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DELAWARE RIVER BASIN

SCS DAM PA-452

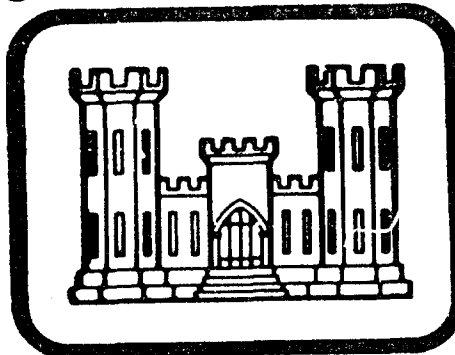
NDI NO. PA-00100

DER NO. 64-177

WAYNE COUNTY, PENNSYLVANIA

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

SACW 31-80-C-0019



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PREPARED FOR
DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland 21203

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MARCH 1980

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PREFACE

This report has been 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 frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design 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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PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITIONS
AND RECOMMENDATIONS

Name of Dam: SCS DAM PA-452
State & State No.: PENNSYLVANIA, 64-177
County: Wayne
Stream: UNNAMED TRIBUTARY TO WALLENPAUPACK CREEK
Date of Inspection: November 6, 1979
[cont'd from p. 1]

→ Based on the visual inspection, past performance and the available engineering data, the dam and its appurtenant structures appear to be in good condition.

In accordance with the Corps of Engineer's evaluation guidelines, the size classification of this dam is small and the hazard classification is high. The recommended Spillway Design Flood (SDF) for this dam is the Probable Maximum Flood (PMF). The spillway capacity is adequate to pass the PMF peak inflow without overtopping the dam.

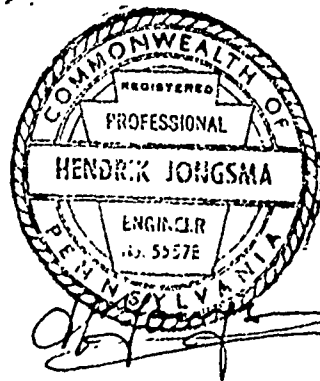
The following recommendations are presented for immediate action by the owner:

1. That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall.
2. That a program be developed for regular inspection and maintenance of the dam and its appurtenant structures.

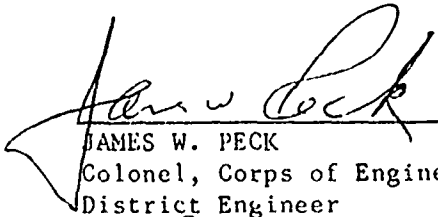
SUBMITTED BY:

BERGER ASSOCIATES, INC.
HARRISBURG, PENNSYLVANIA

DATE: March 10, 1980



APPROVED BY:


JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

DATE:

25 March 1980



OVERVIEW

SCS DAM PA-452

Photograph No. 1

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(15) DACW 31-80-C-0019

⑥ PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM.

SCS DAM PA-452

(NDI-ID/Number PA-00100)
(DER-ID/Number 64-177)

Wayne County, Pennsylvania. Phase I
Delaware River Basin

SECTION 1 - PROJECT INFORMATION

Inspection Report.

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1.1 GENERAL

A. Authority

The Dam Inspection Act, Public Law 92-367, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a program of inspections of dams throughout the United States.

B. Purpose

The purpose of this inspection is to determine if the dam constitutes a hazard to human life and property.

1.2 DESCRIPTION OF PROJECT

A. Description of Dam and Appurtenances

This flood control dam was designed by the United States Soil Conservation Service (SCS) and is listed as SCS Dam PA-452. The structure consists of a 1000-foot-long earthfill embankment with a maximum height of 25 feet. Seven hundred fifty feet of the embankment crosses the valley, the other 250 feet ties the embankment to higher ground in the left abutment. (See Plate III, Appendix E). There are two spillways: the principal spillway and the emergency spillway. The principal spillway is a drop inlet structure with an orifice opening and discharges through a 30-inch diameter pipe. This spillway is designed to handle a 100 year flood. For any larger floods the emergency spillway is required. This grassed earth spillway is located in the right abutment and has its design crest elevation 4.6 feet below the top of embankment. The emergency spillway has a channel bottom width of about 60 feet.

B. Location:

Dreher Township, Wayne County
U.S.G.S. Quadrangle - Newfoundland, Pa.
Latitude 41°-16.6', Longitude 75°-20.8'
Appendix E, Plates I & II

411003

JB

- C. Size Classification: Small (Height: 25 feet
Storage: 129 acre-feet)
- D. Hazard Classification: High (Refer to Section 3.1.E)
- E. Ownership (Maintenance): Wayne County Commissioners
Wayne County Court House
Honesdale, PA 18431
- F. Purpose: Flood control
- G. Design and Construction History

This flood control dam was designed by the U.S. Department of Agriculture, Soil Conservation Service (S.C.S.). An application for a permit to construct the dam was filed with the Pennsylvania Department of Environmental Resources (PennDER) and approved on May 10, 1961. Construction of the dam started in June 1963 and was completed in October of that year. The contractor was E. Soden & Sons.

H. Normal Operating Procedures

The facilities were constructed for flood control. Both spillways are uncontrolled. All inflow above a pool level above the orifice opening in the principal spillway is discharged through the 30-inch outlet pipe until the pool reaches a level of 13.8 feet above the orifice. At that time the emergency spillway would also discharge inflow.

1.3 PERTINENT DATA

A. Drainage Area (square miles)

From files:	.34
Computed for this report:	.27
Use:	.27

B. Discharge at Dam Site (cubic feet per second) See Appendix D for hydraulic calculations

Maximum known inflow (estimated from U.S.G.S. gage data of nearby Mill Creek at Mountainhome, PA)	141
Principal spillway at pool Elev. 1791.4 (emergency spillway elevation)	15
Principal spillway at pool Elev. 1796.0 (low point of dam as surveyed)	17

Emergency spillway at pool level 1817
Elev. 1796.0 (low point of dam)

Total spillway capacity at pool 1834
Elev. 1796.0

C. Elevation (feet above mean sea level)

Top of dam (design crest elevation) 1795.8

Top of dam (low point as surveyed) 1796.0

Emergency spillway crest 1791.4

Normal pool invert (orifice 1777.0
principal spillway)

Downstream portal invert (design) 1766.8

Streambed at centerline of dam - estimate 1771.0

D. Reservoir (miles)

Length of normal pool (Elev. 1777) .1

Length of aximum pool (Elev. 1796.0) .2

E. Storage (acre-feet)

Normal pool (Elev. 1777.0) 7.9

Emergency spillway crest (Elev. 1791.4) 77

Top of dam (Elev. 1796.0) 129

F. Reservoir Surface (acres)

Top of dam (Elev. 1796.0) 11

Emergency spillway crest (Elev. 1791.4) 9

Normal pool (Elev. 1777.0) 1.8

G. Dam

Refer to Plates III and V in Appendix E for plan and section.

Type: Zoned earthfill embankment.

Length in feet: 1000

Height in feet: 25

Top Width: Surveyed - 14 feet, Design - 12 feet.

Side Slopes:	<u>Design</u>	<u>Survey</u>
Upstream	3H to 1V	2.7H to 1V
Downstream	2H to 1V	2.4H to 1V

Zoning: Stones larger than 6 inches placed in Zone II, downstream.

Cutoff: Trench excavated on centerline of dam. Bottom width 20 feet, depth 4 feet. Trench only located in central section of dam (See Plate IV, Appendix E).

Grouting: None.

H. Outlet Facilities

Type: 12" cast iron pipe.

Location: Discharges into drop inlet.

Cl.: re: Metal plate bolted onto discharge end of pipe.

I. Spillway

Principal

Type: Concrete drop inlet structure.

Inlet: 12" x 10" orifice in drop inlet structure.

Outlet: 30" diameter concrete pipe through embankment.

Crest Elevation: 1777.

Location: Upstream toe near center of dam.

Emergency

Type: Uncontrolled sod-lined broad crested weir and channel. The upstream channel slope is 0.4 percent and the downstream slope is 5.8 percent.

Width: 62' on bottom with side slopes of 3.5H to 1V on right and 2.1H to 1V on left.

Crest Elevation: 1791.4.

Location: Right abutment.

J. Emergency Outlet

None.

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The engineering design data for this dam are found in two principal documents: a Design Report and the construction drawings. Both documents were prepared by the S.C.S., the design agency. The Design Report is a comprehensive documentary report with hydrologic and hydraulic data, soils investigation information, including field and laboratory results, geologic report, structural design calculations and specifications. Parts of this report and full size design drawings are available in the files of Pennsylvania Department of Environmental Resources (PennDER). Several of the drawings have been reduced and are included in Appendix E of this report. Reference is made to Section 5.1.A. and 6.1.B. of this report for discussion of some of the available design criteria.

2.2 CONSTRUCTION

Construction reports were not available in the files at PennDER nor the S.C.S. office, except that the period of construction was between June 1963 and October 1963.

2.3 OPERATION

There are no formal records of operation with the owner, PennDER or S.C.S. The purpose of the facility is flood control and besides an annual maintenance inspection program, there are no other operational procedures.

2.4 EVALUATION

A. Availability

Engineering data are available in the offices of PennDER and Soil Conservation Service. As built drawings are located in the office of S.C.S.

B. Adequacy

The available engineering data is considered sufficiently adequate for making a reasonable assessment of the design of the dam.

C. Operating Records

Operating records, including maximum pool levels, are not maintained by the County, the agency responsible for maintenance of the project. A maintenance report indicates that the pool level drops considerably below the orifice opening during dry periods.

D. Post Construction Changes

There have been no modifications made to this facility since the completion of construction in 1963.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

A. General

The general appearance of SCS Dam PA-452 is good. The dam, completed in 1963, was designed and constructed by the Soil Conservation Service as a flood control structure and is located on privately owned property. The County Commissioners of Wayne County are responsible for the maintenance of the dam and its appurtenant structures. An access easement agreement exists between the owners of the property and the Commissioners. The contributing drainage area is small and the property owners reported only small fluctuations in the pool level. During dry periods, the pool level drops below the invert elevation of the principal spillway.

The visual inspection check list and sketches of the general plan and profile of the dam, as surveyed during the inspection, are presented in Appendix A of this report.

Mr. William Hammil and Mr. Michael Deskus, property owners, accompanied the inspectors during the inspection. Photographs made on the day of inspection are reproduced in Appendix C.

B. Embankment

The function of this dam is to detain storm water runoff and to release it slowly, thus reducing the peak discharge in the downstream area. Storage, therefore, is its prime function. Most of its upstream slope is exposed.

The condition of the upstream and downstream embankment slopes appear to be good. There were no signs of slippage or sloughage. A heavy growth of field grass and crown vetch prevented close observation. Seepage was not observed; however, the normal pool level is only about 5 feet above the elevation of the downstream toe. The property owner stated that the downstream area adjacent to the outlet pipe is wet in the summertime, even though water is not flowing through the pipe at this time. This condition is probably caused by poor drainage. Six-inch diameter CMP pipe drains are located in the downstream toe and are visible adjacent to the outlet pipe on each side.

The horizontal alignment of the dam is straight across the valley. At the left abutment a perpendicular extension ties the embankment to higher ground. The vertical profile of the dam varies more than 2 feet from the right end to the left end, but all points are above the design elevation 1795.8 (Refer to Plate A-II, Appendix A). The crest of the embankment is also covered with thick field grass.

C. Appurtenant Structures

There are two spillways; the principal spillway and an emergency spillway. The principal spillway consists of a drop inlet type structure with an orifice opening. There are no controls on this inlet. The water discharges from the structure through a vented 30-inch pipe through the embankment. The outlet of the pipe projects several feet beyond the downstream toe and discharges into a shallow plunge pool. Some riprap protection is present on the downstream toe of the embankment at this location (Photograph 5, Appendix E).

The emergency spillway is located in the right abutment and consists of a grassed earth channel. Beyond the centerline of the dam, the channel curves to the left and follows the toe of the embankment until the channel meets the outlet channel of the principal spillway. Erosion of the embankment is not expected due to the relatively low velocity, the condition of the grass mat and the duration of the flow.

D. Reservoir Area

This dam is located in the headwaters of the stream. The banks of the reservoir are flat and stable. Most of the drainage area is wooded.

E. Downstream Channel

The immediate downstream area of the outlet pipe is flat and consists of a shallow grassed swale. A dike on the right side of the emergency spillway protects a township road. A 4-foot pipe carries the normal flow from the dam outlet under the road. It appears that large discharges would flow over the road. Beyond the road, the stream channel drops steeply through cultivated lands. About 2,000 feet downstream from the dam are two homes, several farm buildings and a pond. Due to the potential hazard to loss of life and economic loss caused by dam failure, the hazard category for this dam is considered to be "High."

3.2 EVALUATION

The overall visual evaluation of the facilities indicates that the dam is in good condition. The emergency spillway has a good grass mat for protection against erosion. The embankment has a thick growth of field grass and crown vetch, preventing close observation. There was no evidence of stability or seepage problems.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

This dam is a flood control dam, maintained by Wayne County. All inflow is discharged through the uncontrolled principal spillway until the pool level reaches the elevation of the emergency spillway. The dam and facilities are regularly inspected by the County for possible maintenance requirements.

4.2 MAINTENANCE OF DAM

The embankment has a thick growth of field grass and crown vetch and is apparently not mowed. There is no brush or heavy weed growth at the present time.

4.3 MAINTENANCE OF OPERATING FACILITIES

The only operating facility is an underwater drawdown pipe. This pipe is closed off with a bolted cover plate inside the principal spillway structure. It has not been opened since the structure was completed.

4.4 WARNING SYSTEM

There is no formally organized surveillance or downstream warning system in operation for this dam.

4.5 EVALUATION

Although the operational procedures for this dam are minimal, the facilities are in good condition. A formal surveillance plan and downstream warning system should be developed for implementation during periods of heavy or prolonged precipitation.

SECTION 5 - HYDROLOGY/HYDRAULICS

5.1 EVALUATION OF FEATURES

A. Design Data

The hydrologic and hydraulic analyses available from PennDER and SCS for SCS Dam PA-452 were extensive. A spillway rating curve, area-capacity curve, design flood hydrograph and flood routing were all contained in the files. The computations contained in Appendix D of this report were made as a check on the design computations. The designer's computations are in reasonably close agreement with those in the Appendix.

The design flood hydrograph used by the designer was based on an SCS emergency spillway hydrograph, having 10.3 inches of runoff and producing a peak inflow of 1540 cfs. When routed through the reservoir, this flood caused the pond water level to rise to about 2.4 feet above the emergency spillway crest.

Since the design flood was not equal to the Probable Maximum Flood (PMF), computations are shown in Appendix D to evaluate the routing of a PMF through this project.

