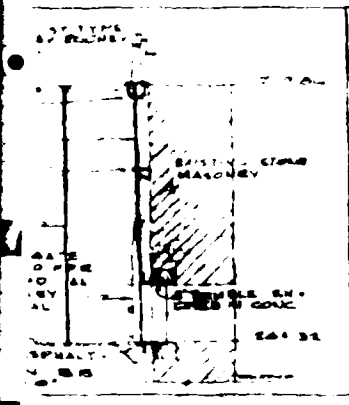
PARCEL 3
90 AC. ±

Map prepared by Gary D. of City of
Colchester, Vermont
A. District of Vermont
Reference:
County of Vermont
Right of Way & Trace Map
Map of State of Vermont
Eng. & Surveying License No. 1234
Book of Records
Map of State of Vermont
Eng. & Surveying License No. 1234
Book of Records

PLANNED REVENUE
N. F. T. S. C. F.

PLANNED REVENUE
N. F. T. S. C. F.
THE
TOWN OF
COLCHESTER
VERMONT

2



ROUTE 270

CONSTRUCTION NOTES

SEE OTHER SHEETS FOR OTHER NOTES

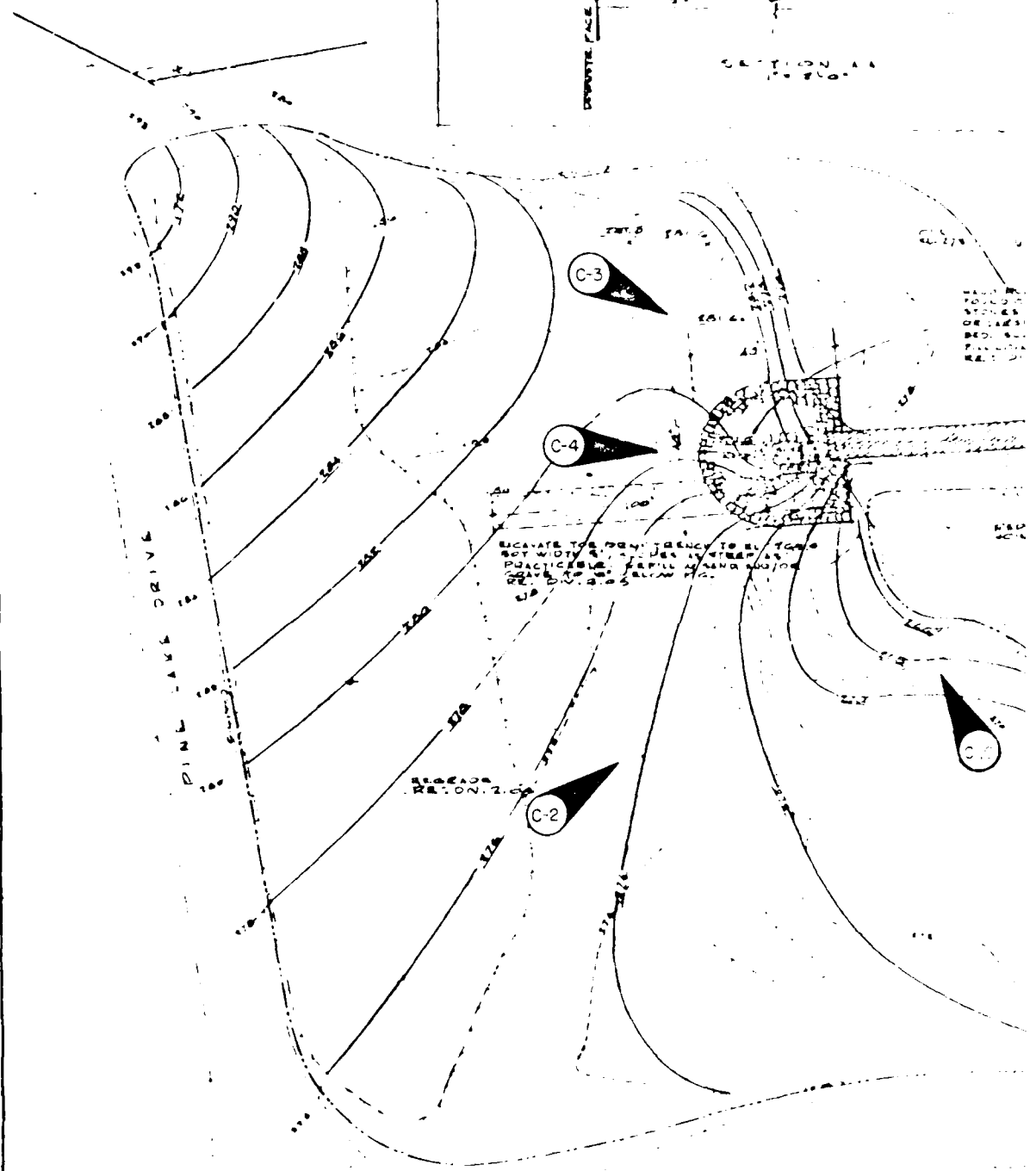
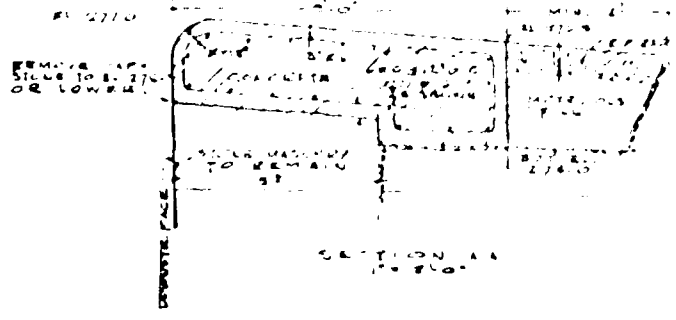
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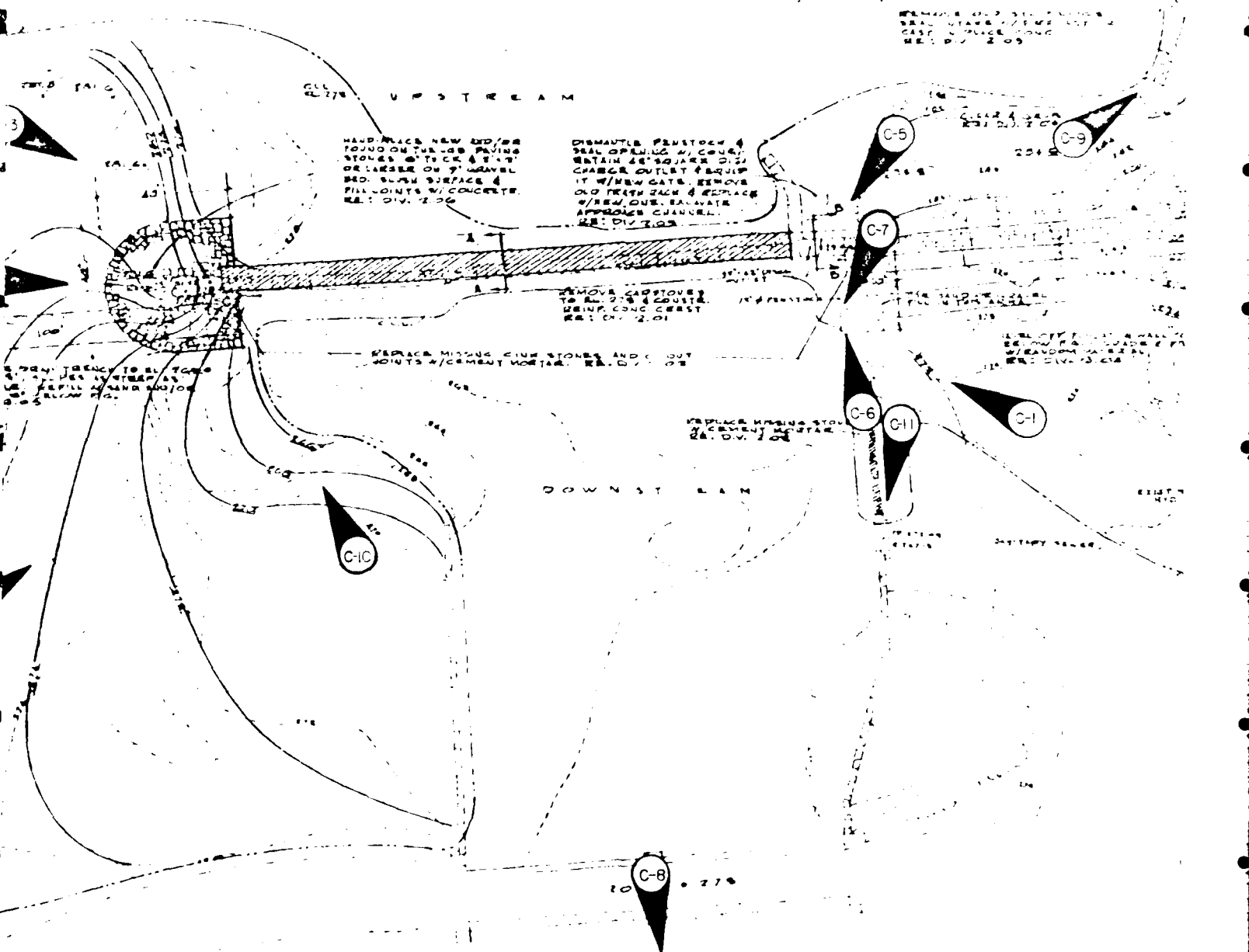
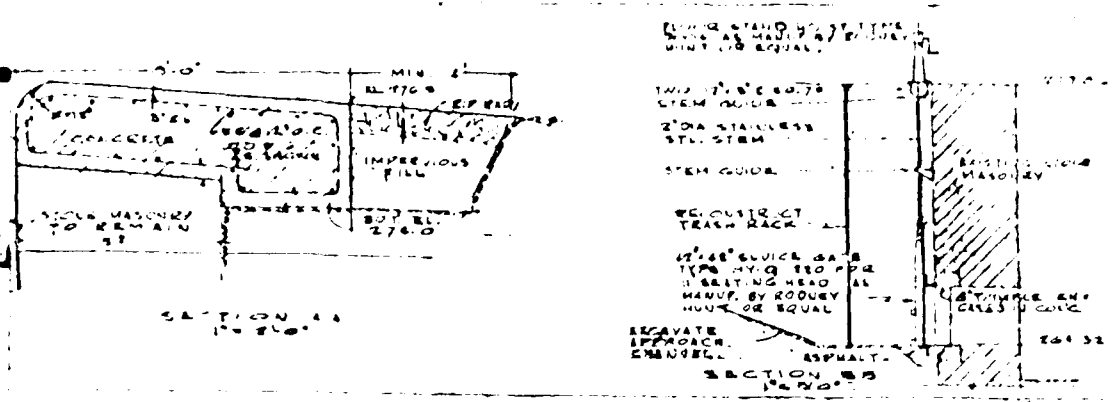
SITE DEVELOPMENT & DAM REPAIRS	
STATE OF CONNECTICUT PUBLIC WORKS DEPARTMENT C.L. STREIBER, COMMISSIONER	
REPAIR OF EARLEVILLE DAM ON THE WALLINGFORD RIVER	6 OF 4
CARDINAL ENGINEERS ASSOCIATES HARTFORD, CONNECTICUT	

