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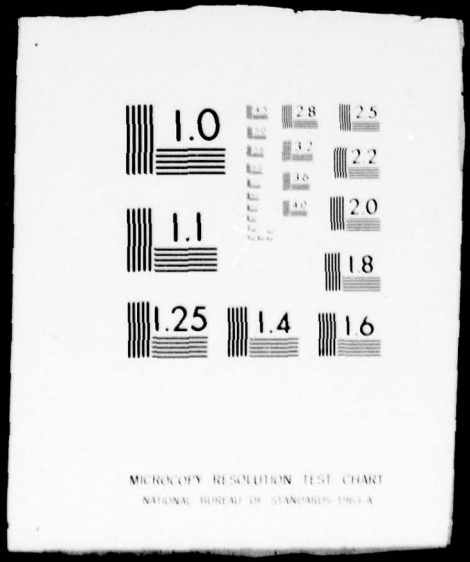
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PASSAIC RIVER BASIN
WHITE MEADOW BROOK
MORRIS COUNTY
NEW JERSEY

LEVEL III

MT. HOPE LAKE DAM

NJ 00464

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PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Mt. Hope Lake Dam (NJ-00464)
Passaic River Basin, White Meadow Brook,
Morris County, New Jersey.
Phase 1 Inspection Report.

(9) Final rept.

(15) DACW61-79-C-0011

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Mt. Hope Lake Dam
National Dam Inspection Act report

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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.

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

IN REPLY REFER TO
NAPEN-D

12 SEP 1979

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

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Mt. Hope Lake Dam in Morris 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, Mt. Hope Lake Dam, a high hazard potential structure, is judged to be in fair overall condition. The dam's spillway is considered inadequate since 77% of the Probable Maximum Flood would overtop the dam. To insure 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 six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980. In the interim, a detailed emergency operation plan and warning system should be promptly developed. Also, during periods of unusually heavy precipitation, around the clock surveillance should be provided.

b. Within six months from the date of approval of this report a program should be implemented to regularly observe seepage.

c. The steel grate walkway over the spillway should be repaired or replaced within three months from the date of approval of this report.

d. The following remedial actions should be completed within six months from the date of approval of this report:

(1) All trees and brush on the embankment should be removed and the dam surface should be properly stabilized.

(2) The concrete surface of the spillway should be repaired by properly grouting spalls and restoring deteriorated areas and coating with an epoxy sealant.

(3) Riprap on the upstream face of the embankment should be renovated to provide adequate uniform slope protection.

(4) The spillway downstream channel should be cleared of significant obstructions.

(5) The outlet works should be thoroughly inspected and renovated if necessary.

e. The owner of the dam should initiate a program of periodic inspection and maintenance, the complete records of which should be kept on file. A visual inspection of the dam and appurtenances should be made annually and reported on a standardized check-list form.

A copy of the report is being furnished to Mr. Dirk C. Hofman, 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 James A. 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.

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NAPEN-D
Honorable Brendan T. Byrne

An important aspect of the Dam Safety 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,

JAMES G. TON
Colonel, Corps of Engineers
District Engineer

1 Incl
As stated

Copies furnished:
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MT. HOPE LAKE DAM (NJ00464)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 2 May and 6 June 1979 by Storch Engineers, 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.

Mt. Hope Lake Dam, a high hazard potential structure, is judged to be in fair overall condition. The dam's spillway is considered inadequate since 77% of the Probable Maximum Flood would overtop the dam. To insure 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 six months from the date of approval of this report. Any remedial measures necessary to insure the adequacy of the spillway and to prevent overtopping should be initiated within calendar year 1980. In the interim, a detailed emergency operation plan and warning system should be promptly developed. Also, during periods of unusually heavy precipitation, around the clock surveillance should be provided.

b. Within six months from the date of approval of this report a program should be implemented to regularly observe seepage.

c. The steel grate walkway over the spillway should be repaired or replaced within three months from the date of approval of this report.

d. The following remedial actions should be completed within six months from the date of approval of this report:

(1) All trees and brush on the embankment should be removed and the dam surface should be properly stabilized.

(2) The concrete surface of the spillway should be repaired by properly grouting spalls and restoring deteriorated areas and coating with an epoxy sealant.

(3) Riprap on the upstream face of the embankment should be renovated to provide adequate uniform slope protection.

(4) The spillway downstream channel should be cleared of significant obstructions.

(5) The outlet works should be thoroughly inspected and renovated if necessary.

e. The owner of the dam should initiate a program of periodic inspection and maintenance, the complete records of which should be kept on file. A visual inspection of the dam and appurtenances should be made annually and reported on a standardized check-list form.

APPROVED: Jack Kobbeman LTC
JAMES G. TON
for Colonel, Corps of Engineers
District Engineer

DATE: 11 Apr 79

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Mt. Hope Lake Dam, NJ00464
State Located:	New Jersey
County Located:	Morris
Drainage Basin:	Passaic River
Stream:	White Meadow Brook
Dates of Inspection:	May 2, 1979; June 6, 1979

Assessment of General Condition of Dam

Based on visual inspections, past operational performance and Phase I engineering analyses, Mt. Hope Lake Dam is assessed as being in fair overall condition.

Hydraulic and hydrologic analyses indicate that the spillway is inadequate. The spillway is not capable of passing the designated Spillway Design Flood (SDF) without overtopping the dam. The SDF for Mt. Hope Lake Dam is equal to the Probable Maximum Flood (PMF). The spillway is capable of passing approximately 76 percent of the PMF.

Therefore, the owner should engage a qualified professional engineer in the near future to perform accurate hydraulic and hydrologic analyses relating to spillway capacity. Based on the findings of the analyses, remedial measures should be undertaken to prevent overtopping of the dam resulting from a storm equivalent to the SDF. In the interim, a detailed emergency operation plan and warning system should be promptly developed. Also during periods of unusually heavy precipitation, around the clock surveillance should be provided.

Three zones of seepage are present along the downstream toe of dam. Arrangments should be made soon to monitor the seepage on a monthly basis. The monitoring should be performed by a qualified professional engineer.

The condition of the steel grate walkway over the spillway is hazardous and the walkway should be repaired or replaced soon.

It is further recommended that the following measures be undertaken by the owner in the near future:

1) All trees and brush on the embankment should be removed and the dam surface should be properly stabilized.

2) The concrete surface of the spillway should be repaired by properly grouting spalls and restoring deteriorated areas and coating with an epoxy sealant.

3) Riprap on the upstream face of embankment should be renovated to provide adequate uniform slope protection.

4) The spillway downstream channel should be cleared of significant obstructions.

