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NEW JERSEY DEPT OF ENVIRONMENTAL PROTECTION TRENTON --ETC F/G 13/13
NATIONAL DAM SAFETY PROGRAM. N. J. NO NAME DAM (NUMBER 55 NJ 00--ETC(U)
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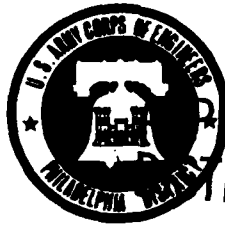
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DELAWARE RIVER BASIN
TRIBUTARY TO POPHANDUSING BROOK,
WARREN COUNTY
NEW JERSEY

AD A103763

N.J. NO NAME DAM
NO. 55
NJ 00815

PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



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DEPARTMENT OF THE ARMY

Philadelphia District
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Philadelphia, Pennsylvania

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. → page 2		



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DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE - 2 D & CHESTNUT STREETS
PHILADELPHIA PENNSYLVANIA 19106

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

31 AUG 1981

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Justification	
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Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for N.J. No. Name Dam No. 55 in Warren County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, N.J. No Name Dam No. 55, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in poor overall condition. The dam's spillway is considered inadequate because a flow equivalent to 3 percent of the Spillway Design Flood - SDF - would cause the dam to be overtopped. (The SDF, in this instance, is one half of the Probable Maximum Flood). To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures and studies within three months from the date of approval of this report. Within three months of the consultant's findings remedial measures to ensure spillway adequacy should be initiated.

b. Within three months from the date of approval of this report the owner should engage a qualified professional consultant to perform the following:

(1) Design and inspect the repairs to the downstream toe of the slope where erosion and sloughing have occurred owing to flowing water in Pophandusing Brook.

(2) Design a channel to reroute the flow of Pophandusing Brook away from the toe of the dam.

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Honorable Brendan T. Byrne

(3) Investigate the standing water and the soft, wet areas at the downstream toe of the dam and design and inspect the construction of appropriate remedial measures.

(4) Design and inspect the construction of erosion protection on the upstream slope of the dam.

(5) Design procedures for and inspect the removal of trees from the embankment.

(6) Design erosion protection for the upstream slope above the reservoir on the southwest side.

c. Within six months from the date of approval of this report the owner should engage a qualified professional consultant to evaluate the requirements for an outlet works and design and construct an appropriate outlet works to serve as a dewatering system.

d. Within six months from the date of approval of this report the following remedial measures should be initiated:

(1) Clear debris from the spillway discharge channel and maintain the channel free of debris.

(2) Institute a program to check the condition of the dam periodically.

(3) Clear brush and uncontrolled vegetation from the slopes of the dam and keep the slope free of all debris.

(4) Clear trees and brush for about 25 feet downstream from the toe of the dam and from the banks of the discharge channel for a distance of 100 feet downstream from the spillway or to the property line whichever is less.

(5) Backfill animal burrows.

e. The owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam, within one year from the date of approval of this report.

f. An emergency action plan and warning system should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency at the dam within six months from the date of approval of this report.

A copy of the report is being furnished to Mr. Dirk C. Holman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman Courter of the Thirteenth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Inspection Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,



ROGER L. BALDWIN
Lieutenant Colonel, Corps of Engineers
Commander and District Engineer

Incl
As stated

Copies furnished:

Mr. Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

Mr. John O'Dowd, Acting Chief
Bureau of Flood Plain Regulation
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

N.J. NO NAME DAM NO. 55 (NJ00815)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 21 April 1981 by Anderson-Nichols and Co. Inc., under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

N.J. No Name Dam No. 55, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in poor overall condition. The dam's spillway is considered inadequate because a flow equivalent to 3 percent of the Spillway Design Flood - SDF - would cause the dam to be overtopped. (The SDF, in this instance, is one half of the Probable Maximum Flood). To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. The spillway's adequacy should be determined by a qualified professional consultant engaged by the owner using more sophisticated methods, procedures and studies within three months from the date of approval of this report. Within three months of the consultant's findings remedial measures to ensure spillway adequacy should be initiated.

b. Within three months from the date of approval of this report the owner should engage a qualified professional consultant to perform the following:

(1) Design and inspect the repairs to the downstream toe of the slope where erosion and sloughing have occurred owing to flowing water in Pophandusing Brook.

(2) Design a channel to reroute the flow of Pophandusing Brook away from the toe of the dam.

(3) Investigate the standing water and the soft, wet areas at the downstream toe of the dam and design and inspect the construction of appropriate remedial measures.

(4) Design and inspect the construction of erosion protection on the upstream slope of the dam.

(5) Design procedures for and inspect the removal of trees from the embankment.

(6) Design erosion protection for the upstream slope above the reservoir on the southwest side.

c. Within six months from the date of approval of this report the owner should engage a qualified professional consultant to evaluate the requirements for an outlet works and design and construct an appropriate outlet works to serve as a dewatering system.

d. Within six months from the date of approval of this report the following remedial measures should be initiated:

(1) Clear debris from the spillway discharge channel and maintain the channel free of debris.

(2) Institute a program to check the condition of the dam periodically.

(3) Clear brush and uncontrolled vegetation from the slopes of the dam and keep the slope free of all debris.

(4) Clear trees and brush for about 25 feet downstream from the toe of the dam and from the banks of the discharge channel for a distance of 100 feet downstream from the spillway or to the property line whichever is less.

(5) Backfill animal burrows.

e. The owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam, within one year from the date of approval of this report.

f. An emergency action plan and warning system should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency at the dam within six months from the date of approval of this report.

APPROVED:



ROGER L. BALDWIN
Lieutenant Colonel, Corps of Engineers
Commander and District Engineer

DATE:

31 Aug 81

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	No Name Dam No. 55
Identification No.:	Fed ID No. NJ00815
State Located:	New Jersey
County Located:	Warren
Stream:	Tributary to Pophandusing Brook
River Basin:	Delaware
Date of Inspection	April 21, 1981

ASSESSMENT OF GENERAL CONDITIONS

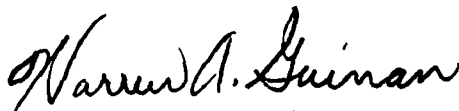
No Name Dam No. 55 is about 30 or more years old and is in poor overall condition. It is an earth embankment about 1,050 feet long, 33.5 feet high (structural height) that is essentially half-horseshoe shaped. It is small in size and is classified as significant hazard. Pohandusing Brook, flowing along about half the length of the dam has seriously eroded the downstream toe. Both standing water, wet and soft ground along the embankment, and extensive growth of wetlands type plants are indicative of seepage either through or under the dam. Trees and brush are growing on the crest and on both up and downstream slopes. The downstream slope also has numerous small erosion gullies. Although a 4-inch cast iron pipe was found at about the center of the dam at the downstream toe, no other evidence of a low-level outlet was noted; the purpose of this pipe could not be determined. A 20-foot wide, natural ground spillway section appears to have been dug at the left abutment. Debris has accumulated at the mouth and swampy type vegetation has grown up in the spillway. Trees and brush cover the downstream channel banks. The spillway will pass about 2.5 percent of the Spillway Design Flood inflow hydrograph, which is one-half the Probable Maximum Flood, without overtopping. Therefore, the spillway is considered inadequate.

The owner should engage a professional engineer qualified in the design and construction of dams to accomplish the following in the time periods specified. Starting soon: design and inspect the repairs to the downstream toe of the slope where erosion and sloughing have occurred owing to flowing water in Pophandusing Brook; design a channel to reroute the flow away from the toe of the dam; investigate the standing water and soft, wet areas of the downstream toe of the dam and design and inspect the construction of appropriate remedial measures; design and inspect the construction of erosion protection on the upstream slopes of the dam; design procedures for and inspect the removal of trees from the embankment; and design

erosion protection for the upstream slope above the reservoir on the southwest side. In the near future: further evaluate the hydrology and hydraulics of the watershed, reservoir, dam, and spillway, and design and implement necessary remedial measures, and at the same time evaluate the requirements for outlet works and design and construct appropriate outlet works to serve as a dewatering system; and backfill animal burrows.

It is further recommended that the owner accomplish the following tasks as part of operational and maintenance procedures. Beginning soon: clear debris from the spillway discharge channel and maintain the channel free of debris; check the condition of the dam periodically; clear brush and uncontrolled vegetation from the slopes of the dam and keep the slopes free of all debris; clear trees and brush for about 25 feet downstream from the toe of the dam and from the banks of the discharge channel for a distance of 100 feet downstream from the spillway or to the property line whichever is less. In the near future: develop an emergency action plan which outlines actions to be taken by the owner to minimize the downstream effects of an emergency at the dam. In the future: develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

ANDERSON-NICHOLS & COMPANY, INC.

A handwritten signature in cursive script, reading "Warren A. Guinan".

Warren A. Guinan, P.E.
Project Manager
New Jersey No. 16848



21 April 1981

OVERVIEW PHOTO

GO NAME #55 DAP

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. 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 reasonable possible storm runoff), or fractions thereof. 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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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY INSPECTION PROGRAM
NO NAME DAM NO. 55
FED ID NO. #NJ00815

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. Authority to perform the Phase I Safety Inspection of No Name Dam No. 55 was received from the State of New Jersey, Department of Environmental Protection, Division of Water Resources by letter dated 12 December 1980 under Basic Contract No. FPM-39 and Contract No. A01093 dated 10 October 1979. This Authority was given pursuant to the National Dam Inspection Act, Public Law 92-367 and by agreement between the State and the U.S. Army Engineers District, Philadelphia. The inspection discussed herein was performed by Anderson-Nichols & Company, Inc.

b. Purpose: The purpose of the Phase I Investigation is to develop an assessment of the general conditions with respect to the safety of No Name Dam No. 55 and appurtenances. Conclusions are based upon available data and visual inspection. The results of this study are to be used to determine any need for emergency measures and to conclude if additional studies, investigations, and analyses are necessary and warranted.