APPENDIX C

PHOTOGRAPHS



①



LEGEND

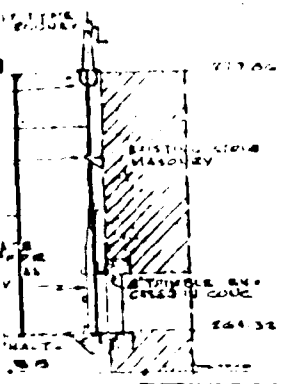
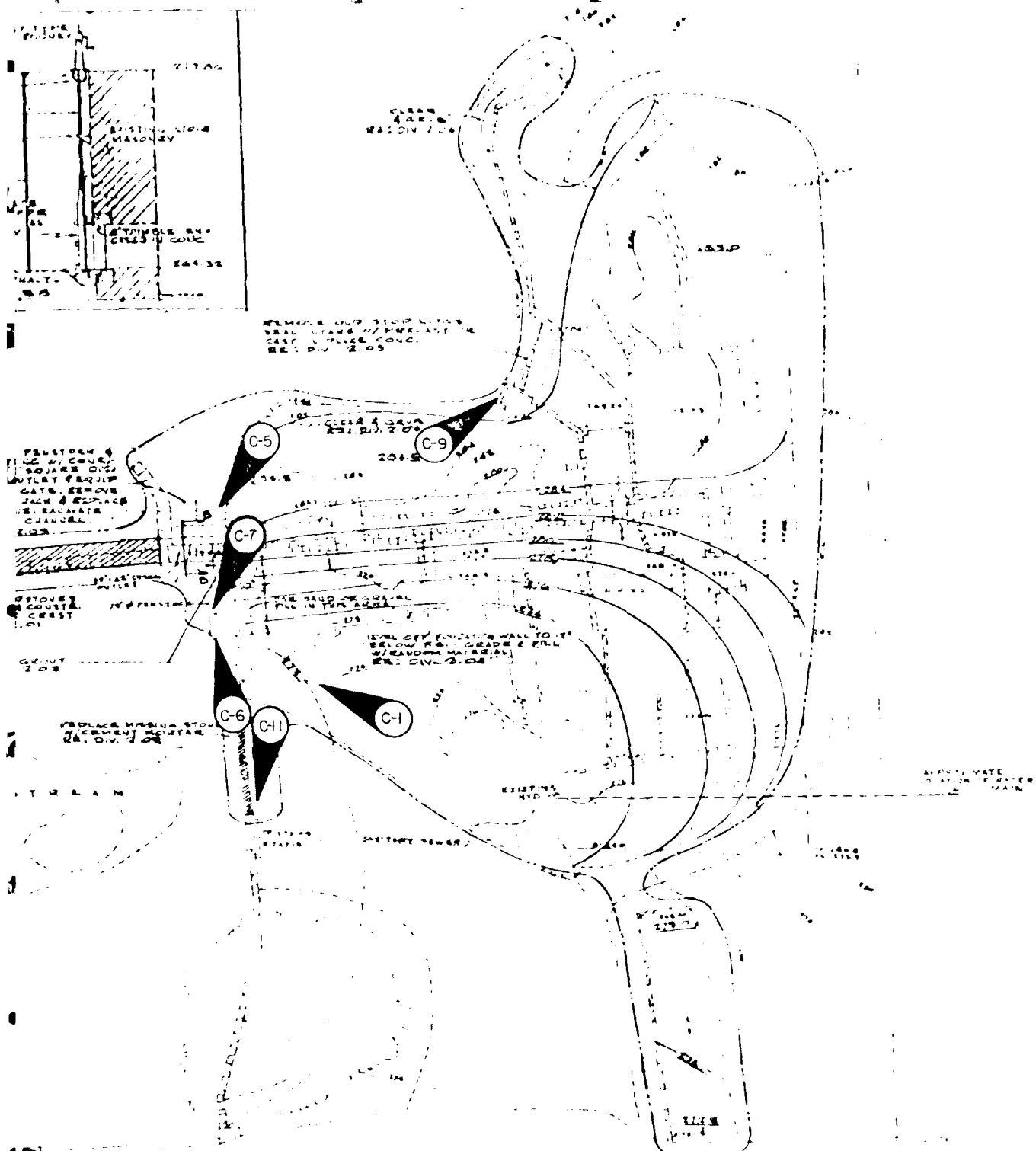
- 276- EXISTING CONTOUR
- 278- EXISTING SPOT ELEV.
- 282- PROPOSED BY CONTOUR
- 284- PROPOSED SPOT ELEV.
- 288- CONTOUR LEAST LINES
- REF. REFER TO SPEC DIVISION

