THAMES RIVER BASIN
MONTVILLE, CONNECTICUT

STONY BROOK RESERVOIR DAM

CT. 00243

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Stony Brook Reservoir Dam consists of two earthfill embankments with concrete core walls, separated by a 650 ft. long natural promontory. The dam and appurtenant works are judged to be in generally fair condition. Based upon the guidelines the recommended test flood ranges from a ½ PMF to a full PMF. A test flood equal to a full PMF (5,840 cfs) was selected.

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STONY BROOK RESERVOIR

CT 00243

STONY BROOK
MONTVILLE, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No.:	CT 00243
Name of Dam:	Stony Brook Reservoir Dam
Town:	Montville
County and State:	New London County, Connecticut
Stream:	Stony Brook
Date of Inspection:	25 October 1979

BRIEF ASSESSMENT

Stony Brook Reservoir Dam consists of two earthfill embankments with concrete core walls, separated by a 650 ft. long natural promontory. The right embankment known as the "Main Dam" is about 770 ft. long and 36 ft. high. The left embankment known as the "Side Dam" is about 340 ft. long and 21 ft. high. A concrete spillway, 35 ft. wide, is located in the Side Dam. The spillway discharges into a stone masonry channel about 220 ft. long. A gate house located upstream from the Main Dam houses controls for the inlet to a 24 in. dia. water supply line and a 24 in. dia. low level outlet.

Stony Brook Reservoir is utilized as a water storage facility for the City of Norwich. It is about 3,200 ft. long and has a surface of about 75 acres at spillway crest level. The drainage area is 2.57 sq. mi. (1,643 acres) and the maximum storage to top of dam is 1,948 acre-ft.; the size classification is thus intermediate. Because failure of the dam could cause serious damage to several homes, a farm, a mobile home park, two secondary roads and two state highways, with the possibility of the loss of more than a few lives and the probability of excessive economic lossses, it has been classified as having a high hazard potential.

The dam and appurtenant works are judged to be in generally fair condition. Brush was growing on the downstream slopes of both dams and in the spillway discharge channel. The gate house is in need of repair and the condition of the outlet gate could not be verified. Seeps were found downstream of both dams and cavities were found in the slopes of both embankments.

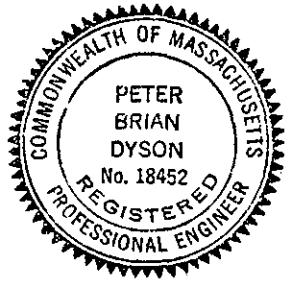
Based upon the guidelines, the recommended test flood ranges from a ½ PMF to a full PMF. A test flood equal to a full PMF (5,840 cfs) was selected.

The routed test flood outflow of 5,200 cfs overtops the crest of the Main Dam by 1.3 ft. and the Side Dam by 0.6 ft. The spillway can pass 1,250 cfs or about 24 percent of the routed test flood outflow without overtopping the Main Dam.

Within one year after receipt of this Phase I Inspection Report, the owner, the City of Norwich, should retain the services of a registered professional engineer and implement the results of his evaluation of the following: (1) a detailed hydrologic - hydraulic investigation to assess further the potential for overtopping and the adequacy of the spillway; and (2) investigate the desirability of installing graded filters, weirs, and channels for improved control and monitoring of the seeps located downstream of both embankments.

The owner should also implement the following operating and maintenance measures: (1) remove brush and tree growth from the dam embankments and from the spillway discharge channel; (2) excavate and remove decayed root structures in the crest and backfill with suitable material; (3) restore ruts in the embankment crests to grade and reseed; (4) depressions on the downstream slopes of both dams should be excavated and backfilled, and their subsequent performance monitored on a monthly basis; (5) seepage and ponding at the toe of both dams should be monitored monthly, pending the results of further investigations; (6) verify that the 24 in. dia. low level outlet gate is operative and perform any necessary repair work; (7) remove the flashboard pins from the spillway crest to prevent the collection of debris; (8) secure the gate house; (9) develop a formal surveillance and flood warning plan; and (10) institute procedures for an annual technical inspection.

Peter B. Dyson
Project Manager



PREFACE

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

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

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

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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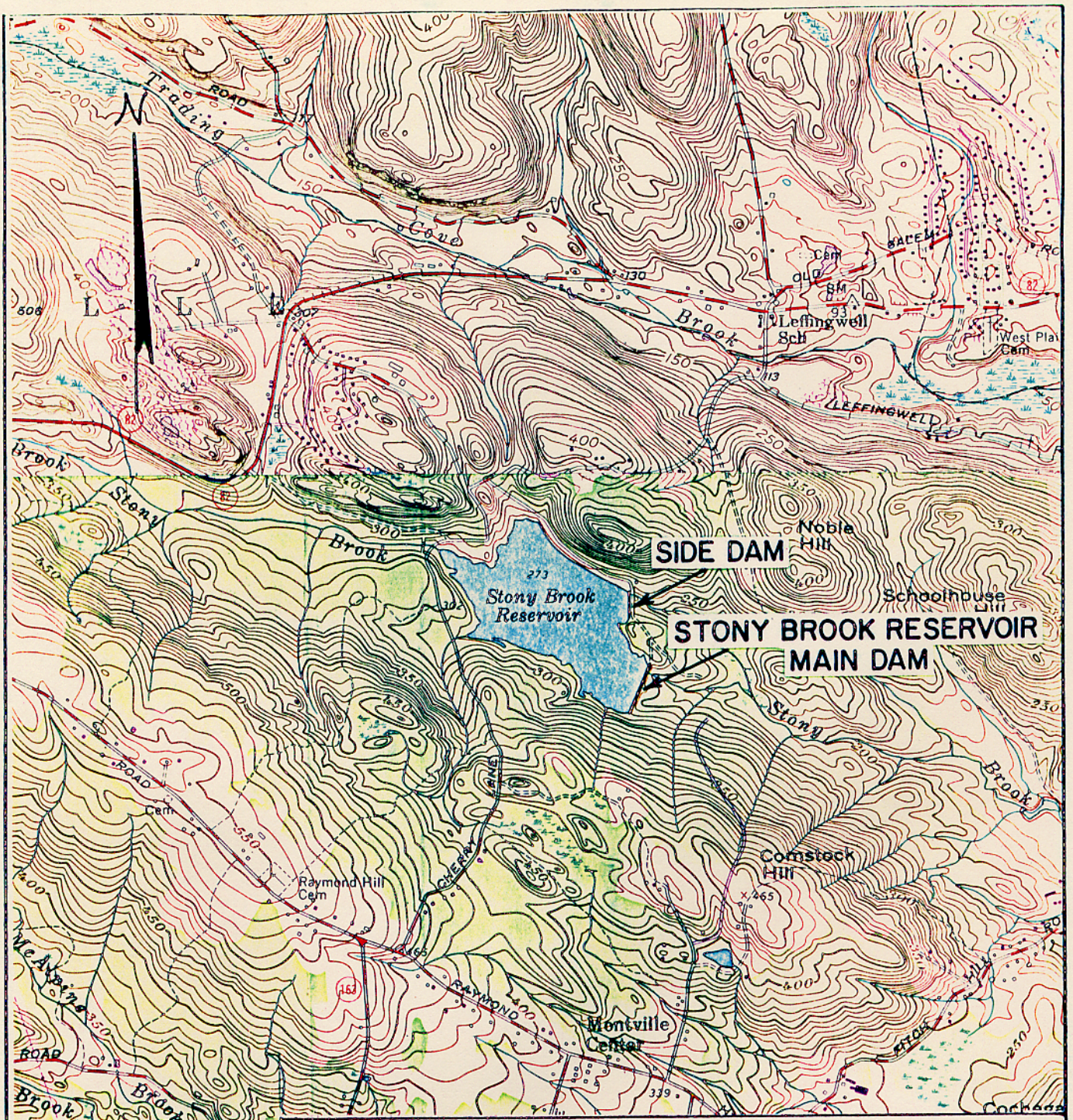
Overview of "Side Dam" from left abutment.
("Main Dam" is over promontory in background.)

Overview of "Main Dam" from left abutment.



LOUIS BERGER & ASSOC., INC WELLESLEY, MASS. ARCHITECT · ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

STONY BROOK RESERVOIR DAM

MONTVILLE, CT. QUADRANGLE

THAMES RIVER BASIN STATE - CT.

SCALE	1:24000
DATE	

PHASE I INSPECTION REPORT

STONY BROOK RESERVOIR DAM CT 00243

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. Louis Berger & Associates, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to Louis Berger & Associates, Inc. under a letter of 28 September 1979 from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-79-C-0051, Job Change No. 2, 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) Update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location. Stony Brook Reservoir Dam is located in New London County in the Town of Montville in southeastern Connecticut. The reservoir is situated on Stony Brook approximately 4.4 miles upstream from the confluence of Stony Brook and the Thames River at Horton Cove. The dam is shown on U.S.G.S. Quadrangle, Montville, Connecticut with coordinates approximately at N 41° 29' 38", W 72° 08' 56".

b. Description of Dam and Appurtenances.

(1) Description of Dams. The project consists of two earth embankment dams separated by about 650 ft. of natural terrain. Both dams are located on the east side of the reservoir. The right, more southerly dam, is called the "Main Dam" and is about 770 ft. long and 36 ft. high. The left, more northerly dam, is called the "Side Dam" and is about 340 ft. long and 21 ft. high. The original dams were constructed about the year 1912. They were raised by 5 ft. in 1924. The reconstruction was accomplished by raising the crest and increasing the fill on the downstream slope. Both dams have a concrete core wall, a crest width of about 15 ft., upstream slopes of 2 horizontal to 1 vertical, and downstream slopes of 1½ horizontal to 1 vertical. The original plans for the

construction of the dams indicate that the embankments had riprap protection on the upstream slopes and rockfill on the downstream slopes. During the 1924 reconstruction earth fill was placed over the downstream slopes which are now covered with vegetation. Additional riprap was placed on the raised portion of the upstream slopes. The concrete core walls were also raised.

(2) Spillway. The open channel spillway for Stony Brook Reservoir Dam is located about 20 ft. from the left abutment of the Side Dam. It has a broad crested overflow section constructed of concrete with a length of 35 ft. and stone masonry training walls. The crest of the overflow weir is fitted with flashboard pins. Just below the weir a concrete bridge spans the discharge channel. The spillway crest discharges into a stone paved channel which carries the outflow for about 220 ft. before emptying into a natural stream.

(3) Gate House. The gate house for the facility is located about 70 ft. upstream of the Main Dam and 140 ft. from the left abutment. The gate house is about 10 ft. square and is constructed of reinforced concrete. Access to the gate house is provided by a concrete service bridge which is now submerged by about 1 ft. of water as a result of the raising of the dam in 1924. The wet well is in two parts; the supply well contains three intake openings 18 in. by 36 in. located at different levels which are controlled by slide gates. The waste water well has one low level intake opening 36 in. square. There are two outlet pipes from the structure, one 24 in. dia. for water supply and the other 24 in. dia. for waste water. Both outlets are controlled by 24 in. dia. circular gates. The waste water outlet pipe is about 260 ft. long. There is a gate valve in the pipeline about 10 ft. from the outlet end, which is not shown on the construction plans.

c. Size Classification. Stony Brook Reservoir Dam is about 36 ft. high above downstream toe level, impounding a maximum of about 1,550 acre-ft. of active storage to spillway crest level, and about 1,948 acre-ft. to top of dam. In accordance with the height and storage capacity criteria given in Recommended Guidelines for Safety Inspection of Dams, the project is classified as intermediate on the basis of both criteria.

d. Hazard Classification. A breach failure of Stony Brook Dam would release water down Stony Brook to its confluence with the Thames River about 4.4 miles downstream. Fitch Hill Road, a farm, and five houses located about 1.3 miles downstream from the dam would be subject to damage by flood waters from the breach, since it is estimated that the stage in the Brook would rise by about 17 ft. in this reach. Below this point, State Route 52 parallels the Brook for a distance of about 7,000 ft. The Brook then passes under the highway alongside Raymond Hill Road, the overpass spanning both the road and the stream. It is estimated that parts of Route 52 would be flooded and suffer severe erosion. One house just upstream of the Route 52 crossing with Raymond Hill Road would be damaged, a mobile home park downstream of Route 52 would be flooded and Raymond Hill Road itself would be inundated by the high waters. About 4.3 miles below the dam, near Route 32, one more house would be subject to damage before the flood wave would be significantly reduced in Horton Cove. In accordance with the Recommended Guidelines for Safety Inspection of Dams, Stony Brook Reservoir Dam has therefore been classified as having a high hazard potential, since failure may cause serious damage to homes and a main highway, with a potential for the loss of more than a few lives.

e. Ownership. Stony Brook Reservoir Dam is owned by the City of Norwich, Connecticut.

f. Operator. Mr. Gregory J. Kuchy, Water and Sewer Division Manager, Department of Public Utilities, 34 Shetucket Street, Norwich, CT 06360 Telephone: (203) 887-2555.

g. Purpose of Dam. Stony Brook Reservoir Dam is operated in conjunction with other water storage facilities for providing municipal water supplies to the City of Norwich. At the time of the inspection the reservoir was being utilized as a back-up facility and had not been drawn upon for some years.

h. Design and Construction History. Stony Brook Reservoir was constructed in 1912. It was designed by Chandler and Palmer, Engineers. Plans of the two original embankment dams can be found in Appendix B. In 1924 both earth embankments were raised by 5 ft. It is believed that the reconstruction work was also designed by Chandler and Palmer. Three of the original plans also indicate features of the reconstruction (see Appendix B). A blank set of the 1924 reconstruction contract documents has also been recovered.

i. Normal Operating Procedure. No written operating procedures were disclosed. Flashboards are no longer used at the facility and the only operating devices are the gates and valves associated with the gate house structure, which are believed to be in poor condition. The dam is maintained by the City of Norwhich. Trees and brush are removed periodically, and concrete and masonry structures are repaired as necessary.

1.3 Pertinent Data

a. Drainage Area. The drainage area contributing to Stony Brook Reservoir is situated at the headwaters of Stony Brook. The drainage area encompasses a total of about 2.57 sq. mi. (1,643 acres), of which 75 acres are occupied by the reservoir. The longest circuitous stream course contributing to the reservoir is about 2.58 mi. long with an elevation difference of about 327 ft., or at a slope of about 127 ft. per mile. The drainage area has a length of about 2.71 miles and a maximum width of about 1.29 miles, with an average width of about 0.9 miles. The basin consists of both open fields and forested area, with a sparse population.

b. Discharge at Damsite

(1) Outlet Works Conduit. Low level discharge from Stony Brook Reservoir is provided for by means of a 24 in. dia. outlet pipe which extends about 260 ft. downstream from the gate house. The inlet of the outlet pipe has an invert elevation of 235.6 ft. The waste pipe would be capable of discharging about 72 cfs when the gates were wide open and the reservoir water surface level was at the top of the Main Dam.

(2) Maximum Known Flood at Damsite. No records are available of flood inflows into Stony Brook Reservoir, nor of spillway releases and surcharge heads during such inflows.

(3) Ungated Spillway Capacity at Top of Dam. The total spillway capacity at top of dam, elevation 277.0 NGVD, is 1,250 cfs.

(4) Ungated Spillway Capacity at Test Flood Elevation. The ungated spillway capacity is 1,780 cfs at test flood elevation 278.3 NGVD.

(5) Gated Spillway Capacity at Normal Pool Elevation. Not applicable

(6) Gated Spillway Capacity at Test Flood Elevation. Not applicable

(7) Total Spillway Capacity at Test Flood Elevation. The total spillway capacity at the test flood elevation is the same as (4) above, 1,780 cfs at elevation 278.3 NGVD.

(8) Total Project Discharge at Test Flood Elevation. The total project discharge at test flood is 5,200 cfs at elevation 278.3 NGVD.

c. Elevations (Ft. above NGVD)

(1) Streambed at centerline of dam - 241.0

(2) Maximum tailwater - Not available

(3) Upstream invert of outlet culvert - 235.6

(4) Recreation Pool - Not applicable

(5) Full flood control pool - Not applicable

(6) Ungated spillway crest - 272.0 (assumed - all other elevations relative to spillway crest)

(7) Design surcharge - Unknown

(8) Test flood design surcharge - 278.3

(9) Top of Main Dam - 277.0
Top of Side Dam - 277.7

d. Reservoir

(1) Length of maximum pool - 3,200 ft.

(2) Length of recreation pool - Not applicable

(3) Length of flood control pool - Not applicable

e. Storage (acre-ft.)

(1) Recreation pool - Not applicable

(2) Flood control pool - Not applicable

(3) Spillway crest pool El. 272.0 NGVD - 1,550

(4) Top of dam El. 277.0 NGVD - 1,948

(5) Test flood pool El. 278.3 NGVD - 2,080

f. Reservoir Surface (acres)

(1) Recreation pool - Not applicable

(2) Flood control pool - Not applicable

(3) Spillway crest El. 272.0 NGVD - 74.9

(4) Top of dam El. 277.0 NGVD - 84.0

(5) Test flood pool El. 278.3 NGVD - 86.6

g. Dam

- Main Dam

(1) Type - Earth embankment with concrete core wall

(2) Length - 770 ft.

(3) Height - 36 ft.

(4) Top Width - 15 ft.

(5) Side Slopes - Upstream - 2 horizontal to 1 vertical, riprapped
Downstream - 1½ horizontal to 1 vertical

(6) Zoning - Earth fill with concrete core wall. Rockfill on original downstream face buried when dam raised 5 ft.

(7) Impervious Core - Vertical concrete wall

(8) Cutoff - Core wall, extension to bedrock unknown

(9) Grout Curtain - Unknown

- Side Dam

(1) Type - Earth embankment with concrete core wall

(2) Length - 340 ft.

(3) Height - 21 ft.

(4) Top Width - 15 ft.

(5) Side Slopes - Upstream - 2 horizontal to 1 vertical, riprapped
Downstream - 1½ horizontal to 1 vertical

(6) Zoning - Earthfill with concrete core wall. Rockfill on original downstream face buried when dam raised 5 ft.

(7) Impervious Core - Vertical concrete wall

(8) Cutoff - Core wall, extension to bedrock unknown

(9) Grout Curtain - None

h. Spillway

(1) Type - Concrete broad crested overflow weir

(2) Length of Weir - 35.0 ft.

(3) Crest Elevation - 272.0 ft.

(4) Gates - None

(5) Upstream Channel - None

(6) Downstream Channel - Stone masonry walls, stone paved floor, discharging into natural stream.

i. Regulating Outlets

(1) Invert - 235.6 NGVD

(2) Size - 24 in. dia.

(3) Description - Circular pipe 260 ft. long through dam.

(4) Control Mechanism - Hand operated circular 24 in. dia. gate in gate house and inline valve about 10 ft. from downstream end of pipe.

SECTION 2 - ENGINEERING DATA

2.1 Design Data

The original dam was designed in 1911 and 1912 by Chandler and Palmer, Engineers. Appendix B includes copies of 10 drawings showing site plans and details of the facilities "as constructed". In 1924 the dam was raised 5 ft. in height and it is believed that the reconstruction was also designed by Chandler and Palmer. Three of the 10 plans found in Appendix B show plan, cross-sections, and profiles of the modifications made to the dam in 1924.

2.2 Construction Data

With the exception of the "as constructed" plans mentioned above, no records or correspondence regarding the original construction have been found. A blank set of contract documents for the 1924 reconstruction work, including the specifications, is included in Appendix B.

2.3 Operation Data

No records or correspondence regarding past operation of the dam have been recovered. At the present time the reservoir is only used as a standby source for the supply of water to the City of Norwich; it has not been utilized for some years. Water levels are recorded.

2.4 Evaluation of Data

a. Availability. Since little engineering data is available, it is not possible to make an assessment of the safety of the dam. The basis of the information presented in this report is principally the visual observations of the inspection team.

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

c. Validity. The drawings and reconstruction documents recovered appear to be valid and are not challenged.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General. The visual inspection of Stony Brook Reservoir Dam took place on 25 October 1979. At that time the water level was about 1 in. above the spillway crest. The discharge over the spillway was estimated to be about 3 cfs. The gate house door was open and the gate house was judged to be in poor condition. The condition of the outlet gates was not determined. Seeps were discovered downstream from both embankments. There was no evidence of any major maintenance problems, but a few items require attention (see Section 7.3). In general the dam was judged to be in fair condition.

b. Dam. Stony Brook Reservoir Dam was built in 1912 to furnish a water supply for the City of Norwich, Connecticut. The dam is actually in two sections: a 770 ft. long, 36 ft. high embankment on the right known as the "Main Dam"; and a 340 ft. long, 21 ft. high embankment on the left known as the "Side Dam". The dams are separated by a rocky promontory about 650 ft. long. Both dams have a concrete core wall and a crushed stone shell 1 ft. thick over a 1 ft. thick layer of gravel on the upstream slope. The dams were both reconstructed in 1924 when their crests were raised by about 5 ft. The reconstruction was accomplished by retaining the upstream slope and building up the fill on the downstream side of the dams. The original downstream slopes were rockfill, which was buried with earth in the course of the reconstruction. The downstream slopes are now covered with a light growth of brush and vegetation. Both dams are about 15 ft. wide at their crests. The slopes are 2 horizontal to 1 vertical on the upstream side and 1½ horizontal to 1 vertical on the downstream side.

The crest of the Main Dam was heavily rutted by vehicles (Appendix C, Photo No. 1). The downstream slope of the dam showed evidence of fairly recent cutting of overgrowth. However, growth had reappeared on the slopes, particularly on the lower third (Appendix C, Photo No. 2). Opposite the gate house, on the downstream alignment of the waste pipe, there were traces of a trenched and backfilled cut. The backfilled trench ended at a rough unmortared masonry headwall which serves as the outlet structure for the waste pipe. The end of the outlet pipe was half submerged in water, and a stream flowed from the pipe (Appendix C, Photo No. 7). However, no turbidity was in evidence. About 20 ft. further downstream from the pipe it appeared that the flow rate about doubled. About 40 ft. from the toe of the dam, also in this trenched zone, a major seep was noted (Appendix C. Photo No. 8). The seep seemed to issue not from the dam itself, but from the left side of the excavated trench. The seep issued from a hole estimated by probing to be about 18 in. deep. After the probing, the turbidity ceased, and the flow resumed at about 1 to 2 gpm. A widespread area below the seep was very marshy beneath a heavy cover of leaf mulch and forest litter, which may indicate the presence of other seeps.

About 190 ft. from the right abutment and about 10 ft. down from the crest on the downstream slope, there was a large hole about 1 ft. in diameter and 3 ft. deep. The hole appeared to be an animal burrow, although there were no signs of recent use. The void did not fit the mechanics of any piping phenomenon.

Rock outcrops were in evidence in the slopes of the right abutment and on the promontory at the left abutment. Although the typical section for the core wall on the plans found in Appendix B shows it to be trenched into rock, the "As-Built" drawings indicate that this may have been the case only on the left third of the Main Dam, where rock is shown. Elsewhere, the foundation soil is described as "hard blue gravel".

On the Side Dam at approximately one third the distance from the right abutment there was a depression about 6 ft. down from the crest. It extended downward another 6 or 7 ft. The characteristics of the void were not those caused by burrowing animals, and it appeared to have been caused by water erosion. Whether the flow had been directly along the surface of the slope, or over the top of the core wall and through the embankment, or through the embankment from surface ponding on the ruts along the crest of the dam, could not be ascertained. However, it is considered that the latter was the most likely cause, since immediately above the slough there was a low spot on the deeply rutted crest which could have caused ponding and water intrusion. At the middle of the Side Dam, at the downstream toe, there was a very extensive marshy area perhaps 40 ft. wide, supplied by at least two streams issuing from the dam. The stream on the left flowed from the dam at more than 2 gpm. However, the flow was very clear and no transported fines could be observed. To the right of these flows, located along the toe there was a 20 ft. wide band of standing water about 1 ft. deep with no flow. As is the case of the Main Dam, there was evidence of recent cutting of growth near the crest of the dam, but firm stands of trees had taken hold near the toe, and light brush was beginning to appear in profusion near the crest (Appendix C, Photo No. 3).

The crushed stone on the upstream face of both dams was in good condition, with little evidence of growth invasion except along the water line.

c. Appurtenant Structures. The spillway for the facility is located in the Side Dam about 20 ft. from its left abutment. The spillway has a 35 ft. long broad crested overflow section of concrete with a width of about 1.5 ft. and stone masonry training walls which extend upward to the top of the dam (Appendix C, Photo No. 4). Discharges over the crest spill into a stone masonry channel with vertical walls and a stone paved invert, which is 35 ft. wide near the crest of the spillway and tapers to a width of 20 ft. at a point about 150 ft. downstream (Appendix C, Photo No. 5). Though the floor of the channel is stone paved, it had been invaded by growth and was partly but not seriously obstructed by brush immediately below the crest of the spillway. A concrete bridge spans the channel just below the crest of the spillway, providing access across the Side Dam to the Main Dam. The crest of the spillway was fitted with flashboard pins, although flashboards are no longer used. The spillway and bridge appeared to be in good condition, but the discharge channel was in only fair condition.

The gate house for the facility is located about 70 ft. upstream and 140 ft. to the right of the left abutment of the Main Dam. The gate house and its service bridge were constructed in 1912. As a result of the 1924 raising of the dam and the subsequent increase in surcharge in the reservoir, the service bridge is now covered by about 1 ft. of water when the reservoir is at spillway level. The door to the gate house was in an open position, apparently broken by vandals, and the railing for the service bridge was missing. There was some minor spalling of the concrete gate house.

