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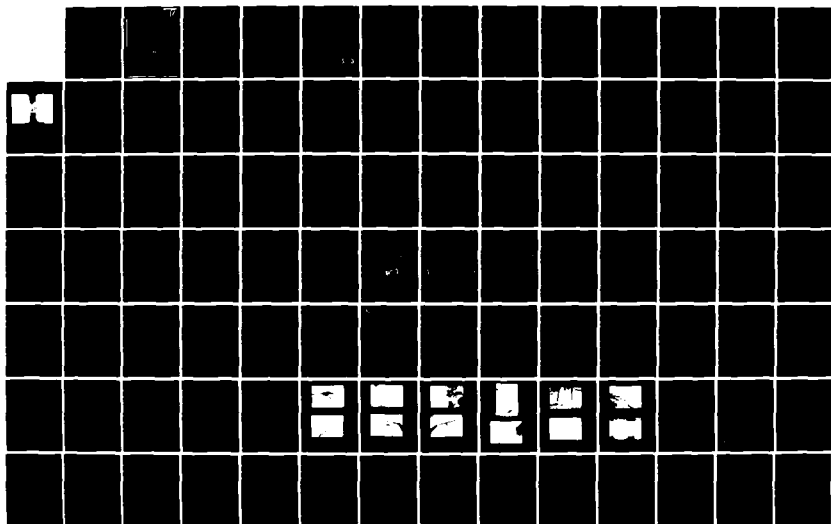
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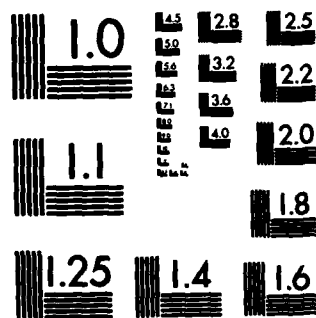
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CONNECTICUT COASTAL
SOUTHINGTON, CONNECTICUT

**SPRING LAKE DAM
CT 00261**

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



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

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Spring Lake Dam is an earthen embankment dam with a reinforced concrete spillway located 60 ft. from the left end and a wood/steel sheet cut-off wall running its entire length. The total length of the dam is 200 ft. including the 31 ft. long spillway. The visual inspection of Spring Lake Dam indicated that the dam is in FAIR condition. Based on its SMALL size and HIGH hazard classification and in accordance with Table 3 of the Corps Guidelines for Safety Inspection of Dams, the test flood is equal to 1/2 the Probable Maximum Flood.		



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:

NEDED

AUG 17 1991

Honorable William A. O'Neill
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor O'Neill:

Inclosed is a copy of the Spring Lake Dam (CT-00261) Phase I Inspection Report, prepared under the National Program for Inspection of Non-Federal Dams. This report is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. I approve the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is vitally important.

Copies of this report have been forwarded to the Department of Environmental Protection, and to the owner, Budd Residential Management, West Hartford, CT. Copies will be available to the public in thirty days.

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

Sincerely,

A handwritten signature in dark ink, appearing to read "C. E. Edgar, III", is written over the typed name.

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

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As stated

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SPRING LAKE DAM

CT 00261



CONNECTICUT COASTAL
SOUTHINGTON, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

Identification No.: CT 00261
Name of Dam: Spring Lake Dam
Town: Southington
County and State: Hartford County, Connecticut
Stream: Unnamed Tributary of the Quinnipiac River
Date of Inspection: May 27, 1981

BRIEF ASSESSMENT

Spring Lake Dam is an earthen embankment dam with a reinforced concrete spillway located 60 feet from the left end and a wood/steel sheet cut-off wall running its entire length. The total length of the dam is 200 feet including the 31 foot long spillway. The top width of the dam varies between a minimum of 13 feet near the left spillway abutment to a maximum of 18 feet at the right end of the dam. The maximum height of the dam, measured at the left spillway abutment, is 13 feet and the maximum storage capacity with water at the top of dam is 94 acre-feet.

The spillway is a sharp crested weir with three separate discharge bays and training walls. A 12 inch conduit with a slide gate control passes through the right discharge bay. A wooden footbridge over the spillway provides access to the outlet control. The dam is used for recreational and aesthetic purposes by the Spring Lake development residents.

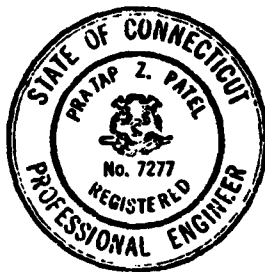
The visual inspection of Spring Lake Dam indicated that the dam is in FAIR condition. The inspection revealed an unprotected upstream face of the dam which could lead to further erosion by wave action and that there are areas of erosion along the spillway training walls. In addition the downstream face of the dam is covered with grass, weeds and brush and there are trees growing along the right abutment of the dam.

Based on its SMALL size and HIGH hazard classification and in accordance with Table 3 of the Corps Guidelines for Safety Inspection of Dams, the test flood is equal to 1/2 the Probable Maximum Flood. The peak inflow of 750 cfs was calculated based on a drainage area of 1.13 square miles and

a Corps peak discharge rate of 665 cfs/sq. mi. for flat to rolling terrain for a 1/2 PMF. The peak outflow was 700 cfs indicating that the spillway, with a peak discharge capability of 1770 cfs, can pass 250% of the design storm without overtopping the dam.

Based on the findings of the visual inspection and hydrologic and hydraulic analysis there is need for additional engineering input, analysis and design. This would include the analysis and design of riprap protection for the upstream face of the dam and for the area of erosion around the spillway training walls. In addition an engineer should design and oversee procedures for removal of the trees and their root systems from the embankment and downstream toe and back-filling with suitable material.

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



Pratap Z. Patel, P.E.
Project Manager

Pratap Z. Patel

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

This Phase I Inspection Report on Spring Lake Dam (CT-00261) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Richard J. DiBuono

RICHARD DIBUONO, MEMBER
Water Control Branch
Engineering Division

Aramast Mahtesian

ARAMAST MAHTESIAN, MEMBER
Geotechnical Engineering Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, CHAIRMAN
Design Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

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

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

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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

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

NATIONAL
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NON FED
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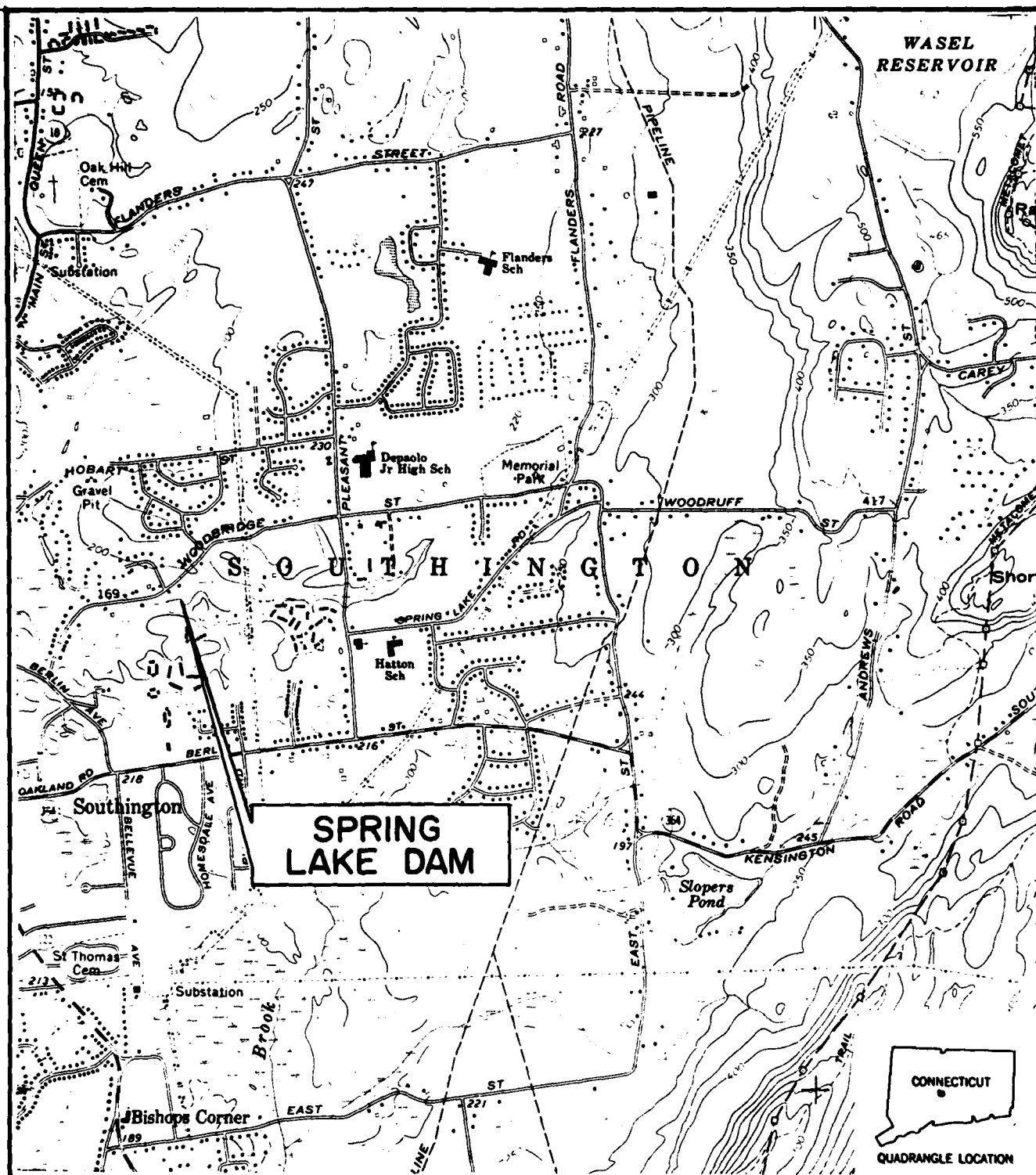
OVERVIEW PHOTO

SPRING LAKE DAM

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SOUTHINGTON

CONNECTICUT

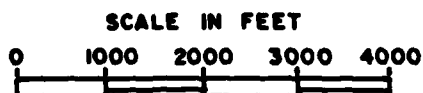


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CORPS OF ENGINEERS
WALTHAM, MASS.



NATIONAL PROGRAM OF INSPECTION OF
NON - FED DAMS
LOCATION MAP

NATIONAL DAM INSPECTION PROGRAM

PHASE I INSPECTION REPORT

SPRING LAKE DAM - CT 00261

SECTION I

PROJECT INFORMATION

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Philip W. Genovese and Associates, Inc. has been retained by the New England Division to inspect and report on selected dams in South Central Connecticut. Authorization and notice to proceed were issued to Philip W. Genovese and Associates, Inc., under a letter of November 17, 1980 from Colonel William E. Hodgson Jr., Corps of Engineers. Contract No. DACW 33-81-C-0017 has been assigned by the Corps of Engineers for this work.

b. Purpose

1. Perform technical inspection and evaluation of non-federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-federal interests.
2. Encourage and prepare the states to initiate quickly effective dam safety programs for non-federal dams.
3. Update, verify, and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

Spring Lake Dam is located in the Town of Southington in Hartford County, Connecticut. Spring Lake is south of Woodruff Road a short distance east of the intersection of Woodruff Road and Berlin Avenue, and approximately 3400 feet east of Connecticut Highway Route 10. The dam impounds the waters of an unnamed tributary of the Quinnipiac River, and is shown on the Meriden, Connecticut, Quadrangle with the approximate coordinates of North $41^{\circ}36.1'$, West $72^{\circ}52.0'$. The Quinnipiac River is approximately one mile west of the dam.

b. Description of Dam and Appurtenances

Spring Lake Dam is an earth embankment with a maximum height of 13 feet, length of 200 feet and upstream and downstream slope of 2 horizontal to 1 vertical. The original embankment appears to have a wood cutoff wall for its entire length. In the area of the rebuilt concrete spillway steel sheet piling has been used as cutoff wall. The three-bay concrete spillway is 31 feet wide, beginning approximately 60 feet from the south end of the dam. This spillway has a sharp-crested weir which is divided into three separate discharge bays. The two outer bays are at elevation 175.0 NGVD, and the center one is at elevation 174.5 NGVD. There is a 12-inch diameter slide gate and drain pipe which are installed in the right spillway bay at an invert elevation of 168.2 NGVD, with a maximum capacity of 10 cfs. A wooden foot bridge passes over the spillway, providing access to the slide gate control mechanism.

Copies of plans and cross-sections of the dam can be seen in Appendix B of this report. Photographs are shown in Appendix C.

c. Size Classification

The dam's maximum impoundment of 94 acre-feet and structural height of 13.0 feet places it in the SMALL size category, using as a reference the size classification table in the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams. Table I of these guidelines classifies a dam with 50 to 1000 acre-feet of storage as being small in size.

d. Hazard Classification

The hazard potential classification for this dam is HIGH, using the Corps Guidelines because there are more than 20 residences in the impact area which would have pre-failure flood depths of 1-5 feet and

post failure flood depths of 2-7 feet and 4 more houses which would have a foot or more of flooding as a direct result of the dam failure. A dam breach could result in the loss of more than a few lives. Also, there are several streets nearby which would be subject to flood damage in the case of a dam breach.

e. Ownership

The dam is located on the property of Spring Lake Village, a condominium community in the Town of Southington. The Managing Agent is Mr. Gary Budd of Budd Residential Management, 2437 Albany Avenue, West Hartford, Connecticut 06117. The telephone number is (203) 233-2683. The property was acquired by the condominium group by deed transfer from Elizabeth Gurlitz of Brooklyn, New York in October, 1967.

f. Operator

Operation and maintenance of Spring Lake Dam is the responsibility of the Board of Directors of the Spring Lake Village community. The Directors may be contacted through the Managing Agent.

g. Purpose of the Dam

The present purpose of Spring Lake Dam is primarily recreational.

h. Design and Construction History

It is believed that Spring Lake Dam was originally built in the late 1800's as an earthen embankment dam with a stone masonry spillway. There was a wood cutoff wall which apparently ran the entire length of the dam. The top of the dam was at elevation 178.5 NGVD, with the spillway weir set at elevation 175.8 NGVD.

In 1963 the dam was inspected under supervision of the State of Connecticut Water Resources Commission and found to be in unsafe condition. Accordingly, on April 22, 1963 the Commission issued an order to then owner Elizabeth Gurlitz directing that certain specific repairs and alterations be made. A construction permit was issued, and plans submitted by A. J. Macchi, Engineer. However, beyond a few repairs to the masonry wall adjoining the spillway none of the recommended work was performed.

The dam was rebuilt in 1970. Work included construction of a new 3 bay concrete spillway and placing additional embankment material on the crest and the slopes. Some of the plans for this reconstruction are included in Appendix B.

i. Normal Operational Procedures

There are no operational procedures currently in effect at this dam.

1.3 Pertinent Data

a. Drainage Area

The drainage area for Spring Lake Dam covers 1.13 square miles, or 723 acres of flat to rolling terrain. Much of the tributary area is residential, and includes a school and park. There are two small ponds north of the dam and a swampy area east of the residential district which feed into Spring Lake. The lake outlets from the dam to a stream which flows into the Quinnpiac River. The topography of the watershed ranges in elevation from 184 feet to 500 feet NGVD.

b. Discharge at Damsite

1. The outlet works at the dam consists of a 12-inch slide gate with invert elevation of 168.2 NGVD and has a maximum discharge capacity of 10 cfs.
2. The maximum flood at the damsite is unknown.
3. The ungated spillway capacity at top of dam elevation of 181.5 is 1770 cfs.
4. The ungated spillway capacity at test flood elevation of 178.6 is 700 cfs.
5. The gated spillway capacity at normal pool elevation is N/A.
6. The gated spillway capacity at test flood elevation is N/A.
7. The total spillway capacity at test flood elevation of 178.6 is 700 cfs.
8. The total project discharge at top of dam elevation of 181.5 is 1770 cfs.
9. The total project discharge at test flood elevation of 178.6 is 700 cfs.

c. Elevation (Feet above NGVD)

1. Streambed at centerline of dam	168.5
2. Bottom of cutoff	Unknown
3. Maximum Tailwater	173.5
4. Normal pool	175.0
5. Full flood control pool	N/A
6. Spillway crest (ungated)	174.5
7. Design surcharge	179.0
8. Top of dam	181.5
9. Test flood surcharge	178.6

d. Reservoir (Length in feet)

1. Maximum pool	1465
2. Normal pool	1400
3. Flood control pool	N/A
4. Top of dam	1775
5. Spillway crest pool	1400

e. Storage (Acre-feet)

1. Normal pool	15.8
2. Flood control pool	N/A
3. Spillway crest pool	14.6
4. Top of dam	94.1
5. Test flood pool	60.6

f. Reservoir Surface (Acres)

1. Normal pool	7.3
2. Flood-control pool	N/A
3. Spillway Crest	6.7
4. Test flood pool	11.6
5. Top of dam	16.8

g. Dam

1. Type	Earthen, with wood and steel sheet cut off wall
2. Length	200 feet
3. Height	13.0 feet
4. Top width	Varies: Between 13 feet and 18 feet
5. Side slopes	Upstream & Downstream: 2 Horizontal to 1 Vertical

- 6. Zoning..... Unknown
- 7. Impervious core..... Unknown
- 8. Cutoff..... Wood sheeting along dam
tied into steel sheet cutoff
at spillway
- 9. Grout curtain Unknown

h. Diversion and Regulating Tunnel

None

i. Spillway

- 1. Type Concrete with sharp crested
weir divided into 3 separate dis-
charge bays
- 2. Length of weir.....31 feet
- 3. Crest elevation Outside bays175.0 NGVD
Center bay174.5 NGVD
- 4. Gates 12 inch slide gate
- 5. Upstream channel..... Wing walls with riprap
- 6. Downstream channel.....Retaining walls with riprap

j. Regulating Outlets

- 1. Invert 168.2
- 2. Size 12 inch
- 3. Description..... Operable sliding gate in the right
spillway bay
- 4. Control Mechanism..... Stem and handle extending up from
gate. Gate may be controlled from
foot bridge over spillway.

SECTION 2

ENGINEERING DATA

2.1 Design Data

Spring Lake Dam was apparently constructed in the late 1800's, but no engineering data has been found to indicate the exact time of construction or the design features. The dam was rebuilt in 1970. Construction documents were prepared by Kratzert & Jones, consulting Engineers, Milldale, Connecticut. These documents are available from the Water Resources Unit of Connecticut Department of Environmental Protection. Included in Appendix B are 5 out of 7 sheets of the construction drawings entitled "Spring Lake Village Spillway". Two sheets showing reenforcing details of the spillway have not been included. These drawings mainly show details of the new spillway and outline of the additional embankment material on the slopes and crest of the original earthen embankment. Plans are not available for the original earthen embankment. Also available is a plan for "Repair of Dam & Spillway - Spring Pond, Southington, Connecticut" prepared by A.J. Macchi, Engineers, Hartford, Connecticut, and dated May 22, 1963.

2.2 Construction Data

No construction records were available for use in evaluating this dam. However there is on record a Certificate of Approval issued by the Water Resources Commission in November, 1970 certifying that the rebuilding had been in accordance with the plans as prepared by Kratzert & Jones.

2.3 Operation Data

No engineering operational data were disclosed.

2.4 Evaluation of Data

a. Availabilty

The design plans for the 1970 rebuilding of Spring Lake Dam were available, however engineering data on original design and construction were not available.

b. Adequacy

The lack of information on original design and construction did not allow for a complete review. Therefore, the condition of this dam was assessed from the standpoint of reviewing design plans for the 1970 rebuilding, findings during the visual inspection, past performance history and sound engineering judgement.

c. Validity

The results of the visual inspection and the Certificate of Approval issued by the Connecticut Water Resources Commission indicate that the rebuilding of the dam is basically in agreement with construction design. One minor change is that there is no steel plate weir on the center spillway bay as shown in View E on page B-5 of the construction drawings.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General

The field inspection of Spring Lake Dam was made on May 27, 1981. The inspection team consisted of personnel from Philip W. Genovese and Associates, Inc. and Geotechnical Engineers, Inc. Inspection check lists, completed during the visual inspection, are included in Appendix A. At the time of inspection the water level was 174.6 NGVD. The upstream face of the dam could only be inspected above this water level.

b. Dam

The dam is an earthen embankment with a reinforced concrete spillway at the left side of the embankment (Photos No. 2 & 3). This spillway extends vertically for the entire cross sectional height of the dam.

The crest of the dam is grass covered and well maintained (Photo No. 3). No surface cracks were observed along the crest of the dam at the time of the inspection.

The upstream face is grass covered. Only occasional pieces of riprap were observed on the upstream face above the reservoir surface. Riprap was observed below water (Photos No. 1 & 2). Surface erosion was present adjacent to the left and right spillway training walls, probably due to trespassing (Photos No. 4 & 6). Small erosion features were also observed 10 feet to the left of the left spillway training wall and 45 feet and 75 feet to the right of the right spillway training wall about 1 to 3 feet above the reservoir surface (Photos No. 1 & 2).

Two 6 to 8-foot round bushes are growing on the right embankment at about the reservoir surface (Photos No. 2 & 3).

The downstream face of the embankment is thickly covered with long grass, weeds and small brush which made visual observation very difficult (Photos #8, 10 & 11). No evidence of past seepage was observed along the toe even though the slope was covered with extensive vegetation. Minor surface sloughs were observed at various locations on both the right and left embankment. Surface erosion, probably due to trespassing, is present adjacent to the right and left spillway training walls. These erosion features are about 4 feet wide and up to 6 inches deep (Photos #7 & 8).