1.2 Project Description

a. Description of Dam and Appurtenances. No Name No. 55 is an earth embankment dam 33.5 feet high, 1050 feet long with the crest width ranging from 8 to 40 feet. The up-and downstream embankments have slopes of 1H:1.6V and 1.1H:1V, respectively. Both of the embankments and the dam crest are brush and tree covered. The spillway is a low area in the earth dam crest at the left abutment on the north side of the dam. The natural, uncontrolled spillway has extensive marshy vegetation. A 4-inch cast-iron pipe was found protruding from the downstream toe near the center of the dam.

b. Location. No. Name Dam No. 55 is located on a tributary stream to Pophandusing Brook in White Township, Warren County, New Jersey. The Dam is shown on U.S.G.S. Quandrangle, Belvidere, New Jersey - Pennsylvania, with approximate coordinates of N40°48.4' W75°02.6'. The dam may be reached by driving southwest on State Route 519 off of US route 46 at Bridgeville to Brass Castle Road, thence southeast through Hazen to the damsite 1/2 mile south. A location map has been included as Figure 3.

c. Size Classification. No Name Dam No. 55 is classified as being small in size on the basis of storage at the dam crest of 61 acre-feet, which is less than 1000 acre-feet but more than 50 acre-feet, and on the basis of its height of 33.5 feet, which is less than 40 feet but more than 25 feet, in accordance with criteria given in the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification. Visual inspection of No. Name No. 55 revealed a significant erosion along the right dam embankment adjacent to the tributary stream of Pophandusing Brook. A breach of the dam through this embankment is likely to flood Brass Castle Road, located about 0.5 miles downstream of the dam, causing appreciable damage to the roadway, bridge and adjacent properties; but few, if any, lives would be lost. Therefore, No Name No. 55 Dam should be classified as significant hazard.

e. Ownership. The Dam is owned by Mr. Robert L. Schumann, 126 Belvidere Avenue, Washington, New Jersey 07882.

f. Purpose of Dam. The original use of No Name No 55 was for irrigation of an adjacent orchard. Presently, the dam is not being used for this purpose; its purpose now was not disclosed.

g. Design and Construction History. No design or construction data pertinent to No Name Dam No. 55 were available.

h. Normal Operational Procedure. No operational procedures pertinent to No Name Dam No. 55 were available.

i. Site Geology. No site specific geologic information (such as borings) was available at the time the dam was inspected. Information derived from the Geologic Map of New Jersey (Lewis and Kummel, 1912) indicates that soils within the immediate site area consist of both stratified and nonstratified glacial deposits. No bedrock outcrops were observed during the dam inspection. This geologic map indicates that bedrock in the area consists of granitoid gneiss of Precambrian age.

1.3 Pertinent Data

a. Drainage Area

0.14 square miles

b. Discharge at Damsite (cfs)

Maximum flood at damsite - unknown

Total ungated spillway capacity at maximum elevation - 10

c. Elevation (ft. above NGVD)

Top of dam - 620.4

Design surcharge (SDF of 1/2 PMF) - 620.7

Recreation pool (at time of inspection) - 620.0

Spillway crest - 620.1

Streambed at centerline of spillway discharge channel (toe) - 592.8

Maximum tailwater (estimated) - 595.0
(at toe of dam)

d. Reservoir (feet)

Length of maximum pool - 900 (estimated)

Spillway crest - 900

e. Storage (acre-feet)

Spillway crest - 58

Design surcharge (1/2 PMF) - 84

Top of dam - 60

f. Reservoir Surface (acres)

Top of dam - 6.5

Spillway crest - 6.4

g. Dam

Type - earthfill

Length - 1050 feet

Height - 27.6 feet (hydraulic)

- 33.5 feet (structural)

Top width - Ranges from 8 to 40 feet

Side slopes - upstream 1H:1.6V, downstream 1.1H:1V

Zoning - unknown

Impervious core - unknown

Cutoff - unknown

Grout curtain - unknown

h. Spillway

Type - Earthen - Free Overflow

Length of weir - 20 feet

Crest elevation - 620.1 feet NGVD

Low level outlet - (A 4-inch CIP found; purpose unknown)

U/S Channel - Pond (unnamed)

D/S Channel - Tributary to Pophandusing Brook

SECTION 2
ENGINEERING DATA

2.1 Design

No original plans, hydraulic or hydrologic, or other engineering data for No Name Dam No. 55 were found.

2.2 Construction Highway

No data concerning the original construction of No Name Dam No. 55 were disclosed.

2.3 Operation

No data pertaining to the operation of the dam were found.

2.4 Evaluation

a. Availability. A search of the New Jersey Department of Environmental Protection Files and contact with representatives of the owner of the dam revealed no information.

b. Adequacy. Evaluation was based on visual observations; these were deemed adequate for this Phase I Study.

SECTION 3 VISUAL INSPECTION

3.1 Findings

a. Dam. Trees are growing on the crest of the dam, on the upstream and downstream slopes and in the area at the downstream toe of the dam. Considerable erosion has taken place on the upstream slope at and above the water line. Several large stones were observed on the upstream face near the right abutment. Roots of trees were observed extending from the upstream slope near the waterline toward the downstream edge of the crest.

The crest of the dam has a tall grass cover with a pedestrian path extending along the entire length. Several animal burrows were observed on the crest and along the downstream slope. Pophandusing Brook flows along the downstream toe for most of the distance from the right abutment to the middle of the dam. Considerable erosion and undercutting of the slope has resulted from its flow.

The downstream slope is uneven and numerous small erosion gullies and sloughs were observed.

b. Appurtenant Structures. The entrance to the ungated earth spillway is clogged with several fallen logs, debris and extensive vegetation. A 4-inch cast iron pipe was observed at the toe of the dam near the center. The purpose of the pipe could not be determined at the time of the visual inspection. No flow was observed from the pipe. Numerous large rocks and boulders were observed on the bottom of the discharge channel.

c. Reservoir Area. The watershed above the lake is steep to moderately sloping and wooded. Some open fields exist along the west side of the reservoir. Slopes on the shore of the lake appear stable. Some sedimentation was observed at the southwest slope into the reservoir; however, the water in most of the reservoir was relatively clear.

d. Downstream Channel. The channel meanders downstream from the spillway until it joins with Pophandusing Brook that flows along the right side of the dam. Trees and brush are growing within and on the banks of the channel downstream of the spillway. Pophandusing Brook flows northward toward Hazen through a very steep channel.

SECTION 4 OPERATIONAL PROCEDURES

4.1 Procedures

No formal operating procedures were revealed.

4.2 Maintenance of Dam

No formal maintenance procedures for the dam were found.

4.3 Maintenance of Operating Facilities

No formal maintenance procedures for the operating facilities were discovered.

4.4 Warning System

No description of any warning system was found.

4.5 Evaluation of Operational Adequacy

Because of the lack of operation and maintenance procedures, the remedial measures described in Section 7.2 should be implemented as described.

SECTION 5
HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data. Because no hydraulic/hydrologic data were disclosed an evaluation could not be performed.

b. Experience Data. No experience data were revealed.

c. Visual Observation. The uncontrolled natural earthen spillway is essentially a low area in the dam crest at the left abutment on the north side of the reservoir. The spillway contains extensive marshy vegetation as does the downstream discharge channel. Fallen logs and other debris have accumulated at the spillway entrance. Although a 4-inch cast-iron pipe was found protruding from the downstream toe near the center of the dam, no evidence was found of an upstream inlet or any controls for this pipe. Its small size suggests that it probably is not a low-level outlet. No other low-level outlets were noted.

d. No Name #55 Dam Overtopping Potential. The hydraulic/hydrologic evaluation for the dam is based on a selected Spillway-Design Flood (SDF) equal to one-half the Probable Maximum Flood (PMF) in accordance with the range of test floods given in the evaluation guidelines, for dams classified as significant hazard and small in size. The PMF was determined by application of the 24-hour Probable Maximum Precipitation (PMP) of 23.3 inches to the SCS dimensionless unit hydrograph. Hydrologic computations are given in Appendix 3.

Water will rise to a depth of 0.3 above the spillway crest before overtopping the low point on the dam embankment crest. Under this head, the spillway capacity is 10 cfs, which is less than the selected SDF.

Flood routing calculations indicate that No Name #55 Dam will be overtopped for 7.3 hours to a maximum depth of 0.3 foot under half-PMF conditions. It is estimated that the spillway can pass about 2.5 percent of the half-PMF inflow hydrograph without overtopping the dam; thus, the spillway is considered inadequate. Overtopping under one-half PMF conditions produces some flooding at the Brass Castle Road bridge about 0.5 miles downstream.

The routed half-PMF peak inflow to the reservoir is 418 cfs, the peak outflow is 409 cfs.

A breach analysis was performed to assess the downstream hazard under dam failure conditions. The results of the breach analysis, contained in Appendix 3, show that appreciable damage would probably occur to Brass Castle Road, the bridge over Pophandusing Brook, and adjacent properties. Because Brass Castle Road is the major ingress and egress road for several residences in the vicinity of Hazen and other outlying villages, loss of the road and bridge would create a hardship on the people in that area. Overtopping or breach of No Name No. 55 Dam, however, would result in the loss of few, if any, lives.

SECTION 6 STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations. The existence of standing water, wet and soft ground, and extensive wetlands type vegetation at the downstream toe of the dam is indicative of seepage either through or under the dam, which, if not properly controlled, could lead to failure of the dam by piping or sloughing of the downstream slope. Serious erosion along the downstream toe by flowing water from Pophandusing Brook could lead to extensive sloughing of the slope, and, if allowed to continue, eventual breaching of the embankment. Trees growing on the crest, and upstream and downstream slopes of the dam embankment may cause seepage and erosion problems if they are blown over and their roots are pulled out, if they die or, if they are cut and the roots are allowed to rot. Small erosion gullies on the downstream slope are susceptible to erosion by rainfall or by overtopping of the dam, and the erosion could, in turn, lead to breaching of the dam.

6.2 Design and Construction Data

No design or construction data pertinent to the structural stability of the dam are available.

6.3 Operating Records

No operating records pertinent to the structural stability of the dam are available.

6.4 Post-Construction Changes

No records of post-construction changes are available.