B. Experience Data

There are no records of flood levels at SCS Dam PA-452. Based on records of the U.S.G.S. stream gage on Mill Creek at nearby Mountain-home, PA, the maximum inflow to PA-452 is estimated to be 141 cfs. The emergency spillway has not been used since construction of the dam was completed in 1963.

C. Visual Observations

On the date of the inspection no conditions were observed that would indicate that the appurtenant structures of the dam could not operate satisfactorily during a flood event, until the dam is overtopped.

D. Overtopping Potential

SCS Dam PA-452 has a total storage capacity of 129 acre-feet and the overall height is 25 feet above the streambed. These dimensions indicate a size classification of "Small". The hazard classification for this dam is "High" (See Section 3.1.E).

The recommended Spillway Design Flood (SDF) for a dam having the above classifications is between one-half the PMF and the full PMF. Since this dam is a flood control structure, the recommended SDF is the full PMF. For this dam the PMF peak inflow is 793 cfs (See Appendix D for hydraulic calculations).

Comparison of the estimated PMF peak inflow of 793 cfs with the estimated total discharge capacity of 1834 cfs indicates that a potential for overtopping of the SCS Dam PA-452 by the PMF does not exist.

An estimate of the storage effect of the reservoir and routing of the computed inflow hydrograph through the reservoir shows that this dam has the necessary storage available to pass the PMF without overtopping. The spillway-reservoir system can pass a flood event equal to 100% of a PMF.

E. Spillway Adequacy

The small size and high hazard categories, in accordance with the Corps of Engineers criteria and guidelines, indicates that the Spillway Design Flood (SDF) for this dam should be in the range of one-half PMF to the full PMF. Since this dam is a flood control structure, the recommended SDF is the PMF.

Calculations show that the spillway discharge capacity and reservoir storage capacity, based on the present low point in the dam profile, combine to handle 100% of the PMF (Refer to Appendix D).

Since the spillway discharge and reservoir storage capacity can pass the full PMF without overtopping, the spillway is considered to be adequate.

The hydrologic analysis for this investigation was based upon existing conditions of the watershed. The effects of future development were not considered.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

A. Visual Observations

1. Embankment

The visual inspection of SCS Dam PA-452 did not detect any signs of embankment instability. The field survey indicates that the embankment slopes are approximately 2.7H to 1V on the upstream side and 2.4H to 1V on the downstream side rather than the design slopes of 3H to 1V and 2H to 1V respectively. The slopes are stable and no signs of distress were noticed. They are apparently adequate for the height and type of embankment.

2. Appurtenant Structures

The emergency spillway in the right abutment appeared to be in good condition with a good grass mat for erosion protection. The side slopes are stable and although flow of water would parallel the toe of the dam, there is no apparent danger of erosion of the embankment.

The principal spillway has only a small orifice opening (10 by 12 inches) in a concrete riser. The riser is vented through an 8-inch pipe (Photograph No. 1, Page iii) and discharges through a 30-inch pipe into a rocklined swale at the downstream toe. All structures appeared to be in good, stable condition.

B. Design and Construction Data

The information contained in the Design Report and the construction drawings indicate that this dam was designed using current and acceptable engineering procedures. The design report indicates that slope stability had been checked with a sliding wedge method, using a friction angle of $\phi = 32.5^\circ$ and cohesion = 0. Using the design slopes and a 10-foot upstream bench, the factors of safety were 2.14 and 2.72 for the upstream and downstream slope respectively. Although it appears that the present slopes vary slightly from the design slopes, the embankment is considered to be stable.

A drain is shown on the plans (Plate V, Appendix E) about 35 feet downstream of the centerline dam. This drain consists of a 6-inch perforated pipe in a filter and outlets in the plunge pool. The construction plans also indicate a cutoff trench on the centerline dam. This 20-foot wide, 4-foot deep trench was excavated over a length of about 300 feet (Plate IV, Appendix E).

The principal spillway outlet pipe has been provided with three antiseep collars. The 30-inch pipe has been placed on a concrete cradle over its full length. The as-built plans indicate a pier support at the end of the outlet pipe, rather than the thickened concrete slab shown on Plate VI, Appendix E.

The emergency spillway has a good protective grass mat and stable side slopes.

C. Operating Records

Operating records for this dam have not been maintained.

D. Post Construction Changes

There have been no changes or modifications made to the dam since its completion in 1963.

E. Seismic Stability

This dam is located in Seismic Zone 1 and it is considered that the static stability is sufficient to withstand minor earthquake-induced dynamic forces. No studies or calculations have been made to confirm this assumption.

SECTION 7 - ASSESSMENT AND RECOMMENDATIONS

7.1 DAM ASSESSMENT

A. Safety

The visual inspection, the review of the Design Report, construction drawings and other available information indicate that SCS Dam PA-452 is in good condition and has been designed in accordance with current engineering practices. The field inspection did not detect any signs of instability or seepage that could be considered to endanger the safety of the dam.

The hydrologic and hydraulic computations indicate that the combination of storage capacity and the discharge of both spillways are adequate to handle 100 percent of the PMF. The spillway is considered to be adequate.

B. Adequacy of Information

The design information contained in the files is considered adequate for making a reasonable assessment of this dam. The conclusions reached that this dam is adequately designed and constructed is supported by the visual appearance of the entire facility.

C. Urgency

The recommendations presented below should be implemented as soon as possible.

D. Additional Studies

Additional studies are not required at this time.

7.2 RECOMMENDATIONS

In order to assure the continued satisfactory operation of this dam, the following recommendations are presented for implementation by the owner:

1. That a formal surveillance and downstream warning system be developed for use during periods of high or prolonged rainfall.
2. That a program be developed for regular inspection and maintenance of the dam and its appurtenant structures.

APPENDIX A

CHECKLIST OF VISUAL INSPECTION REPORT

APPENDIX A

CHECK LIST

PHASE I - VISUAL INSPECTION REPORT

PA DER # 64-177

NDI NO. PA-00 100

NAME OF DAM SCS PA-452 HAZARD CATEGORY High

TYPE OF DAM Earthfill

LOCATION Dreher TOWNSHIP Wayne COUNTY, PENNSYLVANIA

INSPECTION DATE 11/6/79 WEATHER cloudy, cold, windy TEMPERATURE low 40's

INSPECTORS: R. Houseal (Recorder)

OWNER'S REPRESENTATIVE(s):

J. Jongsma

Property Owners

Wm. Hammil

R. Shireman

Michael Deskus

A. Bartlett

NORMAL POOL ELEVATION: 1777.0 (orifice) AT TIME OF INSPECTION:

BREAST ELEVATION: 1795.8

POOL ELEVATION: 1777.1

SPILLWAY ELEVATION: 1791.4

TAILWATER ELEVATION: _____

MAXIMUM RECORDED POOL ELEVATION: Unknown

GENERAL COMMENTS: The visual appearance of this facility is good. The water level is near spillway inlet elev. and most of the earth embankment slope on the reservoir side is exposed. The cover on the embankment, its slopes and the emergency spillway is thick field grass. Crown vetch is also on the slopes.

Water, estimated at 15-20 g.p.m. is discharging from the 30" dia. outlet pipe.

VISUAL INSPECTION
EMBANKMENT

	OBSERVATIONS AND REMARKS
A. SURFACE CRACKS	None observed.
B. UNUSUAL MOVEMENT BEYOND TOE	None observed.
C. SLOUGHING OR EROSION OF EMBANKMENT OR ABUTMENT SLOPES	None observed.
D. ALIGNMENT OF CREST: HORIZONTAL: VERTICAL:	Horizontal - straight alignment with 90° bend. Vertical - refer to profile Appendix A, Plate A-II.
E. RIPRAP FAILURES	No riprap.
F. JUNCTION EMBANKMENT & ABUTMENT OR SPILLWAY	Abutments appear to be sound on both ends of the embankment. The embankment is dis- continuous at the emergency spillway location.
G. SEEPAGE	None detected along toe of slope. Reservoir water level is near or below the elevation of the downstream embankment toe. Water is discharging from 30" outlet pipe at about 15-20 g.p.m.
H. DRAINS	Toe drains - 6" dia. CMP. Discharge point to right & left of 30" concrete outlet pipe. Dry at time of inspection.
J. GAGES & RECORDER	None.
K. COVER (GROWTH)	Thick field grass - plus some crown vetch cover on the embankment slopes.

VISUAL INSPECTION
OUTLET WORKS
PRINCIPAL SPILLWAY

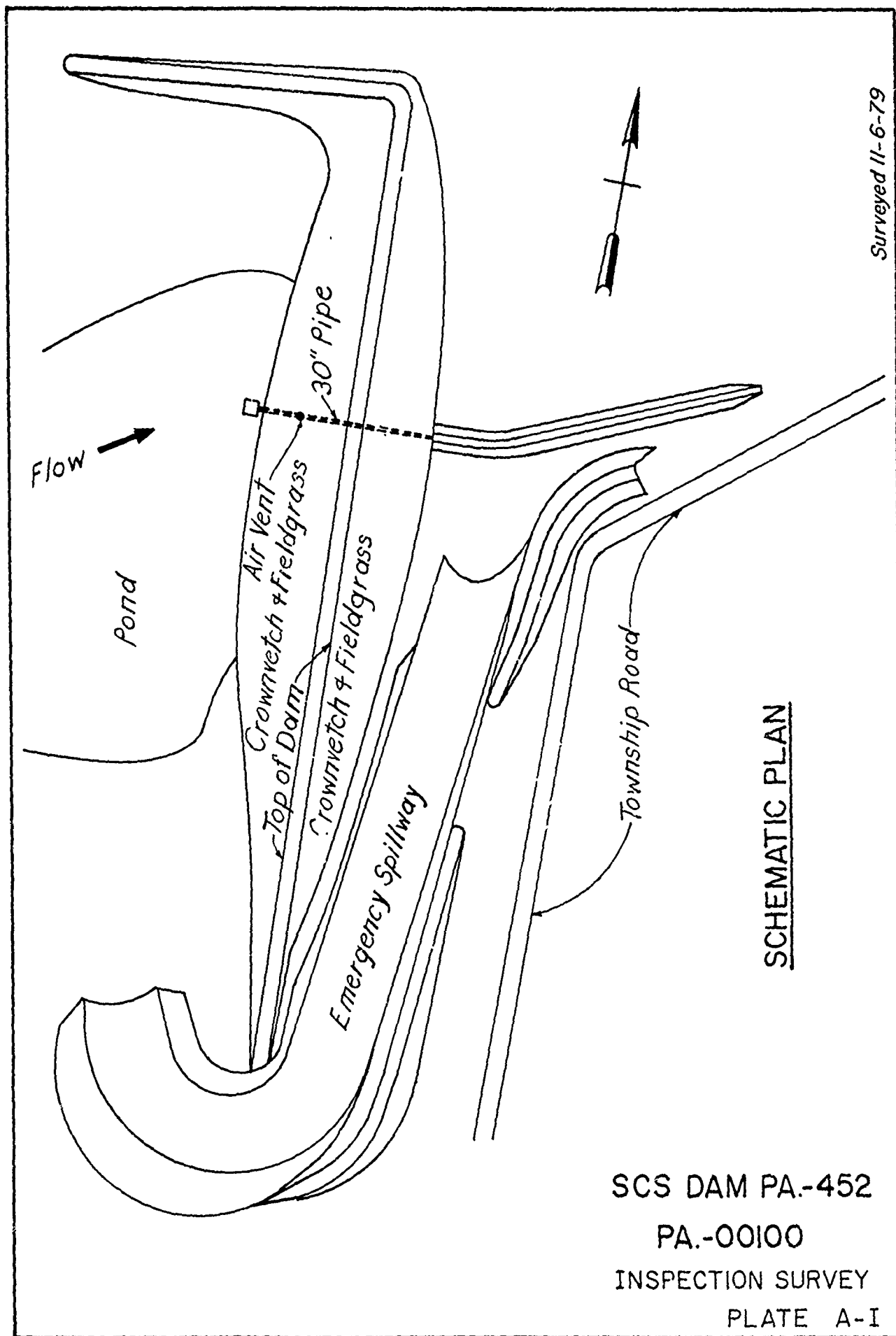
	OBSERVATIONS AND REMARKS
A. INTAKE STRUCTURE	Drop inlet structure, which is the principal spillway.
B. OUTLET STRUCTURE	30" dia. concrete pipe. Discharge estimated at 15-20 g.p.m. directly from drop inlet structure.
C. OUTLET CHANNEL	Shallow, grassed weeded swale.
D. GATES	No gates. Drawdown pipe closed with bolted plate.
E. EMERGENCY GATE	Same as above. Not usable for emergency.
F. OPERATION & CONTROL	16" pipe drawdown pipe. Never used. Maximum pool about 1 inch over orifice.
G. BRIDGE (ACCESS)	Access to inlet structure is directly from the upstream toe of the embankment. No bridge. Not accessible during high pool levels.

VISUAL INSPECTION
SPILLWAY
EMERGENCY SPILLWAY

	OBSERVATIONS AND REMARKS
A. APPROACH CHANNEL	Directly from reservoir at the right end of the embankment.
B. WEIR: Crest Condition Cracks Deterioration Foundation Abutments	<u>Emergency Spillway</u> is a grassed earth channel located on the right end of the main dam embankment.
C. DISCHARGE CHANNEL: Lining Cracks Stilling Basin	<u>Emergency Spillway</u> discharge channel is earth with heavy field grass cover. It is in good condition with no signs of erosion.
D. BRIDGE & PIERS	None.
E. GATES & OPERATION EQUIPMENT	None.
F. CONTROL & HISTORY	None. Never used.

VISUAL INSPECTION

	OBSERVATIONS AND REMARKS
<u>INSTRUMENTATION</u>	
Monumentation	None.
Observation Wells	None.
Weirs	None.
Piezometers	None.
Staff Gauge	None.
Other	None.
<u>RESERVOIR</u>	
Slopes	Partially cultivated, partially wooded. Stable - no erosion evident.
Sedimentation	None reported.
Watershed Description	Mostly wooded, relatively flat.
<u>DOWNSTREAM CHANNEL</u>	
Condition	Grassed swale over first 200 feet. Then crosses road through pipe and steep drop to next pond.
Slopes	Grassed and some trees.
Approximate Population	10 persons within 2,000'.
No. Homes	Pond & 2 homes & farm buildings within 2000 ft. downstream.