Trees up to 12 inches in diameter are growing on the downstream side of the right abutment and along the downstream toe of the right embankment.

c. Appurtenant Structures

The spillway consists of a concrete weir with three separate discharge bays and upstream wing walls in downstream training walls. All of these concrete walls are in good shape. A wooden footbridge traverses the spillway and provides access to the slide gate control mechanism for a 12-inch outlet pipe emerging from the right discharge bay. Both are in good condition although the bridge is missing 4 anchor bolt nuts and has some rotting of toe boards at the base of the railing, and the slide gate needs painting. The slide gate is reported to be in operable condition. There were no indications of seepage adjacent to or through the spillway or downstream training walls. There is some riprap extending approximately 10 feet downstream of the spillway in the spillway/outlet channel.

d. Reservoir Area

There are no indications of instability along the banks of the reservoir in the vicinity of the dam.

e. Downstream Channel

Vegetation including weeds, small brush, and cattails were observed growing on the floor of the discharge channel downstream of the spillway (Photo No. 5)

3.2 Evaluation

Based on the visual inspection, the dam appears to be in FAIR condition. The following features could adversely affect the long-term performance of the dam in the future:

- a. The lack of adequate riprap on the upstream face at and above the waterline will lead to further erosion of the upstream face.
- b. The lack of grass cover at the erosion features on the upstream face and along the spillway training walls will allow for continued erosion at these locations in the future.

- c. The long grass, weeds and small brush on the downstream face obscure the embankment surface making visual observation for seepage, erosion, animal burrows, and other deleterious features very difficult to perform. No evidence of past seepage was observed along the toe of the downstream slope.
- d. Tree growth along the right abutment could create a future seepage problem since the tree roots can provide a seepage path for water. In addition, trees uprooted during a storm may displace large quantities of embankment or abutment soil, creating erosion gullies or channels through the embankment which may lead to breaching of the dam.

SECTION 4
OPERATIONAL AND MAINTENANCE
PROCEDURES

4.1 Operational Procedures

a. General

The dam creates an impoundment of water which is used primarily for recreational purposes within the condominium community. The managing agent for the owners makes frequent general operational checks. However, no operational records pertinent to the structural stability of the dam were available.

b. Description of any Warning System in Effect

There are no downstream warning systems in effect at this facility.

4.2 Maintenance Procedures

a. General

Maintenance work on the dam is done as needed, but there is no regular work or inspection schedule. The visual inspection revealed that the grass on the top of dam and slopes is kept mowed and cleaned.

b. Operating Facilities

Maintenance on the operating facilities is done as needed with no regular schedule of inspections.

4.3 Evaluation

The current operating and maintenance procedures for this dam are inadequate. A formal downstream warning system should be developed and put into effect in case of an emergency at the dam. Also, a program of annual technical inspections by qualified registered engineers should be instituted.

SECTION 5

EVALUATION OF HYDROLOGIC AND HYDRAULIC FEATURES

5.1 General

Spring Lake Dam consists of a 200 foot long earth embankment with a combination wood and steel sheet cut off wall and a 31 foot long concrete spillway located 60 feet from the left end of the dam. The spillway has a sharp crested weir divided into 3 separate discharge bays, with the two outer ones having a weir elevation of 175.0 NGVD, and the center one 0.5 feet lower. There is a 12-inch diameter outlet opening in the right spillway bay with an invert elevation of 168.2 NGVD which is controlled by a slide gate. The outlet has a maximum capacity of 10 cfs with water at the top of dam. A wooden footbridge passes over the spillway and serves to provide access to the slide gate control mechanism.

Spring Lake Dam is classified as being SMALL in size based upon Table I of the Corps of Engineers Guidelines for Inspection of Dams. These criteria define a small dam as having between 50 and 1,000 acre-feet of storage or being between 25 and 40 feet high. Spring Lake Dam is 13 feet high and has a maximum storage capacity of 94 acre-feet.

5.2 Design Data

Spring Lake Dam was originally constructed in the late 1800's as an earthen embankment dam with a 24.5 foot long stone masonry spillway. The top of dam was at elevation 178.5 NGVD and the spillway weir set at 175.8 NGVD. There are indications that a wood plank cut off wall was installed running the entire length of the dam.

In 1970 the dam was rebuilt as part of a planned residential community. Basically this reconstruction consisted of raising the earth embankment to elevation 181.5 NGVD and installing a new spillway as described in Section 5.1. In addition, steel sheeting was driven in below the spillway to an elevation of 157.2 NGVD and a concrete cut off wall was extended from the spillway 2 feet into the earthen dam and joined to the existing wood cut off wall with wood planking.

The plans of this work are included in Appendix B of this report. The design report, entitled "Spring Lake Village Spillway and Dam Design," by Kratzert and Jones, Consulting Engineers in Southington, Connecticut was reviewed as part of this study and is on file in the Water Resources Unit of the Connecticut Department of Environmental Resources.

5.3 Experience Data

The maximum discharge at this dam site is unknown.

5.4 Test Flood Analysis

The test flood analysis for Spring Lake was performed using the Corps guidelines flood at a site and this was compared to the flood given in the design report referenced in Section 5.2. The two results were in complete agreement indicating a peak spillway discharge of 700 cfs, which indicates that the dam will not be overtopped, as the spillway capacity is approximately 1770 cfs.

The calculation of the test flood, which in this case was equal to 1/2 the PMF (Probable Maximum Flood), was based on a drainage area of 1.13 square miles and the Corps peak discharge rate of 665 cfs/sq. mi. for a 1/2 PMF in a flat to rolling terrain. This resulted in a peak inflow of 750 cfs, and following the Corps Guidance for Estimating the Effect of Surcharge Storage on Maximum Probable Discharges, a peak outflow of 700 cfs at elevation 178.6 NGVD. The spillway is capable of handling 250% of the test flood without overtopping the dam.

5.5 Dam Failure Analysis

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

A breach of the dam would result in a peak discharge of 6500 cfs, which would include the discharge from a 60 foot wide breach plus the spillway discharge with water at the top of dam. The pre-failure spillway discharge is 1770 cfs.

A major breach of the dam would discharge into an unnamed tributary to the Quinpiac River and result in an additional 1 to 3 feet of flooding in the area of the residential development located north of Woodruff Road in the vicinity of Marcy Drive. There are more than 20 houses in this area which would experience an increase in flood levels of 1-3 feet as a result of the breach, plus 4 more homes which would have a foot or more of flooding as a direct result of the dam breach. Page D-19 of this report summarizes the affects of a dam breach on downstream structures. Village Road, Woodruff Road and Marcy Drive would all be overtopped by the flood wave. For these reasons a hazard rating of HIGH was selected. This is in agreement with the hazard classification given in the dam's design report. A delineation of the impact area is found on page D-1 of this report.

A breach of the dam was also calculated assuming water at the spillway design flood level of 178.6 NGVD. This resulted in a post-failure discharge of 3940 cfs of which 700 cfs was the spillway component. This had similar consequences as a breach with water at top of dam with 4 to 5 houses experiencing flooding of a foot or more of water as a result of the breach. These calculations, which are found on pages D-20 through D-23, further justify a HIGH hazard rating.

SECTION 6

EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observations

The visual inspection did not disclose any immediate stability problems.

6.2 Design and Construction Data

There were no design and construction data available for the evaluation of the structural stability of the embankment or foundation.

6.3 Post-Construction Changes

Correspondence, specifications and drawings and compaction and grain-size analysis data sheets by the engineering firm of Kratzert and Jones of Milldale, Connecticut, dated from April through August 1970, indicate several modifications which were made to the original dam embankment and spillway structure.

As described in these documents, the modifications to the existing dam basically consisted of the following:

1. Removal of the old spillway and replacement with the existing concrete structure. A steel sheet pile cutoff wall was installed beneath the spillway to a depth of 10 feet below the bottom of the training wall footings. In addition, the correspondence indicates that a wood cutoff wall was encountered during construction which apparently runs the length of the original dam embankment and which was "tied into" the new concrete spillway walls.
2. Raising the crest of the original embankment by 3 feet and grading the upstream and downstream slope to 2:1. The additional embankment soil was specified to be placed after clearing and grubbing the original embankment. The shell material to be used to enlarge the embankment was specified to be free draining bank-run gravel. The top of the original embankment was reported to be El 178.5 NGVD and the top of the modified embankment was to be at El 181.5 NGVD with a maximum design pool elevation of 179, or 0.5 feet above the top of the original embankment. It was not clear whether the free-draining soil was used for the full 3 foot

thickness required to raise the crest or if impervious material was used to raise the crest to above the maximum design pool elevation of 179. Pervious soil in the embankment below the maximum pool elevation could provide a path for seepage when the reservoir was full, however, this does not seem to be of significant concern as the normal operating pool is well below this elevation and even a test flood affects only 0.5 feet of this fill.

3. Grouting of two existing 8 inch diameter cast-iron pipes which passed through the original embankment at about 25 feet and 55 feet to the right of the present right spillway training wall.

4. Placing impervious backfill soil adjacent to the new spillway walls and beneath the new upstream spillway footings.

These documents also called for the placing of riprap on the entire upstream face for a nominal thickness of 12 inches. Therefore, it is possible that the riprap has sloughed off the upper part of the upstream face to below the reservoir elevation since only occasional riprap was noted above the reservoir surface at the time of our observations.

It was also reported in these documents that "The existing dam is in good condition with no leakage or trouble areas discernable."

6.4 Seismic Stability

The Spring Lake Dam is located in Seismic Zone 1, and in accordance with Corps of Engineer's guidelines does not warrant further seismic analysis at this time.

SECTION 7
ASSESSMENT, RECOMMENDATIONS AND REMEDIAL
MEASURES

7.1 Dam Assessment

a. Condition

Based on the visual inspection and review of available information, the dam appears to be in fair condition. Items of concern which must be investigated or corrected to ensure the long-term performance of this dam are listed in Sections 7.2 and 7.3.

b. Adequacy of Information

The information is such that the assessment of the long-term performance of the dam with respect to the geotechnical aspects must be based on the visual inspection.

c. Urgency

The recommendations and remedial measures described below should be implemented by the owner within one year after receipt of this Phase I inspection report.

No information or observations indicate that the Spring Lake Dam requires a comprehensive investigation at this time. However, the recommendations and remedial measures outlined in 7.2 and 7.3 will require some additional engineering input.

7.2 Recommendations

The following recommendations should be carried out under the supervision of a qualified professional engineer experienced in the design and construction of earth dams:

1. Design and oversee the installation of erosion protection for the upstream face of the dam.
2. The areas of erosion on the upstream face and adjacent to the spillway training walls should be backfilled and properly protected with grass or riprap.

3. Design and oversee procedures for the removal of trees and their root systems from embankment and downstream toe and backfill resulting excavation with suitable backfill.

7.3 Remedial Measures

a. Operating and Maintenance Procedures

1. The owner should maintain the proper grass cover on the embankment. This cover should be maintained at a short enough length on the upstream and downstream face and crest of the embankment to permit observation of any deleterious features which could develop such as seepage or animal burrows.
2. The vegetation should be removed from the lower discharge channel.
3. Replace the nuts on the anchor bolts and replace rotted toe boards at the base of the railing for the wooden footbridge and paint the slide gate.
4. In view of the fact that the hazard potential classification for this dam is high, the site should be monitored both during and immediately after any significant rainfall.
5. A formal downstream warning system should be adopted to be used in the event or possibility of a dam failure.
6. A comprehensive inspection and maintenance program should be developed for the dam and the dam should be inspected by a professional engineer qualified in the design and construction of dams annually.

7.4 Alternatives

There are no alternatives to the implementation of the recommendations and remedial measures outlined in 7.2 and 7.3.

APPENDIX A

INSPECTION CHECKLIST

**VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION**

PROJECT SPRING LAKE DAM

DATE: May 27, 1981

TIME PM

WEATHER Fair - 80°F

W.S. ELEV. 174.6 U.S. DN.S.

PARTY:

- | | |
|---------------------------------|-----------|
| 1. <u>W. Gancarz - Genovese</u> | 6. _____ |
| 2. <u>P. Patel - Genovese</u> | 7. _____ |
| 3. <u>R. Murdock - GEI</u> | 8. _____ |
| 4. <u>J. G. Engels - GEI</u> | 9. _____ |
| 5. _____ | 10. _____ |

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Structural</u>	<u>P. Patel</u>	
2. <u>Hydrology & Hydraulics</u>	<u>W. Gancarz</u>	
3. <u>Geotechnical</u>	<u>R. Murdock</u>	
4. <u>Geotechnical</u>	<u>J.G. Engels</u>	
5. _____		
6. _____		
7. _____		
8. _____		
9. _____		
10. _____		

PERIODIC INSPECTION CHECK LIST

PROJECT SPRING LAKE DAM

DATE May 27, 1981

PROJECT FEATURE Dam Embankment

NAME

DISCIPLINE Geotechnical

NAME Engels/Murdock

AREA EVALUATED	CONDITIONS
<u>DAM EMBANKMENT</u>	
Crest Elevation	181.5
Current Pool Elevation	174.6
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed
Pavement Condition	No pavement
Movement or Settlement of Crest	Possible 2 inch to 3 inch settlement to right of right spillway training wall.
Lateral Movement	None apparent
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good, except for possible slight settlement noted above.
Indications of Movement of Structural Items on Slopes	No structures on slope.
Trespassing on Slopes	Erosion tracks up to 4 feet wide due to trespass adjacent to right and left downstream spillway training walls.
Sloughing or Erosion of Slopes or Abutments	See above. Also slight erosion of upstream face 10 feet to left of left upstream spillway training wall and 45 feet and 75 feet to right of right spillway training wall and at downstream face to right of right training wall. Slight sloughing on downstream face. Difficult to see due to extensive vegetation.
Rock Slope Protection - Riprap Failures	Only occasional pieces observed above water line on upstream face. Riprap visible below water on upstream face.

PERIODIC INSPECTION CHECKLIST

PROJECT SPRING LAKE DAM

DATE May 27, 1981

PROJECT FEATURE Dam Embankment

NAME _____

DISCIPLINE Geotechnical

NAME Engels/Murdock

AREA EVALUATED	CONDITION
Unusual Movement or Cracking at or near toe	None observed
Unusual Embankment or Downstream seepage	None observed
Piping or Boils	None observed
Foundation Drainage Features	None observed
Toe Drains	None observed
Instrumentation System	None observed
Vegetation	Small brush and weeds on downstream face. Trees to 12 inches diameter at right abutment and along toe on right side of dam. Two 10 foot round bushes on up-stream face right side of dam.

PERIODIC INSPECTION CHECK LIST

PROJECT SPRING LAKE DAM

DATE May 27, 1981

PROJECT FEATURE Dike Embankment

NAME _____

DISCIPLINE Geotechnical

NAME Engels/Murdock

AREA EVALUATED

CONDITION

DIKE EMBANKMENT

Crest Elevation

No dike present

Current Pool Elevation

Maximum Impoundment to Date

Surface Cracks

Pavement Condition

Movement or Settlement of Crest

Lateral Movement

Vertical Alignment

Horizontal Alignment

Condition at Abutment and at Concrete Structures

Indications of Movement of Structural Items on Slopes

Trespassing on Slopes

Sloughing or Erosion of Slopes or Abutments

Rock Slope Protection - Riprap Failures

Unusual Movement or Cracking at or near Toes

Unusual Embankment or Downstream Seepage

Piping or Boils

Foundation Drainage Features

Toe Drains

Instrumentation System

Vegetation

PERIODIC INSPECTION CHECK LIST

PROJECT SPRING LAKE DAM

DATE May 27, 1981

PROJECT FEATURE Outlet Works - Intake Channel **NAME** _____

DISCIPLINE Structural/H&H Intake St

Intake Structure

NAME Patel/Gancarz

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - INTAKE CHANNEL AND</u> <u>INTAKE STRUCTURE</u>	
a. Approach Channel/ Slope Conditions Bottom Conditions Rock Slides or Falls Log Boom Debris Condition of Concrete Lining Drains or Weep Holes	Underwater None No
b. Intake Structure Condition of Concrete Stop Logs and Slots	Underwater

PERIODIC INSPECTION CHECK LIST

PROJECT SPRING LAKE DAM

DATE May 27, 1981

PROJECT FEATURE Outlet Works - Control Tower

NAME _____

DISCIPLINE Structural

NAME Patel

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u> a. Concrete and Structural General Condition Condition of Joints Spalling Visible Reinforcing Rusting or Staining of Concrete Any Seepage or Efflorescence Joint Alignment Unusual seepage or Leaks in Gate Chamber Cracks Rusting or Corrosion of Steel b. Mechanical and Electrical Air Vents Float Wells Crane Hoist Elevator Hydraulic System Service Gates Emergency Gates Lightning Protection System Emergency Power System Wiring and Lighting System	Not Applicable

PERIODIC INSPECTION CHECK LIST

PROJECT SPRING LAKE DAM

DATE May 27, 1981

PROJECT FEATURE Outlet Works - Transition
and Conduit

NAME _____

DISCIPLINE Structural

NAME Patel

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u> General Condition of Concrete Rust or Staining on Concrete Spalling Erosion or Cavitation Cracking Alignment of Monoliths Alignment of Joints Numbering of Monoliths	Not Applicable

PERIODIC INSPECTION CHECK LIST

PROJECT SPRING LAKE DAM

DATE May 27, 1981

PROJECT FEATURE Outlet Works - Outlet Structure
& Outlet Channel

NAME _____

DISCIPLINE H&H, Structural

NAME Gancarz/Patel

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL</u>	12 inch diameter opening outletting to spillway channel
General Condition of Concrete	Good
Rust or Staining	Slide gate is rusted
Spalling	No
Erosion or Cavitation	No
Visible Reinforcing	No
Any Seepage or Efflorescence	No
Condition at Joints	Good
Drain holes	
Channel	
Loose Rock or Trees Overhanging Channel	Large trees 50 feet downstream
Condition of Discharge Channel	Fair

PERIODIC INSPECTION CHECK LIST

PROJECT SPRING LAKE DAM

DATE May 27, 1981

PROJECT FEATURE Outlet Works - Spillway Weir,
Approach & Discharge Channels

NAME

DISCIPLINE Structural/H&H/Geotechnical

NAME Patel/Gancarz
Engels/Murdock

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
a. Approach Channel	Under water, not observed
General Condition	
Loose Rock Overhanging Channel	None observed
Trees Overhanging Channel	None observed
Floor of Approach Channel	Under water, not observed
b. Weir and Training Walls	
General Condition of Concrete	Very Good
Rust or Staining	No steel plate at center weir crest (See Appendix Page B-5)
Spalling	Some - right spillway bay
Any Visible Reinforcing	No
Any Seepage or Efflorescence	
Drain Holes	None observed
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	None observed
Trees Overhanging Channel	Trees to 24 inches in diameter on left side of channel.
Floor of Channel	Crushed rock for 50 feet downstream of spillway with weeds and small brush growing from floor. Natural stream channel with brush and cattails further downstream.
Other Obstructions	None observed

PERIODIC INSPECTION CHECK LIST

PROJECT SPRING LAKE DAM

DATE May 27, 1981

PROJECT FEATURE Outlet Works - Service Bridge

NAME _____

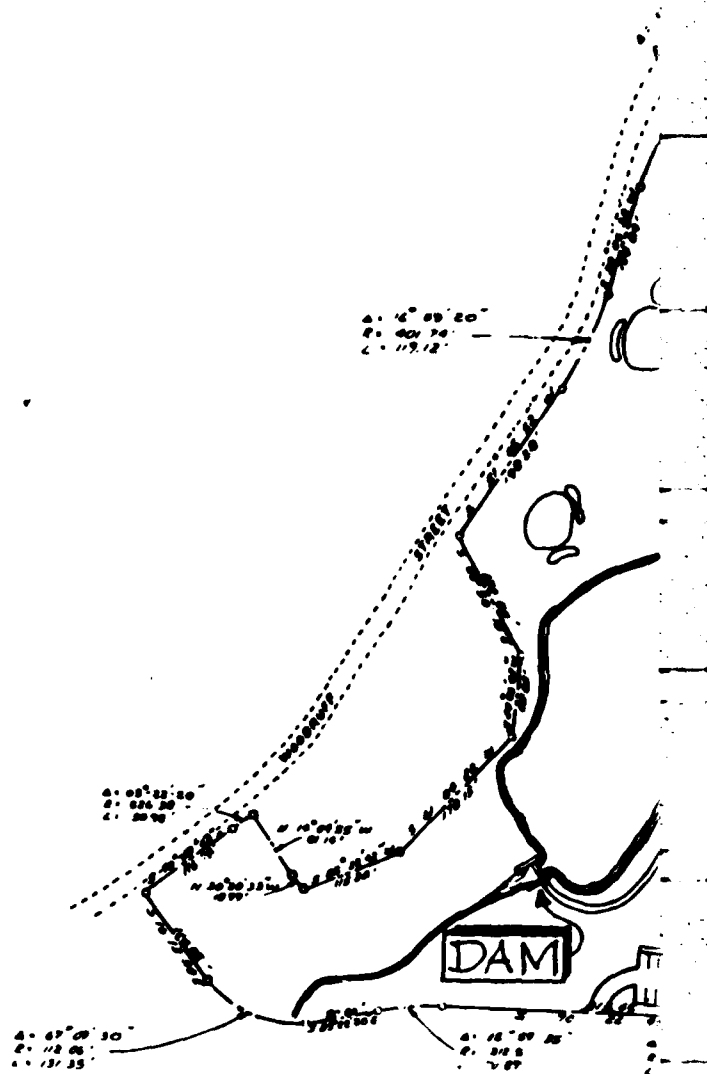
DISCIPLINE Structural

NAME _____

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SERVICE BRIDGE</u>	Wooden footbridge over spillway
a. Super Structure	
Bearings	Good
Anchor Bolts	Good. Both nuts on right side missing, one missing & one loose on left side
Bridge Seat	Very Good
Longitudinal Members	Good
Under Side of Deck	Good
Secondary Bracing	Not applicable
Deck	Very Good
Drainage System	Not applicable
Railings	Some rotting of the toe board at the base of the railing.
Expansion Joints	None
Paint	Good
b. Abutment & Piers	
General Condition of Concrete	Very Good
Alignment of Abutment	Very Good
Approach to Bridge	Very Good
Condition of Seat & Backwall	Very Good

