NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
ROGERS LAKE DAM CT 00..(U) CORPS OF ENGINEERS WALTHAM
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CONNECTICUT RIVER BASIN
OLD LYME, CONNECTICUT

ROGERS LAKE DAM
CT. 00418

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.
SEPTEMBER, 1980
Rogers Lake Dam

NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS

U.S. ARMY CORPS OF ENGINEERS
NEW ENGLAND DIVISION

DEPT. OF THE ARMY, CORPS OF ENGINEERS
NEW ENGLAND DIVISION, NEDED
424 TRAPELO ROAD, WALTHAM, MA. 02254

September 1980

Report Date

September 1980

55

Number of Pages

UNCLASSIFIED

19a. DECLASSIFICATION/DOWNGRADING SCHEDULE

APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

DAMs, INSPECTION, DAM SAFETY,
Connecticut River Basin
Old Lyme, Connecticut

The dam at Rogers Lake is an earth embankment with vertical concrete walls approximately 129 feet in length including a spillway length of 29 feet. The maximum height of the dam is 7 feet. Based on a visual inspection at the site, the dam is considered to be in FAIR condition. The dam is classified as INTERMEDIATE in size and a SIGNIFICANT hazard structure in accordance with recommended guidelines. Based on size and hazard classification, the adopted test flood for this structure is equal to 1/4 the PMF.
Dear Governor O'Neill:

Inclosed is a copy of the Rogers Lake Dam (CT-00418) 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, Town of Old Lyme, Town Hall, Old Lyme, CT 06371.

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,

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

Incl

As stated
ROGERS LAKE DAM
CT 00418

CONNECTICUT RIVER BASIN
OLD LYME, CONNECTICUT

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
NATIONAL DAM INSPECTION REPORT

PHASE 1 - INSPECTION REPORT

IDENTIFICATION NO: CT 00418

NAME OF DAM: Rogers Lake Dam

COUNTY AND STATE: New London County, Connecticut

STREAM: Mill Brook

DATE OF INSPECTION: 15 April, 1980

Brief Assessment

The dam at Rogers Lake is an earth embankment with vertical concrete walls approximately 129 feet in length including a spillway length of 29 feet. The maximum height of the dam is 7 feet. The spillway is an uncontrolled concrete broad crested weir and located about 38 feet from the right dam abutment. The outlet works consists of a gated drop inlet with a 36 inch diameter outlet conduit and is located at the right spillway abutment.

Based on a visual inspection at the site, the dam is considered to be in FAIR condition. However, there are some areas of concern which must be corrected to assure the long term performance of this dam. Signs of concern include: seepage through the downstream concrete wall; large trees next to the downstream face; cracks and spalling of the upstream wall left of the spillway; probable seepage through the downstream face of the spillway; lack of erosion protection on the banks of the discharge channel near the dam; and unprotected low areas on the left and right sides of the dam.

The dam is classified as INTERMEDIATE in size and a SIGNIFICANT hazard structure in accordance with recommended guidelines established by the Corps of Engineers. Based on size and hazard classification, the adopted test flood for this structure is equal to one-half the Probable Maximum Flood (PMF) which is estimated to be 500 CSM, or 4,000 CFS, from the 80 square mile drainage basin. This test flood has a routed outflow discharge equal to 2550 CFS and would overtop the dam by about 3.0 feet. The maximum spillway capacity is equal to 344 CFS which represents only 13 percent of the test flood outflow, therefore, the spillway capacity is considered inadequate.

It is recommended that the Owner engage the services of a registered engineer experienced in the design of dams to accomplish the following: perform detailed hydrologic and hydraulic studies to further assess the
need for and means to increase the project discharge capacity, investiga-
tigate the significance of the seepage from the downstream concrete wall
right of the spillway and downstream spillway face, and recommend
measures for monitoring seepage, remove trees at the downstream toe,
design measures to prevent water from flowing around either side of the
dam during high reservoir levels, and investigate wet areas downstream of
the dam adjacent to the left bank.

The above recommendations and other remedial measures as described in
Section 7 should be implemented by the owner within one year after re-
ceipt of this Phase 1 Inspection Report.

CE MAGUIRE, INC.

By: Richard W. Long, P.E.
Vice President
This Phase I Inspection Report on Rogers 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.

ARAMAST MAHTEIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

RICHARD DIBUONO, CHAIRMAN
Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRIAR
Chief, Engineering Division
PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase 1 Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, DC 20314. The purpose of a Phase 1 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 1 investigation; however, the investigation is intended to identify any need for such studies.

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

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

Phase 1 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 aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition, and the downstream damage potential.

The Phase 1 Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.
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PHASE 1 - INSPECTION PROGRAM
ROGERS 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. CE 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 CE Maguire, Inc. under a letter from Max B. Scheider, Colonel, Corps of Engineers. Contract No DACW33-80-C-0013 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 State 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. Rogers Lake Dam is located in the town of Old Lyme, New London County, Connecticut along Town Woods Road approximately 1100 feet north west of the intersection of Town Woods Road and Boston Post Road (Route 51). Coordinates of the dam are approximately 41° 21.0' North Latitude and 72° 18.2' North Longitude. The dam impounds water from Mill Brook which drains an 8.0 square mile watershed of rolling terrain and empties into Lieutenant River, a tributary to the Connecticut River. The lake has a total surface area of 270 acres at the spillway crest level. The axis of the dam is oriented in a northwes-southeast direction with the lake to the northeast.
b. **Description of Dam and Appurtenances.** Rogers Lake Dam is approximately 125 feet long (including the overflow spillway), about 7 feet high and has crest width that varies from 12.0 to 20.0 feet. The embankment is earth with vertical concrete walls on both the upstream and downstream faces. The crest profile is relatively level and grass covered. The overflow spillway is located near the center of the dam approximately 38 feet from the right abutment area. The spillway is concrete and is a broad crested weir, 29 feet in length. Spillway overflows drop 4 feet to the streambed of Mill Brook and then flow downstream toward Town Woods Road bridge. The outlet works for the dam is located at the right abutment of the spillway and is a gated drop inlet structure with a 36 inch diameter outlet conduit that has a crest at elevation 36.0 NGVD and invert at elevation 32.0 NGVD. The inlet is protected from clogging by a trash screen and the outlet control is a manually operated vertical sluice gate. The outlet works is in operable condition.

c. **Size Classification.** The dam at Rogers Lake has an impoundment capacity at the top of the dam (elev. 38.5 NGVD) equal to 1275 Ac-Ft and a height of 7.0 feet. In accordance with guidelines established by the Corps of Engineers, this dam is classified as an INTERMEDIATE size structure based on its impoundment capacity.

d. **Hazard Classification.** This dam is classified as a SIGNIFICANT hazard potential structure because its failure could result in loss of less than a few lives, inundation of 5-10 dwellings and damage to Town Woods Road, Sill Lane, and Mill Lane. There will be 1-2 feet of water in the impacted dwellings. Utility services within the rights of way may temporarily be disrupted. It is estimated that the failure discharge of 1,120 CFS will travel downstream through the Mill Brook streambed with high velocities. Water depths may reach 6.0 feet for a distance of about 11,000 feet downstream to its confluence with Lieutenant River. Increase in depth due to possible failure of dam is 2.0 feet. Depths of flows downstream of the dam before and after the dam failure are 4.0 and 6.0 feet for respective discharges of 344 and 1122 CFS. See Appendix D for additional data.

e. **Ownership.** The dam is presently owned by the Town of Old Lyme, Connecticut.

f. **Operator.** The gate is maintained and operated by the Town Highway Department:

   Mr. R. Harris, Foreman - Highway Department
   Town Hall
   Old Lyme, Connecticut 06371
   (203) 434-2461

1-2
g. **Purpose of Dam.** Recreation  

h. **Design and Construction History.** There are no formal records of the history of this dam. However, it is estimated that the original dam was constructed about 1822 to provide a source of water for the Bradbury Woolen Mills. As the textile industry faded in the northeast the dam and mill complex were owned and sold several times. About 1922 the Town of Old Lyme purchased the dam and its appurtenances from the Art Lace and Braid Company. Shortly thereafter the dam was raised to its present level. The Town has undertaken concrete patch work on the structure on several occasions. In 1972 the concrete wing wall at the left abutment was extended, and in 1976 the timber gate for the outlet works was replaced. No other work has been undertaken at the facility.  

i. **Normal Operating Procedures.** As a rule, the outlet works is opened at the beginning of October of each year and the pool reduced to approximately 18 inches below the spillway crest and that level maintained for a short period to allow shorefront owners to repair beaches and waterfront structures. In addition, because the dam has experienced overtopping from large intense storm activity the highway department personnel will also lower the pool line 6" to 12" in anticipation of heavy storm activity when possible. The reservoir is used solely for recreation.  