6.5 Seismic Stability

This dam is in Seismic Zone 1. According to the Recommended Guidelines, dams located in Seismic Zone 1 "may be assumed to present no hazard from earthquake provided static stability conditions are satisfactory and conventional safety margins exist." None of the visual observations made during the inspection are indicative of unstable slopes. However, because no data are available concerning the engineering properties of the embankment and foundation materials for this dam, it is not possible to make an engineering evaluation of the stability of the slopes or the factor of safety under static conditions.

SECTION 7
ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. No Name Dam No. 55 is estimated to be about 30 or more years old based on the size of trees on the downstream face, and is in poor condition.

b. Adequacy of Information. The information available is such that the assessment of the dam must be based on the results of the visual inspection.

c. Urgency. The recommendations made in 7.2.a and 7.2.b should be implemented by the owner as prescribed.

d. Necessity for Additional Data/Evaluation. The information available from the visual inspection is adequate to identify the potential problems which are listed in 7.2.a. These problems require the attention of a professional engineer who will have to make additional engineering studies to design or specify remedial measures to rectify the problems. If left unattended, the problems could lead to failure of the dam.

7.2 Recommendations/Remedial Measures

a. Recommendations. The owner should retain a professional engineer qualified in the design and construction of dams to accomplish the following in the time periods specified:

Soon:

1. Design and inspect the repairs to the downstream toe of the slope where erosion and sloughing have occurred owing to flowing water.
2. Design a channel to reroute the flow of Pophandusing Brook away from the toe of the dam.
3. Investigate the standing water and the soft, wet areas at the downstream toe of the dam and design and inspect the construction of appropriate remedial measures.
4. Design and inspect the construction of erosion protection on the upstream slope of the dam.

5. Design procedures for and inspect the removal of trees from the embankment.
6. Design erosion protection for the upstream slope above the reservoir on the southwest side.

In the near future:

- (1) Further evaluate the hydrology and hydraulics of the watershed, reservoir, dam, and spillway, and design and implement necessary remedial measures. Item (2) following should be considered in conjunction with this recommendation.
- (2) Evaluate the requirements for outlet works and design and construct appropriate outlet works to serve as a dewatering system.

b. Operating and Maintenance Procedures. The owner should undertake the following in the time periods specified:

Starting soon:

1. Clear debris from the spillway discharge channel and maintain the channel free of debris.
2. Check the condition of the dam periodically.
3. Clear brush and uncontrolled vegetation from the slopes of the dam and keep the slope free of all debris.
4. Clear trees and brush for about 25 feet downstream from the toe of the dam and from the banks of the discharge channel for a distance of 100 feet downstream from the spillway or to the property line whichever is less.

The owner should do the following:

In the near future:

Develop an emergency action plan which outlines actions to be taken by the owner to minimize the downstream effects of an emergency at the dam.

In the future:

Develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 0.14 square miles, steep
slopes, woods

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 620.1' NGVD
(58 acre feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): Not
applicable

ELEVATION TEST FLOOD POOL: 620.7' NGVD

ELEVATION TOP DAM: 620.4' NGVD

PRINCIPAL SPILLWAY CREST: Free overflow earthen
spillway

a. Elevation 620.1' NGVD

b. Type Earthen

c. Width 15 feet

d. Length 20 feet

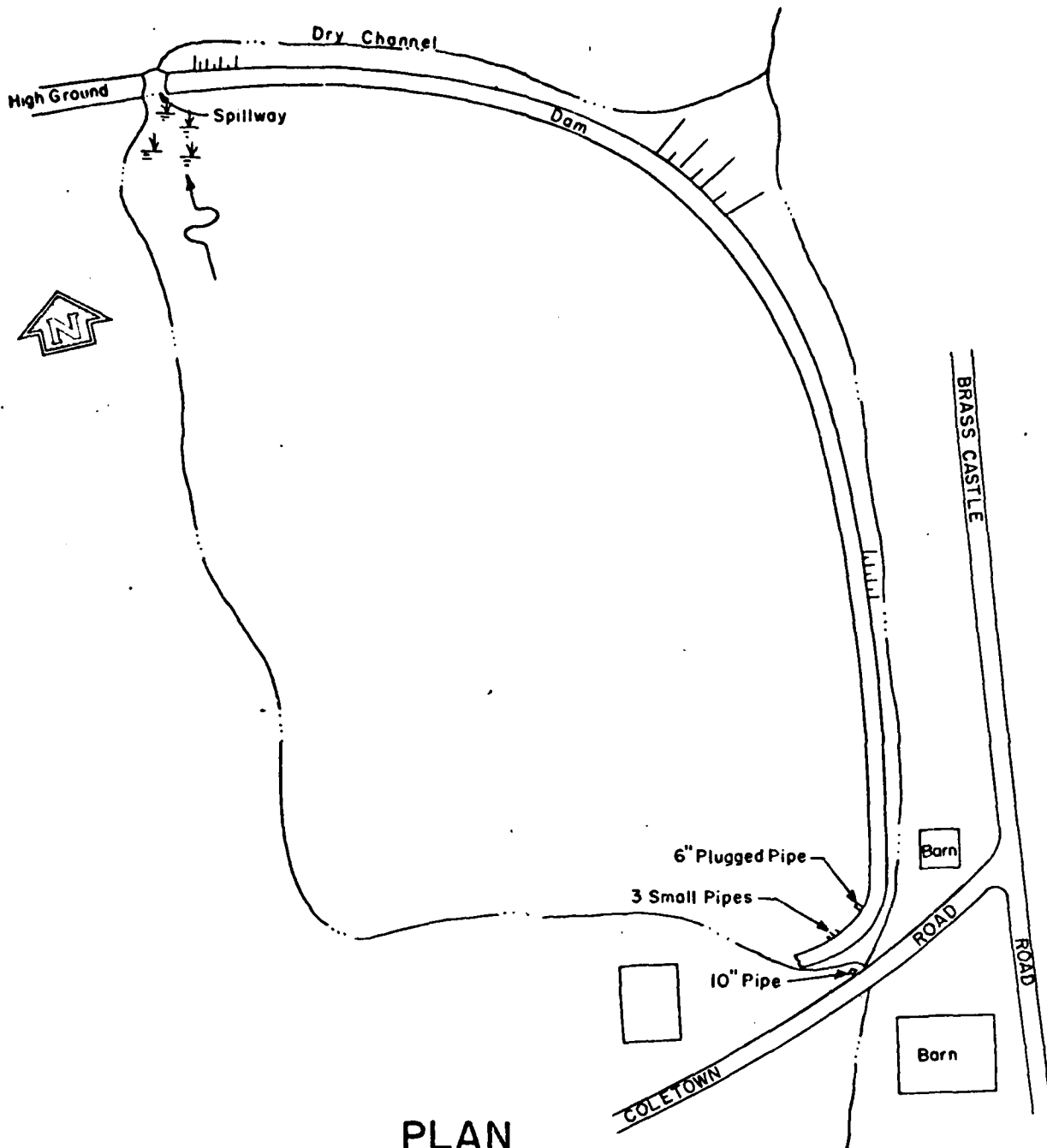
e. Location Spillover left of dam

f. Number and Type of Gates None

OUTLET WORKS: None

HYDROMETEOROLOGICAL GAGES: None

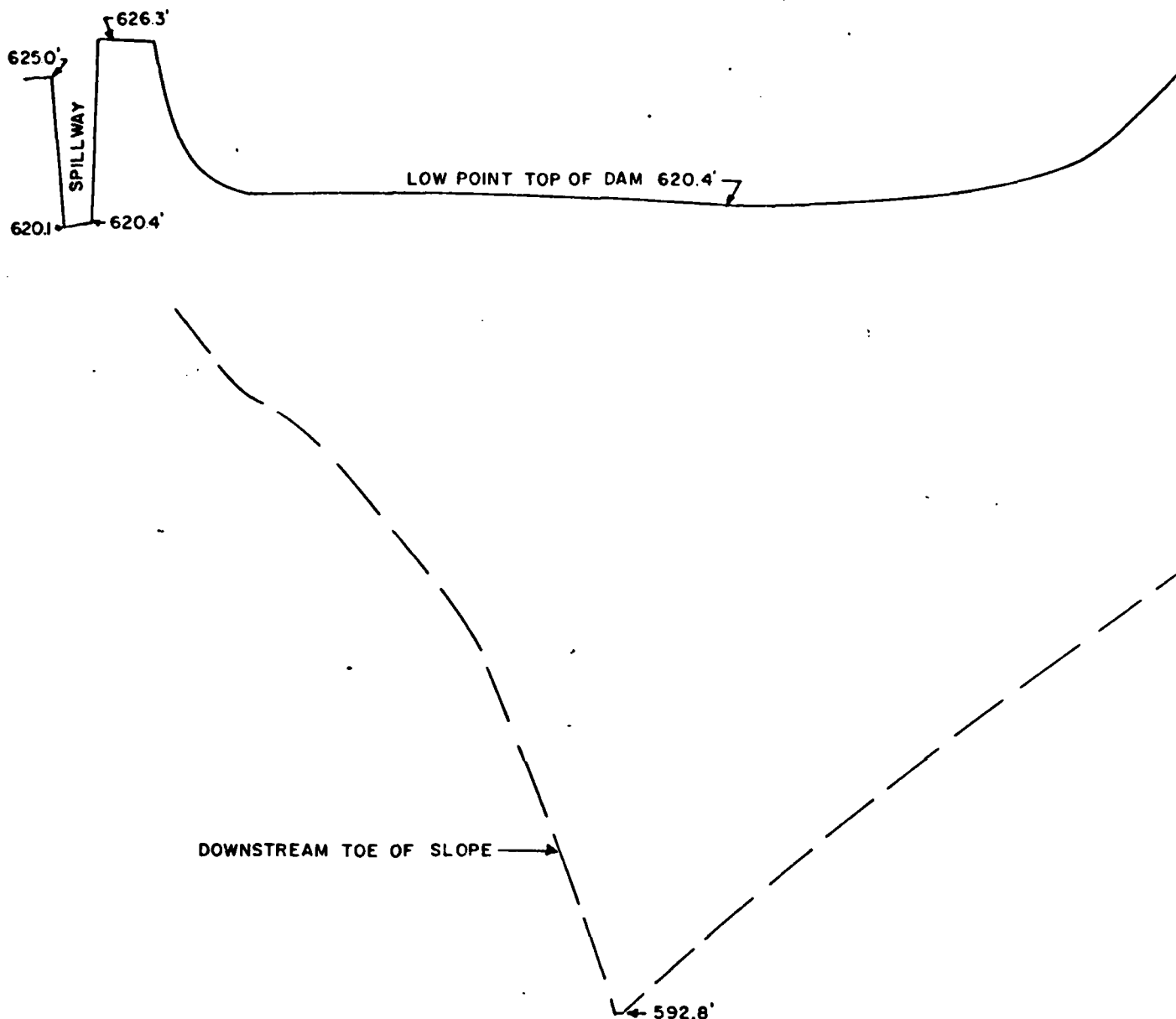
MAXIMUM NON-DAMAGING DISCHARGE: 10 cfs



PLAN

Anderson-Nichols & Co, Inc		U.S. ARMY ENGINEER DIST PHILADELPHIA	
BOSTON	MASSACHUSETTS	CORPS OF ENGINEERS PHILADELPHIA, PA	
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS			
NO NAME DAM No. 55			
TRIB. TO POPHANDUSING BROOK		NEW JERSEY	
		SCALE NOT TO SCALE	
		DATE MAY 1981	