CONSTRUCTION NOTES

- (1) SEE DRAWINGS FOR ALL DIMENSIONS

AS BUILT DRAWING
MAY, 1971

10
NOT TO



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 CONC. & PLACE CONC.
 REF. DIV. 2.03

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REMOVE OLD STOP SIGN
 TRAIL STAKE // PERMIT FOR
 CONC. & PLACE CONC.
 REF. DIV. 2.03

REMOVE OLD STOP SIGN
 TRAIL STAKE // PERMIT FOR
 CONC. & PLACE CONC.
 REF. DIV. 2.03

CONSTRUCTION NOTES
 [] SEE CONSTRUCTION FOR PLAN
 & ELEVATIONS

AS BUILT DRAWING
 MAY, 1971

PHOTO REDUCED
 NOT TO SCALE

3 of 3

EAGLEVILLE LAKE DAM PHOTO INDEX

SITE DEVELOPMENT & DAM REPAIRS

STATE OF CONNECTICUT
 PUBLIC WORKS DEPARTMENT
 211 STATE STREET, HARTFORD, CT 06103

REPAIR OF EAGLEVILLE LAKE DAM
 AT THE DAM, HARTFORD, CT

HAMFIELD & COVENTRY CONNECTICUT

DATE: 5/1/71

CARDINAL ENGINEERS & ASSOCIATES
 NEWTON, MASS.



C-1 Spillway from left side of channel.



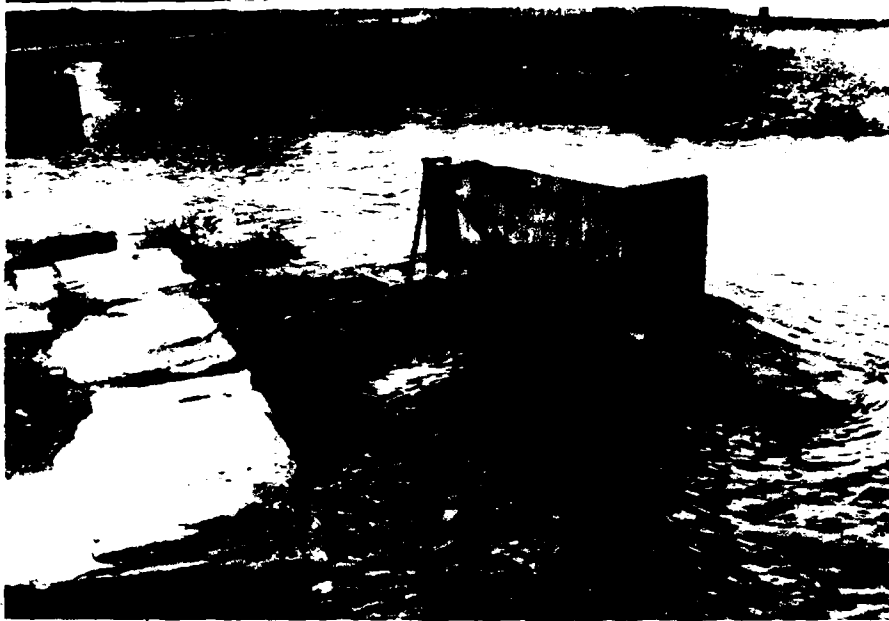
C-2 Spillway from right side of channel.



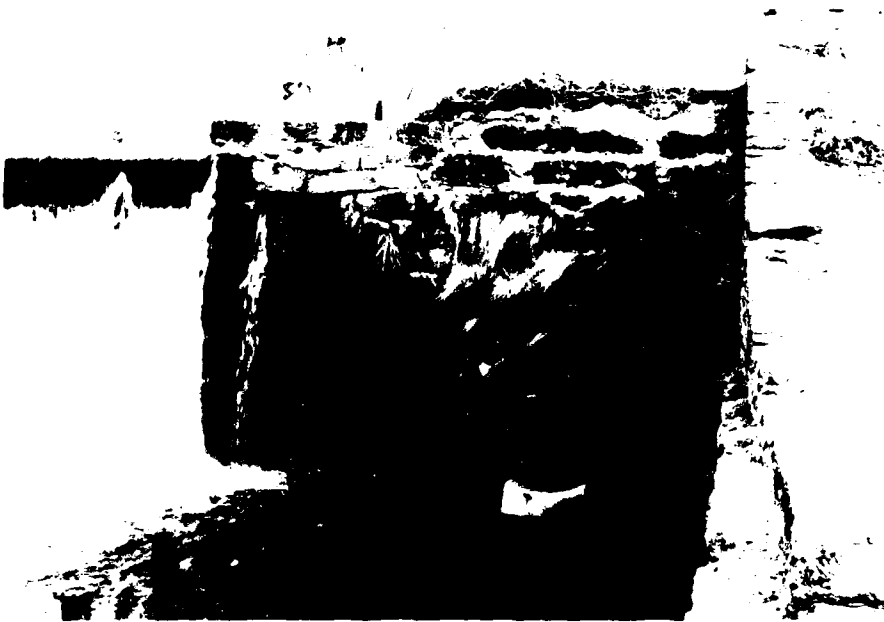
C-3 Spillway, left training wall, outlet works, and abandoned intake to mill from right embankment.