The divided wet well contains three intake ports 18 in. X 36 in. for water supply and one intake 36 in. square for waste water. Each of the water supply inlets is controlled by a slide gate. On the downstream side of the gate house are located two outlets controlled by circular gates. One outlet leads to a 24 in. dia. water supply pipe that is connected to the City of Norwich's system. The other outlet connects to a 24 in. dia. waste pipe through the dam which is about 260 ft. long. An in-line valve is also provided in the waste pipe about 10 ft. from its downstream end. The interior of the gate house was not inspected because the access bridge was under water (Appendix C, Photo No. 6). The working condition of the gates could not be ascertained by test. However, a 1960 report indicates that at that time only the top intake gate was operative (Appendix B). According to Water Division staff, the outlet gates have not been checked recently but are believed to be operative.

d. Reservoir Area. The shores of the reservoir are moderately to steeply sloped, wooded, and display rock outcrops in some profusion. The slopes are stable. There are no structures along the shores of the reservoir.

e. Downstream Channel. As noted above, the stone paved spillway discharge channel had some mature brush growth invading its floor. At the outlet of the channel, flows discharge into a brook which joins the stream issuing from the Main Dam's waste pipe outlet. The stream bed below the confluence is not well defined and major stands of trees encroach upon it. Below the dam, the valley is rather narrow for the next 1.3 miles and no structures are in close proximity to the stream. In the vicinity of Fitch Hill Road the Stony Brook valley widens out and there are several homes relatively close to the stream. About 4,000 ft. beyond Fitch Hill Road, the valley again narrows as the Brook parallels State Route 52 before passing under Route 52 at Raymond Hill Road. Beyond Route 52 the stream gradient is mild until it reaches State Route 32, beyond which point it drops rapidly in a short distance to Horton Cove on the Thames River.

3.2 Evaluation

The visual inspection has adequately revealed key characteristics of the dam as they may relate to its stability and integrity. The dam and appurtenant works were judged to be in fair condition. Seeps were found downstream from both earth embankments. The gate house appears to be in need of repair and the operative condition of the control gates was in doubt. Depressions were found on the downstream side of both embankments, and brush growth was starting to invade both the downstream slopes of the embankments and the floor of the spillway discharge channel.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures

The Stony Brook Reservoir Dam is operated by personnel of the Norwich Water Department. Operations are now limited, as the reservoir is no longer utilized as a primary source of water for the City of Norwich, but is used as a standby supply.

4.2 Maintenance of Dam

Maintenance is carried out as required by City personnel and/or by contractor. This consists of periodic removal of brush and tree growth along the two embankments and in the paved spillway outlet channel, and repair work to concrete and masonry structures as necessary.

4.3 Maintenance of Operating Facilities

No specific maintenance program is in effect. Records indicate that the spillway and training walls have been repaired periodically in the past and that the gate house underwent a thorough inspection in 1960.

4.4 Description of any Warning System in Effect

No specific flood warning plan is in effect for Stony Brook Reservoir Dam. In the event of an emergency, the City Manager and Civil Defense office are notified.

4.5 Evaluation

The facility has simple operating devices and therefore requires no detailed operating procedures. Maintenance involves periodic growth removal from the embankments and spillway discharge channel, surveillance regarding seeps, slope damage, animal burrows, etc., and maintenance of the control gates and operating mechanisms in the gate house. The concrete and masonry structures require periodic inspection and repair as necessary. A formal flood warning plan should be established.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. General. Stony Brook Reservoir Dam consists of two earth embankments impounding a normal storage of 1,550 acre-ft. with provision for an additional 398 acre-ft. of capacity in its surcharge space to the top of dam. It is basically a high surcharge - low spillage facility used for water supply purposes. The spillway is capable of discharging about 1,250 cfs with the surcharge to the top of dam. The general topographic characteristic of the 2.57 sq. mi. (1,643 acre) drainage basin is best described as rolling terrain, which rises from elevation 272.0 at spillway crest to elevation 580. The area contains both open fields and forests but is predominately forested.

b. Design Data. No hydrologic computation or hydraulic data has been recovered for the dam with the exception of the topographic map of the proposed reservoir area to be flooded (see Appendix B).

c. Experience Data. No records are available in regard to past operation of the reservoir, nor of surcharge encroachments and flows through the spillway. The maximum past inflows are unknown.

d. Visual Observations. There is no present evidence either along the reservoir or in the downstream channel to indicate high water levels or signs of major spillway outflows. No one contacted could recollect any such occurrences.

e. Test Flood Analysis. Hydrologic and hydraulic characteristics of Stony Brook Dam and drainage area were evaluated in accordance with the criteria given in Recommended Guidelines for Safety Inspection of Dams. As indicated in Section 1.2, paragraphs c and d, Stony Brook Reservoir Dam is classified as intermediate in size and has a high hazard potential. The recommended range of test floods for hydraulic evaluation of such a dam is between ½ PMF and a full PMF. Because of the extensive residential areas and highways downstream which could be affected by high water, a test flood equal to a full PMF was selected.

Precipitation data were obtained by Hydrometerological Report No. 33, which for the Connecticut area is 24.0 in. of 6 hour point rainfall over a 10 square mile area. This value was then reduced by 20 percent to allow for basin size, shape and fit factors, and an additional 2 percent for infiltration losses. The six hour rainfall was distributed into one hour incremental periods as suggested in COE Publication EC 1110-2-1411.

A triangular incremental unitgraph was assumed for the inflow hydrograph using a computed lag time of 3.35 hours to derive a time-to-peak for the triangular hydrograph of 2.99 hours (see computations on Sheets D-6 thru D-8, Appendix D). The test flood hydrograph is shown on Sheet D-9, Appendix D, indicating a peak inflow of about 5,840 cfs or a CSM of about 2,270.

Discharge tables and curves for the spillway and for over the top of the dam are shown on Sheets D-4 and D-5, Appendix D. The discharge from the 24. in. dia. low level outlet has been neglected.

Flood routings were performed for both the test flood and a ½ PMF. Results of these routings are shown on Sheets D-10 thru D-12, Appendix D, and are summarized as follows:

Flood Magnitude	Routed Test Flood Inflow cfs	Maximum Res. El. ft. NGVD	Max. Head Over Main Dam ft.	Routed Test Flood Outflow cfs
½ PMF	2,920	277.6	0.6	2,420
PMF (Test Flood)	5,840	278.3	1.3	5,200

From the above table, it can be seen that the project will not pass the routed test floow outflow without overtopping the Main Dam by 1.3 ft. and the Side Dam by 0.6 ft. The project, however, can handle about 24 percent of the routed test flood outflow without overtopping the Main Dam.

f. Dam Failure Analysis. A breach owing to structural failure of the dam by piping or sloughing is a possibility. For this analysis a breach was assumed to occur with the water level at the top of the Main Dam and that the Main Dam would be the embankment to be breached. The "rule of thumb" criteria suggested in the NED March 1978 Guidance Report was used for the breach analysis. With a breach width of 40 percent of the dam length equal to 308 ft., an outflow of 113,000 cfs, which includes 1,250 cfs from the spillway, would be realized (see Sheets D-13 thru D-23, Appendix D).

There are no structures close to Stony Brook in the rather narrow valley which extends for a distance of about 1.3 mi. before the dam. At the end of this first reach at Fitch Hill Road the valley widens out and the stream gradient flattens. It is anticipated that about five houses, a farm, and Fitch Hill Road would be subject to flood damage in this area, and that the Brook's stage would rise about 17 ft. in this vicinity. In the next reach of about 1.2 miles the Brook parallels State Route 52 (Connecticut Turnpike). The Brook in this reach is rather confined and no structures other than Route 52 are in the area of potential flooding. Some roadway flooding and scour of the Route 52 embankment would be anticipated. At Raymond Hill road the Brook passes under Route 52. It is estimated that in this reach the Brook's stage would rise about 13.0 ft. In this area it is anticipated that one home, a mobile home park, and Raymond Hill Road would be flooded. Beyond Route 52 the Brook's gradient again flattens until it passes under State Route 32, beyond which point it drops quickly to Horton Cove on the Thames River. In the reach between Raymong Hill Road and Route 32 it is estimated that the stage would rise about 11 ft., flooding one home and parts of Route 32.

In summary, about seven homes, a farm, a mobile home park, and four roadways, two of which are State Highways and two secondary roads, are within the area of potential flooding (Sheet D-24, Appendix D). There is also a potential for the loss of more than a few lives.

SECTION 6 - STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observation. There are no design calculations available for review of the structural stability of the dam and appurtenant structures. However, the field investigations and findings described herein do not indicate any displacement and/or distress which would warrant the preparation of structural stability calculations. The dam is stable, but trees and brush are invading the downstream embankment slopes, there are cavities in these slopes, and there are a number of seeps at the toes of both embankments. These deficiencies require correction and additional investigations should be conducted, as described in Section 7.

b. Design and Construction of Dam. Plans of the original facility and specifications associated with raising the dam have been retrieved and are included in Appendix B. The drawings are by Chandler and Palmer, Engineers, and although they are dated 1911-1912, several of the drawings also show the 1924 reconstruction.

c. Operating Records. There are no operating records of value to a structural assessment. Periodic inspections appear to have been made by officials of the State of Connecticut and its consultants (see Appendix B).

d. Post Construction Changes. The only post construction change of significance to structural stability is the raising of the dam by 5 ft. in 1924. The dam crest was raised to el. 277 from 272, and the core wall also raised a like amount. The raising was achieved by retaining the upstream slopes, and filling in the downstream slope.

Other post construction changes documented in Appendix B relate to removal of trees and brush, repair of concrete and masonry appurtenant structures, and repair of vehicle damage to the top of the embankments.

e. Seismic Stability. The dam is located in Seismic Zone No. 1 and in accordance with Phase I guidelines does not warrant seismic analyses.

SECTION 7
ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. On the basis of the Phase I visual examination, Stony Brook Reservoir Dam is judged to be in fair condition. The deficiencies revealed indicate that a further investigation should be carried out and that some remedial work is needed. The major concerns with the overall integrity of the dam are as follows:

(1) The spillway will only pass about 24 percent of the routed test flood outflow.

(2) The presence of seeps below both the Main Dam and the Side Dam.

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

c. Urgency. The recommendations and remedial measures enumerated below should be implemented by the owner within one year after receipt of this Phase I Inspection Report.

d. Need for Additional Investigations. Additional investigations are required as recommended in Para. 7.2.

7.2 Recommendations

It is recommended that the owner, the City of Norwich, should retain the services of a competent registered professional engineer to make further investigations of the following, and should implement the results:

(1) Make a thorough study of the hydrology of the drainage basin and evaluate further the potential for overtopping and the adequacy of the spillway.

(2) Investigate the need for installing graded filters for improved control of the seepage located downstream of both embankments; and further, investigate the need for weirs and channels for monitoring the rate of seepage.

7.3 Remedial Measures

a. Operations and Maintenance Measures

(1) Remove brush and tree growth from the dam embankments and from the spillway discharge channel.

(2) Excavate and remove decayed root structures in the crest from previous cuttings, and backfill with suitable material, well compacted.

(3) Restore ruts in the embankment crests to grade and reseed. Keep non-essential traffic off the dam embankments.

(4) Depressions on the downstream slopes of both dams should be excavated, cleaned, backfilled, reseeded and their subsequent performance monitored on a monthly basis.

(5) Seepage and ponding at the toe of both dams should be monitored once per month, pending the results of further investigations recommended in Section 7.2.

(6) Verify that the 24 in. dia. low level outlet gate is operative and perform any necessary repair work.

(7) Remove the flashboard pins from the spillway crest to prevent the collection of debris.

(8) Repair the spalled concrete on the gate house and secure the door.

(9) Develop a formal surveillance and flood warning plan, including round-the-clock monitoring during periods of heavy precipitation.

(10) Institute procedures for an annual technical inspection of the dam and its appurtenant structures.

7.4 Alternatives

There are no practical alternatives to the above recommendations.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST
PARTY ORGANIZATION

PROJECT STONY BROOK RESERVOIR DAM

DATE 25 October 1979

TIME 1:30 PM

WEATHER Clear/Warm

W.S. ELEV. 272.1 U.S. DN.S.

PARTY:

1. Peter B. Dyson
2. Pasquale E. Corsetti
3. Roger F. Berry
4. Carl J. Hoffman
5. James Reynolds
6. Humphrey Leary
7.
8.
9.
10.

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Hydrology	Roger F. Berry	
2.	Hydraulics/Structures	Carl J. Hoffman	
3.	Soils/Geology	James Reynolds	
4.	General Features	Peter B. Dyson	
5.	General Features	Pasquale E. Corsetti	
6.			
7.			
8.			
9.			
10.			

PERIODIC INSPECTION CHECKLIST

PROJECT STONY BROOK RESERVOIR DAM DATE 25 October 1979

PROJECT FEATURE Main Dam NAME

DISCIPLINE Soils/Geology NAME James Reynolds

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	277.0
Current Pool Elevation	272.1
Maximum Impoundment to Date	Unknown
Surface Cracks	See Note (1) next page
Pavement Condition	N.A.
Movement or Settlement of Crest	None
Lateral Movement	None
Vertical Alginment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Frequent on crest, heavily rutted by vehicular traffic.
Sloughing or Erosion of Slopes or Abutments	None
Rock Slope Protection - Riprap Failures	U/S New crushed riprap covering original riprap.
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	See Note (2) next page
Piping or Boils	None
Foundation Drainage Features	Unknown
Toe Drains	None other than rock fill at toes shown on As-Builts; not confirmed.
Instrumentation System	None evident

Stony Brook Reservoir Dam
Main Dam
Soils/Geology

NOTE (1): Large animal burrow on downstream slope, one quarter of dam length from right abutment, and 10 ft. down.

(2): Probable seep near exit of waste pipe; another seep about 40 ft. from toe, above waste pipe, up to 2 gpm from 1 ft. dia. and 1.5 ft. deep hole.

PERIODIC INSPECTION CHECKLIST

PROJECT STONY BROOK RESERVOIR DAM DATE 25 October 1979

PROJECT FEATURE Side Dam NAME

DISCIPLINE Soils/Geology NAME James Reynolds

AREA EVALUATED	CONDITIONS
DAM EMBANKMENT	
Crest Elevation	277.7
Current Pool Elevation	272.1
Maximum Impoundment to Date	Unknown
Surface Cracks	Slough (see below)
Pavement Condition	N.A.
Movement or Settlement of Crest	Low point in crest above sloughed zone.
Lateral Movement	None
Vertical Alginment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Frequent on crest, heavily rutted by vehicular traffic.
Sloughing or Erosion of Slopes or Abutments	Erosion below low point of crest about 100 ft. from right abutment.
Rock Slope Protection - Riprap Failures	U/S. New crushed riprap covering original riprap.
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	Two flowing seeps at toe; no turbidity
Piping or Boils	None
Foundation Drainage Features	Unknown
Toe Drains	None other than rock fill at original toe shown on As-Builts; not confirmed.
Instrumentation System	None evident

PERIODIC INSPECTION CHECKLIST

PROJECT STONY BROOK RESERVOIR DAM DATE 25 October 1979

PROJECT FEATURE Gate House NAME

DISCIPLINE Hydraulics/Structures NAME Carl J. Hoffman

AREA EVALUATED	CONDITIONS
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	Tower not inspected from interior.
General Condition	Fair
Condition of Joints	N.A.
Spalling	Minor
Visible Reinforcing	None
Rusting or Staning of Concrete	None
Any Seepage or Efflorescence	None
Joint Alignment	N.A.
Unusual Seepage or Leaks in Gate Chamber	Unknown
Cracks	None evident
Rusting or Corrosion of Steel	None evident
b. Mechanical and Electrical	
Air Vents	N.A.
Float Wells	N.A.
Crane Hoist	N.A.
Elevator	N.A.
Hydraulic System	N.A.
Service Gates	Not verified, said to be operative
Emergency Gates	Not verified, said to be operative
Lighting Protection System	N.A.
Emergency Power System	N.A.
Wiring and Lighting System in Gate Chamber	N.A.

PERIODIC INSPECTION CHECKLIST

PROJECT STONY BROOK RESERVOIR DAM DATE 25 October 1979

PROJECT FEATURE Waste Pipe NAME

DISCIPLINE Hydraulics/Structures NAME Carl J. Hoffman

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

One 24 inch diameter waste pipe, could only be inspected from outlet end. Headwall and pipe appeared to be in fair condition.

PERIODIC INSPECTION CHECKLIST

PROJECT STONY BROOK RESERVOIR DAM DATE 25 October 1979

PROJECT FEATURE Conduit Outlet and Channel NAME

DISCIPLINE Soils/Geology NAME James Reynolds

AREA EVALUATED	CONDITIONS
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Rubble masonry outlet headwall
Rust or Staining	N.A.
Spalling	N.A.
Erosion or Cavitation	None
Visible Reinforcing	N.A.
Any Seepage or Efflorescence	Seepage through conduit and downstream of headwall.
Condition at Joints	N.A.
Drain Holes	None
Channel	
Loose Rock or Trees Overhanging Channel	Trees overhanging
Condition of Discharge Channel	Fair

PERIODIC INSPECTION CHECKLIST

PROJECT STONY BROOK RESERVOIR DAM DATE 25 October 1979

PROJECT FEATURE _____ NAME _____

DISCIPLINE Hydraulics/Structures NAME Carl J. Hoffman

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Reservoir Area
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Unknown (drawings show stone paved)
b. Weir and Training Walls	
General Condition of Concrete	Good
Rust or Staining	None
Spalling	None evident
Any Visible Reinforcing	None evident
Any Seepage or Efflorescence	None evident
Drain Holes	Unknown
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Minor
Floor of Channel	Floor is stone paved, but growth in upper reach.
Other Obstructions	None.

PERIODIC INSPECTION CHECKLIST

PROJECT STONY BROOK RESERVOIR DAM DATE 25 October 1979

PROJECT FEATURE Service Bridge NAME

DISCIPLINE Structures NAME Carl J. Hoffman

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SERVICE BRIDGE	
a. Superstructure	Bridge submerged by about 1 ft. of water.
Bearings	Unknown
Anchor Bolts	Unknown
Bridge Seat	Unknown
Longitudinal Members	Unknown
Underside of Deck	Unknown
Secondary Bracing	Concrete Structure
Deck	Appears Good
Drainage System	Unknown
Railings	Missing
Expansion Joints	Unknown
Paint	N.A.
b. Abutment & Piers	
General Condition of Concrete	Unknown
Alignment of Abutment	Unknown
Approach to Bridge	Good
Condition of Seat and Backwall	Unknown

PERIODIC INSPECTION CHECKLIST

PROJECT: STONY BROOK RESERVOIR DAM DATE: 25 October 1979

AREA EVALUATED	CONDITIONS
Outlet Works - Intake Channel and Intake Structure	N.A.

APPENDIX B

ENGINEERING DATA

13

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CT-243

No. MV-32

WATER RESOURCES COMMISSION
SUPERVISION OF DAMS
INVENTORY DATA

Inventoried By WPS

Date 1 MARCH 1965

Name of Dam or Pond STONY BROOK RESERVOIR

Code No. T 9.4 HC 1.4 SB 4.3

Nearest Street Location CHERRY LANE

Town MONTVILLE

U.S.G.S. Quad. MONTVILLE

Name of Stream STONY BROOK

Owner PUBLIC UTILITIES DEPARTMENT

Address 34 SHETUCKET STREET
NORWICH

Long 72.08.9

Lat 41-29.6

OK

CITY OF NORWICH 7/73

Pond Used For WATER SUPPLY DA 269 SM

Dimensions of Pond: Width 1200 FEET Length 2500 FEET Area ~~75~~ 80.0 ACRES

Total Length of Dam ~~370 + 680~~ 360 + 920 = 1280 = 1050 FEET Length of Spillway ~~35~~ 25 FEET

Location of Spillway EAST END OF EAST DAM

Height of Pond Above Stream Bed ABOUT 30 FEET MAXIMUM

Height of Embankment Above Spillway 5 FEET

Type of Spillway Construction CONCRETE

Type of Dike Construction EARTH, CONCRETE CORE

Downstream Conditions WOODS

Summary of File Data LETTER FROM B. H. PALMER DATED 5-13-63 SAYING: "..... I THINK THE DAM IS IN GOOD CONDITION."

Remarks TWO SECTIONS FORM THE DAM. DAM WAS BUILT IN 1911.

1911

Would Failure Cause Damage? YES Class B

February 13, 1969

Mr. Robert Grimshaw
General Manager
Department of Public Utilities
P. O. Box 1008
(34 Shetucket Street)
Norwich, Connecticut 06362

Subject: Dams owned by Town of Norwich, Norwich, Conn.

Dear Mr. Grimshaw:

Per recent correspondence and a meeting in your office on January 15, 1969, we have inspected ten dams owned by the Town of Norwich, Department of Public Utilities, and are attaching copies of our memos to file on each of these dams.

As a summary, we are listing below the names and locations of the dams with a brief statement of the repair or maintenance work which should be performed to maintain these dams in a safe condition.

On January 15, 1969, the undersigned inspected two electric power dams with Albert F. Nystrom, your electrical Construction Superintendent.

1. Greenville Dam - Norwich - Extensive work has been done on this dam since 1961 consisting primarily of replacement of deteriorated timbers. Generally, the dam appears in good condition. Request that following work be done:

   A. Remove small maple tree on top of west abutment
   B. Remove sapling from downstream face of west abutment
   C. Remove trees on east abutment
   D. Some of the horizontal planks on the lowest level have not been replaced and appear somewhat deteriorated. Replace when needed.

2. Occum Dam - Norwich - Generally, the dam appears in good condition. Request that following work be done before September, 1969.

   A. Fill in eroded ditches in earth section at the east end of the dam. Loam and seed over fill and over a low gravel area adjacent to the masonry wall.
   B. Remove trees from east abutment (earth portion)
   C. Remove small trees near masonry walls at the extreme west end of the dam.

On January 23, 1969, the undersigned inspected the following water supply reservoir dams with Humphrey Leary, your superintendent, Water Division.

3. [redacted] - There are two dams on this reservoir.

Dam #1. This is a smaller dam on the north end of the reservoir with a spillway. It is requested that the following work be done before September, 1969.

A. Repair the upstream training wall on the north side of the spillway.
B. Remove some brush and debris in the lower spillway channel.
C. In a letter dated May 25, 1943 from Clarence Blair, he stated that he and Shepard Palmer concurred that flashboards should not be used on this dam. This is mentioned for your information only.

Dam #2. This is a larger dam at the southeast corner of the reservoir which has a drawdown structures. It is requested that the following work be done by the dates specified.

A. By September, 1969, remove all trees growing near the toe of the dam and brush piles covering same.
B. As soon as possible, get rid of all woodchucks near the dam; two holes were noted on the downstream slope. Institute measures to protect the slope from further burrowing.
C. Observe from time to time the slight depression on the top of the dam above where the pipes pass through the dam, to see if there is any additional settlement. This office should be notified if it is necessary to fill in this slight depression.

4. Deep River Reservoir Dam - Colchester - The spillway channel at this dam was Gunnited in 1963 per previous suggestions and appears in excellent condition. We request that the following work be done as soon as possible:

A. Determine if the woodchuck holes described in our memo are "active" and take measures to protect the downstream slope from future burrowing.
B. Remove remaining brush at the toe of the downstream embankment. (Most of the trees and brush have already been removed.)
C. Supply information regarding the raising of this dam as requested in separate letter.

There was quite a bit of seepage at the downstream toe. We are directing an engineering consultant to this commission to inspect this condition and report to us on the safety of the dam.

5. Taftville Res. #1 Dam - Norwich - Some work has recently been done on this dam which has apparently corrected the seepage through the easterly part of this dam along Canterbury Turnpike. We request that the following items receive attention before September, 1969:

A. Woodchuck holes on the downstream side should be inspected to see if they are active and measures taken to prevent future burrowing. This should be done as soon as possible.

B. Reset stones and mortar the training wall on the east side of the spillway on the upstream side of the dam. Rip rap should be placed up to the top of this wall.

C. Rip-rap the upstream embankment at the easterly end of the dam and check the top of the dam with a level in this area to see that there are no low spots. If so, these should be filled in to the same elevation as the top of the dam.

6. Taftville Res. #2 Dam - Norwich - We request that the following work be done as soon as possible.

A. Restore rip-rap on the upstream slope to the original level where it has settled or been washed away.

B. There was water flowing around the waste pipe at the toe of the dam with water four feet below full pond. You are requested to notify us when the pond is full so that this may be checked again.

We have directed an engineering consultant to this Commission to check the adequacy of the spillway and to determine if there is sufficient protection of the downstream slope in the event of flow through the emergency spillway.

7. Taftville Res. #3 Dam, Norwich - This dam has apparently been abandoned. The dam should either have major repair work done to it as indicated in the enclosed memo, or be removed. If it is decided not to remove the structure, a hydrologic and hydraulic study should be made to determine if the structure has sufficient ponding and spillway capacity to prevent over-topping in a large storm. Please notify us at your earliest convenience of your decision in this regard.

8. Bog Meadow Dam - Norwich - This dam requires fairly major repair and maintenance work, indicated on the enclosed memo. These items should be corrected in the near future.

Please advise us at your earliest convenience as to your intentions.

9. Fairview Reservoir Dam - Norwich - There are two dikes and one main dam at this reservoir.

The dikes are generally in satisfactory condition but require maintenance work as specified in the enclosed memo. (dated Feb 3, 1969)

The main dam appears in good condition. In order to properly evaluate the overall safety of the structure, because of the wet area below this dam, we have written a letter to you (under separate cover) requesting additional information.

10. Dam on Stony Brook immediately upstream from Stony Brook Reservoir - Montville - This is a well built earth dam with masonry walls on the upstream and downstream aides. There is not any water behind this dam at the present time, but because of the condition of the outlet structure, the reservoir could fill up and perhaps overtop in a large storm. It is requested that the following work be done:

A. Remove all trees from the dam
B. Install an effective trash rack on the outlet structure
C. Provide a diversion of excess run-off to avoid overtopping of the dam.