5) The outlet works should be thoroughly inspected and renovated if necessary.

The owner should, in the near future, implement a program of periodic inspection and maintenance for the dam. Repairs should be made as required and the following maintenance should be performed annually: remove adverse vegetation from the embankment, fill and sod any eroded

surfaces, repair riprap and clear the downstream channel. As part of the maintenance program, the lake should be lowered at least once every five years at which time the lake should be cleaned and normally submerged portions of the dam and spillway inspected and repaired.

Richard J. McDermott, P.E.

John E. Gribbin, P.E.



OVERVIEW - MOUNT HOPE LAKE DAM

2 MAY 1979

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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. 30214. 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 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 the unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. 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.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

MT. HOPE LAKE DAM, NJ00464

SECTION 1: PROJECT INFORMATION

1.1 General

A. Authority

Public Law 92-367, August 8, 1972 authorized the Secretary of the Army, through the Corps of Engineers to initiate a National Program of Dam Inspection throughout the United States. The Division of Water Resources of the New Jersey Department of Environmental Protection (NJDEP) in cooperation with the Philadelphia District of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the State of New Jersey. Storch Engineers has been retained by the NJDEP to inspect and report on a selected group of these dams. The NJDEP is under agreement with the Philadelphia District of the Corps of Engineers.

b. Purpose of Inspection

The visual inspections of Mt. Hope Lake Dam were made on May 2, 1979 and June 6, 1979. The purpose of the inspections was to make a general assessment of the structural integrity and operational adequacy of the dam structure and its appurtenances.

1.2 Description of Project

a. Description of Dam and Appurtenances

Mt. Hope Lake Dam is an earthfill dam with a free overflow concrete and timber weir spillway. The embankment is 1252 feet long with top width of 12 feet. The upstream and downstream faces have slopes of 2.5 horizontal to 1 vertical and 3 horizontal to 1 vertical, respecively. The embankment is generally covered with trees, brush and grass with a foot path located along the crest for its entire length. The upstream slope is protected by dumped riprap. No cut-off structure is shown within the dam on the original design drawing. The spillway is constructed for two staged operation. A primary crest, consisting of a 4-foot long timber flashboard, is located between two concrete weir sections comprising the secondary crest. The concrete secondary crest has a total length of 18 feet and an elevation of 797.0 (N.G.V.D.) while the primary crest is set at elevation 796.5. The overall spillway crest length is 22 feet. A steel grate pedestrian walkway spans the full length of the spillway. The bottom of the walkway is approximately 2.7 feet above the spillway crest.

The crest of dam is at elevation 802.0 and is 5.0 feet (measured vertically) above the secondary crest of the spillway. The maximum height of dam is 18 feet.

The outlet works consists of one 12-inch diameter cast iron pipe with a gate valve located near the discharge end. The outlet works pipe is located approximately 300 feet from the east end of the dam while the spillway is located at the west end of the dam.

b. Location

Mt. Hope Lake Dam is located in the Township of Rockaway, Morris County, New Jersey. Constructed across White Meadow Brook, the dam inpounds Mt. Hope Lake which is also known as Mill Pond. Principal access to the dam is by a local unpaved road.

c. Size and Hazard Classification

Size and Hazard Classification criteria presented in "Recommended Guidelines for Safety Inspection of Dams", published by the U.S. Army Corps of Engineers are as follows:

SIZE CLASSIFICATION

	Impoundment	
Category	Storage (Ac-ft)	Height (Ft)
Small	< 1000 and ≥ 50	< 40 and ≥ 25
Intermediate	≥ 1000 and $< 50,000$	≥ 40 and < 100
Large	$\geq 50,000$	≥ 100

HAZARD POTENTIAL CLASSIFICATION

Category	Loss of Life (Extent of Development)	Economic Loss (Extent of Development)
Low	None expected (no permanent structures for human habitation)	Minimal (Undeveloped to occasional structures or agriculture)
Significant	Few (No urban developments and no more than a small number of inhabitable structures)	Appreciable (Notable agriculture, industry or structures)
High	More than few	Excessive (Extensive community, industry or agriculture)

The following characteristics relating to size and downstream hazard for Mt. Hope Lake Dam have been obtained for this Phase I assessment:

Storage: 1953 acre-feet

Height: 18 feet

Potential Loss of Life:

Three houses are located 300 feet downstream from the outlet works. Dam failure due to overtopping could cause inundation of these structures to a depth of approximately 1 foot above first floor elevation resulting in the potential loss of more than a few lives. Four additional houses are located about 1000 feet downstream from the dam. These structures would be inundated to a lesser extent than would the houses nearer to the dam.

Potential Economic Loss:

Approximately seven houses could sustain water damage as a result of dam failure due to overtopping.

Therefore, Mt. Hope Lake Dam is classified as "Intermediate" size and "High" hazard potential.

d. Ownership

Mt. Hope Lake Dam is owned and operated by Halecrest Corp., Mt. Hope, New Jersey.

e. *Purpose of Dam*

The purpose of the dam is the impoundment of a lake used for recreation.

f. Design and Construction History

Mt. Hope Lake Dam was designed and constructed in 1944 by the J.G. White Engineering Company. Reportedly, it has not been altered or repaired since that time.

g. Normal Operational Procedures

The dam and appurtenances are maintained by the Halecrest Corp. through its subsidiary company, the Mt. Hope Mining Co. There is no fixed schedule of maintenance; repairs are made as the need arises.

Reportedly, the outlet works is kept in working condition although it has not been used to lower the lake since the dam was originally constructed.

1.3 Pertinent Data

a. Drainage Area	1.9 sq. mi.
b. Discharge at Dam Site	
Maximum known flood at dam site	Unknown
Outlet works at normal pool elevation	10 c.f.s.
Spillway capacity at top of dam	858 c.f.s.

c. Elevation (Feet above MSL)

Top of dam	802.0
Maximum pool-design surcharge	802.6
Recreation pool	797.0
Spillway crest - primary crest	796.5
- secondary crest	797.0
Stream bed at center line of dam	785.0
Maximum tailwater	801± (at spillway)

d. Reservoir

Length of maximum pool	5500 feet
Length of recreation pool	4900 feet

e. Storage (Acre-feet)

Recreation pool	633 acre-feet
Design Surcharge	2138 acre-feet
Top of Dam	1953 acre-feet

f. Reservoir Surface (Acres)