1.3 **Pertinent Data.**  

a. **Drainage Area.** Rogers Lake Dam is located in the Town of Old Lyme, New London, Connecticut. The drainage basin for the dam extends into the communities of Lyme, East Lyme, and Old Lyme with the lake that is formed by the dam almost evenly divided between the Towns of Lyme and Old Lyme. The basin is generally triangular in shape with a maximum length of 5.3 miles and a total area of 8.0 square miles. (See Appendix D for Basin Map) Approximately 10% of the watershed (0.8 square miles) is swampy or natural storage. The topography is generally rolling to flat with elevations ranging from 420 feet at Grassy Hill in East Lyme to 36 feet at the spillway crest of the dam.  

b. **Discharge at Damsite.** There is no discharge data available for this dam. Listed below is discharge data for the spillway and outlet works:  

1. **Outlet Works:**  

   Conduit size 36-inch diameter pipe.  
   Invert elevation 32.0 feet.
i. Discharge Capacity

51.3 CFS at spillway crest elevation 36.0 feet.

ii. Discharge Capacity

77 CFS at the top of the dam. Elevation 38.5 feet.

iii. Discharge Capacity

99.4 CFS at the test flood. Elevation 41.5 feet.

2. Maximum known flood at damsite

Unknown

3. Ungated spillway capacity at top of dam

344 CFS

4. Ungated spillway capacity at test flood elevation (assuming dam is not overtopped)

1,120 CFS

5. Gated spillway capacity at normal pool elevation

N/A

6. Gated spillway capacity at test flood elevation

N/A

7. Total spillway capacity at test flood elevation (assuming dam is not overtopped)

1,120 CFS

8. Total project discharge at top of dam

416 CFS

9. Total project discharge at test flood elevation

2,650 CFS

c. Elevations (Feet above NGVD)

1. Streambed at toe of dam

32.0

2. Bottom of cutoff

Unknown

3. Maximum tailwater

Unknown

4. Recreation pool

36.0

5. Full flood control pool

N/A

6. Spill crest

36.0

7. Design surcharge (Original Design)

Unknown

1-4
8. Top of dam 38.5
9. Test flood 41.5
d. Reservoir Lengths (in feet)
   1. Normal pool 8,000
   2. Flood control pool N/A
   3. Spillway crest pool 8,000
   4. Top of dam 8,000
   5. Test flood pool 8,000
e. Storage (acre-feet)
   1. Normal pool 600
   2. Flood control pool N/A
   3. Spillway crest pool 600
   4. Top of dam 1,275
   5. Test flood pool 2,058
f. Reservoir Surface Area (acres)
   1. Normal pool 270
   2. Flood control pool N/A
   3. Spillway crest 270
   4. Test flood pool 270
   5. Top of dam 270
g. Dam
   1. Type Vertical concrete walls filled with earth
   2. Length 125 feet including 29.0 feet of spillway
   3. Height 7 feet
   4. Top width 20 feet right embankment
             12 feet left embankment
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**h. Diversion and Regulating Tunnel**

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SECTION 2

ENGINEERING DATA

2.1 Design

There is no available documentation regarding the design of this facility.

2.2 Construction

No formal records of construction or subsequent repairs are available for this dam. However, certain repairs were done to the dam as detailed in Paragraph 1.2-h.

2.3 Operation

No operation records are maintained.

2.4 Evaluation

a. Availability. There is no information available.

b. Adequacy. The lack of in-depth engineering data did not allow for a definitive review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on visual inspection, past performance and sound engineering judgement.

c. Validity. The validity of the limited data must be verified.
SECTION 3

VISUAL INSPECTION

3.1 Findings.

a. General. The Phase I visual inspection of the Rogers Lake Dam was conducted on April 15, 1980 by representative of CE Maguire, Inc. and Geotechnical Engineers, Inc. A visual check-list and photographic record of that inspection have been included in Appendix A and C respectively, of this report. At the time of inspection the water level in the reservoir was about 2.5 feet below the top of the dam and about 0.1 feet above the spillway crest. The dam is about 125 feet long and 7 feet high and consists of upstream and downstream vertical concrete walls with an earth fill between the walls. A spillway and control outlet are located near the center of the dam. Inventory data on the dam indicated that it was constructed in 1822 and rebuilt in 1922.

b. Dam.

1. Upstream Face

The upstream face of the dam consists of a 24-in.-wide concrete wall on each side of the spillway (Photos C-1, C-2 and C-3). The visible portion of the wall on the right side of the spillway is in generally good condition and shows no sign of misalignment. The grassy area to the right of the wall is at a lower elevation than the top of the wall, (Photo C-13). The low spot of this grassy area is about 17 feet from the right end of the wall and is about 0.5 feet lower than the top of the wall, (Photo C-5). The wall on the left side of the spillway consists of two sections: a 34-ft.-long, 24-in.-wide section and a 19-ft.-long, 10-in. -wide section. Spalling of both sections was observed and a 1/2 inch wide vertical crack with a 1/4 inch offset was observed near the center of the 10-in.-wide wall, (Photo C-12). The ground surface to the left of the wall is lower than the top of the wall. A 25-ft.-long row of sandbags, partially eroded, is located to the left of the wall (Photos C-13 and C-14). Sandbags were needed to prevent high stages in the lake from flowing around the left abutment of the dam at a low area.

2. Crest

The crest of the dam is the grassy area between the upstream and downstream concrete walls. To the right of the spillway, the width of the crest is about 16.5 feet (Photo C-3). The ground surface is slightly irregular and brush was observed next to the downstream wall. To the left of...
the spillway the width of the crest is about 9 feet (Photo C-4). The ground surface is irregular and is barren in places. Several tree stumps up to 6 inches in diameter were observed on the crest.

3. Downstream Face and Toe

The downstream face consists of a 12-inch-wide concrete wall on each side of the spillway, (Photos C-5 and C-7). To the right of the spillway the concrete wall is about 18 feet long and has spalled and cracked in several locations. Seepage was observed through a spalled area at the base of the wall located about 6 feet from the left end of the wall and about 5.5 feet below the top of the wall (Photo C-11). The spalled area has dimensions of about 15 inches by 6 inches, and a wooden rule could be placed 8 inches into the spalled area. The seepage appeared to be clear and was flowing at a rate of about 3 gallons per minute. The area downstream of the right wall is covered with thick brush and trees. A 12-inch diameter tree is located about 7 feet from the right corner of the wall. To the left of the spillway the concrete wall is about 24 feet long with mortared stone blocks forming the right portion of the wall. A 26-inch diameter tree is located about 10 feet from the wall, and several small tree stumps are located close to the downstream toe of the wall. An extensive root system is located near the downstream toe of the wall and is apparently part of the large tree located 10 feet from the wall. A wet area with dimensions of about 25 feet by 10 feet is located just downstream of the large tree shown in Photo C-7 and is about 6 feet below the top of the dam. It could not be determined if the wet area is seepage through the dam. An area of lush green growth, about 7 feet by 7 feet, is located to the left of the downstream wall, (see Photo C-5). The cause of this growth is unknown.

c. Appurtenant Structures

1. Spillway

The spillway section is about 29 feet long and consists of stone blocks capped by concrete (Photos C-5, C-6 and C-7). At the time of inspection water was flowing over the spillway crest and it was not possible to inspect the downstream face of the spillway.