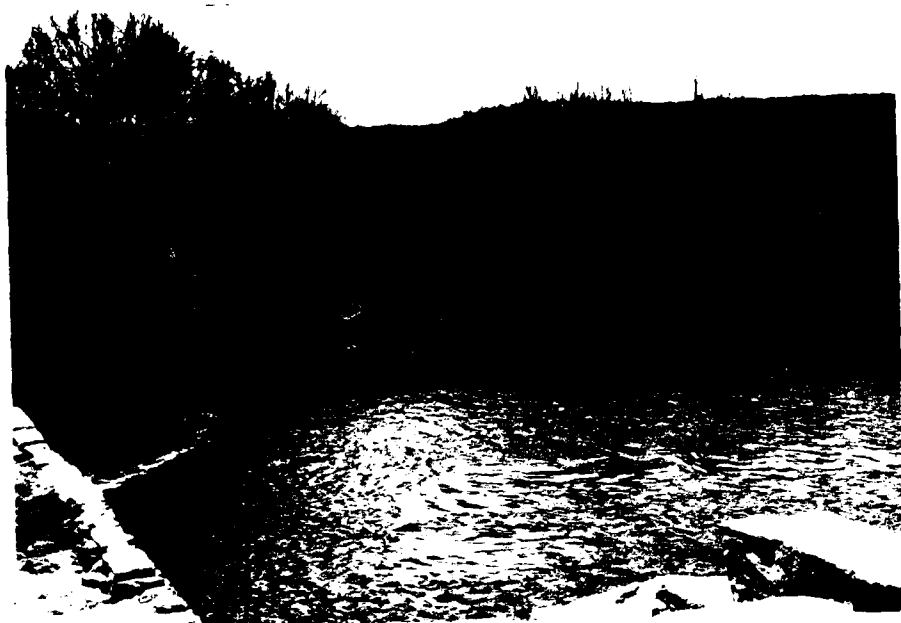
C-4 Left spillway abutment (background) and mortared riprap around right spillway abutment (foreground).



C-5 Outlet works from intake side.



C-6 Outlet works (downstream side); note that one outlet conduit has been sealed off.



C-7 Downstream Channel.



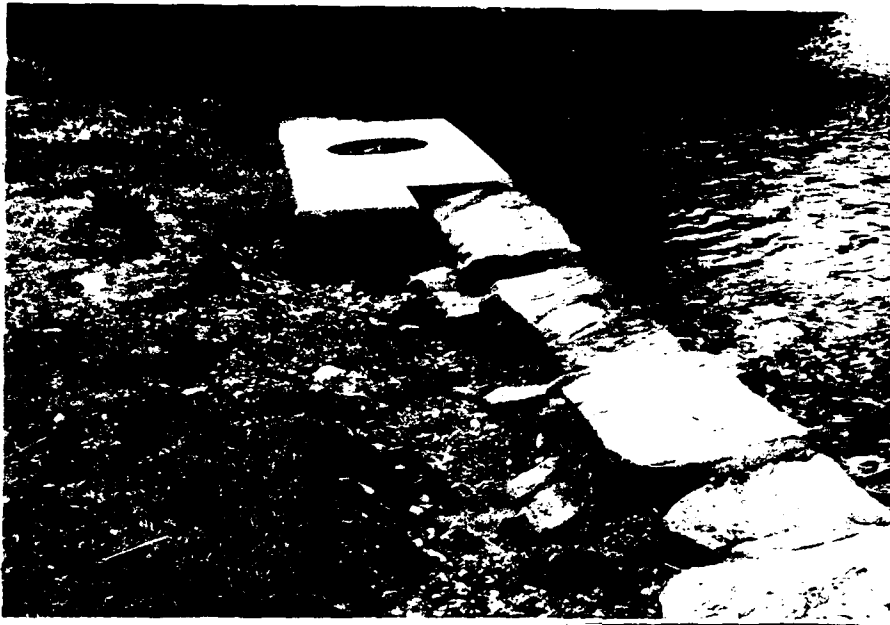
C-8 Downstream Channel below bridge.



C-9 Abandoned intake to former mill building.

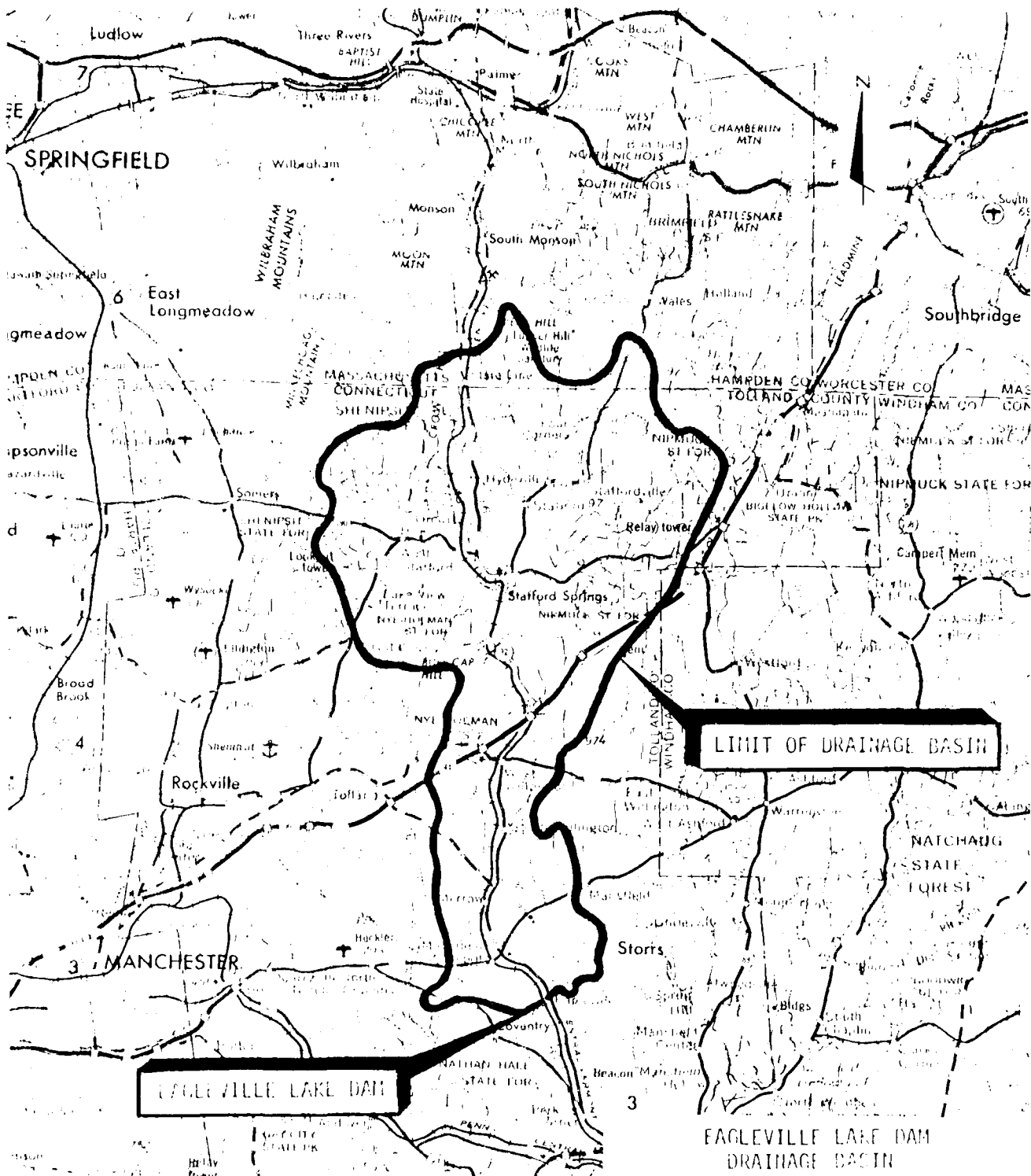


C-10 Right spillway abutment and embankment showing eroded masonry and seepage (in foreground).