FIGURE -1



ELEVATION (VIEW LOOKING D/S)

Anderson-Nichols & Co., Inc.		U.S. ARMY ENGINEER DIST PHILADELPHIA	
BOSTON		CORPS OF ENGINEERS	
MASSACHUSETTS		PHILADELPHIA, PA	
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS			
NO NAME DAM No. 55			
TRIB. TO POPHANDUSING BROOK		NEW JERSEY	
		SCALE NOT TO SCALE	
		DATE MAY 1981	

FIGURE-2



SCALE IN MILES



MAP BASED ON STATE OF NEW JERSEY
OFFICIAL MAP & GUIDE.

Anderson-Nichols & Co., Inc.

BOSTON

MASSACHUSETTS

U.S. ARMY ENGINEER DIST. PHILADELPHIA
CORPS OF ENGINEERS
PHILADELPHIA, PA.

NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS

NO NAME DAM No.55 LOCATION MAP

TRIB. TO POPOHANDUSING BROOK

NEW JERSEY

SCALE: 1" = 4 Miles Approx.

DATE: MAY 1981

FIGURE

APPENDIX 1
CHECK LIST
VISUAL INSPECTION
NO NAME DAM #55

Check List
Visual Inspection
Phase 1

Name Dam NJ No Name #55 (00815) County Warren State NJ Coordinators NJDEP
 Date(s) Inspection 4/21/81 Weather' Warm Temperature 70°
2/16/81 Fair 40°
 Pool Elevation at Time of Inspection 620 (est) NGVD Tailwater at Time of Inspection None NGVD

Inspection Personnel:

<u>Ken Stuart</u>	<u>Gilman</u>
<u>Claire Plaud</u>	<u>Guinan</u>
<u>David Deane</u>	<u>Murdock</u>

David Deane Recorder

Owner not present

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	N/A	
APPROACH CHANNEL	Poorly defined. Heavily laden with vegetation, clogged with weeds and mud.	Clear approach channel.
DISCHARGE CHANNEL	Clogged with brush and weeds Narrow muddy channel, approximately 1' deep by 8' wide. Meanders away from toe of dam.	Clear trees and brush on either side of discharge channel and downstream from the dam.
BRIDGE AND PIERS OVER SPILLWAY	N/A	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	NA	
INTAKE STRUCTURE	Not observed. No gate valve located.	Install gate and valve.
OUTLET PIPE	4" CIP at toe No gate or control valve visible.	Install gate and valve.
OUTLET CHANNEL	4" CIP drains into brook which parallels toe of dam along longest axis.	
EMERGENCY GATE	Not visible	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Significant amount of sloughing and erosion along downstream slope, partly result of flow along toe, also erosion along upstream face.	Repair erosion on dam.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Horizontal alignment good. Vertical alignment - Crest has evidence of slight un- dulation.	
RIPRAP FAILURES	No riprap evident on up- stream slope, some large block placed on upstream slope near right abutment.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
RAILINGS		
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Some erosion of slope at right abutment.	
ANY NOTICEABLE SEEPAGE	Moisture-loving vegeta- tion along most of the toe, some standing water visible.	Investigate seepage and de- sign appropriate remedial measures.
STAFF GAGE AND RECORDER	None apparent.	
DRAINS	None apparent.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Gradual slopes, open fields, heavily wooded in several areas.	
SEDIMENTATION	Significant sedimentation was observed on the southwest slope into the reservoir. The water was relatively clear.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Below dam is broad wooded area. Stream channel paralleling dam is quite steep.	
SLOPES	Moderate to steep hardwood stand.	
APPROXIMATE NO. OF HOMES AND POPULATION	Two homes about 8' above brook at Brass Castle Road bridge. Bridge would probably wash-out should flood wave reach roadway.	Significant hazard

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
PLAN OF DAM	None found
REGIONAL VICINITY MAP	Prepared for this report
CONSTRUCTION HISTORY	None found
TYPICAL SECTIONS OF DAM	None
HYDROLOGIC/HYDRAULIC DATA	None
OUTLETS - PLAN	None found
- DETAILS	None found
- CONSTRAINTS	None found
- DISCHARGE RATINGS	None found
RAINFALL/RESERVOIR RECORDS	None found

ITEM	REMARKS
DESIGN REPORTS	None found.
GEOLOGY REPORTS	None found
DESIGN COMPUTATIONS	
HYDROLOGY & HYDRAULICS	None found
DAM STABILITY	
SEEPAGE STUDIES	
MATERIALS INVESTIGATIONS	
BORING RECORDS	None found
LABORATORY	
FIELD	
POST-CONSTRUCTION SURVEYS OF DAM	None found
BORROW SOURCES	Unknown

REMARKS

ITEM

MONITORING SYSTEMS

None

MODIFICATIONS

None

HIGH POOL RECORDS

None

POST CONSTRUCTION ENGINEERING
STUDIES AND REPORTS

None

PRIOR ACCIDENTS OR FAILURE OF DAM
DESCRIPTION
REPORTS

None

MAINTENANCE
OPERATION
RECORDS

None

ITEMS	REMARKS
SPILLWAY PLAN	
SECTIONS	Prepared for this report from field inspection
DETAILS	None
OPERATING EQUIPMENT PLANS & DETAILS	
	None
	None

APPENDIX 2
PHOTOGRAPHS
NO NAME DAM #55



April 21, 1981

View of upstream face of dam. Note erosion.



April 21, 1981

View looking south along crest of dam embankment.



View looking southwest across reservoir from right dam abutment.

April 21, 1981



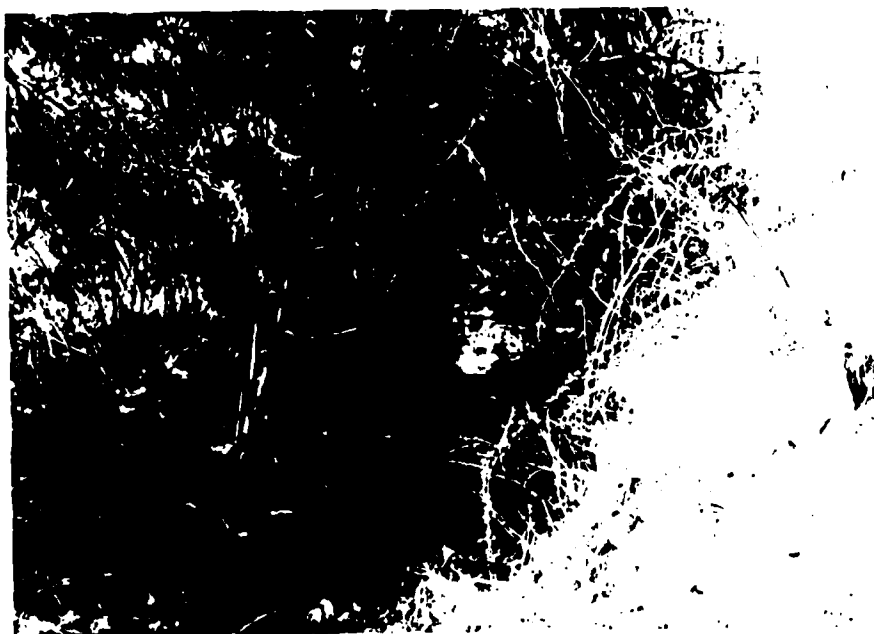
View of an example of erosion occurring on downstream slope as a result of flow along toe; top of escarpment is 4.5 feet down from the crest.

April 21, 1981



View of an animal burrow, 10 inches in diameter, 3.5 feet deep; located halfway down the dam embankment slope.

April 21, 1981



View of channel at the toe of dam looking north along right abutment.