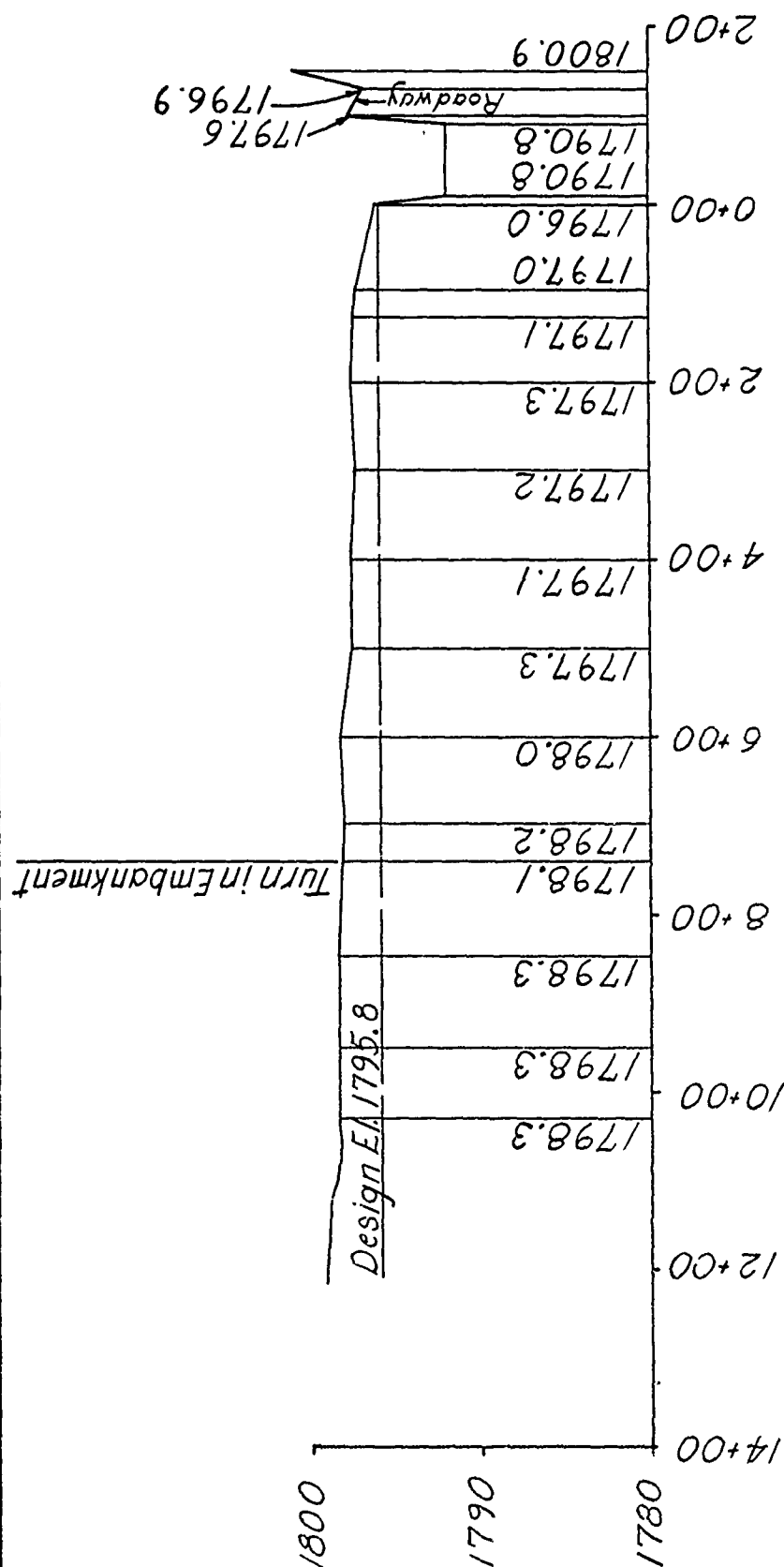
SCS DAM PA-452

PA.-00100

INSPECTION SURVEY

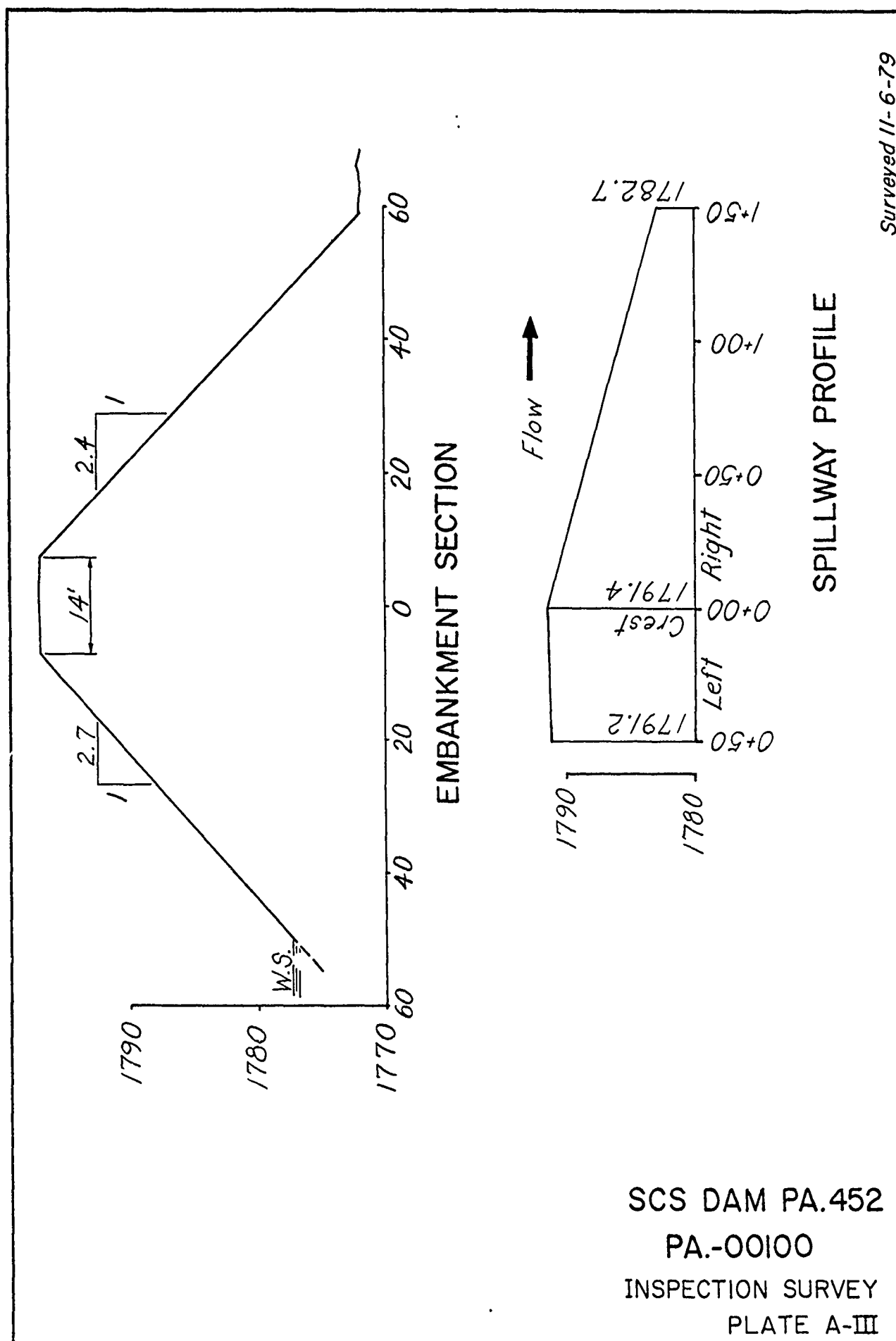
PLATE A-I

Surveyed 11-6-79



EMBANKMENT PROFILE

SCS DAM PA.452
PA.-00100
INSPECTION SURVEY
PLATE A-II



APPENDIX B

CHECKLIST OF ENGINEERING DATA

APPENDIX B

CHECK LIST
ENGINEERING DATA

PA DER # 64-177

NDI NO. PA-00 100

NAME OF DAM SCS DAM PA-452

ITEM	REMARKS
AS-BUILT DRAWINGS	In files of S.C.S.
REGIONAL VICINITY MAP	U.S.G.S. Quadrangle - Newfoundland, Pa. See Plate II, Appendix E
CONSTRUCTION HISTORY	Constructed during summer of 1963 by E. Soden & Sons. No reports of problems, no records.
GENERAL PLAN OF DAM	Appendix E, Plate III.
TYPICAL SECTIONS OF DAM	Plate V, Appendix E. Minor changes made on as-built drawings.
OUTLETS: PLAN DETAILS CONSTRAINTS DISCHARGE RATINGS	Emergency spillway, Plate IV, Appendix E. Principal spillway, Plate VI, Appendix E. In Design Report

ENGINEERING DATA

ITEM	REMARKS
RAINFALL & RESERVOIR RECORDS	None.
DESIGN REPORTS	In PennDER and S.C.S. files.
GEOLOGY REPORTS	Included with Design Report.
DESIGN COMPUTATIONS: HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	In Design Report. Upstream Slope 3H to 1V, F.O.S. 2.14. Downstream slope 2H to 1V with F.O.S. 2.72.
MATERIALS INVESTIGATIONS: BORING RECORDS LABORATORY FIELD	In Design Report
POST CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	Immediately upstream of embankment in pool area. See Plate III, Appendix E.

ENGINEERING DATA

ITEM	REMARKS
MONITORING SYSTEMS	None.
MODIFICATIONS	None reported.
HIGH POOL RECORDS	No records.
POST CONSTRUCTION ENGINEERING STUDIES & REPORTS	None.
PRIOR ACCIDENTS OR FAILURE OF DAM Description: Reports:	None.
MAINTENANCE & OPERATION RECORDS	Annual Maintenance Inspection reports by the Wayne County.
SPILLWAY PLAN, SECTIONS AND DETAILS	See Plans in Appendix E.

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT, PLANS & DETAILS	No equipment. Design drawings indicate gate on drawdown pipe. As-built drawings shows plate bolted on the inside of the principal spillway.
CONSTRUCTION RECORDS	None available.
PREVIOUS INSPECTION REPORTS & DEFICIENCIES	None.
MISCELLANEOUS	The files at PennDER contain Design drawings dated April 1961 and sections of the Design Report. Structural, H&H and stability calculations were not included. The S.C.S. file has a full Design Report and reduced as-built drawings.

CHECK LIST
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 90% wooded, 10% farmland

ELEVATION:

TOP NORMAL POOL & STORAGE CAPACITY: Elev. 1777 Acre-Feet 7.9TOP FLOOD CONTROL POOL & STORAGE CAPACITY: Elev. 1796 Acre-Feet 129MAXIMUM DESIGN POOL: Elev. 1795.8TOP DAM: Elev. 1796

SPILLWAY:

PRINCIPAL

EMERGENCY

- | | | |
|-----------------------------|---|---------------------------|
| a. Elevation | <u>1777</u> | <u>1791.4</u> |
| b. Type | <u>12" x 10" orifice</u> | <u>broad crested weir</u> |
| c. Width | <u>12"</u> | <u>62'</u> |
| d. Length | <u>1'</u> | <u>700'</u> |
| e. Location Spillover | <u>upstream toe</u>
<u>center of dam</u> | <u>right abutment</u> |
| f. Number and Type of Gates | <u>none</u> | <u>none</u> |

OUTLET WORKS:

- a. Type 12" cast iron pipe closed by plate bolted on downstream end.
- b. Location At drop inlet structure.
- c. Entrance inverts 1770
- d. Exit inverts 1770
- e. Emergency drawdown facilities None

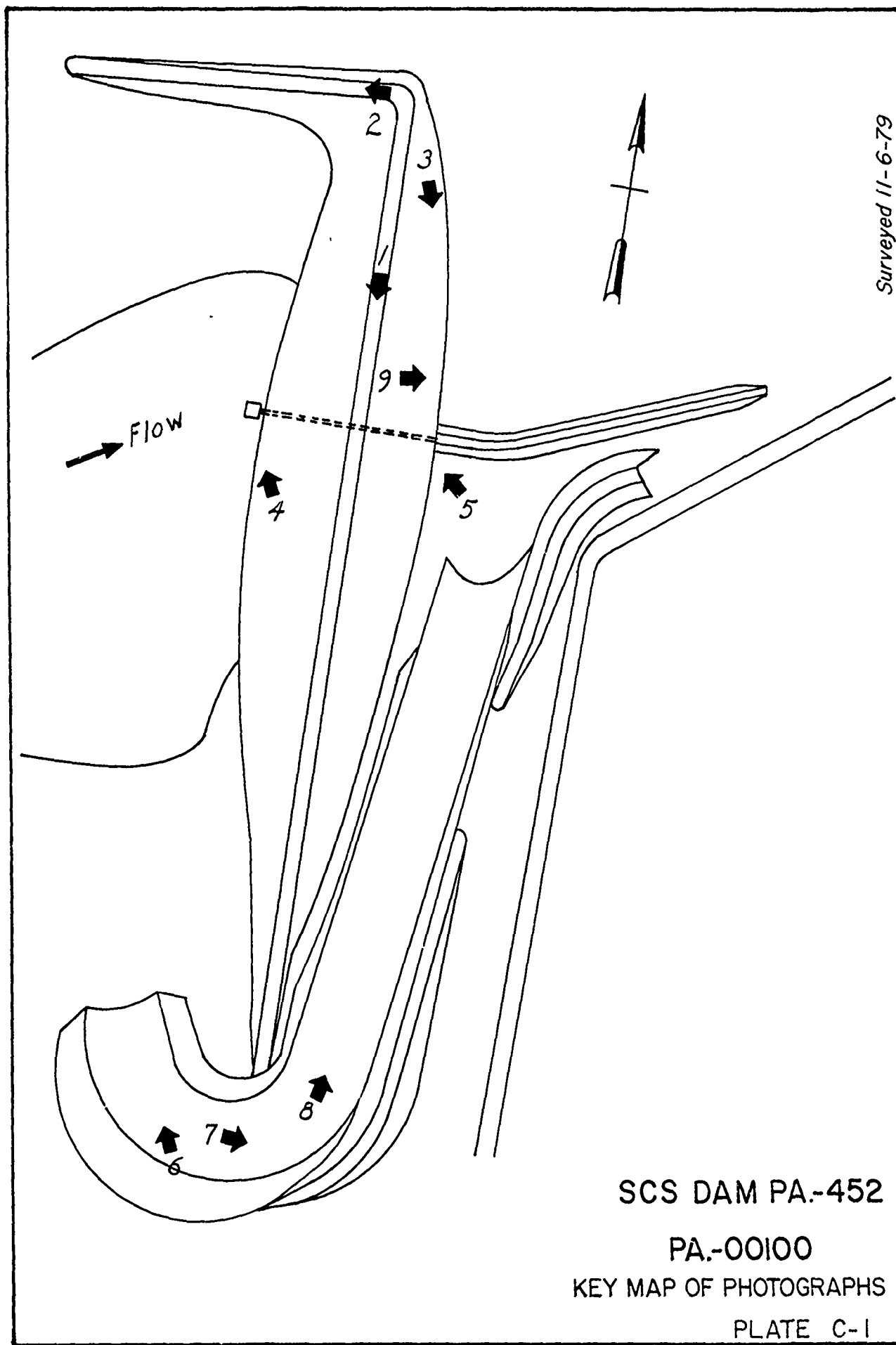
HYDROMETEOROLOGICAL GAGES:

- a. Type None
- b. Location _____
- c. Records _____

MAXIMUM NON-DAMAGING DISCHARGE: 1836 cfs

APPENDIX C
PHOTOGRAPHS

APPENDIX C





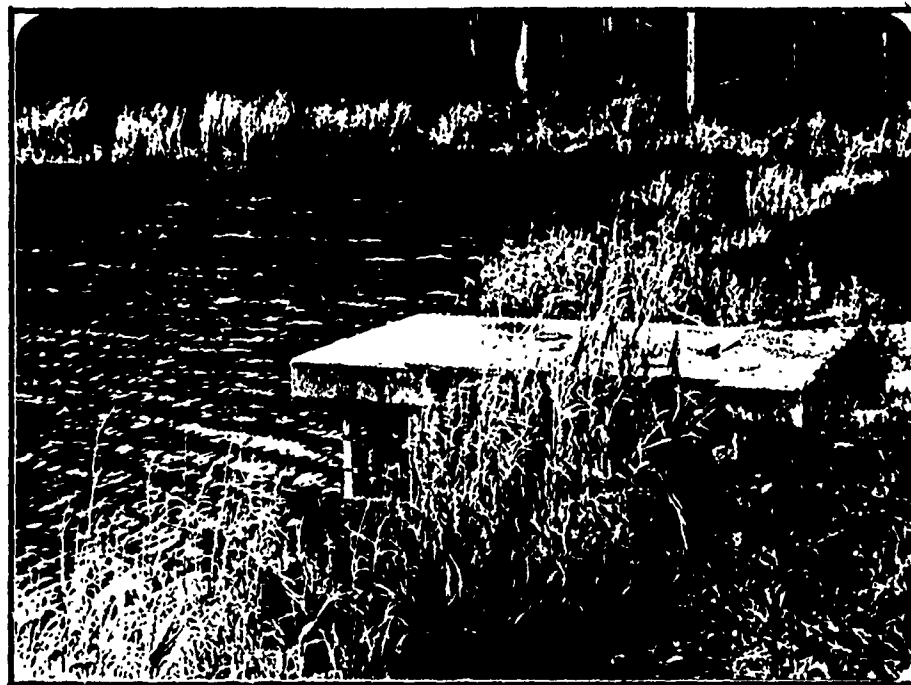
VIEW TO LEFT END OF EMBANKMENT - NO. 2



DOWNSTREAM SLOPE RIGHT END OF EMBANKMENT
WITH EMERGENCY SPILLWAY IN BACKGROUND - NO. 3

PA-00100
Plate C-II

C



DROP INLET STRUCTURE OR
PRINCIPAL SPILLWAY - NO. 4

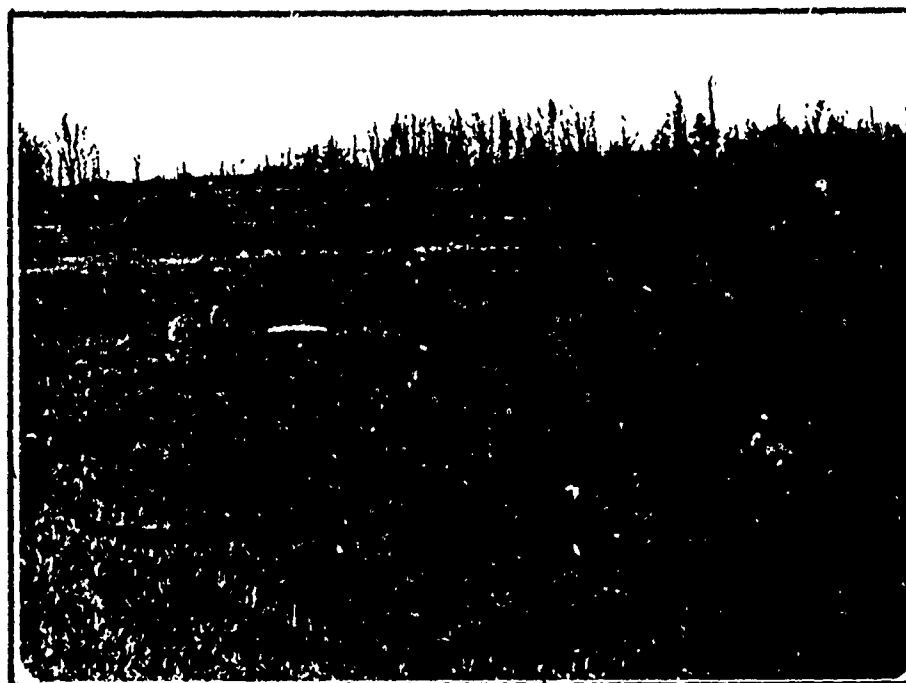


OUTLET PIPE - NO. 5

PA-00100
Plate C-III

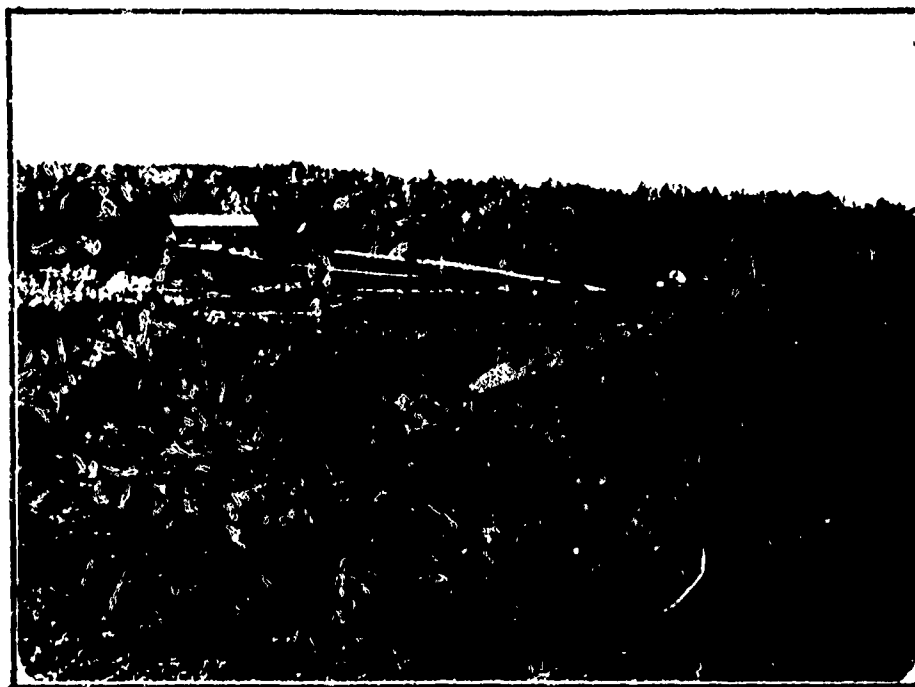


EMERGENCY SPILLWAY ENTRANCE AND RESERVOIR - NO. 6



LOOKING FROM DAMBREAST AT CREST OF
EMERGENCY SPILLWAY - NO. 7

PA-00100
Plate C-IV



EMERGENCY SPILLWAY LOOKING DOWNSTREAM - NO. 8
SPILLWAY SWEEPS TO THE LEFT



DOWNSTREAM CHANNEL OF CUTLET PIPE
AND EMERGENCY SPILLWAY - NO. 9

PA-00100
Plate C-V

APPENDIX D
HYDROLOGY AND HYDRAULIC CALCULATIONS

APPENDIX D

SUMMARY DESCRIPTION
OF
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION

The hydrologic and hydraulic evaluation for this inspection report has employed computer techniques using the Corps of Engineers computer program identified as the Flood Hydrograph Package (HEC-1) Dam Safety Version.

The program has been designed to enable the user to perform two basic types of hydrologic analyses: (1) the evaluation of the overtopping potential of the dam, and (2) the capability to estimate the downstream hydrologic-hydraulic consequences resulting from assumed structural failures of the dam. A brief summary of the computation procedures typically used in the dam overtopping analysis is shown below.

- Development of an inflow hydrograph to the reservoir.
- Routing of the inflow hydrograph(s) through the reservoir to determine if the event(s) analyzed would overtop the dam.
- Routing of the outflow hydrograph(s) of the reservoir to desired downstream locations. The results provide the peak discharge and maximum stage of each routed hydrograph at the outlet of the reach.

The output data provided by this program permits the comparison of downstream conditions just prior to a breach failure with that after a breach failure and the determination as to whether or not there is a significant increase in the hazard to loss of life as a result of such a failure.

The results of the studies conducted for this report are presented in Section 5.

For detailed information regarding this program refer to the Users Manual for the Flood Hydrograph Package (HEC-1) Dam Safety Version prepared by the Hydrologic Engineering Center, U.S. Army Corps of Engineers, Davis, California.

BY RLS DATE 1/28/80
CHKD. BY _____ DATE _____
SUBJECT _____

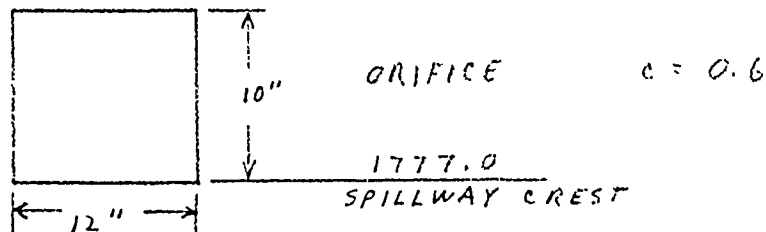
BERGER ASSOCIATES

SHEET NO. 1 OF _____
PROJECT D9656

PA-452

SPILLWAY CAPACITY

PRINCIPAL SPILLWAY



AT LOW POINT TOP OF DAM (1796.0)

$$H = 1796.0 - \left(1777.0 + \frac{5}{12}\right) = 18.58$$

$$Q = CA \sqrt{2gH}$$

$$= 0.6 \times \left(\frac{10}{12} \times 1\right) \times \left(2 \times 32.2 \times 18.58\right)^{.5}$$

$$= 17.3 \text{ CFS}$$

AT INVERT OF EMERGENCY SPILLWAY (1791.4)

$$1791.4 - \left(1777.0 + \frac{5}{12}\right) = 13.98$$

$$Q = CA \sqrt{2gH}$$

$$= .6 \times \left(\frac{10}{12} \times 1\right) \times \left(2 \times 32.2 \times 13.98\right)^{.5}$$

$$= 15 \text{ CFS}$$

BY RLS DATE 1/29/80

BERGER ASSOCIATES

SHEET NO. 2 OF

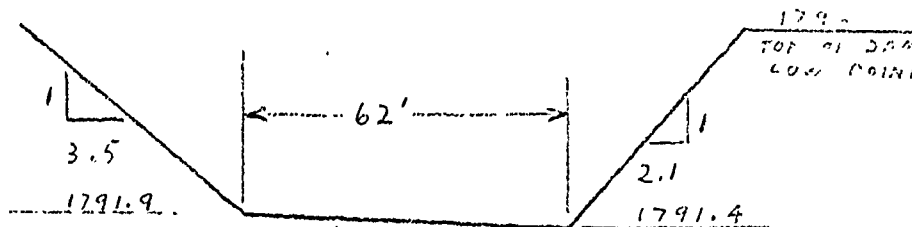
CHKD. BY DATE

PROJECT 09650

SUBJECT PA-452

SPILLWAY CAPACITY

EMERGENCY SPILLWAY



BROAD CRESTED WEIR

$C = 2.7$ (KING'S HOBBS)

$$L = \frac{62 + (62 + 3.5H + 2.1H)}{2}$$

$$H = W.S.ELEV. - 1791.65$$

$$Q = C L H^{3/2}$$

AT TOP OF DAM (1796)

$$H = 1796 - 1791.65 = 4.35$$

$$L = 62 + 62 + (3.5 \times 4.35) + (2.1 \times 4.35) = 74.18$$

$$Q = 2.7 \times 74.18 \times (4.35)^{1.5}$$

$$= 1817 \text{ CFS}$$

BY RLS DATE 2/4/80

BERGER ASSOCIATES

SHEET NO. 3 OF 3

CHKD. BY _____ DATE _____

PROJECT D9650

SUBJECT _____

PA-452DISCHARGE THRU POND DRAIN

12" CAST IRON PIPE, CENTERLINE AT ELEV 1770.5
CLOSED BY METAL PLATE BOLTED ON DOWNSTREAM
END, LOCATED IN DROP INLET STRUCTURE

$$Q = CA\sqrt{2gH}$$

$$C = 0.6$$

AT POOL ELEV. 1777

$$H = 1777 - 1770.5 = 6.5$$

$$Q = 0.6 \times \pi \times \frac{(1)^2}{4} \times (2 \times 32.2 \times 6.5)^{.5}$$

$$= 9.6 \text{ CFS}$$

AT LOW POOL ELEV 1771.5

$$H = 1771.5 - 1770.5 = 1$$

$$Q = 0.6 \times \pi \times \frac{(1)^2}{4} \times (2 \times 32.2 \times 1)^{.5}$$