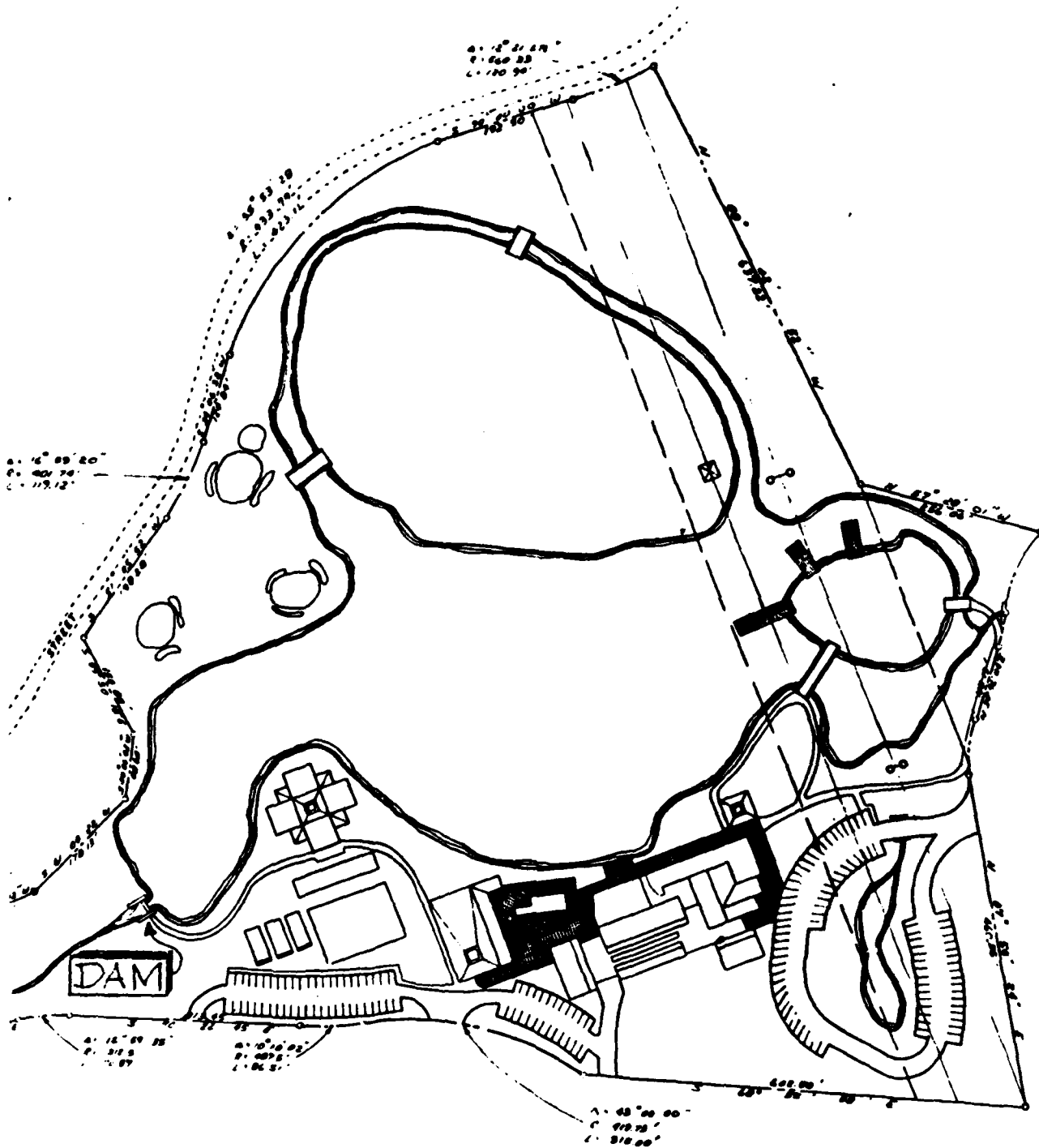
APPENDIX B

ENGINEERING DATA

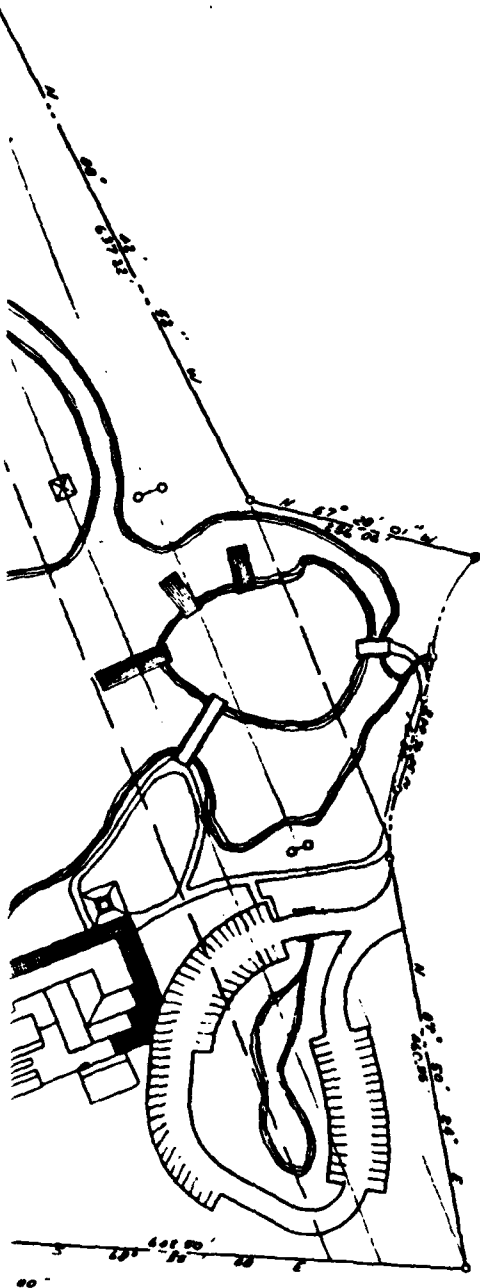


①

B-1



9



A: 75° 04' 48"
 R: 125'
 L: 72.68'

A: 16° 21' 31"
 R: 142.80'
 L: 46.90'

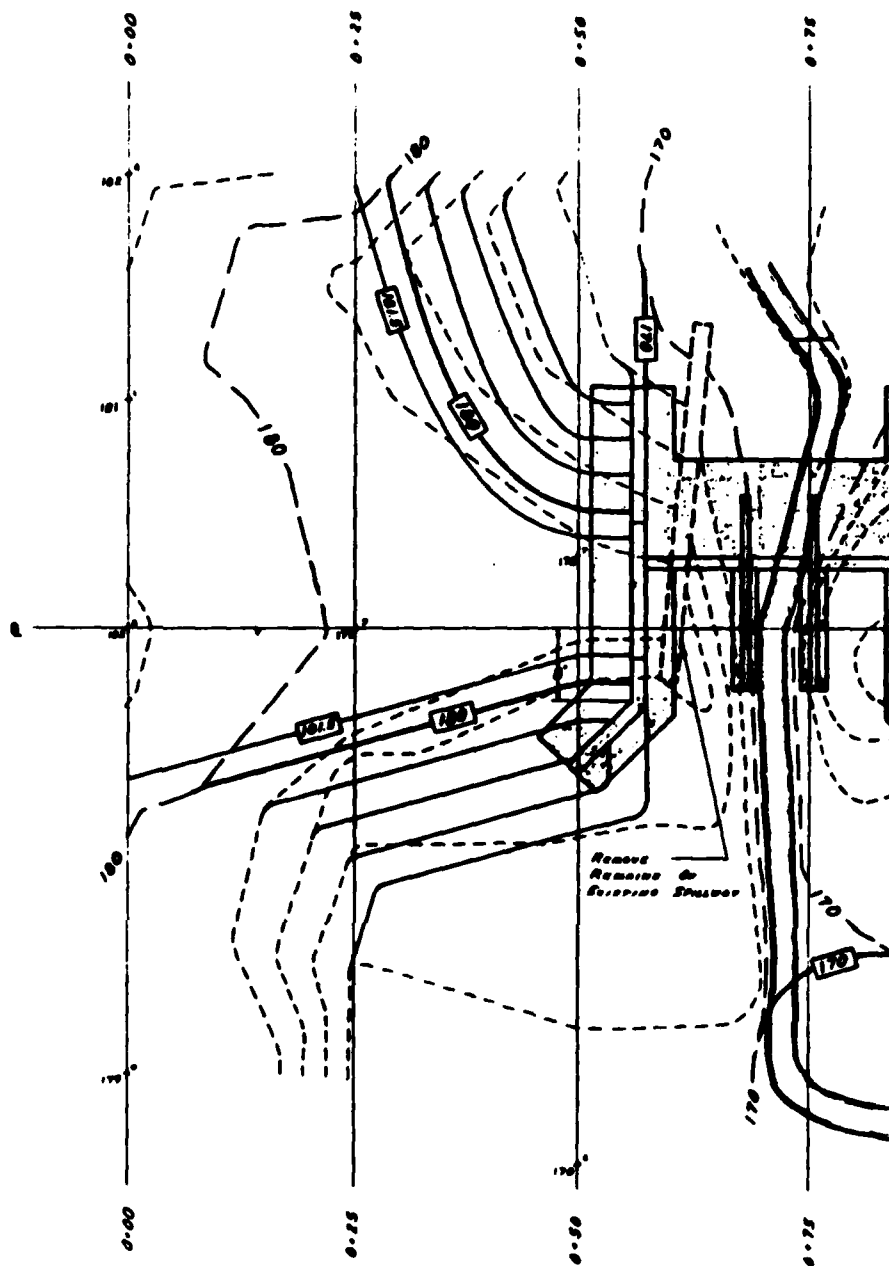
A: 107° 01' 11"
 R: 227.50'
 L: 81.01'

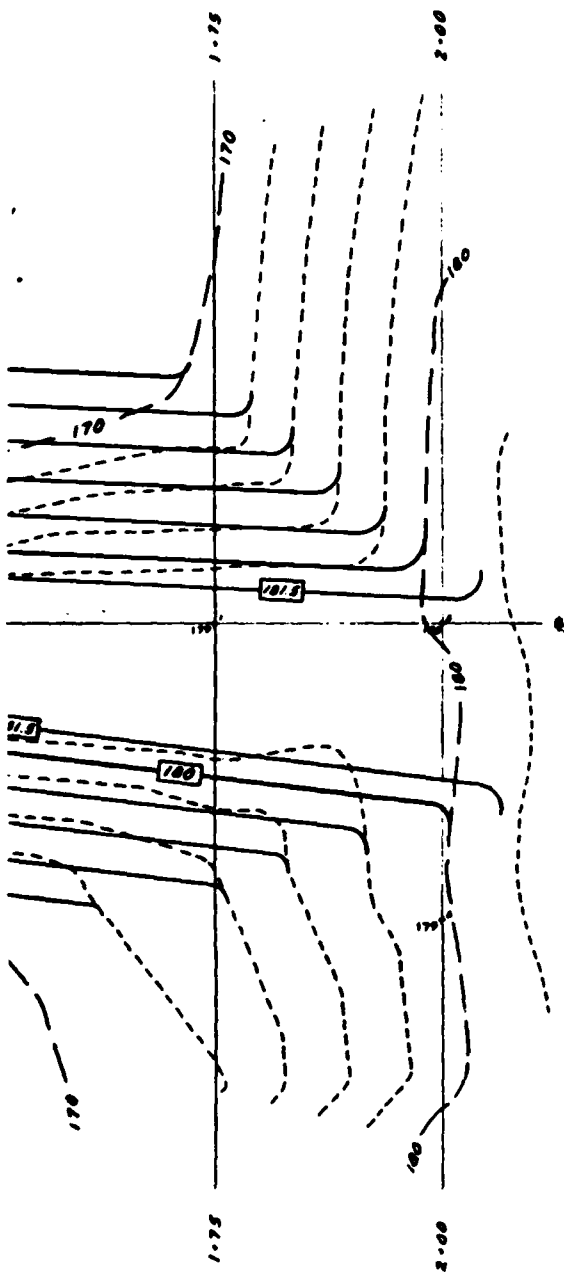


3af:

REVISED: MAY 10, 1970

LOCATION	MAP	FOR
SPRING LAKE VILLAGE SPILLWAY SOUTHINGTON, CONN.		
SCALE: 1" = 100'	APRIL, 1970	
SHEET 1 OF 7		
KRATZERT & JONES CIVIL ENGINEERS · LAND SURVEYORS · SITE PLANNERS 1437 MERIDEN WATERBURY TURNPIKE MILLDALE, CONNECTICUT		





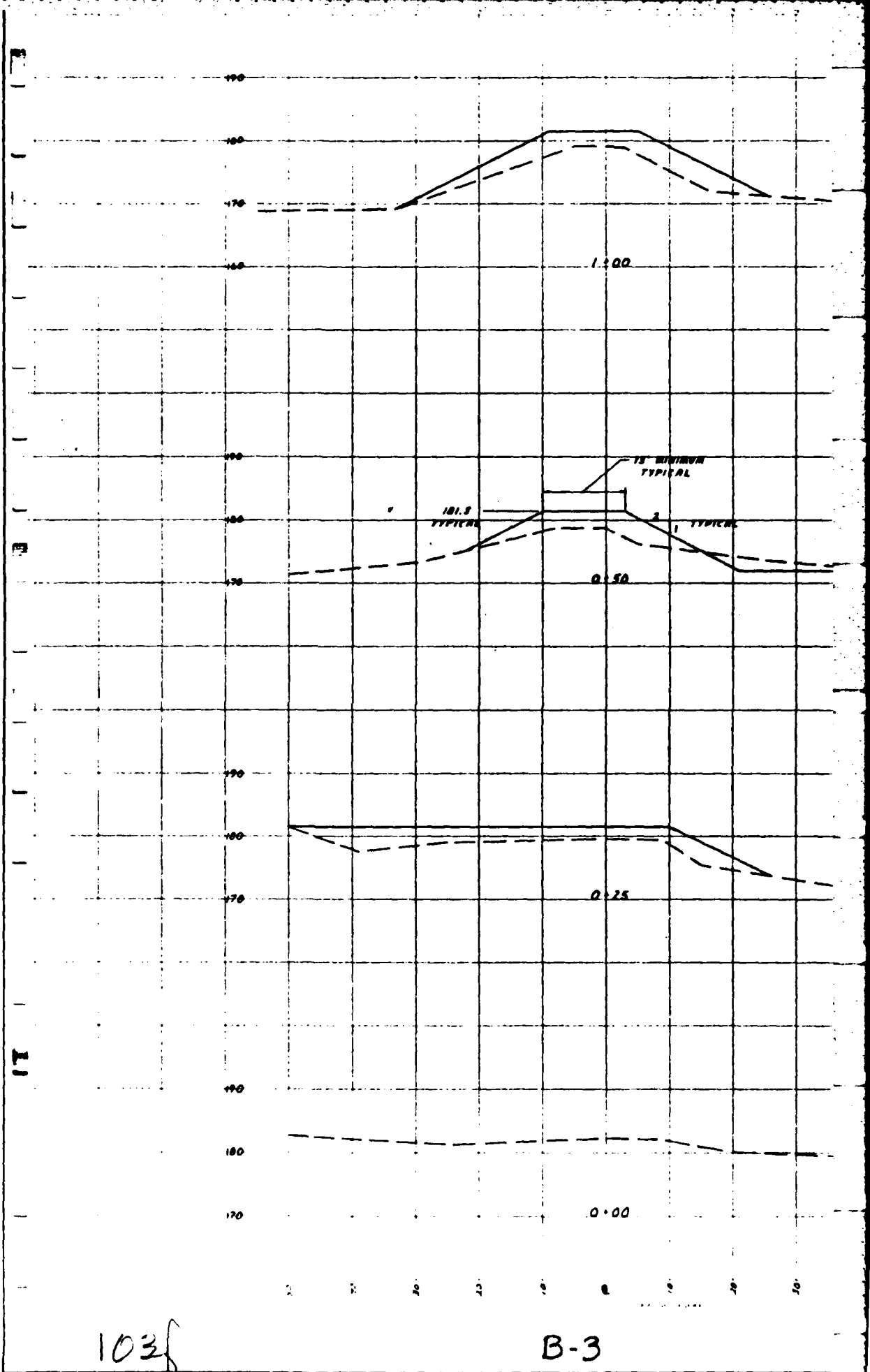
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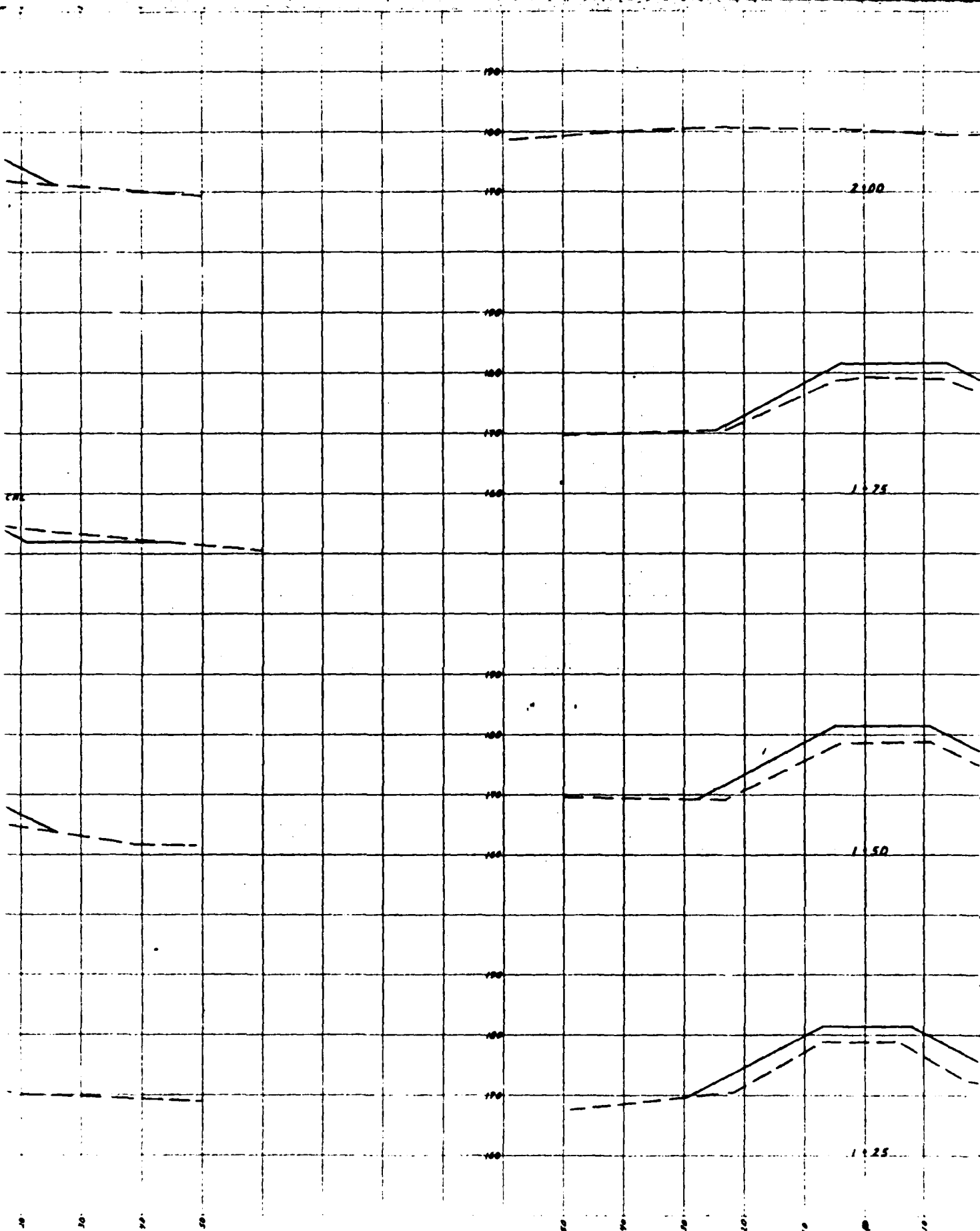
- 1) ALL SLOPES TO BE DRESSED WITH 6" OF TOPSOIL AND SEEDED TO PROVIDE ADEQUATE GRASS COVER
- 2) RIPRAP TO BE PLACED ON UPSTREAM SLOPE ACCORDING TO SPECIFICATIONS

3 of 3

REVISED: MAY 10, 1970

FINAL GRADES FOR	
SPRING LAKE VILLAGE SPILLWAY	
SOUTHINGTON, CONN.	
SCALE: 1" = 10'	APRIL, 1970
SHEET 2 OF 7	
KRATZERT & JONES	
CIVIL ENGINEERS · LAND SURVEYORS · SITE PLANNERS	
1457 MERIDEN WATERBURY TURNPIKE	MILLDALE, CONNECTICUT