None of the above requested work would require the issuance of a Construction Permit except for repair or removal of Taftville Reservoir #3, Norwich, Bog Meadow Dam, Norwich; or the dam above Stony Brook Reservoir, Montville. Plans for the repair or removal of these 3 dams would have to be submitted for approval by an engineer registered in the State of Connecticut and bearing his certification and seal.

You are hereby advised that these inspections did not involve a complete engineering analysis as to the safety or stability of these dams, but involved only a visual inspection indicating items in need of maintenance, repair, or further study. A complete engineering analysis would be required to conclude that these dams are safe or unsafe. Such work would probably include soil borings to provide information on the foundation and embankment. We would not initiate such an investigation ourselves and would not require this of a dam owner unless surface conditions made the safety of the dam suspect, and this was the only method of resolving the point. We are not suggesting that such an investigation is necessary for these dams.

Because of increasing demands on our staff for routine dam work, it may not be possible to inspect these dams each year unless there is particular concern about a certain dam which we would inspect at any time.

One of our engineering consultants has been directed to initiate a study on the adequacy of the spillways on each of these structures but because of monetary limirations we do not expect ot have this study complete until the summer of 1969.

We hope that this inspection has satisfied your request.

Very truly yours,

John J. Curry
Director

Encls.

JJC:WO'B:b

February 4, 1969

Memo to: File

From: William H. O'Brien III

Subject: [redacted] Montville

On January 23, 1969, the undersigned inspected the subject dam in the company of Mr. Humphrey Leary, Superintendent, Town of Norwich Public Utilities Department.

There are two dams on this reservoir, built in 1912.

Dam No. 2 - This is a smaller dam on the north end of the reservoir with a spillway. The following points were noted at the time of inspection.

1. The upstream training wall on the north wall of the spillway was pushed out (above the water line) and should be repaired.

2. Seepage at the toe was noted approximately 100 feet± south of the spillway. The water was not flowing and there was no evidence of fines being carried from the rock at the toe of the dam.

3. Brush and trees referred to in 5-13-63 letter from Palmer had been removed.

4. Some brush and debris was noted in the lower spillway, and should be removed.

5. The water level was 3½ feet below the spillway.

Dam No. 1

This is a larger dam with a drawdown structure at the southeast corner of the reservoir. The following items were noted at the time of inspection.

1. Trees growing at the toe of the dam and brush piles in this area should be removed.

2. Two woodchuck holes were noted in the downstream slope of the dam. One was approximately 200 feet north of the south end of the dam and about ten feet above the toe. The other was 150 feet plus or minus south of the north end and about half way up the embankment.

3. There is one 24" supply line and a 24" waste line apparently reducing to a 12" at the outlet.

4. There is a slight depression on the top of the dam where these lines pass under the dam. This depression should be watched for additonal settlement.

5. There is a valve house on the upstream side of the dam which controls both the waste and supply lines.

W. H. O'Brien III
Civil Engineer

WHOIII:vhb

February 4, 1969

Mr. Humphrey Leary, Superintendent
Water Division
Town of Norwich Public Utilities Department
Norwich, Connecticut

Subject: Stony Brook Dam
Montville

Dear Mr. Leary:

When we went through the plans for the subject dam at your office, we found three plans that we would like copies of. They are as follow:

1) Blueprints totaling five large and one small. These were plans prepared by Chandler & Palmer for the Board of Water Commissioners and dated 1911. We would like copies of plans # 2, 4, 5 and 6.

2) Blueprint "Plan Made for the Board of Water Commissioners - Bridge Alterations at Stony Brook". Chandler & Palmer May, 1948.

3) Duplicates of plans #4 and 5 showing proposed 5 foot addition in white line (pencilled in).

Thank you for your cooperation.

Very truly yours,

William H. O'Brien III
Civil Engineer

WHOIII:vhb

FILE

STATE WATER RESOURCES COMMISSION
RECEIVED
MAY 14 1963
ANSWERED
REFERRED
FILED

May 13, 1963

Re: Stonybrook Reservoir

Mr. Philip L. White
General Manager
Public Utilities Department
Norwich, Connecticut

Dear Sir:-

On Saturday, May 11th, I visited the [redacted] Dam. This is located in the Town of Montville and forms a reservoir which is part of the water supply of the City of Norwich. The dam is an earth fill dam, which was constructed in 1911 and has a concrete core wall. The dam was raised 5 feet in height some years later.* There is a spillway 35 feet wide and 5 feet deep and there was about 2" of water coming over the spillway at the time of the inspection.

The main dam is several hundred feet long and quite high and from examination it appears to be in good condition.

There is a second dam near the spillway. This is much shorter and lower in height. There was a small leak which showed downstream in this second dam located about 100 feet South of the spillway. The leak is not excessive and I have noticed it there before. I think it should be examined from time to time but I do not think it is any cause for anxiety.

Under the head of maintenance I suggest that the brush and trees on the two dams be cut down, so that there will be no danger of an opening being made in case of a high wind storm. The railing leading to the gatehouse is pipe railing, which should have a coat of paint to protect it.

Other than these two items I think the dam is in good condition.

Very truly yours,

CHANDLER & PALMER

B. H. Palmer

BHP/ew
c.c.: Mr. Emitt A. Dell
State Field Inspector

* in 1924 ± per Mr. Leary Supt. 1/23/69 W.H.D.

B-8

REPORT ON STONY BROOK DAM
MADE FOR THE
CITY OF NORWICH DEPT. OF PUBLIC UTILITIES

PHYSICAL CONDITION

Stony Brook Dam is located in the Town of Montville, South of Route 82 and Northeast of Raymond Hill Road. The dam was constructed in 1911 and was raised 5 feet in 1924. The spillway is 38 feet wide and is 5 feet below top of embankment.

The main dam is about 770 feet long and has a maximum height of 36 feet. The second dam, which contains the spillway is about 350 feet long with a maximum height of 19 feet. The dams are earth fill with a concrete core wall. The spillway is concrete and has a stone rollway below the dam. The concrete gate house is located on the upstream side of the main dam. There is a 24" waste pipe which discharges into the former brook bed below the dam and the 24" supply main leading to the Norwich system.

The dam was inspected on October 31, 1978 and again on January 3, 1979. On October 31st the pond level was down about 3½ feet. The pond had been lowered so that maintenance work could be done at the gate house. Pond was full on January 3rd.

Comments are as follows:

1. There is a small leak downstream from the second or small dam and about 100 feet South of the rollway. This leak appears to have been in existance for a long time. It is identified in an inspection report made by this office in 1963.

2. Downstream from the main dam at the former brook bed there is a small amount of seepage. From the vegetation it appears to have existed for a long time. It is not any cause for anxiety.

3. On October 31st part of the trees and brush on the embankments had been cleared. The clearing work had been completed on January 3rd.

4. Spillway and abutment walls appear to be in good condition.

SAFETY OF DAM

From our inspection I believe the dam is safe and in reasonably good condition.

CORRECTIVE MEASURES

Perodic inspections should be made of the dam and structures and the seepage areas referred to above. I do not believe it is necessary to take any corrective action on the seepage. This condition has existed for a long time. It is very minor and it is quite common to see this at the downstream side of a dam.

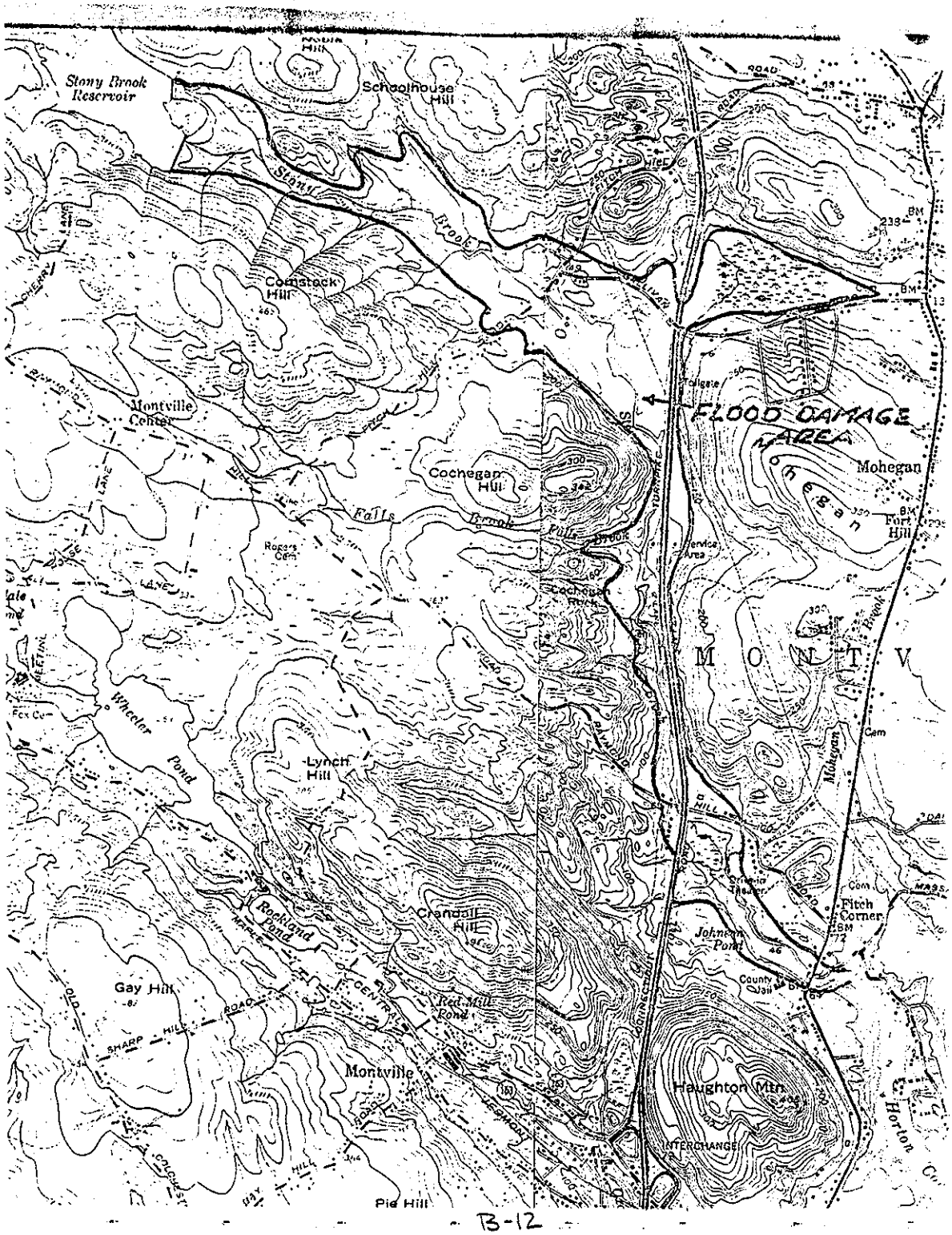
DOWNSTREAM DAMAGE IMPACT

If the main dam at Stony Brook should fail instantaneously there would be high danger to life and damage to property. Stony Brook is at Elevation 273 and empties into Horton Cove (tide water) a distance of about 3.7 miles. The brook runs steeply

down hill through a wooded area before reaching the vicinity of Fitch Hill Road at which point there would be considerable damage.

The plain Southeast of Fitch Hill Road would be flooded including the Pepsi Cola distribution center. Route 52 would be under water as shown on the plan.

There would be extensive damage and danger at Raymond Hill Road and at Route 32.


Stony Brook Reservoir
Schoolhouse Hill
Stony Brook
Comstock Hill
Montville Center
Cochegan Hill
Falls Brook
Rogers Cem
Cochegan Rock
FLOOD DAMAGE AREA
Mohegan
Fort Hill
Service Area
M O N T V
Wheeler Pond
Lynch Hill
Rockland Pond
Crandall Hill
Red Mill Pond
Gay Hill
Montville
Pie Hill
Johnson Pond
Fitch Corner
County Jail
Haughton Mtn
INTERCHANGE
Horton

this is a copy of a memo from the files of the Public Utilities Dept. (Water Division) of the city of Norwich.

13

Friday, September 23, 1960

About 1 P.M. I was contacted by Al Nystrom that he was finished with the Diver at 12th street sub-station. I contacted the Diver (Paul Nardone,) the tender (Jake ----) and showed them the way to Fairview reservoir where we set up for the Diver to examine the condition of the screens and suction pipe in the well house.

Fairview Res. Dam

He reports as follows: On the end of main suction line there is a copper or bronze strainer that is shaped like a football and is about 5 feet long. It is in good condition. It was covered lightly with moss. The height of this strainer is approximately 5 feet off the bottom. This suction line has two bales for a cable to be attached to. The copper cable is attached to the bale nearest the strainer and the other bale is about 10 feet from the strainer.

The suction line is made of copper and is hand rivited.

There are two standpipes, one on either side of the suction line. These two pipes rise about eleven feet off the bottom with a five foot long pipe shaped strainer on top of each. These strainers are loose, but in good condition, outside of one small one-half inch hole on the left hand standpipe facing the reservoir.

Inside of the well house there is an accumulation of dirt and rotten boards. The drain for the well house was not found.

Stoney Brook Dam Montville

We disassembled the equipment and went to Stony Brook gate house and reassembled the equipment to investigate the gate in the well house.

On number one, or top gate, which was opened at the time we shut to see if it would close because of fresh water barnacles or tuberculation. It shut fairly tight because the water level fell in the well house,

Number two, or middle gate, was closed and was encassed with barnacles or tuberculation. The shaft on this gate was bent and the guide brake was pulled away from the wall, making it impossible to operate this gate.

On checking gate number 3, or bottom gate, the diver found this gate also encased with barnacles or tuberculation and was tightly shut. The guide braces on this gate seemed to be in good order. I did not try to open this gate as I was afraid sediment might get in the well, also, all exposed metal in the well was heavily covered with barnacles or tuberculation.

This operation was performed by the Whaling City Dredge and Dock Corporation, Groton, Conn.

Copy to Mr. Palmer 5/27/43

STATE OF CONNECTICUT

SANFORD H. WADHAMS, CHAIRMAN, HARTFORD
~~SHEPARD B. PALMER, SECRETARY~~, NORWICH

CLARENCE H. BLAIR, NEW HAVEN
~~WILLIAM H. CADWELL, NEW BRITAIN~~
JOSEPH W. CONE, GREENWICH
WILLIAM A. MACKENZIE, WALLINGFORD

Linwood G. Mort
Guilford

V. B. Clarke, Ansonia
MAY 27

STATE BOARD OF SUPERVISION OF DAMS

ROOM 317, STATE OFFICE BUILDING, HARTFORD

Created by Chapter 290 of the Public Acts of 1939 to supervise dams, dikes, reservoirs and other similar structures. "All such structures, with their appurtenances, without exception and without further definition or enumeration herein, which, by breaking away or otherwise, might endanger life or property, shall be subject to the jurisdiction conferred by this act."

PLEASE REPLY TO
P. O. Box 236
New Haven, Conn.
May 25, 1943

General S. H. Wadhams, Chairman
State Board of Supervision of Dams
State Office Building
Hartford, Connecticut

Dear General Wadhams:

On May 13, 1943, I made an inspection of the Stony Brook Dam and the Deep River Dam owned by the Norwich Water Department. At Stony Brook the request was to add flashboards twelve inches high to the existing structures. After inspecting this dam, I cannot advise a permit for the flashboards. The present bridge to the gatehouse is at present under water to a depth of five inches, with two inches over the spillway. Under these conditions, I cannot agree that the flashboards on the spillway should be raised higher.

At the Deep River Dam, the spillway has a length of sixty feet, and on my inspection there was four inches running over the spillway. The spillway has a freeboard of five and one-half feet. The request here was also for permission to install twelve inch flashboards. It is my opinion, under present conditions, that this permit could be granted. Margins of safety on the dam will be sufficient after the raise. Shepard Palmer has been consulted and concurs with my opinions.

Very truly yours,

C M Blair

Clarence H. Blair

CHB:CEB
cc-Shepard Palmer

B-15

April 20, 1971

Mr. John Luchs
John J. Mozzochi & Associates
Consulting Engineers
217 Hebron Avenue
Glastonbury, Connecticut

Re: Stonybrook Reservoir Dam
Montville

Dear John:

Per your telephone request of April 20, 1971 we enclose the following plans of the subject dam:

1. Plan by the Chapman Valve Manufacturing Company, Indian Orchard, Massachusetts, number 339-B-6415 dated June 26, 1916.

2. Plan No. 4 for Board of Water Commissioners Norwich, Connecticut, "Plan of Main Dam" consisting of 3 separate sheets by Chandler & Palmer Engineers dated 1911 showing plan profiles and cross sections (2 sheets).

3. Board of Water Commissioners, City of Norwich Stony Brook Reservoir. "Spillway Channel"-Chandler & Palmer, Engineers dated 1911-12.

4. "Side Dam" - (profile, plan and cross sections).

5. "Contour Map".

Enclosed are a total of 8 sheets which are all the plans we have on this dam. It would be appreciated if you would return them as soon as you are finished with them.

Very truly yours,

William H. O'Brien, III
Civil Engineer

B-16

November 6, 1969

Mr. John Luchs
John J. Mozzochi and Associates
217 Hebron Avenue
Glastonbury, Connecticut 06033

Subject: Stonybrook Reservoir Dam #2
Montville, Connecticut

Dear John:

Under the terms of your agreement to act as consultant to this Commission, would you inspect and report on the safety of the subject dam, which is the smaller of the two dams on this reservoir and is at the north end of the reservoir.

We are particularly interested in an evaluation of seepage along the toe of the dam about 100 feet south of the spillway. With the water level 2 feet below the spillway, the water at the toe was stagnant. Please check with the Norwich P. U. C. before inspecting the dam concerning the water level so that it may be inspected under full pond conditions. (John Desmond 887-2555). We have also requested that they notify us at full pond.

Very truly yours,

William H. O'Brien III
Civil Engineer

WHOIII:hm

REQUEST FOR QUOTATION (Original)

BID NO. THE CITY OF NORWICH

Norwich, Connecticut

Date.....19.....

In your reply refer to Purchasing. Dept.

.....

TO .....

.....

.....

IMPORTANT

PLEASE QUOTE ON THIS SHEET IN SPACE INDICATED BELOW FOR THE MATERIALS AND/OR SERVICES DESCRIBED. KEEP THE DUPLICATE WHICH WE SEND ENCLOSED AND RETURN THE ORIGINAL.

EXPLAIN FULLY ANY SUBSTITUTES SUBMITTED. PURCHASES MADE BY THE NORWICH DEPARTMENT OF PUBLIC UTILITIES ARE CONSIDERED EXEMPT FROM THE PAYMENT OF FEDERAL EXCISE TAXES, CONNECTICUT SALES TAXES, ETC., AND SUCH TAXES MUST BE IDENTIFIED SEPARATELY OR EXCLUDED FROM THE BID PRICES. EXEMPTION CERTIFICATIONS WILL BE FURNISHED AS REQUIRED.

THE RIGHT TO ACCEPT ALL OR ANY PART OR TO DECLINE THE WHOLE IS RESERVED.

Your quotation must be in our office

By .....

..... 19.....

THE CITY OF NORWICH

.....

THIS IS NOT AN ORDER

Shipping Point: .....

F. O. B. ..... Via: .....

Delivery: Complete Shipment to be made from ..... in ..... days from receipt of order

Terms: .....% ..... days: Net ..... days Shipping Weight ..... lbs.

m	Quantity	Materials and/or Services Required	Price
		REPAIRS TO STONY BROOK, TAFTVILLE #2 AND BOG MEADOW RESERVOIR DAMS	
L.		For furnishing all of the required supervision, labor, tools, equipment and materials necessary to complete repair work at Owner's Stony Brook Reservoir Dams #1 and #2 and Cherry Lane Dam, to include the removal of trees, brush and debris and suitable masonry work as per attached detail for a lump sum of	
2.		Same as item 1, to complete repair work at Owner's Taftville #2 Reservoir Dam, to include the removal of trees, brush and debris and providing of suitable riprap on upstream face of the dam as per attached detail for a lump sum of	
3.		Same as item 1, to complete repair work at Owner's Bog Meadow Reservoir Dam, to include removal of trees, brush and debris and suitable masonry work at spillway and inlet per attached detail for a lump sum of	
		ITEM #1 - STONY BROOK RESERVOIR DAMS	
		Dam #1 - Southeast Corner of Reservoir - Work to be Done	
		(a.) Access to the dam site may be had from the easterly end, however, as the access ends at the westerly end of the dam and there is no cul-de-sac, turning a vehicle around for purposes of exit may be difficult.	

Please answer without exception all questions listed on this request for quotation

To THE CITY OF NORWICH

Date.....19.....

We quote you as above.

Signed: .....

By: B-18

REQUEST FOR QUOTATION (Original)

BID NO. THE CITY OF NORWICH

Norwich, Connecticut

Date.....19.....

In your reply refer to Purchasing. Dept.

.....

TO .....

.....

.....

THIS IS NOT AN ORDER

Shipping Point: .....

F. O. B. ..... Via: .....

IMPORTANT

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Your quotation must be in our office

By .....

..... 19.....

THE CITY OF NORWICH

.....

Delivery: Complete Shipment to be made from ..... in ..... days from receipt of order

Terms: .....% ..... days: Net ..... days Shipping Weight ..... lbs.

em	Quantity	Materials and/or Services Required	Price
		(b.) Removal of approximately 8 trees which are now within a 20' distance of the toe on the downstream side of the dam.	
		(c.) Removal of heavy brush from downstream side of the dam for the same distance as (b.) above.	
		(d.) Disposal of all cut trees and brush, from not only the dam site, but completely out of the Reservoir proper by the Contractor.	
		(e.) The Contractor shall repair any damage to the top of the dam due to trucks or other vehicles during the construction period. He shall rake this area off smooth, and if desired by the Owner's Superintendent, reseed any areas that require it.	
		Dam #2 - North End of Reservoir - Work to be Done	
		(a.) Access to this dam site, the smaller of the two active dams at Stony Brook, is to be had by following the road from the main entrance of Stony Brook Reservoir in a northerly direction.	
		(b.) Repair the upstream training wall on the north side of the spillway.	
		(c.) Install a new cement cap on retaining wall of the spillway that has eroded away.	

Please answer without exception all questions listed on this request for quotation

TO THE CITY OF NORWICH

Date.....19.....

We quote you as above,

Signed: .....

By: .....

B-19

REQUEST FOR QUOTATION (Original)

BID NO. THE CITY OF NORWICH

Norwich, Connecticut

Date.....19.....

In your reply refer to Purchasing Dept.

TO .....

.....

.....

THIS IS NOT AN ORDER

IMPORTANT

PLEASE QUOTE ON THIS SHEET IN SPACE INDICATED BELOW FOR THE MATERIALS AND/OR SERVICES DESCRIBED. KEEP THE DUPLICATE WHICH WE SEND ENCLOSED AND RETURN THE ORIGINAL.

EXPLAIN FULLY ANY SUBSTITUTES SUBMITTED. PURCHASES MADE BY THE NORWICH DEPARTMENT OF PUBLIC UTILITIES ARE CONSIDERED EXEMPT FROM THE PAYMENT OF FEDERAL EXCISE TAXES, CONNECTICUT SALES TAXES, ETC., AND SUCH TAXES MUST BE IDENTIFIED SEPARATELY OR EXCLUDED FROM THE BID PRICES. EXEMPTION CERTIFICATIONS WILL BE FURNISHED AS REQUIRED.

THE RIGHT TO ACCEPT ALL OR ANY PART OR TO DECLINE THE WHOLE IS RESERVED.

Your quotation must be in our office

By .....

..... 19.....

THE CITY OF NORWICH

.....

Shipping Point: .....

F. O. B. ..... Via: .....

Delivery: Complete Shipment to be made from ..... in ..... days from receipt of order

Terms: .....% ..... days: Net ..... days Shipping Weight ..... lbs.

em	Quantity	Materials and/or Services Required	Price
		(d.) Remove brush and debris from the lower spillway for a distance of 50 feet.	
		(e.) The Contractor shall dispose of all brush and debris cleaned from the spillway by removing it from the Reservoir proper.	
		(f.) The Contractor shall repair any damage to the top of the dam due to trucks or other vehicles during the construction period. He shall rake this area off smooth, and if desired by the Owner's Superintendent, reseed any areas that require it.	
		Inactive Cherry Lane Dam - Work to be Done	
		(a.) Access to this dam, located immediately upstream from Stony Brook Reservoir, is by way of Cherry Lane, a dirt road west of the Stony Brook Reservoir main entrance.	
		(b.) Removal of all trees on the dam proper.	
		(c.) Removal of trees and brush for a distance of 25 feet upstream from the dam proper and including the spillway section.	
		(d.) The Contractor shall dispose of all brush and trees taken from dam proper, 25 feet upstream and the spillway by removing them from the Reservoir proper.	

Please answer without exception all questions listed on this request for quotation

To THE CITY OF NORWICH

Date.....19.....

We quote you as above,

Signed: .....

By: .....

B-20

December 18, 1970

Mr. John P. Desmond
Superintendent of Purchasing
& Stores
City of Norwich
Department of Public Utilities
P. O. Box 1008
34 Shetucket Street
Norwich, Connecticut 06360

Re: Public Utilities Dept.
Dams, Norwich

Dear Mr. Desmond:

Thank you for your letter of November 13, 1970 stating that all the repair work requested by this department in the fall of 1969 has been completed.

As I look out the window it is now snowing so it may be springtime before we can reinspect these dams. We will be in further touch with you when it is possible for us to do this. Thank you for your cooperation.