Seepage has been noted through the spillway structure of the dam in the following correspondence:

a. October 29, 1956 - "...several small leaks in the masonry of the spillway..." and "...leakage at the
toe of a concrete apron on the downstream side of the discharge gate."

b. April 5, 1971 - "...substantial leak thru the downstream masonry of the spillway section just east of the drawdown pipe."

2. Outlet Works

The outlet works of the dam is located on the right side of the spillway, (Photo C-8 and C-9).

It is a gated drop inlet structure with a 36 inch diameter outlet conduit. The inlet is protected from clogging by a trash screen and the conduit is controlled by a manually operated timber sluice gate. There was evidence of cracking of the outlet structure. The gate was recently replaced and was in good condition.

d. Reservoir Area

There were no indications of slope instability along the shore of the reservoir in the vicinity of the dam (See Photos C-7 and C-13).

e. Downstream Channel

The downstream channel is the natural streambed. A small island is located in the center of the downstream channel near the spillway section (Photos C-7 and C-10). A small tree and tree stumps are located on the island. The downstream channel passes under a roadway bridge about 57 feet from the spillway. The banks of the downstream channel between the dam and bridge are unprotected earth.

3.2 Evaluation

On the basis of the visual inspection, the dam is judged to be in FAIR condition because of the following features:

a. Seepage through the downstream concrete wall of the dam which could lead to erosion of the dam and instability of the concrete walls.

b. Large trees next to the downstream face of the dam which could be uprooted during a storm causing instability of the dam. Roots near the dam which could provide paths for seepage.

c. Cracks and spalling of the upstream concrete wall left of the spillway which could lead to instability of the dam.
d. Probable seepage through the masonry forming the downstream face of the spillway.

e. Absence of adequate erosion protection on the banks of the downstream channel near the dam.

f. Low areas on the left and right sides of the dam which could be overtopped during high reservoir levels.
SECTION 4
OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

a. General. Rogers Lake is used by Town residents as a recreational facility. The highway department under the direction of the highway foreman operates the dam for this purpose. As a general rule, the reservoir pool level is lowered approximately 18 inches at the beginning of October each year to permit lake front homeowners to repair and rehabilitate their beaches and waterfront structures. An attempt is also made to reduce the pool level on early warning of an intense impending storm.

b. Description of Any Warning System. The dam is observed daily by highway personnel during the summer recreational season and at least weekly during the winter. Any changed or serious conditions would be reported to the highway foreman and the Town Selectman and appropriate action taken. Early warning of forthcoming storm activity is generally obtained through local weather forecasts. There is no formalized emergency action plan for the dam.

4.2 Maintenance Procedures

a. General. The highway department is responsible for all maintenance at the dam. This maintenance is generally minor grass trimming and clearing of brush. The outlet works sluice gate was replaced several years ago and minor concrete patch work has been accomplished in the past by the department personnel. No other maintenance has been required.

b. Operating Facilities. The outlet works is normally operated several times during the year, providing the Owner with knowledge of its conditions and need for repair, on a continuing basis.

4.3 Evaluation

Observations of the dam are conducted in a regular basis and operational equipment tests also performed periodically. Minor maintenance (grass and brush trimming) appears to be suitable for the facility. Major deficiencies that are found would be reported directly to the highway department and a program of repair established depending in the severity of the item. Maintenance procedures are judged to be adequate for the structure.

Emergency procedures and notifications of proper authorities should be formalized for this dam. Included in the "Emergency Action Plan" should be the locations of emergency equipment, materials, and personnel as well as a dewatering procedure to prevent or minimize
dam failure or overtopping. Highway personnel should be briefed and alerted to potentially hazardous signs and areas to check in the field at the dam on a regular basis in order to provide the notification of impact area residents.
SECTION 5
EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General. Rogers Lake, with a drainage area of 8.0 square miles, is located in the Towns of East Lyme, Lyme, and Old Lyme, Connecticut. The dam site is located along Town Woods Road approximately 1,100 feet from the intersection of Town Woods Road and Boston Post Road in Old Lyme. Typical basin characteristics of the watershed are rolling to flat slopes, small storage capacity (about 10 percent natural swamps or valley storages) and terrain that is densely wooded.

The total length of the dam is 125 feet. The storage capacity is equal to 600 Ac-Ft at the spillway crest (36.0 feet) and can accommodate 1.40 inches of runoff from the watershed. Each foot of depth in the reservoir pool above the spillway crest represents 270 Ac-Ft of storage or 0.63 inches of runoff from the basin. Because one foot of depth in the reservoir at the spillway crest is equal to 0.63 inches of runoff it is estimated that overtopping of the dam by the test flood cannot be eliminated by lowering the pool level prior to storm inflow.

5.2 Design Data. No specific design data is available for this watershed or structure. In lieu of existing design information, U.S.G.S. topographic maps (scale 1" = 2,000 ft.) were utilized to develop hydrologic parameters such as: drainage area, 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 the surface area remained constant above the spillway crest. Some of the pertinent hydraulic data was obtained and/or confirmed by actual field measurements at the time of the visual inspection. Test flood inflows and outflows and dam failure flows were determined in accordance with the Corps of Engineers guidelines. Final values used in this report are quite approximate and are no substitute for actual detail analysis.

5.3 Experience Data. No historical data for recorded discharges or water surface elevations is available for this dam. It was reported by an adjacent home owner, as well as the highway foreman, that the dam has experienced frequent overtopping from large storms. The overtopping occurs by high reservoir stages flowing around the left abutment area and then returning to the river. This has been prevented in some cases by the installation of sand bags.

5.4 Test Flood Analysis. Recommended guidelines for the Safety Inspection of Dams by the Corps of Engineers were used for the selection of the Test Flood. Under those guidelines, the dam is classified as a SIGNIFICANT hazard and INTERMEDIATE size structure and warrants testing by a storm event ranging from one-half the Probable Maximum Flood (PMF) to the full PMF. The watershed has a
total drainage area equal to 8.0 square miles of which 10 percent or 0.8 square miles is swampy or natural storage. The drainage area is sparsely populated and largely wooded. The average basin slope is approximately 0.003 feet per foot and is considered flat. The overall hydrologic parameters of the basin indicate the watershed should be classified as rolling terrain and flat. Consequently, because of the watershed characteristics and the size of the dam (i.e. on the low side of the intermediate classification) a test flood equal to one-half the PMF (500 CSM) or 4,000 CFS was adopted for this analysis. Outflow discharges were also developed using Corps of Engineers criteria and approximate routing techniques with a uniform crest elevation of 38.5 and overtopping allowed. The routed outflow discharge for the test flood inflow is 2,550 CFS with outlets closed. The spillway and outlet rating curves are illustrated in Appendix D. Flood routings were performed with an assumed full pond condition (pool level at spillway crest). Towns Wood Road will not affect the computed maximum spillway outflow.

The spillway capacity is hydraulically inadequate to pass the test flood outflow and the test flood would overtop the dam by approximately 3.0 feet. The maximum outflow capacity of the spillway is 344 CFS or only 13 percent of the test flood outflow discharge. At the spillway crest level the capacity of the outlet structure is 51.3 CFS. Using the outlet works it will require 68 hours to lower the pool one foot. For the total storage to be drained through the outlet works it will require 13 days.

5.5 Dam Failure Analysis. An instantaneous full depth – partial width breach equal to 25% of the length of dam or 25 feet was adopted based on visual inspection of the downstream topographic features. The adopted width of breach was based on visual inspection of the channel immediately downstream of the dam.