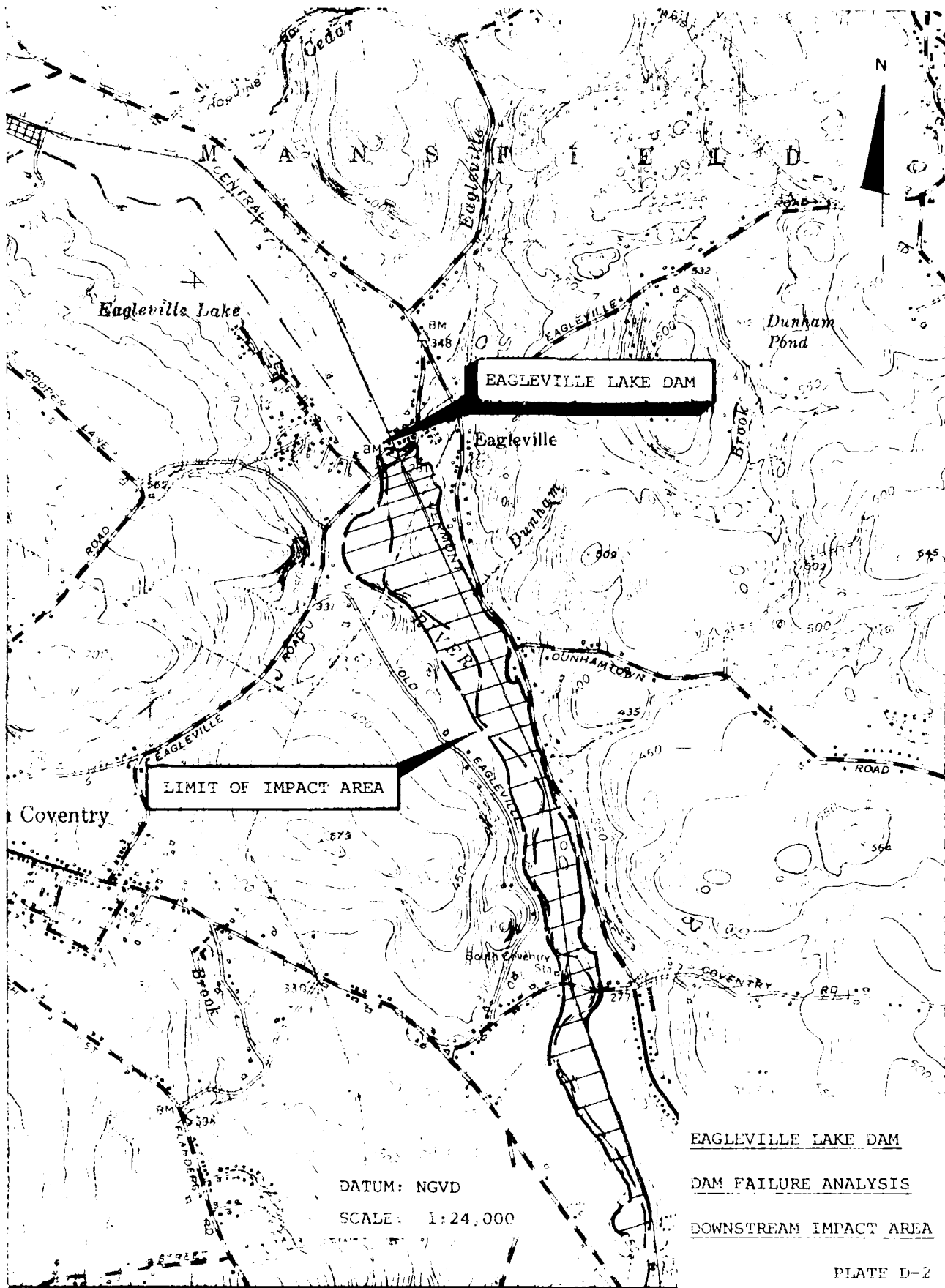
C-11 Erosion behind left training wall downstream of spillway, (manhole is sewer outfall).

APPENDIX D
HYDROLOGIC AND HYDRAULIC COMPUTATIONS



datum: NGVD
 USGS Quadrangle Sheets:
 Albany, N.Y.
 Hartford, Ct.
 scale: 1 : 250,000
 Drainage Area: 110 sq. miles

PLATE 100-101



A. Size Classification Eagleville Lake Dam
 Height of dam = 22.0 ft.; hence small
 Storage capacity at top of dam (elev.284.0) = 900 AC-FT.; hence small
 Adopted size classification small

B.i) Hazard Potential

This dam is located in the rural area of Town of Eagleville, Conn.
Its failure can cause appreciable economic loss and can damage Eagleville Road,
Coventry Road and can erode R.R embankment.

ii) Impact of Failure of Dam at Maximum Pool (Top of Dam)

It is estimated from the rule of "thumb" failure hydrograph, that the following adverse impacts are a possibility by the failure of this dam.

- a) Loss of life No ; - to - lives can be lost.
- b) Loss of homes NO ; - to - homes can be lost.
- c) Loss of buildings No ; - to - buildings can be lost.
- d) Loss of highways or roads Yes ; 2 -- 3 roads can be damaged.
- e) Loss of bridges Yes ; 1 to 2 bridges can be lost.
- f) Miscellaneous Yes ; Utility systems like electric poles.

The failure profile can affect a distance of 14000 feet from the dam. For water surface elevation, see next page in Appendix D.

C. Adopted Classifications

<u>HAZARD</u>	<u>SIZE</u>	<u>TEST FLOOD RANGE</u>
<u>Significant</u>	<u>small</u>	<u>Half PMF to 100-Year</u>
Adopted Test Flood =	<u>Half</u>	<u>PMF : 350 CSM</u>
		<u>= 38500 CFS</u>

D. Overtopping Potential

Drainage Area 110 = 110 sq. miles
 Spillway crest elevation = 277.0 NGVD
 Top of Dam Elevation = 284.0 CFS
 Maximum spillway discharge
 Capacity without overtopping of dam = 11300 CFS
 "test flood" inflow discharge = 38500 CFS
 "test flood" outflow discharge = 34800 CFS
 % of "test flood" overflow carried by spillway without overtopping = 30.7%
 "test flood" outflow discharge portions which overflows over the dam = 23500
 % of test flood which overflows over the dam = 69.3%

Estimating Maximum Probable Discharges - Inflow and Outflow Values Date of Inspection: 4/17/79

Name of Dam Eagleville Lake Dam, Location of Dam Willimantic R., Town Mansfield, Conn.

Watershed Characterization Rolling Terrain with upstream swamps and storages, is swampy or occupied by storage reservoirs
11.0 sq. miles of drainage area

Adopted "test" flood = Half PMF = 350 CSM = 38500 CFS; Re = Effective Rainfall = 19.0 inches

D.A. = Drainage Area (gross) = 110.0 Square Miles, Basin Slope = 0.02-0.04 hence; flat to moderate

S.A. = Surface Area of Reservoir = 0.13 Square Miles, Time of Concentration 15-18 hours

Shape and Type of Spillway = Free overflow; vertical fall; sharp crest; stone masonry/curved in shape at top of crest.