April 21, 1981



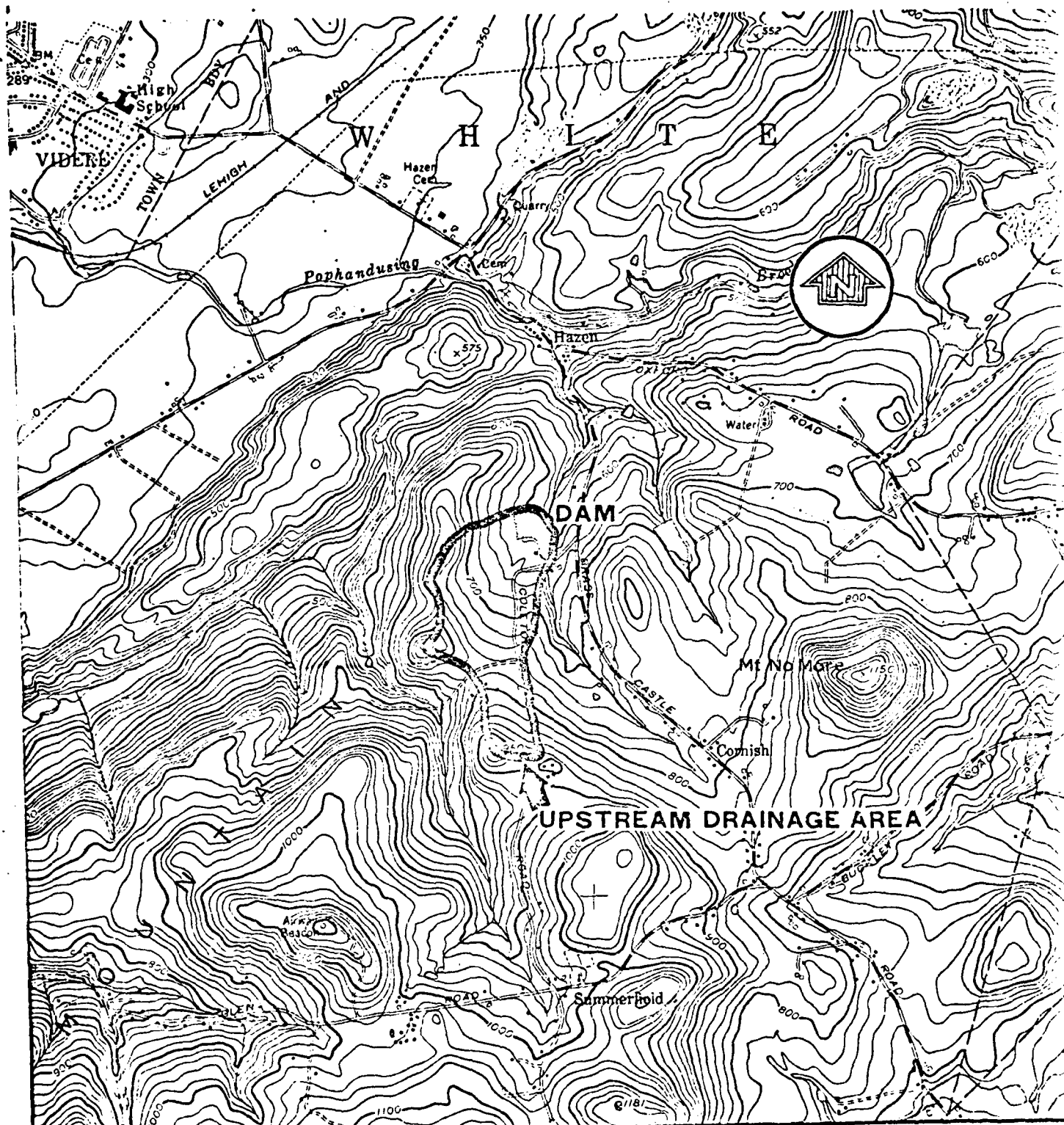
View of downstream slope of dam showing extensive vegetation, debris and sloughing.

April 21, 1981

APPENDIX 3

HYDROLOGIC COMPUTATIONS

NO NAME DAM #55



**NATIONAL PROGRAM OF INSPECTION OF
NON - FED. DAMS**

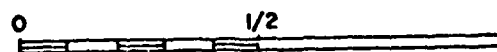
**NO NAME DAM No. 55
WHITE TOWNSHIP, NEW JERSEY
REGIONAL VICINITY MAP
MAY 1981**

**DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
PHILADELPHIA, PENNSYLVANIA**

Anderson-Nichols & Company, Inc.

BOSTON, MA.

SCALE IN MILES



**MAP BASED ON U.S.G.S. 7.5 MINUTE QUADRANGLE
SHEET BELVIDERE, N.J., PA. 1955, REVISED 1971.**

JOB NO. 3670-10

SQUARES 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
1/4" SCALEHYDROLOGIC COMPUTATIONS

NAME : NO NAME DAM #55

LOCATION : WARREN COUNTY, NJ

DRAINAGE AREA : 0.14 SQ. MI.

SURFACE AREA : 6.5 AC

EVALUATION CRITERIA :

SIZE : SMALL

HAZARD : SIGNIFICANT

SPILLWAY DESIGN FLOOD : 1/2 PMF

JOB NO. 3670-10SQUARES 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
1/4" SCALETIME OF CONCENTRATION① TEXAS HIGHWAY METHOD

OVERLAND ONLY - NO CHANNEL

$$\text{SLOPE} = \frac{950-620}{3400'} = 0.097 \text{ H/H}$$

AVE. VEL. THRU WOODS = 3.0 FPS

$$T_c = 3400' \div 3.0 \text{ FPS} \div 3600 \text{ sec/hr}$$

$$T_c = 0.32 \text{ hr}$$

② SOIL & WATER CONSERVATION

$$T_c = L/0.6$$

$$\text{WHERE: } L = \frac{10.8 (S+1)^{1.67}}{9000 Y^{0.5}} \quad S = \frac{1000}{CN} - 10$$

CN = 74 - WOODS

HYDRO. COND - GOOD TO POOR

HYDRO GROUP - C

$$S = \frac{1000}{74} - 10 = 3.51$$

$$L = 3400'$$

$$Y = 9.7\%$$

$$L = \frac{(3400)^{0.8} (3.51+1)^{1.67}}{9000 (9.7)^{0.5}} = 0.295$$

$$T_c = L/0.6 = 0.295/0.6 = 0.49 \text{ hr}$$

✓ FROM NOMOGRAPH SOLUTION - $L = 0.28 \text{ hr}$

JOB NO. 3670-10QUARES 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
4' SCALE③ FROM SCS TR #55