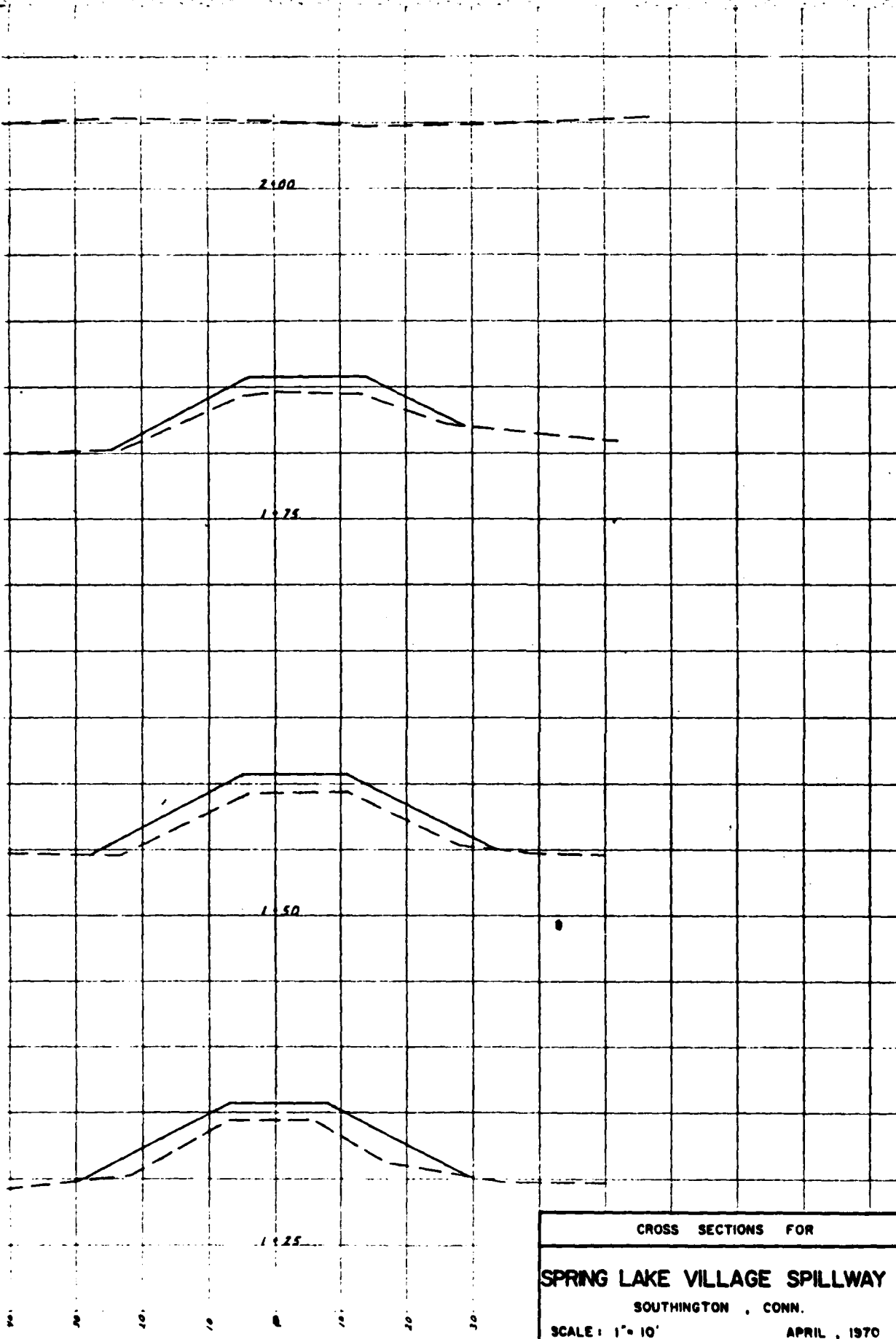




20/3

REVISIONS
DATE
BY

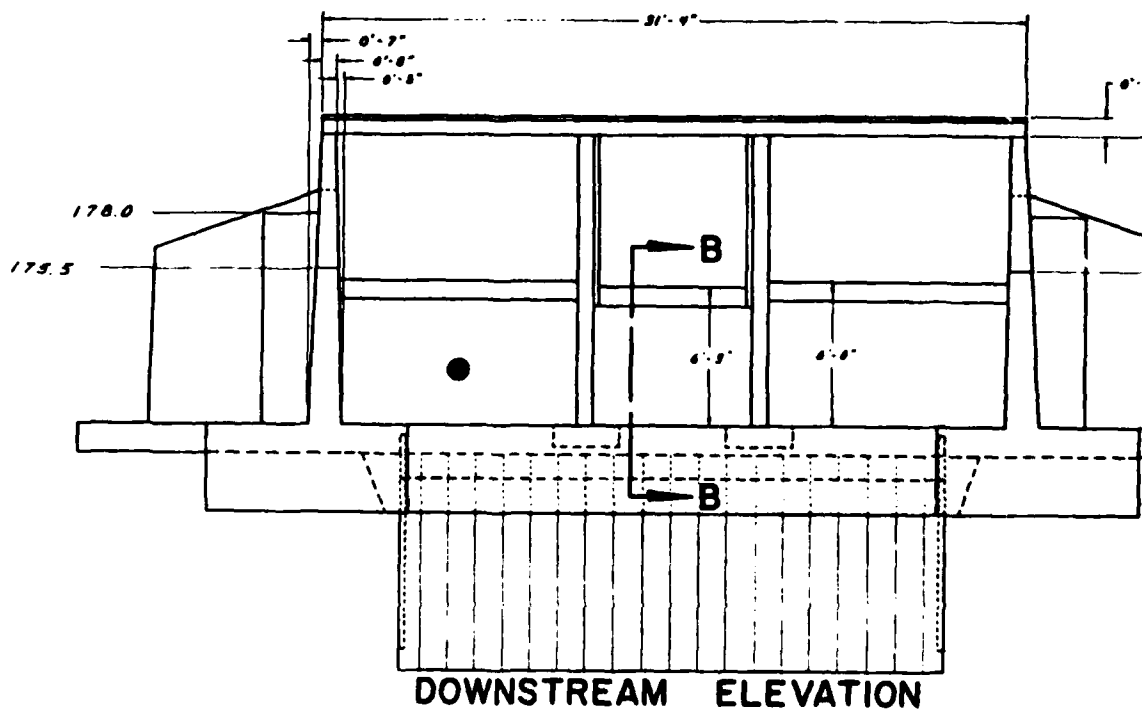
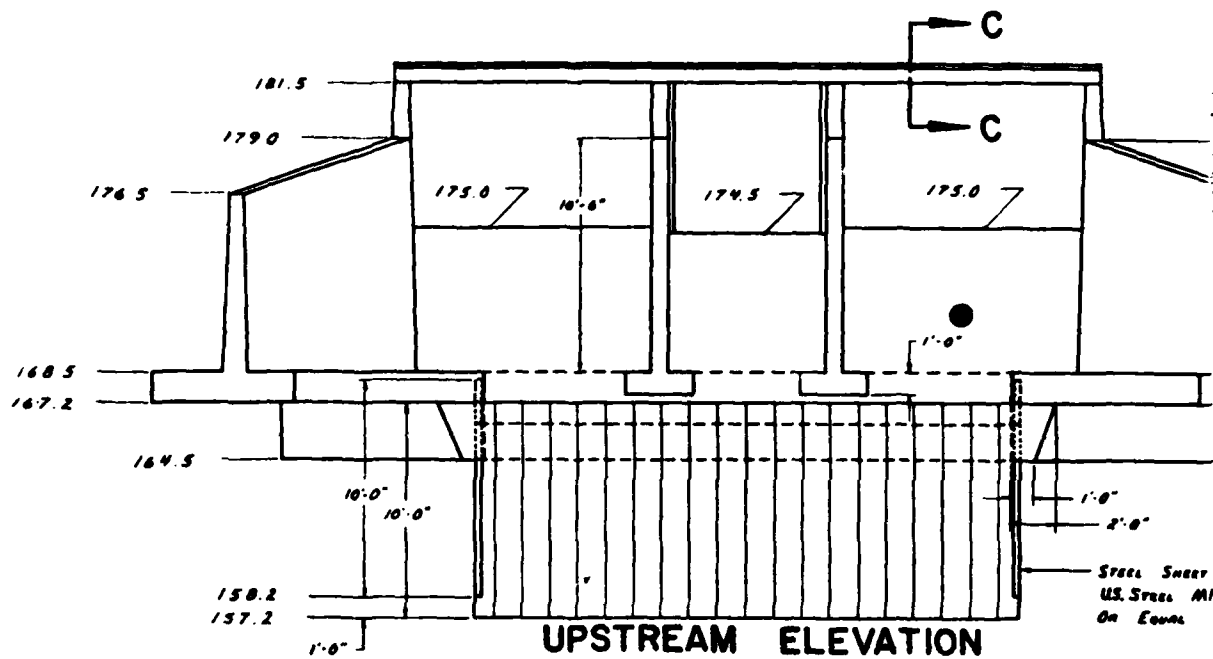
REVISED:



3 of 3

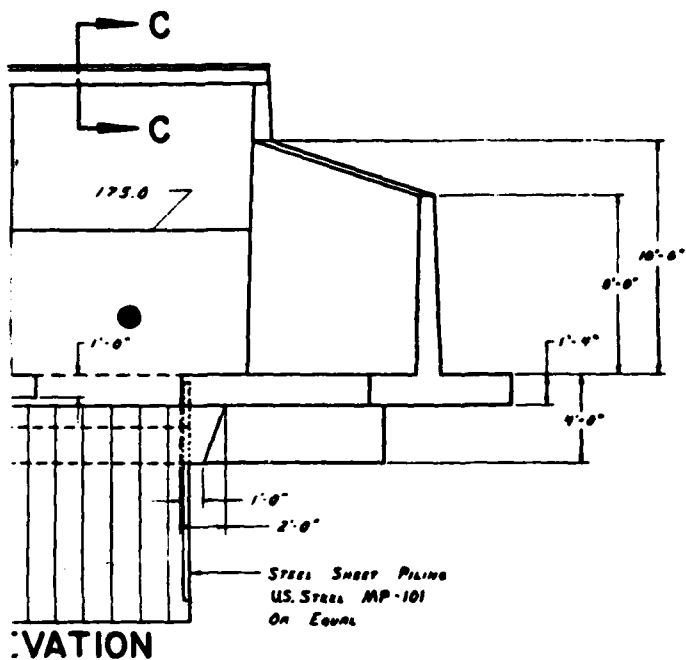
REVISED: MAY 10

CROSS SECTIONS FOR	
SPRING LAKE VILLAGE SPILLWAY	
SOUTHINGTON , CONN.	
SCALE: 1" = 10'	APRIL , 1970
SHEET 3 OF 7	
KRATZERT & JONES	
CIVIL ENGINEERS · LAND SURVEYORS · PLANNERS	

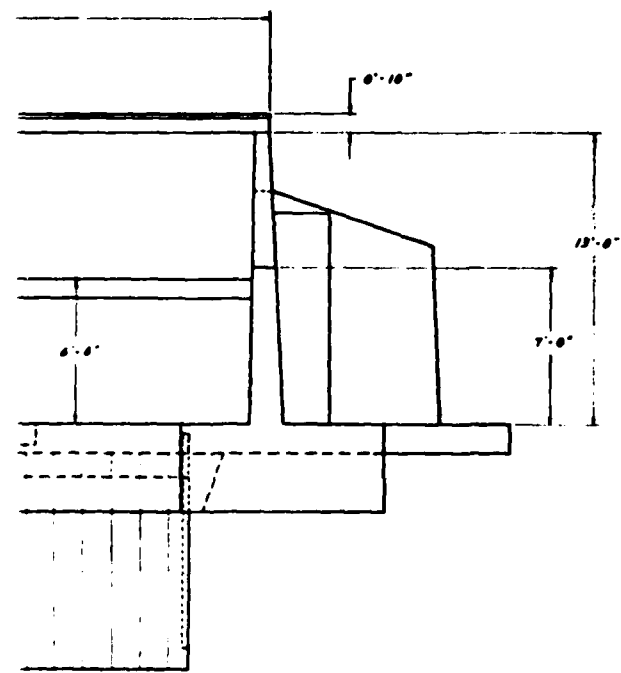


1 of 3

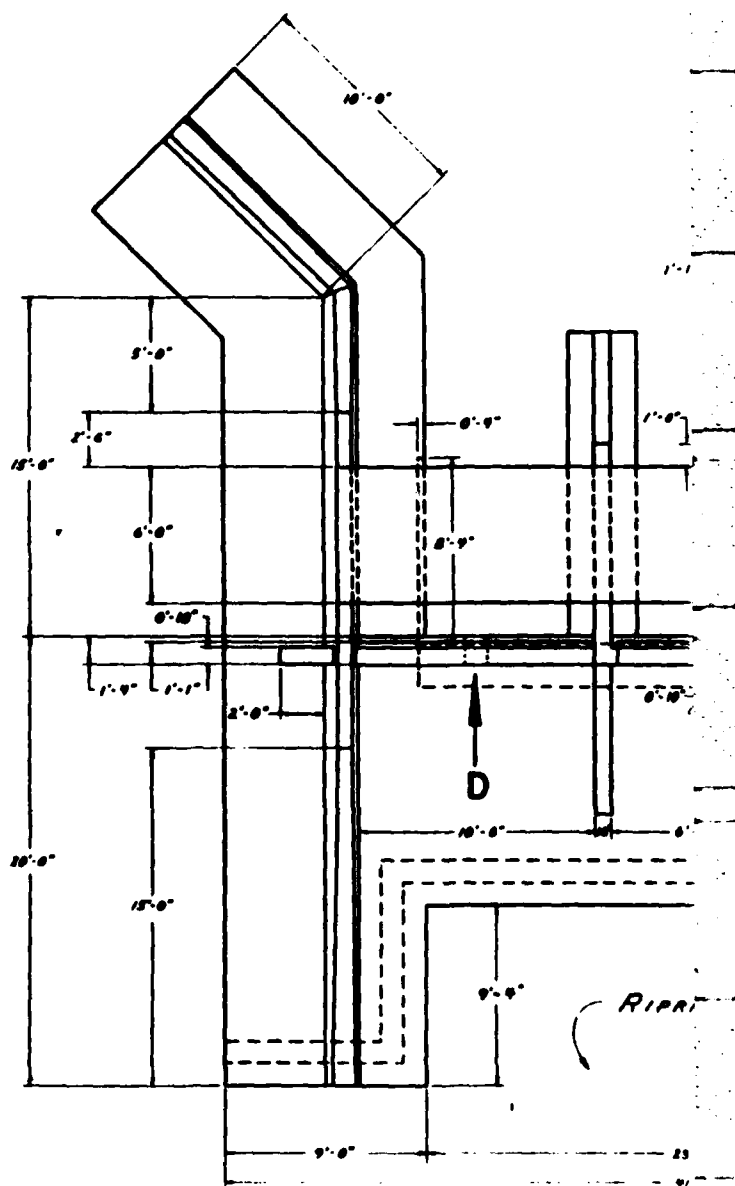
B-4



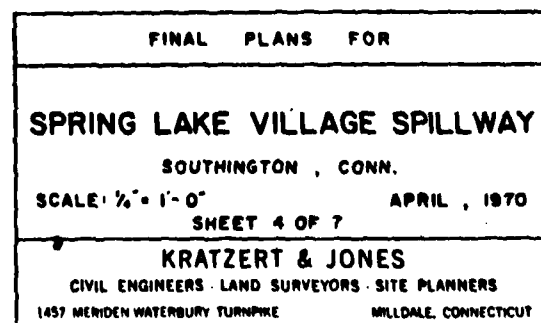
ELEVATION



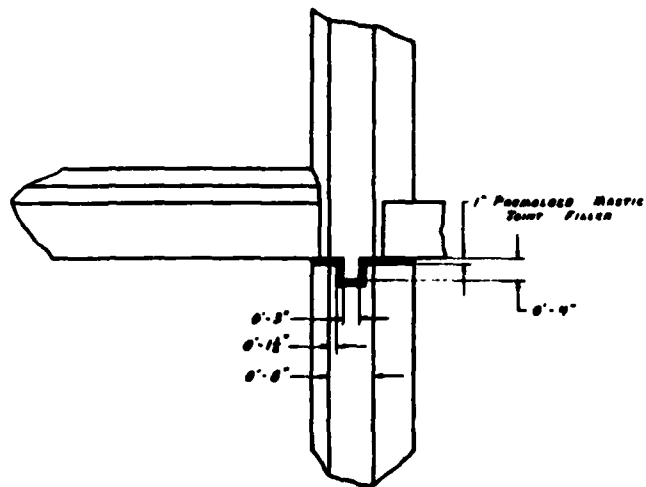
ELEVATION



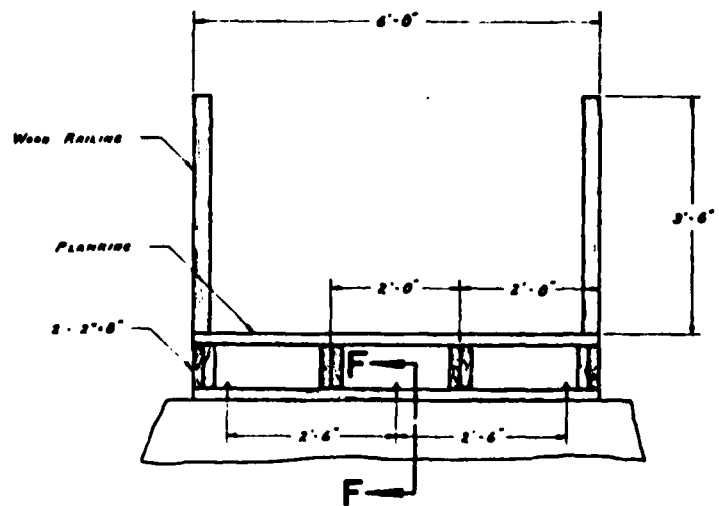
2 of 3

REVISÉ: M^{re}

1970



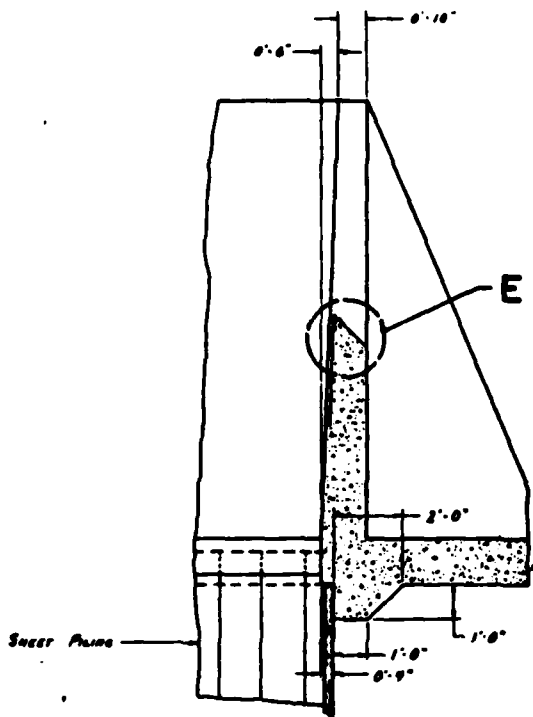
VIEW A
SCALE: 1/4" = 1'-0"



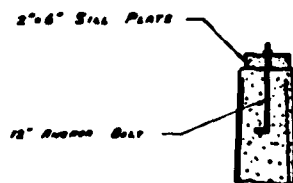
SECTION C-C
SCALE: 1/4" = 1'-0"

1 of 3

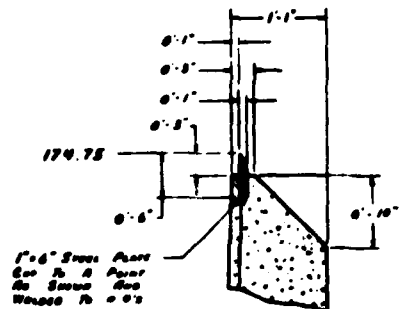
B-5



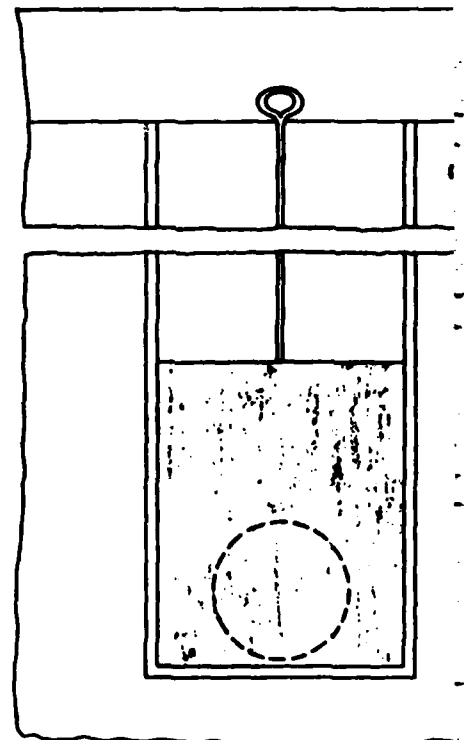
SECTION B-B
SCALE: $\frac{3}{8}$ " = 1'-0"



SECTION F-F
SCALE: 1" = 1'-0"

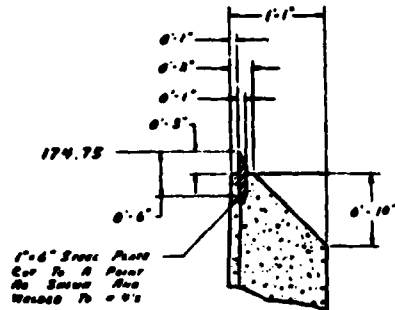


VIEW E
SCALE: 1" = 1'-0"
(CENTER SECTION ONLY)

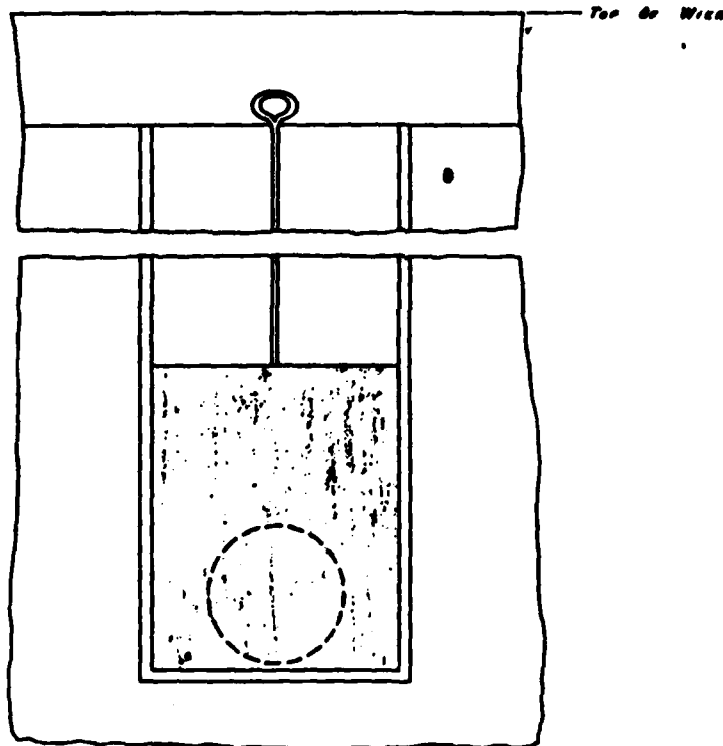


VIEW IN DIRECTION
(SLIDE GATE)

9 of 3



VIEW E
SCALE: 1" = 1' - 0"
(CENTER SECTION ONLY)



VIEW IN DIRECTION D
(SLIDE GATE)

3aff3

FINAL PLANS FOR

SPRING LAKE VILLAGE SPILLWAY
SOUTHINGTON, CONN.