Very truly yours,

William H. O'Brien, III
Civil Engineer

WHOIII:mh

STATE OF CONNECTICUT
WATER RESOURCES COMMISSION
STATE OFFICE BUILDING o HARTFORD, CONNECTICUT 06115

November 6, 1969

Mr. John Desmond
Supt. of Purchasing and Stores
Department of Public Utilities
City of Norwich
P. O. Box 1008 - 34 Shetucket Street
Norwich, Connecticut 06360

Subject: 1. Stonybrook Reservoir Dams 1 & 2, Montville
2. Cherry Lane Dam (at Stonybrook) Montville
3. Taftville Reservoir #2, Norwich
4. Bog Meadow Reservoir Dam, Norwich

Dear Mr. Desmond:

In answer to your letter of October 27, 1969 and enclosed specifications for repairs to the subject dams, we have the following comments:

1. Stonybrook Reservoir, Montville

Dam #1 - O.K.
Dam #2 - O.K.

We request that you advise us when this reservoir is full. (water up to the spillway) so that we may have the seepage at the toe checked under this condition.

2. Cherry Lane Dam (at Stonybrook), Montville - O.K.

3. Taftville Reservoir #2, Norwich - O.K.

We have not as yet received the comments of our consultant on the "low grassed area" in the top of the dam and the leakage around the waste pipe. Please advise us when this reservoir is full also.

4. Bog Meadow Reservoir Dam, Norwich

a) The work called for does not include items 1 thru 4 of our memo dated February 5, 1969, a copy of which has been sent to you. We would like to know in some detail (a sketch would be helpful) exactly what will be done to correct these items. When this has been received, we will decide if a Construction Permit is necessary. It is not anticipated that one would be required.

b) We would like more detail on the installation of the chain link wire fence at the inlet structure. It should be designed so that it can not become clogged thereby decreasing the capacity of the spillway. Please submit a drawing of the proposed installation.

B-22

c) A Construction Permit is not required for the work in your specifications and they are fine as far as they go.

Please advise us as the work is completed at each reservoir. We will plan to inspect them from time to time as the schedule permits.

Very truly yours,

William H. O'Brien III
Civil Engineer

WHOIII:hm

CITY OF NORWICH
DEPARTMENT OF PUBLIC UTILITIES
P. O. BOX 1008
34 SHETUCKET STREET
NORWICH, CONN. 06360

October 27, 1969

STATE WATER RESOURCES COMMISSION
RECEIVED
OCT 28 1969
ANSWERED
ACKNOWLEDGED
FILED

State of Connecticut
Water Resources Commission
State Office Building
Hartford, Connecticut 06115

Attn: Mr. William H. O'Brien, III, Civil Engineer

Dear Mr. O'Brien:

As per our recent telephone conversation, we enclose the proposed specifications for repairs to and removal of trees, brush and debris at Stony Brook, Taftville #2 and Bog Meadow Reservoir Dams.

Before this bid is published, we would appreciate your comments as to the work to be accomplished, the wording, etc. You will note that the clean-up of lumber at Cherry Lane Dam in Stony Brook Reservoir along with the filling in of woodchuck holes and repairing of fences are not mentioned, this work has already been accomplished or is in the process of being accomplished by our Water Division personnel.

The Deep River Reservoir work is also to be handled in a separate manner, as I have explained to you verbally, and Mr. Charles Hochmann of Charles A. Maguire Associates has been directed to contact you before borings on this dam are started.

Chandler and Palmer, Engineers, have been engaged by us to write specifications and draw plans for the major repairs to Taftville #3 Reservoir Dam and this, after receiving approval from your Department, will also be handled in a separate manner.

In answer to your letter to Mr. Grimshaw dated October 17, we trust that the work as outlined in these specifications will suffice for Bog Meadow Dam as these were drawn up by Chandler and Palmer on August 13, 1969.

We will await your reply before proceeding further.

Very truly yours,

CITY OF NORWICH
DEPARTMENT OF PUBLIC UTILITIES

John F. Desmond
Supt. of Purchasing and Stores

JTDesmond/bg
Enclosure

B-24

CITY OF NORWICH
DEPARTMENT OF PUBLIC UTILITIES

P. O. BOX 1008
34 SHETUCKET STREET
NORWICH, CONN. 06360

November 13, 1970

887-2555

State of Connecticut
Water Resources Commission
State Office Building
Hartford, Connecticut 06115

Attn: Mr. Pelletier

Gentlemen:

As per our telephone conversation of date, we wish to advise that the repairs requested by your Mr. William O'Brien, Civil Engineer, in the fall of 1969 have been completed as of November 9, 1970.

Our Mr. Humphrey Leary, Water Superintendent, will be happy to accompany you or any member of the Water Resources Commission on a tour of the reservoirs affected at your convenience.

Sincerely yours,

CITY OF NORWICH
DEPARTMENT OF PUBLIC UTILITIES

John T. Desmond
Supt. of Purchasing and Stores

JTDesmond/bg

STATE WATER RESOURCES COMMISSION
RECEIVED
NOV 16 1970
ANSWERED
REFERRED
FILED

B-25

April 23, 1969

Mr. Humphrey Leary, Superintendent
Water Division
Department of Public Utilities
Norwich, Connecticut

Subjects: Stony Brook Reservoir Dam
Montville

Taftville Reservoir #1 Dam
Norwich

Dear Mr. Leary:

We are enclosing the originals of the following plans which you loaned to us to have copies made.

1. A drawing of the slide gate prepared by the Chapman Valve Mfg. Co. dated June 26, 1916, for Stony Brook Reservoir Dam, Montville.

2. Blueprints numbered 896-11, 896-12 and 896-13 dated June 10, 1943, prepared by Chas. T. Main Inc. Engineers, Boston, labeled Ponemah Mills. (Taftville Reservoir #1, Norwich).

Thank you for your cooperation.

Very truly yours,

William H. O'Brien III
Civil Engineer

Encs.

WHOIII:vhb

JOHN J. MOZZOCHI AND ASSOCIATES
CIVIL ENGINEERS

GLASTONBURY, CONN. 06033
317 HEBRON AVENUE
PHONE 633-9401

PROVIDENCE, R. I. 02903
200 DYER STREET
PHONE GAspee 1-0420

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

REPLY TO: Glastonbury

January 13, 1968-69

Subject: Public Utilities Dams (9)
Griswold
Norwich
Stony Brook Reservoir Dam
Montville

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

Dear Mr. O'Brien:

I have checked our file No. 57-75-83 and find I was requested to estimate the spillway capacities for the nine (9) dams on November 30, 1967. This request came a short time after the death of John Mozzochi and due to the confusion, was filed away with nothing being done to date.

The file does contain some material Mr. Mozzochi obtained as follows:

1. Repairs to Occum Dam & Hydro-Elec. Station Sheets 1, 10 & 11.

2. Some minor information on the Greenville Dam. ($8\frac{1}{2}$"x11" copy sheets taken off of larger plans).

3. Rough field measurements of spillways.

To check the adequacy of the spillways on the nine dams, I feel it is necessary to visit each site and get the necessary field information for analysis. I will also attempt to get prints (of construction drawings) for record purposes.

Very truly yours,

JOHN J. MOZZOCHI AND ASSOCIATES

By John Luchs Jr.
John Luchs, Jr., Associate

JL/ed

STATE WATER RESOURCES COMMISSION
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JAN 14 1969
ANSWERED
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B-27

STATE OF CONNECTICUT

WATER RESOURCES COMMISSION

STATE OFFICE BUILDING • HARTFORD, CONNECTICUT 06115

January 9, 1969

Mr. John Luchs
John J. Mozzochi & Associates
217 Hebron Avenue
Glastonbury, Connecticut

Subject: Dept. of Public Utilities Dams
Norwich, Montville and Colchester

Dear John:

On November 30, 1967, we wrote to John Mozzochi asking for a report on the adequacy of the spillways on each on nine dams owned by the City of Norwich and previously referred to in his letter of September 28, 1967, your file No. 57-73-83.

The dams are as follows:

1. Stony Brook Reservoir, Montville
2. Deep River Reservoir, Colchester
3. Occum Dam, Shetucket River - Norwich
4. Greenville Dam, Shetucket River - Norwich
5. Fairview Reservoir Dam, Norwich
6. Taftville Reservoir #1 Dam, Norwich
7. Taftville Reservoir #2 Dam, Norwich
8. Taftville Reservoir #3 Dam, Norwich
9. Bog Meadow Reservoir Dam, Norwich

Would you please advise us of the status of this report?

John had apparently made an effort to locate plans for these dams with quite limited success, since many of the records were apparently lost. We would ask that you send to us whatever plans, specifications or other data he was able to assemble when you are through with them.

In making these studies, in addition to your regular analysis, would you evaluate the rainfall which would produce a runoff equivalent to the spillway capacities. In determining such rainfall, please use the following durations:

Drainage area	Rainfall duration
10 square miles or less	6 hours
10 - 50 square miles	12 hours
50 - 100 square miles	18 hours
greater than 100 square miles	24 to 96 hours

Very truly yours,

William H. O'Brien III
Civil Engineer

WHOIII:vhb

JOHN J. MOZZOCHI AND ASSOCIATES
CIVIL ENGINEERS

GLASTONBURY, CONN. 06033
217 HEBRON AVENUE
PHONE 633-9401

PROVIDENCE, R. I. 02903
200 DYER STREET
PHONE GASPEE 1-0420

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

REPLY TO: Glastonbury

September 28, 1967

STATE WATER RESOURCES COMMISSION
RECEIVED
SEP 29 1967
ANSWERED
REFERRED
FILED

Mr. William P. Sander
Engineer - Geologist
State of Connecticut
Water Resources Commission
State Office Building
Hartford, Connecticut 06115

Re: Our File No. 57-73-83
City-Owned Dams
Norwich, Connecticut

Dear Mr. Sander:

In response to your instruction of May 22, 1967, authorizing me to inspect the nine (9) dams owned by the City of Norwich, I eventually made an appointment through the General City Manager, Robert Grimshaw, to meet with the head of the Public Utility Department, Mr. Mystrom, and the Superintendent of the Water Department, Mr. Leary, and met with them on Tuesday, September 26th.

Of the nine dams concerned, two are operated by the Electric Power Department of Norwich and seven by the Water Department. The two power dams are low-head structures, one on the Shetucket River, called Occum Dam, which is a concrete-spillway type, and the second is a wood-crib type also on the Shetucket River at a section of Norwich known as Greenville. Both of these dams are in good condition and have had constant repairs since the city acquired them. On the Greenville Dam there is currently work going on repairing the down-stream apron. At the time of my inspection, everything that I could see appeared to be in good order at both dams.

In the order of their importance, the water reservoir dams are as follows:

Stoney Brook Dam, in Montville, rated at a 500 million gallon capacity;

Deep River Reservoir, in Colchester, rated at 385 million gallons;

Fairview Reservoir, in Norwich, rated at 450 million gallons;

Taftville #1 rated at 88 million gallons;

Taftville #2 rated at 22 million gallons;

Taftville #3 rated at about one million gallons;

Bog Meadow Dam, which has never been in use, has no exact quantity determined.

My observations of these dams showed that they have been well kept up with the exception of some minor work which could be easily accomplished through the normal maintainence program. I discussed these in detail with Mr. Leary at the time of my inspection and list them herewith:

On Stoney Brook there are several small growths of cedar trees on the dam itself which should be removed. The brush on the downstream side of the embankment should be cleared off and the turf cover could stand some fertilizing in order to create a little better growth.

The same maintenance program applies to the Deep River Reservoir.

Taftville #1 is in very good condition with the exception that there is one twin 12" oak tree in the embankment which should be removed.

Taftville #2 has to have trees cleared and brush removed as in the other cases.

Taftville #3 has not been used in some years and it needs a large amount of clearing of the dike because it has overgrown tremendously.

This also applies to Bog Meadow which has not been in use. It also has trees and brush to be removed; and, in addition, there should be some repair work done on the rip rap which has been displaced. At the corner of the masonry wall near the spillway some additional earth fill is required.

I requested that plans on all of these dams be furnished to us in order to build up a file in our office. It was discouraging to find an absolute lack of any information as to original construction. I have not been able to determine whether or not these can be obtained through the offices of Chandler and Palmer who appear to have been the consultants for the city throughout the years and, undoubtedly, have much of this information in their files. Perhaps you may be in a better position to contact them.

I think that this was the limit of my authorization to make the inspection. If there is a need for us to do any further checking of the capacity of spillways, checking of runoffs, etc., I believe a more extensive program of investigation would be required.

Very truly yours,

John J. Mozzochi and Associates
Civil Engineer

JJM/cd

B-31

Stoney Brook Reservoir Dam, ~~Norwich~~ Montville

THIS MEMORANDUM OF AN AGREEMENT, made and entered into this _____ day of _____, 1924, by and between The Board of Water Commissioners of the City of Norwich of the first part, and _____ contractor, of the second part,

W I T N E S S E T H:

THAT the said contractor has agreed, and does by these presents agree, with the party of the first part, for the considerations hereinafter mentioned, and under the penalty expressed in a bond bearing even date herewith and hereto annexed, at his or its own cost and expense, to furnish all necessary tools, materials and labor, except as hereafter mentioned, for the construction, in a thorough, substantial and workmanlike manner, of additions to the dams and appurtenances at the Stony Brook Reservoir, Dam Montville, ~~Norwich~~, under the direction of, and in accordance with, the plans made by the engineers of the party of the first part, and in accordance with the following

S P E C I F I C A T I O N S:

BATTERS AND STAKES:

The contractor shall furnish and set all necessary batters and stakes on which the engineers will mark the lines and grades of the finished work.

MATERIALS:

All materials except steel for reinforcing concrete, which will be furnished by the Board of Water Commissioners, are to be furnished by the contractor, and shall be of the best quality of the kind and class specified.

Any suitable material for the work may be taken from any land owned by the City of Norwich in the vicinity of the reser-

voir, except in the vicinity of the tool house. The locations from which material is taken must be those approved by the engineers.

CEMENT:

First class Portland cement, of a brand approved by the engineers must be used.

No cement is to be brought on to the ground, the brand of which has not been previously approved by the engineers. This must be stored and held until sufficient time and opportunity has been given for tests satisfactory to the engineers, or until permission has been given by the engineers to use it. The cement must be stored in tight buildings with floors at least one foot above the ground, and no bags of cement any portion of which has become hardened will be allowed to be used.

The cement must be able to pass the tests of the American Society of Civil Engineers for testing materials, and neat cement must show in a twenty-four hour test a tensile strength of one hundred seventy-five pounds per square inch, and in a seven days' test at least four hundred pounds per square inch.

Permission from the engineers to use any cement, either before or after testing, will not relieve the contractor from the necessity of doing good work, nor of removing any work that proves imperfect and replacing the same with good work.

SAND:

The sand must be clean, sharp, and of medium fineness satisfactory to the engineers, and must test to at least 90 per cent of standard Ottawa sand.

BROKEN STONE:

The broken stone used shall be sound and clean and of a size that will pass through a two-inch ring and not pass through a half-inch ring.

If reinforced concrete is used, the stone must be small enough to pass through a one and one-half inch ring.

CLEARING:

All trees and brush shall be removed by the contractor from the ground to be covered by the extensions of the dams.

EARTH EXCAVATION:

The excavation for corewall and spillway and other masonry, must extend to hard pan, sound ledge or other tight material approved by the engineers.

So much of this material as is suitable for the embankment may be used there, if properly rolled, tamped, or otherwise packed to the satisfaction of the engineers.

The contractor shall first remove the wood, brush and grass from the site of the extensions of the dams and appurtenances. Any earth excavated on the extensions at the direction of the engineers shall be paid for as earth excavation.

Material excavated for masonry foundation and used in the embankment without handling but once, will be paid for but once, and at the price for embankment.

ROCK EXCAVATION:

Loose and seamy ledge and boulders in loose ground must be removed.

Boulders containing one-third of a cubic yard, or more, will be classed as rock excavation.

Wherever the corewall is built on ledge, a triangular groove three inches deep must be cut therein near the center of the corewall, which will be paid for as though the ledge was excavated to that depth and the width of the wall or footing.

EMBANKMENTS:

The material used in extending the downstream sides of the embankments below the level of the top of the present embankments shall consist of earth and stones so mixed that there shall be no vacant places between stones.

The embankments on the upstream side of the corewalls must consist of the best available material. The material shall be entirely free from perishable matter. It shall be free from stones as far as practicable, and contain no stones more than four inches long. No stones of any size shall come in contact with each other.

The material used in refilling the corewall and masonry trenches must be either puddled or tamped in six-inch layers.

The material on the downstream side of the corewall above the present level of the top of the embankments must be free from perishable material and rolled with a grooved roller of a weight satisfactory to the engineers, in layers not more than eight inches thick before rolling. All stones that would interfere with a proper rolling of the material must be confined to the downstream edge of the embankment.

The embankment material above the level of the top of the present embankments must be kept as wet as can be without sticking to the roller, or making mud.

The downstream edge of the downstream embankment not less than 12 inches wide is to be wholly of stone, neatly graded to the lines indicated on the plans, provided there is sufficient stone in the material used in the embankment to make this facing.

No frozen earth shall be used in the embankment, and no earth is to be added when the surface of the embankment is frozen.

APPROACHES:

Wherever so directed by the engineers embankments shall be made giving access to the main embankments from the present ground. These must have the best available road surface material for the upper eight inches.

CONCRETE:

The concrete must contain sufficient cement to more than fill the voids in the sand, and sufficient sand to more than fill the voids in the broken stone. In no case shall there be less than one part of cement to three parts of sand, or less than three parts of sand to five parts of broken stone.

The spillway masonry and bridge pier shall be built of concrete, containing one part cement, two parts sand, and four parts broken stone.

A mechanical mixer of a type satisfactory to the engineers must be used in mixing concrete, and the material must be mixed thoroughly enough to have the cement coat all the sand uniformly. Only a sufficient amount of water to thoroughly wet the material shall be used.

Clean, wet stones, not more than ten inches long, may be imbedded in the concrete. The clear space between them, measured horizontally, shall be at least one-half the thickness of the largest adjoining stone, and the spaces, measured vertically, shall be at least three inches. The stones must not come within two inches of the forms, one foot of top of spillway, or twelve inches of the bottom or ends of the dam, connections, or corewall. The largest dimensions of the stones must not be greater than one-fourth the thickness of the masonry at the height where such stones are placed.

These provisions do not apply to reinforced concrete.

The concrete must be well puddled against the forms and

around such stones as may be imbedded therein.

The corewall must be built in sections and each section brought up to the top each night, and vertical joints between work done on different days must be well broken by building in removable timbers or boxes, so as to make a V-shaped groove at least four inches deep in each joint. Each section must be kept substantially level in building, and the material must be placed in such a manner that the more liquid portion shall be well distributed throughout the mass.

The work shall be divided by tight partitions into sections of such a size that the horizontal surface on which concrete is being placed at any time shall not exceed that which can be covered each hour. Work done on some previous day must be thoroughly cleaned and washed, the whole surface roughened, and weak concrete, if any exists, removed before new concrete is put in.

The forms must be strong, tight, clean, and very firmly braced or tied. For exposed surfaces the forms must be planed and oiled. The surface of the concrete after the forms are removed must be freed from all loose material and unsightly projections and, if so directed, all surfaces to remain exposed and the water side of corewall shall be painted with a neat cement wash, as thick as can be applied with a brush as soon as practicable after removing the forms. The work must be wet when the wash is applied.

All of the work, both finished surfaces and joints must be kept wet for at least two weeks after the concrete is put in, unless it is covered with earth. All exposed corners of concrete masonry must have three-inch bevels.

MORTAR:

All mortar used in corewall must consist of one part Portland cement to not more than two parts of sand thoroughly mixed

before wetting. Mortar in abutments and wing walls may have not more than three parts sand to one part cement.

STONE MASONRY:

If the spillway is built of stone masonry, the stones must be fairly rectangular and laid on their largest surfaces with full mortar joints. The mortar must be thickly spread, and the stones firmly bedded thereon so as to leave no voids. No stones are to extend through the wall except the coping. The coping stones must extend entirely across the wall and have joints not more than one inch thick. The spillway masonry must be tight.

If the corewall is built of stone masonry, it must be built of clean, wet stones not more than one foot long, well bedded in mortar. All stones and chocks are to be pushed into a liberal supply of mortar. The whole upstream surface must be plastered with mortar when clean and wet. Every necessary precaution must be taken to make the corewall perfectly tight. Abutments, wing walls, and other stone masonry, not otherwise herein described, are to be first-class mortared rubble, finished with stones extending the full width of top of wall.

PAVING:

The water slope of the embankment shall be paved with stones not less than eight inches deep at top of slope and sixteen inches deep at lower side, set on edge on a layer of coarse gravel or stones not more than four inches long. The joints in the paving shall be entirely filled with broken stone or gravel swept in with stiff brooms or washed in with water.

BRIDGE:

The present bridge over the spillway is to be removed. That part of the pier under the bridge is to be taken down to a level at least six inches below present top of spillway, so as to allow

the spillway to be extended continuously, and so much of the abutments shall be removed as is necessary to connect the spillway and corewall extensions continuously. The new bridge is to be built according to the plans provided. The concrete is to be of 1-2-4 mix with stone from 1-1/2" to 1/2" in size. This must be well placed around the steel and carefully tamped against the forms so as to leave no voids. Steel must be securely fastened in place. Forms must be tight, using planed and oiled boards for exposed surfaces with all exposed corners beveled. The forms on exposed surfaces must be removed as soon as safe and the surface rubbed down and painted with cement mortar.

All reinforcement on the job will be furnished by the Board of Water Commissioners. The pier and its footing are to be reinforced.

The price for the bridge does not include the pier and its footings which will be paid for as 1-2-4 concrete.

PRICES AND PAYMENTS:

1. For each cubic yard of earth excavated for corewalls and spillway,.....$

2. For each cubic yard of rock excavation for corewalls,.....$

3. For each cubic yard of concrete 1-3-5 mix,.....$

4. For each cubic yard of concrete 1-2-4 mix,.....$

5. For each cubic yard of stone masonry in abutments or corewalls,.....$

6. For each cubic yard of embankment on upstream side of corewall and refilled trenches,.....$

7. For each cubic yard of embankment on downstream side of present embankments below level of top of present embankments,.....$

8. For each cubic yard of embankment above level of

top of present embankments downstream from the corewall, including approaches for roadway,.....$

9. For each square yard of paving on upstream side of and over corewall,..... .....$

10. For building the new bridge and removing the old bridge,.....$

Excavation for corewall and spillway trenches will be measured to lines one foot outside of the concrete, provided that the excavation is actually made to that width.

Embankment material will be measured in the embankment when completed, and will include the stone on downstream slope.

The above prices include all necessary pumping and bailing of water, all forms for concrete, all batters, and all labor and tools, and all materials except the steel reinforcement.

Payment will be made some time between the first and tenth of each month for eighty-five per cent. of the approximate amount of work completed during the preceding calendar month, according to the engineers' approximate estimate. These payments will not include cement or other material on the ground, but not in place. In determining the amount of work to be paid for each month, the character and amount of the work done compared with that remaining to be done will be considered.

Final payment except two per cent. of the total amount of the contract will be paid between the first and tenth of the month, following the one in which the last monthly payment is due.

The two per cent. reserved for repairs will be due six months after the completion of the work, provided that the work is then in good condition.

Repairs required during the above mentioned six months, if not promptly made by the contractor, may be made by the party of the first part and charged to the contractor.

GENERAL:

The contractor agrees to begin said work on, or before, _____, and complete it before _____.

The spillway shall not be raised until the corewalls have been raised to the new level, except the corewalls near the spillway, except by special permission of the engineers.

No masonry shall be built when the temperature is below thirty degrees Fahrenheit, except by special permission of the engineers in such manner as the engineers may direct.

The contractor shall employ constantly on the work a competent superintendent, acceptable to the engineers, who in the contractor's absence shall be his legal representative.

The contractor shall employ competent workmen only, and shall discharge from the work any and all employes as may be considered by the engineers as unable or unwilling to do properly the work assigned to them.

For any extra or special work ordered by the engineers, and not herein specified or covered by the prices herein mentioned, the actual cost to the contractor of labor and material, plus ten per cent, will be paid.

The contractor agrees that he will indemnify and save harmless the said Board of Water Commissioners and the City of Norwich from all suits or actions of every name or description brought against said Board or said City, for, or on account of, any injuries or damages received or sustained by any person or persons by or from the said contractor, his servants or agents, in the construction of said work, by or in consequence of any negligence in guarding the same, or any improper material used in its construction, or by or on account of any act or omission of the said contractor or his agents.

Changes in, additions to, or deductions from the work may be

made by the engineers without invalidating the contract, and proper additions and deductions are to be made to the amount to be paid to correspond with such changes, additions, or deductions.

The contractor must not sublet any portion of the work, except delivery of material, without permission of the party of the first part.

The payment provided for at the completion of the work shall not be due until satisfactory evidence is given that all labor and material, the expense of which would or might become a lien on the property of said Board or said City has or will be paid for by the contractor.

No buildings used for eating or lodging or stables shall be maintained on the drainage area tributary to the Brook above the dam site.

No privies shall be maintained on the drainage area. The contractor must realize that the water in the reservoir is being used for domestic consumption and every precaution must be taken to prevent pollution of the water. Privies for the men must be built by the contractor at least one hundred and fifty feet below the dams and the men instructed to use them. The contractor must see that this rule is enforced. Any person caught using the ground as a privy above the dams on the drainage area of the reservoir must be immediately dismissed from the job at the request of the engineers.