Top of dam	307 acres
Maximum pool	310 acres
Recreation pool	190 acres
Spillway crest	190 acres

g. Dam

Type	Earthfill
Length	1252 feet
Hydraulic height	18 feet
Side slopes - Upstream	3 horiz. to 1 vert.
- Downstream	2.5 horiz. to 1 vert.
Zoning	Unknown
Impervious core	Unknown
Cutoff	Unknown
Grout curtain	Unknown

h. Diversion and Regulating Tunnel — N.A.

i. Spillway

Type	Uncontrolled concrete weir
Length of weir - primary	4 feet
- secondary	18 feet
Crest elevation - primary	796.5
- secondary	797.0
Gates	N.A.
Approach channel	N.A.
Discharge channel	Concrete lined channel

j. Regulating outlets — 12" dia.cast iron pipe with gate valve

SECTION 2: ENGINEERING DATA

2.1 Design

No calculations or reports pertaining to the dam could be obtained. Construction drawings titled "Plan of Proposed Dam and Spillway" by the J.G. White Engineering Company, dated April 2, 1942, are available. The drawings include the following:

1. Plan of Dam with Topography
2. Profiles of Dam and Spillway
3. Sections of Dam and Spillway

2.2 Construction

No data or reports pertaining to the construction of the dam are available.

2.3 Operation

No records of operation of the lake or dam and no inspection reports subsequent to construction are available.

2.4 Evaluation

a. Availability

Available engineering information is limited to the construction plans by J.G. White Engineering Company, on file at Mt. Hope Mining Co.

b. Adequacy

The available engineering information forms a limited description of the subject dam and is considered to be of limited assistance in the performance of a Phase I evaluation. A list of absent information is included in paragraph 7.1.b.

c. Validity

The description of the spillway found on the construction drawings was found to be at variance with observations made during the inspections. Most other information contained on the construction drawings that could be verified is valid within a reasonable allowance for error.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

The inspections of Mt. Hope Lake Dam were performed on May 2, 1979 and June 6, 1979 by staff members of Storch Engineers. A copy of the visual inspection check list is contained in Appendix I. The following procedures were employed for the inspections:

1. The embankment of the dam, appurtenant structures and adjacent areas were examined.
2. The embankment and accessible appurtenant structures were measured and key elevations determined by surveyors level.
3. Key elevations of downstream channel, typical section and elevations of adjacent areas were determined by hand level.
4. The embankment, appurtenant structures and adjacent areas were photographed.

b. Dam

The horizontal alignment of the embankment appears to be in conformance with the construction drawings. The vertical alignment of the dam crest is generally level with some irregularity.

The crest of the embankment is partially covered with grass with a bare strip located along its center forming a foot path. Both the upstream and downstream slopes are thickly

wooded with trees and brush and a foot path is worn into the downstream slope at a point near the east end of dam. The upstream slope is protected by riprap along most of its length. The overall condition of the riprap is fair. Variations in the thickness of riprap along the dam were observed.

Adjacent to the downstream toe of embankment, along the west portion of the dam, a ditch or swale containing standing water was observed. The source of the water cannot be determined without further investigation. The swale possibly could have been excavated at the time of original construction to provide fill for the embankment.

Seepage was observed discharging as a trickle from the toe of embankment approximately 25 feet east of the outlet works at a point where a stream flowed prior to the construction of the dam. Orange colored deposits were noted at the discharge point. Two other zones of seepage were observed at the toe of embankment along the west portion of the dam. The seepage was manifest as orange deposits in the standing water.

The generalized soil description of the dam site consists of glacial terminal moraine overlying gneissic bedrock (Byram Gneiss) at or near the surface. The terminal moraine consists of an unassorted and heterogeneous mixture of materials, ranging in size from clay to boulders, deposited at the outer edge of the ice sheet during the Wisconsin stage of continental glaciation.

c. Appurtenant Structures

The concrete overflow section of the spillway is generally in fair condition. The upstream end of the east training wall is

severely spalled and at one location reinforcing rods are exposed. Spalling was also observed on the west training wall near the waterline. The concrete slab forming the spillway crest and apron appears to be in satisfactory condition. Riprap along the spillway section also appeared to be in satisfactory condition. The walkway over the spillway is constructed with a steel grate surface and one section of the grate is absent resulting in a hazardous condition.

The outlet works consists of a 12-inch cast iron pipe with a gate valve. The only component that can be observed is the cover of the steel gate valve casing. The cover which is locked and significantly rusted, did not appear to have been recently removed for gate operation.

d. Reservoir Area

Mt. Hope Lake is an irregularly shaped lake with a maximum width of approximately 4900 feet. The north shore is dominated by structures connected with the Mt. Hope Mining Company. Some homes are located along the west shore of the lake. The overall topography of the reservoir area is wooded with moderate to steep shores having an average grade of 10 percent.

e. Downstream Channel

The spillway discharges into a shallow and winding channel partially obstructed with trees, weeds, rocks and debris. The gradient of the channel increases with distance from the dam and the shape of the channel becomes better defined further downstream. Reportedly, prior to construction of the dam, two streams flowed through the area now occupied by Mt. Hope Lake. After construction, one stream became the spillway downstream channel and the bed of the other stream became the outlet works discharge channel.

SECTION 4: OPERATIONAL PROCEDURES

4.1 Procedures

The level of water in Mt. Hope Lake is regulated naturally by discharge over the spillway of the dam. The lake reportedly is never lowered for any purpose. Reportedly, the gate valve is not opened at times of severe storms to augment the capacity of the spillway.

4.2 Maintenance of the Dam

There is no program of regular inspection and maintenance of the dam and appurtenant structures. Maintenance is performed by the maintenance staff of the Mt. Hope Mining Co. on an "as needed" basis.

4.3 Maintenance of Operating Facilities

Maintenance of operating facilities is performed on an "as needed" basis. The gate valve of the outlet works reportedly is operated every year to confirm that it remains in working condition.

4.4 Description of Warning System

Reportedly, there is no warning system in use at the present time.

4.5 Evaluation of Operational Adequacy

The operation of the dam has been satisfactory to the extent that it has not been known to have overtopped since it was constructed in 1942.

Maintenance documentation is poor and the maintenance program for the dam appears to be insufficient in the following areas:

1. Trees and brush on embankment not removed.
2. Spalling of spillway training wall not repaired.
3. Accumulation of debris in downstream channel not removed.
4. Cover on gate valve casing allowed to rust excessively.
5. Absent section of steel grate on spillway walkway not replaced.
6. Wearing of downstream slope of embankment by pedestrians not corrected.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data

Size and hazard classification were used in conjunction with "Recommended Guidelines for Safety Inspection of Dams," published by the U.S. Army Corps of Engineers to establish the SDF (Spillway Design Flood) for Mt. Hope Lake Dam. The appropriate SDF range for this facility is the PMF (Probable Maximum Flood).