$$\text{SLOPE} = 9.7\%$$

GRND COVER - WOODS

FROM NOMOGRAPH: $V = 0.79 \text{ FPS}$

$$T_c = \frac{1}{3600(V)}$$

WHERE: $l = 3400'$

$$T_c = \frac{3400}{3600(0.79)}$$

$$T_c = 1.2 \text{ hr.}$$

④ KERBY METHOD

$$T_c = 0.83 \left(\frac{NL}{\sqrt{S}} \right)^{0.467}$$

WHERE: $N = 0.65$ - DECIDUOUS & CONIFER
TIMBERLAND

$$L = 3400'$$

$$S = 0.097 \text{ ft/ft}$$

$$T_c = 0.83 \left[\frac{0.65(3400)}{\sqrt{0.097}} \right]^{0.467}$$

$$T_c = 52.2 \text{ min OR } 0.87 \text{ hr}$$

$$T_{c \text{ AVE}} = \frac{0.32 + 0.49 + 1.2 + 0.87}{4} = 0.72 \text{ hr}$$

$$LAG = 0.6 T_c = 0.6(0.72)$$

$$LAG = 0.43 \text{ hr}$$

JOB NO. 3670-10

QUARES 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
1/4 IN. SCALE

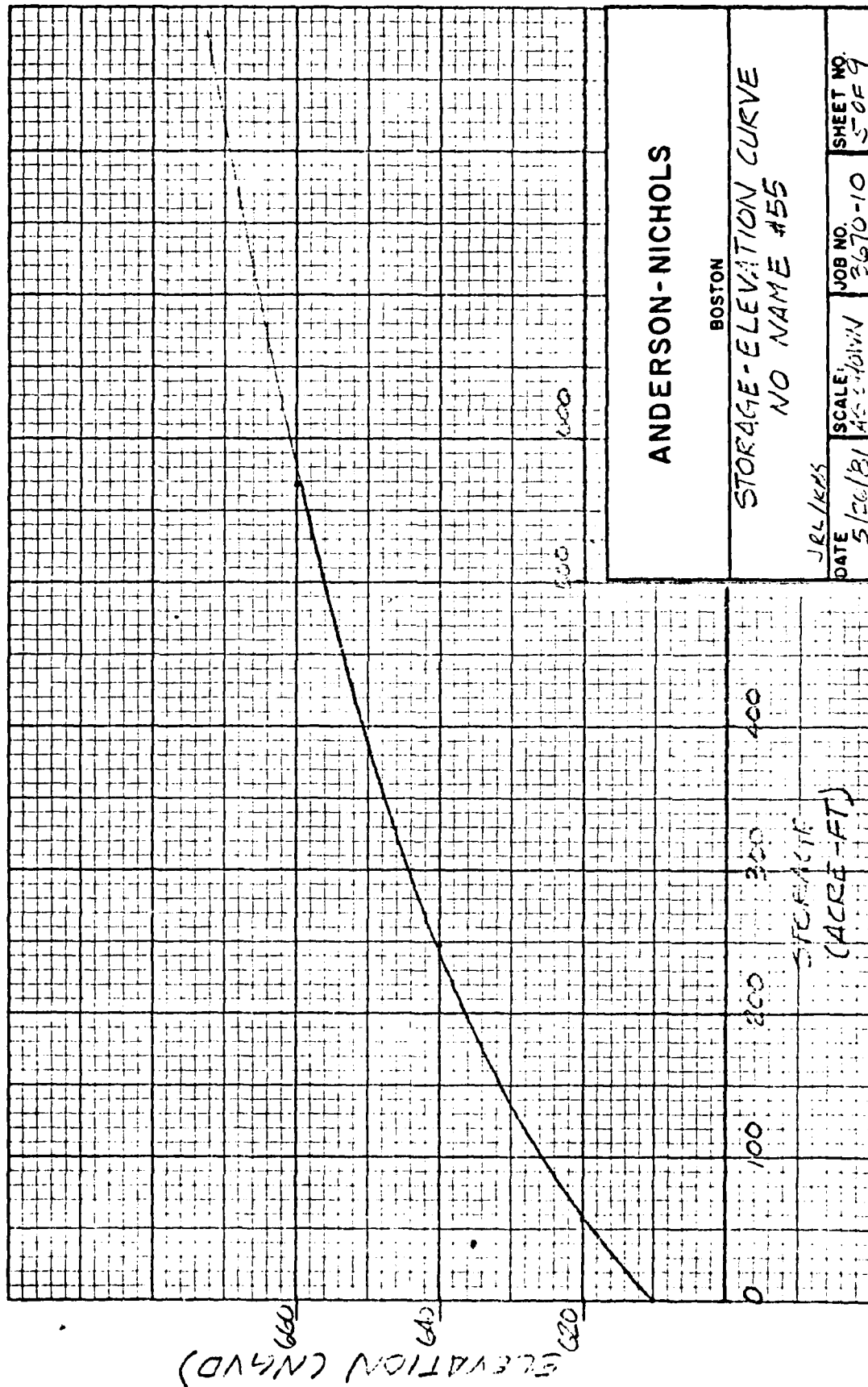
STORAGE - ELEVATION

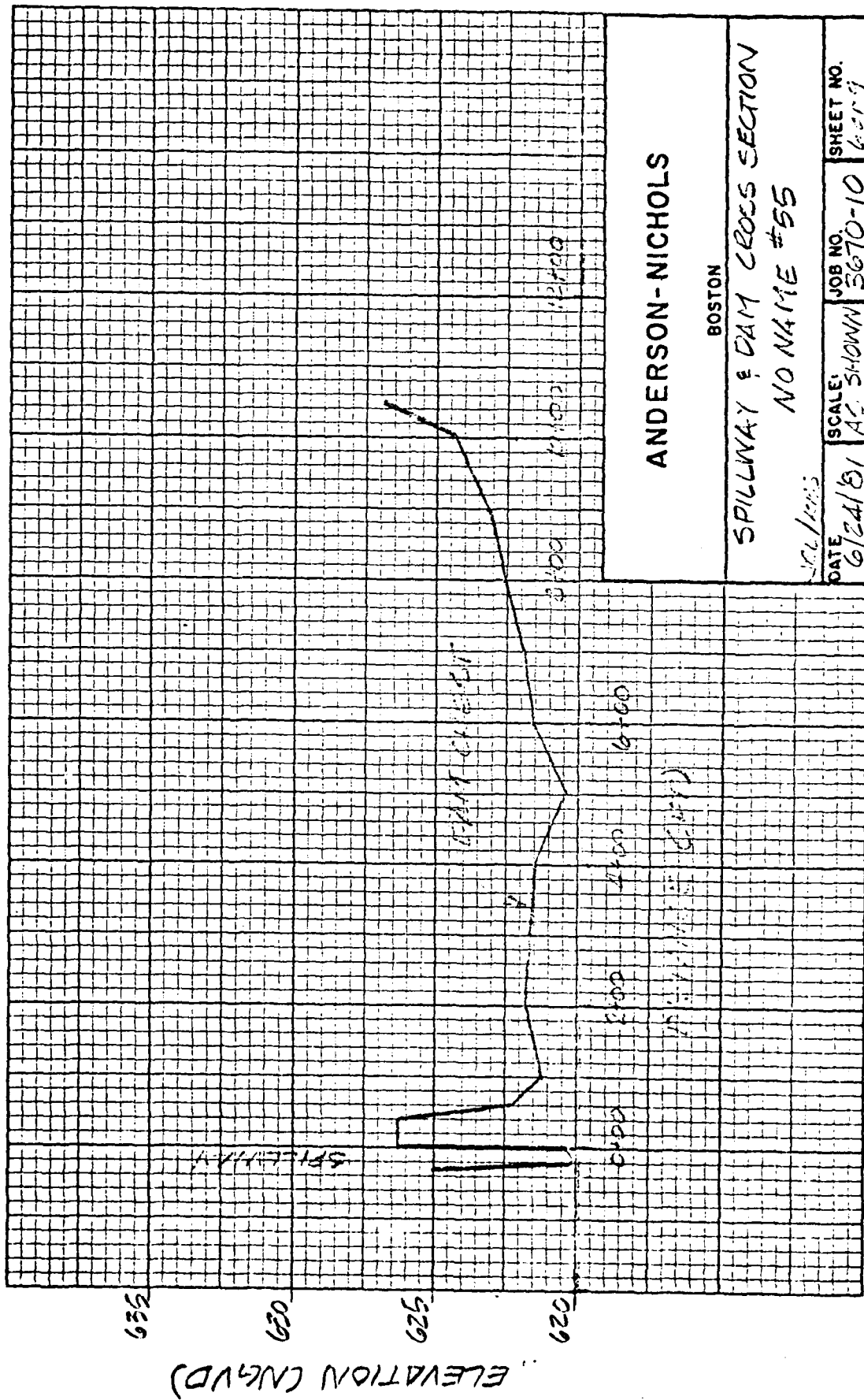
ELEVATION (NGVD)	HEAD (FT)	AREA (AC)	AVE. AREA (AC)	SPACE (AC-FT)
620.1		6.4		57.6
	20.1		9.6	
640.		12.8		249.6
	20.0		16.0	
660		19.2		569.6

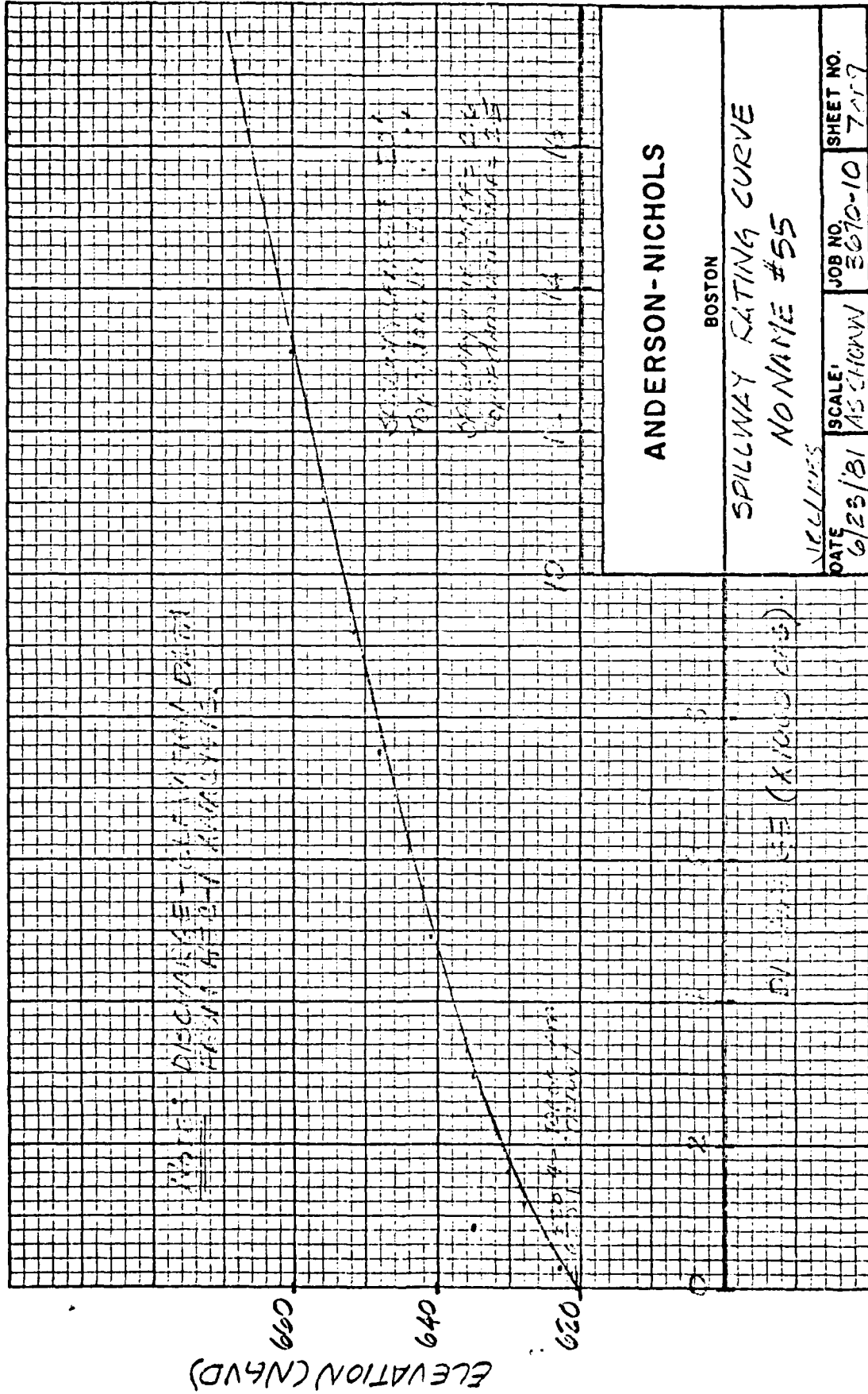
STORAGE INPUT FOR HEC-I ANALYSIS*

	<u>ELEV.</u>	<u>STORAGE (AC-FT)</u>
	610	0
SPILLWAY	620.1	58
TOP OF DAM	620.4	61
SPILLWAY ABUT. (C.T.)	625	94
SPILLWAY ABUT. (C.T.)	626.3	106
	640	250
	660	510

→ STORAGE VALUES FROM STORAGE-ELEVATION CURVE







DISTANCE (CFT)

7+00

6+00

5+00

4+00

3+00

2+00

460

ELEVATION (NGVD)

440

420

400

ELEVATION (NGVD)