SCALE: AS SHOWN APRIL, 1970
 SHEET 5 OF 7

KRATZERT & JONES

CIVIL ENGINEERS · LAND SURVEYORS · SITE PLANNERS

1457 MERIDEN-WATERBURY TURNPIKE

MILDALE, CONNECTICUT

REVISED: MAY 10, 1970



STATE OF CONNECTICUT
WATER RESOURCES COMMISSION
STATE OFFICE BUILDING - HARTFORD 15, CONNECTICUT

April 22, 1963

ORDER

Mrs. E. Gurlitz
282 Beaumont Street
Brooklyn, New York

Dear Mrs. Gurlitz:

According to the records in this office the so-called Spring Lake Dam, located on the Quinnipiac River about 0.7 mile easterly of the Southington Green, is under your ownership.

Section 25-110 of the 1958 Revision of the General Statutes places under the jurisdiction of this Commission all dams, "which, by breaking away or otherwise, might endanger life or property." The Commission finds that the failure of this dam would endanger life or property.

In accordance with Section 25-111 of the General Statutes this dam has been inspected and found to be in an unsafe condition. The statute states in part: . . . "If, after any inspection described herein, the commission finds any such structure to be in an unsafe condition, it shall order the person, firm or corporation owning or having control thereof to place it in a safe condition or to remove it, and shall fix the time within which such order shall be carried out."

The following specific recommendations are considered as minimum requirements to place this structure in a safe category:

1. Keep pond drawn down until repairs are made.
2. Repair earth embankment and masonry wall forming the downstream face of the overflow section.
3. Repair masonry walls adjoining the spillway.
4. Remove trees from embankment.

B-6

Mrs. E. Gurlitz

-2-

April 22, 1963

The repairs and alterations shall be carried out in accordance with engineering plans and specifications prepared by a registered engineer and submitted to this Commission for approval and the issuance of a permit prior to any construction work in accordance with Section 25-112 of the General Statutes.

The Commission shall be notified within two weeks what steps you plan to take to repair or remove the structure. The work shall be completed by September 15, 1963.

This is an order in accordance with Section 25-111 of the 1958 Revision of the General Statutes.

Very truly yours,

WATER RESOURCES COMMISSION

By William S. Wise, Director

WSW:mac

B-7

June 26, 1968

Mr. Francis J. Hubney, Trustee
459 Marion Ave.
Plantsville, Southington, Connecticut

SUBJECT: Spring Lake Dam, Southington

Dear Mr. Hubney:

According to the town clerk's office in Southington, the subject dam, also known as Camp Crestwood Pond Dam, was transferred to you from Elizabeth Gurlitz in October, 1967.

The Water Resources Commission has jurisdiction over this dam since it is one, "--which by breaking away or otherwise, might endanger life or property--". (See Section 25-110 of the General Statutes, copy enclosed.)

We do not know if you are aware of the fact that an ORDER was issued to the former owner by this Commission on April 22, 1963, to place this dam in a safe condition, (copy enclosed). According to this ORDER, the work was to be completed by September 15, 1963.

The ORDER was based on a finding by an engineering consultant to this Commission dated March 13, 1963 (copy enclosed) that this dam was unsafe.

Since that time, plans prepared by A. J. Macchi, Engineers, 44 Gillett Street, Hartford, dated May 22, 1963, were submitted for approval and a Construction Permit dated May 31, 1963 (copy enclosed) was issued by this office. In repeated letters after the permit was issued, it was brought to the former owner's attention that the repairs had not been completed and asking when they would be, but no direct answer was received.

B-8

June 26, 1968

This gives you a brief history of the events to date. The Water Resources Commission has a responsibility to see that the work is completed as indicated in its original ORDER. The original Construction Permit has expired and a new one must be applied for with plans prepared by an engineer registered in the State of Connecticut and bearing his certification and seal. Perhaps the simplest procedure would be to have the original engineer re-submit his plans (a copy of which is enclosed). There will be some additional work required, namely:

1. Repair deteriorated concrete block spillway.
2. Mortar beneath cap stones of spillway, on the downstream masonry wall.
- 3.
3. Remove all trees and brush growing on the earth embankments.
4. The top of the dam should be designed to withstand the weather and a good deal of pedestrian traffic.

We hope that this matter can be settled very quickly without the issuance of another ORDER and additional action. We are most concerned about the raising of the earth sections of the embankment to the level of the spillway abutment walls. This would give additional protection against failure of the dam due to overtopping. If we receive assurances that this work will proceed directly, it may not be necessary to drain the pond as stipulated in the original ORDER.

May we hear from you before July 10, 1968, as to your intentions?

Very truly yours,

William H. O'Brien III
Civil Engineer

WHOIII:ljs

cc: A. J. Macchi

B-9

INTERDEPARTMENT MAIL

DATE

June 26, 1968

TO File

DEPARTMENT

W. H. O'Brien III

DEPARTMENT

SUBJECT Spring Lake Dam or Camp Crestwood Pond Dam, Southington

On June 25, 1968, the undersigned looked at this dam to determine its present condition.

According to the Southington town clerk's office, the property was transferred in October, 1967, from Elizabeth Gurlitz to :

- | | | |
|---|---|----------|
| 1. Francis J. Hubeny
459 Marion Ave.
Plantville, Southington, Connecticut | } | TRUSTEES |
| 2. Raymond Stollman | | |
| 3. Albert C. Bassett | | |

The ORDER reads as follows:

1. Keep pond drawn down until repairs are made.
--(Pond was full with water flowing at a depth of 1" in 39" wide dry weather spillway.)
2. Repair earth embankment and masonry wall forming the downstream face of the overflow section.
(The masonry wall has been repaired but needs additional pointing up beneath cap stones of spillway. The earth embankment has not been raised.)
3. Repair masonry walls adjoining spillway.
(This has been done.)
4. Remove trees from embankment. (This has not been done.)

The construction permit has expired, and of the ten items under "scope of work" in the approved plans by Macchi dated May 22, 1963, only #5 and #9 have been done. From the field inspection on June 25, 1968, it appeared that at least the remainder of these items should be completed to place the dam in a safe condition. In addition to these items, the concrete block spillway is deteriorated badly and has gotten worse since the last picture (photo #2 with McKenzie's report of March 14, 1966)--see attached picture taken on June 25, 1968. This should be repaired in addition to repointing of the spillway cap stones.

B-10

INTERDEPARTMENT MAIL

DATE June 26, 1968

TO

File

DEPARTMENT

FROM

W. H. O'Brien III

DEPARTMENT

SUBJECT

Spring Lake Dam or Camp Crestwood Pond Dam, Southington

Page -2-

Note (A) (10) under "scope of work" should be changed to read: "Remove all trees and brush from the top and sides of the dam."

The low spot in the north embankment was only one foot $\pm$ above the general spillway. An 8" $\pm$ cast iron drawdown (?) was observed coming from the downstream embankment at the north end of the dam, the flow line of which was about 6' $\pm$ below the general spillway level. This pipe was leaking slightly. I did not see a valve on the upstream side.

William H. O'Brien III

William H. O'Brien III
Civil Engineer

WHOIII:ljs

B-11



STATE OF CONNECTICUT

WATER RESOURCES COMMISSION

STATE OFFICE BUILDING

HARTFORD, CONNECTICUT 06115

CONSTRUCTION PERMIT FOR DAM

May 28, 1970

Mr. Francis J. Hubeny and
Mr. Albert C. Bassett and
Mr. Raymond Stollman, Trustees
c/o Mr. Stephen K. Elliott, Esq.
98 Main Street
Southington, Connecticut 06489

TOWN: Southington
RIVER: Quinnipiac River
TRIBUTARY: Unnamed

Gentlemen:

Your application for a permit to ~~XXXXXX~~ (repair) : an unnamed
(construct) a dam on _____
tributary of Quinnipiac River known as Spring Lake Dam
in the Town of Southington in accordance
with plans prepared by Kratzert and Jones
dated April 1970, Rev. May 10, 1970 has been reviewed.

The construction, in accordance with those plans, is APPROVED under the conditions which follow.

- I. The Commission shall be notified as follows:
 - a) When construction is started.
 - b) When construction is completed and ready for final inspection.
- II. This permit with the plans and specifications must be kept at the site of the work and made available to the Commission at any time during the construction.
- III. If any changes are contemplated or required, the Commission must be notified and supplementary approval obtained.
- IV. If the construction authorized by this permit is not started within 2 years of the date of this permit and completed within 4 years of the date, this permit must be renewed.
- V. Additional requirements -

B-12

Your attention is directed to Section 25-112 of the 1958 Revision of the General Statutes which states in part regarding this Construction Permit: "A copy of the permit shall be sent to the town clerk." The enclosed carbon copy of this permit is the copy intended for the town clerk and it is your obligation to duly file this copy.

Your attention is further directed to Section 25-115 of the 1958 Revision of the General Statutes - "Liability of Owner or Operator". Nothing in this chapter and no order, approval or advice of the Commission or a member thereof, shall relieve any owner or operator of such a structure from his legal duties, obligations and liabilities resulting from such ownership or operation. No action for damages sustained through the partial or total failure of any structure or its maintenance shall be brought or maintained against the state, a member of the Commission or the Commission, or its employees or agents, by reason of supervision of such structure exercised by the Commission under this chapter."

The Commission cannot convey or waive any property right in any lands of the State, nor is this permit to be construed as giving any property rights in real estate or material or any exclusive privileges, nor does it authorize any injury to private property or the invasion of private rights or any infringement of federal, state or local laws or regulations.

Your attention is also directed to Section 26-134 of the 1958 Revision of the General Statutes - "Obstructing Streams". No person shall, unless authorized by the director, prevent the passing of fish in any stream or through the outlet or inlet of any pond or stream by means of any rack, screen, weir or other obstruction or fail, within ten days after service upon him of a copy of an order issued by the director, to remove such obstruction." The address of the State Board of Fisheries and Game is State Office Building, Hartford, Connecticut.

Very truly yours,

WATER RESOURCES COMMISSION

John J. Curry, Director

JJC/CHOIII/h

cc: Kratzert & Jones

B-B

INT DEB MEL MES...3
STO 200 2/69

SAVE TIME. Handwritten messages are acceptable.
Use carbon if you really need a copy

TO	C. J. Pelletier	AGENCY	WRC	DATE	11/10/70
FROM	W. P. Sander	AGENCY	WRC	TELEPHONE	
SUBJECT	Southington - Spring Lake Dam				

On the above date, an inspection was made of the subject dam for which a Construction Permit was issued on May 28, 1970.

The dam has been constructed in accordance with the plans as prepared by Kratzert and Jones dated April 1970 and revised May 10, 1970. A good stand of grass has started.

It is my recommendation that a Certificate of Approval be issued.

WPS:m

W. P. Sander
William P. Sander

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

B-14



STATE OF CONNECTICUT

WATER RESOURCES COMMISSION

STATE OFFICE BUILDING

HARTFORD, CONNECTICUT 06115

CERTIFICATE OF APPROVAL

November 17, 1970

Mr. Francis J. Hubeny and
Mr. Albert C. Bassett and
Mr. Raymond Stollman, Trustees
c/o Mr. Stephen K. Elliott, Esq.
98 Main Street
Southington, Connecticut 06489

TOWN: Southington
RIVER: Quinnipiac River
TRIBUTARY: unnamed
CODE NO.: Q32.8 U 1.2

NAME AND LOCATION OF STRUCTURE: Spring Lake Dam is located in Southington approximately 3400 feet east of Route 10 and immediately south of Woodruff Street.

DESCRIPTION OF STRUCTURE AND WORK PERFORMED: Reconstruction of an existing earth dam with a new, three-bay spillway.

CONSTRUCTION PERMIT ISSUED UNDER DATE OF: May 23, 1970

This certifies that the work and construction included in the plans submitted, for the structure described above, has been completed to the satisfaction of this Commission and that this structure is hereby approved in accordance with Section 25-114 of the 1958 Revision of the General Statutes.

The owner is required by law to record this Certificate in the land records of the town or towns in which the structure is located.

WATER RESOURCES COMMISSION

John J. Curry, Director

JJC:S:m

B-15

INSP. 1-30-79₂-

II. Spring Lake, Southington

This is a relatively new dam (construction date - 1970) consisting of an earth embankment and concrete spillway section. As I understand the problem, individuals were concerned about cracking in the downstream counterforts of the spillway. Upon inspection, some surface cracking of the concrete was evident, one location appearing to be at a construction joint. As the major forces on these counterforts are compressive and as sufficient reinforcing steel is present, I do not believe these surface cracks are of a critical nature.

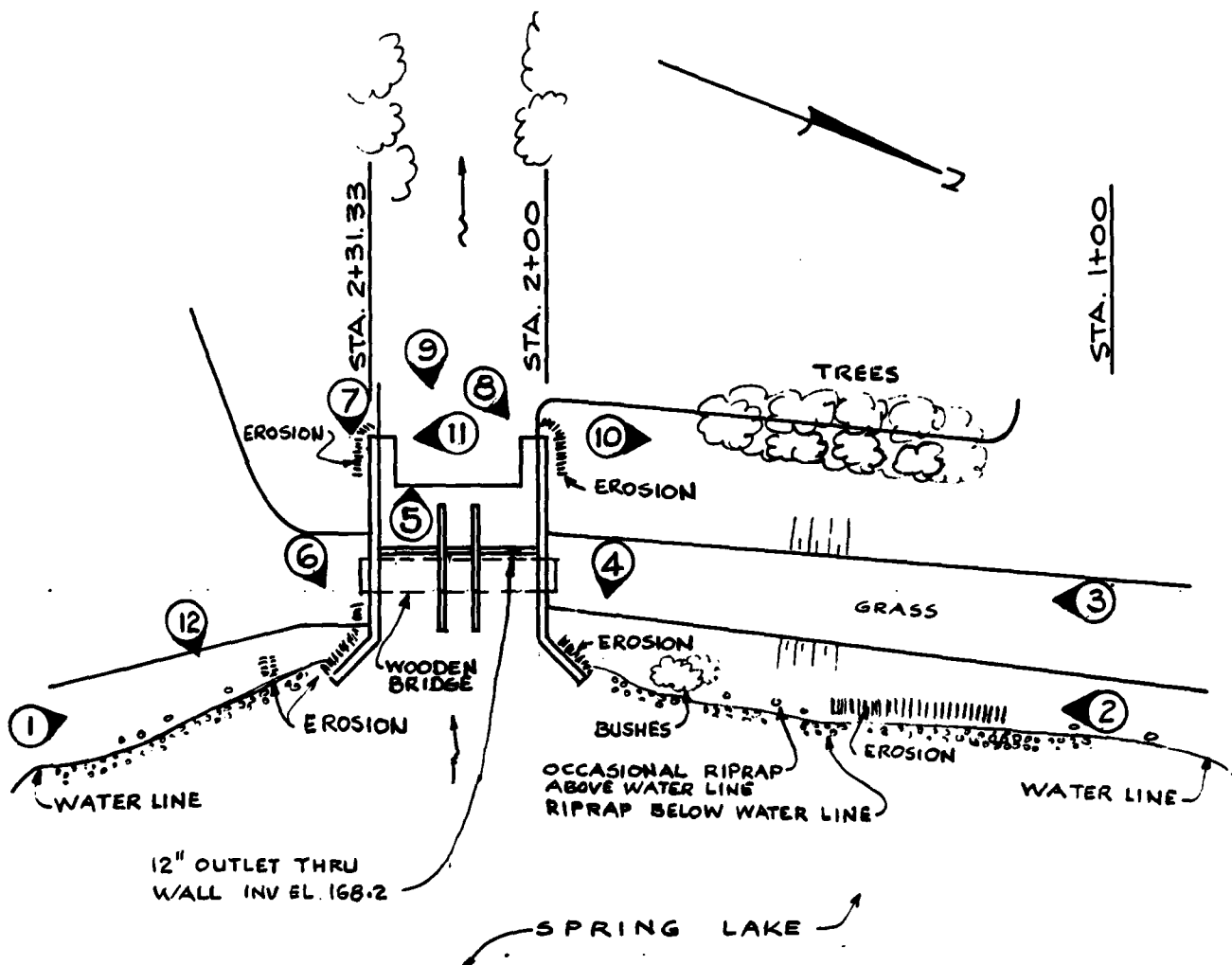
Paul Biscuits

PB:1jk

B-16

APPENDIX C

PHOTOGRAPHS



PLAN
SCALE 1"=30' APPROX.

③ REFERS TO PHOTO NUMBER,
LOCATION AND DIRECTION

NOTES REFER TO EXISTING CONDITION ON
MAY 27, 1981

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

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

NATIONAL
PROGRAM
OF
INSPECTION
OF
NON FED
DAMS

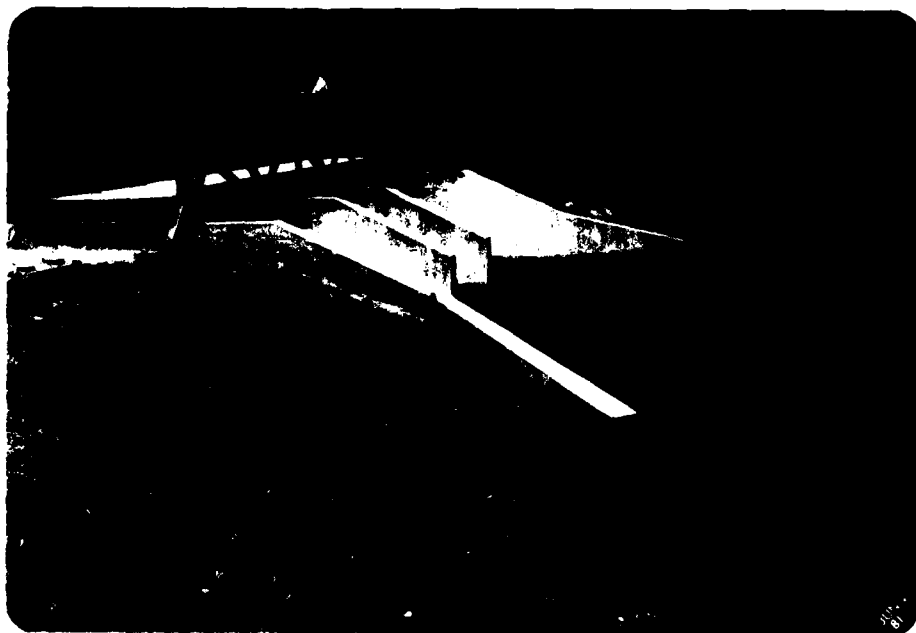
PHOTO LOCATION PLAN

SPRING LAKE DAM

TR-QUINNIPIAC RIVER

SOUTHINGTON

CONNECTICUT



1. Upstream face of dam, view toward right abutment, erosion adjacent to left spillway training wall, only occasional pieces of riprap above water line.



2. Upstream face of dam, right side; large clusters of brush near the water line.

PHILIP W. GENOVESE & ASSOCIATES, INC.
ENGINEERS HAMDEN, CONNECTICUT

SPRING

LAKE

DAM

(CT00306)



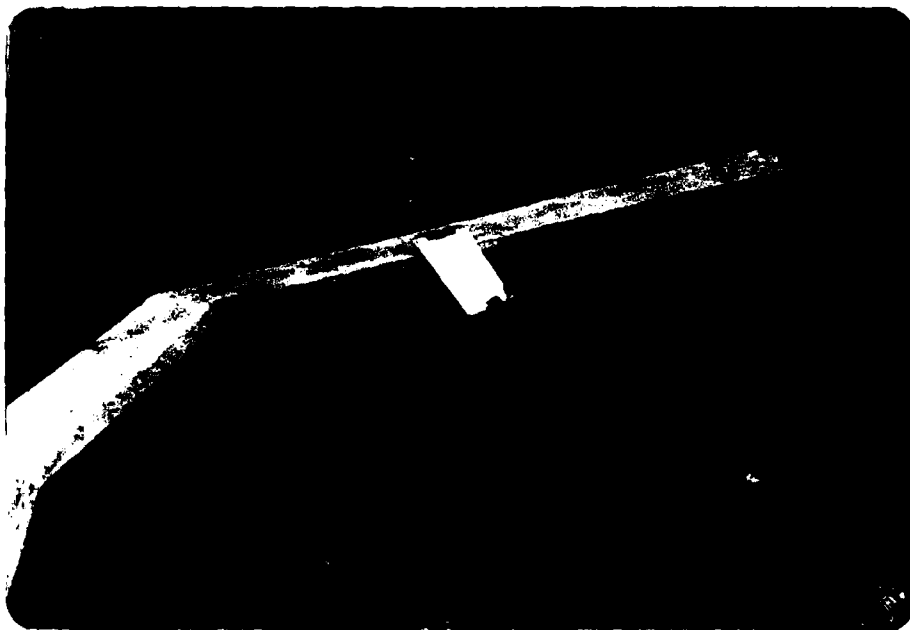
3. View along crest looking toward left abutment.