The inflow hydrograph for Mt. Hope Lake Dam was calculated using the Soil Conservation Service Triangular Unit Hydrograph with curvilinear transformation and the HEC-1-DB computer program. General hydrologic characteristics used in this method were computed using USGS quadrangles and aerial photographs. The drainage area contributing to Mt. Hope Lake is 1.9 square miles and most of the watershed is undeveloped. The SDF peak was computed to be 11,570 c.f.s.

Reservoir storage capacities were estimated using surface areas measured from USGS quadrangles. Discharge rates for the spillway were computed by the use of a weir formula appropriate for the configuration of its overflow sections. (See Appendix 4). The capacity of the spillway with water level equal to the top of dam was computed to be 858 c.f.s.

The SDF inflow hydrograph was routed through the spillway at Mt. Hope Lake Dam using the HEC-1-DB computer program. For routing analysis, the overall length of the dam with crest elevation at 802.0 (N.G.V.D.) was taken to be 1252 feet. The

routing indicated that the dam would be overtopped by the SDF. The overtopping, in a non-breach condition would occur for about 4.1 hours with a maximum flow height above the dam crest of approximately 0.6 foot and a maximum overall discharge of 2545 c.f.s. The spillway is capable of passing approximately 76 percent of the PMF with lake level equal to the crest of dam.

A breach analysis for the dam was performed using the HEC-1-DB computer program. The breach section was assumed to be located in the area of the outlet works which is the location of maximum height of dam. The analysis indicated that three homes located 300 feet downstream from the dam would be inundated to a depth of approximately 1 foot above their first floor elevation. Four additional homes located 1000 feet downstream from the dam would be inundated to a lesser extent.

The three homes 300 feet downstream from the dam are located along the outlet works discharge channel. Flow in this channel would not exceed 1000 c.f.s. during non-failure conditions since spillway discharge is conveyed by a separate channel. Such a magnitude of flow corresponds to a water level at the three homes approximately 2 feet below their first floor elevation.

Therefore, dam failure due to overtopping would increase downstream flow from a level 2 feet below the first floors of the three homes to a level 1 foot above these first floors. This analysis indicated that dam failure due to overtopping would significantly increase the hazard to loss of life downstream from the dam from that which would exist without overtopping failure.

However, the spillway is capable of passing more than 1/2 PMF with lake level equal to the crest of dam. Accordingly, the subject spillway is assessed as being inadequate in accordance with criteria developed by the U.S. Army Corps of Engineers.

b. Experience Data

Reportedly, Mt. Hope Lake Dam has never been overtopped since it was constructed.

c. Visual Observation

At the time of field inspection there was no evidence of recent overtopping to the dam.

d. Overtopping Potential

As indicated in paragraph 5.1.a, a storm of magnitude equal to the SDF would cause overtopping of the dam to a height of 0.6 foot in a non-breach condition. The spillway is capable of passing approximately 76 percent of the PMF (or SDF) with lake level equal to the crest of dam.

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

The embankment appeared at the time of inspection, to be outwardly structurally stable with no evidence of cracks or displacement. However, the visual inspection disclosed three zones of seepage which are described in paragraph 3.1.b. An accurate determination of the severity of the seepage cannot be made without further investigation beyond the scope of a Phase I inspection.

b. Design and Construction Data

Analysis of structural stability and construction data for the embankment and spillway structure are not available.

c. Operating Records

No operating records for the dam are available. A water elevation gage is located near the spillway, but readings have not been recorded since the dam was originally constructed. The water level of Mt. Hope Lake is not presently monitored.

d. Post Construction Changes

Since Mt. Hope Lake Dam was constructed in 1944, no changes or repairs to the dam have been made.

e. Seismic Stability

Mt. Hope Lake Dam is located in Seismic Zone 1 as defined in "Recommended Guidelines for Safety Inspection of Dams" which is a zone of very low seismic activity. Experience indicates that dams in Seismic Zone 1 will have adequate stability under seismic loading conditions if stable under static loading conditions. Mt. Hope Lake Dam appeared to be outwardly stable under static loading conditions at the time of inspection.

SECTION 7: ASSESSMENT AND RECOMMENDATION

7.1 Dam Assessment

a. Safety

Based on hydraulic and hydrologic analyses outlined in Section 5 and Appendix 4, the spillway of Mt. Hope Lake Dam is assessed as being inadequate. The spillway is not able to pass the SDF without an overtopping of the dam.

The dam appeared, at the time of inspection, to be outwardly structurally stable. The seepage is not considered to be an immediate indication of instability. No reported nor written evidence was found that would contradict this assessment.

b. Adequacy of Information

Information sources for this study include: 1) field inspections, 2) plans prepared by the J.G. White Engineering Corp. 3) USGS quadrangle, 4) aerial photograph from Morris County, 5) Consultation with the mine superintendent of Halecrest Corp.

The informaton obtained is sufficient to allow a Phase I assessment as outlined in "Recommended Guidelines for Safety Inspection of Dams."

Some of the absent data are as follows:

1. Stream and lake elevation gaging records.
2. Maintenance documentation.
3. Structural and hydraulic design computations and reports.
4. Soils report for the site.
5. Seepage analysis and report.

c. Necessity for Additional Data/Evaluation

Additional evaluation is considered necessary in order to assess the effect of the observed seepage on the structural integrity of the dam. The evaluation should be based on monitoring of seepage as outlined in paragraph 7.2.c.

7.2 Recommendations

a. Remedial Measures

Based on hydraulic and hydrologic analyses outlined in paragraph 5.1.a and Appendix 4 the spillway is assessed as being inadequate. Therefore, it is recommended that a qualified professional engineer be engaged in the near future to perform more accurate hydraulic and hydrologic analyses relating to the spillway capacity. The analyses should more accurately determine runoff characteristics of the drainage basin and the downstream channel capacity.

Based on the findings of these analyses, the dam and spillway should be modified to prevent overtopping of the dam resulting from a storm equivalent to the SDF. In the interim, a detailed emergency operation plan and warning system should be promptly developed. Also, during periods of unusually heavy precipitation, around the clock surveillance should be provided.

In addition to the above, it is recommended that the steel grate walkway over the spillway should be repaired or replaced soon.

It is further recommended that the following measures be undertaken by the owner in the near future:

1) All trees and brush on the embankment should be removed and the dam surface should be properly stabilized.

2) The concrete surface of the spillway should be repaired by properly grouting spalls and restoring deteriorated areas and coating with an epoxy sealant.