Any information in the possession of the engineers as to the amount or character of the work to be done will be furnished by them in good faith, but no responsibility on the part of the party of the first part, or the engineers, is assumed thereby.

None of the work is to be done out of ordinary working hours, or on Sundays or holidays, except by special permission of the engineers.

The order in which different parts of the work are done must be such as shall meet the approval of the engineers.

Local labor is to be used as much as is practicable.

No claim for extra work is to be valid, unless such extra work was ordered by the engineers in writing before it was performed.

The contractor will be required to furnish a bond in the sum of $10,000 conditioned upon the faithful performance of the contract.

The premises of the City of Norwich must be left free from all temporary structures erected by the contractor and rubbish of every kind at the completion of the work.

If at any time in the opinion of the engineers the work is not being prosecuted in accordance with the contract as to quality of material, character of the work or rate of progress, said engineers may notify the contractor that he must abandon the work and leave his tools and materials in the control of said engineers, unless within two weeks of the receipt of such notice the contractor improves the quality of the work or material or increases the rate of progress to the satisfaction of the engineers. If the contractor fails to so improve the quality of work or rate of progress to the satisfaction of the engineers within said time the contractor must abandon the work within six days after the receipt of a notice from the engineers, authorized by vote of the Board of Water Commissioners, ordering them so to do, and the work shall then be prosecuted to completion by contract or otherwise, as the Board of Water Commissioners shall direct, at the expense of said contractor.

The whole of said work, both as regards quality of material and mode of execution, must be performed in the most thorough, substantial and workmanlike manner, to the satisfaction and

acceptance of the party of the first part or their engineers.

IN WITNESS WHEREOF, We have hereunto set our hands and seals the day and year above written.

_____(L.S.)

_____(L.S.)

_____(L.S.)

_____(L.S.)

KNOW ALL MEN BY THESE PRESENTS, That _____

_____ as principal and

_____

as surety, are held and firmly bound unto the City of Norwich and the Board of Water Commissioners of the City of Norwich, in the sum of Ten Thousand Dollars ($10,000) lawful money of the United States of America, to be paid to the said City and said Board of Water Commissioners, their successors and assigns, for which payment well and truly to be made, we hereby bind ourselves, our heirs, executors and administrators and every of them, for and in the whole, firmly by these presents.

Sealed with our seals, and dated this _____ day of _____, one thousand nine hundred and twenty-four.

The condition of this obligation is such that,

WHEREAS, The said _____ has entered into a contract with the said Board of Water Commissioners, bearing date of the _____ day of _____ A.D. , and annexed hereto,

Now if the said _____ shall well and truly keep and perform all the terms and conditions of said contract on their part to be kept and performed, and shall indemnify and save harmless the said Board of Water Commissioners and the City of Norwich, aforesaid, from all loss, cost, expense or damages by reason of any act or omission of the contractor, his agents or servants or workmen as therein stipulated, then this obligation shall be of no effect; otherwise, it shall remain in full force and virtue.

Signed and sealed in presence of

_____ (L.S.)

_____ (L.S.)

_____

_____ (L.S.)

_____

_____ (L.S.)

PLAN No. 1.

FOR

BOARD OF WATER COMMISSIONERS.

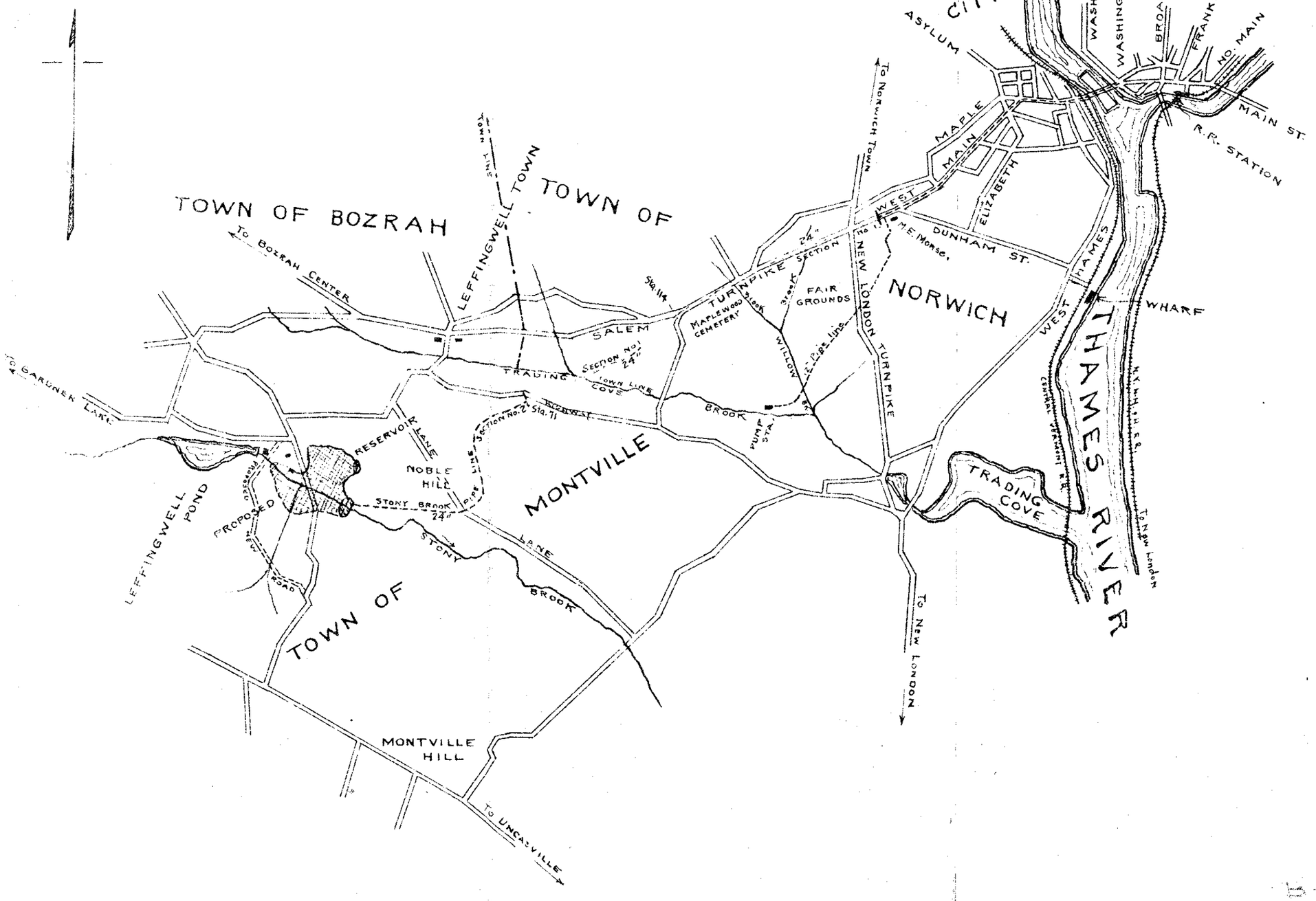
NORWICH. CONN.

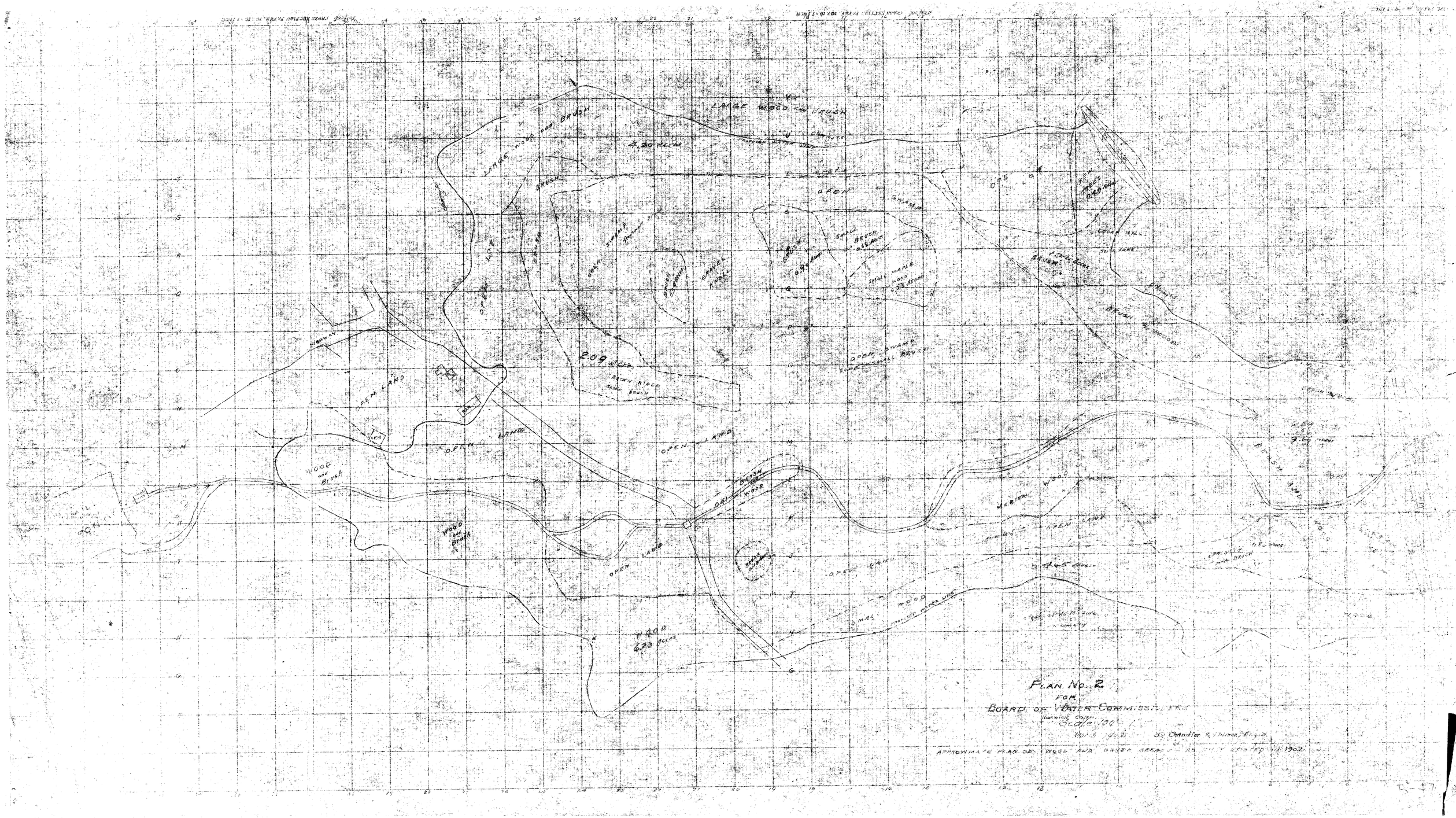
ROAD MAP

SHOWING STONY BROOK RESERVOIR

AND PIPE LINE.

APPROXIMATE SCALE 2 INCHES = 1 MILE




LARGE WOOD AND BRUSH
4.20 ACRES
OPEN SWAMP
OPEN LAND
WOOD AND BRUSH
2.09 ACRES
OPEN SWAMP
SMALL BRUSH
SMALL MAPLE WOOD
GRAVEL KNOLL
BRUSH
WOOD
6.23 ACRES
PROPOSED WATER LINE
PLAN No. 2
FOR
BOARD OF WATER COMMISSIONERS
Norwich, Conn.
Scale 100'
By Chandler & Thomas, Engrs.
APPROXIMATE PLAN OF WOOD AND BRUSH AREAS AS THEY EXISTED IN 1902

PLAN No. 3.

FOR

BOARD OF WATER COMMISSIONERS

Scale 100'

Plan No. 4

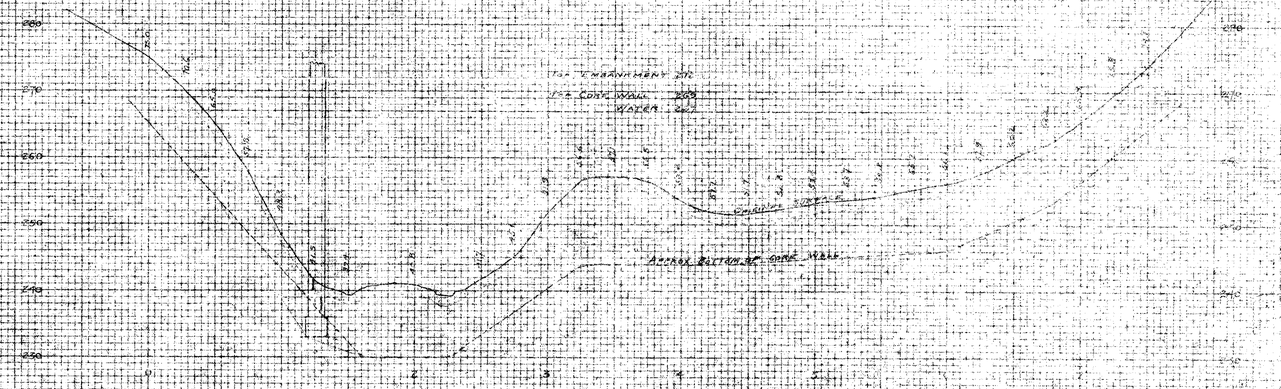
FOR

Board of Water Commissioners

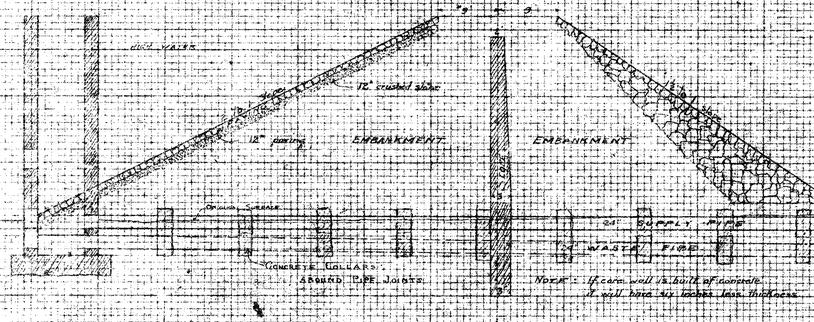
Norwich, Conn.

Plan of Main Dam

Scale 50 feet to the inch. 1911. By Chandler & Palmer, Engrs.

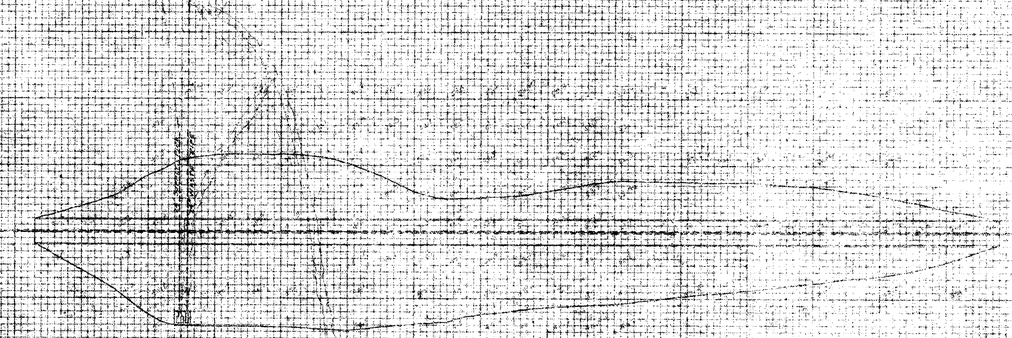


Profile of Main Dam



Cross-Section

Scale 10 feet to the inch



Plan of Main Dam

"Keystone" CROSS SECTION PAPER, 10 × 10 – 1 INCH

"Keystone" CROSS SECTION PAPER, 10 × 10 – 1 INCH

PLAN No. 5.

FOR

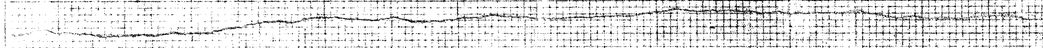
BOARD OF WATER COMMISSIONERS.

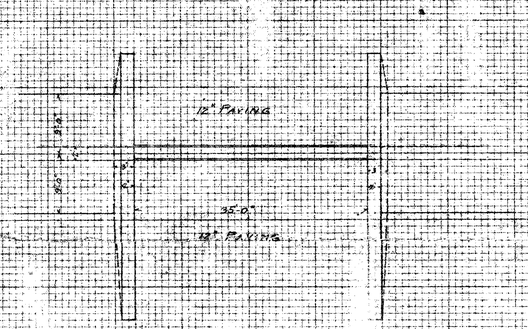
NORWICH, CONN.

PLAN OF SIDE DAM.

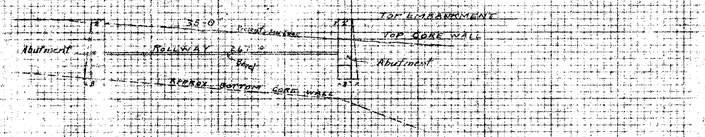
Scale 50 feet to the inch. Chandler & Palmer Engrs.

1911.

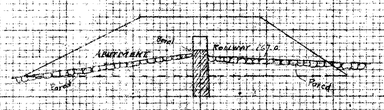




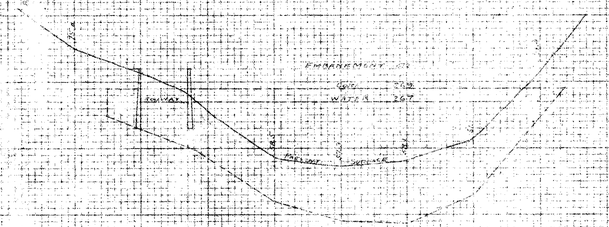
PLAN OF ROLLWAY.
Scale 10'=1"



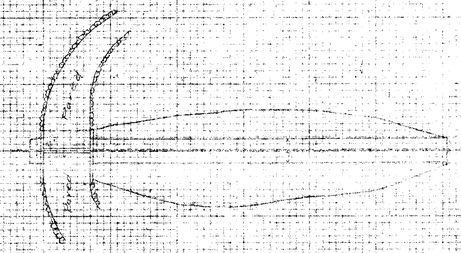
PROFILE OF ROLLWAY.



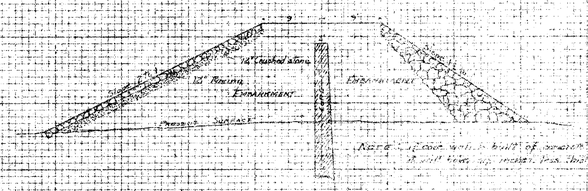
CROSS-SECTION OF ROLLWAY.



PROFILE OF SIDE DAM.



PLAN OF SIDE DAM.



CROSS SECTION

Scale 10 feet to the inch.

PLAN NO. 6.

FOR

BOARD OF WATER COMMISSIONERS

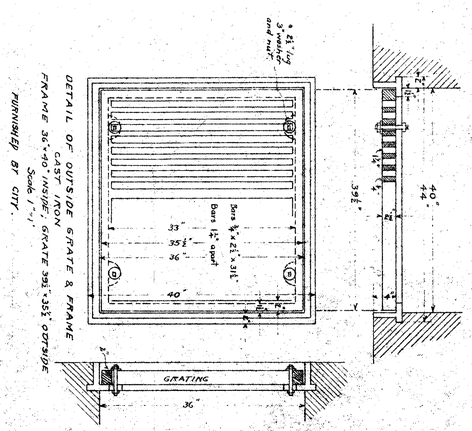
NORWICH, CONN.

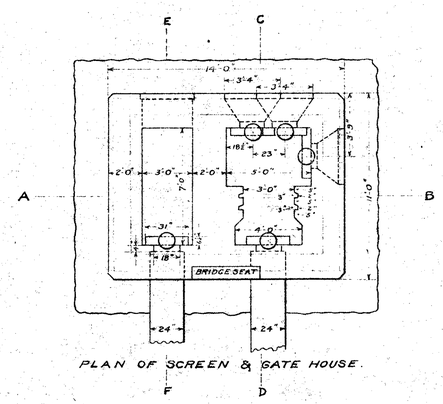
PLAN OF GATE HOUSE

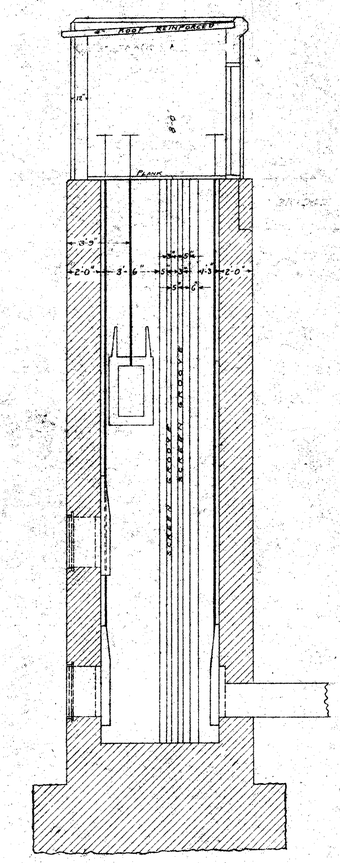
Scale 4'-1"

By Chandler & Palmer, Engrs

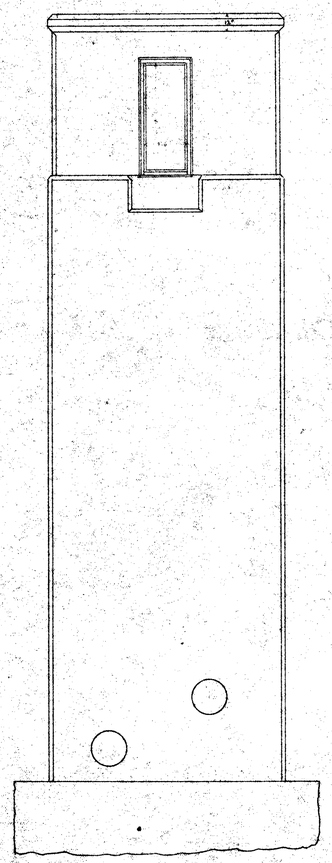
1911.



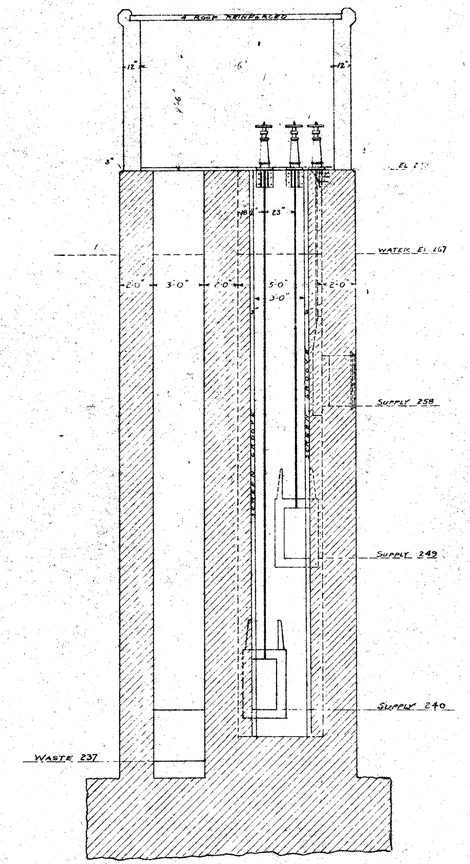




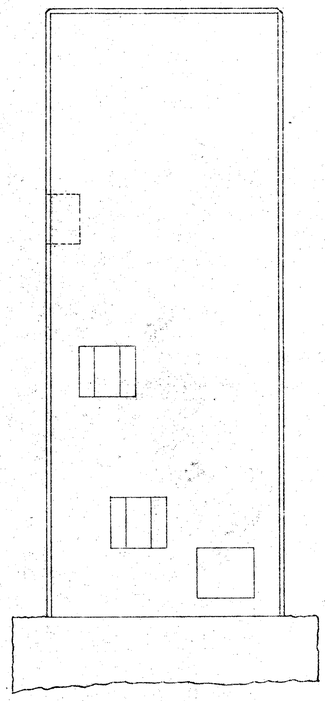
CROSS-SECTION ON LINE C.D.