4. Erosion adjacent to right training wall.



5. Discharge channel looking downstream



6. Erosion adjacent to left spillway training wall.

PHILIP W. GENOVESE & ASSOCIATES, INC.
ENGINEERS HAMDEN, CONNECTICUT

SPRING

LAKE

DAM

(CT00306)



7. Pedestrian path on downstream face adjacent to left spillway training wall.

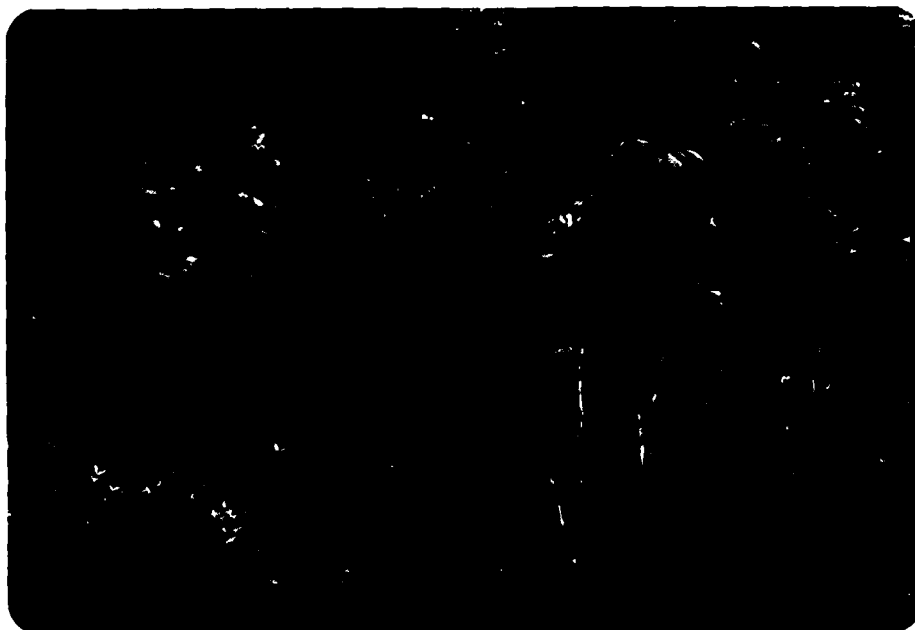


8. Erosion adjacent to end of right spillway training wall.

PHILIP W. GENOVESE & ASSOCIATES, INC.		SPRING	LAKE	DAM	(CT00306)
ENGINEERS	HAMDEN, CONNECTICUT				



9. View of downstream face of spillway. Note outlet gate in left bay.
Note gate in center bay. Wood boards for concrete surface protection.



10. Downstream face, right side of dam.

PHILIP W. GENOVESE & ASSOCIATES, INC.
ENGINEERS HAMDEN, CONNECTICUT

SPRING

LAKE

DAM

(CT00306)



11. Downstream face to left of spillway.



12. Reservoir area.

PHILIP W. GENOVESE & ASSOCIATES, INC.
ENGINEERS HAMDEN, CONNECTICUT

SPRING

LAKE

DAM

(CT00306)

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS



N	0 2000 4000 FT. SCALE	DRAINAGE & IMPACT AREA MERIDEN QUAD DRAINAGE AREA = 1.13 SQ.M.	
PHILIP W. GENOVESE & ASSOCIATES, INC. ENGINEERS HAMDEN, CONNECTICUT		SPRING LAKE DAM (CT00306)	

PROJ. NO. 80411
DESCRIPTION Spring Lake Dam
Southington, Conn

GENOVESE AND ASSOCIATES
CONSULTING ENGINEERS
HAMDEN, CONN.

SHEET NO. D-2 OF 23
BY WJG DATE 5-28-81
CHKD. BY _____ DATE _____

Spring Lake Dam -

Size of Dam -

$$\begin{aligned}\text{Top of Dam} &= 181.5 \\ \text{D/S Invert} &= 168.5 \\ \text{Height of Dam} &= 13.0'\end{aligned}$$

Storage Capacity

$$\text{Surface Area of Lake @ elev 175} = 7.3 \text{ AC}$$

$$\text{Surface Area of Lake @ elev 180} = 13.3 \text{ AC}$$

$$\text{Surface Area of Lake @ elev 190} = 36.7 \text{ AC}$$

For the water stored between the assumed normal w.s. elev (elev. 175) and the d/s invert (elev. 168.5) we will assume a conical volume ($V = \frac{1}{3} \times b \times h$). For the area between the normal w.s. elev (175) and the top of dam we will use $\frac{b_1 + b_2}{2} \times h$.

Therefore we have:

$$V = \left[\frac{1}{3} \times 7.3 \times 6.5 \right] + \left[\frac{7.3 + 16.8}{2} \times 6.5 \right]$$

$$V = 15.3 + 79.3$$

$$V = 94.1 \text{ AC-FT}$$

Using the COE guidelines (Table 1) for determining the size of dams this is classified as a SMALL dam as governed by storage capacity.

$$\text{Height} = 13'$$

$$\text{Storage} = 94.1 \text{ AC-FT} \quad \text{and } 0.12 > 50 \quad 2.1 \times 1000$$

PROJ. NO. B04111
 DESCRIPTION Spring Lake Dam
Southington, Conn.

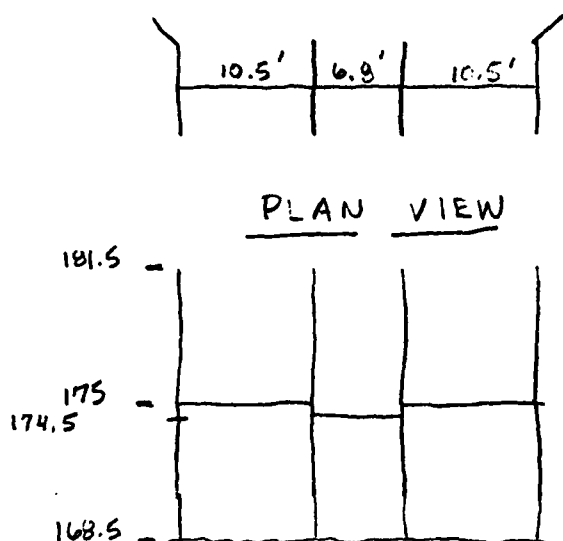
GENOVESE AND ASSOCIATES
 CONSULTING ENGINEERS
 HAMDEN, CONN.

SHEET NO. D-3 OF 23
 BY WJB DATE 5-28-81
 CHKD. BY _____ DATE _____

SPILLWAY ANALYSIS -

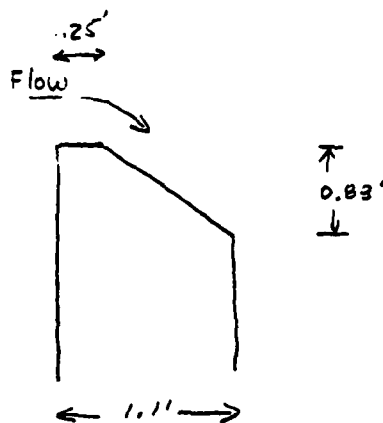
Spring Lake Dam

The Spillway at Spring Lake Dam consists of a sharp crested weir spanning across 3 separate bays. Detailed plan, profile and section views are shown on sheets B-4 & B-5. Briefly however we have the following:



PLAN VIEW

ELEVATION VIEW



Our analysis of the spillway will be done using formulas for sharp crested weirs found on page 175 of Open Channel Flow by F.M. Henderson. The general formula is:

$$Q = \frac{2}{3} C_d L \sqrt{2g} H^{3/2}$$

$$C = \frac{2}{3} C_d \sqrt{2g}$$

The calculations utilizing this formula and the information from the graphs above are found on the next page.

where $C_d = 0.611 + .08 \frac{H}{W}$

H = depth of flow

W = elev from weir to d/s channel invert

Formula is acceptable

for $\frac{H}{W} < 5$

PROJ. NO. 80411
 DESCRIPTION Spring Lake Dam
Southampton, Conn

GENOVESE AND ASSOCIATES
 CONSULTING ENGINEERS
 HAMDEN, CONN.

SHEET NO. D-4 OF 23
 BY 11-26 DATE 5-28-81
 CHKD. BY _____ DATE _____

Spring Lake Dam

ELEV	C ₁	L ₁	Q ₁	C ₂	L ₂	Q ₂	C ₃	L ₃	Q ₃	Q _{OUT}
174.5	-	10.5'	0	-	6.8'	0	-	10.5'	0	0
175.0	-		0	3.33		8	-		0	8
176.0	3.34		35	3.40		42			35	112
177.0	3.41		101	3.47		93			101	295
178.0	3.48		190	3.54		158			190	538
179.0	3.55		298	3.61		234			298	830
180.0	3.62		425	3.68		323			425	1173
181.0	3.68		564	3.75		423			568	1559
181.5	3.72	✓	647	3.78	✓	476			647	1770

p. 4-12 Kings Handbook

$$Q_{OUTLET} = C A \sqrt{2g \Delta H} \quad C = 0.615 + .007 \times 2^{5-h}$$

$$Q_{SPWY ELEV (174.5)} = 0.622 (\pi (1/2)^2 (8.02) (5.0)^{1/2} \quad INV_{12'} = 168.2$$

$$H = 174.5 - (168.2 + \frac{16}{12})$$

$$H = 5.0'$$

$$Q_{174.5} = 9.3 \text{ CFS}$$

$$Q_{178.6} = (.619) \pi (1/2)^2 (8.02) (6)^{1/2}$$

$$Q_{178.6} = 9.6 \text{ CFS}$$

Assumed
 $TW = 168.5 + 41 = 172.6$

$$\Delta H = 179.6 - 172.6 = 6.0'$$

p. 4-33 Table 4-8
 Kings Hbk C = .619
 Figure C D = 1.31'

$$Q_{181.5} = (.619) \pi (1/2)^2 (8.02) (6)^{1/2}$$

$$Q_{181.5} = 9.6 \text{ CFS}$$

Assumed
 $TW = 168.5 + 7 = 175.5$

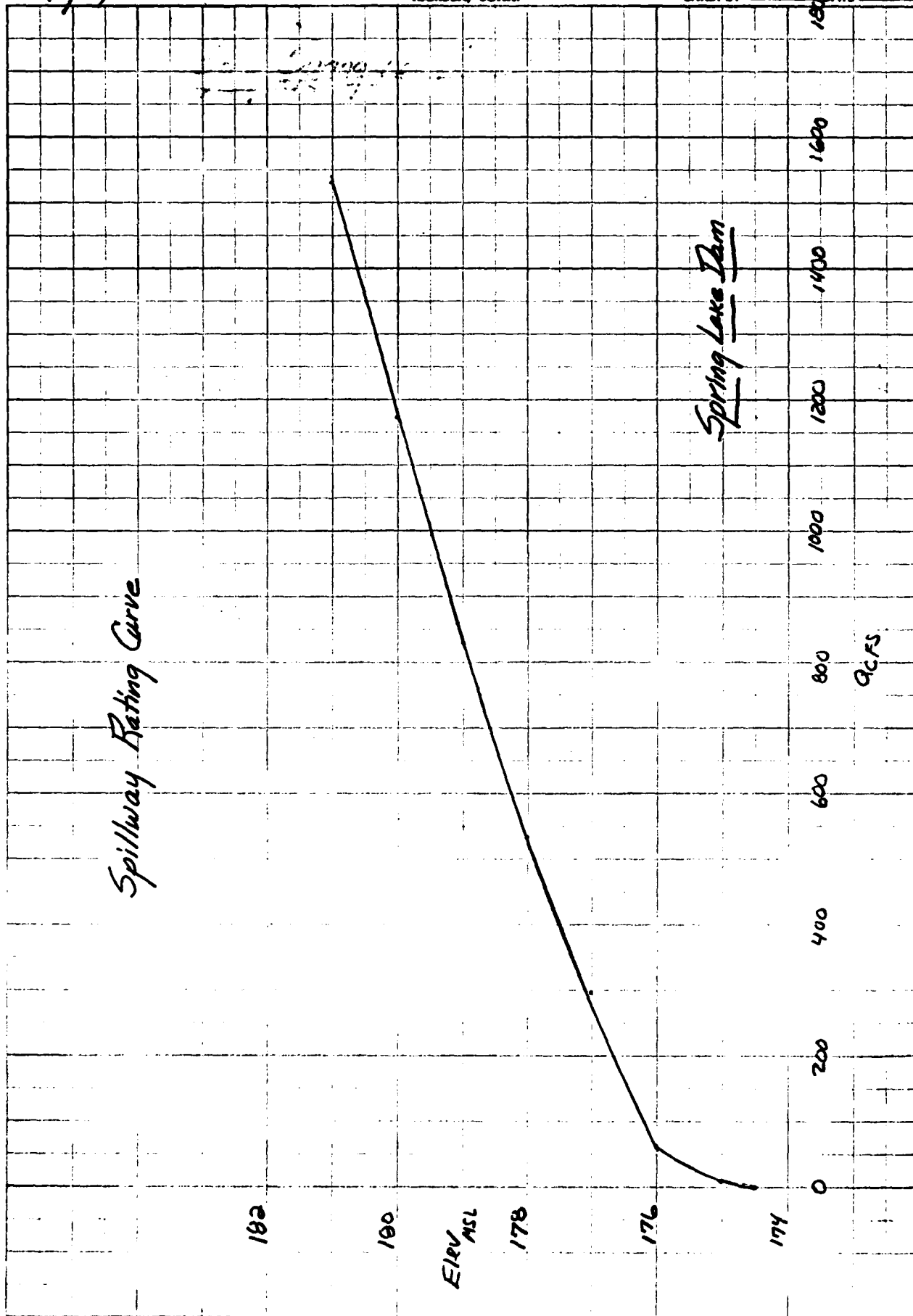
$$\Delta H = 181.5 - 175.5 = 6'$$

Effect on outlet is negligible #15

PROJ. NO. 80411
DESCRIPTION Spring Lake Dam
Washington, D.C.

GENOVESE AND ASSOCIATES
CONSULTING ENGINEERS
HAMDEN, CONN.

SHEET NO. D-5 OF 23
BY WJG DATE 5-28-81
CHKD. BY _____ DATE _____



PROJ. NO. 804111
DESCRIPTION Spring Lake Dam
Southington, Conn.

GENOVESE AND ASSOCIATES
CONSULTING ENGINEERS
HAMDEN, CONN.

SHEET NO. D-6 OF 23
BY WJG DATE 5-24-81
CHKD. BY _____ DATE _____

Spring Lake Dam
Probable Maximum Flood (PMF)

The PMF to be used in the spillway analysis is based on the size of the dam and the downstream hazard potential. This is a SMALL dam. The downstream hazard potential is estimated to be SIGNIFICANT or HIGH due to the existence of a fairly low lying residential area 700-800 feet downstream of the dam. The range of spillway design floods for each of these (taken from Table 3) is:

SMALL dam w/ SIGNIFICANT HAZARD -
100 yr $\rightarrow$ $\frac{1}{2}$ PMF

SMALL dam w/ HIGH hazard -
 $\frac{1}{2}$ PMF $\rightarrow$ PMF

Considering the uncertainty with regards to hazard factor we will use $\frac{1}{2}$ PMF for the spillway analysis.

Drainage Area Tributary to Dam = 1.13 square miles (see D1 of 23)

Watershed Characteristics = Flat to Rolling
 $\therefore$ from the COE Max. Probable Flood Peak Flow Rate Chart a PMF = $930 \frac{\text{CFS}}{\text{MI}^2} \rightarrow 2125 \frac{\text{CFS}}{\text{MI}^2}$

Considering the watershed we will use a value which is equal to $930 \frac{\text{CFS}}{\text{MI}^2}$ plus one third

the difference between $2125 \frac{\text{CFS}}{\text{MI}^2}$ & $930 \frac{\text{CFS}}{\text{MI}^2}$. Thus

$$= 930 + \frac{1}{3}(2125 - 930) = 1330 \frac{\text{CFS}}{\text{MI}^2}$$

$$\frac{1}{2} \text{ PMF} = \frac{1}{2} \times 1330 \frac{\text{CFS}}{\text{MI}^2} \times 1.13 \text{ MI}^2 = 750 \text{ CFS}$$

PROJ. NO. 02411
 DESCRIPTION Spring Lake Dam
Southbury, Conn.

GENOVESE AND ASSOCIATES
 CONSULTING ENGINEERS
 HAMDEN, CONN.

SHEET NO. D-7 of 23
 BY WJG DATE 5-28-81
 CHKD. BY _____ DATE _____

SURCHARGE STORAGE ROUTING

$$\text{Inflow} = 750 \text{ cfs}$$

$$\text{Elev} = 178.75$$

This equals:

$$\text{STOR}_1 = \frac{(178.75 - 174.5 \text{ ft}) \left(\frac{12''}{\text{ft}} \right) \frac{(7.3 + 11.8) \text{ AC}}{2}}{1.13 \frac{\text{in}}{\text{ft}} (640 \frac{\text{AC}}{\text{ft}})} = 0.67'' \text{ Runoff}$$

$$Q_{P2} = Q_{P1} \times \left(1 - \frac{\text{STOR}_1}{19/2} \right)$$

$$Q_{P2} = 750 \times \left(1 - \frac{0.67}{9.5} \right)$$

$$Q_{P2} = 697 \text{ cfs}$$

$$\text{Elev} = 178.6$$

$$\text{STOR}_2 = \frac{(178.6 - 174.5) (12) \frac{(7.3 + 11.4)}{2}}{1.13 (640)} = 0.64'' \text{ Runoff}$$

$$Q_3 = 750 \times \left(1 - \frac{.67 + .64}{2} \right)$$

$$Q_{P3} = 698 \text{ cfs} \quad (\text{say } 700 \text{ cfs})$$

$$\text{Elev} = 178.6$$

The resulting outflow is 700 cfs
 @ an elevation of 178.6. The spillway
 can handle $\frac{1770}{700} \times 100 = 253\%$ (say 250%)
 of the design flood.

Dam Breach Analysis -

$$Q_b = \frac{8}{27} (0.4) W_b \sqrt{g} d^{3/2}$$

$$Q_b = \frac{8}{27} (0.4) (150) (32.2)^{1/2} (13)^{3/2}$$

$$W_b = 150'$$

$$g = 32.2$$

$$d = 13'$$

$Q_b = 4728$ CFS. In addition to this 60' breach (.4 x 150') in the embankment there will be a spillway discharge of:

$$Q_{SPWY} \text{ w/ water @ top of dam} = 1770 \text{ CFS}$$

$$Q_{TOTAL} = Q_b + Q_{SPWY}$$

$$Q_{TOTAL} = 4728 + 1770 = 6498 \text{ CFS}$$

$$Vol = 94.1 \text{ AC-FT}$$

SECTION AT DAM

$$Q_0 = 1770 \text{ CFS @ elev } 181.5$$

$$Q_{PK} = 6498 \text{ CFS @ } d + z = \frac{2}{3} (13) + 168.5$$

$$\text{elev} = 177.2$$

SECTION A (500' dls of dam)

$$Q_0 = 1770 \text{ CFS}$$

$$\text{Elev}_0 = 173.2$$

$$A_0 = 760 \text{ FT}^2$$

$$Q_{PF} = 6498 \text{ CFS}$$

$$\text{Elev}_{PF} = 176.7$$

$$A_{PF} = 1730 \text{ FT}^2$$

$$\text{Vol in Reach} = \frac{500' (1730 - 760 \text{ FT}^2)}{43,560 \frac{\text{FT}^2}{\text{AC}}} = 11.1 \text{ AC-FT}$$

$$Q_{P2} = Q_{P1} \left(1 - \frac{V_1}{S}\right)$$

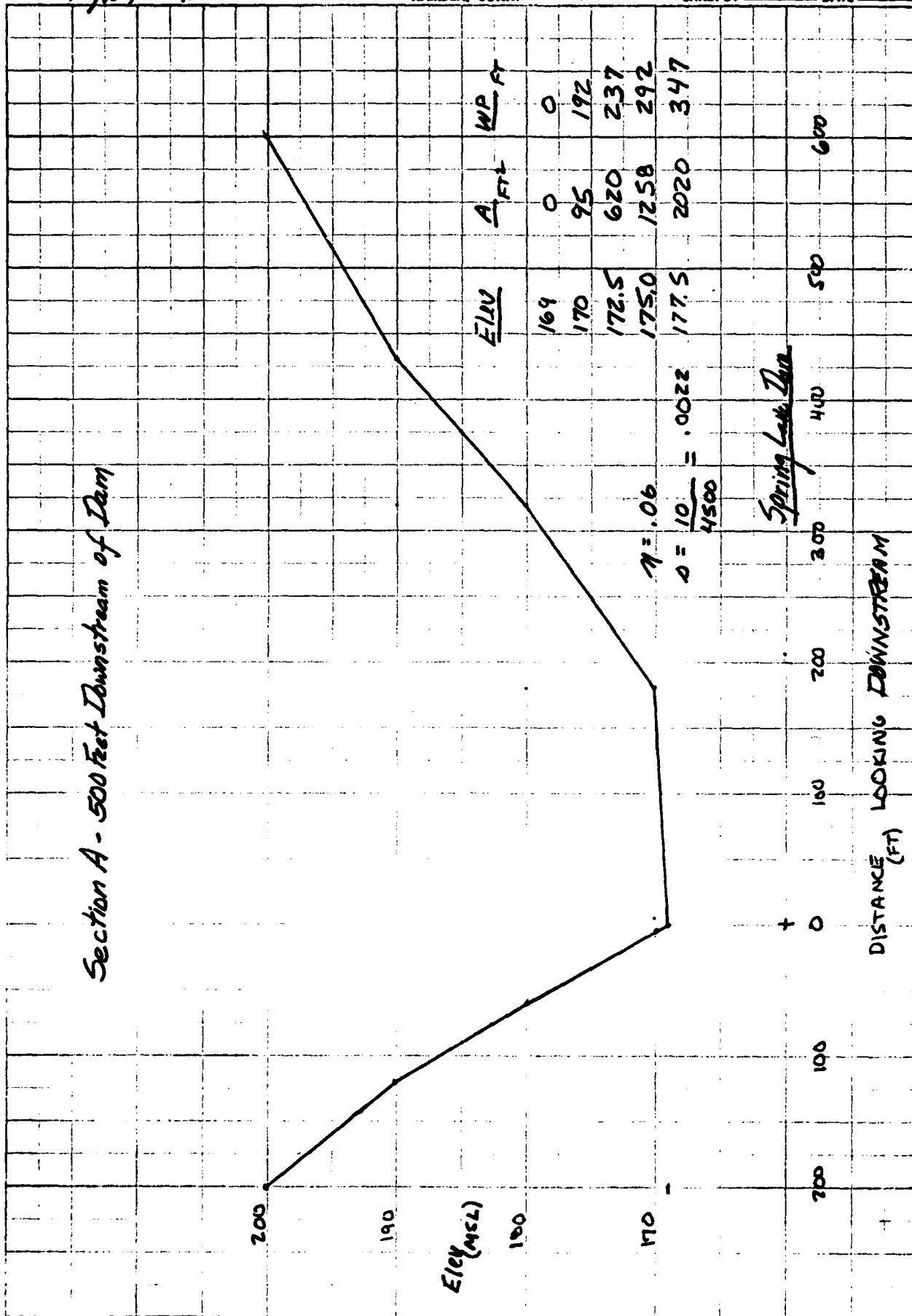
$$Q_{P2} = 6498 \left(1 - \frac{11.1}{94.1}\right) = 5731 \text{ CFS}$$

PROJ. NO. B04111
 DESCRIPTION Spring Lake Dam
Southampton, Conn.