420

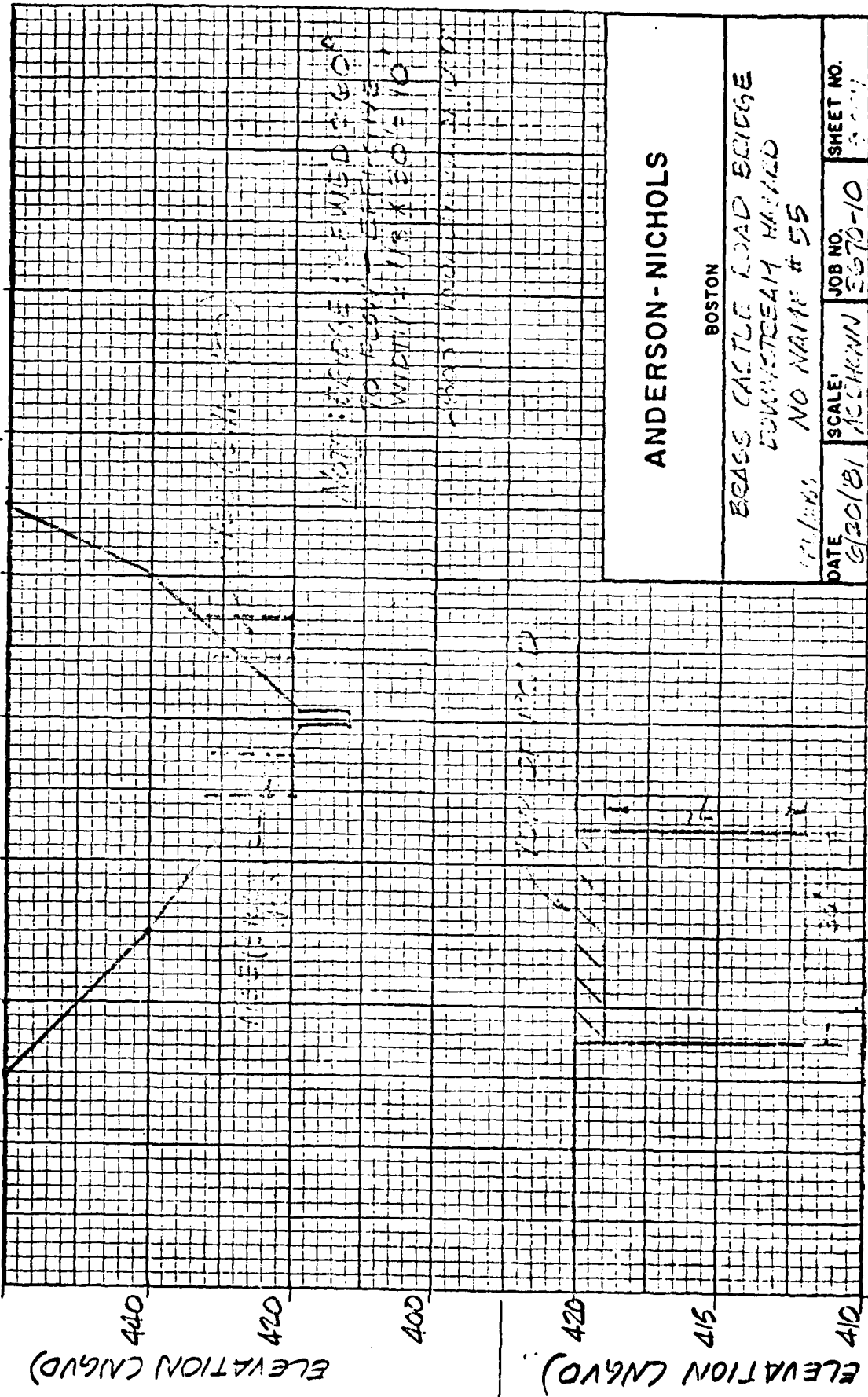
415

410

4+50

5+00

5+50

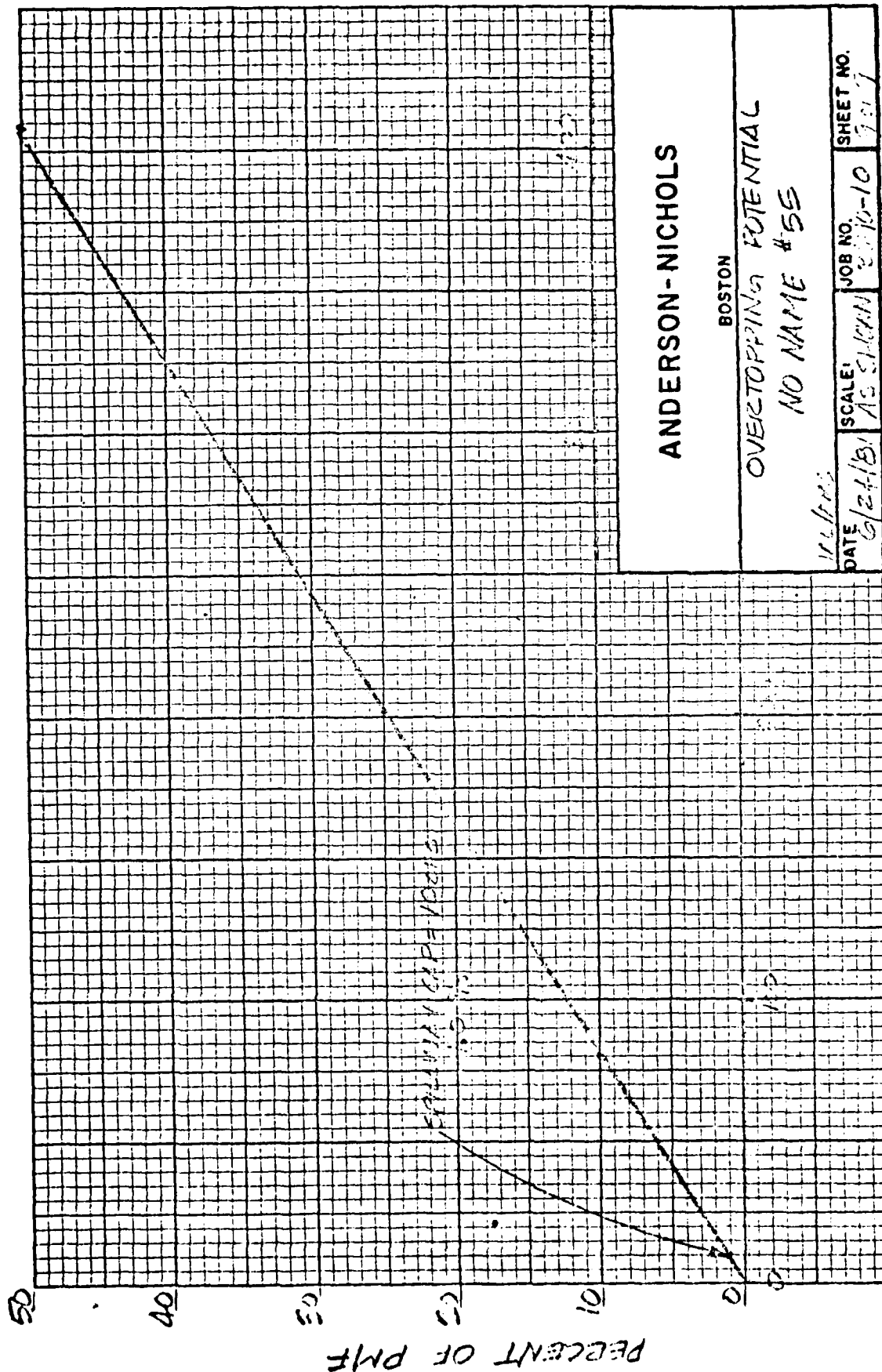


ANDERSON-NICHOLS

BOSTON

BRASS CASTLE ROAD BRIDGE
TOWNSTREAM HALL
NO NAME # 55

DATE	SCALE	JOB NO.	SHEET NO.
6/20/81	AS SHOWN	6670-10	5



APPENDIX 4

HEC-1 OUTPUT

OVERTOPPING AND BREACH ANALYSIS

NO NAME DAM #55

HFC-1 INPUT

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

ID NO NAME DAY NO. 55 OVERCIPPING ANALYSIS #45EL A-NCCO INC#4
 NEW JERSEY DAY NO. 015 ALBANY COUNTY WHITE TOWNSHIP
 0.10 0.25 0.5 MULTIPLES OF PMF FROM 24-HOUR FMP BREACH ANALYSIS

JR FLOW 0.1 0.25 0.5

KK A1 NC NAME #55
 KKA 0.14 0.25 0.5
 KAL 0.42 0.42 0.42
 KAD 0.43 0.43 0.43

NC 111 123 132

KK5 ROUTER INFLOW HYDROGRAPH THROUGH POND
 KKA 1 1 1
 KAL 2 2 2
 KAD 3 3 3

600 130 1 1 620.4

KK5 600 130 1 1 620.4

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 * U.S. ARMY CORPS OF ENGINEERS *
 * THE HYDROLOGIC ENGINEERING CENTER *
 * 609 SECOND STREET *
 * DAVIS, CALIFORNIA 95616 *
 * (916) 440-3285 (R (FIS) 449-3285) *

 * FLOOD HYDROGRAPH PACKAGE (HLC-1) *
 * FEBRUARY 1981 *
 * *
 * FLA. LATE06/25/91 TIME10.04.10 *

NO NAME DAM NO. 55 OVERTOPPING ANALYSIS #481 A-NEDD INC#4
 NEW JERSEY DAM NO. 815 WARREN COUNTY WHITE TOWNSHIP
 0.1,0.25,0.5 MULTIPLES OF PMF FROM 24-HOUR PMF BREACH ANALYSIS

 * IC OUTPUT CONTROL VARIABLES *
 * PRINT CONTROL *
 * PLOT CONTROL *
 * YES: HYDROGRAPH PLOT SCALE *
 * YES: PRINT DIAGNOSTIC MESSAGES *

 * IT HYDROGRAPH TIME DATA *
 * MINUTES IN COMPUTATION INTERVAL *
 * STARTING TIME *
 * ENDING TIME *
 * NUMBER OF HYDROGRAPH ORDINATES *
 * STARTING DATE *
 * ENDING DATE *

COMPUTATION INTERVAL 0.17 HOURS
 TOTAL TIME BASE 9.53 HOURS

 * ENGLISH UNITS *
 * CATCHMENT AREA SQUARE MILES *
 * PRECIPITATION DEPTH INCHES *
 * LENGTH, ELEVATION FEET *
 * STORAGE VOLUME CUBIC FEET PER SECOND *
 * SURFACE AREA ACRES *
 * TEMPERATURE DEGREES FAHRENHEIT *

* JP MULTI-PLAN OPTION 2 NUMBER OF PLANS

* JR MULTI-RATIO OPTION
 RATIOS OF RUNOFF 0.50
 C.10

 * KK *
 * A1 *
 * NO NAME #55 *

SCS UNIT HYDROGRAPH COMPUTATION-EXPONENTIAL LOSS RATE

SUBBASIN RUNOFF DATA

IC BA SUBBASIN CHARACTERISTICS
 AREA 0.14 SUBBASIN AREA

 * IF BASE FLOW CHARACTERISTICS *
 * INITIAL FLOW *
 * BEGIN BASE FLOW RECESSON *
 * RECESSON CONSTANT *

2. 11. 1944

PROBEABLE MAXIMUM	STICK
23.50	0.00
20.00	0.14
15.00	0.00

US
TRANS
NAMES
XEROX
QUESTIONS
REPLICATION
COLLECTION
EFFICIENT

PERCENT OF INDEX PRECIPITATION OCCURRING IN GIVEN TIME	
6-HR	123.0
12-HR	123.0
24-HR	132.0
48-HR	132.0
72-HR	132.0
96-HR	132.0

UNIFORM LOSS RATE
STOCK
CAPITAL

1.00 INITIAL LOSS RATE
1.00 UNIFORM LOSS RATE
0.00 PREVIOUS AREA

09 41
SEC DISINTEGRATION UNIT GRAPH

UNIT HYPOTHEGRAPH	15	500-OF-PERIOD	ORDINATES
29.	93.	132.	114.
30.	2.	1.	1.
31.	71.	9.	24.