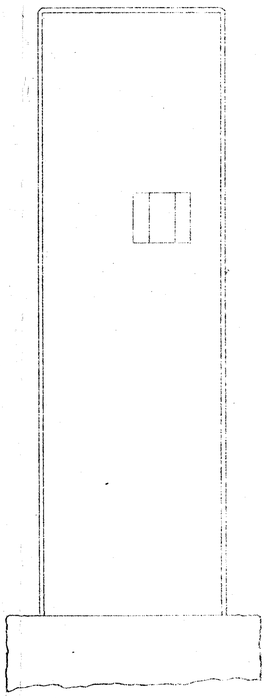
FRONT ELEVATION



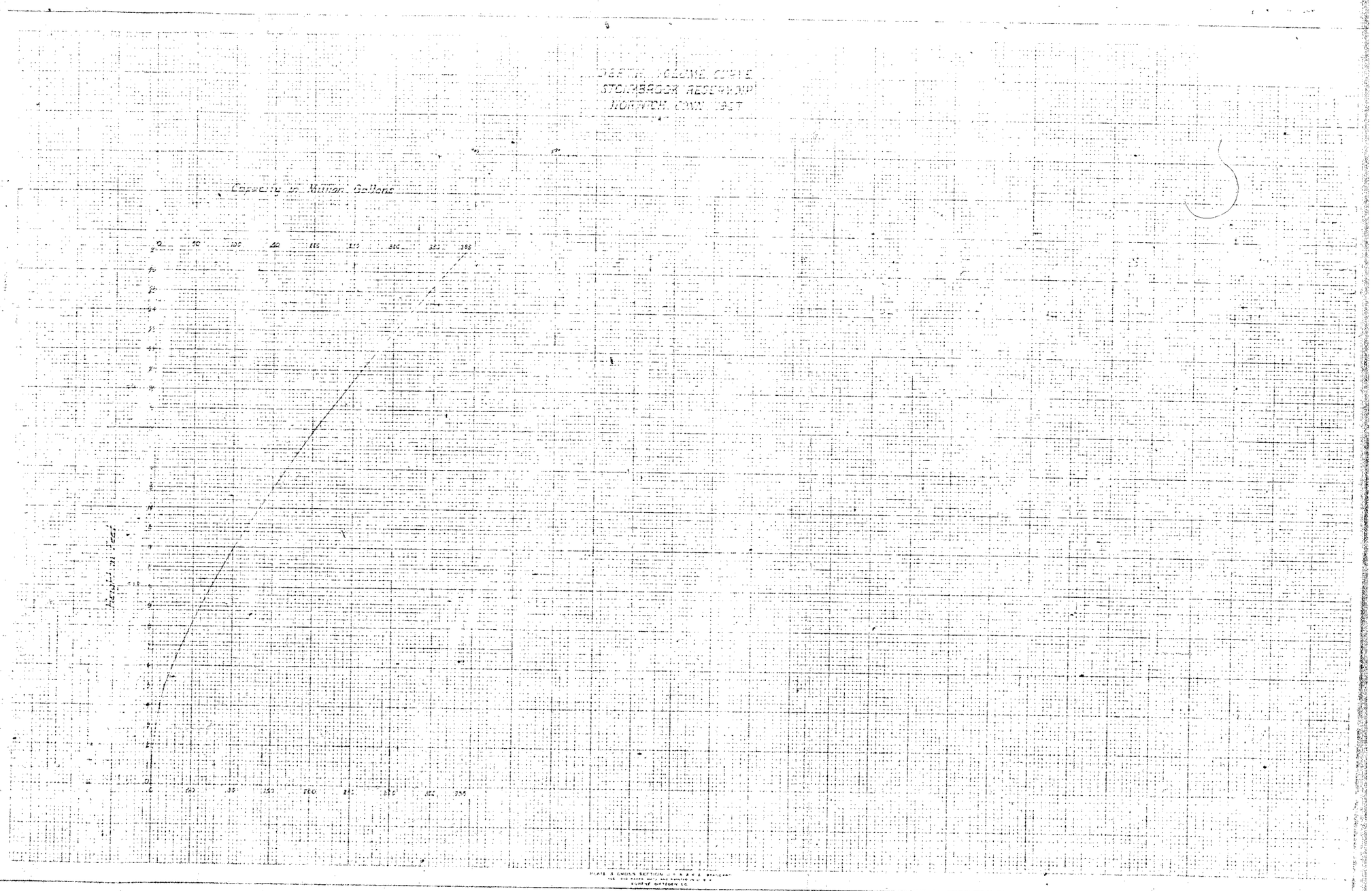
CROSS-SECTION ON LINE A.B.



REAR ELEVATION



SIDE ELEVATION


DEPTH VOLUME CURVE
STOMBROOK RESERVOIR
NORWICH, CONN. 1927
Capacity in Million Gallons
Height in Feet

BOARD OF WATER COMMISSIONERS.
CITY OF NORWICH.

STONY BROOK RESERVOIR — TOWN OF MONTVILLE

CONTOUR MAP

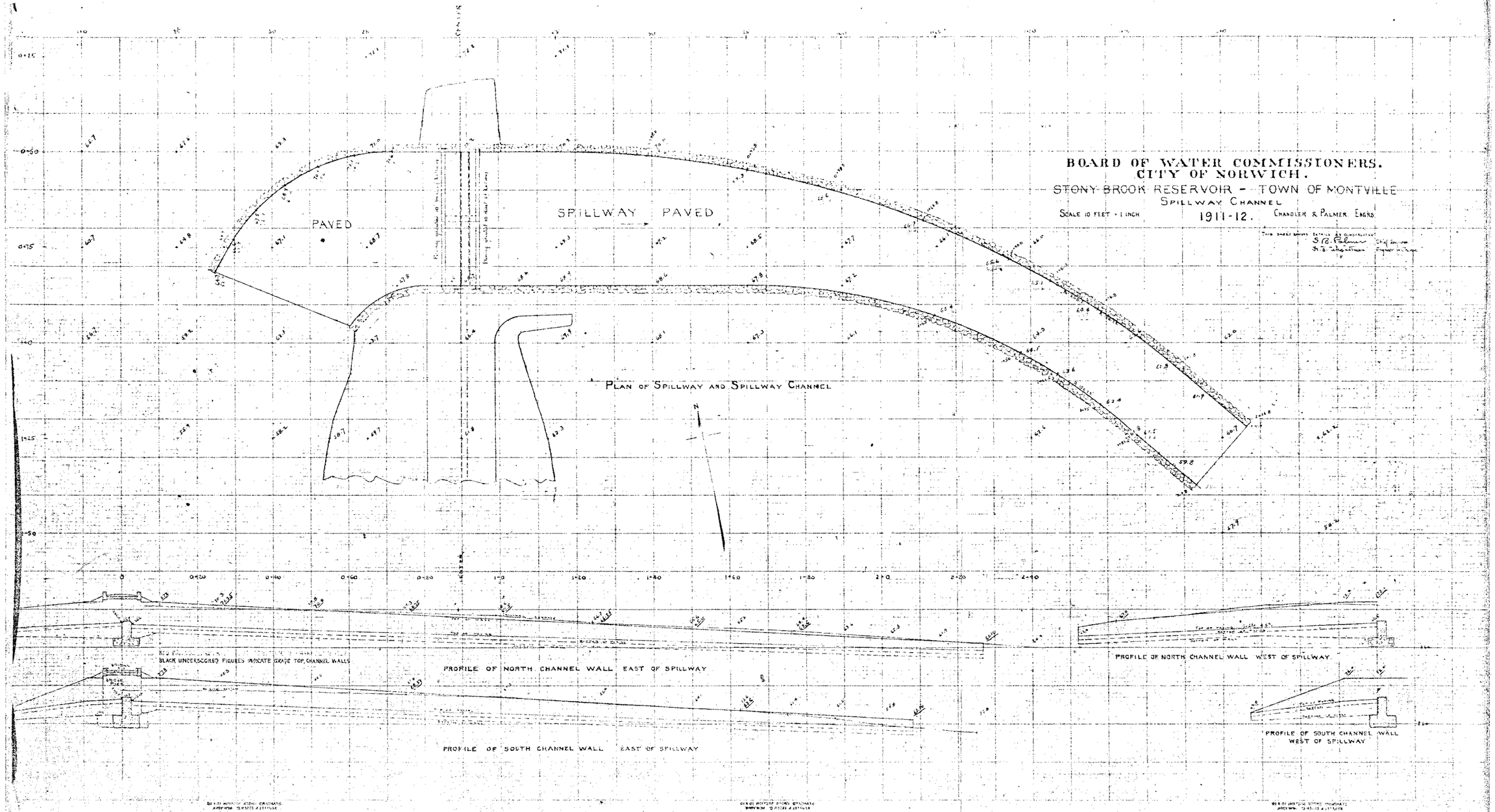
SCALE 100 FEET - 1 INCH

1911-12.

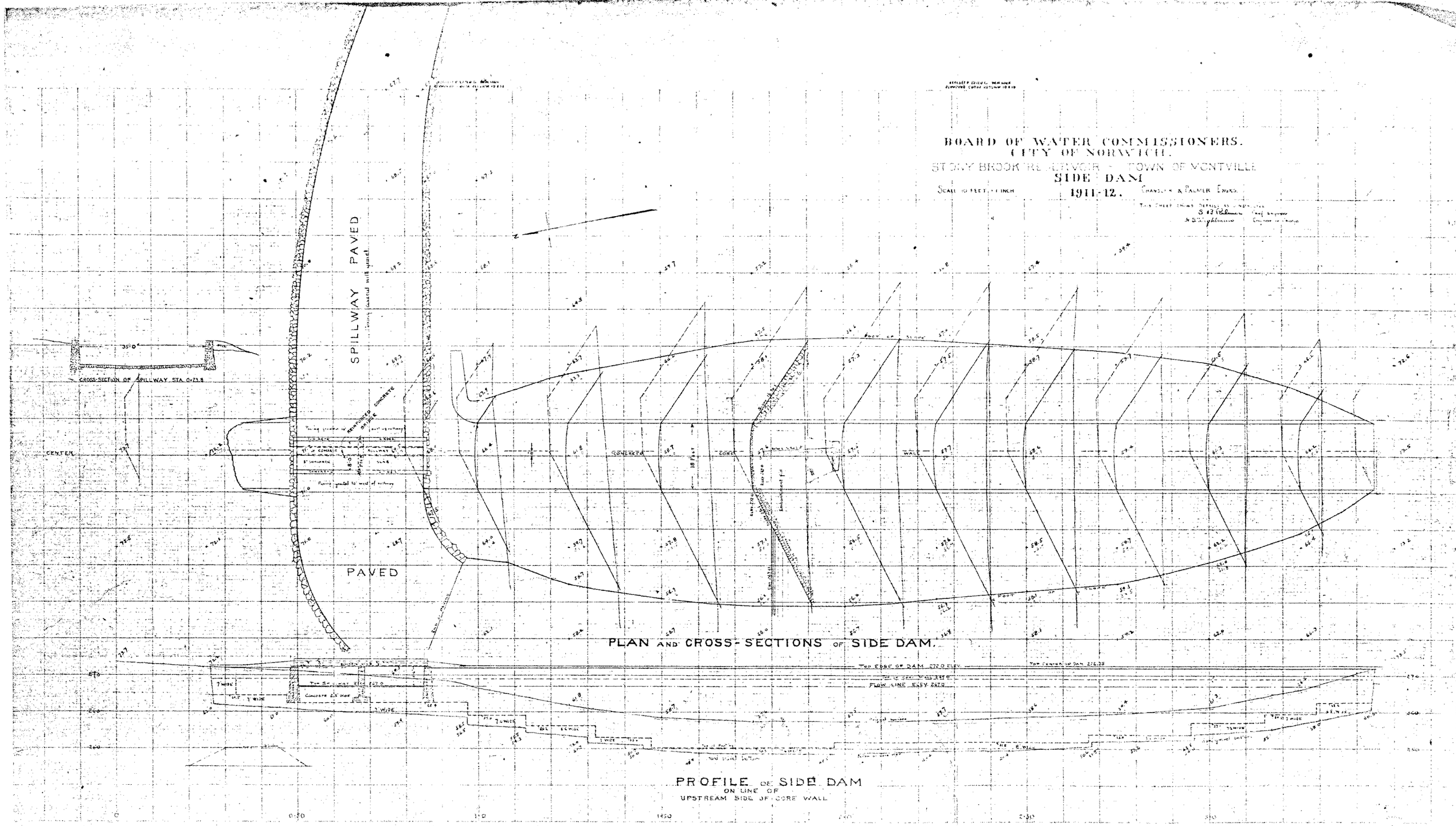
Chandler & Palmer, Engrs.

NOTE. FLOW LINE EL. 267.00
CAPACITY 385,000,000 GALLONS
AREA FLOWED 99.00 ACRES
DISTANCE AROUND 1.63 MILES
RESERVOIR CROSS SECTION 50 FEET SQUARES

B-53


BOARD OF WATER COMMISSIONERS.
CITY OF NORWICH.
STONY BROOK RESERVOIR - TOWN OF MONTVILLE
SPILLWAY CHANNEL
SCALE 10 FEET = 1 INCH
1911-12.
CHANDLER & PALMER ENGRS.
PAVED
SPILLWAY PAVED
PLAN OF SPILLWAY AND SPILLWAY CHANNEL
BLACK UNDERSCORED FIGURES INDICATE GRADE TOP CHANNEL WALLS
PROFILE OF NORTH CHANNEL WALL EAST OF SPILLWAY
PROFILE OF NORTH CHANNEL WALL WEST OF SPILLWAY
PROFILE OF SOUTH CHANNEL WALL EAST OF SPILLWAY
PROFILE OF SOUTH CHANNEL WALL WEST OF SPILLWAY

B-54


BOARD OF WATER COMMISSIONERS.
CITY OF NORWICH.
STONY BROOK RESERVOIR - TOWN OF MONTVILLE
SIDE DAM
1911-12.
SPILLWAY PAVED
PAVED
CROSS-SECTION OF SPILLWAY STA. 0+23.8
CENTER
CONCRETE
CORE
WALL
PLAN AND CROSS-SECTIONS OF SIDE DAM.
PROFILE OF SIDE DAM
ON LINE OF
UPSTREAM SIDE OF CORE WALL

B-55

Stony Brook Dam

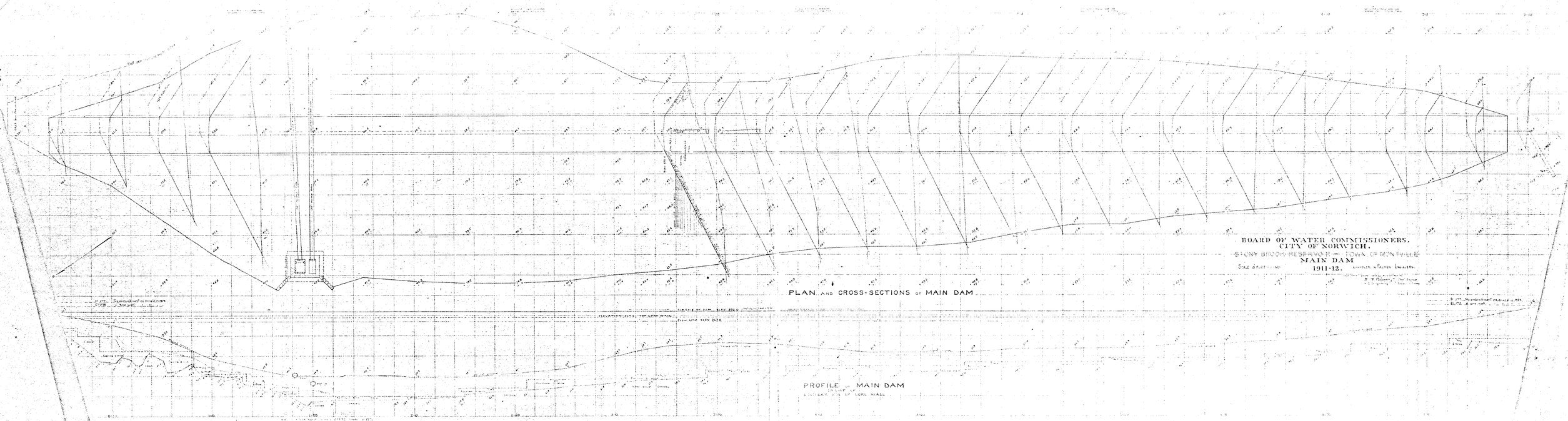
PROFILE OF WASTE PIPE LINE 260 FEET 24" PIPE

PROFILE OF SUPPLY PIPE LINE 255 FEET 24" PIPE

GATE AND SCREEN HOUSE

BOARD OF WATER COMMISSIONERS,
CITY OF NORWICH
STONY BROOK RESERVOIR - TOWN OF MONTVILLE
MAIN DAM
SCALE 10 FEET = 1 INCH 1911-12.
CHANDLER & PARKER, ENGINEERS

B-56



BOARD OF WATER COMMISSIONERS.
CITY OF NORWICH.
STONY BROOK RESERVOIR — TOWN OF MONTVILLE
MAIN DAM
1911-12.
SCALE 8 FEET = 1 INCH. LANDER & PALMER, ENGINEERS.

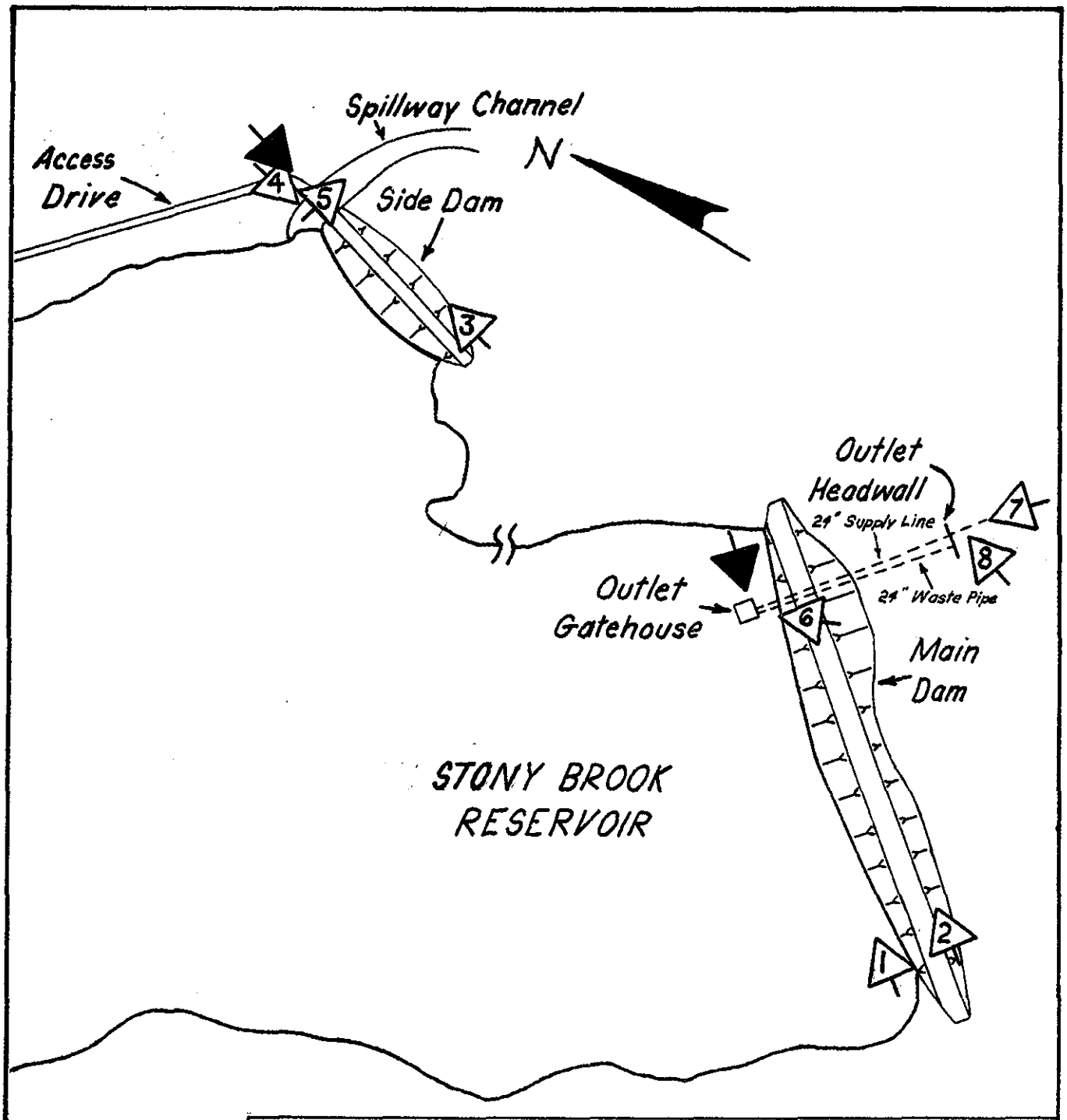
PLAN AND CROSS-SECTIONS OF MAIN DAM

PROFILE OF MAIN DAM

B-57

APPENDIX C

PHOTOGRAPHS



Overview Photos →

Appendix 'C' Photos →

LOUIS BERGER & ASSOC., INC WELLESLEY, MASS. ARCHITECT · ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

STONY BROOK RESERVOIR DAM

SKETCH PLAN SHOWING LOCATION & ORIENTATION OF PHOTOS

STATE - CT.

			SCALE
			DATE

1. Upstream face of "Main Dam" from right abutment.

2. Downstream face of "Main Dam" from right abutment.

3. Crest and downstream face of "Side Dam".

4. Spillway and upstream face of "Side Dam".

5. Spillway discharge channel from bridge.

6. Gate house with service bridge under water.

7. End of 24 in. dia. outlet pipe through "Main Dam".

8. Seepage about 40 ft. below toe of "Main Dam".

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

BY IKH DATE 4/4/79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF

CHKD. BY DATE INSPECTION OF DAMS - CONN & RI PROJECT

SUBJECT STONY BROOK RESERVOIR - DRAINAGE AREA

FIND: ENTIRE AREA ABOVE RESERVOIR

PLANIMETER No 365
INDEX @ 89.9
1.0 = 1 sq in.

USGS Sheet	Ave Reading (sq in)
Montville, Conn	12.00
Fitchville, Conn	5.89
	17.89

Scale: $(1")^2 = (2{,}000')^2$ 4,000,000 sq ft/sq in

$$\text{Area} = \frac{17.89 \text{ sq in} \times 4{,}000{,}000 \text{ sq ft/sq in}}{43{,}560 \text{ sq ft/Acre}} = \boxed{1{,}642.79 \text{ Acres}}$$

$$1{,}642.79 \div 640 \text{ Acres/sq mi} = \boxed{2.57 \text{ sq mi}}$$

BY REB DATE 11/6/79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF

CHKD. BY DATE INSPECTION OF DAMS PROJECT

SUBJECT STONEY BROOK RESERVOIR, STORAGE CAPACITY

AREA @ SPILLWAY CREST, ELEV 272.0

READ #2 52.87 READ #3 53.67 AVE = 0.815
" #1 52.04 " #2 52.87 AREA = 74.9 ACRES
0.83 0.80

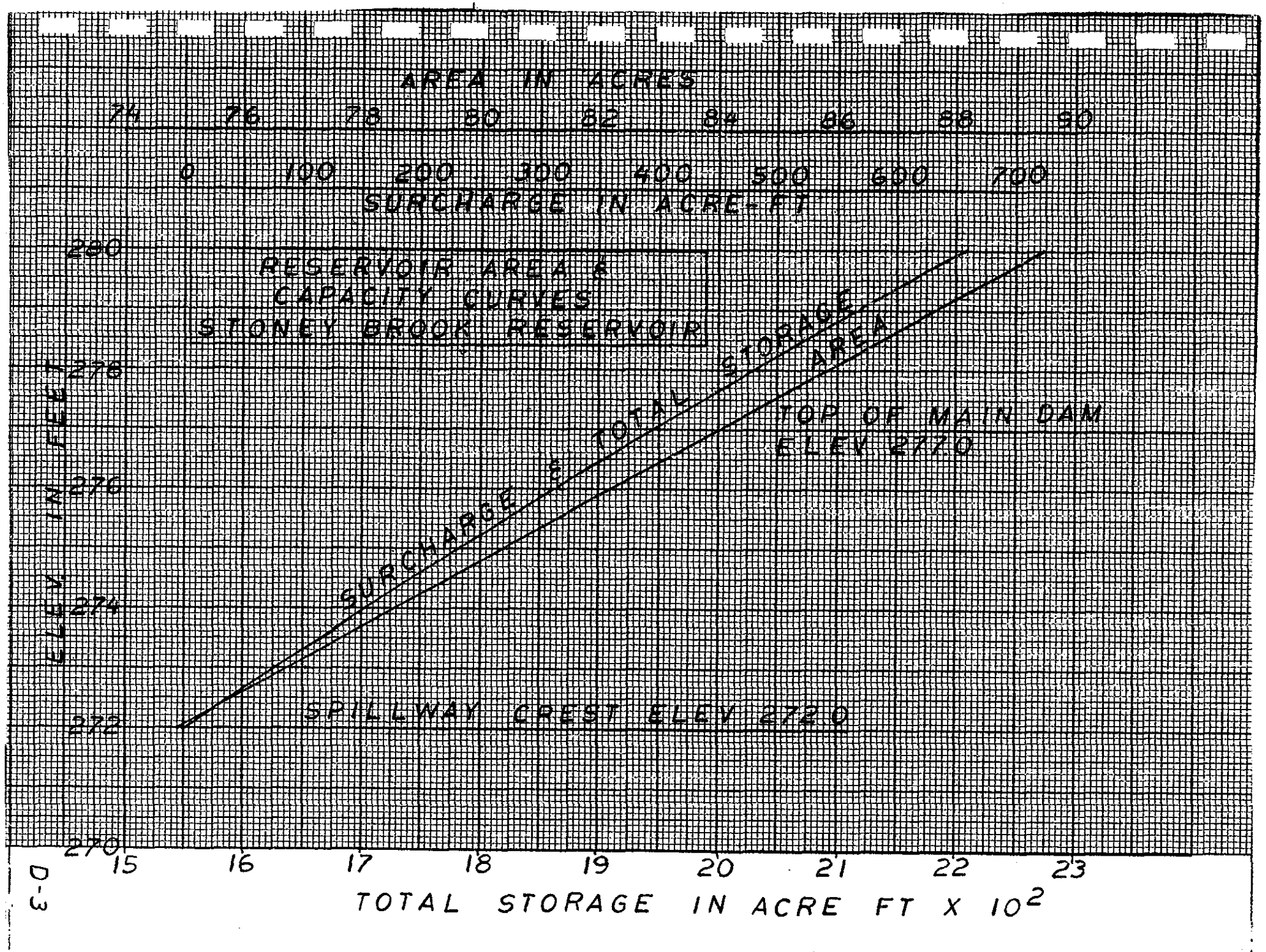
AREA @ ELEV 280

READ #2 82.20 READ #3 83.18 READ #4 84.15
" #1 81.35 " #2 82.20 " #3 83.18
.85 .98 0.97

AVE = 0.975
AREA = 89.5

ELEV	AREA	AVE AREA	Δh	Δ STORAGE	TOTAL STORAGE	SURCHARGE STORAGE
272	74.9				* 1550	
273	76.7	75.8	1	76	1626	76
274	78.6	77.65	1	78	1704	154
275	80.4	79.5	1	80	1784	234
276	82.2	81.3	1	81	1866	315
277	84.0	83.1	1	83	1948	398
278	85.8	84.9	1	85	2033	483
279	87.7	86.75	1	87	2120	570
280	89.5	88.6	1	89	2209	659