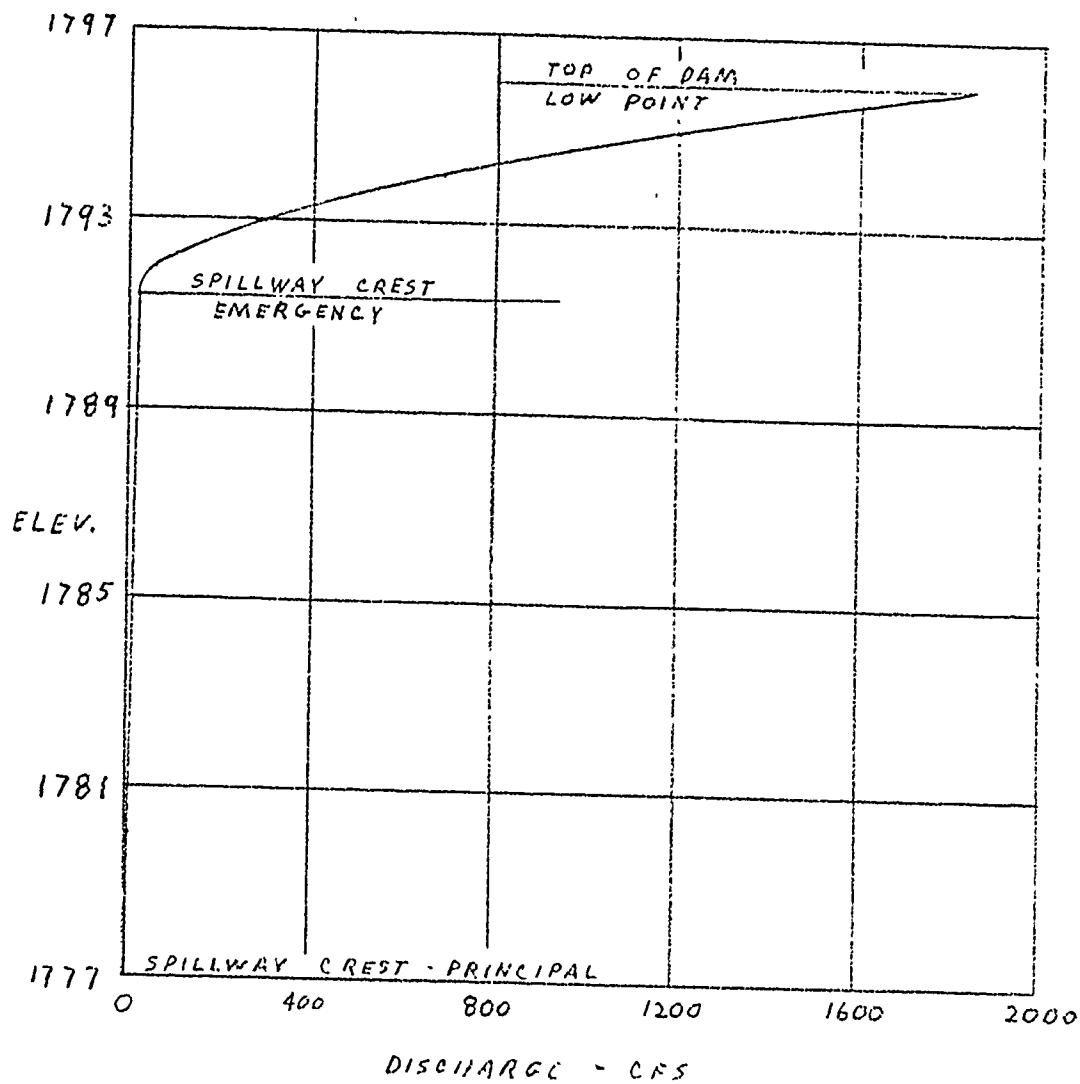
$$= 3.8 \text{ CFS}$$

BY RLS DATE 2/9/80
CHKD. BY _____ DATE _____
SUBJECT _____

BERGER ASSOCIATES

SHEET NO. 4 OF _____
PROJECT D 9650

DISCHARGE RATING CURVE



BY RLS DATE 2/4/80

BERGER ASSOCIATES

SHEET NO. 5 OF

CHKD. BY _____ DATE _____

PROJECT D. 9650

SUBJECT _____

PA-452MAXIMUM KNOWN FLOOD AT DAM SITE

THERE ARE NO RECORDS OF FLOOD LEVELS AT SCS DAM PA-452, BASED ON THE GAGE RECORDS FOR MILL CREEK AT NEARBY MOUNTAINHOME, PA. (D.A. = 5.84 SQ. MI.) THE MAXIMUM DISCHARGE AT THE GAGE OCCURRED IN JULY 1969 WHEN A DISCHARGE OF 1650 CFS WAS OBSERVED. THE MAXIMUM INFLOW TO SCS DAM PA-452 IS ESTIMATED TO BE:

$$Q = \left(\frac{.27}{5.84} \right)^{0.8} \times 1650$$

$$= 141 \text{ CFS}$$

BY RLS DATE 2/4/80
CHKD. BY _____ DATE _____
SUBJECT _____

BERGER ASSOCIATES

SHEET NO. 6 OF _____
PROJECT D9650

PA-452

SIZE CLASSIFICATION

MAXIMUM STORAGE = 129 ACRE-FEET

MAXIMUM HEIGHT = 25 FEET

SIZE CLASSIFICATION IS "SMALL"

HAZARD CLASSIFICATION

SEVERAL HOMES AND FARM BUILDINGS ARE
LOCATED NEAR THE CHANNEL ABOUT 2000 FEET
DOWNSTREAM

USE "HIGH"

RECOMMENDED SPILLWAY DESIGN FLOOD

THE ABOVE CLASSIFICATIONS INDICATE
USE OF AN SDF EQUAL TO ONE-HALF
THE PROBABLE MAXIMUM FLOOD TO
THE FULL PMF.

BY RLS DATE 2/1/80

BERGER ASSOCIATES

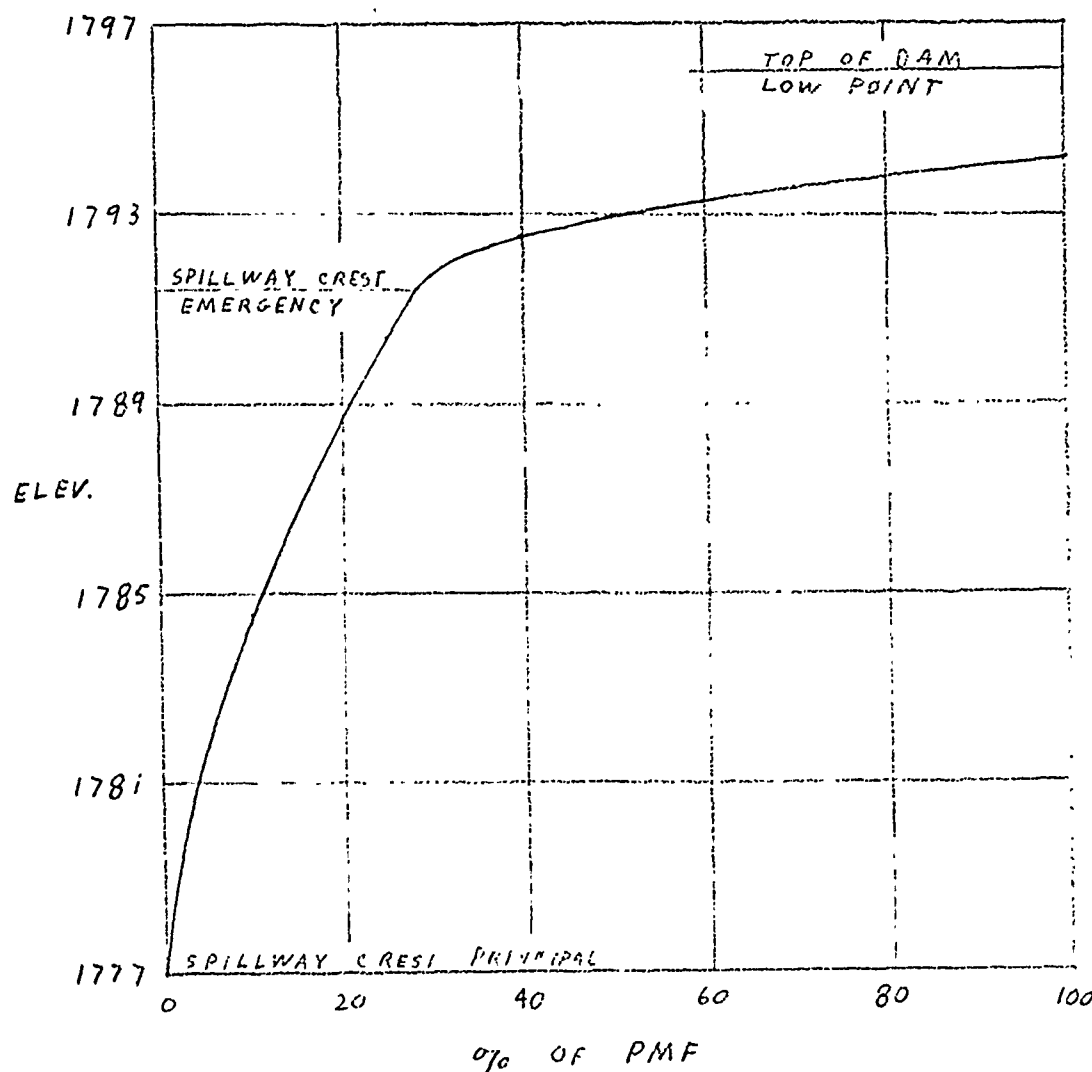
SHEET NO. 7 OF

CHKD. BY _____ DATE _____

PROJECT 29650

SUBJECT PA 452

SPILLWAY CAPACITY CURVE



HYDROLOGY AND HYDRAULIC ANALYSIS DATA BASE

NAME OF DAM: PA-452 RIVER BASIN: DELAWARE
PROBABLE MAXIMUM PRECIPITATION (PMP) = 22.0 INCHES/24 HOURS⁽¹⁾

(FOR FOOTNOTES SEE NEXT PAGE)

STATION		1	2	3	4
STATION DESCRIPTION		RESERVOIR	DAM		
DRAINAGE AREA (SQUARE MILES)		.27			
CUMULATIVE DRAINAGE AREA (SQUARE MILE)		.27	.27		
ADJUSTMENT OF PMP FOR DRAINAGE AREA (%) ⁽²⁾	6 HOURS	111			
	12 HOURS	123			
	24 HOURS	133			
	48 HOURS	142			
	72 HOURS	--			
		Zone 1			
SNYDER HYDROGRAPH PARAMETERS	ZONE ⁽³⁾	1			
	C_p / C_t ⁽⁴⁾	.45/1.23			
	L (MILES) ⁽⁵⁾	.88			
	L_{co} (MILES) ⁽⁵⁾	.5			
	$T_p = C_t (L \cdot L_{co})^{0.3}$ (hours)	.96			
SPILLWAY DATA	CREST LENGTH (FT.)		EMERGENCY 62	PRINCIPAL 12" x 10"	
	FREEBOARD (FT.)		4.6	19	
	DISCHARGE COEFFICIENT		2.7	0.6	
	EXPONENT		1.5	--	
	ELEVATION		1791.4	1777	
AREA ⁽⁶⁾ (ACRES)	NORMAL POOL (1777)		1.8		
	ELEV. <u>1788</u>		7.72		
	ELEV. <u>1798</u>		12.55		
STORAGE (ACRE-FOOT)	NORMAL POOL ⁽⁷⁾		7.9		
	ELEV. <u>1763.8</u> ⁽⁸⁾		0		
	ELEV. _____ ⁽⁸⁾				
	ELEV _____ ⁽⁸⁾				

- (1) Hydrometeorological Report 33 (Figure 1), U.S. Army, Corps of Engineers, 1956.
- (2) Hydrometeorological Report 33 (Figure 2), U.S. Army, Corps of Engineers, 1956.
- (3) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).
- (4) Snyder's Coefficients.
- (5) L = Length of longest water course from outlet to basin divide.
 L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.
- (6) Planimetered area encompassed by contour upstream of dam.
- (7) PennDER files.
- (8) Computed by conic method.

710-440-1029 (1 of 4) 440-1029
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 26 FEB 79

1/4

1	A1	SCS DAM PA-452	*** TRIBUTARY TO WALLENGRAVE CREEK										
2	A2	BREWER TWP., WAYNE COUNTY, PA.											
3	A3	NDI # PA-00100	PA DER # 64-177										
4	E	300	0	15	0	0	0	0	0	-4	0		
5	B1	5											
6	J	1	9.	1									
7	J1	1	.9	.8	.7	.6	.5	.4	.35	.1			
8	K	1									1		
9	K1	INFLOW HYDROGRAPH											
10	M	1	1	.27									
11	P		22.0	111	123	133	142						
12	T										1	.05	
13	U	.96	.45										
14	X	-1.5	.05	2									
15	K	1	2									1	
16	N1	RESERVOIR ROUTING											
17	Y		1										
18	Y1	1									7.9	-1	
19	V4	1777	1780	1785	1791.4	1792	1793	1794	1795	1796			
20	V5	0	6	11	15	50	294	683	1178	1634			
21	SA	0	1.8	2.67	3.7	4.7	6.27	7.72	8.03	9.27	10.06		
22	SA	11.28	12.55										
23	SE	1784	1777	1780	1782	1784	1786	1788	1790	1792	1794		
24	SE	1796	1798										
25	SE	1777											
26	SD	1796											
27	K	99											

1

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	1
ROUTE HYDROGRAPH TO	2
END OF NETWORK	

 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION JULY 1978
 LAST MODIFICATION 26 FEB 79

RUN DATE: 80/03/05.
 TIME: 05:29:31.

SCS DAM PA-452 *** TRIBUTARY TO WALLENGRAVE CREEK
 BREWER TWP., WAYNE COUNTY, PA.
 NDI # PA-00100 PA DER # 64-177

JOB SPECIFICATION

NO	KRR	KMIN	IDBY	IKR	IMIN	NETAC	IFLT	IPAT	NOTA
300	0	15	0	0	0	0	0	-4	0
			JOPER	NET	LRGPT	TRACE			
			5	0	0	0			

SCS 1/4 PA-402 1/4/17 THINNING TO WILDERNESS AREA
 NUMBER 1/4/17 1/4/17
 1/4/17 1/4/17 1/4/17

JOB SPECIFICATION:

NO	DATE	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME
1	1	15	0	0	0	0	0	0	0
			JOPE	MT	LOFT	FRAGE			
			5	0	0	0			

MULTI-PHASE ANALYSIS TO BE APPLIED

1/4/17 1/4/17 1/4/17

1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17

SUB-AREA RUNOFF COMPUTATION

HYDROGRAPH DATA

TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME
1	0	0	0	0	0	0	0	0	0

HYDROGRAPH DATA

TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME
1	1	127	0.00	127	0.00	0.00	0.00	0.00	0.00

PRECIP DATA

TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME
1	12.00	111.00	113.00	113.00	113.00	113.00	113.00	113.00	113.00

1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17

LOSS DATA

TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00

UNIT HYDROGRAPH DATA

1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17

LOSS DATA

1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17

UNIT HYDROGRAPH OF END-OF-PERIOD COORDINATES: 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17

TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME	TIME
9.	24.	24.	24.	24.	24.	24.	24.	24.	24.
24.	24.	24.	24.	24.	24.	24.	24.	24.	24.
6.	6.	6.	6.	6.	6.	6.	6.	6.	6.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

END-OF-PERIOD FLOW

1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17

1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17 1/4/17

HYDROGRAPH ROUTING

RESERVOIR ROUTING

	ISTAP	ICORP	IECON	ITAPE	JPLT	JPRF	ISAME	ISAME	ISAME
	2	1	0	0	0	0	1	0	0
ROUTING DATA									
	CL055	CL055	AVS	IRIS	ISAME	IOPT	IPMP	ISAME	ISAME
	0.0	0.000	0.00	1	0	0	0	0	0
	ASTPS	NSTOL	LAG	AMSKN	X	TSA	STORA	I-PRAT	
	1	0	0	0.000	0.000	0.000	8.	-1	
STAGE	1777.00	1790.00	1785.00	1791.40	1792.00	1793.00	1794.00	1795.00	1796.00
FLOW	0.00	6.00	11.00	15.00	50.00	294.00	685.00	1178.00	1854.00
SURFACE AREA=	0.	2.	3.	4.	5.	6.	8.	9.	10.
	11.	13.							
CAPACITY=	0.	8.	14.	21.	29.	40.	54.	70.	85.
	129.	153.							107.
ELEVATION=	1764.	1771.	1780.	1782.	1784.	1786.	1788.	1790.	1792.
	1795.	1798.							1794.
	CEEL	SPJED	COGW	EXPW	ELEV	COOL	DAREP	EAFL	
	1777.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

DAM DATA

TOPEL	CORG	EXPL	DAPEL
1796.0	0.0	0.0	0.