The calculated dam failure discharge of 1,120 CFS assumes the reservoir full (at the top of the dam) just prior to failure when maximum spillway discharge was 344 CFS and will produce an approximate water surface level of elevation 35.0 feet immediately downstream from the dam (about 2.0 feet above the depth just prior to failure.) The depths of flow before and after the failure of the dam are 4.0 and 6.0 feet, respectively. The estimated damage reach extends downstream 11,000 feet with normal flow in the channel. The failure could result in loss of less than a few lives, inundation of 5-10 dwellings and potential damage to Town Woods Road, Sill Lane and Mill Lane. It is estimated that a water depth of 1 foot will occur in those dwellings impacted by the failure flow. Utility services located within the rights of way of the roadways may temporarily be disrupted. It is estimated that high velocities of flow may cause erosion along the streambanks and undermining of foundations of dwellings adjacent to the stream resulting in foundation settlements or sliding. The prime impact area has been estimated, if the dam were to fail, and has been delineated on the drainage basin map in Appendix D. Discharge from the outlet structure is
excluded from the total failure discharge computations assuming them to be inoperable and/or insignificant. As a result of the failure analysis, the dam has been classified as a SIGNIFICANT hazard structure. Towns Wood Road would not be overtopped by failure flow discharge.
ROGERS LAKE DAM

Inflow, Outflow and Surcharge Data

<table>
<thead>
<tr>
<th>FLOOD</th>
<th>24-HOUR TOTAL RAINFALL IN INCHES</th>
<th>24-HOUR* RUNOFF IN INCHES</th>
<th>MAXIMUM INFLOW IN CFS</th>
<th>MAXIMUM** OUTFLOW IN CFS</th>
<th>SURCHARGE HEIGHT IN FEET</th>
<th>SURCHARGE STORAGE ELEVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>¼ PMF</td>
<td>11.9</td>
<td>9.5</td>
<td>4000</td>
<td>2550</td>
<td>5.5</td>
<td>41.5</td>
</tr>
</tbody>
</table>

= Test Flood

*Infiltration assumed as 0.1"/hour
**Lake assumed initially full at spillway crest elevation 36.0
(top of dam = 38.50)

NOTES:

1. ¼PMF = Test Flood computation based on COE guidelines.
2. The maximum capacity of the spillway without overtopping the top of the dam (elevation 38.5 feet) is equal to 344 CFS.
3. All discharges indicated are dependent upon the continued integrity of upstream storage reservoirs.
4. Surcharge storage is assumed to overtop the dam when exceeding the spillway capacity.
5. Test flood = one-half PMF = 500 CSM = 4,000 CFS (D.A. = 8.0 sq. miles).
SECTION 6

EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations. The visual observations did not disclose any indications of present structural instability. The long-term performance of the dam could be affected by the following features: seepage through downstream concrete wall, cracking and spalling of the upstream concrete spillway, possible seepage through the spillway and trees growing near the downstream face.

6.2 Design and Construction Data. No design or construction drawings or construction records of the dam are available.

6.3 Post-Construction Changes. The dam was rebuilt in 1922, but the extent of the rebuilding is unknown.

6.4 Seismic Stability. The dam is located in Seismic Zone 1 and, in accordance with the recommended Phase 1 guidelines, does not warrant seismic stability analysis.
SECTION 7

ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES

7.1 Assessment.

a. **Condition.** Based on the visual inspection, the dam is judged to be in FAIR condition. Features which could adversely affect the condition of the dam in the future are:

1. Seepage through the downstream concrete wall.
2. Large trees growing adjacent to the downstream embankment face.
3. Cracks and spalling of the concrete work of the dam.
4. Seepage through the spillway.
5. Inadequate erosion protection for the downstream channel adjacent to the dam.
6. Low areas at the left abutment of the dam that require sand bagging.

b. **Adequacy of Information.** The available information is such that the assessment of the condition of the dam must be based on visual observations.

c. **Urgency.** The recommendations and remedial measures described below should be implemented by the owner within one year after receipt of the Phase 1 report.

7.2 Recommendations.

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

1. **Inspect the downstream face of the spillway when there is no flow over the spillway.**

2. **Investigate the significance of 1) seepage from the downstream concrete wall right of the spillway and 2) probable seepage from the masonry forming the downstream face of the spillway, and recommend measures for monitoring the seepage and/or preventing piping of soil from the dam.**

3. **Investigate the source of 1) the wet area downstream of the dam adjacent to the left bank of the downstream channel and 2) the lush growth left of the downstream face of the dam. Assess the significance of the cause of these features and recommend measures for controlling them if necessary.**
4. Remove trees between the dam and roadway bridge and backfill root depressions with appropriate soils.

5. Investigate the source of the irregular ground surface of the crest. Regrade the crest, establish grassy vegetation on the crest, and monitor the surface of the crest during future inspections.

6. Perform detailed hydrologic and hydraulic studies to further assess the need for and means to increase the project discharge capacity.

7.3 Remedial Measures.

   a. Operation and Maintenance Procedures.

      1. Clear brush and trees from the banks of the downstream channel between the dam and roadway bridge and place riprap on the banks for erosion protection.

      2. Repair spalled concrete and cracks in the structures.

      3. Clear brush and trees on the crest of the dam and adjacent to the downstream face of the dam.

      4. Institute a program of annual technical inspection by a qualified registered engineer.

      5. Implement a regular maintenance program.

      6. Develop and "Emergency Action Plan" that will include an effective preplanned downstream warning system, locations of emergency equipment, materials and manpower, authorities to contact and potential areas that require evacuation. Monitoring during flood periods should be included in the plan.

7.4 Alternatives.

There were no practical alternatives to the above recommendations considered.
APPENDIX A

INSPECTION CHECKLIST
VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT: Rogers Lake Dam  DATE: April 15, 80
TIME: A.M.
WEATHER: Fair
W.S.ELEV: 36.1  U.S. 32.2  D.S.

PARTY:

1. S. Khanna, CEM / Hydraulics
2. E. Dessert, CEM / Civil
3. R. Brown CEM / Civil
4. R. Murdock, GEI / Geotechnical
5. T. Keller, GEI / Geotechnical

PROJECT FEATURE INPECTSED BY REMARKS

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 
9. 
10. 

A-1
PERIODIC INSPECTION CHECKLIST

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>Rogers Lake Dam</th>
<th>DATE</th>
<th>April 15, 1980</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSPECTOR DISCIPLINE</td>
<td></td>
<td>DISCIPLINE</td>
<td></td>
</tr>
<tr>
<td>INSPECTOR DISCIPLINE</td>
<td></td>
<td>DISCIPLINE</td>
<td></td>
</tr>
</tbody>
</table>

### AREA EVALUATED | CONDITION

**DAM EMBANKMENT**

- **Crest Elevation**: 36.0
- **Current Pool Elevation**: 36.1
- **Maximum Impoundment to Date**: Unknown
- **Surface Cracks**: None of significance in earth fill between concrete walls. Occasional cracking and spalling of concrete walls on upstream and downstream sides of earth fill, but no significant movement of walls.
- **Pavement Condition**: No pavement.
- **Movement or Settlement of Crest**: None that could be attributed to movement of the dam, but topo is irregular on left side between and around concrete walls.
- **Lateral Movement**: No significant lateral movement observed.
- **Vertical Alignment**: No vertical misalignment of significance observed.
- **Horizontal Alignment**: No horizontal misalignment of significance observed.
- **Condition at Abutment and at Concrete Structures**: Sandbags at left abutment; abutment area is lower than the top of the dam.
- **Indications of Movement of Structural Items on Slopes**: No structural items.
- **Trespassing on Slopes**: None of significance.
- **Sloughing or Erosion of Slopes or Abutments**: None of significance.
PERIODIC INSPECTION CHECKLIST

<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DAM EMBANKMENT</strong> (Cont.)</td>
<td></td>
</tr>
<tr>
<td>Rock Slope Protection - Riprap</td>
<td>No riprap.</td>
</tr>
<tr>
<td>Failures</td>
<td></td>
</tr>
<tr>
<td>Unusual Movement or Cracking at</td>
<td>None of Significance.</td>
</tr>
<tr>
<td>Near Toe</td>
<td></td>
</tr>
<tr>
<td>Unusual Embankment or Downstream Seepage</td>
<td>Seepage through spalled area in downstream face of concrete on right side of dam. Wet area left of downstream channel which may be seepage.</td>
</tr>
<tr>
<td>Piping or Boils</td>
<td>None observed.</td>
</tr>
<tr>
<td>Foundation Drainage Features</td>
<td>None</td>
</tr>
<tr>
<td>Toe Drains</td>
<td>None</td>
</tr>
<tr>
<td>Instrumentation System</td>
<td>None</td>
</tr>
<tr>
<td>Vegetation</td>
<td>26-inch diameter tree 10 feet from downstream face of dam (left side); brush growth on earth fill (right side); area of lush green growth - left side.</td>
</tr>
</tbody>
</table>
PERIODIC INSPECTION CHECKLIST