14. 8. 5.

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HYDROGRAPH AT STATION A1

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MAXIMUM
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164

72-055-21-165

23.53-HR
21.953
1.64

CUMULATIVE AREA = 0.14 SC MI

GRAPH AT STATION =
PLAN I, KATIO =

[illegible]

FLUX FLUX -
(CFS) 416.
TIME
(HRS) : 00

(145-5753)
(CE5)
6-112

MAXIMUM	AVERAGE	FLOR
124.42	72.42	72.42
10.976	10.976	10.976

23.83-44
42.
10.076
24.82.

CUMULATIVE AREA = 0.1450 MI

PLAN 2 INPUT DATA FOR STATION - -- ALL ARE SAME AS FOR PLAN 1

 15 KK A2 *

 FCUTE INFLOW HYDROGRAPH THROUGH POND

HYDROGRAPH ROUTING DATA

16 RS STORAGE ROUTING
 STYPE 1 NUMBER OF SURREACHES
 ITPR 57.00 TYPE OF INITIAL CONDITION
 PSVRIC 0.0 INITIAL COEFFICIENT
 0.0 WORKING R AND D COEFFICIENT

17 SV STAGE 0.0 57.6 61.0 94.0 106.0 250.0 570.0
 18 SE ELEVATION 610.00 620.10 620.40 625.00 626.30 640.00 650.00

19 SS SPILLWAY
 CREL 620.10 SPILLWAY CREST ELEVATION
 SFWID 20.00 SPILLWAY WIDTH
 COWH 2.00 WEIR COEFFICIENT
 EXPN 1.50 EXPONENT OF HEAD

20 ST TOP OF DAM
 TPEL 620.40 ELEVATION AT TOP OF DAM
 COWID 900.00 DAM WIDTH
 COWH 2.00 WEIR COEFFICIENT
 EXPD 1.50 EXPONENT OF HEAD

21 SB BREACH DATA
 FLPM 601.00 ELEVATION AT BOTTOM OF BREACH
 FPMID 130.00 WIDTH OF BREACH BOTTOM
 1.00 SLOPE OF BREACH
 1.00 TYPE FOR BREACH TO DEVELOP
 600.00 W.S. ELEVATION TO TRIGGER FAILURE

COMPUTED PAVING CURVE

ELEVATION 610.00 620.10 620.40 625.00 626.30 640.00 650.00
 630.07 632.41 635.00 637.53 640.91 647.81 651.63
 623.18 624.53 625.13 625.69 627.08 627.68
 628.89 629.24 629.86 630.53 631.21 631.87
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16 SE ELEVATION 610.00 620.10 620.40 625.00 626.30 640.00 660.00

18 SS SPILLWAY CREST ELEVATION
SPILLWAY WIDTH
25% COEFFICIENT
EXPO. OF HEAD

20 ST TOP OF DAM
TOP OF DAM
DAM WIDTH
WEIR COEFFICIENT
EXPO. OF HEAD

22 SB BREACH DATA
ELEVATION AT BOTTOM OF BREACH
WIDTH OF BREACH SECTION
SLOPE
TIME FOR BREACH TO DEVELOP
W.S. ELEVATION TO TRIGGER FAILURE

COMPUTED RATING CURVE

ELEVATION	610.00	620.10	620.22	620.50	621.21	622.07	623.19	624.53	626.13	627.98
	630.07	632.41	635.00	637.83	640.91	644.24	647.81	651.63	655.69	660.00
OUTFLOW	0.0	2247.18	2.24	17.97	60.66	143.80	280.89	485.36	770.78	1150.55
	1638.18	0.0	2990.90	3883.13	4937.04	6166.23	7584.21	9204.47	11040.46	13105.60
STORAGE	0.0	57.60	55.00	62.38	66.80	72.98	80.93	90.65	104.47	123.67
	145.60	170.27	197.45	227.23	264.55	317.79	374.93	436.01	501.04	570.00
OUTFLOW	0.0	0.0	2090.86	3883.13	4937.04	6166.23	7584.21	9204.47	11040.46	13105.60

BREACH BOTTOM ELEVATION CHANGED TO LOWEST-RESERVOIR-ELEVATION = 610.00

REC'D DAM FAILURE AT 14.67 HOURS

PEAK FLOW (CFS) 405. TIME (HR) 16.17
 (CES) 147.2
 (INCHES) 9.762
 (AC-FT) 73.

MAXIMUM AVERAGE FLOW 72-HR 23.83-HR
 24-HR 40. 40.

PEAK STORAGE (AC-FT) 3. TIME (HR) 16.17
 6-HR 1.

MAXIMUM AVERAGE STORAGE 72-HR 0. 24-HR 0. 6-HR 1.

PEAK STAGE (FEET) 416.32 TIME (HR) 16.17
 6-HR 413.92
 24-HR 412.53
 72-HR 412.53

CUMULATIVE AREA = 0.14 SQ MI

PLAN 2 INPUT DATA FOR STATION A3 ARE SAME AS FOR PLAN 1
 ** WARPING ** MODIFIED PULS. ROUTING WILL BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 179. TO 476078.

HYDROGRAPH AT STATION A3
 PLAN 2, RATIO = 0.50

PLAN	HR	ORD	OUTFLOW	STORAGE	STAGE	DA	MON	HR	ORD	OUTFLOW	STORAGE	STAGE
1	1	1	0.0	0.0	412.0	0.0	0.0	0.0	97	230.0	2.55	415.7
2	2	2	0.0	0.0	412.0	0.0	0.0	0.0	98	331.0	2.7	416.0
3	3	3	0.0	0.0	412.0	0.0	0.0	0.0	99	364.0	2.7	416.0
4	4	4	0.0	0.0	412.0	0.0	0.0	0.0	100	365.0	2.7	416.0
5	5	5	0.0	0.0	412.0	0.0	0.0	0.0	101	267.0	2.1	415.0
6	6	6	0.0	0.0	412.0	0.0	0.0	0.0	102	264.0	1.8	414.0
7	7	7	0.0	0.0	412.0	0.0	0.0	0.0	103	175.0	1.0	413.0
8	8	8	0.0	0.0	412.0	0.0	0.0	0.0	104	176.0	1.0	413.0
9	9	9	0.0	0.0	412.0	0.0	0.0	0.0	105	135.0	1.0	413.0
10	10	10	0.0	0.0	412.0	0.0	0.0	0.0	106	135.0	1.0	413.0

PEAK FLOW AND STAGE (TIME-OF-PEAK) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
 FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
 TIME TO PEAK IN HOURS

DESIGNATION	STATION	AREA	PLAN	RATIO 1 0.10	RATIOS APPLIED TO FLOWS RATIO 2 0.25	RATIO 3 0.50
HYDROGRAPH AT	A1	0.14	1	94.00	209.00	414.00
			2	94.00	209.00	414.00
				16.00	16.00	16.00
CUTED TO	A2	0.14	1	30.00	201.00	409.00
			2	16.17	16.00	16.00
				16.17	16.23	16.23
				15.33	13.83	13.00
			** PEAK STAGES IN FEET **			
			1	620.59	620.59	620.71
			2	16.17	16.20	16.20
				620.41	620.44	620.42
				14.73	13.23	12.42
CUTED TO	A3	0.14	1	76.00	201.00	405.00
			2	16.17	16.17	16.17
				16.17	16.17	16.17
				15.33	13.83	13.00
			** PEAK STAGES IN FEET **			
			1	413.00	414.70	416.32
			2	16.17	16.17	16.17
				419.56	419.64	419.69
				15.33	13.83	13.00

SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION A2

PLAN 1

RATIO OF PPE	MAXIMUM RESERVOIR H.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
0.10	620.50	0.10	62.	409.	4.33	16.17	0.0
0.25	620.59	0.19	62.	201.	6.17	16.00	0.0
0.50	620.71	0.31	63.	409.	7.33	16.00	0.0

INITIAL VALUE
620.10
58.
0.

SPILLWAY CREST
620.10
58.
0.

TOP OF DAM
620.40
61.
9.

PLAN 2

RATIO OF PPE	MAXIMUM RESERVOIR H.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
0.10	620.41	0.01	61.	921.	0.27	15.27	14.67
0.25	620.44	0.04	61.	949.	0.31	13.77	13.17
0.50	620.42	0.02	61.	974.	0.29	12.94	12.33

INITIAL VALUE
620.10
58.
0.

SPILLWAY CREST
620.10
58.
0.

TOP OF DAM
620.40
61.
14282.

See APPENDIX END OF JOB ***

APPENDIX 5

REFERENCES

NO NAME DAM #55

APPENDIX 5
REFERENCES

NO NAME DAM NO. 55

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