B = Width of Spillway = 170 feet; C = Coefficient of discharge = (3.33-friction) = 3.33

Maximum Capacity of Spillway Without Overtopping = 11300 CFS = 32.5 % of test flood outflow.
 (at elevation 284.0)

Top of Dam Elevation = 284.0; Spillway Crest Elevation = 277.0

Overflow portion of length of Dam = 350; C = Coefficient of discharge for Dam = 3.00

Name of Dam	Test Flood Qp CSM	Inflow Characteristics		Outflow Characteristics First Approximation		Outflow Characteristics Second Approximation		Outflow Characteristics Third Approximation (Adopted)			
		hg in feet	h1 in ft.	Qp1 CFS	S1 in in.	S2 in in.	h2 in ft.	Qp2 CFS	S3 in in.	h3 in ft.	Qp3 CFS
1	2	4	7	6	8	9	10	11	12	13	14
Eagleville Lake	1/2 PMF = 350	15.70	15.70	38500	0.22	0.20	15.30	36800	0.20	15.30	34800

Qp = discharge; hg = surcharge height; S = storage in inches; HOFF; Outflow discharge values are computed as per COE guidelines.

"Rule of Thumb Guidance for Estimating
Downstream Dam Failure Discharge"

BASIC DATA

Name of dam Eagleville Lake Dam Name of town Eagleville, Conn.
 Drainage area = 110.0 sq. mi., Top of dam 284.0 NGVD
 Spillway type = Overflow - Sharp Crest Crest of spillway 277.0 NGVD
 Surface area at crest elevation = 83.0 Acres = 0.13 Sq. M.
 Reservoir bottom near dam = 262.0 NGVD
 Assumed side slopes of embankments 2:1
 Depth of reservoir at dam site 22.0 = y_0 = 22.0 ft.
 Mid-height elevation of dam = 266.0 NGVD
 Length of dam at crest = 180.0
 Length of dam at mid-height = 140.0
 20% of dam length at mid-height = w_b = 28.0

Step 1:

Elevation (NGVD)	Estimated Storage in AC-FT
277.0	320
278.0	403
279.0	486
280.0	569
281.0	652
282.0	735
283.0	818
284.0	900

Step 2:

$$Q_{D1} = \frac{8}{27} w_b \sqrt{g} y_0^{3/2}$$

$$= \frac{1.68}{27} w_b y_0^{3/2} = \frac{4854}{27} \text{ CFS}$$

Failure Discharge = 11300 + 4854 = 16154 CFS

NOTE:

Failure of dam is assumed to be instantaneous when pool reaches top of dam and is full depth--partial width failure. Failure site is assumed at the side of spillway section.

Eagleville Lake Dam

Dam Failure Analysis

1. Failure discharge with pool at top of dam (elev.284.0) = 16154 CFS
2. Depth of water in reservoir at time of failure = 22.0 ft.
3. Maximum depth of flow downstream of dam)
at time of failure) = 17.0 ft.
4. Water surface elevation just downstream)
of dam at time of failure) = 279.0 NGVD

The failure discharge of 16154 CFS will enter Willimantic R. and flow downstream 200 feet until the brook crosses S. Eagleville Road. There is significant valley storage in this 200 feet length of brook to reduce the discharge substantially. Also due to roughness characteristics, obstructions and frictional losses, it is very likely that the unsteady dam failure flow will dissipate its wave and kinetic energy and thus convert to steady and uniform flow obeying Manning's formulae 3,000 feet downstream. The failure profile will have the following hydraulic characteristics:

DISTANCE FROM THE DAM	WATER SURFACE ELEVATION NGVD	REMARKS
0 + 00	284.0	Upstream of dam Downstream of dam
0 + 00	279.0	
10 + 00	274.0	
20 + 00	272.0	
30 + 00	270.0	
40 + 00	268.0	
50 + 00	266.0	
60 + 00	264.0	
70 + 00	262.0	
80 + 00	260.0	
90 + 00	258.0	
100 + 00	256.0	
140 + 00	254.0	

Beyond 14000 feet and until the brook crosses Route 31, the failure discharge will flow in the below given channel characteristics:

Q = 14000 CFS; s = 0.005 to 0.0017
 n = 0.05; b = Varies; d = 15.00 feet

Side slopes = 1V or 2H.

Eagleville Lake Dam

COMPUTATIONS FOR
SPILLWAY RATING CURVE AND
OUTLET RATING CURVE COMPUTATIONS

Spillway width = 170.0 feet; Spillway crest elevation = 277.0 NGVD
Length of dam = 350 feet; Top of dam elevation = 284.0 NGVD
C = 3.33 for Spillway; 3.0 for Dam

i)