PROJECT Rogers Lake Dam

DATE April 15, 1980

INSPECTOR DISCIPLINE

INSPECTOR DISCIPLINE

AREA EVALUATED

OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE

a. Approach Channel

<table>
<thead>
<tr>
<th>Slope Conditions</th>
<th>Same approach as for spillway (approach from lake).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom Conditions</td>
<td>Edge of lake wooded.</td>
</tr>
<tr>
<td>Rock Slides or Falls</td>
<td>None</td>
</tr>
<tr>
<td>Log Boom</td>
<td>None</td>
</tr>
<tr>
<td>Debris</td>
<td>Branches fouling intake gate.</td>
</tr>
<tr>
<td>Condition of Concrete Lining</td>
<td>None</td>
</tr>
</tbody>
</table>

b. Intake Structure

<table>
<thead>
<tr>
<th>Condition of Concrete</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop Logs and Slots</td>
<td>None</td>
</tr>
</tbody>
</table>
**PERIODIC INSPECTION CHECKLIST**

**PROJECT**  
Rogers Lake Dam

**DATE**  
April 15, 1980

**INSPECTOR**  

**DISCIPLINE**  

<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTLET WORKS - CONTROL TOWER</td>
<td>Gate control consists of vertical lift timber gate (3-4 years old), treated timber in good condition. Gate stem is treated timber with steel rack and pinion mechanism. Lift mechanism is operated with wrench.</td>
</tr>
</tbody>
</table>
| a. Concrete and Structural | General Condition Good  
Condition of Joints Good  
Spalling None  
Visible Reinforcing None  
Rusting or Staining of Concrete None  
Any Seepage or Efflorescence None  
Joint Alignment Good  
Unusual Seepage or Leaks in Gate Chamber Not observable.  
Cracks None observed.  
Rusting or Corrosion of Steel None observed. |
<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTLET WORKS - TRANSITION AND CONDUIT</td>
<td>Not observable.</td>
</tr>
</tbody>
</table>
PERIODIC INSPECTION CHECKLIST

PROJECT Rogers Lake Dam DATE April 15, 1980
INSPECTOR DISCIPLINE INSPECTOR DISCIPLINE

<table>
<thead>
<tr>
<th>AREA EVALUATED</th>
<th>CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</td>
<td></td>
</tr>
<tr>
<td>General Condition of Concrete</td>
<td>Outlet channel is the same as the spillway discharge channel.</td>
</tr>
<tr>
<td>Rust or Staining</td>
<td>Good</td>
</tr>
<tr>
<td>Spalling</td>
<td>None observed.</td>
</tr>
<tr>
<td>Erosion or Cavitation</td>
<td>Slight</td>
</tr>
<tr>
<td>Visible Reinforcing</td>
<td>None</td>
</tr>
<tr>
<td>Any Seepage or Efflorescence</td>
<td>Not observable, however seepage into discharge conduit was reported by a local resident.</td>
</tr>
<tr>
<td>Condition at Joints</td>
<td>Good</td>
</tr>
<tr>
<td>Drain Holes</td>
<td>None</td>
</tr>
<tr>
<td>Channel</td>
<td>Natural Streambed.</td>
</tr>
<tr>
<td>Loose Rock or Trees Overhanging Channel</td>
<td>Trees overhanging channel.</td>
</tr>
<tr>
<td>Condition of Discharge Channel</td>
<td>Good</td>
</tr>
<tr>
<td>AREA EVALUATED</td>
<td>CONDITION</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</strong></td>
<td></td>
</tr>
<tr>
<td>a. Approach Channel</td>
<td></td>
</tr>
<tr>
<td>General Condition</td>
<td>Direct approach from body of lake.</td>
</tr>
<tr>
<td>Loose Rock Overhanging Channel</td>
<td>Good</td>
</tr>
<tr>
<td>Trees Overhanging Channel</td>
<td>None</td>
</tr>
<tr>
<td>Floor of Approach Channel</td>
<td>None</td>
</tr>
<tr>
<td>b. Weir and Training Walls</td>
<td></td>
</tr>
<tr>
<td>General Condition of Concrete</td>
<td>Concrete</td>
</tr>
<tr>
<td>Rust or Staining</td>
<td>Good</td>
</tr>
<tr>
<td>Spalling</td>
<td>None</td>
</tr>
<tr>
<td>Any Visible Reinforcing</td>
<td>Slight</td>
</tr>
<tr>
<td>Any Seepage or Efflorescence</td>
<td>None observed.</td>
</tr>
<tr>
<td>Drain Holes</td>
<td></td>
</tr>
<tr>
<td>c. Discharge Channel</td>
<td></td>
</tr>
<tr>
<td>General Condition</td>
<td>Good</td>
</tr>
<tr>
<td>Loose Rock Overhanging Channel</td>
<td>None</td>
</tr>
<tr>
<td>Trees Overhanging Channel</td>
<td>Yes</td>
</tr>
<tr>
<td>Floor of Channel</td>
<td>Natural gravel, cobbles and boulders.</td>
</tr>
<tr>
<td>Other Obstructions</td>
<td>Bridge 57 feet downstream of weir.</td>
</tr>
</tbody>
</table>
APPENDIX B

ENGINEERING DATA
APPENDIX B-1

Correspondence pertaining to the history, maintenance, and modifications to the Rogers Lake Dam as well as copies of past inspection reports are located at:

State of Connecticut
Department of Environmental Protection
State Office Building
165 Capitol Avenue
Hartford, Connecticut 06115
Attention: Mr. Victor J. Galgowksi,
   Dam Safety Engineer
APPENDIX B-2

SELECTED COPIES OF PAST INSPECTION REPORTS
No. 10

INVENTORIED BY WM 8

Date 30 June 1964

Name of Dam or Pond ROGERS LAKE

Code No. C 27 LT 2.5 ML 2.2

Nearest Street Location TOWN WOODS ROAD

Town OLD LYM E LONG 74-18-1

U.S.G.S. Quad. OLD LYM E

Name of Stream MILL BROOK LAT 41-21-0

Owner TOWN OF OLD LYM E

Address OLD LYM E CONNECTICUT 06371

Pond Used For RECREATION DA 2.53 SM

Dimensions of Pond: Width 1200 FEET Length 8500 FEET Area 2.53 ACRE

Total Length of Dam 160 FEET Length of Spillway 30 FEET

Location of Spillway CENTER OF DAM

Height of Pond Above Stream Bed 5 FEET

Height of Embankment Above Spillway 4 FEET

Type of Spillway Construction CONCRETE

Type of Dike Construction CONCRETE EARTH DOWNSTREAM

Downstream Conditions CULVERT UNDER TOWN WOODS ROAD

Summary of File Data REPORT BY B. H. PALMER DATED 11-1-56

COMMENTING ON LEAKS IN THE DAM AND SAYING THAT THEY WERE NOT SERIOUS

Remarks

Would Failure Cause Damage? YES Class B
Who Owns Lake? Sorry You Asked

OLD LYME (Special) — Who owns Rogers Lake? The Planning Commission is not glad that you asked.

It seems that certain lakefront residents wanted to take advantage of the lowered water level in the lake and extend seawalls into the lake.

When one resident asked permission of the Planning Commission to do this, the commission found that neither they, nor any other group in town, had control over the lake. So before filling in the lake, it appears someone would have to show record of ownership dating back in all probability, to 1665, the year the town was separated from Old Saybrook.

A recommendation to determine ownership of Rogers Lake was then made to the State Water Resources Commission by town officials to prevent the filling in of a portion of the water front.

SWRC said it had no authority in the matter, and suggested the town contact the owner and have him issue a cease and desist order.

One town official said the lake around the lake is privately owned. And there is the matter and just a memory by the time of virtually every back tax since the Stamp Act. Plus ther-
State of Connecticut
Water Conservation Comm.
Hartford, Conn.

To whom it may concern,

I am writing to inquire of your office as to whether your jurisdiction covers such an agency.

On several occasions, I have noted that large trucks have been driving across from the base of the dam at Roger's Lake in Old Lyme, Conn.