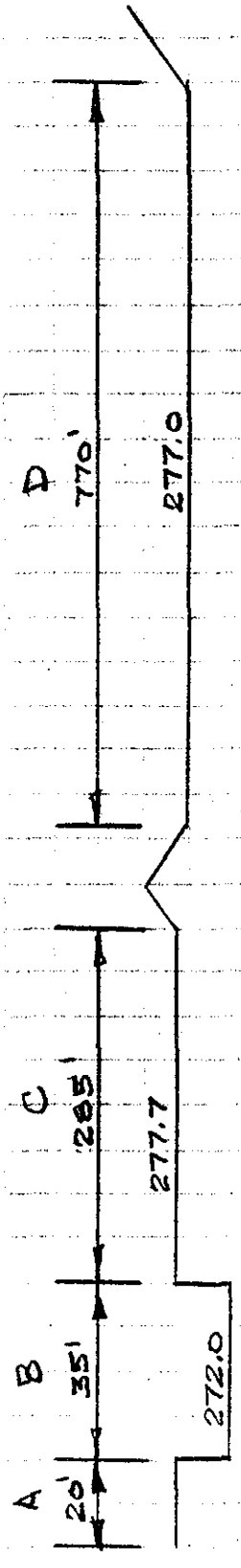
* FROM CITY OF NORWICH CAPCITY CURVE


AREA IN ACRES
74 76 78 80 82 84 86 88 90
0 100 200 300 400 500 600 700
SURCHARGE IN ACRE-FT
RESERVOIR AREA &
CAPACITY CURVES
STONEY BROOK RESERVOIR
SURCHARGE & TOTAL STORAGE
AREA
TOP OF MAIN DAM
ELEV 277.0
SPILLWAY CREST ELEV 272.0
ELEV. IN FEET
280
278
276
274
272
270
15 16 17 18 19 20 21 22 23
TOTAL STORAGE IN ACRE FT X 10²

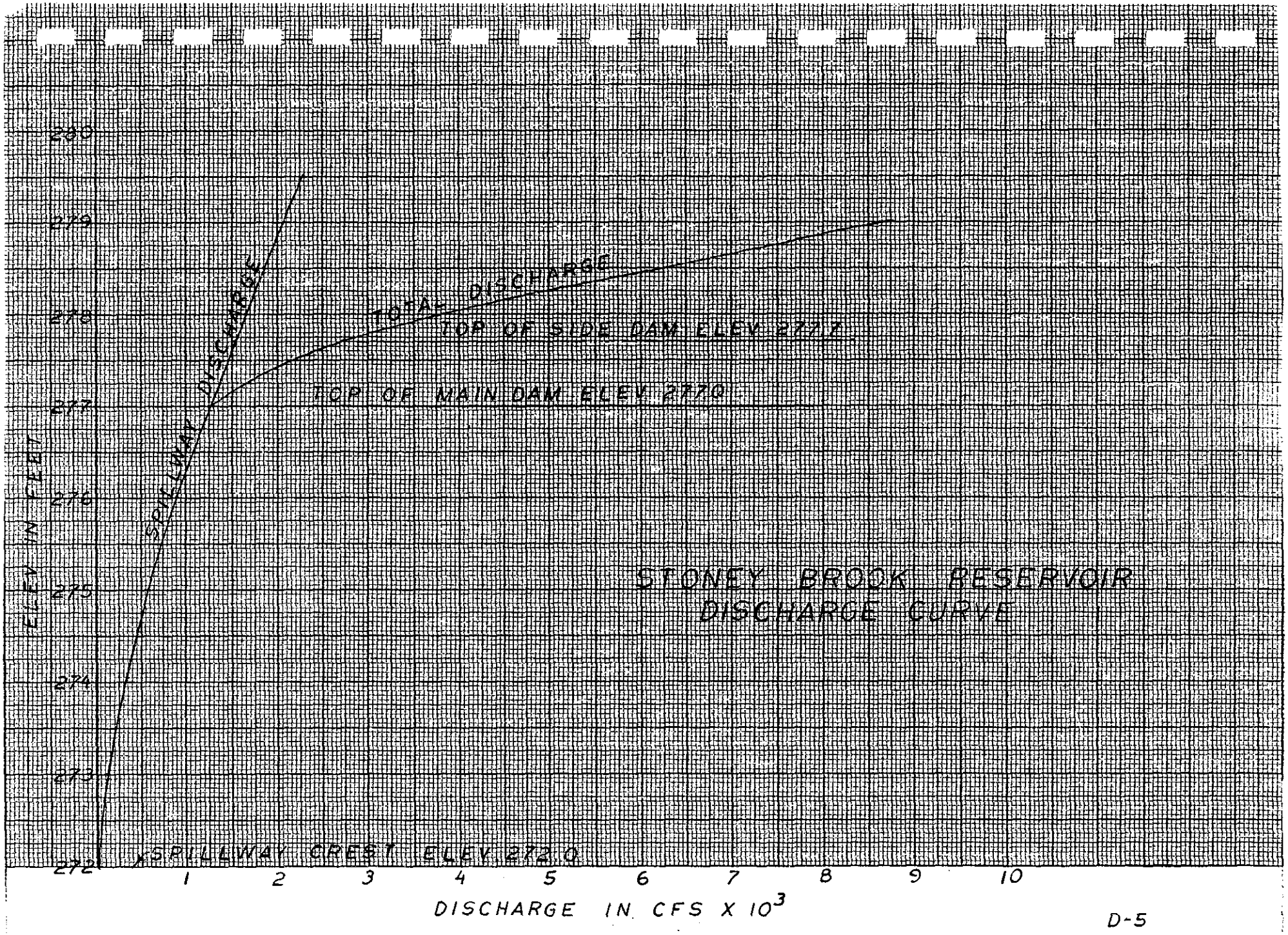
BY RFB DATE 11-7-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF

CHKD. BY DATE Inspection of Dams PROJECT

SUBJECT Stoney Brook Reservoir, Discharge Capacity



ELEV. FT.	A+C, C=2.7		B, C=3.2		D, C=2.7			
	L	H	L	Q	L	H	Q	ΣQ
272	305	0	35	0	770	0	0	0
273		0		112		0	0	110
274		0		317		0	0	320
275		0		582		0	0	580
276		0		896		0	0	900
277		0		1252		0	0	1250
277.7		0		1525		.7	1217	2740
278		.3		1646		1	2079	3860
278.5		.8		1856		1.5	3819	6260
279		1.3		2074		2	5880	9170
279.5		1.8		2300		2.5	8218	12510
	1221							
	1989							


STONEY BROOK RESERVOIR
DISCHARGE CURVE
TOTAL DISCHARGE
TOP OF SIDE DAM ELEV 277.2
TOP OF MAIN DAM ELEV 277.0
SPILLWAY CREST ELEV 272.0
ELEVATION IN FEET
DISCHARGE IN CFS X 10³
280
279
278
277
276
275
274
273
272
1
2
3
4
5
6
7
8
9
10

BY RFB DATE 9-11-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF

CHKD. BY DATE INSPECTION OF DAMS PROJECT

SUBJECT STONY BROOK RESERVOIR, INFLOW HYDROGRAPH

DRAINAGE AREA (TOTAL) = 2.57 sq. mi = 1645 ACRES

BY INSPECTION RESERVOIR AREA < 25% D.A.

NOW LENGTH OF LONGEST WATER COURSE, L = 13,600
L = 2.58 MI

& ELEV DIFFERENCE = 600 - 273 = 327 FT

$\therefore$ SLOPE = $\frac{327}{2.58}$ = 126.7 FT/MI & $\sqrt{S}$ = 11.26

NOW $\frac{L L_c}{\sqrt{S}} = \frac{(2.58)(2.58)}{2(11.26)} = 0.296$

$\left(\frac{L L_c}{\sqrt{S}}\right)^{.33} = (.296)^{.33} = 0.669$

$LAG = K\left(\frac{L L_c}{\sqrt{S}}\right)^{.33} = 0.669\,K$

ASSUME K = 5.0 HRS (REFER TO "CURVE B" MOUTAINOUS REGION, MIXED TERRAIN, BOC REC)

$LAG = 5.0(.669) = 3.35$ HRS

$T_p = 0.41D + .82\,LAG$, WHERE D = 1.0 HRS

$T_p = 0.41(1) + .82(3.35)$

$T_p = 0.41 + 2.58 = 2.99$ HRS

CHECK VELOCITY $T_c = \frac{T_p - .5D}{0.6}$

$T_c = \frac{2.99 - .5}{0.6} = 4.15$ HRS

$V = \frac{13,600}{(4.15)3600} = 0.91$ FT/SEC O.K.

$T_R = 1.67\,T_p = 1.67(2.99) = 4.99$ HRS

$T_B = T_p + T_B = 2.99 + 4.99 = 7.98$ HRS

---

q_p = PEAK RATE IN CFS

$$q_p = \frac{484\,A\,Q}{T_p}$$

A = DRAINAGE AREA

Q = RUNOFF IN INCHS

$$q_p = \frac{484\,(2.57)(1)}{2.99} = 416 \text{ CFS}$$

PMP = PROBABLE MAXIMUM PRECIPITATION

$= 24''\,(0.8) = 19.2''$ FOR CONNECTICUT

$= 18.8''$ CONSIDERING INFILTRATION FOR OVERLAND FLOW

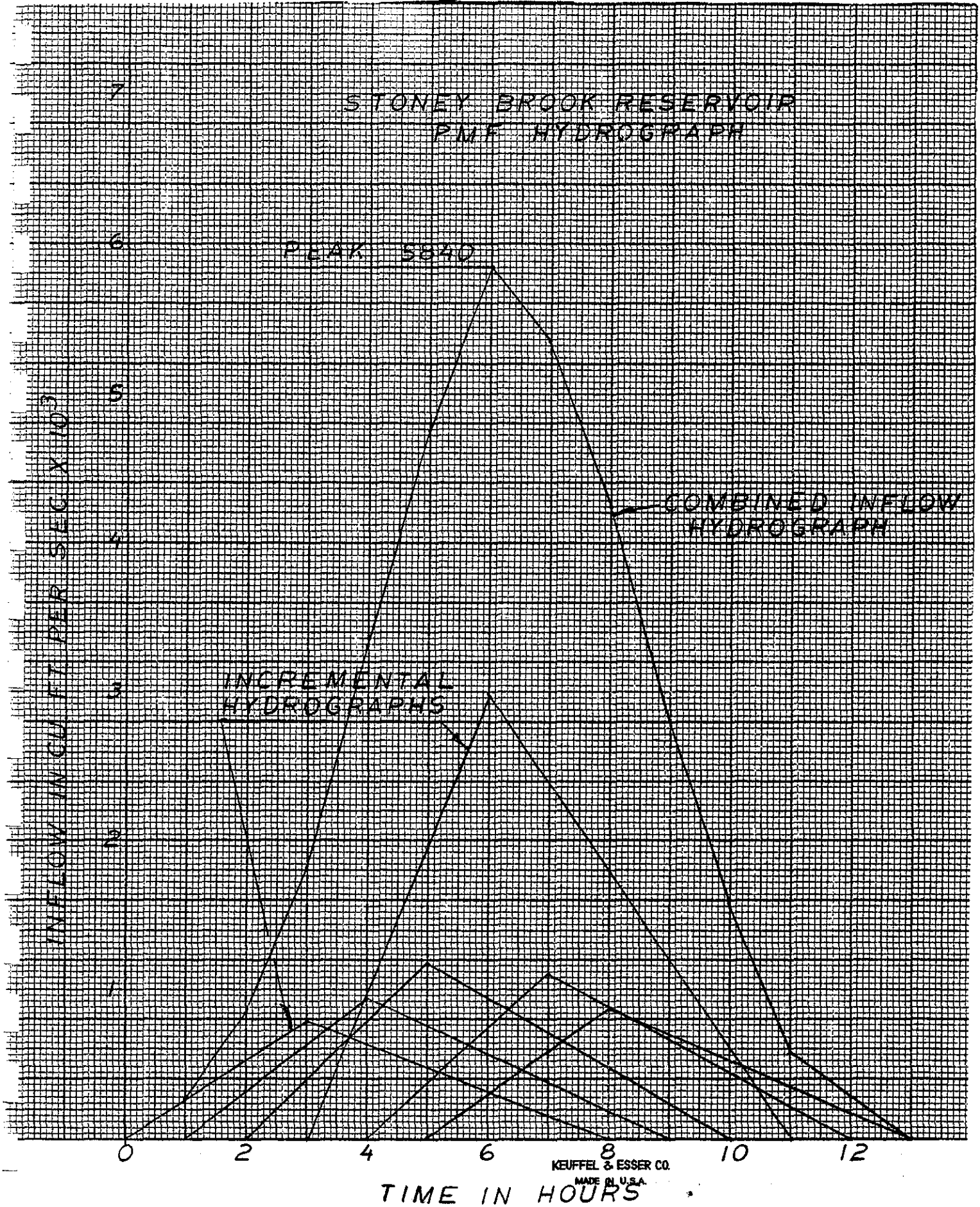
BY RFB DATE 9-11-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 3 OF
CHKD. BY DATE INSPECTION OF DAMS PROJECT
SUBJECT STONEY BROOK RESERVOIR, INFLOW HYDROGRAPH

FLOOD HYDROGRAPH FOR PMF

$q_p = 416$

TIME (HOURS)	RAINFALL *%	RAINFALL INCHS	Q_p CFS	TIME BEGIN	TIME PEAK	TIME END
0.0	-					
1.0	10	1.88	782	0	2.99	7.98
2.0	12	2.26	940	1.0	3.99	8.98
3.0	15	2.82	1173	2.0	4.99	9.98
4.0	38	7.14	2970	3.0	5.99	10.98
5.0	14	2.63	1094	4.0	6.99	11.98
6.0	11	2.07	861	5.0	7.99	12.98

* DISTRIBUTION OF MAXIMUM 6 HOUR SPS OR PMP IN PERCENT OF 6 HOUR AMOUNT PER EM 1110-2-1411


STONEY BROOK RESERVOIR
PMF HYDROGRAPH
PEAK 5840
COMBINED INFLOW HYDROGRAPH
INCREMENTAL HYDROGRAPHS
INFLOW IN CUBIC FEET PER SECOND X 10³
7
6
5
4
3
2
1
0
2
4
6
8
10
12
KEUFFEL & ESSER CO.
MADE IN U.S.A.
TIME IN HOURS

BY RFB DATE 11-7-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF

CHKD. BY DATE INSPECTION OF DAMS PROJECT

SUBJECT STONEY BROOK RESERVOIR, RESERVOIR ROUTING

DRAINAGE AREA = 2.57 MI² = 1645 ACRES

SIZE CLASSIFICATION - INTERMEDIATE

MAXIMUM STORAGE = 1948 ACRE-FT
HEIGHT = 36 FT

HAZARD CLASSIFICATION = HIGH
OCE GUIDELINES, USE PMF

FROM INFLOW HYDROGRAPH, PMF = 5840 CFS

STEP 1: Q_{P1} = 5840 CFS

STEP 2a: ELEV = 278.42 FT

STEP 2b: SURCHARGE VOLUME = 518 ACRE-FT

$$\text{INCHES RUNOFF} = \frac{518 \text{ ACRE-FT}}{1645 \text{ ACRES}} \times 12 \text{ IN/FT} = 3.78''$$

STEP 2c

$$Q_{P2} = 5840 \times \left(1 - \frac{3.78}{19}\right) =$$

$$= 5840 \, (1 - 0.199)$$

$$= 4678 \text{ CFS}$$

STEP 3a FOR Q = 4,678

SURCHARGE HEIGHT = 278.19

SURCHARGE VOLUME = 495 ACRE-FT.

INCHES OF RUNOFF = $\frac{495}{1645} \times 12\ IN/FT = 3.61$ INCHES

STEP 3b

AVE STOR = $\frac{3.78 + 3.61}{2} = 3.695$ INCHES

AVE. SURCHARGE = $\frac{3.695 \times 1645}{12\ IN/HR} = 506$ ACRE-FT

FROM STAGE-STORAGE CURVE :. STAGE = 278.3 FT

FROM STAGE-DISCHARGE CURVE :. $Q_{P3} = 5{,}200$ CFS

PMF OVERTOPS MAIN DAM BY 278.3 - 277 = 1.3 FT

PMF OVERTOPS SIDE DAM BY 278.3 - 277.7 = 0.5 FT

TRY 1/2 PMF = 2,920 CFS

STEP 1: $Q_{P1} = 2920$ CFS

STEP 2a: SURCHARGE HEIGHT = 277.76'

STEP 2b: SURCHARGE VOLUME = 460 ACRE-FT

INCHES OF RUNOFF = $\frac{460\ ACRE\cdot FT}{1645} \times 12\ IN/HR = 3.36$"

STEP 2c: $Q_{P2} = 2920\left(1 - \frac{3.36}{9.5}\right) =$

$= 2920\,(1 - 0.357)$

$= 1878$ CFS

STEP 3a: FOR Q = 1,878 CFS

SURCHARGE HEIGHT = 277.48

SURCHARGE VOLUME = 435 ACRE-FT

INCHS OF RUNOFF = $\frac{435}{1645} \times 12\ IN/HR = 3.17$ INCHS

STEP 3b AVE STOR $\frac{3.36 + 3.17}{2} = 3.26$ INCHS

AVE SURCHARGE = $\frac{3.265 \times 1645}{12\ IN/HR} = 448$ ACRE-FT

FOR 448 ACRE-FT

SURCHARGE HEIGHT = 277.6 FT

FROM STAGE DISCHARGE CURVE: $Q_{P3} = 2{,}420$

1/2 PMF OVERTOPS MAIN DAM BY 0.6 FT
1/2 PMF DOES NOT OVERTOP SIDE DAM

BY RFB DATE 11-8-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 1 OF

CHKD. BY DATE INSPECTION OF DAMS PROJECT

SUBJECT STONEY BROOK RESERVOIR, FAILURE ANALYSIS

STEP 1: RESERVOIR ELEV @ FAILURE = 277.0
WATER AT TOP OF MAIN DAM
STORAGE = 1948 ACRE-FT.

HEIGHT = 36 FT.
W = 40% OF 770 FT = 308 FT

STEP 2: PEAK FAILURE OUTFLOW

$$Q_{P1} = 8/27\, W \sqrt{g}\, Y_o^{3/2}$$

$$Q_{P1} = 1.68\,(308)(36)^{3/2}$$

$$Q_{P1} = 111{,}767$$

ADD SPILLWAY FLOW: $Q_{SPILLWAY} = 1{,}250$ CFS

$$Q_{P1\,TOTAL} = 111{,}767 + 1{,}250 = 113{,}017$$

SAY $Q_{P1} = 113{,}000$ CFS

REACH #1, STA 0+00 TO 42+00

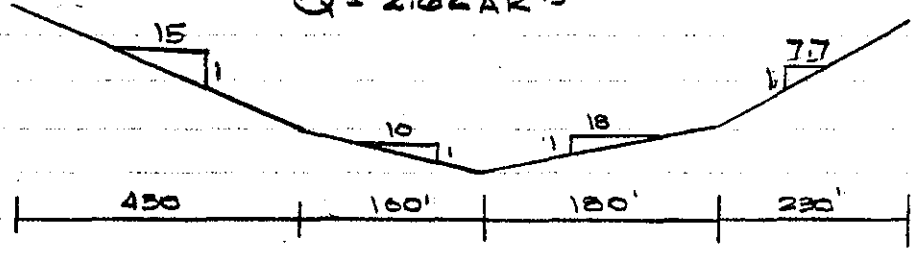
$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

$$n = 0.08$$

$$Q = 2.62\, A R^{2/3}$$

$$S = \frac{250-170}{4000} = 0.02$$

$$S^{1/2} = 0.141$$

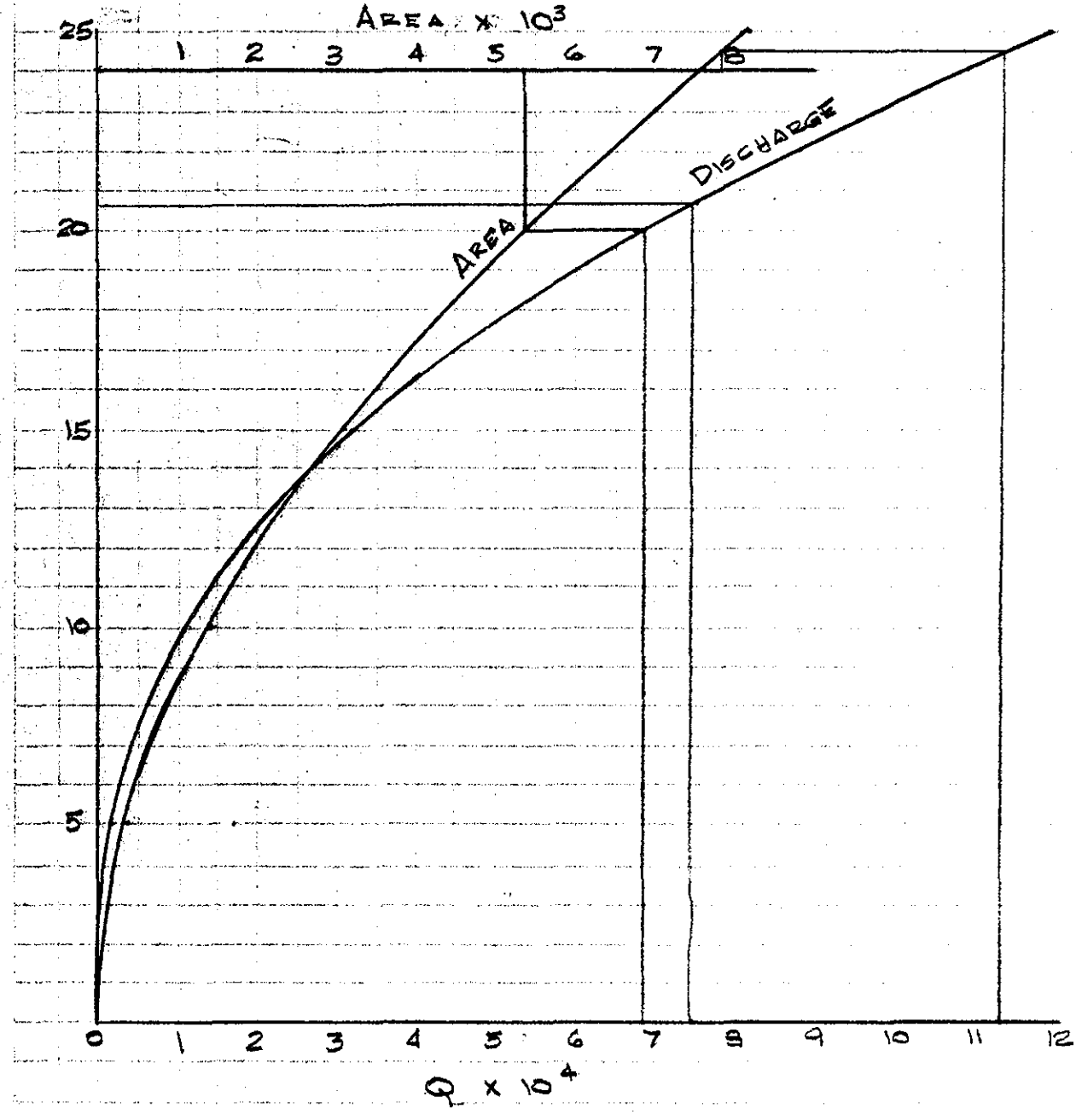


BY RFB DATE 11-8-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 2 OF ...

CHKD. BY ... DATE ... INSPECTION OF DAMS PROJECT ...