PEAK OUTFLOW IS 758. AT TIME 41.00 HOURS

PEAK OUTFLOW IS 670. AT TIME 41.00 HOURS

PEAK OUTFLOW IS 574. AT TIME 41.00 HOURS

PEAK OUTFLOW IS 485. AT TIME 41.25 HOURS

PEAK OUTFLOW IS 343. AT TIME 41.75 HOURS

PEAK OUTFLOW IS 277. AT TIME 42.25 HOURS

PEAK OUTFLOW IS 174. AT TIME 42.75 HOURS

PEAK OUTFLOW IS 14. AT TIME 43.50 HOURS

PEAK OUTFLOW IS 11. AT TIME 43.25 HOURS

9/1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
 AREA IN SQUARE MILES (SQUARE KILOMETERS)

PERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS								
				RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6	RATIO 7	RATIO 8	RATIO 9
				1.00	.90	.80	.70	.60	.50	.40	.25	.10
PROGRAPH AT	1	.27	1	793.	714.	634.	553.	472.	397.	317.	193.	79.
	(	.70)	(	22.48)	20.21)	17.97)	15.72)	13.47)	11.23)	8.98)	5.61)	2.25)
NOTED TO	2	.27	1	759.	670.	579.	486.	393.	277.	174.	14.	11.
	(	.70)	(	21.48)	18.97)	16.38)	13.76)	10.85)	7.55)	4.94)	.41)	.30)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1777.05	1777.00	1790.00
STORAGE	8.	8.	107.
OUTFLOW	0.	0.	1234.

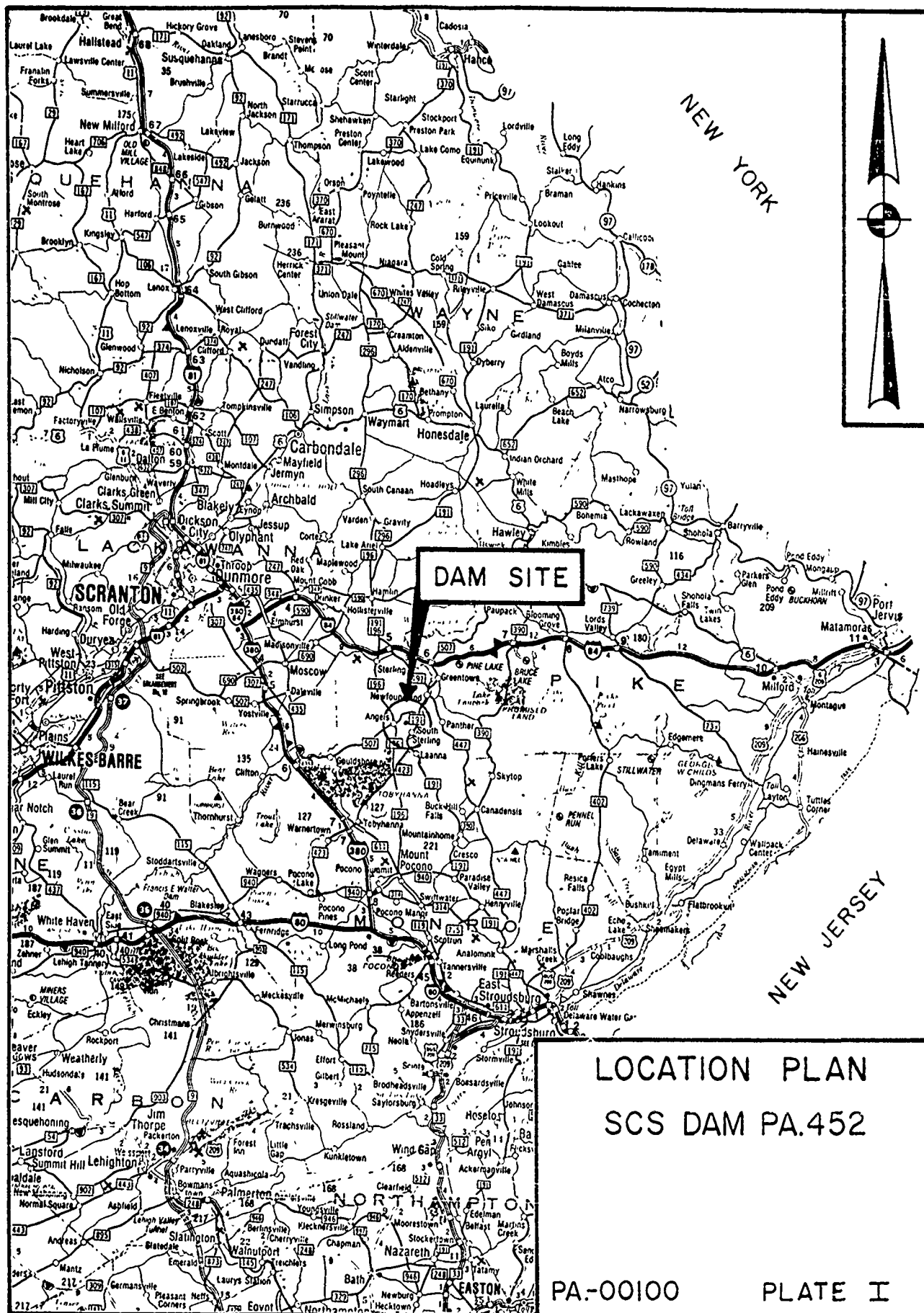
RATIO OF PMF	MAXIMUM RESERVOIR W.S. ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1794.15	0.00	109.	759.	0.00	41.00	0.00
.90	1793.97	0.00	107.	670.	0.00	41.00	0.00
.80	1793.75	0.00	105.	579.	0.00	41.00	0.00
.70	1793.49	0.00	102.	486.	0.00	41.00	0.00
.60	1793.23	0.00	100.	393.	0.00	41.75	0.00
.50	1792.93	0.00	97.	277.	0.00	42.25	0.00
.40	1792.51	0.00	93.	174.	0.00	42.75	0.00
.25	1790.47	0.00	74.	14.	0.00	43.50	0.00
.10	1784.57	0.00	32.	11.	0.00	45.25	0.00

31 ENCOUNTERED.

APPENDIX E

PLATES

APPENDIX E



TP 101 ELEV 1774.8 TP 102 ELEV 1777.1 TP 103 ELEV 1770.4

2.0' TOP SOIL, BROWN SILT
Boulders 3" to 12" dia
W/ 25% GRAVEL
SEEPAGE AT 50%

2.0' SANDY SILT
GRAVELS 1/4" to 3/8"
3" to 6" dia
OVER 6" = 5%

2.0' TOP SOIL, BROWN SILT
Boulders 3" to 12" dia
W/ 25% GRAVEL
SEEPAGE AT 50%

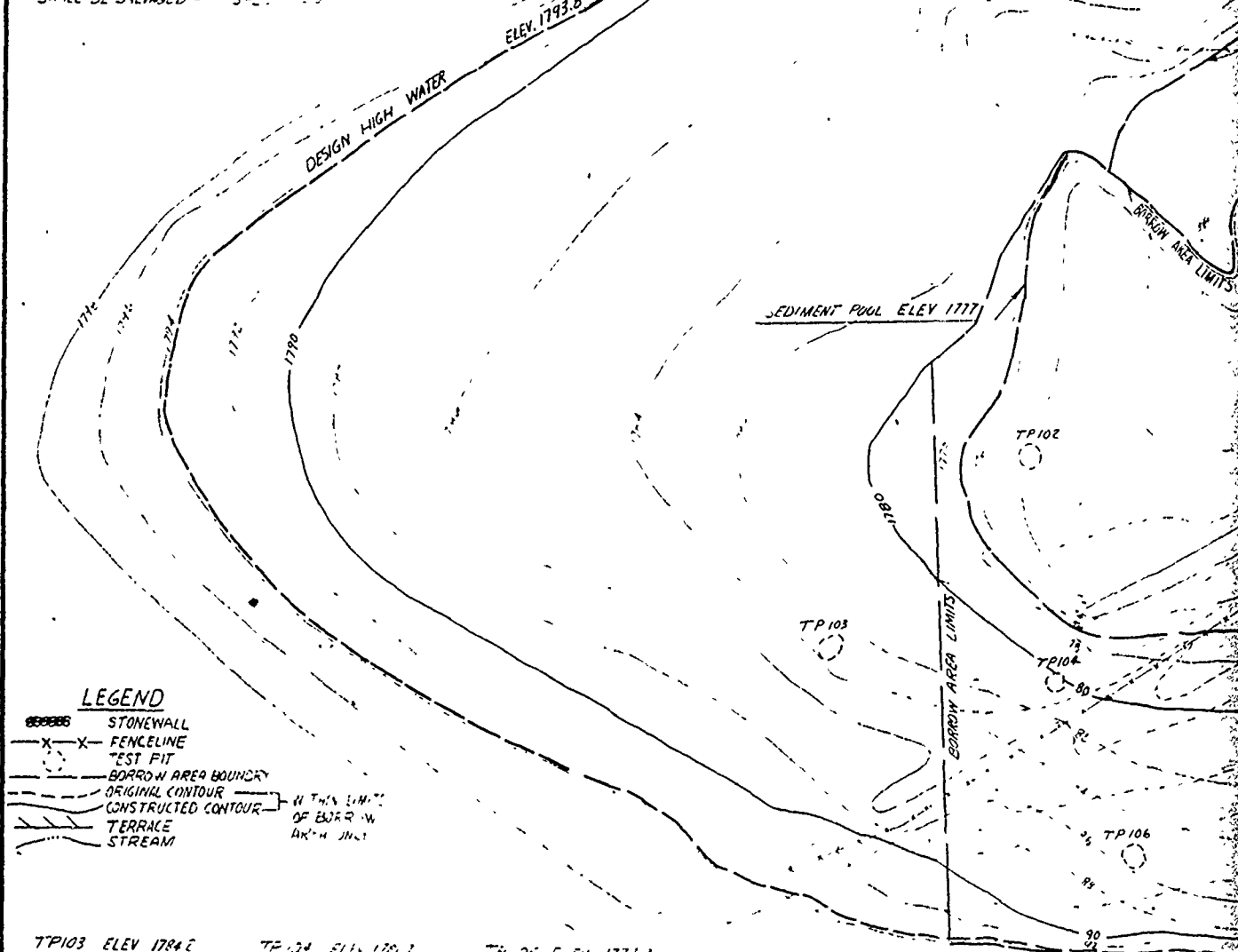
2.5' SANDY SILT
GRAVELS 1/4" to 3/8"
3" to 6" dia
OVER 6" = 5%

1.0' TOP SOIL, BROWN SILT
Boulders 3" to 12" dia
W/ 25% GRAVEL
SEEPAGE AT 50%

4.0' SANDY SILT
GRAVELS 1/4" to 3/8"
3" to 6" dia
OVER 6" = 5%

PROPOSED DAM
S 262° 10' W
FFL

NOTE:
ALL FENCES SHOWN ON DRAWING
SHALL BE SALVAGED - SEE: 2-53



- LEGEND**
- STONEWALL
 - FENCELINE
 - TEST PIT
 - BORROW AREA BOUNDARY
 - ORIGINAL CONTOUR
 - CONSTRUCTED CONTOUR
 - TERRACE
 - STREAM

TP103 ELEV 1784.2

TP104 ELEV 1781.7

TP105 ELEV 1771.7

4.0' TOP SOIL, BROWN SILT
LARGE BOULDERS TO
3'0" DIA.