I ask this question concerning this matter.

My concern is based on the premise that private contractors should not be allowed to pump water.
They draw from corn sources, moment as they use the files votes at other premises.

As a law owner I pay electric charges for power to draw votes from Rogersville.

Please remind me to instruct without the other.

Paul be good enough to inform me if the practice is permitted under law or if a complaint can be submitted against the mayor of the free votes for commercial purposes.

Very truly,

[Signature]
June 29, 1972

Mr. Merle S. Bugbee
First Selectman
Memorial Town Hall
Old Lyme, Connecticut 06371

Res: Rogers Lake Dam
Old Lyme

Dear Mr. Bugbee:

Thank you for your letter of June 27, 1972 and attached sketch indicating a proposed retaining wall along the shoreline of the subject lake.

Since this construction would be along the shoreline abutting the end of the dam and no construction or modifications on the dam itself are contemplated, a Construction Permit from this department would not be required for this work.

Very truly yours,

William H. O'Brien, III
Civil Engineer

WHOB

lg
June 27, 1972

Mr. William H. O'Brien III
Water Resource Commission.
State Office Building
Hartford, Connecticut 06115

Re: Rogers Lake Dam, Extension of South Wing Wall

Dear Mr. O'Brien:

Please advise me of procedures to follow if the Town of Old Lyme is required to obtain State permission to extend the south wing of Rogers Lake Dam.

The extension will be about 35' in length. It will not raise the level of the lake and will eliminate the possibility of the lake overflowing around the south end of the present wall, a problem we are now faced with every time we have extensive rain falls.

Very truly yours,

Meredith S. Bugbee
First Selectman

Enclosure: Rough Sketch
Mr. Rudolph A. Brey  
Lake Drive  
Rogers Lake West Shore  
Old Lyme, Connecticut  06173

Res: Rogers Lake Dam  
General Correspondence  
Old Lyme

Dear Mr. Brey:

This is in reply to your question concerning withdrawal of water from the stream below the subject dam by trucks.

We know of no specific state statute which is applicable to the situation which you describe.

We suggest that you seek legal counsel on how best to proceed in this matter.

Very truly yours,

William H. O'Brien, III  
Civil Engineer

cc: Dan W. Lufkin, Commissioner  
Department of Environmental Protection
April 5, 1971

Mr. Merle S. Bugbee
First Selectman
Town of Old Lyme
Memorial Town Hall
Old Lyme, Connecticut 06371

Re: Rogers Lake Dam
Old Lyme

Dear Mr. Bugbee:

On March 29, 1971 the undersigned inspected the subject dam with you as a result of your request in your letter dated March 11, 1971.

The dam appeared to be in satisfactory condition. There was a fairly substantial leak thru the downstream masonry of the spillway section just east of the draw down pipe. The leak was about 3 feet below the spillway and is apparently the same one mentioned in a letter dated November 1, 1956 from B. H. Palmer, Member State Board for Supervision of Dams to Paul W. Hains, First Selectman, Old Lyme. There was no question of the safety of the dam at that time and it does not appear to be a safety consideration at this time in light of the fact that it has been leaking for many years and you felt that there had been no noticeable increase in the volume of the leak.

In order to conserve water you may wish to try to stop this leak from the downstream side. If there is an "undercut" in the joint between the stones, packing with lead wool and facing with concrete may stop this leak. The lead wool is available in hardware or plumbing supply stores. If this method is attempted, please advise as to results.

Very truly yours,

William H. O'Brien, III
Civil Engineer

P.S. Comment on other dams in separate letters.
March 11, 1971

State Board for the Supervision of Dams
Water Resources Commission
State Office Building
Hartford, Connecticut 06115

Re: Letter of 3-10-71, Inspection of Upper Mill Pond Dam

Gentlemen:

On the tenth of March I wrote you requesting an inspection of the Upper Mill Dam in the Town of Old Lyme.

Since you, in all probability, will grant my request, I would like to have you check all three dams when you make the check.

If possible, could you let me know a few days ahead of your planned inspection, and I will be available to accompany your engineer on the inspection.

Very truly yours,

Merle S. Bugbee
For the Board of Selectmen

MSB: eh

cc-Mr. Kneeland

STATE WATER RESOURCES COMMISSION
RECEIVED
MAR 15 1971

ANSWERED
REPLIED
FILED
August 3, 1967

Merle S. Bugbee
First Selectman
Town of Old Lyme
Memorial Town Hall
Old Lyme, Connecticut 06371

Dear Mr. Bugbee:

In answer to your letter to Mr. Willis J. Snow dated July 12, 1967, the Rogers Lake Dam was inspected on August 1, 1967. The dam was found to be in essentially good condition. It was noted that an area of concrete on the northwest wing wall is spalling and should be repaired to prevent further damage. In addition, the small trees and brush that is growing on the southeast wall should be removed.

The condition of the dam does not appear to be changed from the last inspection by this agency on June 30, 1964.

Very truly yours,

William P. Sander
Engineer - Geologist

WPS:rek
July 12, 1967

Mr. Willis J. Snow, Principal Engineer
State Board for the Supervision of Dams
State Office Building
Hartford, Connecticut

Dear Mr. Snow:

The Town of Old Lyme requests that the town owned dam at Rogers Lake be subjected to an inspection by your department as provided by Section 25-111, General Statutes, Volume 5, 1965 Supplement.

I believe this dam to be in a reasonably safe condition, but would appreciate the opinion and recommendation of your engineers.

Very truly yours,

Merle S. Bugbee
First Selectman
November 1, 1956

Mr. Paul M. Jaimes
First Selectman
Old Lyme, Connecticut

Dear Sir:

This afternoon I looked at the Dam at Rogers Lake in Old Lyme. The water was about 13" below full pond and the gate was closed. There was a substantial leak through the spillway section a short distance from the gate and this leak was about 30" below the top of the spillway. I would think that this leak would be substantially greater during high water. There is no question of safety of the Dam but I can see that it loses a good deal of water through these leaks. I suggest that you open the gate and draw the pond down another 2 feet. After it is drawn down you can construct a small sand bag coffer dam around the inlet of the gate and around that portion of the spillway where the leaks are the worst. I think then that all the leaves and debris should be cleaned out from in back of the dam and facing concrete about 3" thick put in back of the spillway and carried down at least below the depth of the leaks. This concrete should be carried around into the opening which is in front of the gate. I am sure that this would stop the leaks in a satisfactory manner.

The cheaper way would be to draw the pond down and clean out the leaves etc., and backfill with good clay which would have a tendency to fill up the cracks where the water is coming through. However, this is not a sure method and I recommend that you do it with concrete. It would be desirable to carry the concrete all the way across the spillway but it will be up to you as to how much you want to do.

Very truly yours,

[Signature]

Member, State Board for Supervision of Dams

c.c.: Mr. J. Snow
Principal Engineer
Mr. Benjamin E. Palmer  
Chandler & Palmer  
16 Franklin Street  
Norwich, Connecticut  

Dear Mr. Palmer:

Mr. Paul W. Haines, First Selectman of Old Lyme, called my home last week to say that the dam at Rogers Lake in Old Lyme was leaking and they had been unable to determine where the trouble lay. I took a quick look at it the following day and observed that, in addition to several small leaks in the masonry of the spillway, there was considerable leakage at the toe of a concrete apron on the downstream side of the discharge gate. It was impossible at the time to determine if there were other serious leaks.

Will you kindly investigate this matter when opportunity permits in order that any necessary repairs may be made as soon as possible?

Thank you for this favor.

Sincerely yours,

Willis J. Snow  
Principal Engineer

cc: Mr. Paul W. Haines,  
First Selectman
APPENDIX B-3

PLANS, SECTIONS AND DETAILS
APPENDIX C

PHOTOGRAPHS
PHOTO C-13 Washout area near left abutment of dam.

PHOTO C-14 Washout area. Note remains of sand bags.
PHOTO C-11  Seepage area at base of dam.

PHOTO C-12  Cracking of concrete wall upstream face of dam.
PHOTO C-9 Outlet works, discharge.

PHOTO C-10 Spillway and outlet works discharge channel.
PHOTO C-7  Spillway and embankments from downstream right side.