SUBJECT STONEY BROOK RESERVOIR, FAILURE ANALYSIS

ELEV	ΔAREA	AREA	P	R	$R^{2/3}$	Q
5	350	350	140.3	2.49	1.84	1687
10		1400	280.6	4.99	2.92	10,710
15	1684	3084	394.6	7.82	3.94	31835
20		5335	508.6	10.49	4.80	67,092
25		8153	622.6	13.06	5.56	118,766



FOR Q = 113,000, STAGE = 24.4', AREA = 7820 □

$$V_1 = \frac{7820 \times 4200}{43{,}560} = 772 \text{ ACRE·FT}$$

$$Q_{p2\,(TRIAL)} = 113{,}000\left(1 - \frac{772}{1948}\right)$$

$$= 68{,}218 \text{ CFS}$$

FOR Q = 68,200, STAGE = 20.0, AREA = 5350 □

$$V_2 = \frac{5350 \times 4200}{43{,}560} = 528 \text{ ACRE·FT}$$

$$V_{AVE} = \frac{772 + 528}{2} = 665 \text{ ACRE·FT}$$

$$Q_{p2} = 113{,}000\left(1 - \frac{665}{1948}\right)$$

STA 428, Q_{p2} = 74,424 CFS, STAGE 20.7 FT, ΔH = 16.7 FT

REACH 2 STA 42+00 TO 110+00

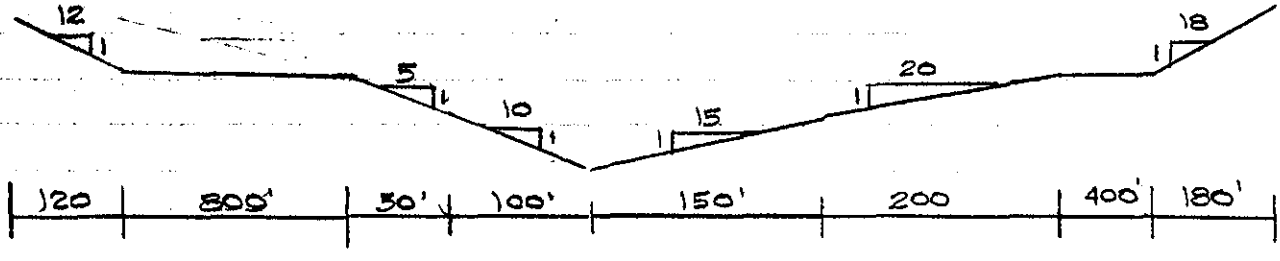
$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

$$n = 0.05$$

$$Q = 2.50\, A R^{2/3}$$

$$S = \frac{170 - 120}{7100} = .007$$

$$S^{1/2} = .084$$

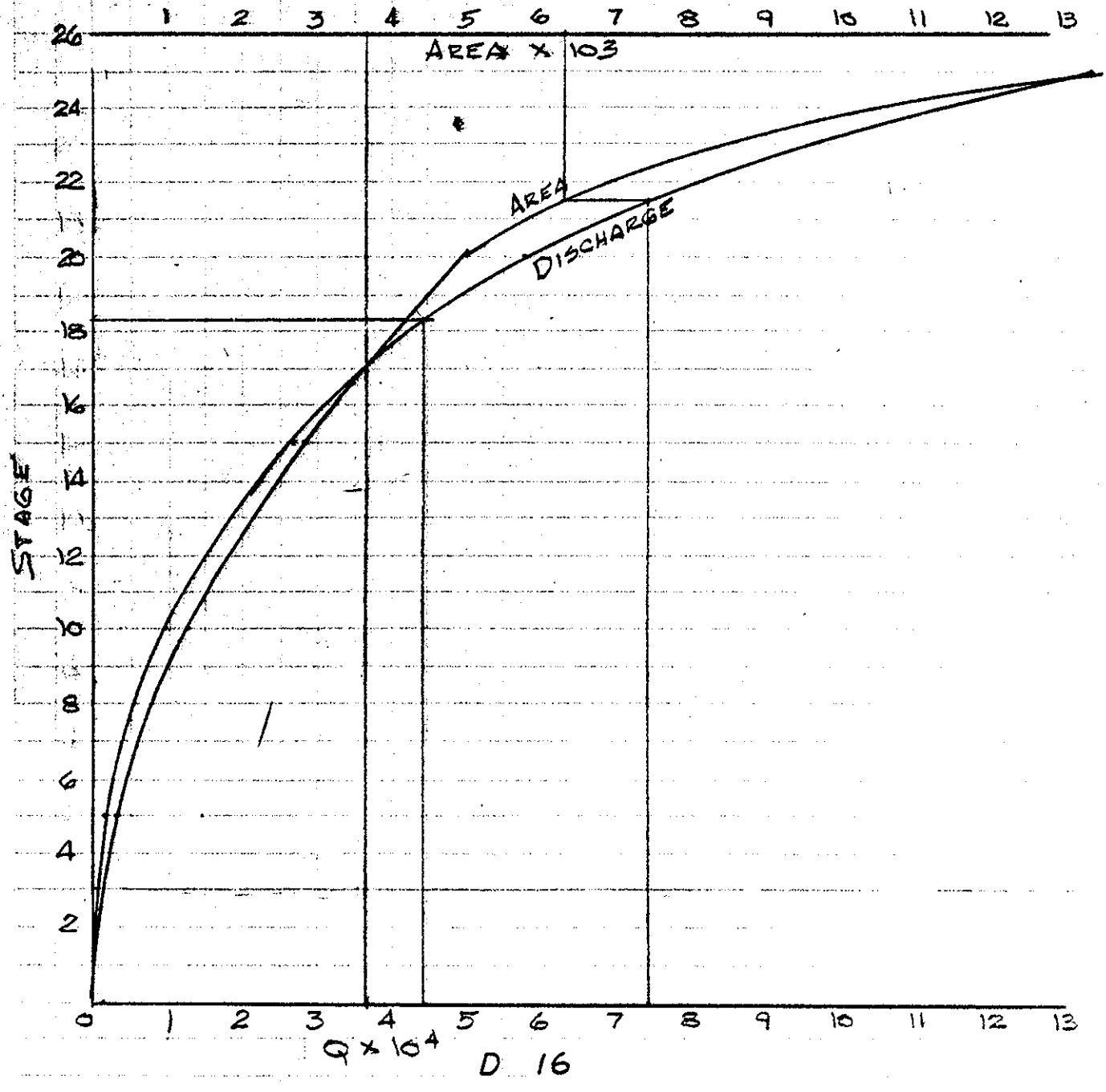


BY RFB DATE 11-8-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 4 OF

CHKD. BY DATE INSPECTION OF DAMS PROJECT

SUBJECT STONEY BROOK RESERVOIR, FAILURE ANALYSIS

ELEV.	Δ AREA	AREA	P	R	$R^{2/3}$	Q
5	312	312	125.4	2.49	1.84	1435
10		1250	250.8	4.98	2.92	9125
15		2812	376.4	7.47	3.82	26854
20		5000	502	9.96	4.63	57875
25		13875	1852	7.49	3.83	132,853



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FOR $Q = 74,424$, STAGE $= 21.5'$, AREA $= 6,300$

$$V_1 = \frac{6,300 \times 6,800}{43,560} = 983 \text{ ACRE-FT}$$

$$Q_{P2(TRIAL)} = 74,424\left(1 - \frac{983}{1948}\right)$$

$$= 36,868 \text{ CFS}$$

FOR $Q = 36,868$, STAGE $= 17.0$, AREA $= 3,650$

$$V_2 = \frac{3650 \times 6800}{43,560} = 570 \text{ ACRE-FT}$$

$$V_{AVE} = \frac{983 + 570}{2} = 776 \text{ ACRE-FT}$$

$$Q_{P2} = 74,424\left(1 - \frac{776}{1948}\right)$$

$Q_{P2} = 44,777$, STAGE $= 18.7$ FT $\quad \Delta H \cong 13.7$ FT

REACH #3 STA 110+00 TO 150+00

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

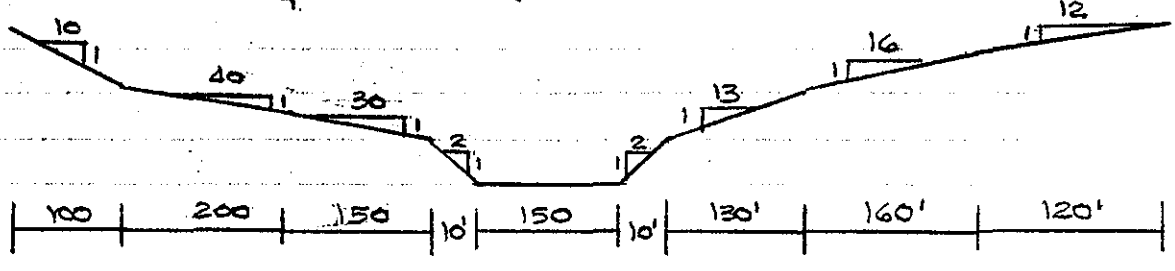
$n = .08$

$$Q = 1.86\, A R^{2/3}$$

$$S = \frac{120 - 80}{4000}$$

$S = 0.01$

$S^{1/2} = 0.1$

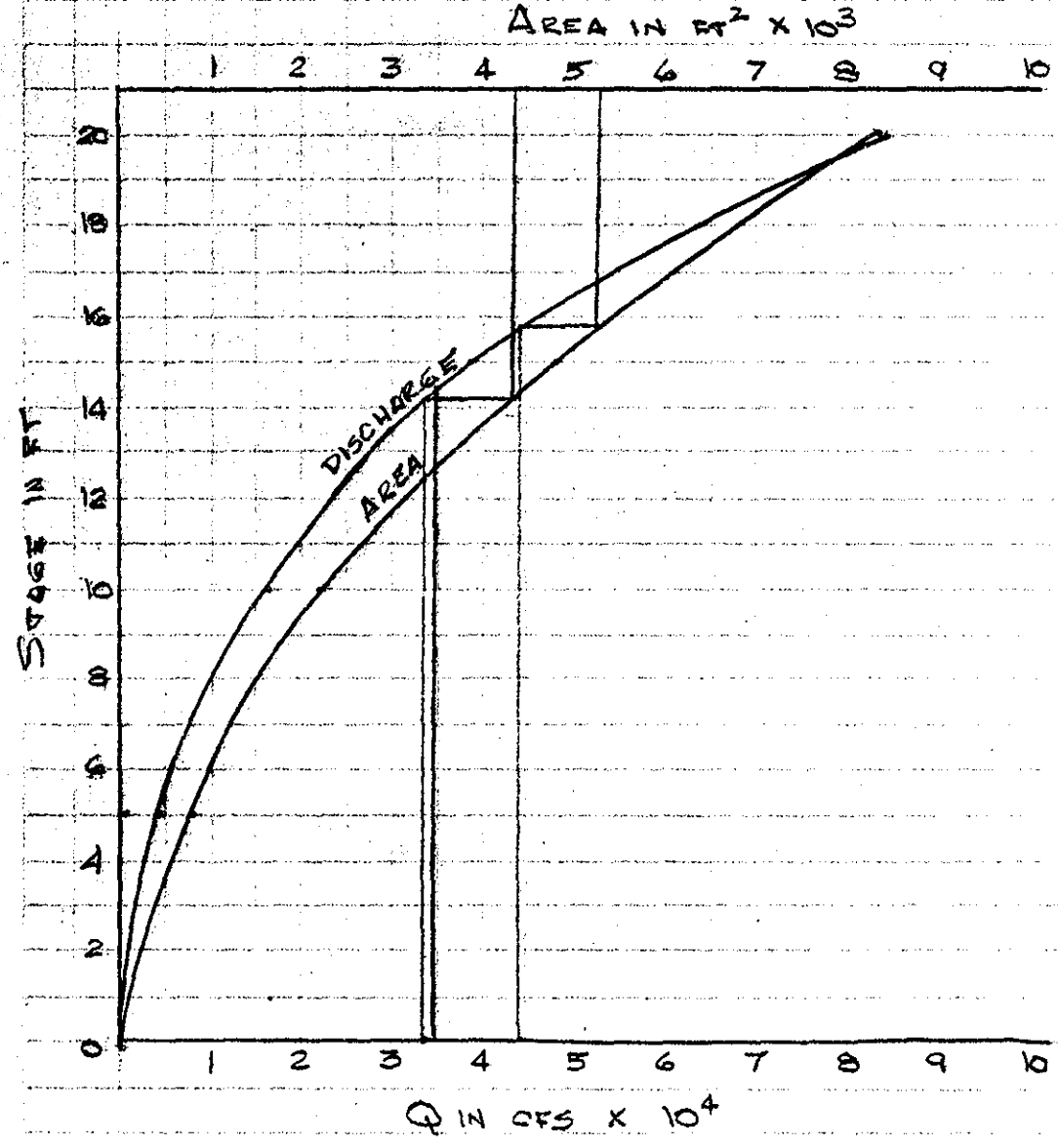


BY RFB DATE 11-13-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 6 OF ___

CHKD. BY ___ DATE ___ INSPECTION OF DAMS PROJECT ___

SUBJECT STONEY BROOK RESERVOIR, FAILURE ANALYSIS

STAGE	AREA	P	R	$R^{2/3}$	Q
5	800	172.4	4.64	2.78	4136
10	2187	268	8.16	4.06	16,515
15	4775	533.2	8.95	4.31	38,279
20	8250	663.6	12.58	5.41	84,022



FOR $Q = 44{,}777$, STAGE = 15.8 FT, AREA = 5,250

$$V_1 = \frac{5250 \times 4000}{43{,}560} = 482 \text{ ACRE·FT}$$

$$Q_{p_2(TRIAL)} = 44{,}777 \left(1 - \frac{482}{1948}\right)$$

$$= 33{,}698 \text{ CFS}$$

FOR $Q = 33{,}698$, STAGE = 14.2 FT, AREA = 4,320

$$V_2 = \frac{4320 \times 4000}{43{,}560} = 397 \text{ ACRE·FT}$$

$$V_{AVE} = \frac{482 + 397}{2} = 440 \text{ ACRE·FT}$$

$$Q_{p_2} = 44{,}777 \left(1 - \frac{440}{1948}\right)$$

$Q_{p_2} = 34{,}663$ STAGE = 14.4 FT, $\Delta H \cong 12$ FT

REACH 4 STA 150+00 TO 184+00

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

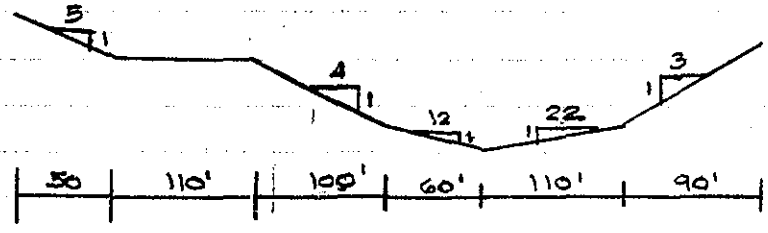
$n = 0.08$

$$Q = 1.75 A R^{2/3}$$

$$S = \frac{80 - 50}{3400}$$

$S = 0.009$

$S^{1/2} = 0.094$

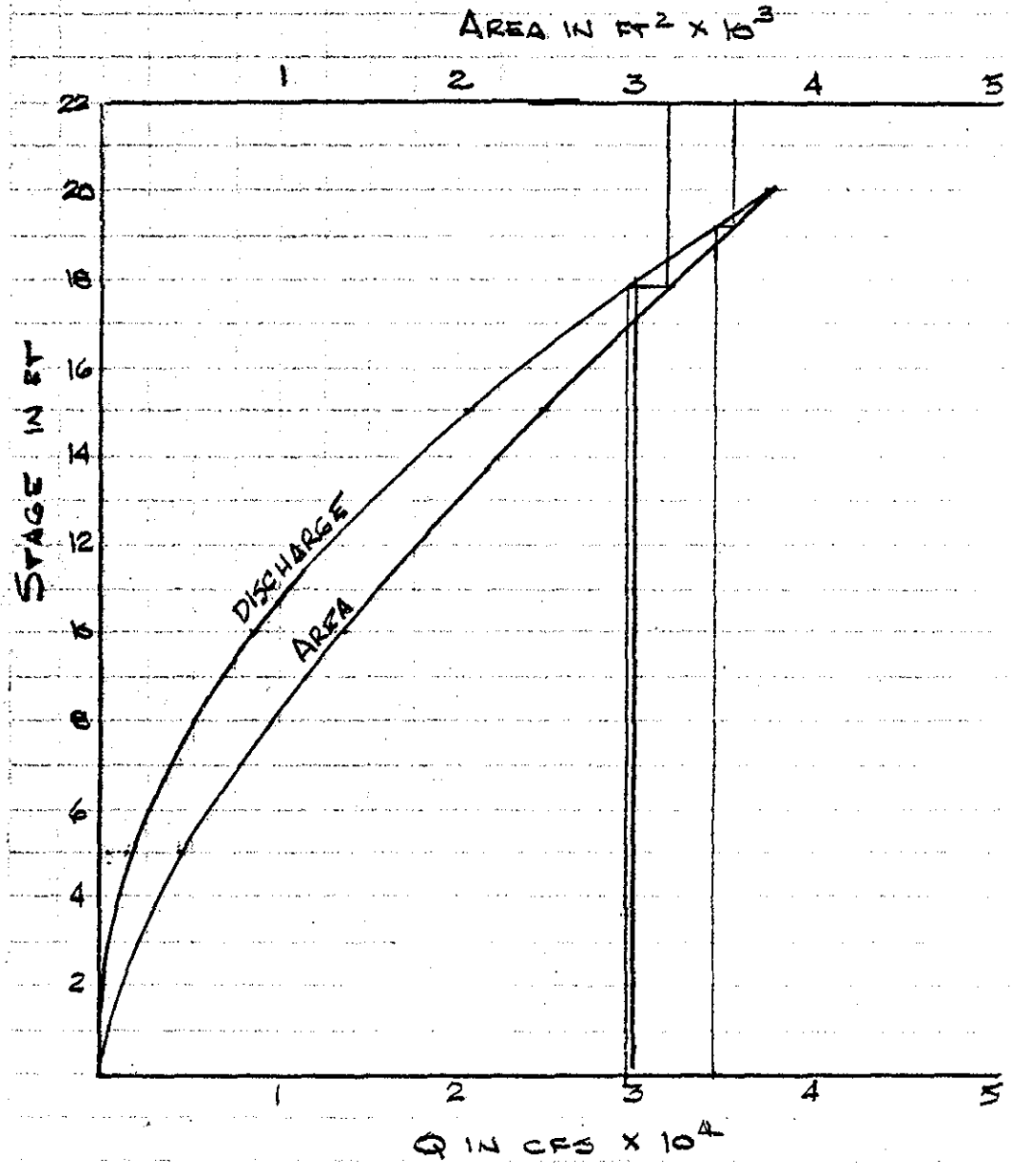


BY RFB DATE 11-13-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 8 OF

CHKD. BY DATE Inspection of Dams PROJECT

SUBJECT Stoney Brook Reservoir, Failure Analysis

Stage	Area	P	R	$R^{2/3}$	Q
5	425	170.3	2.50	1.84	1368
10	1362	206.7	6.59	3.52	8390
15	2475	243.1	10.2	4.70	20356
20	3762	279.5	13.46	5.66	37,262



FOR $Q = 34{,}663$ CFS, STAGE = 19.2, AREA = 3550

$$V_1 = \frac{3550 \times 3400}{43{,}560} = 277 \text{ ACRE-FT}$$

$$Q_{P2\,(TRIAL)} = 34{,}663\left(1 - \frac{277}{1948}\right)$$

$$= 29{,}735$$

FOR $Q = 29{,}735$, STAGE = 17.8 FT AREA = 3180

$$V_2 = \frac{3180 \times 3400}{43{,}560} = 248$$

$$V_{AVE} = \frac{277 + 248}{2} = 262 \text{ ACRE-FT}$$

$$Q_{P2} = 34{,}663\left(1 - \frac{262}{1948}\right)$$

$Q_{P2} = 30{,}000$ CFS, STAGE = 18 FT, $\Delta H = 13$

REACH 184+00 TO 227+00

$$Q = \frac{1.486}{n} A R^{2/3} S^{1/2}$$

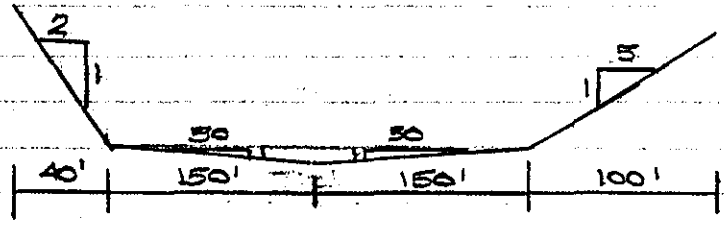
$n = .105$

$Q = 1.01\, A R^{2/3}$

$$S = \frac{5}{4300}$$

$S = 0.001$

$S = 0.034$

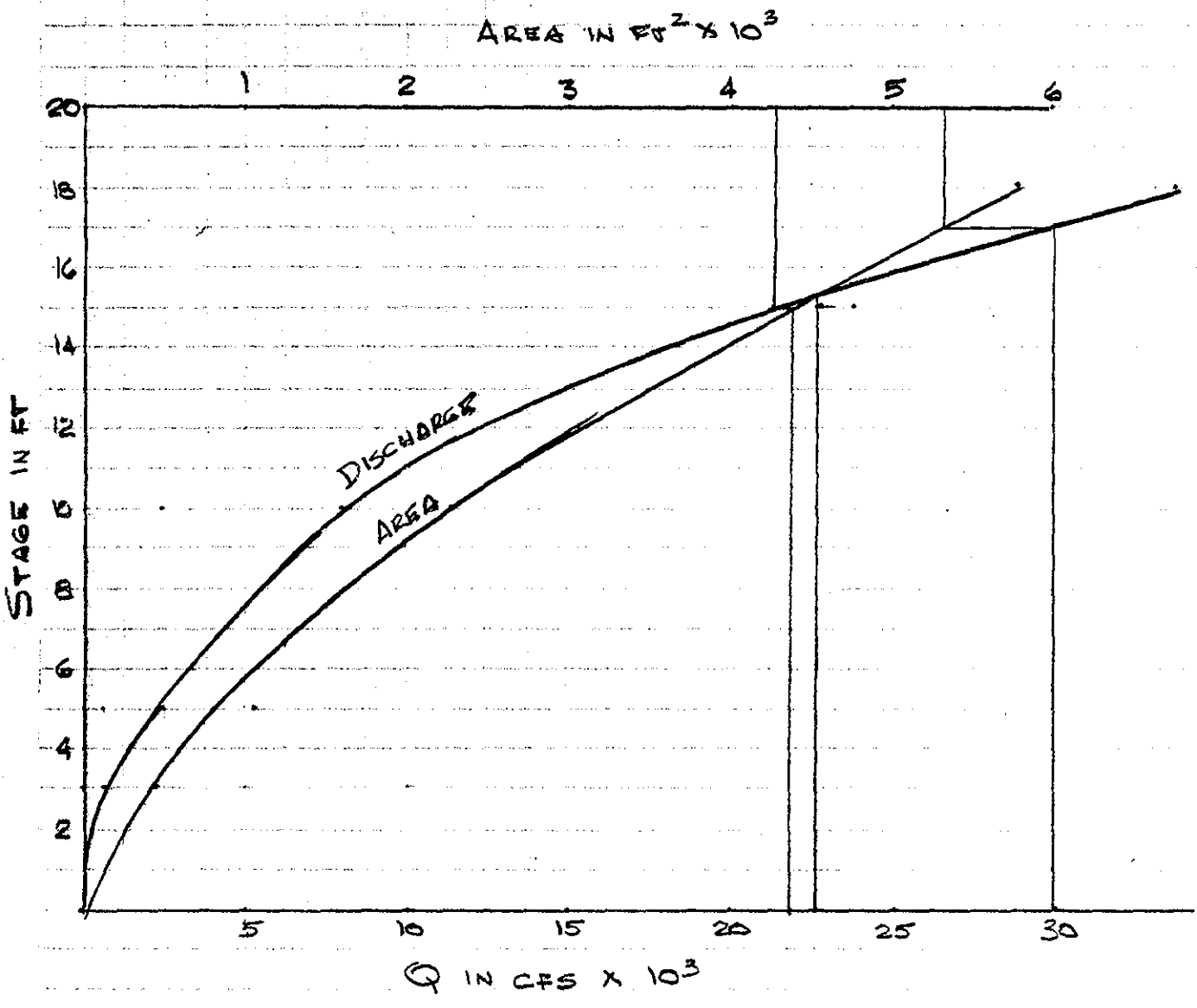


BY RFB DATE 11-13-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 10 OF

CHKD. BY DATE INSPECTION OF DAMS PROJECT

SUBJECT STONEY BROOK RESERVOIR, FAILURE ANALYSIS

STAGE	AREA	P	R	$R^{2/3}$	Q
3	450	300	1.5	1.31	595
5	1064	314.7	3.38	2.25	2417
10	2272	351.3	6.47	3.47	7962
15	4554	387.9	11.74	5.17	23780
18	5738	409.9	14.00	5.81	33671



BY RFB DATE 11-13-79 **LOUIS BERGER & ASSOCIATES INC.** SHEET NO. 11 OF ___

CHKD. BY ___ DATE ___ INSPECTION OF DAMS PROJECT ___

SUBJECT STONEY BROOK RESERVOIR, FAILURE ANALYSIS

$Q = 30{,}000$, STAGE = 17 FT, AREA = 5310

$$V_1 = \frac{5310 \times 4300}{43{,}560} = 524 \text{ ACRE-FT}$$

$$Q_{p2}\,(\text{TRIAL}) = 30{,}000\left(1 - \frac{524}{1948}\right)$$

$$= 21{,}930 \text{ CFS}$$

FOR $Q = 21{,}930$ STAGE = 15 FT, AREA = 4280

$$V_2 = \frac{4280 \times 4300}{43{,}560} = 422$$

$$V_{AVE} = \frac{524 + 422}{2} = 473 \text{ ACRE-FT}$$

$$Q_{p2} = 30{,}000\left(1 - \frac{473}{1948}\right)$$

$Q_{p2} = 22{,}715$, STAGE = 15.3 FT $\Delta H = 11.3$

SUMMARY

STA	Q	STAGE	ΔH = STAGE (BREACH) − STAGE (SPILLWAY)	DAMAGE
0+00	113,000	24.4	20.4	NONE
42+00	74,400	20.7	16.7	5 HOUSES, 1 FARM, PITCH HILL RD
110+00	44,800	18.7	13.7	EROSION RT 52
150+00	34,700	14.4	12.0	1 HOUSE, RAYMOND HILL RD
184+00	30,000	16.0	13.0	MOBILE HOME PARK
227+00	22,700	15.3	11.3	1 HOUSE, ROUTE 32

LOUIS BERGER & ASSOC., INC. WELLESLEY, MASS. ARCHITECT ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

STONY BROOK RESERVOIR DAM

DRAINAGE AREA AND AREA OF POTENTIAL FLOODING

STATE - CT.

			SCALE 1: 24000
			DATE

DRAINAGE AREA

STONY BROOK RESERVOIR DAM

AREA OF POTENTIAL FLOODING

MONTVILLE

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APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS