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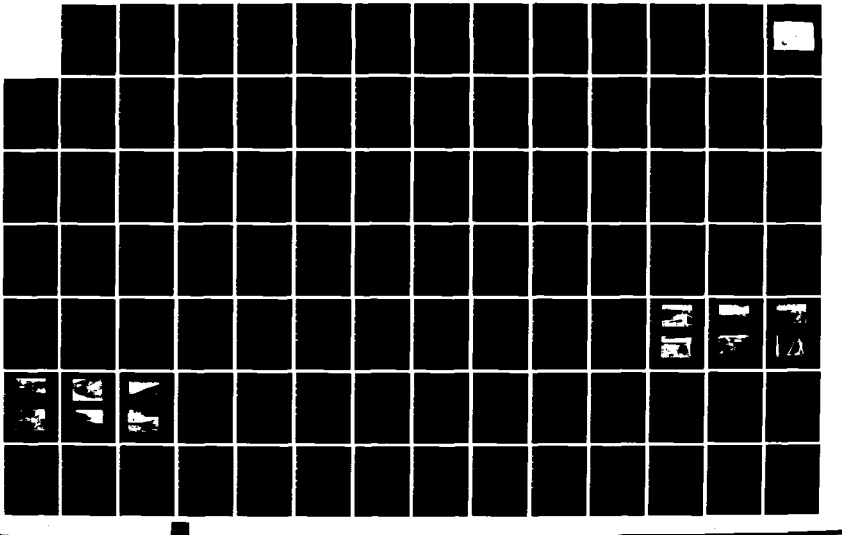

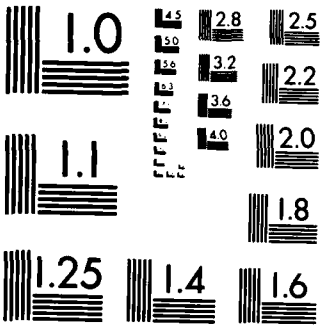

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BRATTLEBORO, VERMONT

PLEASANT VALLEY RESERVOIR DAM
V T. 00064

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

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

JUNE 1979

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Connecticut River Basin
Brattleboro, VT.
Pleasant Valley Brook

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

TDe dam is an earth fill dam with a concrete core wall and a concrete spillway. The dam is 800 ft. long with a maximum height of 34 ft. It is small in size with a high hazard potential. The test flood for the dam is the full PMF. There were a few significant conditions observed which should be corrected by the owner. An annual program of technical inspections should be instituted.

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PLEASANT VALLEY RESERVOIR DAM

VT 00064

BRATTLEBORO, VERMONT

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

Identification No:	VT 00064
Name of Dam:	Pleasant Valley Reservoir
Town:	Brattleboro
County and State:	Windham County, Vermont
Stream:	Pleasant Valley Brook
Date of Inspection:	April 12, 1979

BRIEF ASSESSMENT

The Pleasant Valley Reservoir Dam is an earth fill dam with a concrete core wall and a concrete spillway. The dam is 800 feet long with a maximum height of 34 feet and crest width of 12 feet. The manmade reservoir was built and is still used as the principal supply of water for the Town of Brattleboro. The reservoir surface area is approximately 25 acres while the drainage area comprises 1.16 square miles.

The intake tower provides control of a 16-inch and a 24-inch which reduces to an 18-inch pipe which lead to the chlorination building.

Based on a size classification of small and a high hazard classification, in accordance with the "Recommended Guidelines for Safety Inspection of Dams, Department of the Army, November 1976" the test flood for this dam is the probable maximum flood (PMF). The routed test flood outflow of 4,680 CFS overtops the dam by approximately .84 feet. The spillway has a capacity without dam overtopping of 2,443 CFS which represents 52 percent of the test flood.

The following significant conditions were observed:

1. Several seeps and wet areas were located along the downstream slope and toe.

2. Two cracks have developed in the spillway downstream training wall and a large amount of efflorescence has developed.

3. The outlet of one toe drain pipe has become buried.

4. Brush and several trees have grown in the emergency spillway discharge channel.

5. The sealant has eroded from the construction joints on the downstream face of the spillway.

6. The concrete apron below the spillway has broken in several places.

7. The valves on the intake structure are inoperable.

The Pleasant Valley Reservoir Dam is in fair condition based on the visual inspection. Detailed assessment and recommendations for remedial action are contained in Section 7 of this report. In summary, it is recommended that the following actions be instituted under the guidance of a qualified engineer within one year of the receipt of this report by the owner:

1. Assess the spillway capacity.

2. Direct the repairs of the spillway apron.

3. Develop a plan for control and monitoring of seepage through the dam and its foundation.

4. Investigate the severity of the structural problem relating to efflorescence found on the downstream spillway training wall.

5. Repair the valves on the intake tower.

6. Cut the trees and brush in the discharge channel.

7. Prepare a formal warning plan for the trailer park downstream of the dam.

Additionally, an annual program of technical inspections should be instituted.

DUFRESNE - HENRY ENGINEERING CORP. INCORPORATED 1961 SPRINGFIELD, VT.

STATE OF VERMONT WALTER A. HENRY, P.E. No. 530 PROFESSIONAL ENGINEER

Walter A. Henry

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

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OVERVIEW OF
PLEASANT VALLEY RESERVOIR
BRATTLEBORO, VERMONT

anchors on the embankment end. On the control tower end, the I-beams are an integral part of the concrete of the control tower. The control tower was found to be in good structural condition. However, all of the valve stems are rusted and are at this time inoperable with the valves open. Two steel plates covering openings on the top of the control tower have also rusted.

d. Reservoir Area

The reservoir area consists of approximately 25 acres and is the principal water supply for the Town of Brattleboro. The banks are well forested and there are no signs of erosion, sloughing or slope instability.

e. Downstream Channel

The emergency spillway channel has been cut out of natural rock at the right abutment. The channel had several trees growing in it (see Photo 5) and some brush has also been allowed to grow.

3.2 Evaluation

The significant findings of the visual inspection are as follows:

a. The valves on the intake tower are inoperable due to rusting of the stem gears.

b. Trees and brush have been allowed to grow in the discharge channel.

c. The downstream face of the emergency spillway has cracking and spalling occurring along construction joints.

d. Efflorescence has formed from 2 cracks in the spillway training wall.

e. The concrete apron at the toe of the spillway has cracked and broken because of a poor bond with the natural rock bed.

f. Seeps were observed along most of the toe of the dam and also in some locations from the lower two to four feet of the downstream slope. One such area corresponds to the previous spillway location to the left of the present spillway. None of the seeps shows indications of soil erosion and thus, does not present an immediate problem for the safety of the dam. However, continuous observation is required to detect any changes in this condition.

g. The end of a drain pipe relieving water from a seep (spring) within the embankment has been covered over causing a large wet area near the toe of the slope.

shown in Photo 7 as rust-colored water which corresponds to the location of a spring that existed under the new fill placed in 1954 when the dam was raised. This spring is located on the plan as spring #2. According to Mr. Orman Holden, Water Superintendent, 6-inch cast-iron pipe and french drains were used to relieve the water from this spring. Even though the outlet pipe was not visible a metal detector indicated its presence. The total flow from the seeps within the left part of the dam discharges through a corrugated metal pipe and into the discharge channel as shown in Photo #4. From the discharge channel to the spillway, the toe was wet for practically the full length of this section of the dam (see Photo 9). Near the spillway, as shown on the plan as spring #1, there is a 12-inch corrugated metal pipe outlet installed to relieve the water from another spring as located also in 1954. Photo 8 shows a close-up of the outlet and the rust-colored water which discharges into an outlet trench. A metal detector was used to trace the outlet pipe. Photo 9 shows the red jacket in the location to where the outlet pipe was traced. Another seep was present closer to the spillway, approximately 4 feet above the toe, on the slope also shown in Photo 9. This seep is believed to be in the same location as the old spillway site before the 1954 construction.

None of the seeps show visual indication of soil transport and therefore do not represent an unsafe condition at this time.

c. Appurtenant Structures

The concrete spillway (see Photo 2) located on the right abutment is 88 feet long and varies in height from 4 feet high to approximately 10 feet high. The exposed part of the upstream face of the spillway is in good condition and the joints in the concrete have been patched. The downstream face, however, has several construction joints in need of repair, as the water overtopping the spillway has eroded the sealant and the concrete at the joints has spalled as shown in Photo 1. The concrete apron immediately below the spillway has cracked and broken in several places.

The downstream training wall located at the left side of the spillway has 2 cracks of minimum width and approximately 5 feet long. From these cracks, a large amount of efflorescence has developed (see Photo 6). Continued leaching of the lime from the concrete could cause serious concrete deterioration and result in a collapse of the training wall.

The service bridge (see Photo 3) spans approximately 55 feet and consists of two 12-inch I-beams with aluminum grating and 1-1/2-inch pipe handrails. It seats on a concrete pad and steel

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a. General

The Pleasant Valley Reservoir Dam is judged to be in fair condition based on visual inspection. Several seeps were found along the downstream toe; however, none indicated major erosion or settlement, indicators of instability.

At the time of inspection, the water level was 3.6 feet below the crest and 1 inch above the spillway crest.

b. Dam

The dam consists of an earth embankment with an upstream paved slope. The crest elevation remains constant for the entire length of the dam at 634.2

The upstream slope is protected by a concrete pavement which is in good condition as can be seen in Photos 1, 3 and 5. The concrete slab extends below the water surface to elevation 620. From that point downward along the slope is riprap. Joints in the concrete slabs have been patched with a sealant and kept in good condition.

The crest is grass covered and in good condition. It is 12 feet wide and incorporates an access road to the service bridge (see Photo 1).

The downstream slope is grass covered and has been well maintained. The grass covering has been mowed and no brush or trees have been allowed to grow. There are some indications of minor sloughing as judged by slight depressions and bulges of the slope surface.

Inspection along the downstream face revealed several seeps and wet areas along the toe of the dam and also on the downstream slope up to two to four feet above the toe. For a distance of about 100 feet from the left abutment there was water seeping out of the toe and from the lower 2 feet of the downstream slope (see Photo 10). The flow was well distributed along this area with no significant concentrations of flow in any given location. The water collected in a stream that flows toward the outlet channel as shown in the plan. Between the left corner in the dam alignment and the outlet there was water seeping out of the toe for practically the full length of this section of the dam. The water augments the flow of the stream that carries the water from the seeps near the left abutment. A concentrated seep is

c. Validity

The data on file pertaining to the renovation work during 1954 appears to be generally consistent with the visual observations made. However, there are several differences between the original construction plans and the visual observations made. According to a letter on file with the Water Conservation Board an addendum was issued and an alternate set of plans made. The alternate plans were not available. However, the original plans, field observations and correspondence on file give a basic idea of what changes were made. The major changes were:

1. The spillway length was changed from 72 feet to 88 feet.

2. The concrete paved slope on the upstream face was added to the scope of work.

3. Top of dam elevation was changed to the present elevation of 634.2.

SECTION 2 - ENGINEERING DATA

2.1 Design

There are no records available that pertain to the original (1906-1909) design of the dam. However, for the renovations in 1954 detailed drawings and specifications were prepared. Copies of the plans are in Appendix B.

2.2 Construction

There are no documents available that describe the original construction of the dam. However, for the renovations of 1954 there is some correspondence on file with the Vermont Water Conservation Board. The Consulting Engineer, Barker & Wheeler, of Albany, New York designed the renovations while F. A. Tucker, Inc. of Rutland, Vermont was the Contractor. According to two different inspection reports, on file, there were cracks that developed in the concrete work - one in the spillway and the other in the core wall at station 2 + 65.3. This station does not correspond with any of the seep locations as described under Section 3 "Visual Inspection." No mention of repair of these cracks was present.

2.3 Operation

Operational procedures have been assigned to Mr. Orman Holden, Water Superintendent for the Town of Brattleboro (802-254-4255). Mr. Holden supervises the normal operations of grass and brush cutting as well as control of flow into Pleasant Valley Reservoir and the regulation of the chlorination facilities. Flow into the reservoir is controlled at a diversion dam along Stickney Brook at Sunset Lake and at the two wells located next to the West River.

2.4 Evaluation

a. Availability

The drawings for the renovations of 1954 to raise the height of the dam by 10 feet were available from the Town of Brattleboro Public Works Department, Brattleboro, Vermont.

b. Adequacy

There are no records of the original design and construction. The plans for raising the dam along with the visual comparisons are adequate to judge the extent of work performed. However, this does not establish the quality of materials and workmanship involved in the actual construction. Therefore, this report is based on visual inspection, construction plans, verbal reports and sound engineering judgment.

(5) Upstream Channel

Reservoir - approach channel.

(6) Downstream Channel

Variable width 20 to 34 feet cut out of bedrock.

(7) General

Crest of spillway approximately 4 feet below top of dam.

j. Regulating Outlets

There are no regulating outlets other than the control tower which provides control of the inlet structure as well as the 16-inch and 18-inch pipes leading to the chlorination building.

(4) Top Width

12 feet.

(5) Side Slopes

Upstream - 2H:1V.
Downstream - 2H:1V.

(6) Zoning

None.

(7) Impervious Core

A concrete core wall extending to full height constructed of 2 separate walls. The top wall, sitting downstream of the lower is tied to the lower wall with a concrete apron.

(8) Cutoff

None known. Core wall is probably founded on bedrock.

(9) Grout Curtain

None known.

(10) Other

Not applicable.

h. Diversion and Regulating Tunnel

Not applicable.

i. Spillway

(1) Type

Concrete crest, ogee section.

(2) Length of Weir

88 feet.

(3) Crest Elevation

630.5.

(4) Gates

None.

(2) Flood Control Pool

Not applicable.

(3) Spillway Crest Pool

430 acre-feet.

(4) Top of Dam

522 acre-feet.

(5) Test Flood Pool

544 acre-feet.

f. Reservoir Surface Area

(1) Recreation Pool

Not applicable.

(2) Flood Control Pool

Not applicable.

(3) Spillway Crest

25 acres.

(4) Test Flood Pool

25 acres.

(5) Top of Dam

25 acres.

g. Dam

(1) Type

Earth embankment with concrete core wall extending to within 1 foot of the top of the dam.

(2) Length

Overall - 800 feet.
Spillway - 88 feet.

(3) Height

Maximum height approximately 34 feet.

(2) Maximum Tailwater

Not applicable.

(3) Upstream Portal Invert Diversion Tunnel

Not applicable.

(4) Recreation Pool (Normal)

Not applicable.

(5) Full Flood Control Pool (Maximum Pool)

Not applicable.

(6) Spillway Crest

630.5.

(7) Design Surcharge (1954 Design)

633.0.

(8) Top of Dam

634.2.

(9) Test Flood Surcharge

635.04.

d. Reservoir Data

(1) Length of Maximum Pool

1850 feet.

(2) Length of Recreation Pool

Not applicable.

(3) Length of Flood Control Pool

Not applicable.

e. Storage Data

(1) Recreation Pool

Not applicable.

is pumped into Pleasant Valley Reservoir. However, the only drainage area used in this report for the hydrologic/hydraulic analysis is the 1.16 square miles which is directly above the Pleasant Valley Reservoir.

b. Discharge at the Dam Site

(1) Outlet Works

The normal discharge from Pleasant Valley Reservoir is through a 16-inch and an 18-inch pipe which run from the control tower to the chlorination building. The only other discharge from the dam comes from the spillway located at the right abutment. The concrete spillway is 88 feet long and varies in height from 4 feet to 9 feet high. The maximum capacity of the spillway is 2443 CFS at elevation 634.2 which is the top of the dam elevation.

(2) Maximum Known Flood at Dam Site

Unknown.

(3) Ungated Spillway Capacity at Top of Dam

2443 CFS at elevation 634.2.

(4) Ungated Spillway Capacity at Test Flood Elevation

3300 CFS at elevation 635.04.

(5) Gated Spillway Capacity at Normal Pool Elevation

Not applicable.

(6) Gated Spillway Capacity at Test Pool Elevation

Not applicable.

(7) Total Spillway Capacity at Test Flood Elevation

3300 CFS at elevation 635.04.

(8) Total Project Discharge at Test Flood Elevation

4600 CFS at elevation 635.04.

c. Elevation Data

(1) Streambed at Centerline of Dam

600.0 ±.

park consisting of approximately 60 trailers. The wave at this point would be 10 feet above the average ground elevation of the park. The majority of the trailer park would be destroyed. Therefore, the hazard classification for this dam is high.

e. Ownership

The Pleasant Valley Reservoir is owned by the Town of Brattleboro, Vermont.

f. Operator

The dam is currently being maintained by the Town of Brattleboro, through the Public Works Department. The contact is Mr. Orman Holden, Water Superintendent. Telephone 802-254-4255.

g. Purpose

The dam's sole purpose is to impound water for use as a potable water supply reservoir for the Town of Brattleboro.

h. Design and Construction History

The Pleasant Valley Reservoir Dam was originally constructed in 1909. There are no design or construction records available for the original construction. In 1954 the dam was raised 10 feet in height. Plans for this modification are contained in Appendix B.

i. Normal Operating Procedures

Normal operating procedures consist of regulating the flow into the Pleasant Valley Reservoir. Flow control is provided at a diversion dam on the Stickney Brook, and at two wells located along the West River in the Town of Brattleboro. Other operational procedures consist of routine maintenance of the chlorination equipment and control of the domestic water supply system.

1.3 Pertinent Data

a. Drainage Area

The drainage area for the Pleasant Valley Reservoir is 1.16 square miles of moderately sloped, forested land. A diversion dam on the Stickney Brook with a 12-inch pipe carries water of Sunset Lake and Stickney Brook to the Pleasant Valley Reservoir. The watershed above the diversion dam totals approximately 3 square miles. Along with this flow is the flow from two wells located along the West River in the Town of Brattleboro, which

b. Description of Dam and Appurtenances

The Pleasant Valley Reservoir Dam is an earth fill type dam with a concrete core wall. The dam is 800 feet long with a maximum height of 34 feet and a top width of 12 feet.

The upstream face has exposed riprap below the water level with a concrete slab above the water surface on a slope of 2H:1V. The downstream face is grass covered with a slope of 2H:1V. The crest of the dam is at a constant elevation, which is 634.2 feet MSL.

The dam was raised by 10 feet in height and the spillway enlarged in a major renovation in 1954. The original dam had a concrete corewall with much steeper slopes (1 on 1) on the upstream, riprapped face. During renovation a reinforced concrete corewall was installed on the downstream side of the original corewall and extended to within one foot of the full height. A concrete apron connecting new and old corewalls was also constructed. A concrete slab was laid on a 2 on 1 slope, on the upstream face of the dam, from the point of junction of the corewalls up to the top of the dam.

The normal outlets are a 16-inch and an 18-inch pipe controlled both at the intake structure and by underground valves adjacent to the chlorination building. The chlorination building is located immediately downstream of the dam and chlorinates all of the water for the Town of Brattleboro at this one location.

The only other discharge is from the 88-foot wide ungated concrete spillway, constructed for high level runoff flows, located at the right abutment. The discharge channel for the spillway has been cut out of natural rock and varies in width from 20 to 34 feet.

c. Size Classification

Pleasant Valley Reservoir Dam has a size classification of small. The dam has a maximum height of 34 feet and impounds a maximum storage of approximately 522 acre-feet. The USCE guidelines place dams with maximum heights lower than 40 feet and maximum storage between 50 and 1000 acre-feet in the small classification.

d. Hazard Classification

A failure of the Pleasant Valley Reservoir Dam would release a wave approximately 20 feet high into the Pleasant Valley Brook. Immediate damage would occur in the loss of the chlorination building. The wave would continue down the valley until it reached the Whetstone Brook in West Brattleboro. At the confluence of the Whetstone and Pleasant Valley Brooks is a trailer

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
NAME OF DAM: PLEASANT VALLEY

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. Dufresne-Henry Engineering Corporation has been retained by the New England Division to inspect and report on selected dams in the State of Vermont. Authorization and notice to proceed were issued to Dufresne-Henry Engineering Corporation under a letter of November 20, 1978 from Max B. Scheider, Colonel, Corps of Engineers. Contract No. DACW33-79-C-0010 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 nonfederal interests.

(2) Encourage and prepare the states to initiate quickly effective dam safety programs for nonfederal dams.

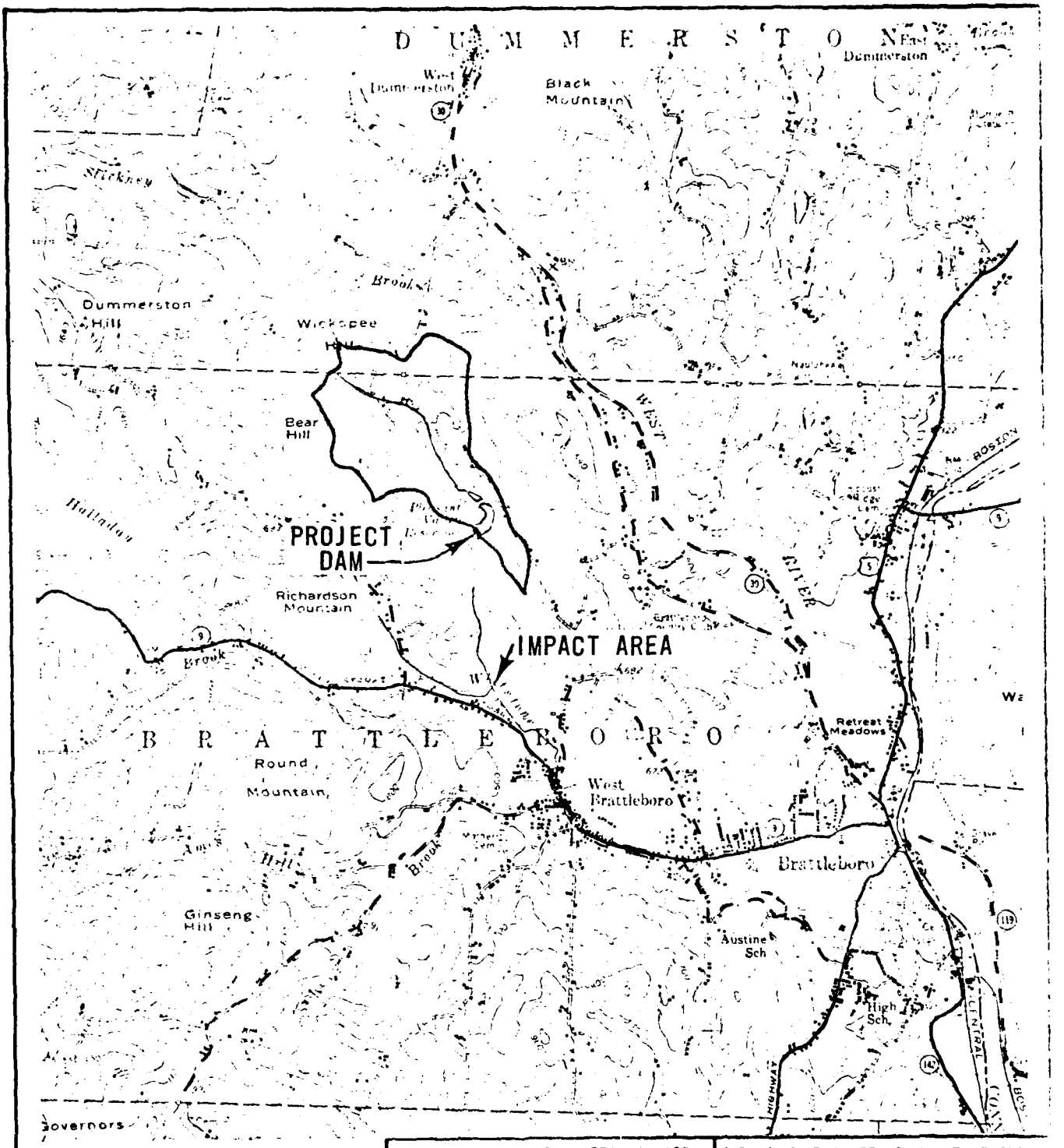
(3) To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

The Pleasant Valley Reservoir is located in the Town of Brattleboro, Windham County, Vermont, in the southeastern section of the State.

The dam is located approximately 3-1/2 miles northwest of the Village of Brattleboro on what is known as the Pleasant Valley Brook, which is a tributary of the Whetstone Brook.



SOURCE OF MAP:
U.S. GEOLOGICAL SURVEY
BRATTLEBORO, VT.-N.H.
QUADRANGLE 1954
1:62,500 SERIES V713

DUFRESNE-HENRY ENGINEERING CORP. ARCHITECT-ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

PLEASANT VALLEY RESERVOIR DAM

CLIENT NO.	04-0095	SCALE	1"=1 MILE
ENGINEER	WAL	DATE	

SECTION 4 - OPERATIONAL PROCEDURES

4.1 Procedures

The major operational procedure for Pleasant Valley Reservoir is the operation of the chlorination equipment at the site and the control of flow into the reservoir. Flow into the reservoir is controlled at Sunset Lake, a diversion dam on Stickney Brook below Sunset Lake and at two wells located within Brattleboro.

4.2 Maintenance of Dam

Other than the major renovation of 1954 the following activities have been performed:

1. Grassed areas on the crest, on the downstream slope, and surrounding the chlorination building, have been mowed during the summer months.

2. Some brush has been cut and trees trimmed surrounding the chlorination building and adjacent to the incoming powerline within the last two years.

4.3 Maintenance of Operating Facilities

Apart from routine maintenance involved with the chlorination equipment, the only other established program consists of operating the underground valves next to the chlorination building, once a year.

4.4 Description of Any Warning System in Effect

Although there is no mechanical or electrical system in effect, Mr. Orman Holden stated that the trailer park downstream of the dam had been evacuated before due to the flooding of the Whetstone Brook.

4.5 Evaluation

The current program of mowing the grassed areas is proper maintenance. The brush cutting activities should be extended to include removal of any growth in the spillway channel. The valves on the control tower, once made operable, should be exercised once every 3 months. The underground valves next to the chlorination building should be placed on the same schedule.

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SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 Evaluation of Features

a. General

The Pleasant Valley Reservoir Dam is an earth embankment dam with a concrete core wall built solely as an impoundment for use as the principal water supply reservoir for the Town of Brattleboro.

b. Design Data

There is no available data for the original design or construction from 1905-1909. However, for the major renovation of 1954, tracings of the construction plans are included in Appendix B. Also contained in Appendix B is a copy of a letter with the spillway design capacity for the 1954 renovation (page 13 of Appendix B).

c. Experience Data

There is no record of overtopping of the Pleasant Valley Reservoir Dam.

d. Visual Observations

Several wet areas (seeps) were found on the downstream toe of the dam, as located on the plan in Appendix B. According to Mr. Orman Holden, Water Superintendent, two of the seeps are from springs which were located before the renovation in 1954. The water was directed to the toe of the dam by the use of pipe and French drains.

e. Test Flood Analysis

Based on a size classification of small and a hazard classification of high, the probable maximum flood (PMF) was selected for the test flood. The test flood was developed using the computer program HEC-1 from the U. S. Army Corps of Engineers. The test flood inflow was 4700 CFS (4062 CSM) which after storage routing produced a routed test flood outflow of 4680 CFS. During the probable maximum flood the Pleasant Valley Reservoir Dam would be overtopped by approximately .84 feet or 10 inches. This is assuming the earth embankment would not erode during the overtopping. With the water level at the top of the dam the spillway has a capacity of 2,443 CFS which is 52 percent of the test flood flows.

f. Dam Failure Analysis

A failure of the Pleasant Valley Reservoir Dam, with the water level at the top of the earth embankment, would release a wave approximately 23 feet high, with approximate flow of 88,000 CFS. This wave would travel down between the two steep side slopes until it reached the trailer park at the confluence with the Whetstone Brook. At this location the wave would be approximately 10 feet above the trailer park ground elevation, endangering the majority of the 60 trailers within the park. The average ground elevation within the trailer park is 490 with the streambed 3 to 4 feet lower at this point. Many lives could be lost as a result of dam failure. Flood routing of this dam break flood was not done due to the steep stream slope.

SECTION 6 - STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

The visual inspection did not disclose any indications of present structural instability. The future stability could be affected by the numerous seeps along the downstream toe and by loss of the apron downstream of the spillway which could cause undermining.

b. Design and Construction Data

The design and construction data available is insufficient for a formal stability analysis of the dam.

c. Operating Records

There are no available records which are significant with respect to the stability of the dam.

d. Post-Construction Changes

There are no known changes that have taken place after raising of the dam in 1954.

e. Seismic Stability

The dam is located in seismic zone 2, and in accordance with the recommended Phase I guidelines, does not warrant seismic analysis.

SECTION 7 - ASSESSMENT, RECOMMENDATIONS/ REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition

On the basis of the visual inspection, the dam is in fair condition. There are no areas of immediate safety concern, however, the future safety of the dam can be influenced by the following:

1. The numerous seeps along the downstream toe require monitoring to ensure that they do not produce any erosion of the embankment soils in the future.

2. Continuing deterioration of the spillway apron could be conducive to undermining of the spillway.

b. Adequacy of Information

The information on the design and construction of the dam was very limited and thus the assessment of the condition of the dam is based solely on the visual inspection.

c. Urgency

The recommendations presented in Sections 7.2 and 7.3 should be carried out within 1 year of receipt of this report by the owner.

d. Need for Additional Investigations

There is no need for additional investigations beyond those recommended in Section 7.2.

7.2 Recommendations

It is recommended that the following actions be taken under the direction of an engineer qualified in dam engineering:

a. Direct the repairs of the concrete spillway apron.

b. Develop a plan for control and monitoring of seepage through the dam and its foundation. Discharge from the seeps should be analyzed and recorded on a regular basis for flow and suspended solids concentration. Special attention should be given during and just after a significant rainfall.

c. Assess the capacity of the emergency spillway.

d. Investigate the structural integrity of the downstream spillway training wall in the area of the efflorescence deposits.

7.3 Remedial Measures

a. Operation and Maintenance Procedures

1. An annual program of safety technical inspections should be instituted.

2. The outlet of the drainage pipe from spring #2, on the left side of the dam, should be excavated and exposed and free drainage provided.

3. Prepare a formal warning system for the trailer park downstream of the dam.

4. Routine yearly maintenance should include:

   a. Removal of trees from the spillway channel.

   b. Patching of spalled areas in the concrete of the downstream face of the spillway.

   c. Maintenance of valves on the intake tower so that they are operable at all times in case it is necessary to dewater the conduits through the dam. Controlling of the flow exclusively from the downstream side of the dam means that conduits are under pressure within the dam continuously. If any of the conduits leak, it can induce failure of the dam unless the flow can be immediately turned off at the upstream end.

5. Round-the-clock monitoring during heavy rain.

APPENDIX A

VISUAL INSPECTION CHECK LIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Pleasant Valley Reservoir DATE April 12, 1979

TIME 12:45

WEATHER Sunny, 50° + F.

W.S. ELEV. 630.5 U.S. ____ DN.S.

PARTY:

1. Gonzalo Castro, G.E.I.
2. Walt Henry, D-H
3. Morris Root, D-H
4. Wayne Leonard, D-H
5. _____
6. Orman Holden - Water Department
7. Chester Carpenter - Water Department
8. _____
9. _____
10. _____

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

PERIODIC INSPECTION CHECK LIST

PROJECT Pleasant Valley Reservoir DATE April 12, 1979

PROJECT FEATURE Dam Embankment NAME

DISCIPLINE Geotechnical NAME Gonzalo Castro

AREA EVALUATED	CONDITION
DAM EMBANKMENT	Good Condition
Crest Elevation	634.2
Current Pool Elevation	630.5
Maximum Impoundment to Date	Surface area 25 acres
Surface Cracks	
Pavement Condition	U.S Good D.S. No pavement
Movement or Settlement of Crest	None
Lateral Movement	None
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Good
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Horses & motorcyle tracks
Sloughting or Erosion of Slopes or Abutments	None
Rock Slope Protection - Riprap Failures	None
Unusual Movement or Cracking at or near Toes	None
Unusual Embankment or Downstream Seepage	3 principal wet areas at toe - 1 near left abutment and 2 others where springs had been. Other wet areas along toe.
Piping or Boils	None observed
Foundation Drainage Features	None known
Toe Drains	None known, see above.
Instrumentation System	None
Vegetation	Crest and downstream slope covered with well maintained grass.

PERIODIC INSPECTION CHECK LIST

PROJECT Pleasant Valley Reservoir **DATE** April 12, 1979

PROJECT FEATURE Control Tower **NAME** Morris Root

DISCIPLINE H & H **NAME** Walt Henry
Wayne Leonard

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural	
General Condition	Good
Condition of Joints	Good
Spalling	None
Visible Reinforcing	None
Rusting or Staining of Concrete	Not observable
Any Seepage or Efflorescene	Not observable
Joint Alignment	Good
Unusual Seepage or Leaks in Gate Chamber	Not observable
Cracks	None
Rusting or Corrosion of Steel	Plates over chamber need paint
b. Mechanical and Electrical	
Air Vents	Open to atmosphere
Float Wells	None
Crane Hoist	None. Hoist for screens.
Elevator	None
Hydraulic System	None
Service Gates	Sluice gates/gate valves - stems rusted. Need quarterly maintenance/operation.
Emergency Gates	16" (?) gate valve - rusty stem.
Lightning Protection System	None
Emergency Power System	None
Wiring and Lighting System in Gate Chamber	None

PERIODIC INSPECTION CHECK LIST

PROJECT Pleasant Valley Reservoir DATE April 12, 1979

PROJECT FEATURE Outlet Works NAME Morris Root

DISCIPLINE H & H NAME Wayne Leonard
Walt Henry

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	Not a part of this project.
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST

PROJECT Pleasant Valley Reservoir **DATE** April 12, 1979

PROJECT FEATURE Outlet Structure **NAME** Morris Root

DISCIPLINE H & H **NAME** Wayne Leonard
Walt Henry

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	N/A
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain Holes	
Channel	
Loose Rock or Trees Overhanging Channel	
Condition of Discharge Channel	

PERIODIC INSPECTION CHECK LIST

PROJECT Pleasant Valley Reservoir DATE April 12, 1979

PROJECT FEATURE Spillway NAME Morris Root

DISCIPLINE H & H NAME Wayne Leonard

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Good - reservoir
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Reservoir bottom, some silt and small twigs.
b. Weir and Training Walls	
General Condition of Concrete	Good vertical joints in concrete have been plugged but sealant has eroded and some spalling is occurring.
Rust or Staining	None
Spalling	None
Any Visible Reinforcing	None
Any Seepage or Efflorescene	Downstream left wall has two large areas of efflorescence through small cracks.
Drain Holes	None
c. Discharge Channel	
General Condition	Good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Trees in channel at upstream end.
Floor of Channel	Is bedrock for most part.
Other Obstructions	Concrete apron at toe of spillway is breaking out. Poor bond with rock.

One is for the installation of a reinforced concrete corewall on the downstream side of the existing corewall, with a concrete apron extending from the new corewall and resting on the existing corewall.

The other consists of a reinforced concrete slab on a 1 on 2 slope on the upstream face of the dam, extending up the slope from a point of junction with the top of the existing concrete corewall.

Either of these plans would eliminate any additional loading, except for the added water depth, in the existing upstream embankment.

Which of these designs will be submitted for your approval will depend to a great extent on the estimated cost of the project.

We hope to be able to have a tentative design in your hands the first part of next week.

Very truly yours,

BARKER & WHEELER

By J. K. Fraser
J. K. Fraser

JKF
d
m
a

cc: Mr. Miller

BARKER & WHEELER
Engineers

36 STATE ST., ALBANY 7, N.Y.

June 25th, 1954.

Mr. R. W. Thieme,
Acting Commissioner of Water Resources
Montpelier, Vermont.

Subject: Pleasant Valley Reservoir Dam
Brattleboro, Vermont.

Dear Mr. Thieme:-

As you know, on the day of the hearing in Brattleboro, we obtained some samples of the material in the upstream face of the Pleasant Valley Dam.

Subsequently, Mr. Kestner of this office, and Mr. M. N. Sinacori, a Soils Engineer, visited the site and made various observations, and additional soil samples were taken from the embankment area.

We are enclosing several prints which show the sieve analyses of these various samples.

Curves marked A, B and C were samples taken from the area noted as "Embankment Borrow Area" on the plans, on the easterly side of the existing entrance roadway.

Sample D was taken in the same general area, however on the westerly side of the roadway.

These four samples were analyzed by Mr. Sinacori.

Sample E, which was taken from the upstream face of the dam, was analyzed in this office, and you will note that our sieves do not go above the #4 sieve in size. It will further be noted that there is quite a similarity between all of the samples.

We are studying at present two proposed modifications of the plans.

The new corewall has been placed some distance downstream from the original corewall. and it has been designed to be stable under all conditions. That is, the new corewall is stable when the reservoir is full and without any earth behind it, and also when the reservoir is empty without any benefit of backfill in place on the upstream side, and with the backfill in place on the downstream side.

The new slopes on the upstream face have been placed as flat as possible, contemplating a lowering of the water surface 5 feet during construction.

Considering the limited extent to which the dam is raised, we do not believe that the work proposed to be done will impair the stability of the dam in any way.

The watershed area, as obtained from the U.S.G.S. map, is 1.16 square miles. We have provided a vertical distance, or freeboard. of 3 feet between the top of the new spillway and top of the new corewall, which extends to the full height of the embankment.

The reservoir is not subject to wave action, and the spillway, with a length of 72 feet, based upon a coefficient of 3.5, will pass 1,000 cfs with a depth of 2.5 feet over the spillway. This is equivalent to a discharge of 860 sec. ft. per sq.. mi., based on the watershed area of 1.16 square miles.

The ogee section, however, was designed for an overflow depth of 2-1/2 feet, and under such a condition, the coefficient, instead of being 3.5, should be approximately 3.88, in which case the total discharge would be approximately 1,090 cfs, or 945 cfs per square mile.

We trust this is the information you desire.

Very truly yours,

BARKER & WHEELER

By J. K. Fraser
J. K. Fraser

JKF:DA

cc: Mr. Miller

BARKER & WHEELER
Engineers
36 STATE ST., ALBANY 7, N.Y.

June 9th, 1954.

Mr. R. W. Thieme,
Acting Commissioner of Water Resources
Montpelier, Vermont.

Dear Mr. Thieme:-

This letter is in reply to your letter of June 3rd with regard to raising of the Pleasant Valley Reservoir Dam in Brattleboro.

The present dam was constructed in 1909, or 45 years ago. The slope on the upstream side is approximately 1 on 1, and is covered with stone riprap. We realize that such a slope is much steeper than is normally desired. However, it is apparent that these slopes have maintained their original position, and the present dam shows no considerable structural weakness.

There is a concrete corewall 2'-3" wide on the top with an unknown bottom width, and apparently the entire dam was founded on rock. We have in the office some pictures of the original construction which we will present at the hearing.

The plans indicate two "springs", which may represent leakage under the corewall, or leakage through the rock, one of them at Station 1+85, and the other at Station 4+00. Neither of these are at the deepest sections of the dam.

The flow from these "springs" was measured in the field, and determined to be approximately 3,000 gallons per day each, or at a rate of about 2 gallons per minute. This amount of leakage does not seem to be serious. The flow shows no sign of carrying sediment.

If the dam is to be raised as contemplated, the work must be accomplished without dewatering, and with this in mind, there was no practical way to increase the existing slopes on the upstream face of the dam above the present slope and still be able to utilize the reservoir for water supply purposes.

TOWN OF BRATTLEBORO

WINDHAM COUNTY VERMONT

NOTICE TO BIDDERS, INFORMATION FOR BIDDERS, PROPOSAL, FORM OF CONTRACT, BOND AND SPECIFICATIONS FOR RAISING THE PLEASANT VALLEY RESERVOIR DAM

TOWN OFFICIALS

George F. Miller, Town Manager

Board of Selectmen

William M. Moore, Chairman
Richard H. Sherwin
Henry G. Chamberlin
Daniel J. Stolte
John P. Helyar

May - 1954

Barker and Wheeler
Consulting Engineers

36 State Street Albany, New York

The plans presented call for raising the spillway 10 feet, or from the present elevation of 620.5 to 630.5. This will increase the storage capacity of the reservoir 60,000,000 gallons, and the flooded area from 16 to 25 acres. To accomplish this it is proposed to construct a reinforced concrete retaining, or corewall, back of the existing corewall, and to widen the embankment on the downstream side from a crest width of 12 feet to a bottom width of approximately 140 feet - at the highest point of the dam.

A spillway of Ogee Section, with a crest elevation of 730.5 - will have a length of 72'. This is designed for the runoff from a watershed as taken from the USGS Map of 1.16 square miles and will discharge the following quantities under the heads listed:

1.0	feet	272 C.F.S.
1.5	"	462 "
2.0	"	713 "
2.5	"	1,000 "

The spillway channel which varies in width from 20' to 34' is designed to accommodate the maximum discharge capacity of the spillway.

All the improvements contemplated under these plans are on lands owned and controlled by the municipality, and have been approved by the electorate.

Two sets of plans and specifications are being sent you today by Parcel Post.

Your early attention will be greatly appreciated.

Very truly yours,

BARKER & WHEELER

By J. K. Fraser
J. K. Fraser

JKF:cvb
Cc: Mr. Thieme
Mr. Miller

BARKER & WHEELER
Engineers
36 STATE ST., ALBANY 7, N.Y.

May 21, 1954.

State of Vermont
Water Conservation Board
Montpelier, Vermont

Attention: Mr. R. W. Thieme, Acting Commissioner of Water Resources.

Dear Mr. Thieme:

We hereby make application, for the Town of Brattleboro, Windham County, Vermont, for permission to raise the height of the existing Pleasant Valley Reservoir Dam, to increase the storage capacity of the reservoir to meet deficiencies when the watershed is unable to produce sufficient water to meet demands, particularly during extreme dry periods, such as occurred last summer.

We are presenting, for your consideration and approval, plans and specifications covering the improvements contemplated, which meet with the approval of the local municipal authorities.

Pleasant Valley Reservoir, located about 3½ miles northwest of the Village of Brattleboro, on what is known as Pleasant Valley Brook, was created in 1909, by constructing an earth dam with concrete corewall, and 20 foot concrete spillway. The dam being about 650 feet long. Water is conveyed to the Village thru two 16" transmission mains, one of which was constructed in 1952.

The original plans called for the construction of a dam to impound 120,000,000 gallons of water covering an area of about 25 acres. However, it was subsequently decided to reduce the height of the dam and impound only 80,000,000 gallons, which was the plan carried out and in effect at this time.

The height of the present dam varies from 8 to 25 feet, and has a crest width of about 12 feet, and a bottom width of 95 feet at the highest point. The corewall is reputed to have a base thickness of 10 feet - at maximum height, and measures 2" - 4" at the top. Plans of the dam are not available. The present spillway is 70 feet long and has a free board of about 18 inches.

April 14, 1954

Barker & Wheeler, Engineers,
36 State Street,
Albany 7, New York.

Gentlemen:

Your letter dated April 6th addressed to the Public Service Commission has been referred to this office for action since Public Acts of 1949 transferred responsibility for all dams, except those incident to hydro-electric development, to the Water Conservation Board.

Section 9398 of the Vermont Statutes as amended by this Act reads as follows:

> 9398. Application; construction or reconstruction of dam. Any person, firm, partnership, cooperative electric association or domestic or foreign corporation who proposes to construct such dam, or to remodel, reconstruct, alter, enlarge, or add to such existing dam shall apply in writing to the Board for authority so to do, and shall give notice thereof to the selectmen of the town in which such dam, or any part thereof is to be located. Such application shall set forth the place of location, the height, the width thereof at the top and base, any proposed changes to such existing dam, the approximate area to be overflowed and the approximate number of, or additional cubic feet of water to be impounded thereby and the plans and specifications to be followed in the construction, remodelling, reconstructing, altering, raising or adding to thereof."

Your application to the Board may be in the form of a letter requesting permission for your client to enlarge or reconstruct the certain dam. Changes to the structure should be described as required in Section 9398 quoted above. Your letter should be accompanied by plans and specifications to be followed in the reconstruction.

If you require further information in this regard, I shall be happy to communicate further.

Sincerely yours,

R. W. Thieme
Acting Commissioner of Water Resources

RWT/eg

BARKER & WHEELER
Engineers

36 STATE ST., ALBANY 7, N.Y.

April 6, 1954.

Public Service Commission,
Montpelier, Vt.

Gentlemen -

We are doing the preliminary work in connection with raising the dam to increase the storage of the Pleasant Valley Reservoir at Brattleboro. I do not have any detailed regulations with regard to the form that an application to the Public Service Commission for approval should have, and I would appreciate it if you would send them to me, together with any other information that you consider pertinent.

Very truly yours,

Robert C. Wheeler.

RCW
m
w
c

VERMONT DEPARTMENT OF WATER RESOURCES

INFORMATION SHEET

Name of Dam Pleasant Valley Res Town Brattleboro

Owner Town of Brattleboro Name of Stream Whetstone Brook Trib.

Address Brattleboro Classification 2

Vermont

U.S.G.S. Coordinates: Lat. 42° 52' 56" Long. 72° 33' 25"

U.S.G.S. Map Brattleboro, Vt-NH Aerial Photos Vt-62-11 19-137,138

U.S.G.S. Elev. @ Spillway

Total Length of Dam ~~600'~~ 720' + 80' = 800' Crest Width of Emergency Spillway 80'

Width of Top 12' Maximum Height

Spillway Capacity: Principal Emergency 88' 1300 CFS

Pond Area 25 acres Drainage Area 1.2 sq mi

Pond Volume: Normal Water Level Design High Water Level

Maximum Water Depth: Normal Water Level Design High Water Level

Storage Before Emergency Spillway is Used

Use of Reservoir Water Supply, Town of Brattleboro

Description of Dam: EF Conc. Core Wall

Description of Spillway(s):

Designed by Alteration Barber & Wheeler Eng, Albany Year Built Alteration 1954; Orig const 1904

Hearing Date June 15, 1954 Order Date

Additional Remarks:

APPENDIX B

PROJECT RECORDS AND PLANS

PERIODIC INSPECTION CHECK LIST

PROJECT Pleasant Valley Reservoir **DATE** April 12, 1979

PROJECT FEATURE Reservoir **NAME** Morris Root

DISCIPLINE _____ **NAME** Wayne Leonard
Walt Henry

AREA EVALUATED	CONDITION
Stability of Shoreline	Excellent
Sedimentation	Minimum observed
Changes in Watershed Runoff Potential	Small possibility
Upstream Hazards	None
Downstream Hazards	Trailer Park
Alert Facilities	Evacuation has been exercised. Floods in Whetstone Brook.
Hydrometeorological Gages	Small rain gage, hi-lo thermostat
Operational & Maintenance Regulations	Water supply - 99% for Brattleboro. Use some wells during dry weather.

PERIODIC INSPECTION CHECK LIST

PROJECT Pleasant Valley Reservoir **DATE** April 12, 1979

PROJECT FEATURE Service Bridge **NAME** Morris Root

DISCIPLINE H & H **NAME** Wayne Leonard
Walt Henry

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	55 feet long x 4 feet wide
a. Super Structure	
Bearings	Small steel plates (foot bridge only)
Anchor Bolts	None
Bridge Seat	1 1/2 feet overlap on concrete on dam 9 inches into tower
Longitudinal Members	12 inch I beams
Under Side of Deck	Just grates
Secondary Bracing	Tie rod
Deck	Grating
Drainage System	Grates
Railings	Good condition 1 1/2 inch diameter pipe
Expansion Joints	None
Paint	Fair
b. Abutment & Piers	
General Condition of Concrete	Good
Alignment of Abutment	Good
Approach to Bridge	Good
Condition of Seat and Backwall	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Pleasant Valley Reservoir DATE April 12, 1979

PROJECT FEATURE Intake Channel NAME Morris Root

DISCIPLINE H & H NAME Wayne Leonard
Walt Henry

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

July 6, 1954

Mr. J. K. Fraser,
Barker & Wheeler, Engineers
36 State Street,
Albany 7, N. Y.

Re: Pleasant Valley Reservoir Dam, Brattleboro, Vt.

Dear Mr. Fraser:

This will acknowledge your letter of June 25th, 1954, containing a graphical report of the sieve analyses of several soil samples from the subject dam site.

On Wednesday afternoon, June 30th, Mr. Kestner of your office and Mr. Miller, Town Manager of Brattleboro, visited this office to discuss several alternate plans for dam cross-section designed to provide an upstream slope more suited to the soil available for the dam construction. Mr. Kestner stated that one of these designs utilizing a reinforced concrete revetment on the upstream face would compare very favorably, costwise, with the original design.

Your preliminary sketch showing the Proposed Reinforced Concrete Revetment for Earth Dam has been reviewed by our staff. We feel that it is a decided improvement over the original design and are in agreement with this method of construction.

May we suggest that steps be provided on the downstream face of the existing dam to provide a better bond or support of new embankment. Of course, you will require all turf, brush, roots, etc., to be removed from the existing dam prior to placing of the new embankment. We also feel that the 2' of earth on the upstream face above the concrete revetment might well be replaced with concrete or riprap.

Naturally we reserve the right of review of your altered design for this dam and you may be assured of our prompt attention to this matter when your drawings are submitted.

Sincerely yours,

Acting Commissioner of Water Resources

RWT/og
cc to Benjamin W. Fisher
cc to George F. Miller

BARKER & WHEELER
Engineers
36 STATE ST., ALBANY 7, N.Y.

July 22nd, 1954.

TOWN OF BRATTLEBORO
WINDHAM COUNTY, VERMONT

Addendum No. 2
to Contract Documents Dated May 1954
for Raising Pleasant Valley Reservoir Dam

Introduction

This office has prepared alternate plans for raising Pleasant Valley Reservoir, utilizing a paved slope on a 1 on 2 compacted embankment. The State of Vermont Water Conservation Board, under letter of July 6, 1954, indicated agreement with the alternate plan for construction. The low bidder, F.A. Tucker, Inc., Rutland, Vermont, signed the original contract, including Addendum No. 1 covering the alternate plan, on July 7, 1954.

Addendum No. 1 provided for the performance of the contract in accordance with the alternate plan, and at the same unit prices bid under the original plan, insofar as these items are capable of classification under the contract.

Details of the alternate plan have been prepared on Drawings dated July 22, 1954 bearing the following numbers and sub-titles:

Sheet No.	Sub-Title
2A	Plan of Paved Slope Dam and Cut-off Details Station 7+22.
3A	Sections Through Dam, Stations 0+00 - 2+05.68.
4A	Sections Through Dam, Stations 2+33 - 5+00.
5A	Sections Through Dam, Stations 5+50 - 7+25.
6A	Spillway and Abutment Details.
7A	Slope Paving and Walkway Details.

BARKER & WHEELER
Engineers
36 STATE ST., ALBANY 7, N.Y.

July 26th, 1954.

Mr. R. W. Thieme,
Acting Commissioner of Water Resources
Montpelier, Vermont.

Subject: Brattleboro, Vermont

Dear Mr. Thieme:-

We are sending under separate cover two sets of plans containing Sheets No. 1, 2, 2A, 3A, 4A, 5A, 6A, 7 and 7A, and two copies of Addendum No. 2 to the specifications for raising the Pleasant Valley Reservoir.

These plans utilize a reinforced concrete slope pavement on a compacted embankment with a 1 on 2 slope.

On Sheet No. 7A of these plans the types of construction joints to be used are detailed.

Various other modifications are described in Addendum No. 2, and are also detailed on the plans.

The new spillway, which is nearly 88 feet in length, is capable of discharging about 1,300 cfs at a 2-1/2-foot head, and 1-1/2-foot freeboard.

Construction of this project is underway at the present time, with F. A. Tucker, Inc., of Rutland, Vermont as the Contractor.

Very truly yours,

BARKER & WHEELER

By J. A. Kestner, Jr.
J. A. Kestner, Jr.

JAK:DA

cc: Mr. Miller

PLEASANT VALLEY RESERVOIR

Brattleboro, Vt.

August 4, 1954

The undersigned visited the Pleasant Valley Reservoir, Brattleboro, on August 4, 1954.

The contractor was working on the project. At the time of the visit work was going on in building up the intake tower and on the new spillway section.

The section of the new dam between the spillway and the pipe outlet had been cleared and grubbed and the muck removed. Some fill had been placed in this section.

The outlet pipes were incased in concrete from the lower end up to the toe of the old dam.

The concrete core wall is exposed for its entire length. There is quite a large crack in the wall at sta. 2 plus 65.31.

I visited Mr. Miller at his office in Brattleboro. He said that the contractor had removed considerable muck in the area between the spillway and the outlet pipe and he thought that it was probably placed there at the time the original dam was built.

S/ J. E. Cerutti

PLEASANT VALLEY RESERVOIR

October 6, 1954

The site of construction was visited and the following was noted:

1. The first sections of the concrete slab that tied into the existing corewall on the upstream face were being poured.

2. I was told that the pouring of concrete would be completed in about two weeks.

3. The concrete work for the new spillway was completed and some back fill had been done.

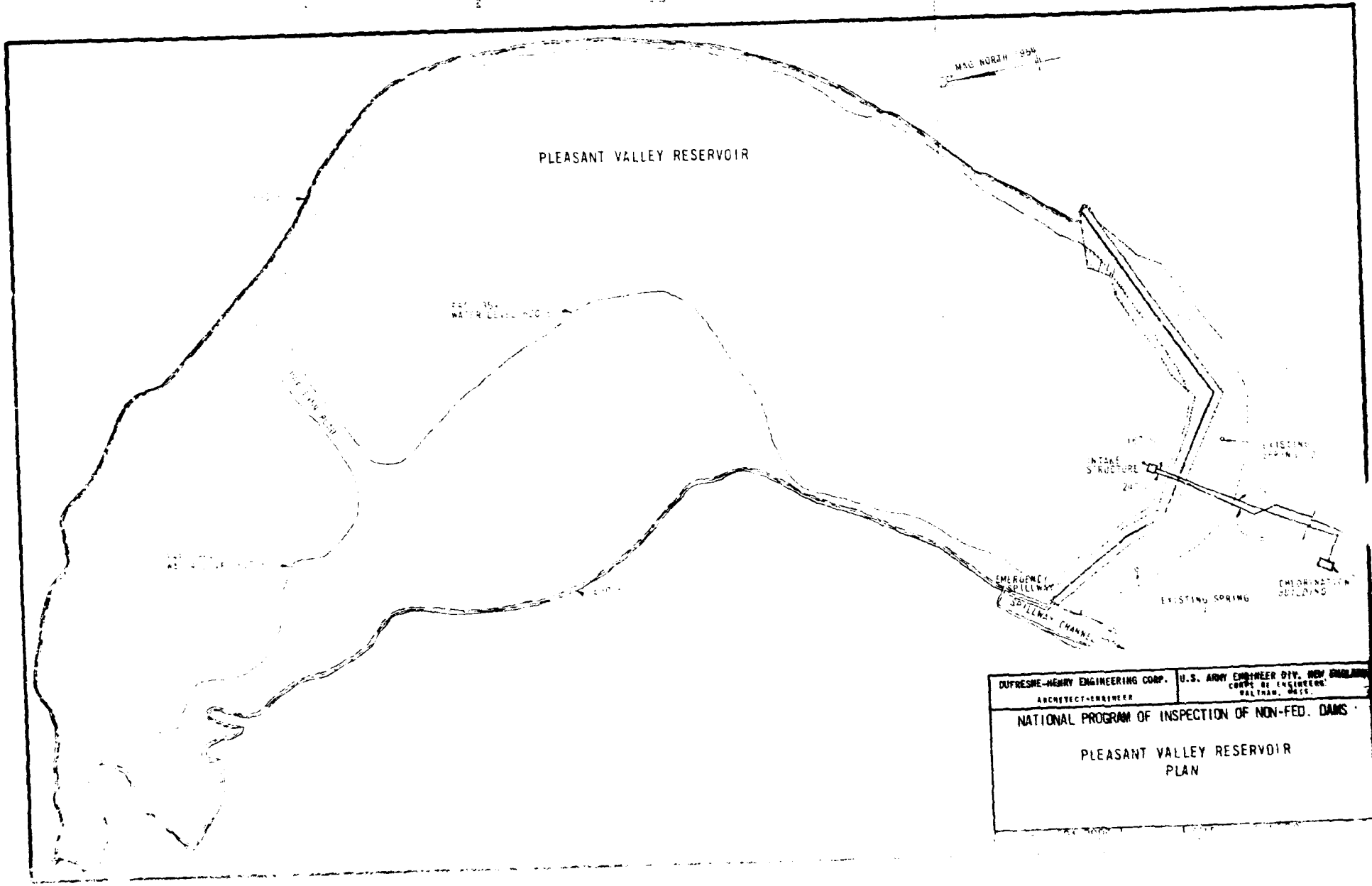
4. It was noted in the concrete work for the spillway that there was a long crack that extended from the backfill on the upstream face rather straight over the top and down the front face and continued out of sight into the earth below. The crack in most places was large enough to stick a knofe blade into. The crack was located about 24' to 25' from the north end of the spillway structure.

5. Work was being done on the spillway channel.

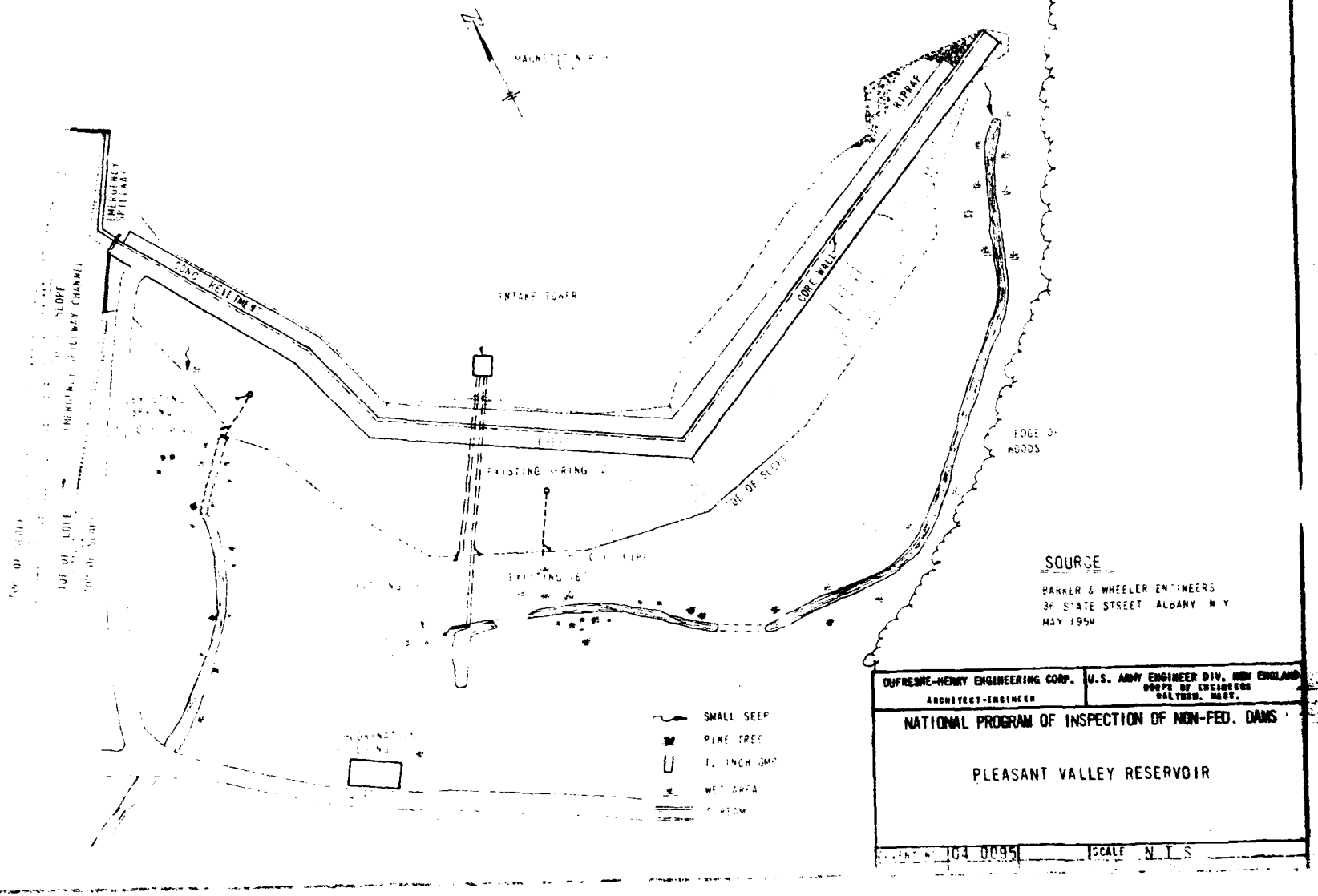
6. Excavation was being made in the embankment borrow area.

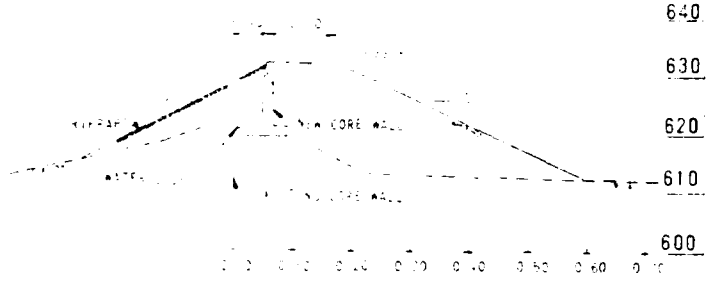
7. The new roadway entrance was partially graded.

s/ Richard S. Haupt

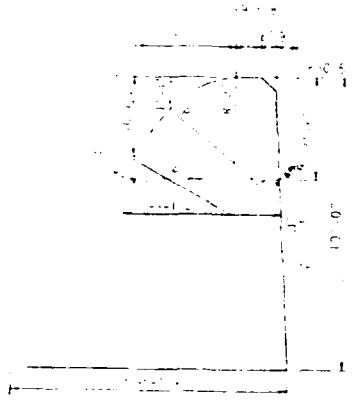


273

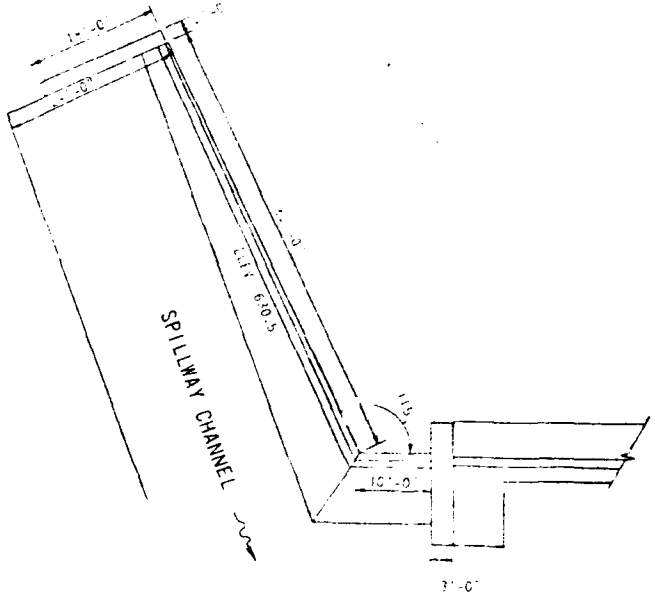




TYPICAL SECTION



SPILLWAY SECTION



EMERGENCY SPILLWAY PLAN

SOURCE

BARKER & WHEELER ENGINEERS
36 STATE STREET ALBANY N Y
MAY 1954

DUFRESNE-HENRY ENGINEERING CORP. ARCHITECT-ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

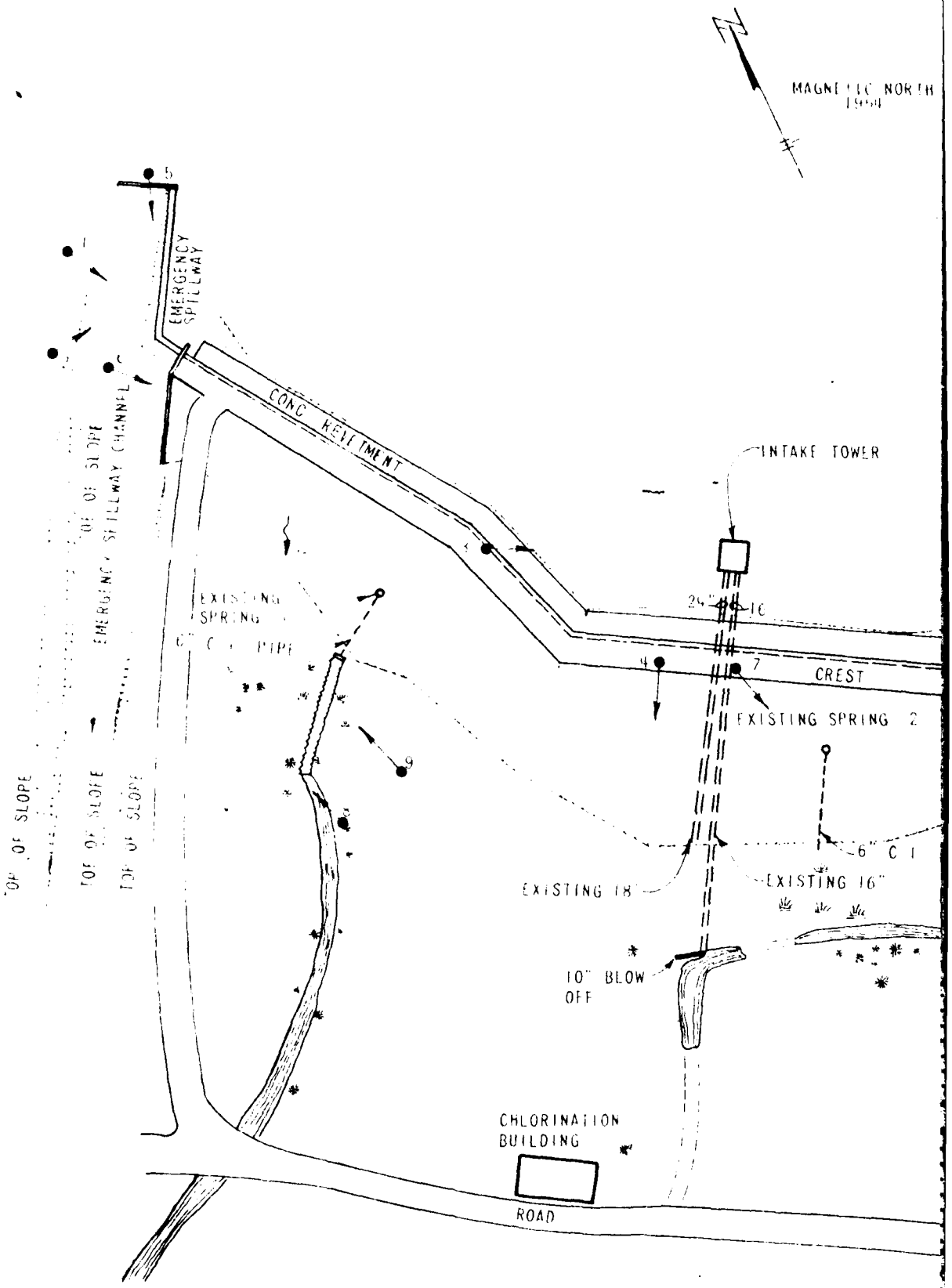
PLEASANT VALLEY RESERVOIR

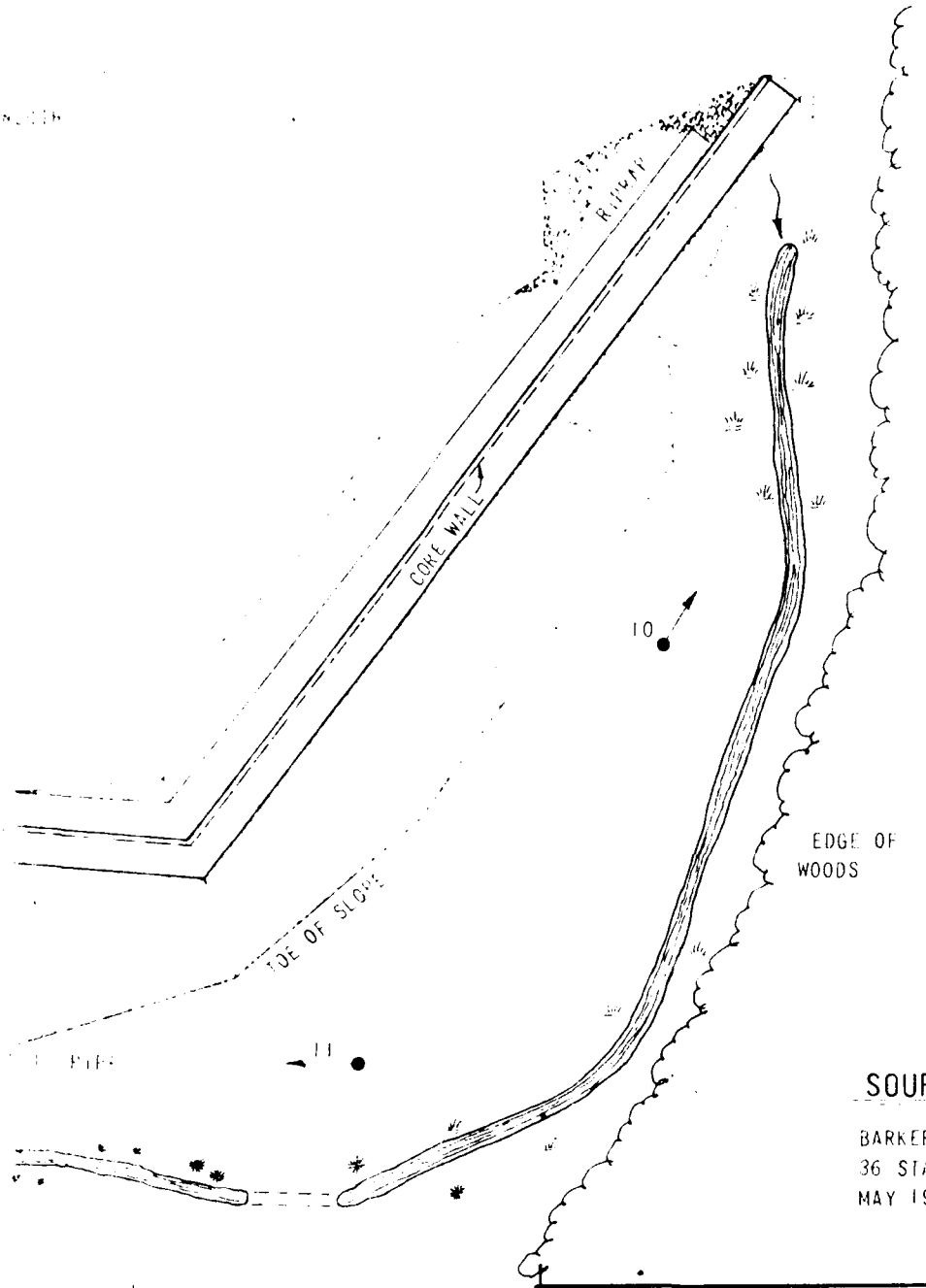
CLIENT NO 04-0095	SCALE
	DATE

APPENDIX C

PHOTOGRAPHS

1. View of crest of dam, spillway and access bridge, from right abutment.
2. View of spillway at right abutment.
3. View of control tower and access bridge looking toward left abutment.
4. View of chlorination building immediately downstream of dam.
5. View of spillway and discharge channel.
6. View of spillway training wall showing hairline cracks and efflorescence.
7. View of downstream toe showing seep from 6-inch C.I. pipe at Spring #2 location.
8. View of rusty water and top of 12-inch C.M.P. from Spring #1.
9. View along downstream toe showing seep from old spillway and along toe. Coat shows location of 6-inch C.I. pipe.
10. View showing toe along left abutment and seeps.
11. View showing downstream face of dam.
12. View of trailer park downstream of dam.





SOURCE

BARKER & WHEELER ENGINEERS
36 STATE STREET ALBANY N Y
MAY 1954

- PHOTO LOCATION
- SMALL SEEP
- PINE TREE
- 12 INCH CMP
- WET AREA
- STREAM

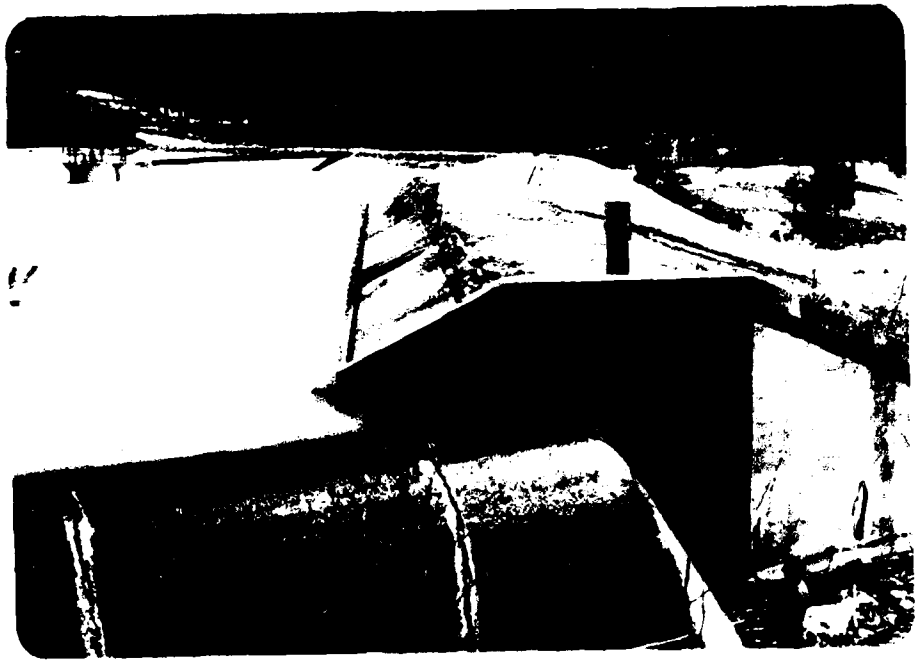
DUFRESNE-HENRY ENGINEERING CORP. ARCHITECT-ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

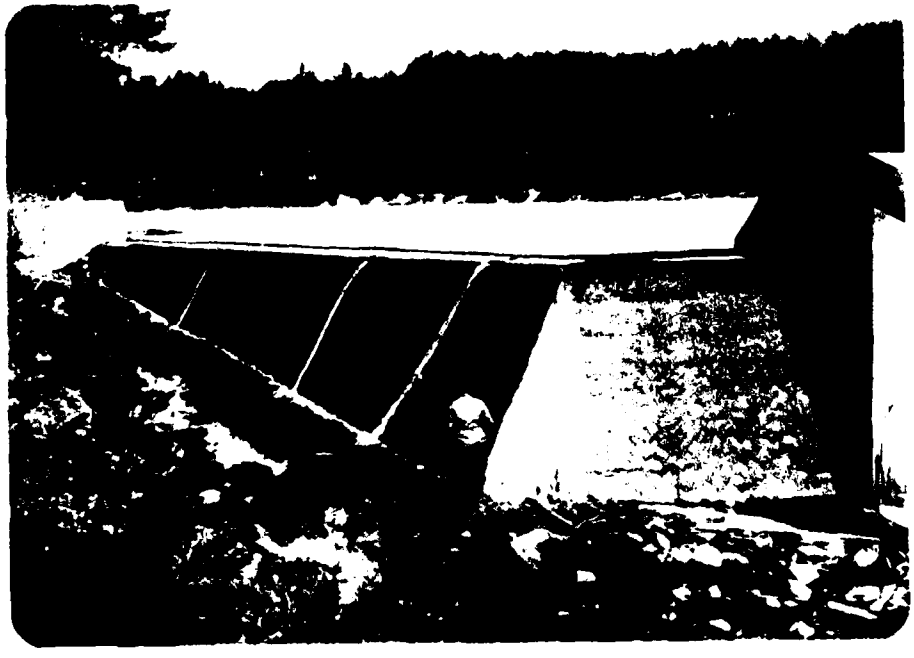
PLEASANT VALLEY RESERVOIR
PHOTO LOCATION

CLIENT NO	04-0095	SCALE	N.T.S.
ENG	WAL	DATE	4-20-79

12

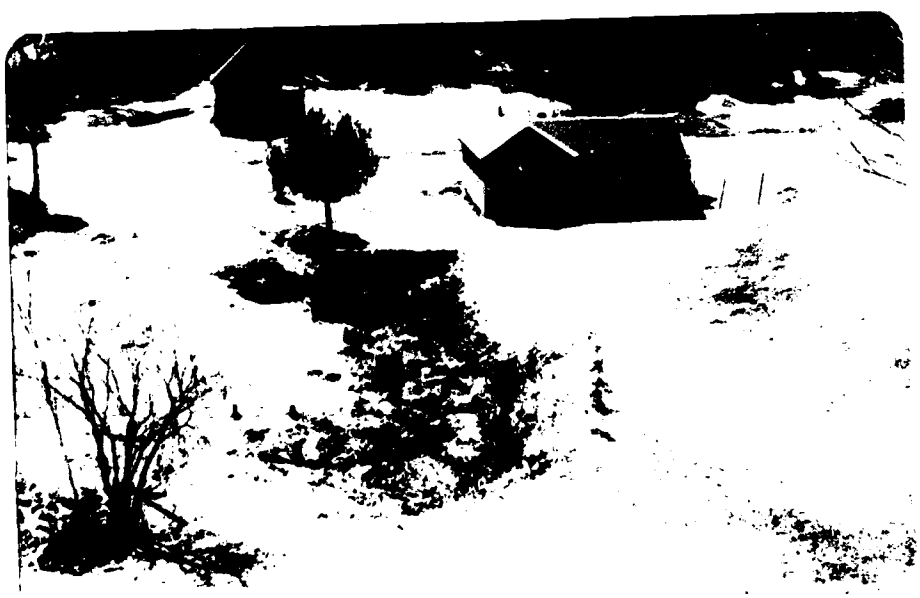


#1. VIEW OF CREST OF DAM, SPILLWAY AND ACCESS BRIDGE, FROM RIGHT ABUTMENT

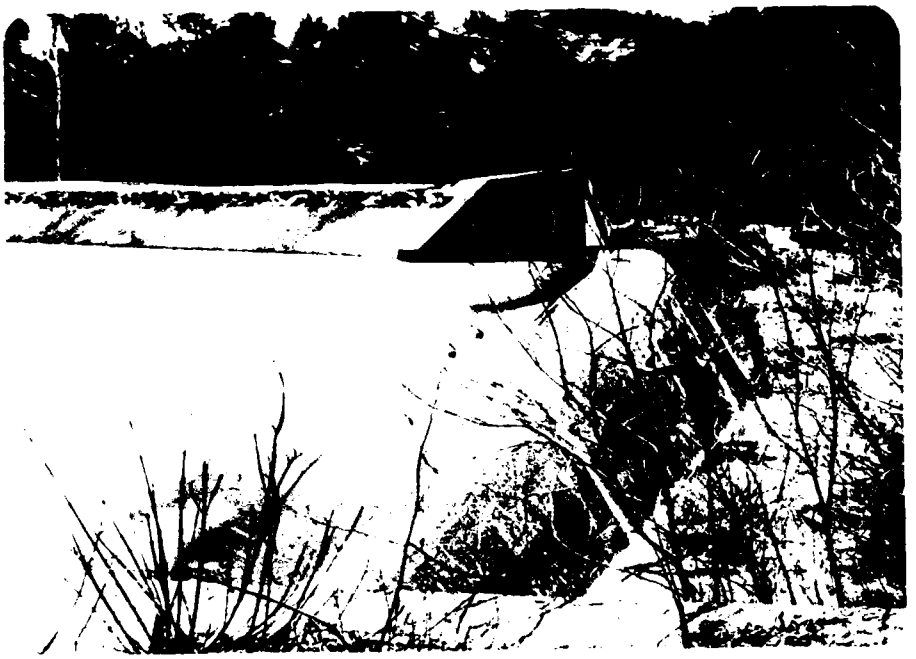


#2. VIEW OF SPILLWAY AT RIGHT ABUTMENT

#3. VIEW OF CONTROL TOWER AND ACCESS BRIDGE LOOKING TOWARD LEFT ABUTMENT



#4. VIEW OF CHLORINATION BUILDING IMMEDIATELY DOWNSTREAM OF DAM



#5. VIEW OF SPILLWAY AND DISCHARGE CHANNEL

#6. VIEW OF SPILLWAY TRAINING WALL SHOWING HAIRLINE CRACKS AND EFFLORESCENCE

STATION 1

INFLOWS(, OUTFLOWS(AND OBSERVED FLOWS(

		0.	1000.	2000.	3000.	4000.	5000.	0.	0.	0.	0.	0.	0.	0.	
												PRECIPIT(AND EXCESS((			
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.2	0.8	0.4	0.0	
1	0	101													
1	0	201													
1	0	301													
1	0	401													
1	0	501													
1	0	601													
1	1	101													
1	1	201													
1	1	301													
1	1	401													
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1	6	201													
1	6	301													
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1	8	30. 1													
1	8	40. 1													
1	8	50. 1													
1	8	60. 1													
1	9	10. 1													

SUB 24.00 21.12 99707.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4712.	2306.	692.	692.	99707.
INCHES		18.50	22.21	22.21	22.21
AC-FT		1146.	1376.	1376.	1376.

1	13	10	0.40	0.38	1297.
1	13	20	0.40	0.38	1210.
1	13	30	0.40	0.38	1307.
1	13	40	0.40	0.38	1397.
1	13	50	0.40	0.38	1477.
1	13	60	0.40	0.38	1564.
1	14	10	0.50	0.48	1600.
1	14	20	0.50	0.48	1659.
1	14	30	0.50	0.48	1729.
1	14	40	0.50	0.48	1811.
1	14	50	0.50	0.48	1895.
1	14	60	0.50	0.48	1969.
1	15	10	1.27	1.25	2078.
1	15	20	1.27	1.25	2307.
1	15	30	1.27	1.25	2693.
1	15	40	1.27	1.25	3211.
1	15	50	1.27	1.25	3781.
1	15	60	1.27	1.25	4301.
1	16	10	0.47	0.45	4639.
1	16	20	0.47	0.45	4712.
1	16	30	0.47	0.45	4526.
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1	16	50	0.47	0.45	3644.
1	16	60	0.47	0.45	3173.
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1	21	10	0.03	0.01	787.
1	21	20	0.03	0.01	276.
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1	21	50	0.03	0.01	244.
1	21	60	0.03	0.01	234.
1	22	10	0.03	0.01	225.
1	22	20	0.03	0.01	216.
1	22	30	0.03	0.01	208.
1	22	40	0.03	0.01	199.
1	22	50	0.03	0.01	191.
1	22	60	0.03	0.01	184.
1	23	10	0.03	0.01	177.
1	23	20	0.03	0.01	170.
1	23	30	0.03	0.01	163.
1	23	40	0.03	0.01	156.
1	23	50	0.03	0.01	150.
1	23	60	0.03	0.01	144.

1	2	10	0.02	0.00	1.
1	2	20	0.02	0.00	1.
1	2	30	0.02	0.00	1.
1	2	40	0.02	0.00	1.
1	2	50	0.02	0.00	1.
1	2	60	0.02	0.00	1.
1	3	10	0.02	0.00	1.
1	3	20	0.02	0.00	1.
1	3	30	0.02	0.00	1.
1	3	40	0.02	0.00	1.
1	3	50	0.02	0.00	1.
1	3	60	0.02	0.00	1.
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1	4	20	0.02	0.00	1.
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1	9	10	0.06	0.04	179.
1	9	20	0.06	0.04	179.
1	9	30	0.06	0.04	179.
1	9	40	0.06	0.04	179.
1	9	50	0.06	0.04	179.
1	9	60	0.06	0.04	179.
1	10	10	0.06	0.04	179.
1	10	20	0.06	0.04	179.
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1	10	40	0.06	0.04	179.
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1	11	10	0.06	0.04	179.
1	11	20	0.06	0.04	179.
1	11	30	0.06	0.04	179.
1	11	40	0.06	0.04	179.
1	11	50	0.06	0.04	179.
1	11	60	0.06	0.04	179.
1	12	10	0.33	0.31	198.
1	12	20	0.33	0.31	264.
1	12	30	0.33	0.31	395.
1	12	40	0.33	0.31	573.
1	12	50	0.33	0.31	772.
1	12	60	0.33	0.31	956.

HEC-1 VERSION DATED JAN 1973
UPDATED AUG 74
CHANGE NO. 01

PLEASANT VALLEY RESERVOIR
BRATTLEBORO VERMONT
-RESERVOIR ROUTING PROGRAM

JOB SPECIFICATION

NO	NMR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
144	0	10	1	0	0	0	2	0	0

JOPER NWT
3 0

SUB-AREA RUNOFF COMPUTATION

SUB AREA RUNOFF

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	0	0	0	0	0	1

HYDROGRAPH DATA

INVDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.16	0.0	0.0	1.00	0.0	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.0	18.00	111.00	123.00	133.00	0.0	0.0	0.0

LOSS DATA

STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0.0	0.0	1.00	0.0	0.0	1.00	0.30	0.12	0.0	0.0

UNIT HYDROGRAPH DATA
TPD 0.76 CPD0.75 NTAB 0

RECESSION DATA
STRTQB 2.90 QRCSN -0.10 RTIOR 1.90
APPROXIMATE FLOW COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TCS 5.74 AND RS 2.75 INTERVALS

UNIT HYDROGRAPH 18 END-OF-PERIOD ORDINATES, LAG= 0.76 HOURS, CP= 0.75 VOL= 1.00

71.	250.	470.	652.	724.	668.	506.	351.	243.	169.
117.	81.	56.	39.	27.	19.	13.	9.		

END-OF-PERIOD FLOW

	TIME	RAIN	EXCS	COMP Q
1	0 10	0.02	0.00	2.
1	0 20	0.02	0.00	2.
1	0 30	0.02	0.00	2.
1	0 40	0.02	0.00	2.
1	0 50	0.02	0.00	2.
1	0 60	0.02	0.00	2.
1	1 10	0.02	0.00	2.
1	1 20	0.02	0.00	2.
1	1 30	0.02	0.00	2.
1	1 40	0.02	0.00	2.
1	1 50	0.02	0.00	2.
1	1 60	0.02	0.00	2.

DUFRESNE-HENRY ENGINEERING CORPORATION

W.A.L. SUBJECT Pleasant Valley Reservoir SHEET NO. ___ OF ___
ATE 3-27-79 Computer Input Data JOB NO. 04-0095

Soil Classification

Dominant Soils of the Paxton - Woodbridge - Woodstock Assoc.
Hydrologic Soil Group "C"

From S.C.S for Group "C" soil Run off curve No. = 73
Land use — Wooded

Initial Rainfall Losses (Assume wet condition)

From Table 10.1 = .30 inches

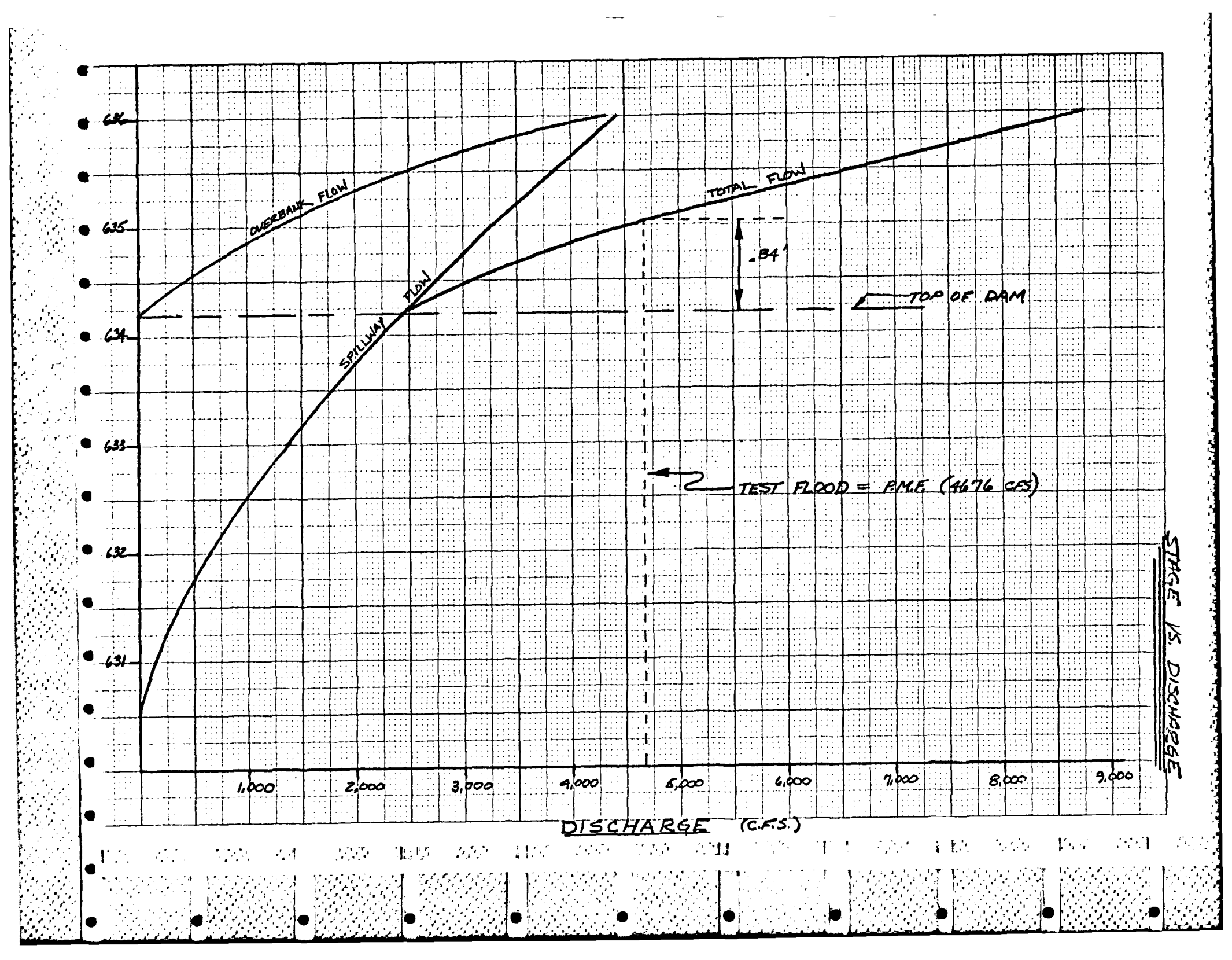
Infiltration Rate from SCS
For Group "C" soil = .12 inches/hour

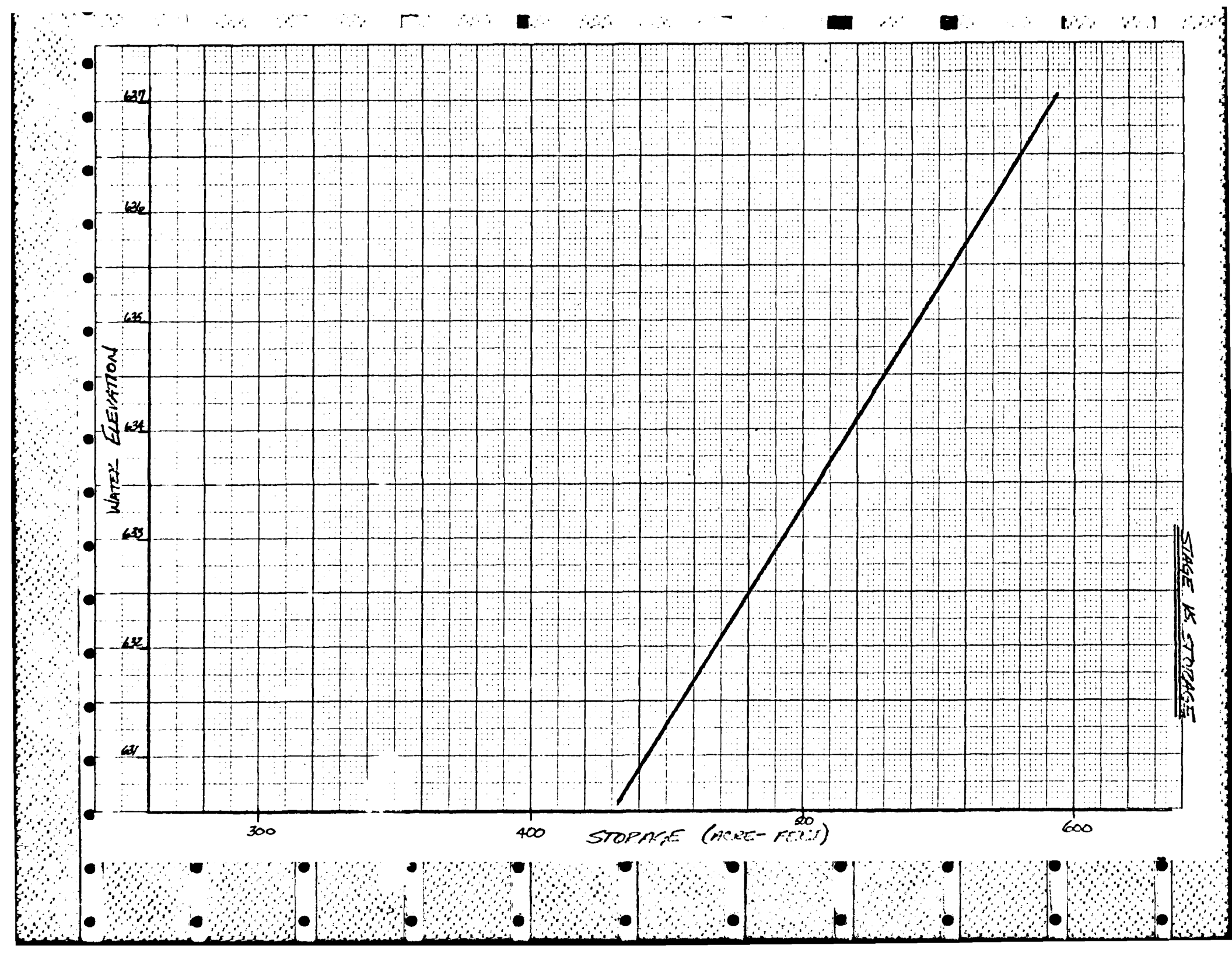
Average Slope

$$\frac{960-640}{.98396} = 325'/\text{mile}$$

Elev @ 10% 640
Elev @ 85% 960
Total length 1.31195 miles
Dist between 10 & 85% points .98396 mi.

$$F = 2.2\left(\frac{LL_c}{\sqrt{S}}\right)^{.37} = 2.2\left[\frac{(1.31195)(.6)(1.31195)}{\sqrt{325}}\right]^{.37} = .76$$


636
635
634
633
632
631
OVERBANK FLOW
TOTAL FLOW
SPILLWAY FLOW
.84'
TOP OF DAM
TEST FLOOD = P.M.F. (4676 CFS)
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000
DISCHARGE (C.F.S.)
STAGE VS. DISCHARGE


STAGE VS. STORAGE
WATER ELEVATION
637
636
635
634
633
632
631
300
400
500
600
STORAGE (ACRE-FEET)

DUFRESNE-HENRY ENGINEERING CORPORATION

BY W.A.L SUBJECT PLEASANT VALLEY RESERVOIR SHEET NO. ____ OF ____
DATE 3-26-79 DISCHARGE & STORAGE CALCULATIONS JOB NO. 04-0095

SPILLWAY ELEV 630.5
LENGTH 88'
ASSUME C = 3.9
USE $Q = CLH^{3/2}$

EMBANKMENT ELEV 634.2
LENGTH 717'
ASSUME C = 2.5
USE $Q = CAH^{1/2}$

ASSUME LOW LEVEL OUTLET NEGLIGIBLE

WSEL	$H_{SPILLWAY}$	Q SPILLWAY	$H_{EMBANKMENT}$	$Q_{EMBANKMENT}$	Q TOTAL (C.F.S)
630.5	—	—	—	—	-0-
631.0	0.5	121	—	—	121
632.0	1.5	631	—	—	631
633.0	2.5	1357	—	—	1357
634.0	3.5	2247	—	—	2247
635.0	4.5	3276	0.8	1283	4559
636.0	5.5	4427	1.8	4329	8756
637.0	6.5	5687	2.8	8398	14,085

FOR SPILLWAY @ 634.2 $H = 3.7$ $Q = 2443$

STORAGE

NORMAL RESERVOIR STORAGE 430 ACRE-FT
POND AREA 25 ACRE

ASSUME INCREASE OF 25 ACRE-FT OF STORAGE PER 1 FOOT INCREASE IN WATER ELEVATION.

WSEL	STORAGE
630.5	430
631.0	443
632.0	468
633.0	493
634.0	518
635.0	543
636.0	568
637.0	593

FOR TEST FLOOD (ELEV 635.04)
STORAGE = 544 AC-FT

AT TOP OF DAM (ELEV 634.2)
STORAGE = 522 AC-FT

DUFRESNE-HENRY ENGINEERING CORPORATION

BY W.A.L. SUBJECT PLEASANT VALLEY RESERVOIR SHEET NO. 1 OF ___
DATE 3-21-79 DRAINAGE AREA - CLASSIFICATION JOB NO. 04-0095

DRAINAGE AREA

SCALE 1: 62500
FACTOR .97304 SQ MI/SQ IN

PLANIMETER READING 1.18

(1.18)(.97304) = 1.16 SQ MILES

POND AREA

25 ACRES

STORAGE (NORMAL) 190,000,000 GAL

$$\frac{190{,}000{,}000 \text{ GAL}}{7.48 \text{ GAL/FT}^3\ (43{,}560)} = 430 \text{ ACRE-FT}$$

TOP OF DAM STORAGE 522 ACRE-FT

CLASSIFICATION

SIZE

HEIGHT 34' MAX
STORAGE 430 AC-FT

SMALL

HAZARD

TRAILER PARK DOWNSTREAM HIGH

TEST FLOOD

FOR SMALL HIGH HAZARD ⇒ ½ PMF TO PMF

FROM HEC 1
PMF = 4712 CFS

USE PMF AS TEST FLOOD

ROUTING

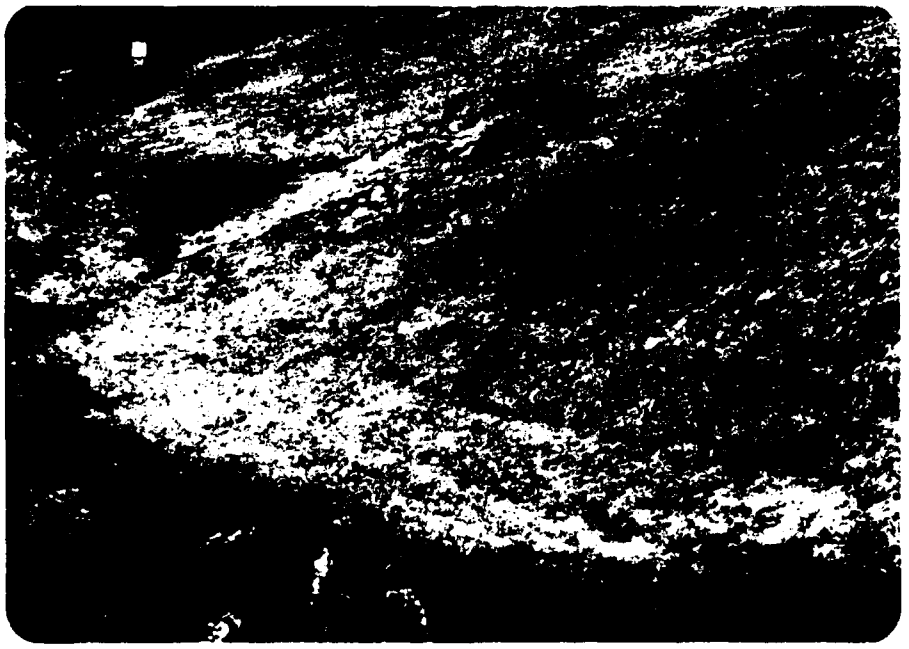
PMF ROUTED TO 4676 CFS

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

#11. VIEW SHOWING DOWNSTREAM FACE OF DAM

#12. VIEW OF TRAILER PARK DOWNSTREAM OF DAM

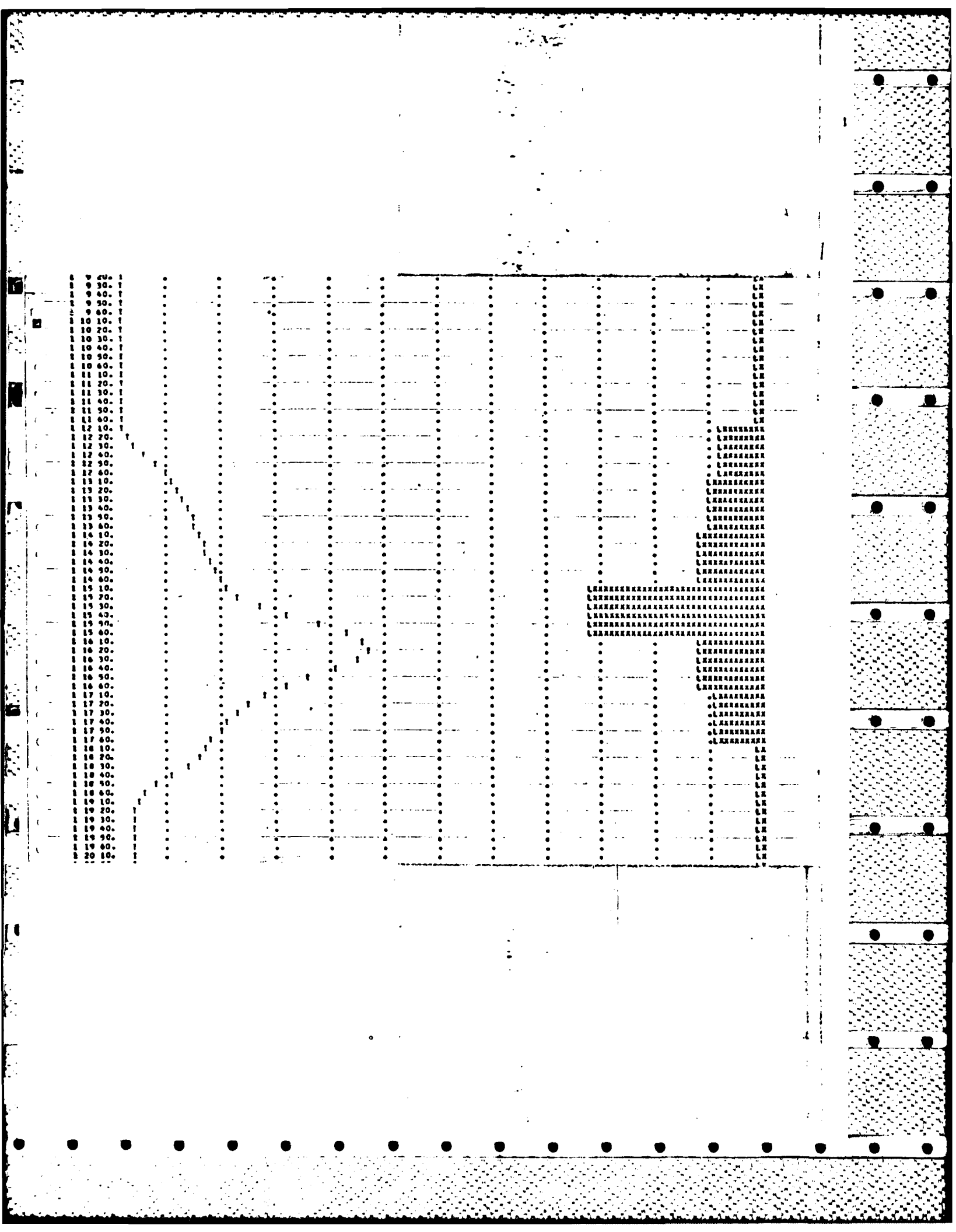


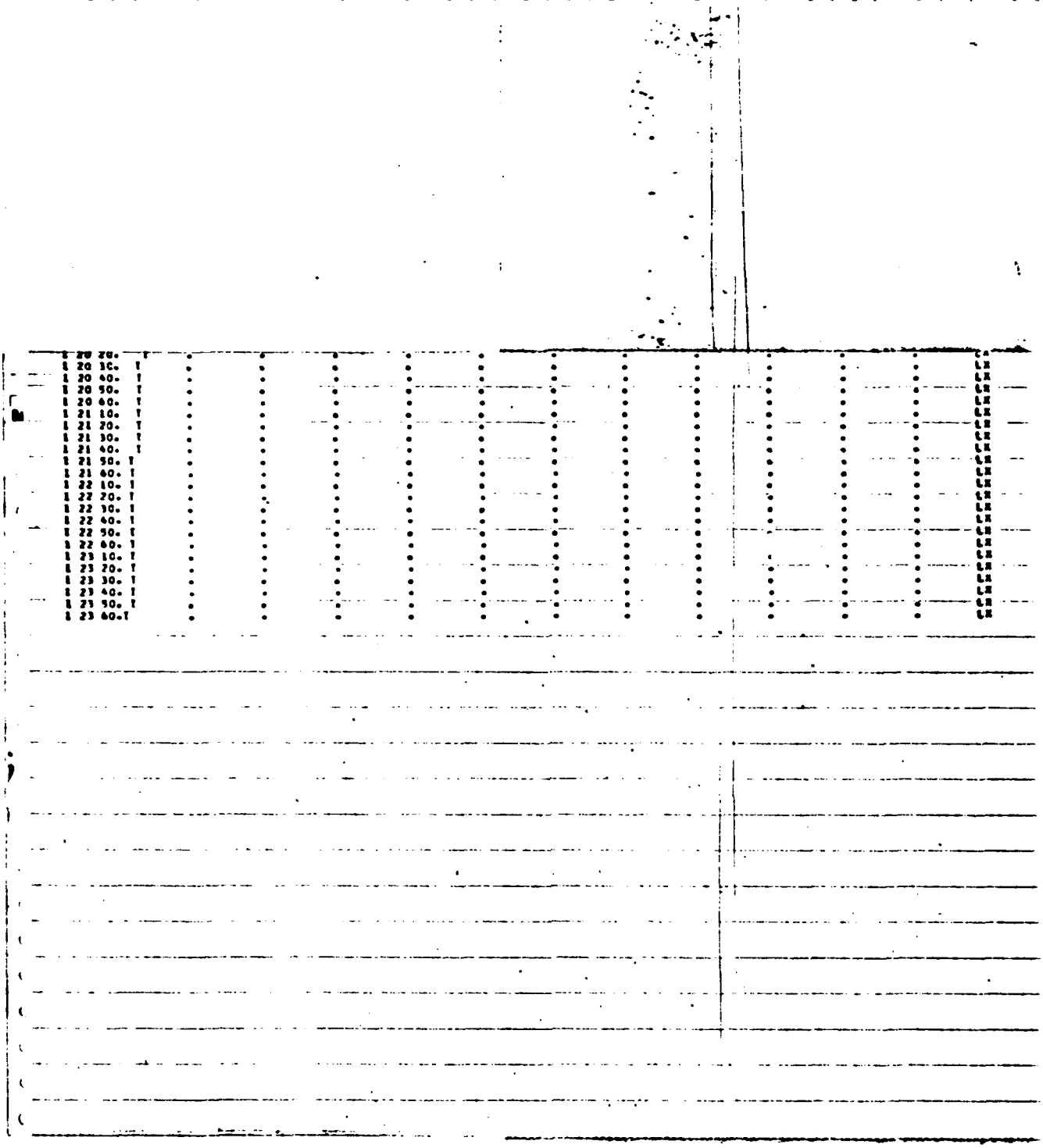
#9. VIEW ALONG DOWNSTREAM TOE SHOWING SEEP FROM OLD SPILLWAY AND ALONG TOE. COAT SHOWS LOCATION OF 6" C.I. PIPE

#10. VIEW SHOWING TOE ALONG LEFT ABUTMENT AND SEEPS

#7. VIEW OF DOWNSTREAM TOE SHOWING SEEP FROM 6-INCH C.I. PIPE AT SPRING #2 LOCATION

#8. VIEW OF RUSTY WATER AND TOP OF 12-INCH C.M.P. FROM SPRING #1





HYDROGRAPH ROUTING

PLEASANT VALLEY RESERVOIR ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME
1	1	0	0	0	0	1

ROUTING DATA

GLOSS	CLOSS	AVG	IRES	ISAME
0.0	0.0	0.0	1	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA
1	0	0	0.0	0.0	0.0	-1.

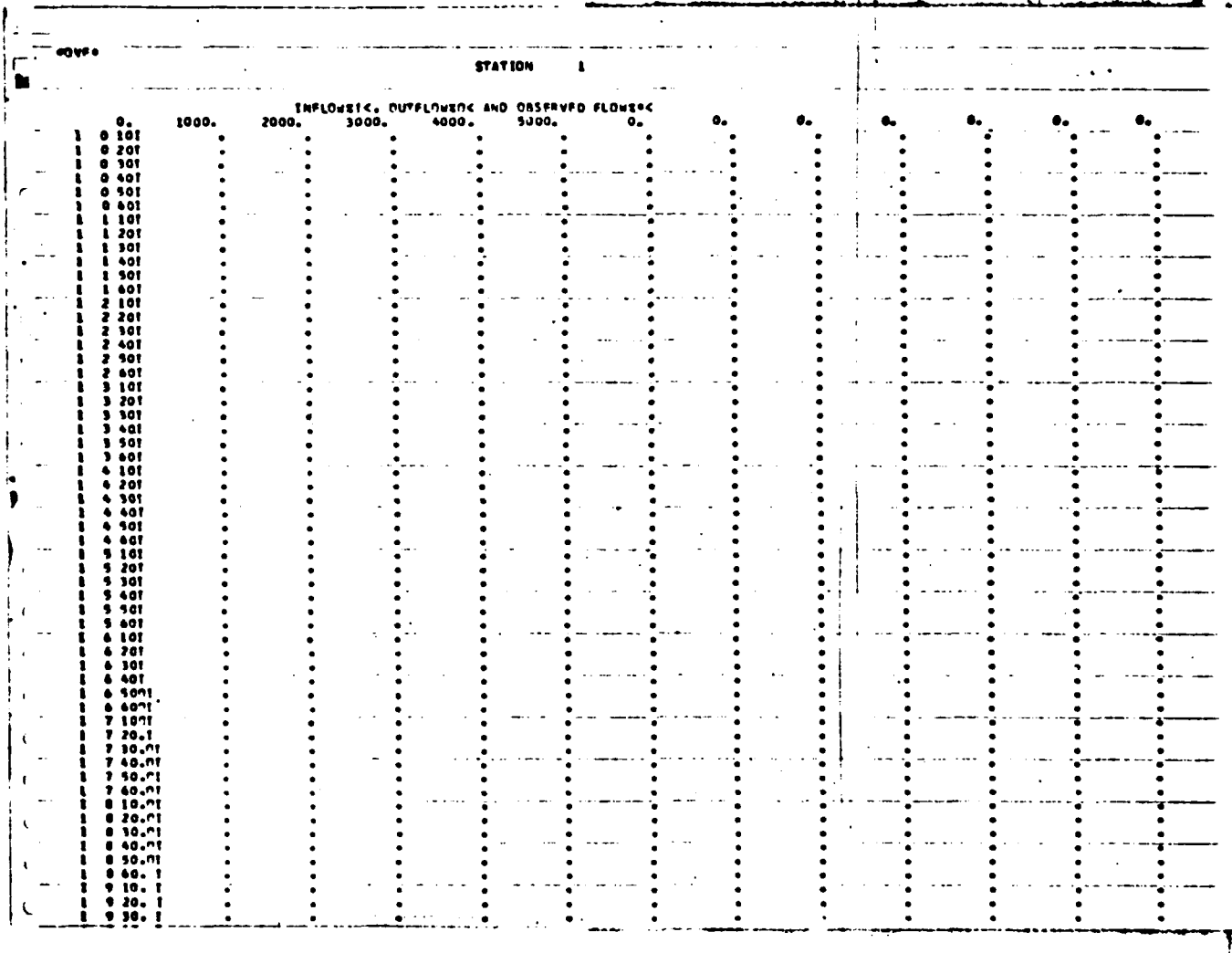
STORAGE	430.	443.	460.	493.	518.	543.	568.	593.	0.	0.
OUTFLOW	0.	121.	631.	1357.	2247.	3276.	6937.	12776.	0.	0.

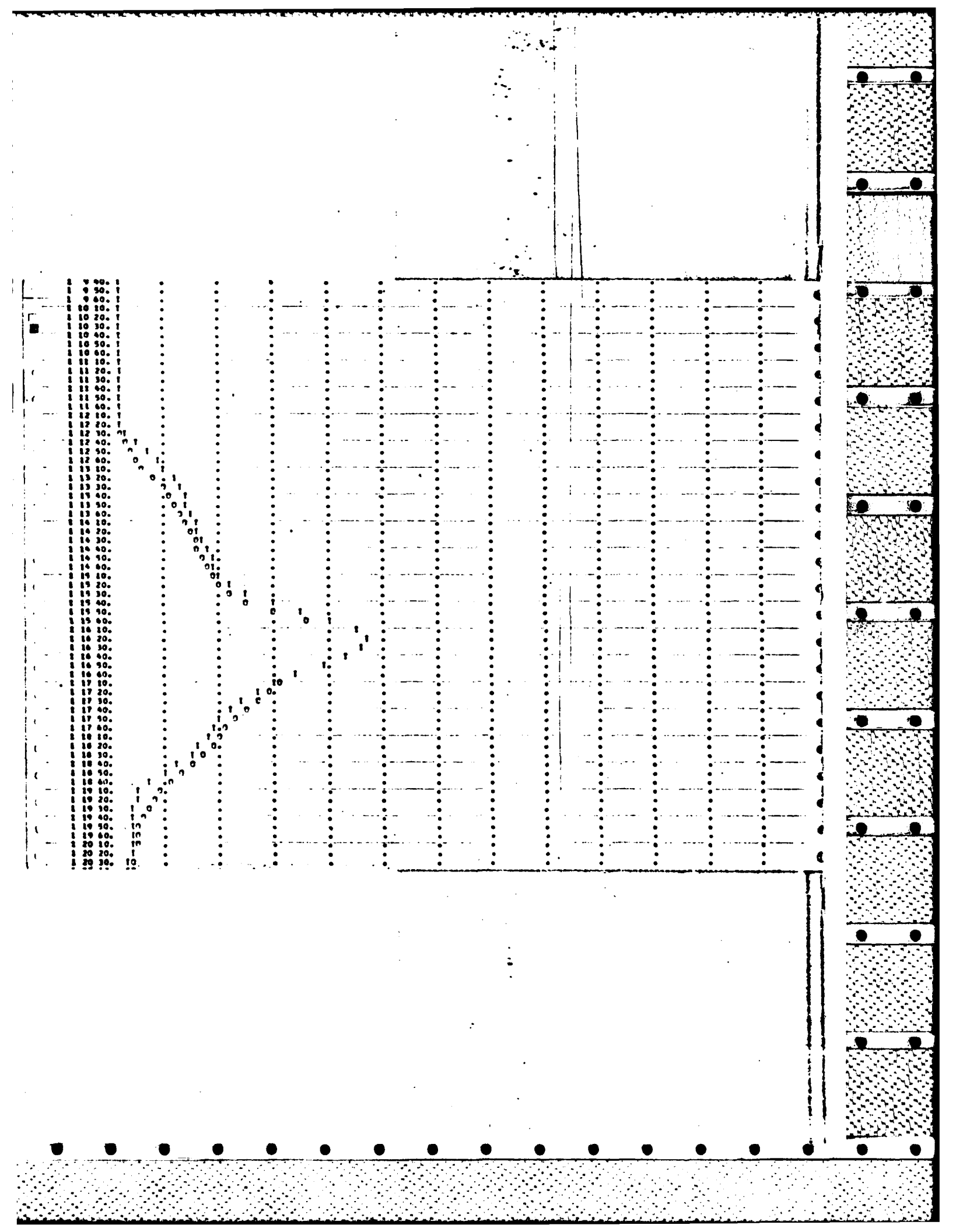
		TIME		ECP STOR	AVG IN	ECP OUT
1	0	10		430.	2.	2.
1	0	20		430.	2.	2.
1	0	30		430.	2.	2.
1	0	40		430.	2.	2.
1	0	50		430.	2.	2.
1	0	60		430.	2.	2.
1	1	10		430.	2.	2.
1	1	20		430.	2.	2.
1	1	30		430.	2.	2.
1	1	40		430.	2.	2.
1	1	50		430.	2.	2.
1	1	60		430.	2.	2.
1	2	10		430.	2.	2.
1	2	20		430.	1.	2.
1	2	30		430.	1.	2.
1	2	40		430.	1.	2.
1	2	50		430.	1.	2.
1	2	60		430.	1.	2.
1	3	10		430.	1.	2.
1	3	20		430.	1.	2.
1	3	30		430.	1.	1.
1	3	40		430.	1.	1.
1	3	50		430.	1.	1.
1	3	60		430.	1.	1.
1	4	10		430.	1.	1.
1	4	20		430.	1.	1.
1	4	30		430.	1.	1.
1	4	40		430.	1.	1.
1	4	50		430.	1.	1.
1	4	60		430.	1.	1.
1	5	10		430.	1.	1.
1	5	20		430.	1.	1.
1	5	30		430.	1.	1.
1	5	40		430.	1.	1.
1	5	50		430.	1.	1.
1	5	60		430.	1.	1.
1	6	10		430.	2.	1.
1	6	20		430.	8.	2.
1	6	30		430.	23.	4.
1	6	40		431.	45.	9.
1	6	50		432.	73.	17.

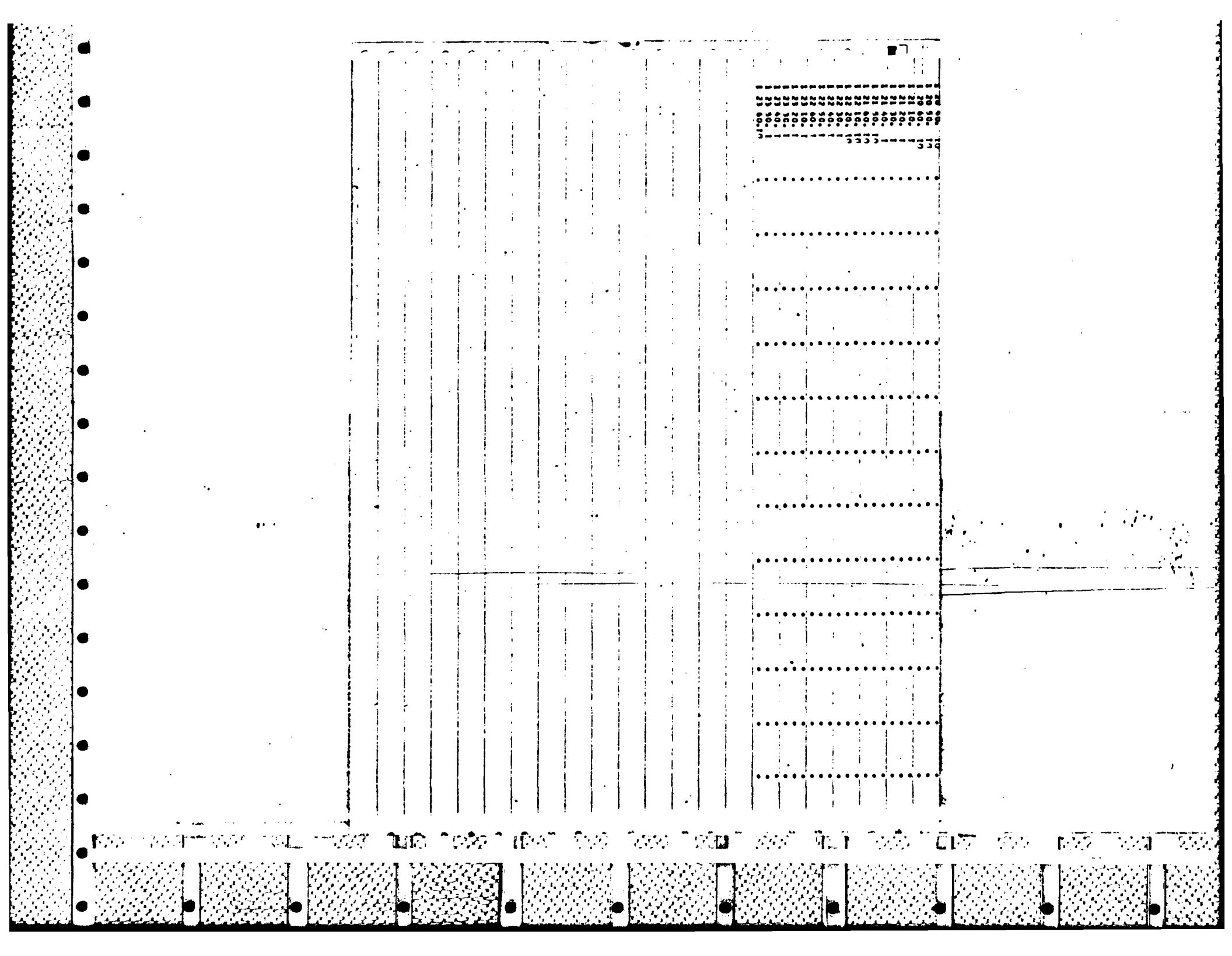
1	6	60	433.	101.	27.
1	7	10	434.	124.	39.
1	7	20	435.	141.	51.
1	7	30	437.	153.	63.
1	7	40	438.	161.	75.
1	7	50	439.	167.	86.
1	7	60	440.	171.	96.
1	8	10	441.	174.	106.
1	8	20	442.	176.	114.
1	8	30	443.	177.	123.
1	8	40	444.	178.	136.
1	8	50	444.	178.	147.
1	8	60	445.	179.	155.
1	9	10	445.	179.	161.
1	9	20	445.	179.	165.
1	9	30	445.	179.	169.
1	9	40	445.	179.	171.
1	9	50	446.	179.	173.
1	9	60	446.	179.	175.
1	10	10	446.	179.	176.
1	10	20	446.	179.	176.
1	10	30	446.	179.	177.
1	10	40	446.	179.	178.
1	10	50	446.	179.	178.
1	10	60	446.	179.	178.
1	11	10	446.	179.	178.
1	11	20	446.	179.	178.
1	11	30	446.	179.	179.
1	11	40	446.	179.	179.
1	11	50	446.	179.	179.
1	11	60	446.	179.	179.
1	12	10	446.	189.	181.
1	12	20	447.	252.	194.
1	12	30	448.	331.	228.
1	12	40	451.	484.	291.
1	12	50	456.	672.	385.
1	12	60	462.	863.	502.
1	13	10	468.	1026.	672.
1	13	20	474.	1153.	805.
1	13	30	479.	1259.	956.
1	13	40	484.	1352.	1088.
1	13	50	488.	1437.	1205.
1	13	60	491.	1511.	1307.
1	14	10	494.	1572.	1402.
1	14	20	497.	1624.	1492.
1	14	30	499.	1694.	1571.
1	14	40	501.	1770.	1650.
1	14	50	503.	1853.	1730.
1	14	60	506.	1932.	1809.
1	15	10	508.	2024.	1894.
1	15	20	511.	2193.	2011.
1	15	30	517.	2500.	2204.
1	15	40	525.	2952.	2529.
1	15	50	535.	3496.	2956.
1	15	60	545.	4041.	3638.
1	16	10	551.	4470.	4473.
1	16	20	553.	4675.	4676.
1	16	30	552.	4619.	4619.
1	16	40	550.	4330.	4329.
1	16	50	547.	3840.	3888.
1	16	60	544.	3409.	3407.
1	17	10	540.	2988.	3149.
1	17	20	535.	2665.	2935.
1	17	30	529.	2417.	2706.
1	17	40	524.	2213.	2488.
1	17	50	519.	2042.	2291.

1	17	60	515.	4904.	2133.
1	18	10	511.	1780.	1994.
1	18	20	507.	1646.	1857.
1	18	30	503.	1609.	1706.
1	18	40	498.	1241.	1522.
1	18	50	492.	982.	1317.
1	18	60	485.	729.	1121.
1	19	10	478.	538.	927.
1	19	20	473.	458.	770.
1	19	30	469.	440.	660.
1	19	40	466.	422.	594.
1	19	50	464.	405.	547.
1	19	60	462.	389.	508.
1	20	10	460.	376.	475.
1	20	20	459.	359.	447.
1	20	30	458.	345.	422.
1	20	40	457.	331.	399.
1	20	50	456.	318.	379.
1	20	60	455.	305.	361.
1	21	10	454.	293.	344.
1	21	20	453.	281.	329.
1	21	30	452.	270.	314.
1	21	40	452.	260.	301.
1	21	50	451.	249.	288.
1	21	60	451.	239.	276.
1	22	10	450.	230.	265.
1	22	20	450.	221.	254.
1	22	30	449.	212.	244.
1	22	40	449.	203.	234.
1	22	50	448.	195.	224.
1	22	60	448.	188.	215.
1	23	10	447.	180.	207.
1	23	20	447.	173.	198.
1	23	30	446.	166.	190.
1	23	40	446.	160.	183.
1	23	50	446.	153.	176.
1	23	60	445.	147.	169.
			SUM		98826.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4676.	2272.	685.	685.	98826.
INCHES		10.22	21.97	21.97	21.97
AC-FT		1127.	1359.	1359.	1359.


STATION 1
INFLOWS(<, OUTFLOWS(< AND OBSERVED FLOWS(<
0. 1000. 2000. 3000. 4000. 5000. 0. 0. 0. 0. 0. 0. 0.





RUNOFF SUMMARY, AVERAGE FLOW

		PEAK	6-HOUR	24-HOUR	72-HOUR	AREA
HYDROGRAPH AT	1	4712.	2304.	692.	692.	1.16
ROUTED TO	1	4676.	2272.	685.	685.	1.16

DUFRESNE-HENRY ENGINEERING CORPORATION

BY W.A.L. SUBJECT PLEASANT VALLEY RESERVOIR SHEET NO. ____ OF ____
DATE 3-27-79 DAM FAILURE ANALYSIS JOB NO. 04-0095

FOR DAM FAILURE WITH WSEL AT SPILLWAY ELEV 630.5

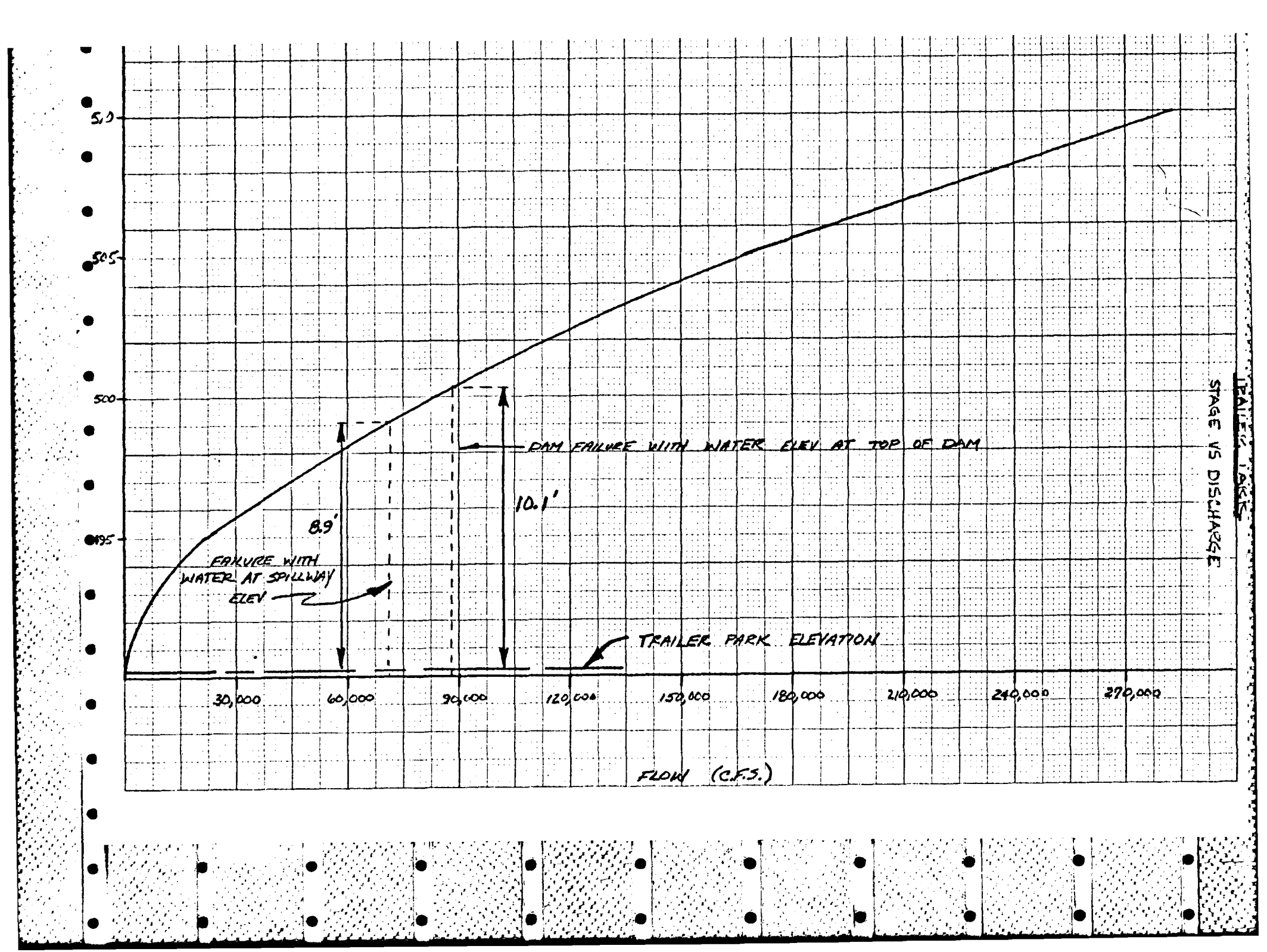
$$Q = 8/27\ W_b \sqrt{g}\ Y_o^{3/2}$$

$$Q = 8/27\ (.4)(660)\sqrt{32.2}\ (29.5)^{3/2} = \underline{71,120\ \text{CFS}}$$

FOR DAM FAILURE WITH WSEL AT TOP OF DAM ELEV 634.2

$$Q = 8/27\ W_b \sqrt{g}\ Y_o^{3/2}$$

$$Q = 8/27\ (.4)(660)\sqrt{32.2}\ (34)^{3/2} = \underline{87,999\ \text{CFS}}$$


505
500
495
STAGE VS DISCHARGE
TRAILER PARK
DAM FAILURE WITH WATER ELEV AT TOP OF DAM
10.1'
8.9'
FAILURE WITH WATER AT SPILLWAY ELEV
TRAILER PARK ELEVATION
30,000
60,000
90,000
120,000
150,000
180,000
210,000
240,000
270,000
FLOW (C.F.S.)

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

ASSUME $N = .05$
$R = A/WP$

$S = \frac{620-485}{5729} = .02$

TRAILER PARK ELEV ≈ 490

AT 510 CONTOUR

$A = 2.63\ IN^2\ (4000) = 10{,}520\ FT^2$

W.P. = 180.1 + 320.2 + 65.8 + 22.4 + 31.6 + 40.3 = 660.4 FEET

$Q = \frac{1.486}{.05}(10{,}520)\left[\frac{10{,}520}{660.4}\right]^{2/3}(.02)^{1/2} =$ 282,527 CFS

AT 505 CONTOUR

$A = 1.87\ IN^2\ (4000) = 7480\ FT^2$

W.P. = 180.1 + 320.2 + 32.9 + 11.2 + 31.6 + 40.3 = 616.3 FEET

$Q = \frac{1.486}{.05}(7480)\left[\frac{7480}{616.3}\right]^{2/3}(.02)^{1/2} =$ 167,424 CFS

AT 500 CONTOUR

$A = 1.20\ IN^2\ (4000) = 4{,}800\ FT^2$

W.P. = 180.1 + 320.2 + 31.6 + 40.3 = 572.2

$Q = \frac{1.486}{.05}(4{,}800)\left[\frac{4{,}800}{572.2}\right]^{2/3}(.02)^{1/2} =$ 83,884 CFS

T 495 CONTOUR

$A = (.46)(4000) = 1840\ FT^2$

W.P. = 180.1 + 160.1 + 15.8 + 40.3 = 396.3

$Q = \frac{1.486}{.05}(1840)\left[\frac{1840}{396.3}\right]^{2/3}(.02)^{1/2} =$ 21,634 CFS

DUFRESNE-HENRY ENGINEERING CORPORATION

LEONARD
3-28-79

SUBJECT PLEASANT VALLEY RESERVOIR
TRAILER PARK DAMAGE

SHEET NO. ____ OF ____
JOB NO. 04-0095

AT TRAILER PARK ≈ 490

DAM FAILURE WITH WATER ELEVATION AT SPILLWAY LEVEL
71,120 cfs WOULD BE RELEASED.

FROM GRAPH APPROX 8.9 FEET OF WATER WOULD HIT TRAILER PARK

DAM FAILURE WITH WATER ELEVATION AT TOP OF DAM
88,000 cfs WOULD BE RELEASED.

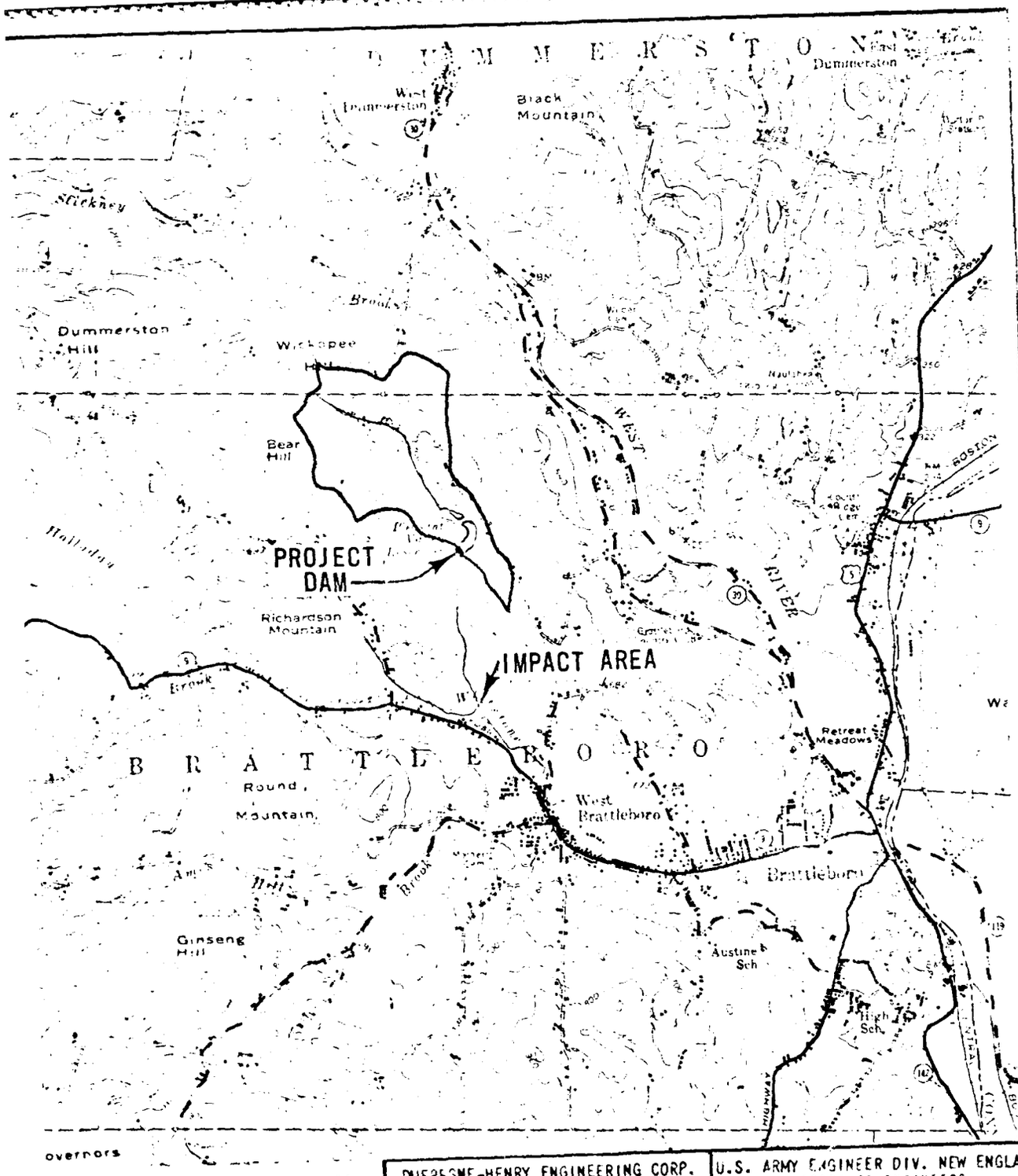
FROM GRAPH APPROX 10 FEET OF WATER OVER TRAILER PARK.

WEL SLOPE $\frac{600-500}{1800 \text{ FEET}} = .06 = 6\%$

∴ DUE TO STEEP DISCHARGE CHANNEL GRADIENT, RULE OF THUMB ROUTING NIT APPLICABLE

THEREFORE USE PEAK FAILURE OUTFLOWS.

WITH EITHER DAM FAILURE (WSEL @ SPILLWAY LEVEL OR WSEL @ TOP OF DAM) TRAILER PARK WOULD BE DESTROYED.



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SOURCE OF MAP:
U.S. GEOLOGICAL SURVEY
BRATTLEBORO, VT -N.H.
QUADRANGLE 1954
1:62,500 SERIES V713

DUFRESNE-HENRY ENGINEERING CORP. ARCHITECT-ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

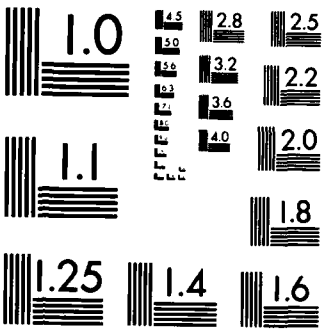
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

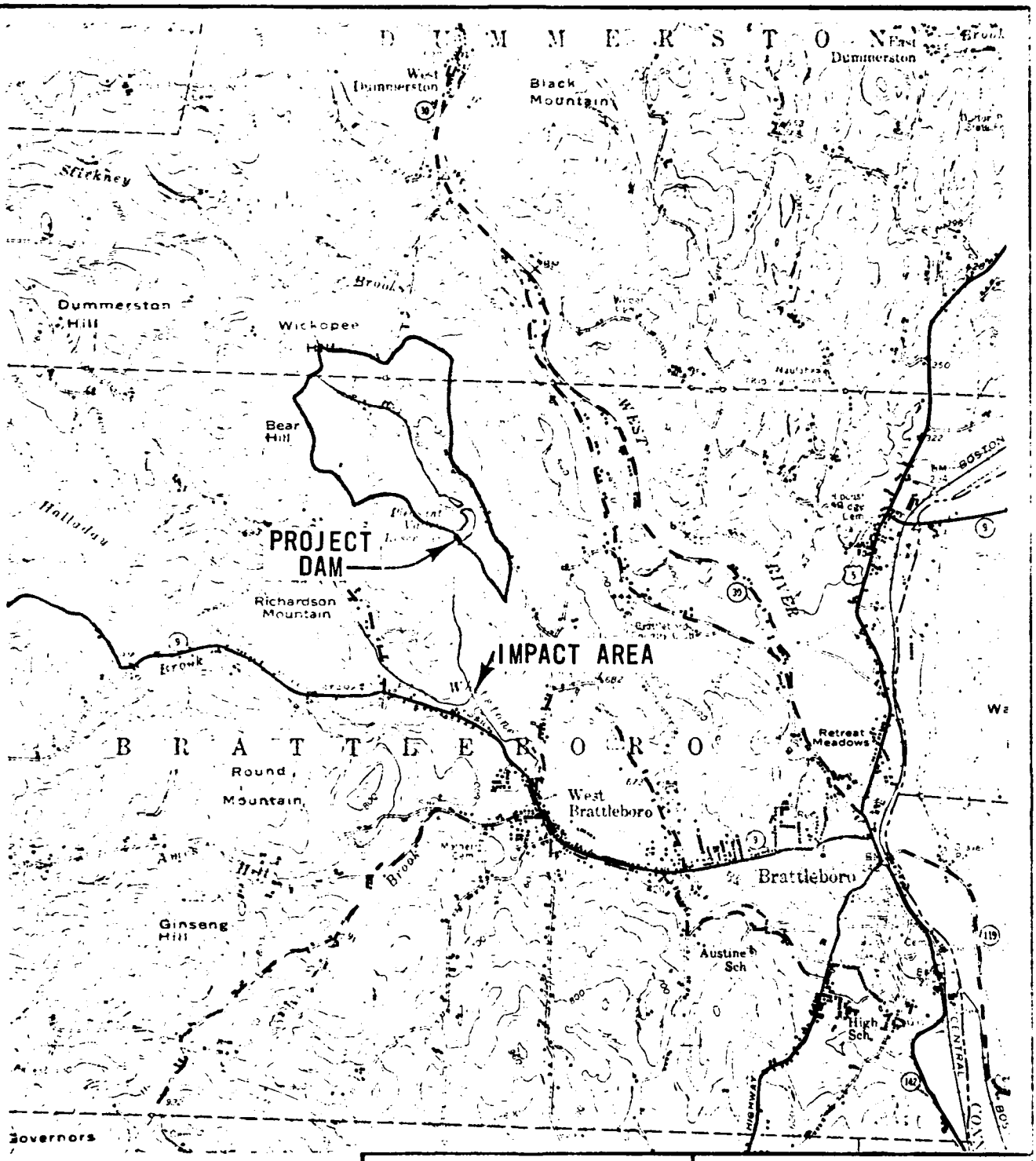
PLEASANT VALLEY RESERVOIR DAM

CLIENT NO	04-0095	SCALE	1"=1 MILE
ENGINEER	WAL	DATE	

AD-A156 016 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS PLEASANT VALLEY RESER.. (U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV JUN 79 2/2

UNCLASSIFIED F/G 13/13 NL





SOURCE OF MAP:
U.S. GEOLOGICAL SURVEY
BRATTLEBORO, VT.-N.H.
QUADRANGLE 1954
1:62,500 SERIES V713

DUFRESNE-HENRY ENGINEERING CORP. ARCHITECT-ENGINEER	U.S. ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

PLEASANT VALLEY RESERVOIR DAM

CLIENT NO.	04-0095	SCALE	1"=1 MILE
ENGINEER	WAL	DATE	

APPENDIX E

Information as Contained in the National Inventory of Dams

END

FILMED

8-85

DTIC