3) Riprap on the upstream face of embankment should be renovated to provide adequate uniform slope protection.

4) The spillway downstream channel should be cleared of significant obstructions.

5) The outlet works should be thoroughly inspected and renovated if necessary.

The implementation of the above remedial measures will require proper detailed studies and design and the obtaining of applicable NJDEP approvals.

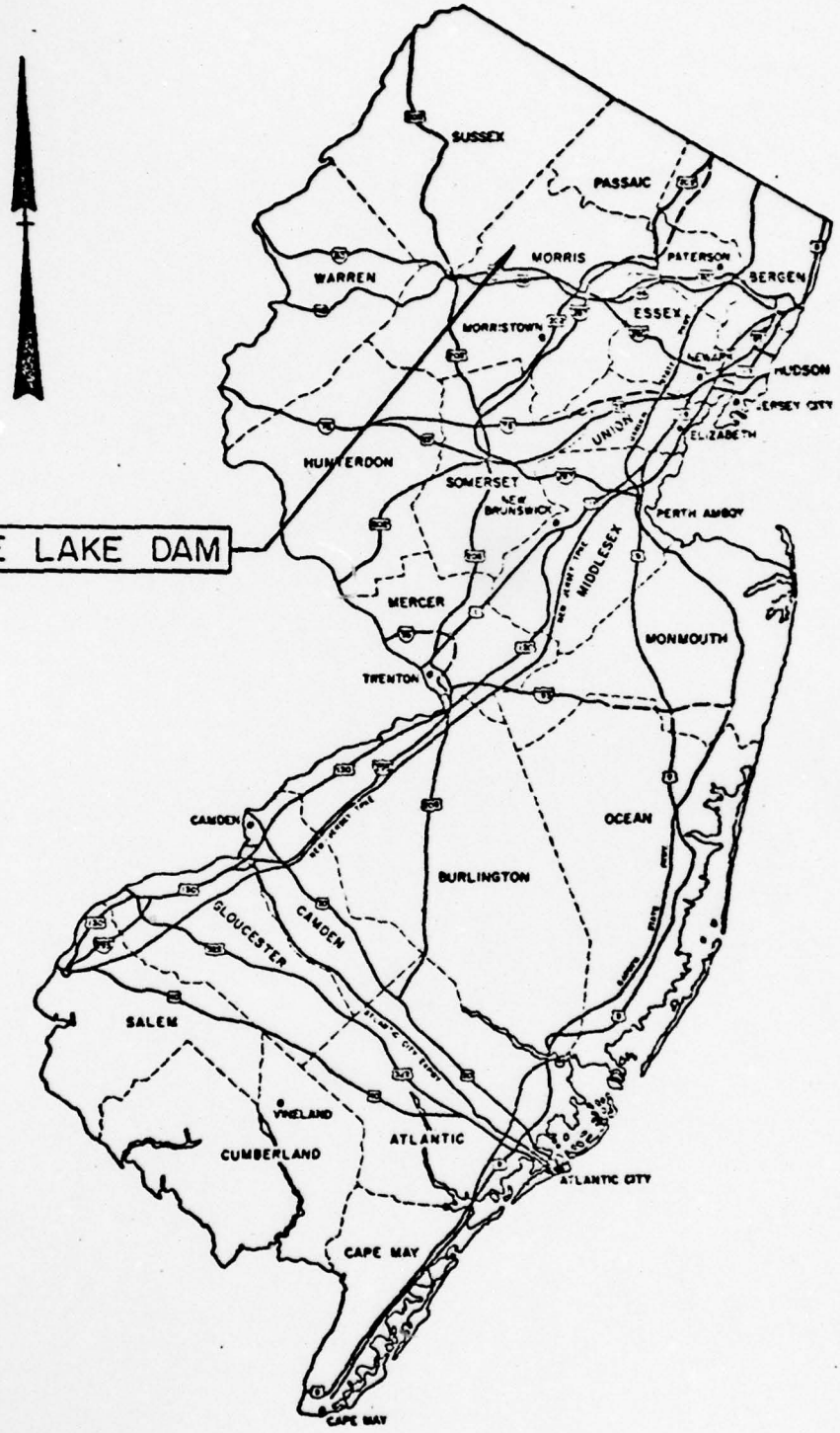
b. Maintenance

The owner of the dam should initiate, in the near future, a program of periodic inspection and maintenance, the complete records of which to be kept on file and made available to the public. A visual inspection of the dam and appurtenances by a qualified professional engineer should be made annually and reported on a standardized check-list form. Repairs should be made as required and the following maintenance should be performed annually: remove adverse vegetation from the embankment, fill and sod any eroded surfaces of the embankment, repair riprap and clear the downstream channel. In addition, the lake should be lowered at least once every five years at which time the lake should be cleaned and the normally submerged portions of the dam and spillway inspected and repaired.

c. Additional Studies

Arrangements should be made soon to monitor the seepage by visual observation. If necessary, measurements should be made by the use of appropriate instrumentation. Standing water in the swale adjacent to the west portion of the dam should be drained prior to performance of the monitoring. The monitoring should be performed on a monthly basis by a qualified professional engineer and included in the permanent records mentioned in paragraph 7.2.b.