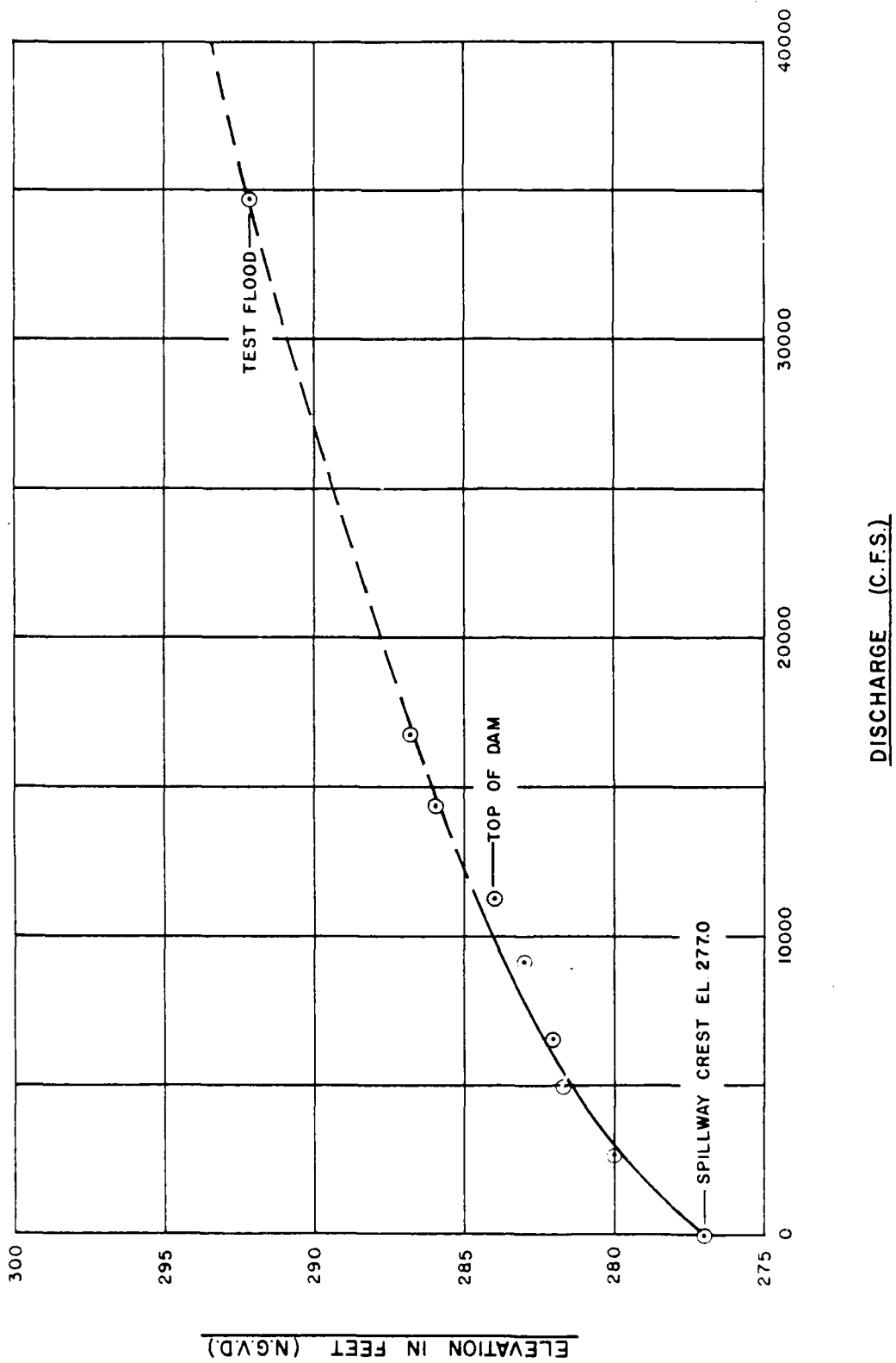
SPILLWAY RATING CURVE COMPUTATIONS

Elevation (ft.) NGVD	Spillway Discharge (CFS)	Remarks
277.0	0	Spillway Crest
278.0		
279.85	2736	
281.75	6000	
282.00	6577	
283.00	8740	
284.00	11300	Top of Dam
286.00	14400	
286.90	16800	
292.30	34800	Test Flood.

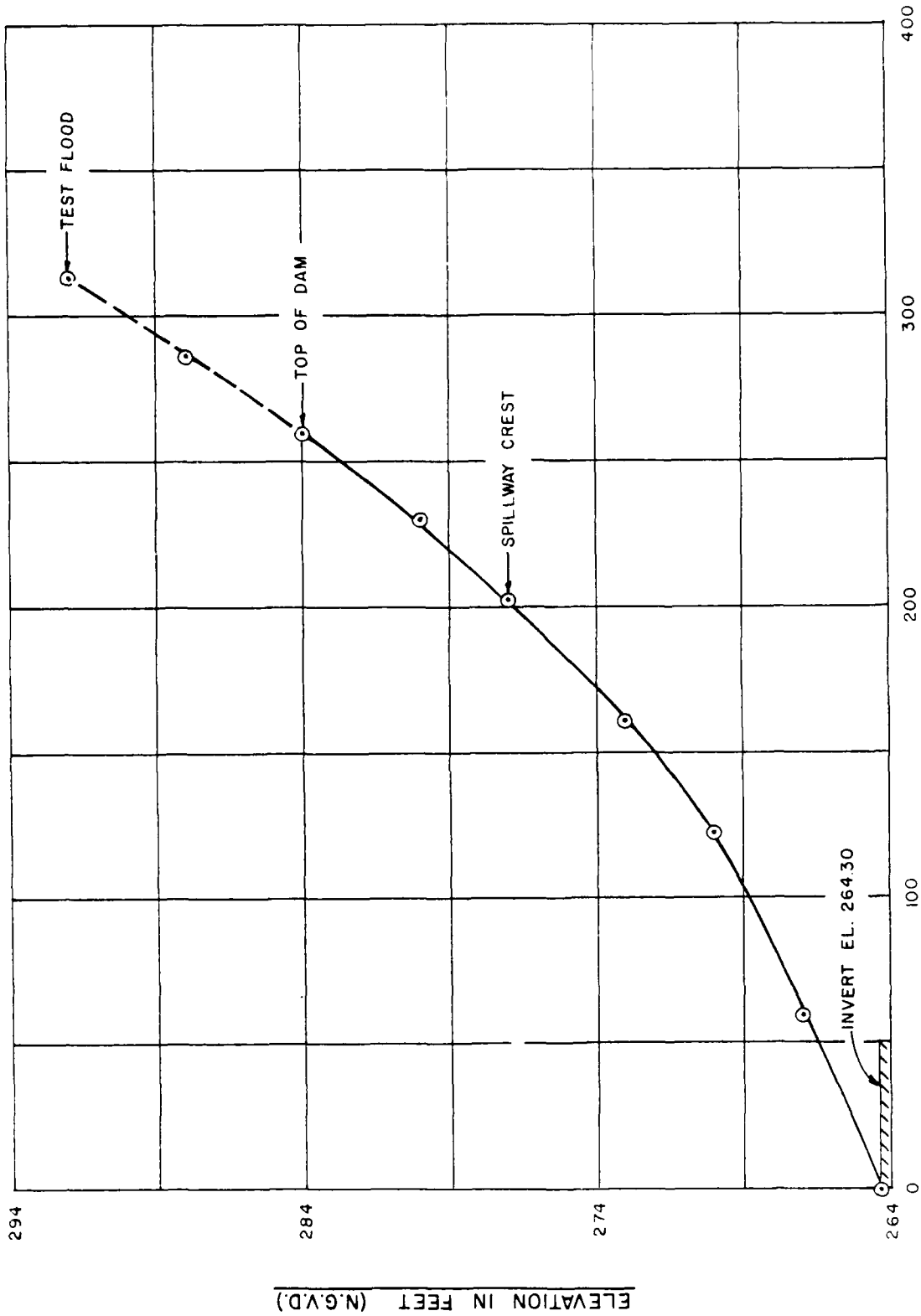
ii)

OUTLET RATING CURVE COMPUTATIONS

Elevation (ft.) NGVD	Discharge (CFS)	Remarks
292.30	314	Test flood elevation
288.00	287	
284.00	260	Top of Dam
280.00	229	
277.00	203	Spillway Crest
273.00	162	
270.00	123	
267.00	62	
264.30	0	Invert elevation of outlet



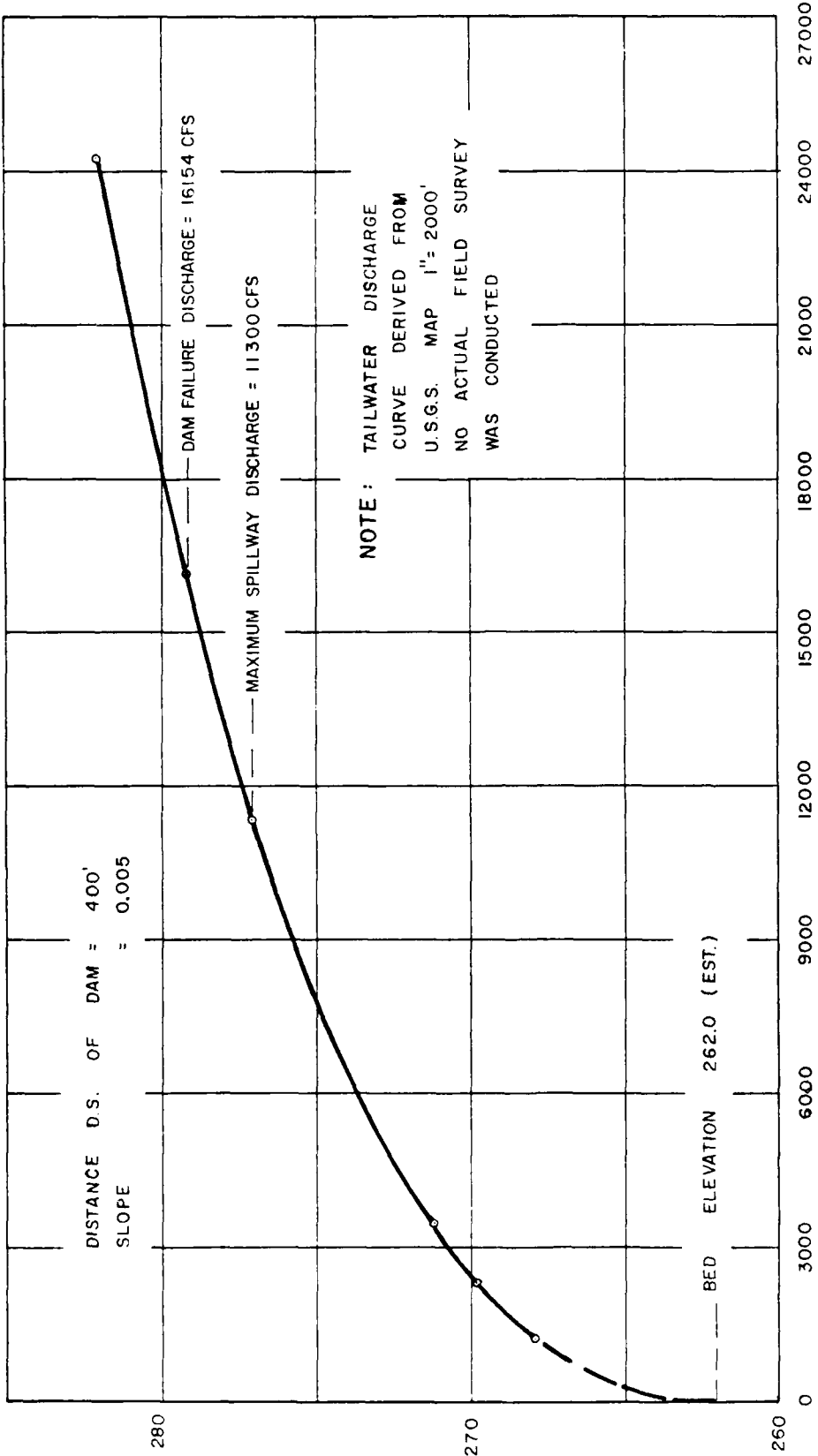
EAGLEVILLE LAKE DAM
 SPILLWAY RATING CURVE



DISCHARGE (C.F.S.)

ELEVATION IN FEET (N.G.V.D.)

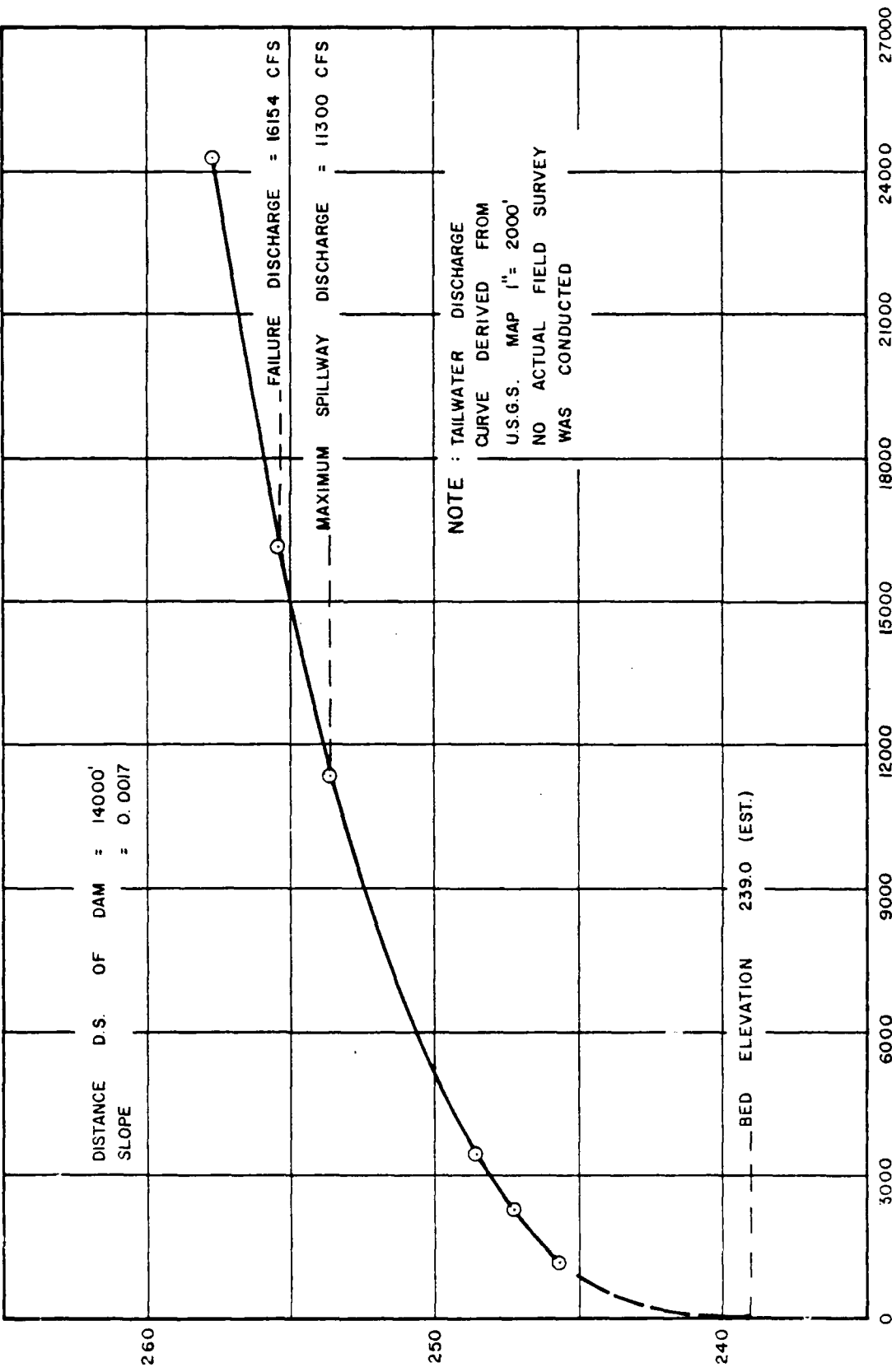
EAGLEVILLE LAKE DAM
OUTLET RATING CURVE



ELEVATION IN FEET (NGVD.)

EAGLEVILLE LAKE DAM
TAILWATER DISCHARGE CURVE NO. 1

DISCHARGE IN C.F.S.



ELEVATION IN FEET (NG.V.D.)

EAGLEVILLE LAKE DAM
TAILWATER DISCHARGE CURVE NO. 2

DISCHARGE IN C.F.S.

WD-A143 521

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
EAGLEVILLE LAKE DAM (..(U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV JUN 79

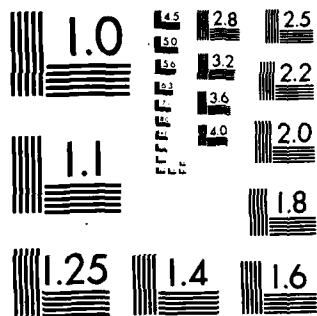
2/2

UNCLASSIFIED

F/G 13/13

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

APPENDIX E

INFORMATION AS CONTAINED IN THE
NATIONAL INVENTORY OF DAMS

END

FILMED

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