GENOVESE AND ASSOCIATES
 CONSULTING ENGINEERS
 HAMDEN, CONN.

SHEET NO. D-9 OF 23
 BY WJT DATE 5-28-61
 CHKD. BY _____ DATE _____

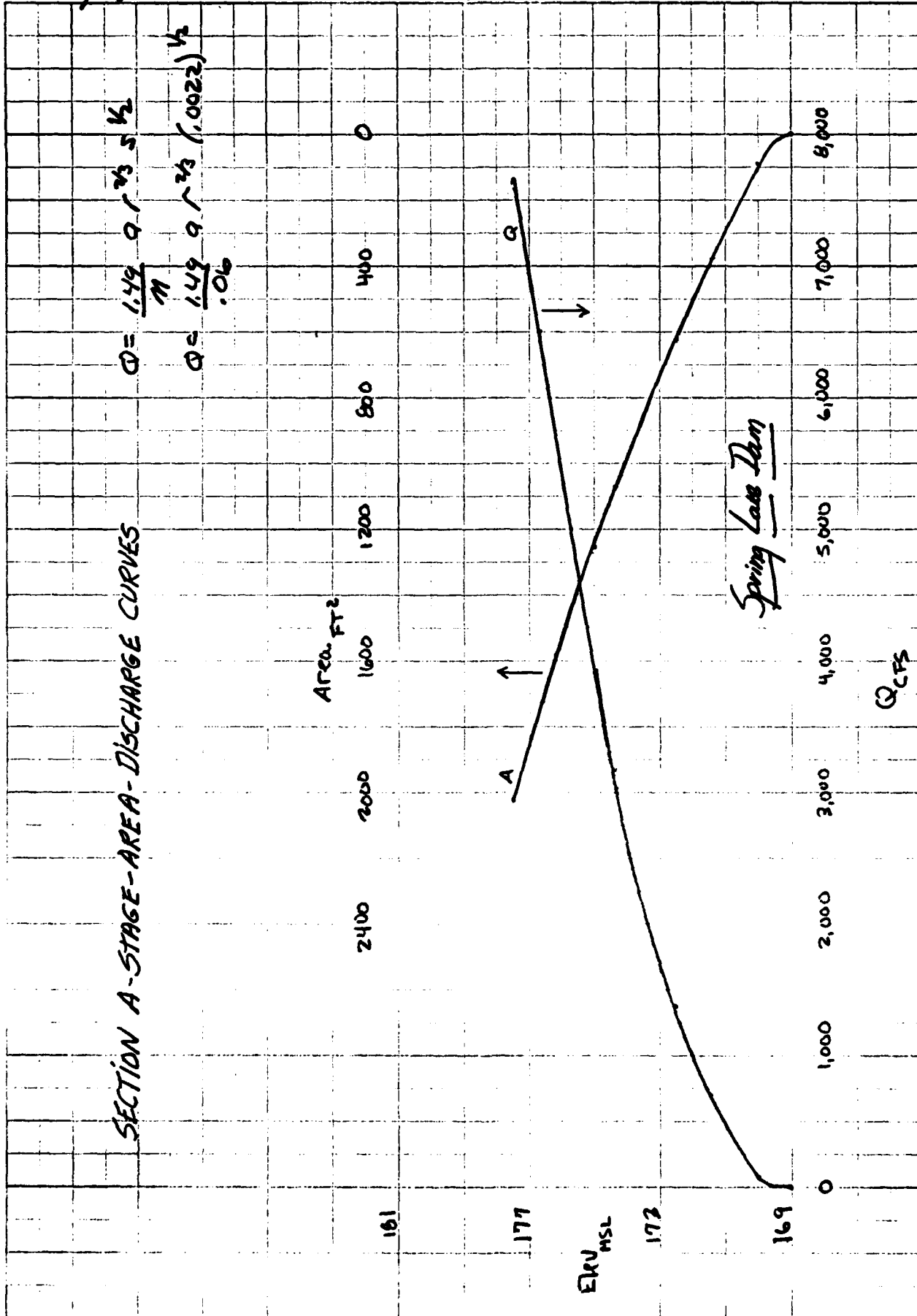
Section A - 500 Feet Downstream of Dam



PROJ. NO. 804111
 DESCRIPTION Spring Lake Dam
Spring Lake, Conn.

GENOVESE AND ASSOCIATES
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 HAMDEN, CONN.

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 BY WJD DATE 5-28-81
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$$Q = \frac{1.49}{M} A^{2/3} S^{1/2}$$

$$Q = \frac{1.49}{.06} A^{2/3} (.0022)^{1/2}$$

161
 177
 ELU MSL
 173
 169

PROJ. NO. Boyle
DESCRIPTION Spring Lake Dam
Interbay, Conn.

GENOVESE AND ASSOCIATES
CONSULTING ENGINEERS
HAMDEN, CONN.

SHEET NO. D-11 OF 23
BY WJB DATE 5-28-81
CHKD. BY _____ DATE _____

Spring Lake Dam
 $Q_{PF_2} = 5731 \text{ CFS}$

$$ELEV_{PF} = 176.2$$

$$A_{PF} = 1590 \text{ FT}^2$$

$$V_2 = \frac{500 (1590 - 760)}{43,560} = 9.5 \text{ AC-FT}$$

$$Q_{P_3} = 6498 \left(1 - \frac{11.1 + 9.5}{2 (94.1)} \right)$$

$$Q_{P_3} = 5787 \text{ CFS}$$

$$ELEV = 176.3$$

SECTION A (1100' D/S OF DAM)

$$Q_0 = 1770 \text{ CFS}$$

$$ELEV_0 = 170.9$$

$$A_0 = 925 \text{ FT}^2$$

$$Q_{PF} = 5787 \text{ CFS}$$

$$ELEV_{PF} = 172.1$$

$$A_{PF} = 1630 \text{ FT}^2$$

$$V_3 = \frac{600 (1630 - 925)}{43,560} = 9.7 \text{ AC-FT}$$

$$Q_{P_4} = 5787 \left(1 - \frac{9.7}{94.1} \right)$$

$$Q_{P_4} = 5190 \text{ CFS}$$

$$ELEV = 172.0$$

$$A = 1600 \text{ FT}^2$$

$$V_4 = \frac{600 (1600 - 925)}{43,560} = 9.3 \text{ AC-FT}$$

$$Q_{P_5} = 5787 \left(1 - \frac{9.7 + 9.3}{2 (94.1)} \right) = 5203 \text{ CFS}$$

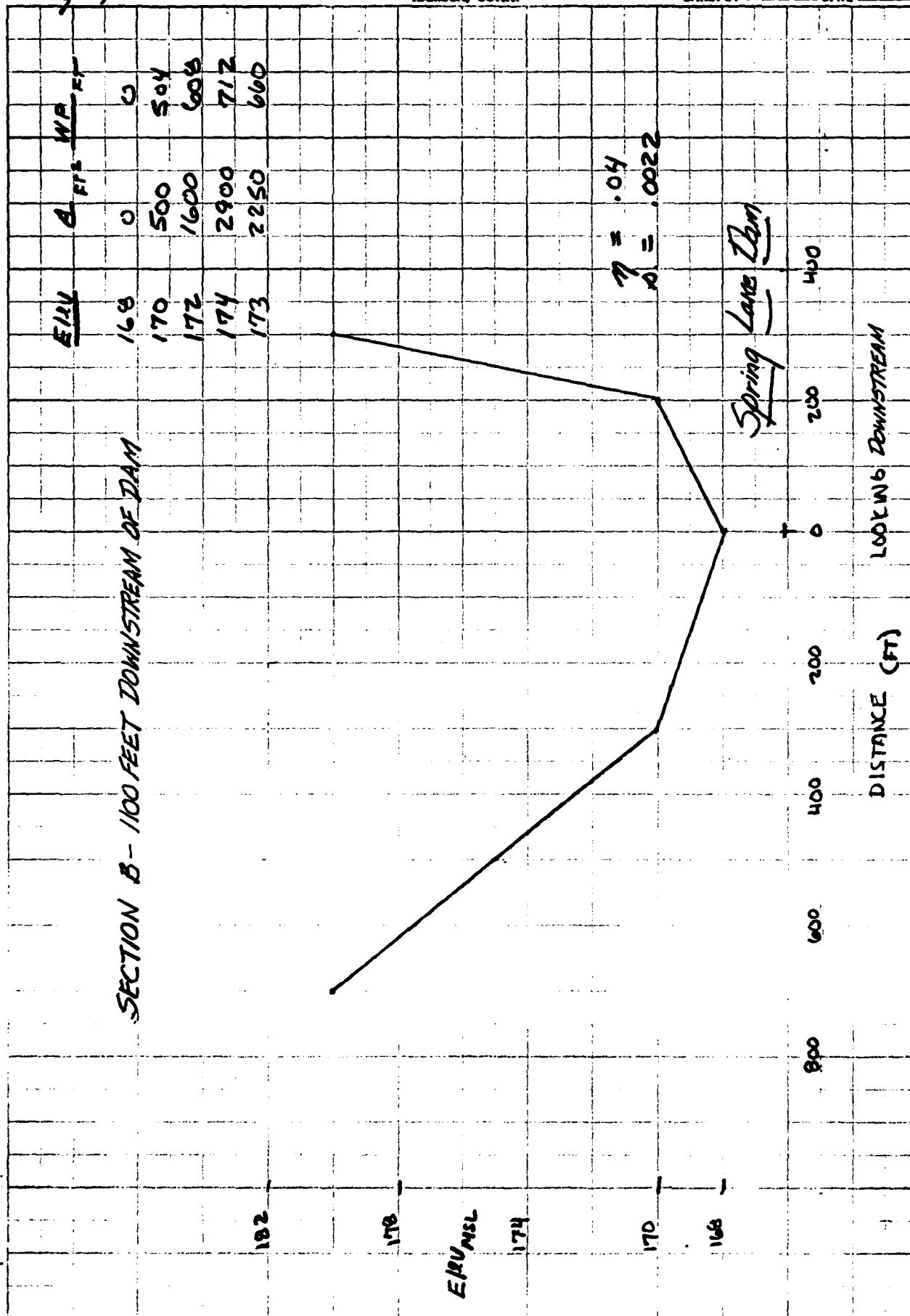
$$Q_{P_5} = 5203 \text{ CFS}$$

$$ELEV = 172.0$$

PROJ. NO. 804111
 DESCRIPTION Spring Lake Dam
Southington, Conn.

GENOVESE AND ASSOCIATES
 CONSULTING ENGINEERS
 HARTFORD, CONN.

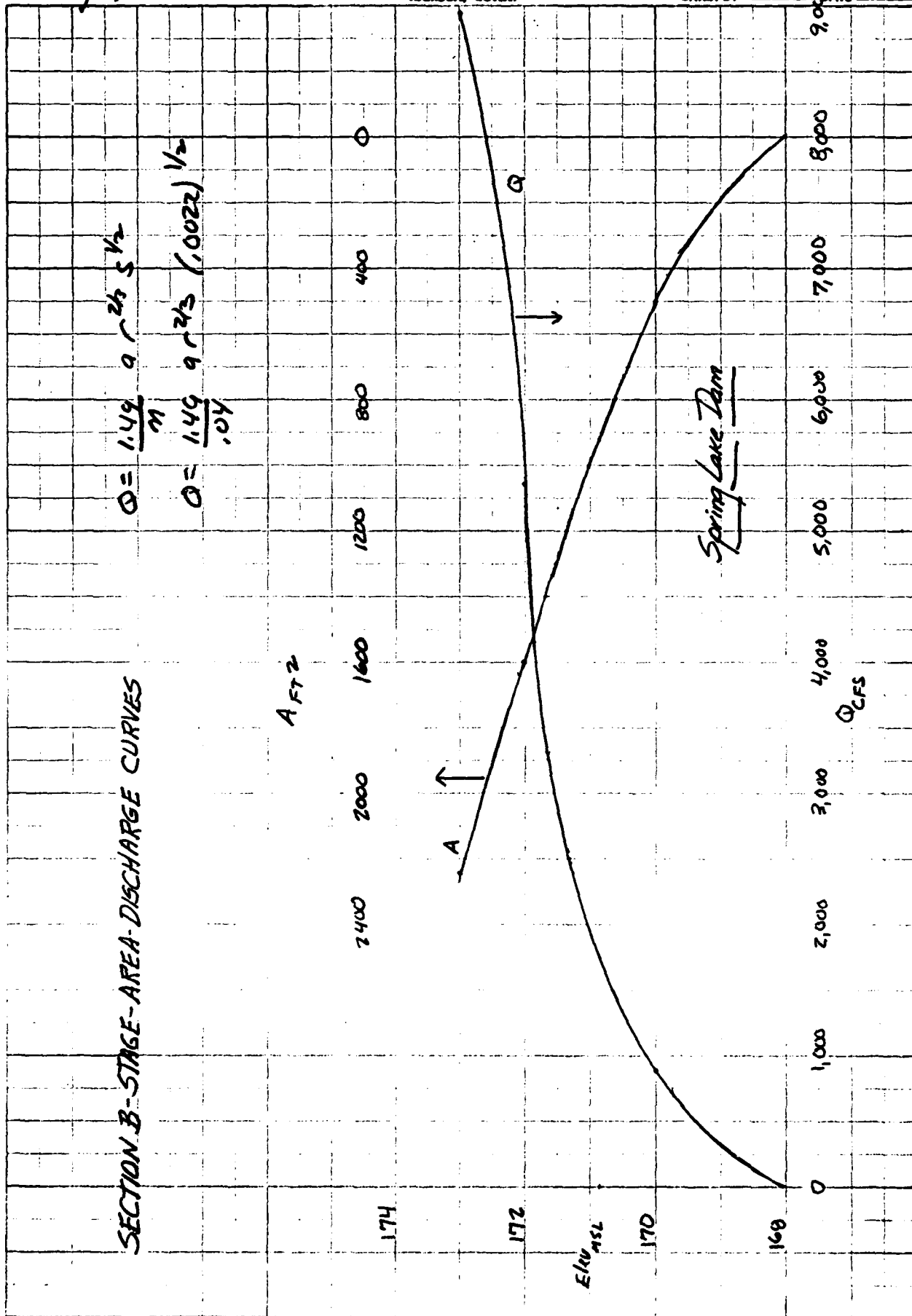
SHEET NO. D-12 OF 23
 BY WJB DATE 5/26/81
 CHKD. BY _____ DATE _____



PROJ. NO. 804111
 DESCRIPTION Spring Lake Dam
Southington, Conn.

GENOVESE AND ASSOCIATES
 CONSULTING ENGINEERS
 HAMDEN, CONN.

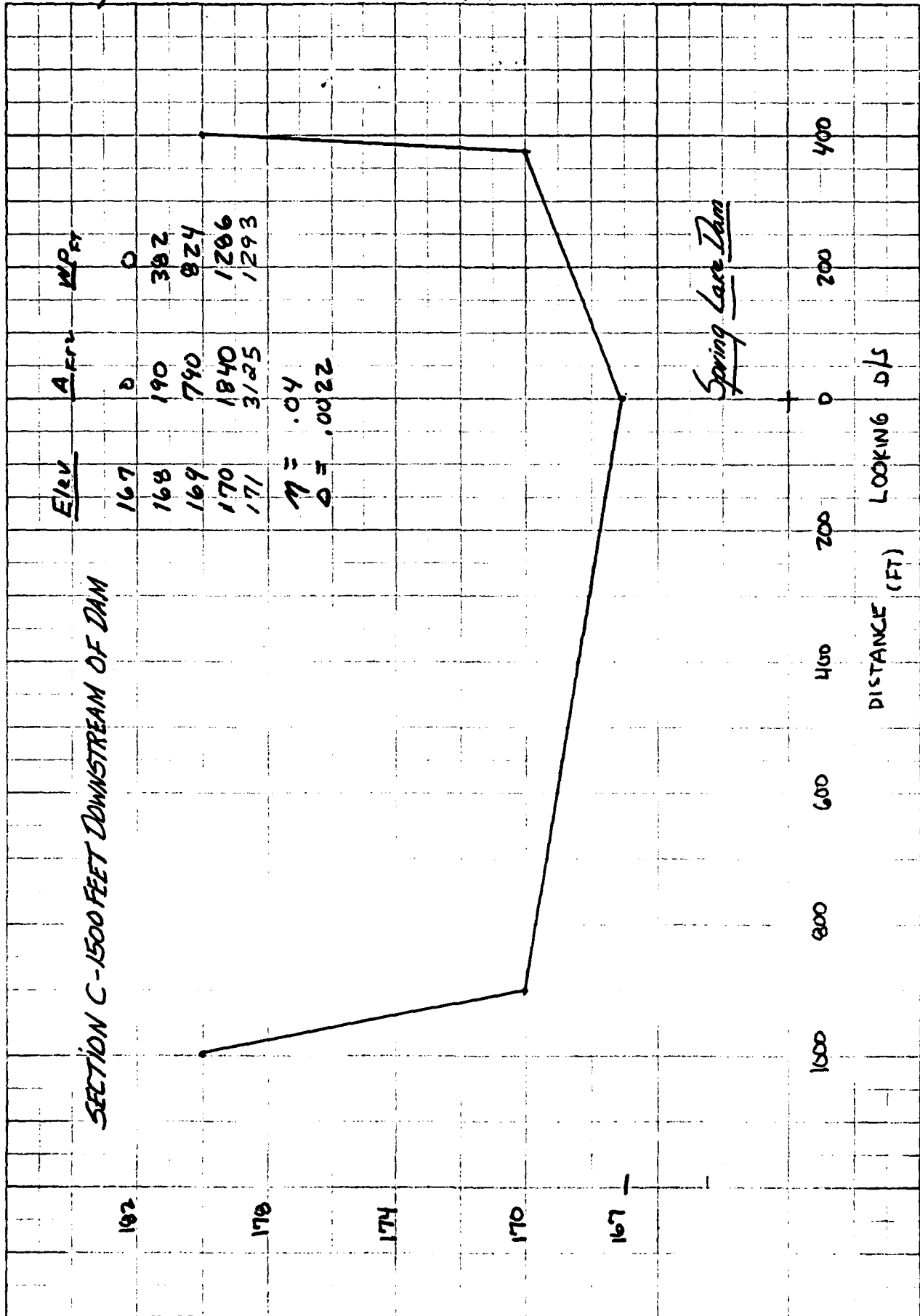
SHEET NO. D-13 OF 23
 BY WJB DATE 5-28-81
 CHKD. BY DATE



PROJ. NO. 804111
 DESCRIPTION Spring Lake Dam
Southampton, Conn.

GENOVESE AND ASSOCIATES
 CONSULTING ENGINEERS
 HAMDEN, CONN.