PLATES



MOUNT HOPE LAKE DAM

PLATE 1

STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY

DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

KEY MAP

MOUNT HOPE LAKE DAM

I.D. N.J. 00464

SCALE: NONE

DATE: MAY, 1979

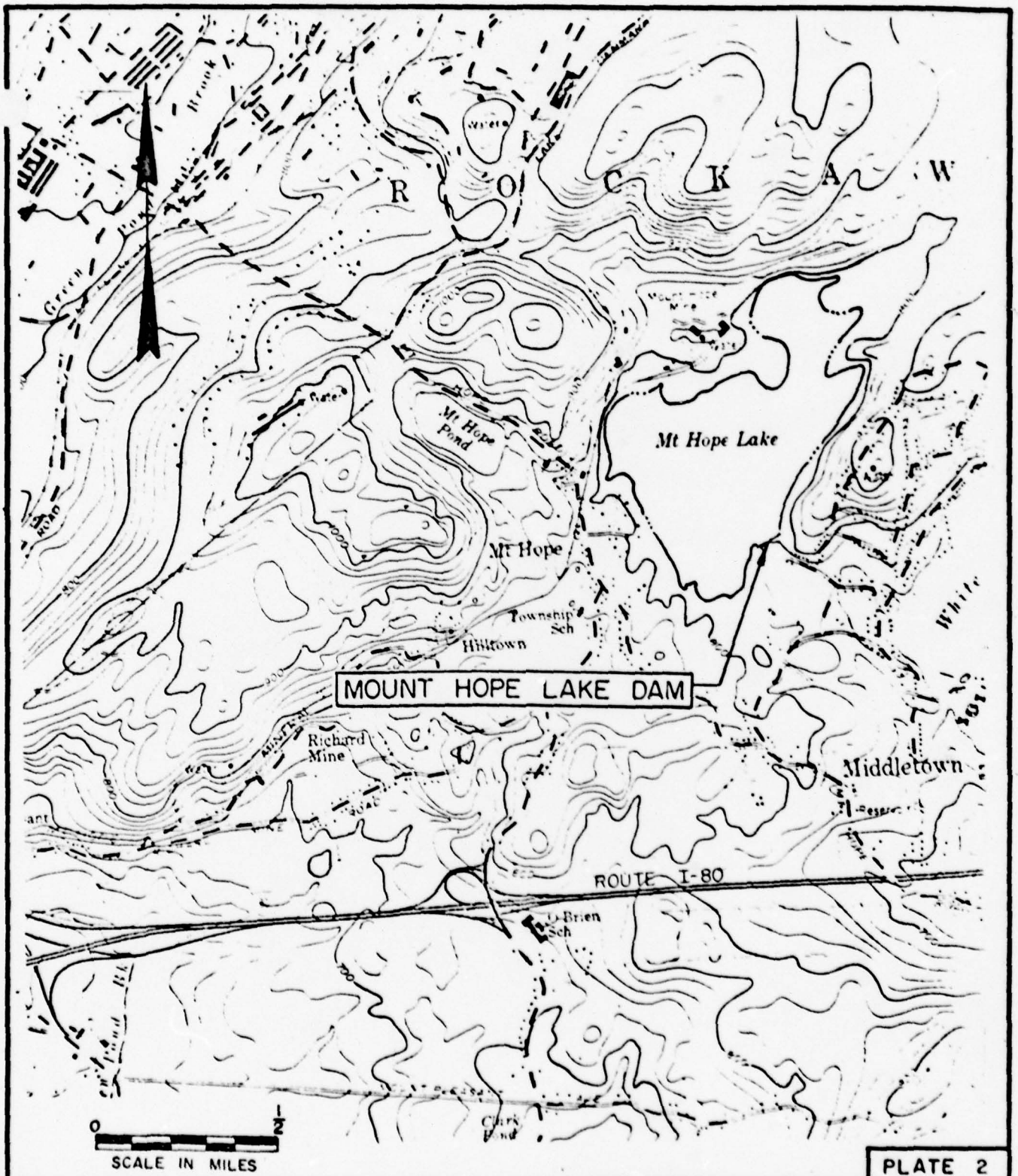


PLATE 2

STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY

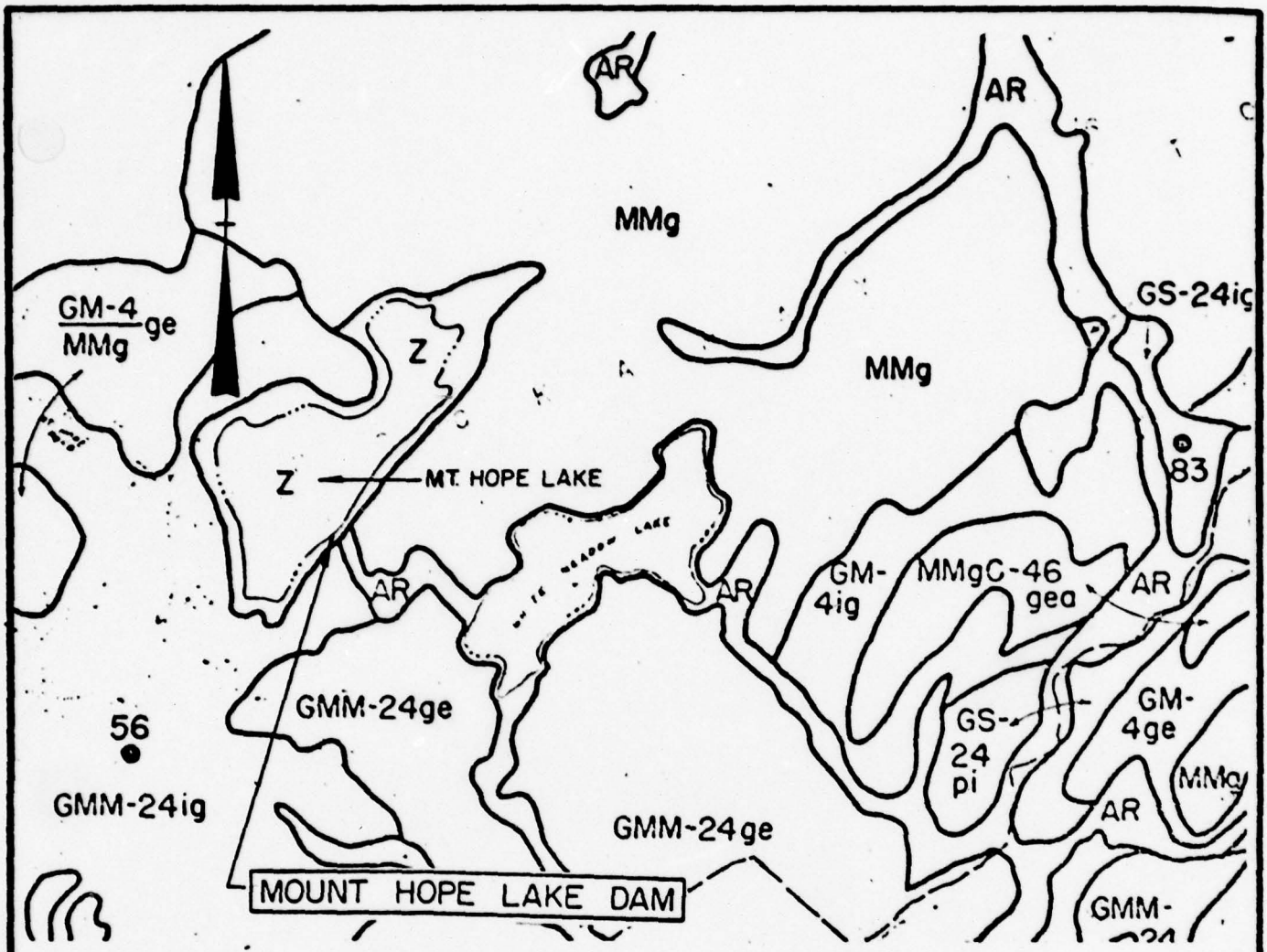
DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

VICINITY MAP

MOUNT HOPE LAKE DAM

I.D. NJ 00464	SCALE: AS SHOWN
	DATE: JUNE, 1979



Legend

Z	Swamp; ground water table at surface during most of the year and surface soils generally high in organic content.
GMM-24	Glacial terminal moraine. Unassorted and heterogeneous mixture of materials, ranging in size from clay to boulders, deposited at the outer edge of the ice sheet during the Wisconsin stage of continental glaciation.
MMg	Gneissic bedrock at or near the surface. (Byram Gneiss, Pre-Cambrian formation)
Note:	Information taken from Rutgers University Soil Survey of New-Jersey, Report No. 9, Morris County, and Geologic Map of New Jersey prepared by Lewis and Kummel.