PHOTO C-8  Cutlet works intake structure and gate control.
PHOTO C-5  Spillway and embankment from downstream left side.

PHOTO C-6  Spillway from left side.
PHOTO C-3  Crest of embankment from right abutment.

PHOTO C-4  Crest of embankment from left side.
PHOTO C-1  Upstream face of dam from left side.

PHOTO C-2  Upstream face of dam from right side.
APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS
A. Size Classification

Rogers Lake Dam

Height of dam = 7.0 ft.; hence Small

Storage capacity at top of dam (elev. 355") = 1275 AC-FT.; hence Intermediate

Adopted size classification INTERMEDIATE

B. Hazard Potential

This dam is classified as a significant hazard potential structure because its failure could result in loss of less than a few lives, inundation of 5-10 dwellings and damage to Town Woods Road, Sill Lane and Mill Lane. Utility services within the rights of way may be temporarily disrupted. It is estimated that the failure discharge of 1122 CFS will travel downstream through the Mill Brook streambed with velocities of up to 20 feet per second.

C. Adopted Classifications

<table>
<thead>
<tr>
<th>HAZARD</th>
<th>SIZE</th>
<th>TEST FLOOD RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGNIFICANT</td>
<td>INTERMEDIATE</td>
<td>Half PMF to Full PMF</td>
</tr>
</tbody>
</table>

Adopted Test Flood = Half PMF = 500 CSM

D. Overtopping Potential

Maximum spillway discharge
Capacity without overtopping of dam = 344 CFS
"test flood" inflow discharge = 4000 CFS
"test flood" outflow discharge = 2550 CFS
% of "test flood" overflow carried by spillway without overtopping = 13%
"test flood" outflow discharge portion which overflows over the dam = 2206
% of test flood which overflows over the dam = 87%
Estimating Maximum Probable Discharges - Inflow and Outflow Values

Date of Inspection: April 15, 1980

Name of Dam: Rogers Lake Dam  Location of Dam: Mill Brook  Town: Old Lyme, CT

Watershed Characterization: Rural, swampy; natural storages; flat slopes  0.6 sq. miles of drainage area

0.6 sq. miles of drainage area in swampy or occupied by storage reservoirs

Adopted "test" flood = 500 CSM  4000 CFS;  Re = Effective Rainfall = 9.5 inches

D.A. = Drainage Area (Gross) = 3.0 Square Miles; Basin Slope = 0.003; hence: Flat

S.A. = Surface Area of Reservoir = 0.422 Square Miles; Time of Concentration = 50 minutes

Shape and Type of Spillway = Free overflow, vertical fall, broad crest, concrete structure

B = Width of Spillway = 29.0 feet; C = Coefficient of Discharge = (30R - Friction) = 3.0

Maximum Capacity of Spillway Without Overtopping = 344 CFS = 13/4 of test flood/overflow

Top of Dam Elevation = 38.50; Spillway Crest Elevation = 36.00

Overflow portion of Length of Dam = 96; C = Coefficient of discharge for Dam = 3.0

(including spillway)

<table>
<thead>
<tr>
<th>Name of Dam</th>
<th>Test Flood</th>
<th>Inflow Characteristics</th>
<th>Outflow Characteristics First Approximation</th>
<th>Outflow Characteristics Second Approximation</th>
<th>Outflow Characteristics Third Approximation (Adopted)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CSM</td>
<td>CFS</td>
<td>in feet</td>
<td>in inches</td>
<td>CFS</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Rogers Lake</td>
<td>1/2PMF</td>
<td>500</td>
<td>4000</td>
<td>12.80</td>
<td>8.1</td>
</tr>
</tbody>
</table>

Q_p = Discharge; h= Surcharge height; S = Storage in inches

NOTE: Outflow discharge values are computed as per CSM guidelines.
NAME OF DAM: **ROGERS LAKE DAM**

**ESTIMATING EFFECT OF SURCHARGE STORAGE ON "TEST FLOOD"**

A. This routing of floods through the reservoir was carried out according to the guidelines established by the Corps of Engineers in Phase 1 Inspection for Dam Safety Investigations issued in March, 1978.

B. Formulas used are as follows:

1. For no overtopping: \( Q = C_1 B_1 h_1^{3/2} \)
   For overtopping: \( Q = C_1 B_1 [h_2^2 + F.B.]^{3/2} + C_2 B_2 h_2^{3/2} \)
   For open channel flow: N/A
   For orifice flow: N/A
   where \( C_1 \) = coefficient of discharge for spillway; \( B_1 \) = length of spillway
   \( C_2 \) = coefficient of discharge for dam; \( B_2 \) = length of dam
   \( h_1 \) = head over spillway crest (feet); \( h_2 \) = head over dam (feet)
   F.B. = distance between spillway crest and top of dam

2. Surcharge storage in inches = \( S = 12 (h_1 + h_2) \frac{S.A.}{D.A.} = 0.633 h \)
   where S.A. = surface area +
   D.A. = drainage area in sq. miles

3. Outflow = inflow \( (1 - \frac{S}{R_e}) \); where \( R_e \) = effective rainfall = 9.5"

4. Length of dam = 96.0 ft.; Top of Dam elev. = 38.50 ft.; \( c \) for dam = 3.0
   Length of spillway = 29.0 ft.; Spillway crest el. 36.0 ft.; \( c \) for spillway = 3.0
   \( Q = 3 \times 29 (2.5 + h_2)^{1.5} + 3 \times 9\times h_2^{1.5} \) where \( h_2 \) is head over top of dam
   \( S = \) Storage in inches = \( 12h \frac{S.A.}{D.A.} = 0.633h \) where \( h \) is head over spillway crest

5. Inflow = 4000 C.F.S.

<table>
<thead>
<tr>
<th>Q in CFS</th>
<th>Elevation</th>
<th>Total Head over crest ( h_1 + h_2 = h )</th>
<th>Storage in inches = ( S )</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3733</td>
<td>37</td>
<td>1.0</td>
<td>0.633</td>
<td></td>
</tr>
<tr>
<td>3200</td>
<td>39</td>
<td>3.0</td>
<td>1.899</td>
<td></td>
</tr>
<tr>
<td>2667</td>
<td>41</td>
<td>5.0</td>
<td>3.165</td>
<td></td>
</tr>
<tr>
<td>2134</td>
<td>43</td>
<td>7.0</td>
<td>4.431</td>
<td></td>
</tr>
<tr>
<td>1601</td>
<td>45</td>
<td>9.0</td>
<td>5.697</td>
<td></td>
</tr>
<tr>
<td>2550</td>
<td>41.5</td>
<td>5.5</td>
<td>3.481</td>
<td></td>
</tr>
</tbody>
</table>
"Rule of Thumb Guidance for Estimating Downstream Dam Failure Discharge"

BASIC DATA

Name of dam  Rogers Lake Dam  Name of town  Old Lyme, CT

Drainage area  8.0 sq. mi., Top of dam  38.50 NGVD

Spillway type = Free vertical fall overflow weir  Crest of spillway  36.0 NGVD

Surface area at crest elevation = 270 Acres = 0.422 sq mi.

Reservoir bottom near dam = 31.50 NGVD

Assumed side slopes of embankments  2:1

Depth of reservoir at dam site = \( y_0 \) = 7.0 ft.

Mid-height elevation of dam = 34.0 NGVD

Length of dam at crest = 125.0 ft.

Length of dam at mid-height = 100.0 ft.

\( 25\% \) of dam length at mid-height = \( W_B \) = 25 ft.

Width of channel immediately downstream = \( B = 25 \) ft.; Shape of breach = rectangular

<table>
<thead>
<tr>
<th>Elevation (NGVD)</th>
<th>Estimated Storage in AC-FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.00</td>
<td>600</td>
</tr>
<tr>
<td>36.50</td>
<td>735</td>
</tr>
<tr>
<td>37.50</td>
<td>1005</td>
</tr>
<tr>
<td>38.50</td>
<td>1275</td>
</tr>
<tr>
<td>40.50</td>
<td>1815</td>
</tr>
<tr>
<td>41.50</td>
<td>2058</td>
</tr>
</tbody>
</table>
ROGERS LAKE DAM

1. DAM FAILURE ANALYSIS

A. Failure Analysis

Discharge = \( \frac{\beta}{27} W_b \sqrt{g y_o} \)

= 1.68 W_b y_o^{1.5}

= 778 C.F.S.