2.0' TOP SOIL, BROWN SILT
Boulders 3" to 12" dia
W/ 25% GRAVEL
SEEPAGE AT 50%

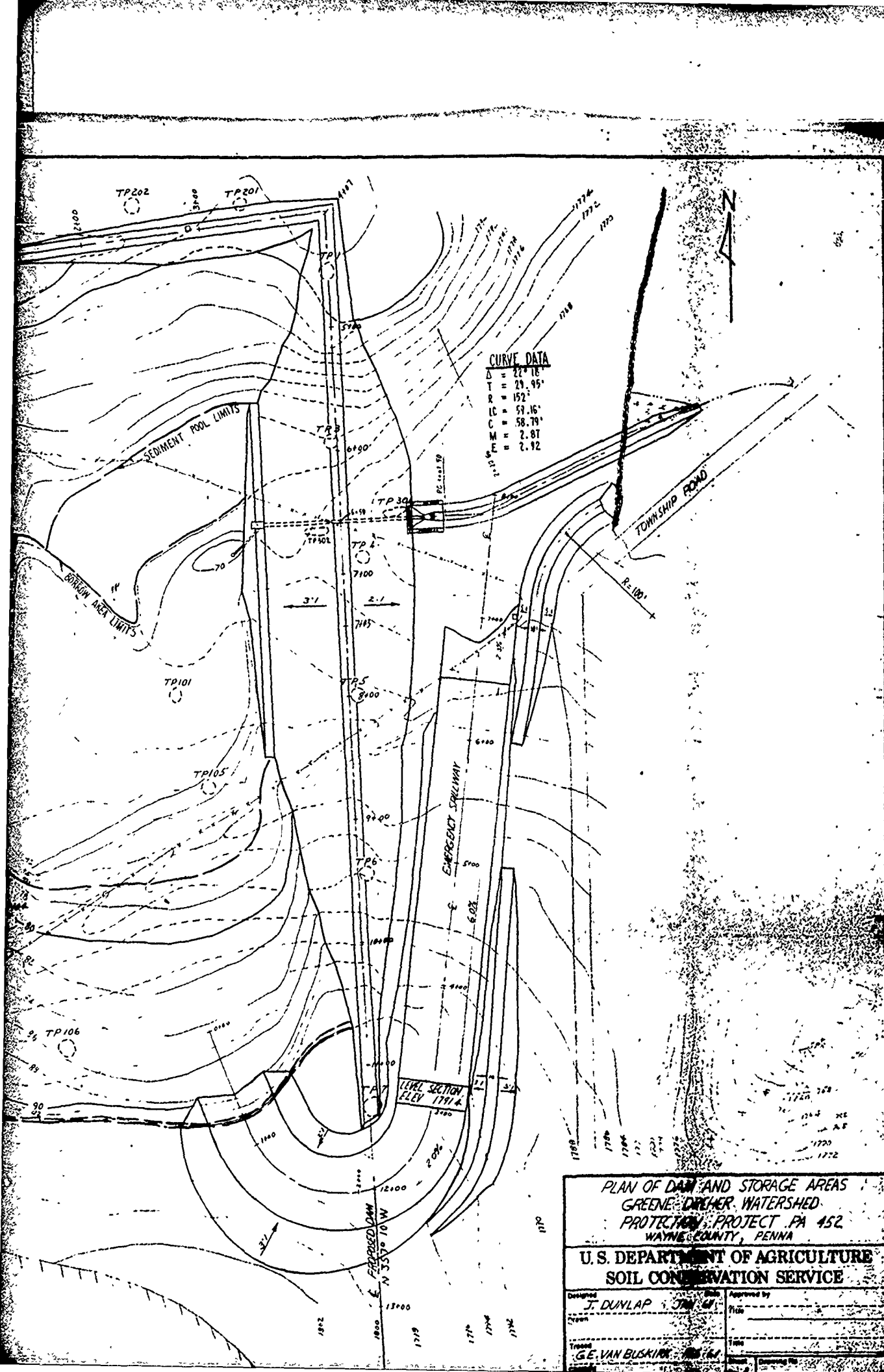
1.5' SILTY TOP SOIL
ORGANIC MATTER
1.0' SANDY SILT

2.0' SANDY SILT
W/ GRAVELS FROM
1/4" to 3/8" 25%
3" to 6" 10%
OVER 6" = 5%

2.0' SANDY SILT
GRAVELS 1/4" to 3/8"
3" to 6" dia
OVER 6" = 5%

1.5' SANDY SILT
GRAVELS 1/4" to 3/8"
3" to 6" dia
OVER 6" = 5%

SCALE 1" = 50 FEET

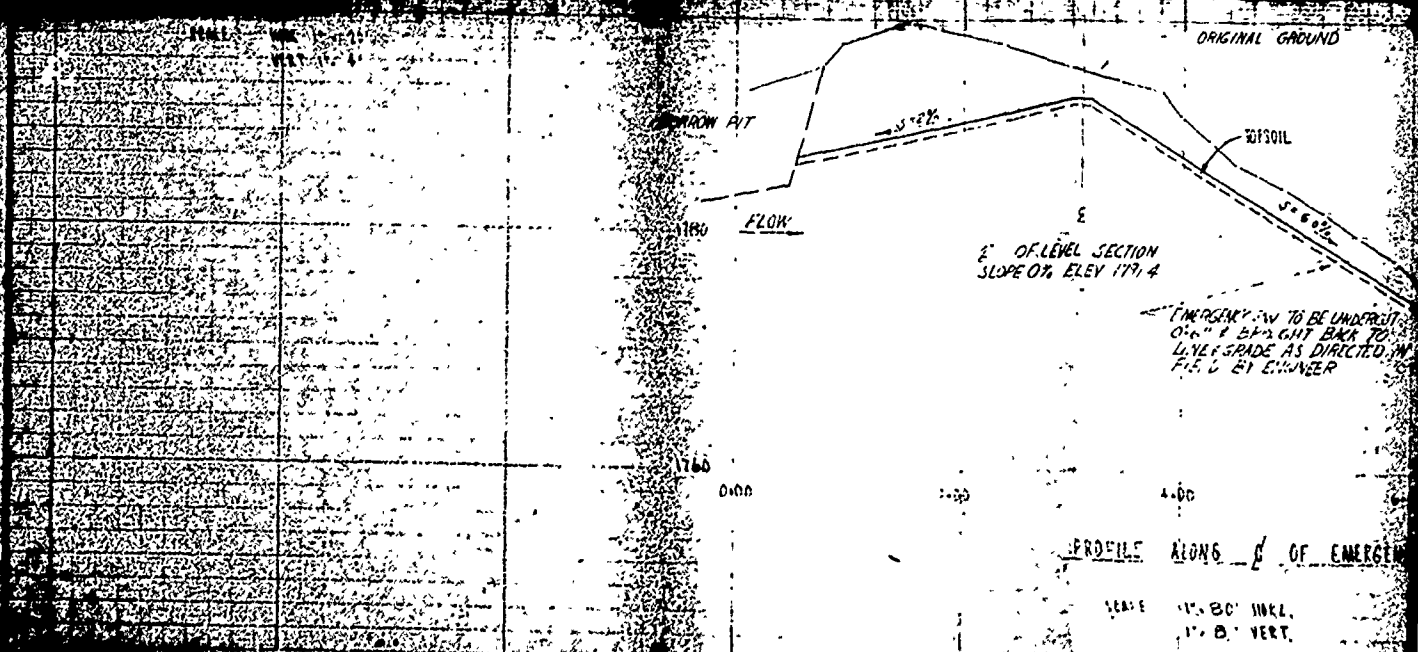
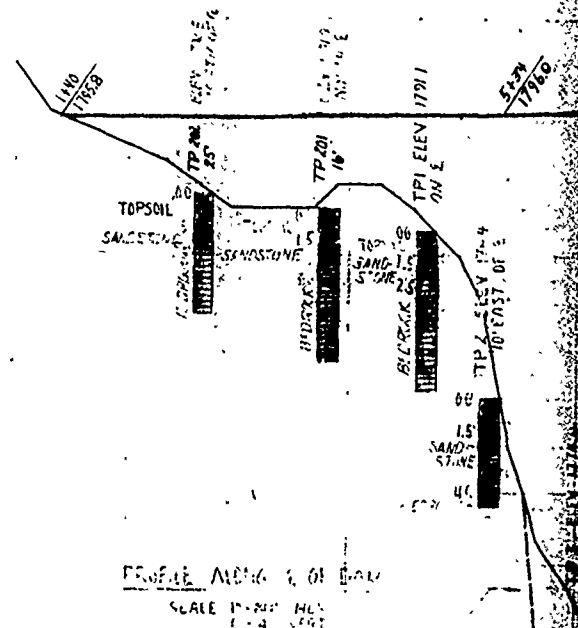


PLAN OF DAM AND STORAGE AREAS
 GREENE DRAINER WATERSHED
 PROTECTION PROJECT PA 452
 WAYNE COUNTY, PENNA

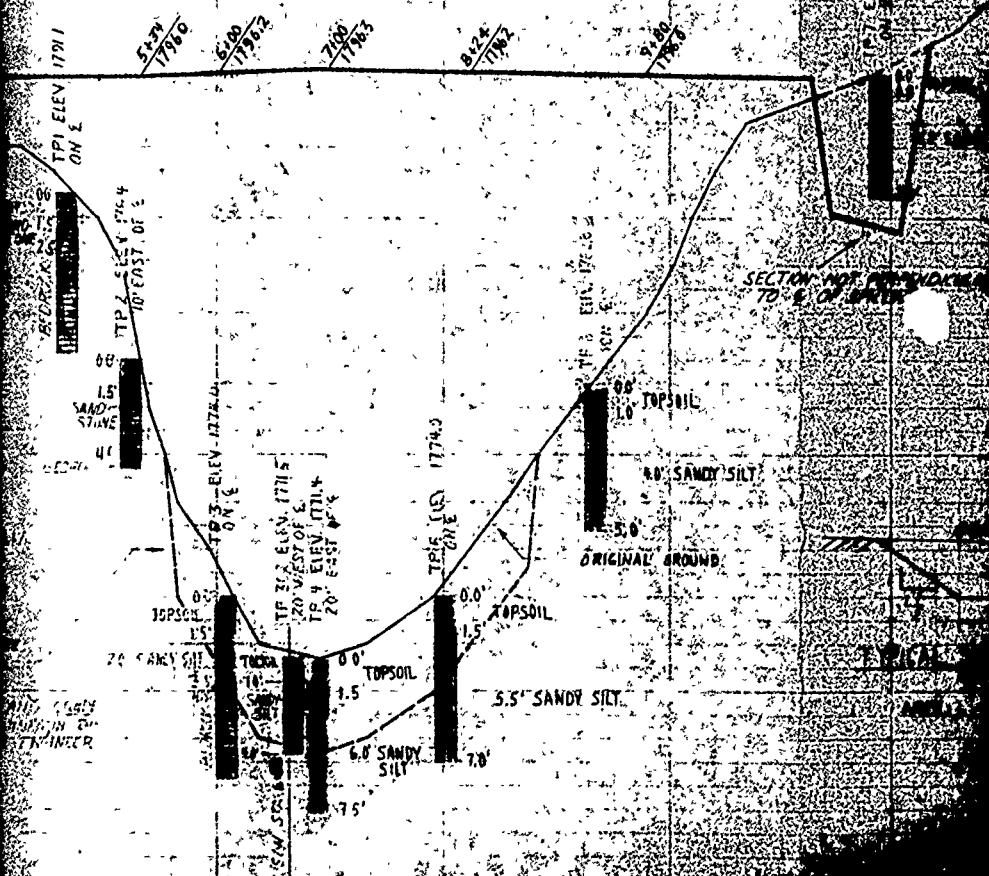
U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Designed J. DUNLAP	Drawn J. DUNLAP	Approved by Title
Typed G. E. VAN BUSKIRK	Checked G. E. VAN BUSKIRK	Date

PA - 000
 PLATE I



CONSTRUCTION ELEVATIONS



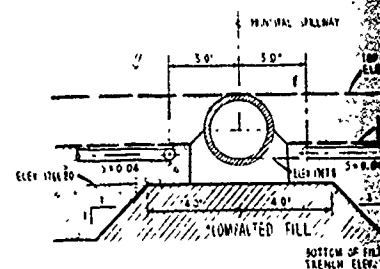
ORIGINAL GROUND

TOPSOIL

EMERGENCY SW TO BE UNDERLIT BY BRIGHT BACK TO REVEAL GRADE AS DIRECTED IN FIELD BY ENGINEER

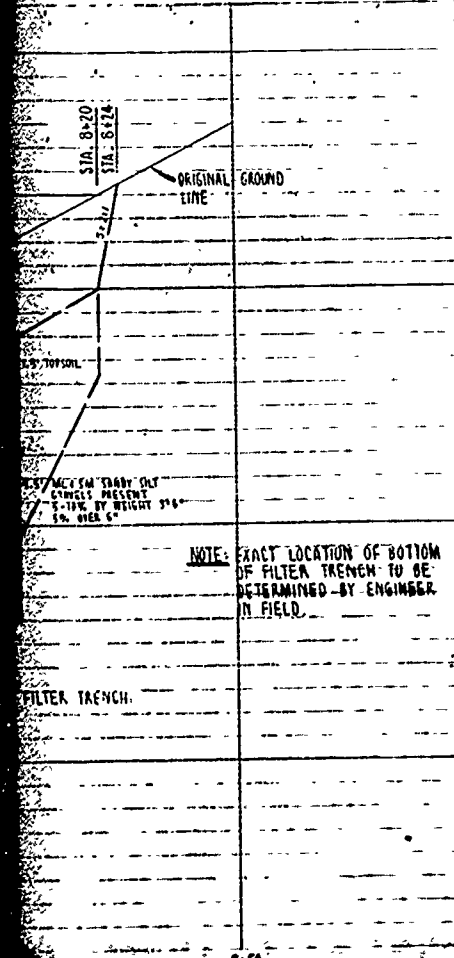
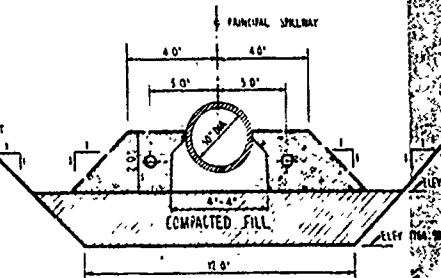
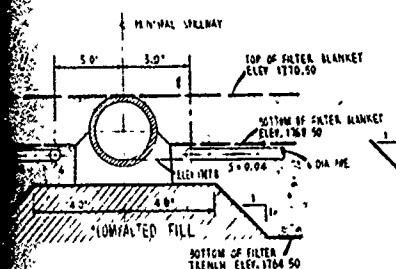
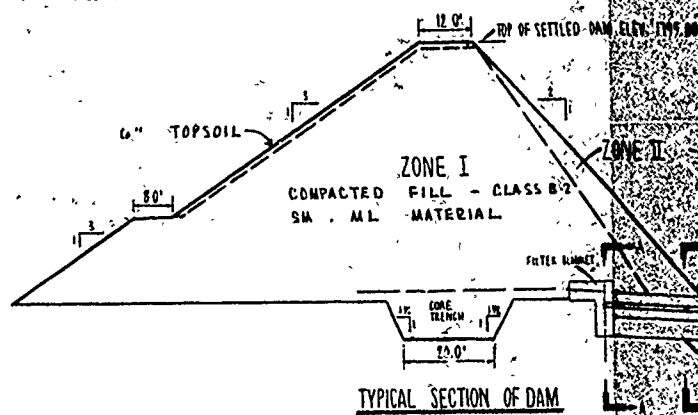
LINE OF EMERGENCY SPILLWAY

80 INCH.
80 YERT.



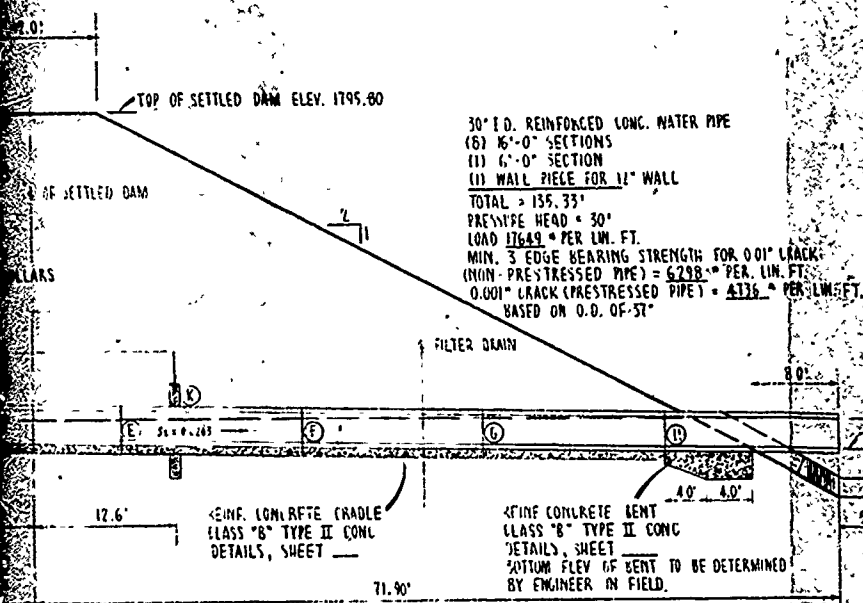
SECTION A-A





DESIGN DATA		PIERS	
Size No.	% Passing	U.S. Standard Stone Size	
2"	100		
1"	90-100		
3/4"	85-98		
3/8"	60-85		
1/4"	52-72		
10	31-55		
20	3-33		
40	0-26		