SHEET NO. D-14 OF 23
 BY WJG DATE 5-28-81
 CHKD. BY _____ DATE _____

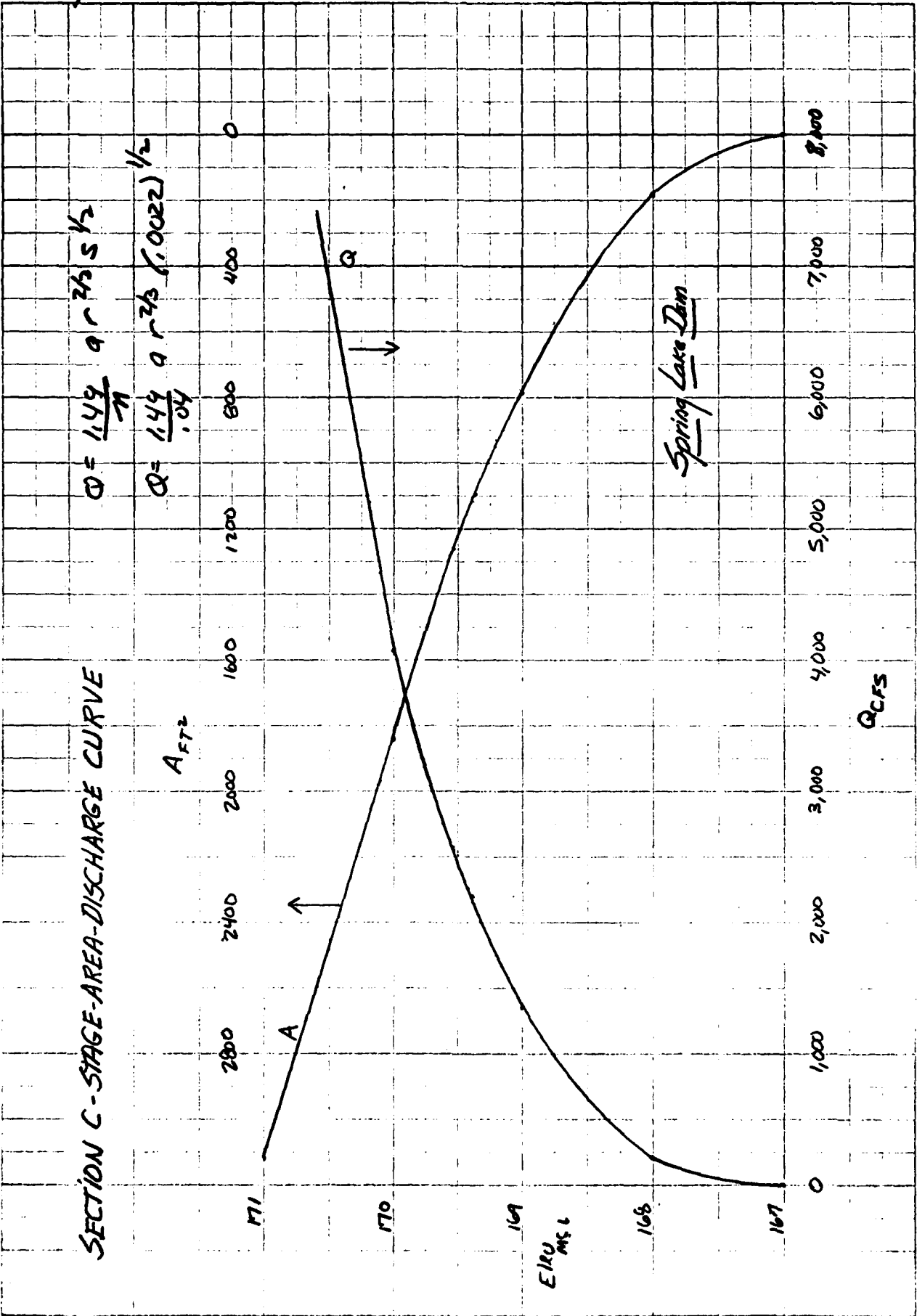


PROJ. NO. 804111
 DESCRIPTION Spring Lake Dam
Sanctuary Pond, Conn.

GENOVESE AND ASSOCIATES
 CONSULTING ENGINEERS
 HAMDEN, CONN.

SHEET NO. 0-15 OF 23
 BY WJG DATE 5-24-81
 CHKD. BY _____ DATE _____

SECTION C - STAGE-AREA-DISCHARGE CURVE



PROJ. NO. 804111
DESCRIPTION Spring Lake Dam
Sandwich, Conn

GENOVESE AND ASSOCIATES
CONSULTING ENGINEERS
HAMDEN, CONN.

SHEET NO. D-16 OF 23
BY WJG DATE 5-28-81
CHKD. BY _____ DATE _____

SECTION C (1500' D/S OF DAM) Spring Lake Dam

$$Q_0 = 1770 \text{ CFS}$$

$$\text{Elev}_0 = 169.2$$

$$A_0 = 955 \text{ FT}^2$$

$$Q_{PF} = 5203 \text{ CFS}$$

$$\text{Elev}_{PF} = 170.2$$

$$A_{PF} = 2060 \text{ FT}^2$$

$$V_5 = \frac{400(2060 - 955)}{43,560} = 10.1 \text{ AC-FT}$$

$$Q_p = 5203 \left(1 - \frac{10.1}{94.1}\right)$$

$$Q_p = 4645 \text{ CFS}$$

$$\text{Elev} = 170.1$$

$$A = 1970 \text{ FT}^2$$

$$V_6 = \frac{400(1970 - 955)}{43,560} = 9.3 \text{ AC-FT}$$

$$Q_p = 5203 \left(1 - \frac{10.1 + 9.3}{2(94.1)}\right)$$

$$Q_p = 4667 \text{ CFS}$$

$$\text{Elev} = 170.1$$

SECTION D (2050' D/S OF DAM)

$$Q_0 = 1770 \text{ CFS}$$

$$\text{Elev}_0 = 171.0$$

$$A_0 = 910 \text{ FT}^2$$

$$Q_{PF} = 4667 \text{ CFS}$$

$$\text{Elev}_{PF} = 173.4$$

$$A = 1650 \text{ FT}^2$$

$$V_7 = \frac{750(1650 - 910)}{43,560} = 12.7 \text{ AC-FT}$$

$$Q_p = 4667 \left(1 - \frac{12.7}{94.1}\right) = 4037 \text{ CFS}$$

$$\text{Elev} = 173.0$$

$$A = 1530 \text{ FT}^2$$

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NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS
SPRING LAKE DAM (CT 0. (U) CORPS OF ENGINEERS WALTHAM
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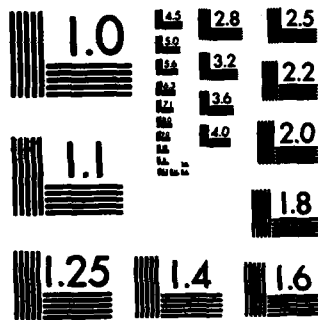
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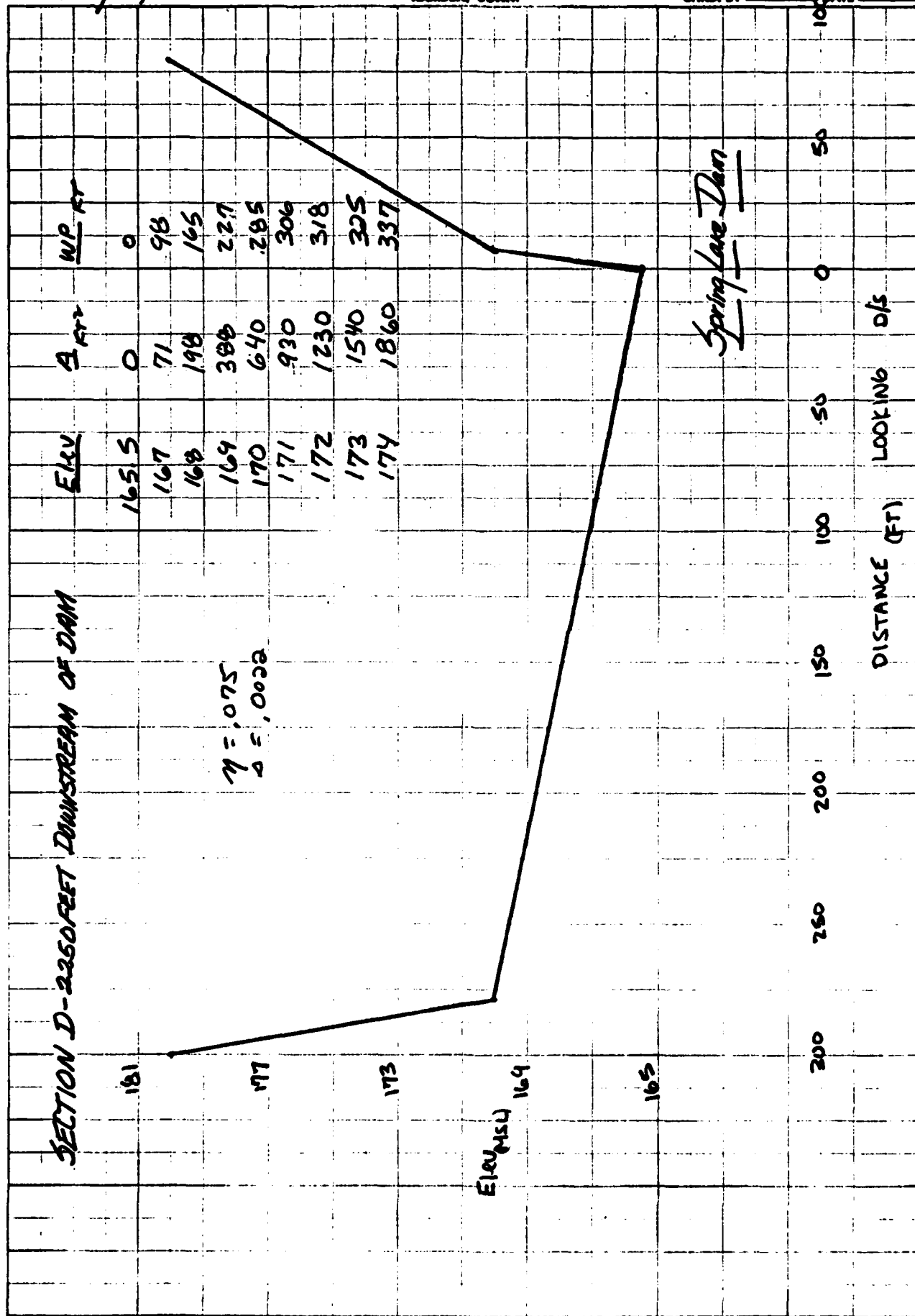


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

PROJ. NO. 904111
 DESCRIPTION Spring Lake Dam
Southbury, Conn.

GENOVESE AND ASSOCIATES
 CONSULTING ENGINEERS
 HARTFORD, CONN.

SHEET NO. D17 OF 23
 BY WJB DATE 5-28-61
 CHKD. BY _____ DATE _____

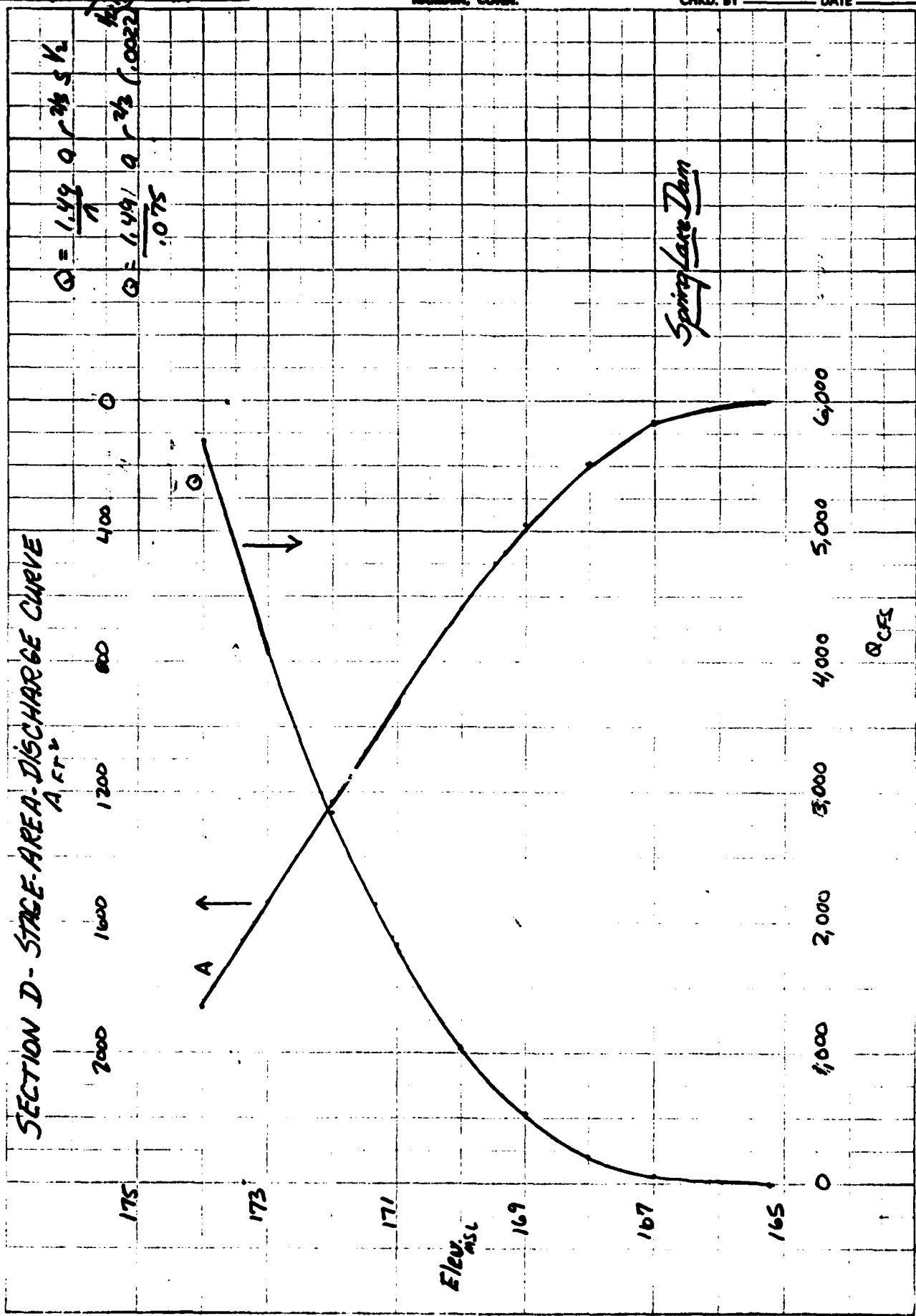


PROJ. NO. 804111
 DESCRIPTION Spring Lake Dam
Feeding the Canal

GENOVESE AND ASSOCIATES
 CONSULTING ENGINEERS
 HAMDEN, CONN.

SHEET NO. D18 OF 23
 BY WJB DATE 5-28-81
 CHKD. BY _____ DATE _____

SECTION - D
 STAGE - AREA - DISCHARGE CURVE



$$V_s = \frac{750 (1530 + 910)}{43,560} = \frac{\text{Spring Lake Dam}}{10.7 \text{ AC-FT}}$$

$$Q_p = 4667 \left(1 - \frac{10.7 + 12.7}{2 (94.1)} \right)$$

$$Q_p = 4087 \text{ CFS}$$

$$\text{ELV} = 173.0$$

SECT.	LOCATION	PRE-FAIL ELEV	POST FAIL ELEV	AFFECTS	
				# Struct	ELV
DAM	DAM	181.5	177.2	—	—
A	500' DLS	173.2	176.3	1	170
B	1100' DLS	170.9	172.0	8	169-170
C	1500' DLS	169.2	170.1	7	167-170
D	2250' DLS	171.0	173.0	8	166-170

The results of this analysis indicate that there are > 20 homes that would experience an increase in flood levels due to a dam break. Additionally there are 4 more homes that would experience flooding of 1-2 feet as a direct result of the dam failure. It is our opinion that such widespread flooding warrants a HIGH hazard classification. This classification is concurred with on page 2 of the dam's design report which stated that "the dam presents a high hazard potential."

An alternative here is Spring Lake Dam to look at the maximum water surface expected at the dam (i.e. the elevation of the spury. Design Flood). From p. D-7 this is 178.6'. In this case:

$$Q_s = \frac{8}{27} (.4) (150) \sqrt{32.2} (178.6' - 168.5')^{3/2}$$

$$Q_s = 3238 \text{ CFS}$$

$$Vol = 15.8 + \left(\frac{7.3 + 11.6}{2} \right) (2.6)$$

$$Q_{spury} = 700 \text{ CFS}$$

$$Vol = 50.0 \text{ AC-FT}$$

$$Q_{total} = 3238 + 700 = 3938 \text{ CFS}$$

Using this post-failure discharge and a pre-failure discharge of 750 cfs we get the following flood elevations using the Corps Rule of Thumb Dam Failure Methodology. (See p. D21 - D23 for notes).

SECTION	LOCATION	PRE-FAIL ELEV	POST FAIL ELEV	DAM FAIL AFFECTS # Str.	ELEV
Dam	Dam	178.6'	175.2'	-	-
A	500' o/s	171.5	174.5	-	-
B	1100' o/s	169.8	171.3	2	170.0
C	1500' o/s	168.5 ^(169.4)	169.4 ^(171.0)	1	170.0
D	2250' o/s	169.4	171.0	2	170.0

Again we see 4-5 structures which will experience more than a foot of water as a result of the dam break so a H16H hazard is justifiable.

PROJ. NO. 80411
DESCRIPTION Spring Lake Dam
Sanctuary, Conn.

GENOVESE AND ASSOCIATES
CONSULTING ENGINEERS
HAMDEN, CONN.

SHEET NO. 0-21 OF 23
BY WJG DATE 5-20-61
CHKD. BY _____ DATE _____

Section A (500' D/S)

Spring Lake Dam

$$Q_0 = 700 \text{ CFS}$$

$$ELV_0 = 171.5$$

$$A_0 = 390 \text{ FT}^2$$

$$Q_p = 3938 \text{ CFS}$$

$$ELV_p = 175.0$$

$$A_p = 1240 \text{ FT}^2$$

$$V = \frac{(500)(1240 - 390)}{43,560} = 9.8$$

$$Q_p = 3938 \left(1 - \frac{9.8}{50.0}\right)$$

$$Q_p = 3160 \text{ CFS}$$

$$ELV = 174.5$$

$$A = 1080$$

$$V = \frac{(500)(1080 - 390)}{43,560} = 7.9$$

$$Q_p = 3938 \left(1 - \frac{9.8 + 7.9}{2(50.0)}\right)$$

$$Q_p = 3240 \text{ CFS}$$

$$ELV = 174.5$$

Section B (1100' D/S)

$$Q_0 = 700 \text{ CFS}$$

$$ELV_0 = 169.75$$

$$A_0 = 400 \text{ FT}^2$$

$$Q_p = 3240 \text{ CFS}$$

$$ELV_p = 171.6$$

$$A_p = 1350 \text{ FT}^2$$

$$V = \frac{600(1350 - 400)}{43,560} = 13.1$$

$$Q_p = 3240 \left(1 - \frac{13.1}{50.0}\right)$$

$$Q_p = 2391$$

$$ELV = 171.3$$

$$A = 1150 \text{ FT}^2$$

$$V = \frac{600(1150 - 400)}{43,560} = 10.3$$

PROJ. NO. B0411
DESCRIPTION Spring Lake Dam
Southampton Conn.

GENOVESE AND ASSOCIATES
CONSULTING ENGINEERS
HARTFORD, CONN.

SHEET NO. 002 OF 23
BY WJT DATE 5-28-81
CHKD. BY _____ DATE _____

$$Q_p = 3240 \left(1 - \frac{13.1 + 19.8}{2 (50.0)} \right)$$

$$Q_p = 2482 \text{ CFS}$$
$$ELV = 171.3'$$

Spring Lake Dam

Section C (1500' D/S)

$$Q_0 = 700 \text{ CFS}$$
$$ELV_0 = 168.5$$
$$A_0 = 430 \text{ FT}^2$$

$$Q_p = 2482 \text{ CFS}$$
$$ELV_p = 169.5$$
$$A_p = 1220 \text{ FT}^2$$

$$V = \frac{(400) (1220 - 430)}{43,560} = 7.3 \text{ AC-FT}$$

$$Q_p = 2482 \left(1 - \frac{7.3}{50.0} \right)$$

$$Q_p = 2120 \text{ CFS}$$
$$ELV_p = 169.35$$
$$A_p = 1100 \text{ FT}^2$$

$$V = \frac{(400) (1100 - 430)}{43,560} = 6.2$$

$$Q_p = 2482 \left(1 - \frac{7.3 + 6.2}{2 (50.0)} \right)$$

$$Q_p = 2147 \text{ CFS}$$
$$ELV_p = 169.4$$

SECTION D (2250' D/S)

$$Q_0 = 700 \text{ CFS}$$
$$ELV_0 = 169.4$$
$$A_0 = 475$$

$$Q_p = 2147$$
$$ELV_p = 171.3$$
$$A_p = 1030 \text{ FT}^2$$

$$V = \frac{750 (1030 - 475)}{43,560} = 9.6$$

$$Q_p = 2147 \left(1 - \frac{9.6}{50.0} \right) = 1735 \text{ CFS}$$

PROJ. NO. B0441
DESCRIPTION Spring Lake Dam
Southampton, Conn.

GENOVESE AND ASSOCIATES
CONSULTING ENGINEERS
HAMDEN, CONN.

SHEET NO. D-23 OF 23
BY WJG DATE 5-28-81
CHKD. BY _____ DATE _____

$$ELEV_p = 170.9$$

$$A_p = 905 \text{ FT}^2$$

Spring Lake Dam

$$V = \frac{750 (905 - 476)}{43,560} = 7.4$$

$$Q_p = 2147 \left(1 - \frac{7.4 + 9.6}{2 (50)} \right)$$

$$\begin{array}{l} Q_p = 1782 \text{ CFS} \\ ELEV = 171.0 \end{array}$$

APPENDIX E

**INFORMATION AS CONTAINED IN
THE NATIONAL INVENTORY OF DAMS**

NOT AVAILABLE AT THIS TIME

END

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