B. Maximum Spillway Discharge with W.S.E. At top of Dam = 344 C.F.S.

C. Total Dam Failure Discharge = 1122 C.F.S.

D. Reservoir - Storage Data:

- Volume of storage at spillway crest = 600 AC-ft. @ Elev. 36.0
- Surcharge storage at top of dam = 675 AC-ft. @ Elev. 38.5
- Storage Total = 1275 AC-ft. @ Elev. 38.5

E. Flood Discharge Channel

1. Maximum depth of flow just D/S of Dam = \( \frac{4}{y_o} = 3.11 \) feet

Notes:

1. Failure of dam is assumed to be instantaneous. When pool reaches top of dam, and is a full-depth partial width rectangular shape failure with a width of failure = \( W = 25 \) feet and depth of failure \( y_o = 7.0 \) feet.

2. Steady, uniform flow phenomenon is assumed for determination of failure profile and is based on Manning's formulae.

3. Failure profile for impacted area determination is determined at one typical cross section in the downstream channel. Reduction in discharge due to available storage has been taken into account.
ii. Reach 1

Length = 11000 feet; Station 0 to Station 110.0; n = 0.05

Bed slope = \( S_0 = S_f = 0.0025 \); Bed width = \( b = 38 \) feet

Bed width is scaled from U.S.G.S. map; scale 1" = 2,000 feet

As bed width is large and 1" = 2,000 feet and 10-foot contour interval scale maps are being used for various channel parameters, it is appropriate to assume that \( d = R = \text{Hyd Radius} = \text{depth} \), hence Manning's formulae is transformed:

\[
Q = A \left( \frac{1.49}{n} \right) \frac{R^{2/3}}{S} = bd \left( \frac{1.49}{n} \right) \frac{d^{2/3}}{S}
\]

\[
Q = b \left( \frac{1.49}{n} \right) \frac{S}{d}^{5/3} = Kd \frac{5}{3} = 57d^{5/3}
\]

State Discharge Relationship for Reach 1

<table>
<thead>
<tr>
<th>Depth = d in Feet</th>
<th>Stage of Elevation</th>
<th>Discharge in CFS = Q</th>
<th>Velocity in ft./sec.</th>
<th>Storage Volume in AC-ft. = V</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>18.0</td>
<td>0</td>
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<tr>
<td>2</td>
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<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>12</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

F. Water surface profiles resulting from maximum spillway discharge and also from dam failure discharge are shown on Plate D-13 for comparison purposes. This figure also shows the rise in water depth due to failure of dam.

Also, Discharge — Depth and Storage-depth curves are shown on Plate D-12 for downstream channel.

Notes: 1. Storage volume in AC-ft = \( \frac{\text{Length of Reach}}{43,560} \) (Bed Width) (Depth)

2. Failure discharge being large will mostly be overbank flow on existing channel.
G. For $Q_1 = 1122$ CFS; depth = 6.0 ft. $V_1 = 68$ AC-ft.

Trial $Q_2 = Q_1 \left(1 - \frac{V_1}{\text{Storage}}\right) = 1122 \left(1 - \frac{68}{1273}\right) = 1062$ CFS

$V_2 = AC$-ft.

$\text{Avg } V = \frac{V_1 + V_2}{2} = 66$ AC-ft.

$Q_2 = Q_1 \left(1 - \frac{\text{Avg.}}{\text{Storage}}\right) = 1064$ CFS; $y_2 = 5.8$ ft.

Depth at center of flood as adopted = 6.0 ft.

Additional dam failure analysis beyond Reach 1 has not been undertaken because the depth of flow of 5.8 feet at the end of Reach 1 will not cause any hazardous conditions further downstream. The failure discharge and depth will continually decrease beyond Reach 1.
SUMMARIZED AND ADOPTED VALUES

FOR

DAM FAILURE ANALYSIS

i. Name of Dam Rogers Lake Dam

ii. Dam Failure Discharge _______ = _______ 778 cfs.

iii. Maximum Spillway Discharge _______ = _______ 344 cfs.

iv. Total Dam Failure Discharge _______ = _______ 1122 cfs.

v. Normal (Manning Depth) for 1122 = ____ 6.0 feet

vi. Normal (Manning Depth) for 344 = ____ 4.0 feet

vii. Increase in depth due to failure of dam = ____ 2.0 feet

viii. W.S.E. prior to failure = Ground Elevation + 4.0

ix. W.S.E. after failure = Ground Elevation + 6.0

Note: The adopted depth of flow values are assumed to be accurate representations of damages in the impacted areas. Professional judgement is used in these final adopted values.
Rogers Lake Dam

Computations for Spillway Rating Curve and Outlet Rating Curve Computations

Spillway width = 29.0 feet; Spillway crest elevation = 36.0 NGVD
Length of dam = 125 (including spillway) feet; Top of dam elevation = 38.5 NGVD
\( c = 3.0 \)

### Spillway Rating Curve Computations

<table>
<thead>
<tr>
<th>Elevation (ft.) NGVD</th>
<th>Spillway Discharge (CFS)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>36.0</td>
<td>0</td>
<td>Spillway Crest Elevation</td>
</tr>
<tr>
<td>36.5</td>
<td>31</td>
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</tr>
<tr>
<td>37.0</td>
<td>87</td>
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</tr>
<tr>
<td>37.5</td>
<td>160</td>
<td>Top of Dam Elevation</td>
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<tr>
<td>38.0</td>
<td>246</td>
<td></td>
</tr>
<tr>
<td>38.5</td>
<td>344</td>
<td>Test Flood Elevation</td>
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<td>554</td>
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<tr>
<td>40.0</td>
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<tr>
<td>44.0</td>
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### Outlet Rating Curve Computations

<table>
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<th>Elevation (ft.) NGVD</th>
<th>Discharge (CFS)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
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<td>41.5</td>
<td>99.4</td>
<td>Test Flood Elevation</td>
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<td>81.1</td>
<td>Top of Dam Elevation</td>
</tr>
<tr>
<td>38.5</td>
<td>77.0</td>
<td></td>
</tr>
<tr>
<td>36.5</td>
<td>57.3</td>
<td>Spillway Crest Elevation</td>
</tr>
<tr>
<td>36.0</td>
<td>51.3</td>
<td>Invert Elevation</td>
</tr>
<tr>
<td>32.0</td>
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</table>

Size of outlet = 36 inch dia. pipe; Area of outlet = 7.07 sq. ft.
Invert of outlet = 32.0; Center line of outlet = 33.5
OUTLET RATING CURVE
ROGERS LAKE DAM

PLATE D-15
APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS
## INVENTORY OF DAMS IN THE UNITED STATES

<table>
<thead>
<tr>
<th>STATE</th>
<th>COUNTY</th>
<th>CO-ORD</th>
<th>STATE</th>
<th>COUNTY</th>
<th>CO-ORD</th>
<th>NAME</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>REPORT DATE</th>
</tr>
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<tr>
<td>CT</td>
<td>011</td>
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<td>ROGERS LAKE DAM</td>
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**POPULAR NAME**

ROGERS LAKE

**RIVER OR STREAM**

MILL BROOK

**NEAREST DOWNSTREAM CITY-TOWN-VILLAGE**

OLD LYME

**TYPE OF DAM**

ROGUE

**YEAR COMPLETED**

1922

**PURPOSES**

R

**STRUCTURAL HEIGHT**

9

**HORIZONTAL DIAMETER**

7

**MAXIMUM DISCHARGE**

1275

**DEPLOURING CAPACITIES**

400

**OWNER**

TOWN OF OLD LYME

**ENGINEERING BY**

REPOSITORY AGENCY

**CONSTRUCTION BY**

INSPECTION BY

AGUILA INC

**INSTRUCTION DATE**

15 FEB 02

**AUTHORITY FOR INSPECTION**

PL 92-367