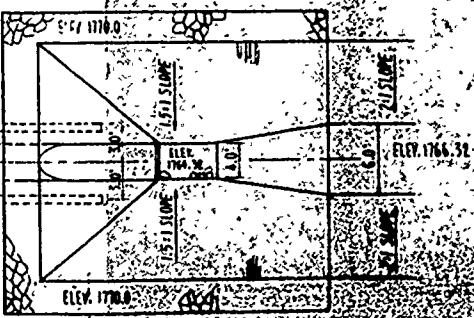
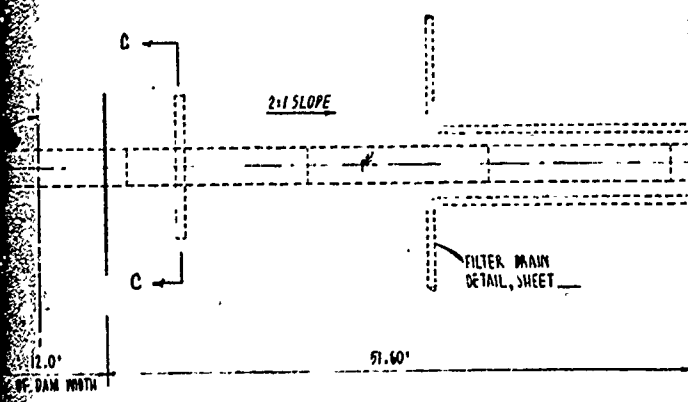




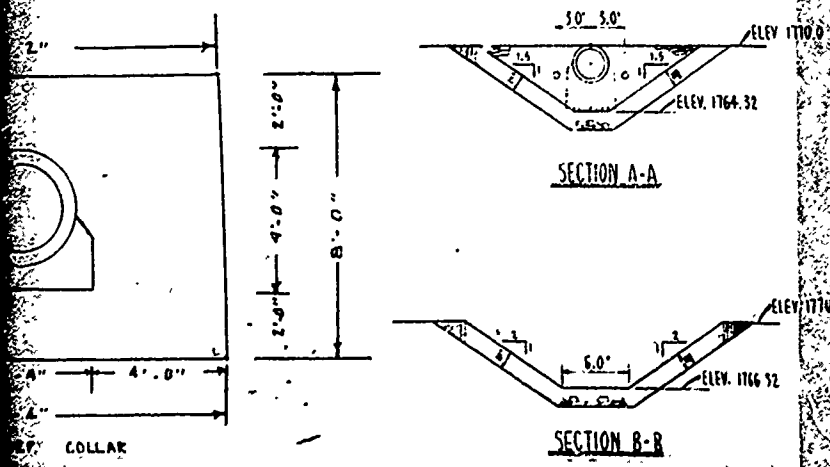
POINT	DISTANCE FROM REAR END	SLOPE	WATER SURFACE ELEVATION
RISER	0		1795.80
A	6		1795.80
B	32		1795.80
C	30		1795.80
D	4		1795.80
E	10		1795.80
F	86		1795.80
G	102		1795.80
H	118		1795.80
WOLEY	134		1795.80
I	25		1795.80
J	30		1795.80
K	75		1795.80

NOTE: MAXIMUM CAMBER 0.50"
 ABOVE DIMENSIONS OF TYPE LINE
 ARE BASED ON NORMAL SILE AND DO NOT INCLUDE CREEP

PLAN OF PRINCIPAL SPILLWAY
 SCALE: 1" = 8.0'



PLAN
 SCALE: 1" = 8.0'



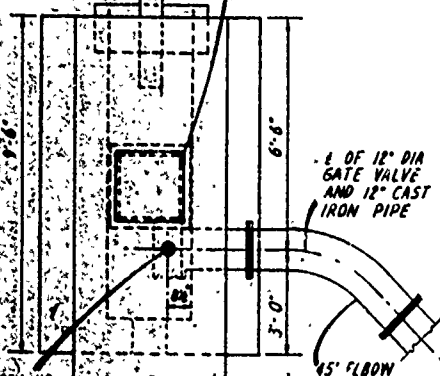
PA 452

U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

PA-00100
 PLATE VI

MANHOLE COVER: NEENAH FOUNDRY CO.
CATALOG "A" MODEL 1872-C WITH TYPE
"B" FRAME OR EQUAL.

3" O.D. PIPE
AERATION DETAILS
SHEET

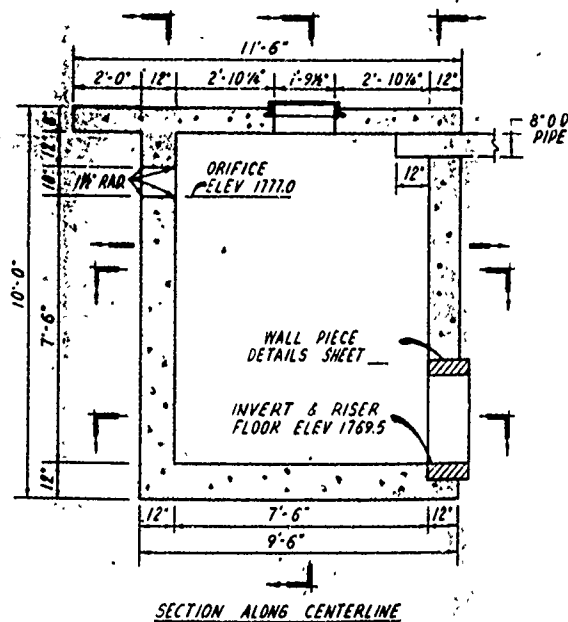
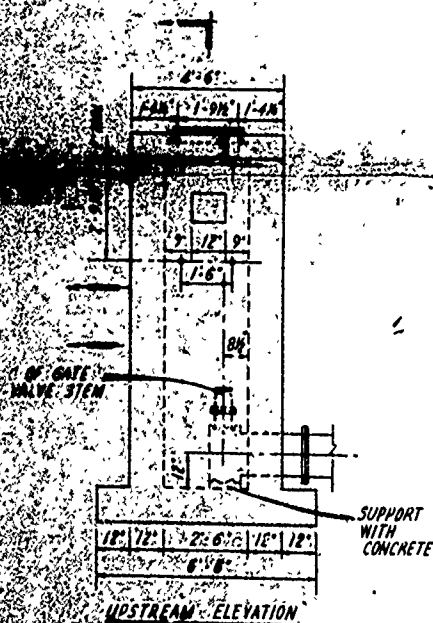
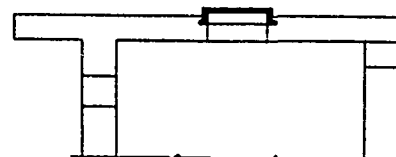
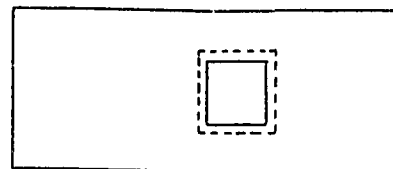


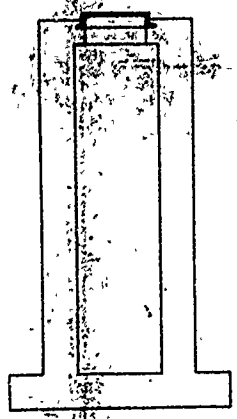
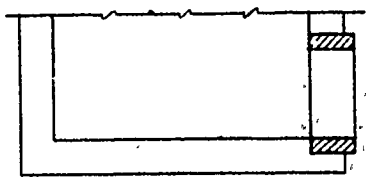
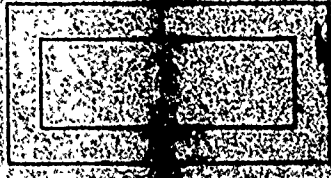
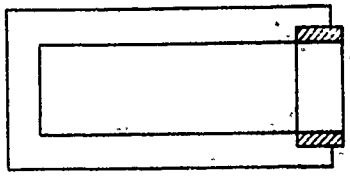
PIPE SLEEVE 6' LONG
7 1/2" I.D. DIAMETER
ACCORDING TO STEAM
PIPE CODE AND MANUFACTURER'S RECOMMENDATIONS

PLAN VIEW

12" GATE VALVE NOTES:

FULLY ADJUSTABLE SUPPORTING BRACKETS -
NUMBER REQUIRED - TYPE AND LOCATION ACCORDING
TO MANUFACTURER'S RECOMMENDATION
EXTENSION STEM LENGTH - 8.5'
12" DIA GATE VALVE - CRANE MODEL NO 791 -
FLANGED F.O.D. OR APPROVED EQUAL.
(CRANE CATALOG #53)





UNITED STATES
NAVY
OFFICE OF THE SECRETARY
WASHINGTON, D. C.

PA-0010
PLATE

C

APPENDIX F
GEOLOGIC REPORT

APPENDIX F

GEOLOGIC REPORT

Bedrock - Dam and Reservoir

Formation Name: Poplar Gap Member, Catskill Formation.

Lithology: Predominantly fine- to medium-grained, gray sandstones, locally conglomeratic. Some interbeds of red siltstone and shale. Sandstones are generally well cemented with quartz, but calcareous cement is present at the base of some beds.

Structure

The site is within the Pocono Plateau area and the beds are essentially horizontal. A dip of "5° in a N80°W direction" noted in the geologic report in the file is probably cross-bedding.

Air photo fracture traces trend: N10°W and E-W.

Overburden

The site is within the limits of Pleistocene glaciation and variable thicknesses of ground moraine and outwash sands and gravels are present. Outcrops are present at the left abutment, and test pits on the left side of the dam hit rock at two feet and four feet. Pits in the valley bottom and in the right abutment were five to 8.5 feet deep and did not hit bedrock. The material in the pits was mostly till composed of sandy silt or silty sand with gravel and boulders.

Aquifer Characteristics

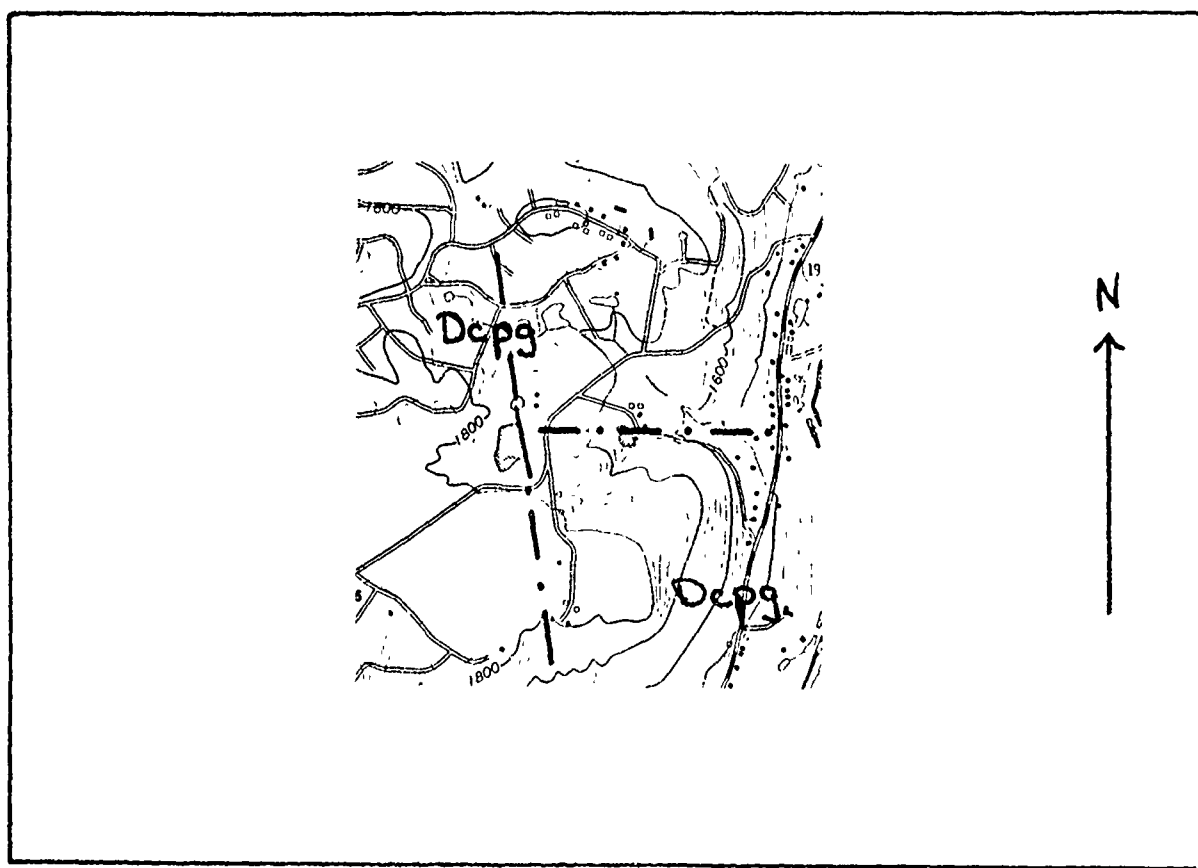
The rocks of the Catskill Formation are essentially impermeable, ground water movement is entirely along bedding planes and fractures. The most permeable aquifers in the area are the sands and gravels of glacial origin in the valleys. A bed of such sand and gravel was found at a depth of six to eight feet in a test pit near the center of the valley.

Discussion

When this dam is full there is a potential of some leakage along fractures in the bedrock, and in sand and gravel layers in the valley fill. However, it seems unlikely that such leakage would continue long enough to cause damage.

Sources of Information

1. Manuscript Geologic Map of the Newfoundland Quadrangle, in open file, Pa. Geological Survey, Harrisburg, Pa.
2. Geologic report, dated May 1960, by James Lauffer, in inspection file.
3. Air photographs, scale 1:40,000. Dated 1973.



Depg

Catskill fm. - Poplar Gap member

---•--- air photo fracture trace