PLATE 3

STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY

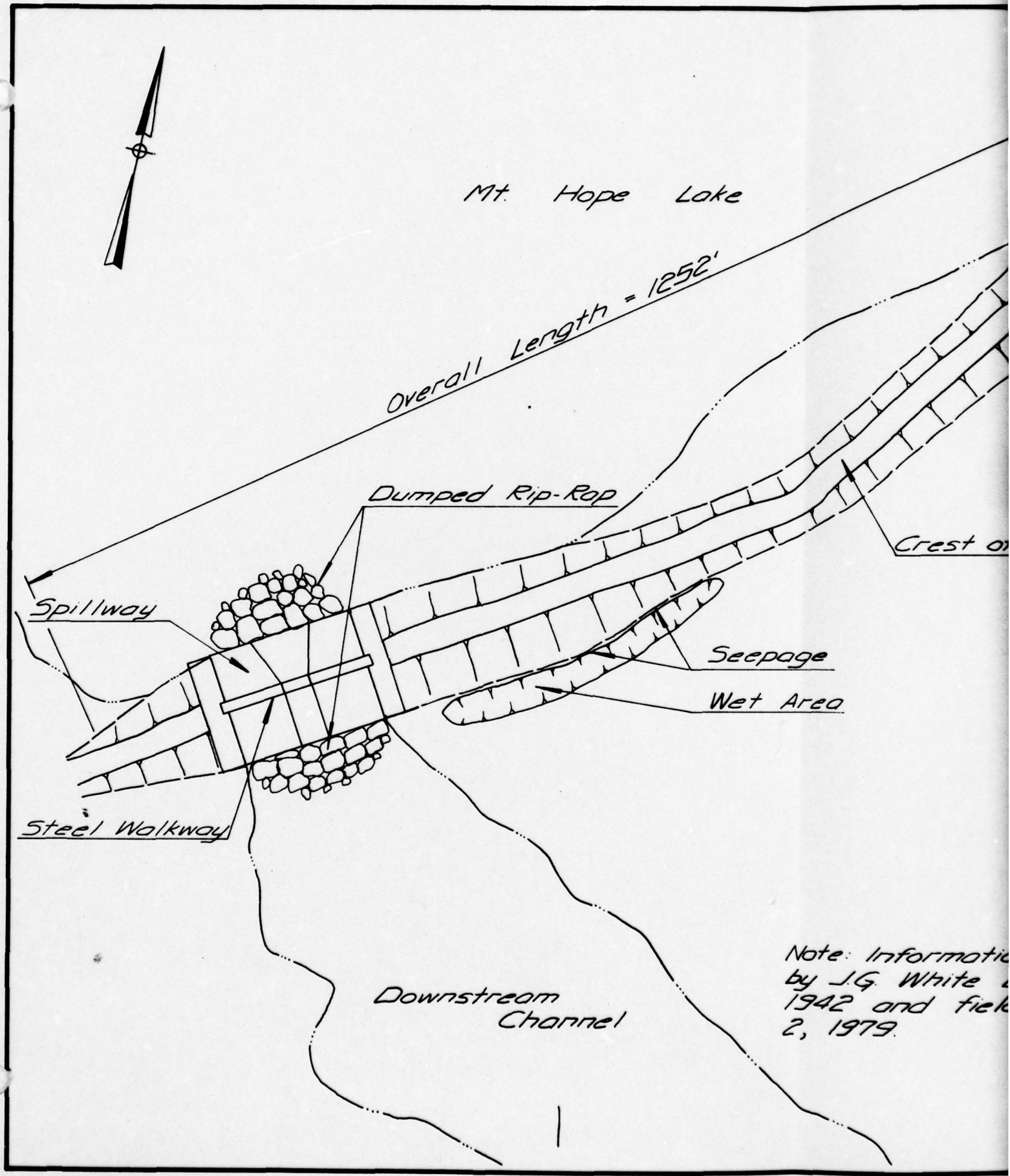
DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY

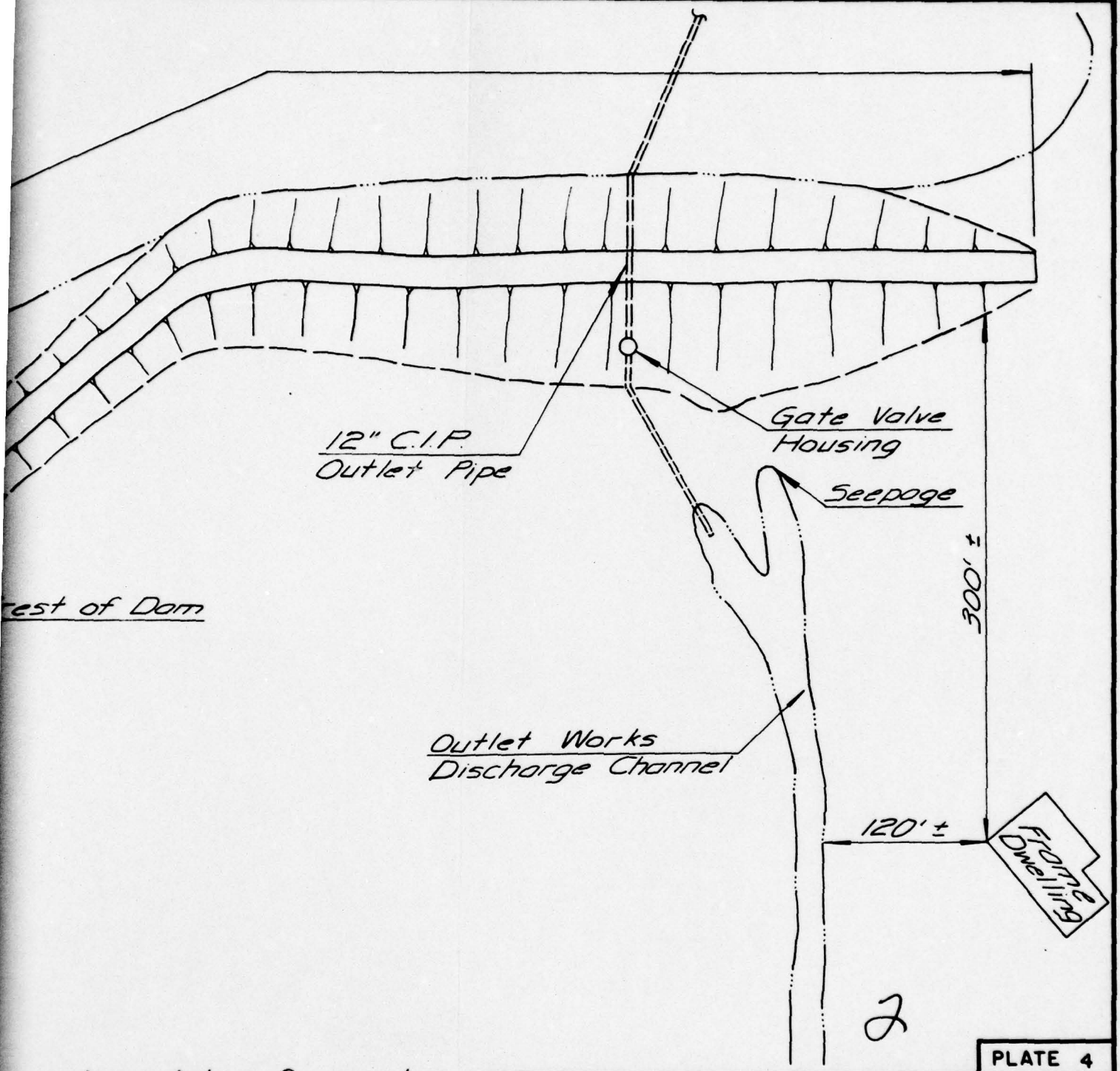
INSPECTION AND EVALUATION OF DAMS

SOIL MAP

MOUNT HOPE LAKE DAM

I D NJ00464	SCALE: NONE
	DATE: JUNE, 1979


Mt. Hope Lake
Overall Length = 1252'
Dumped Rip-Rap
Crest of
Spillway
Seepage
Wet Area
Steel Walkway
Downstream Channel
Note: Informatio
by J.G. White
1942 and fiel
2, 1979.



rest of Dam

rmation taken from plan
Vhite Engineering Corp.
d field inspection May

2

PLATE 4

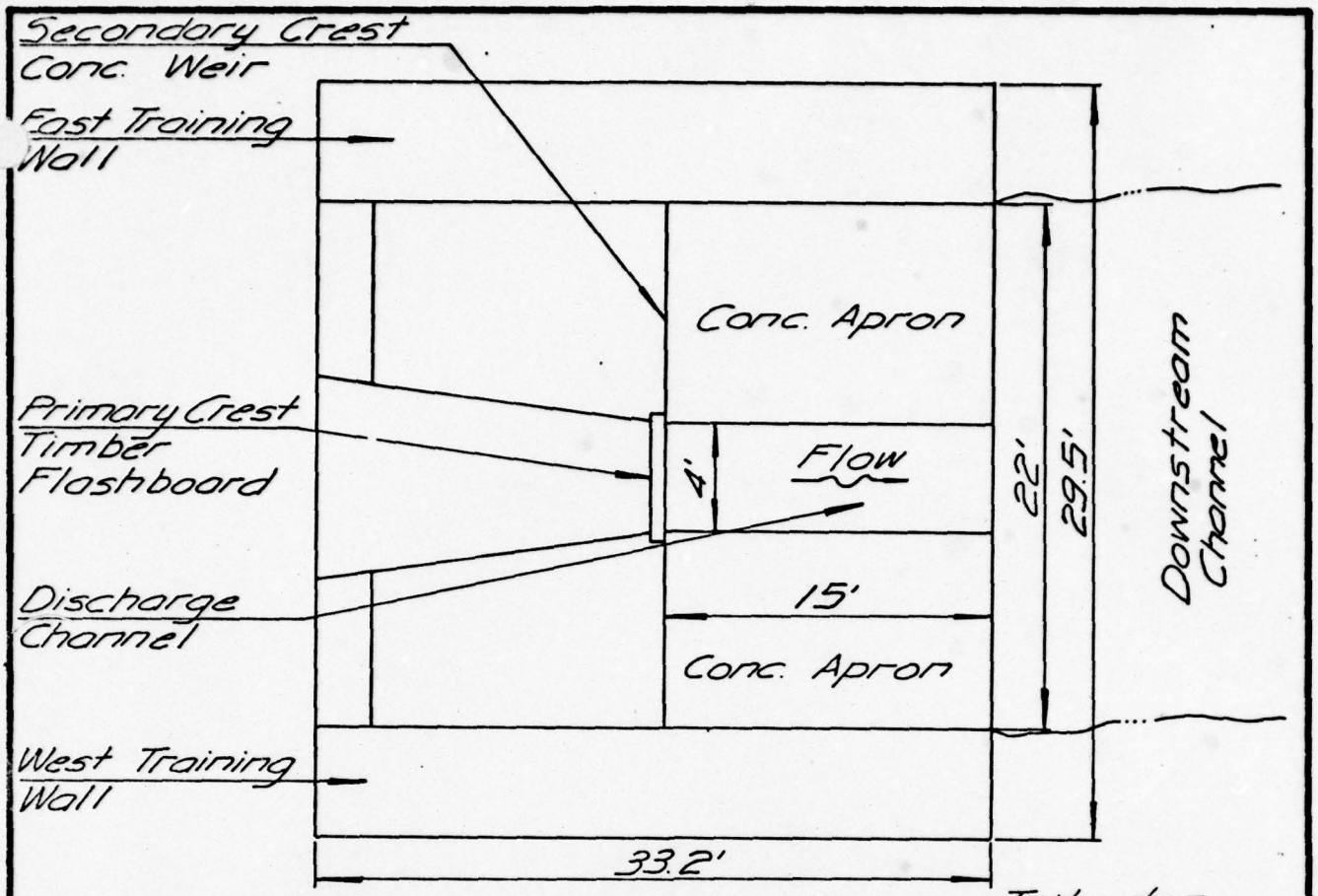
STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY

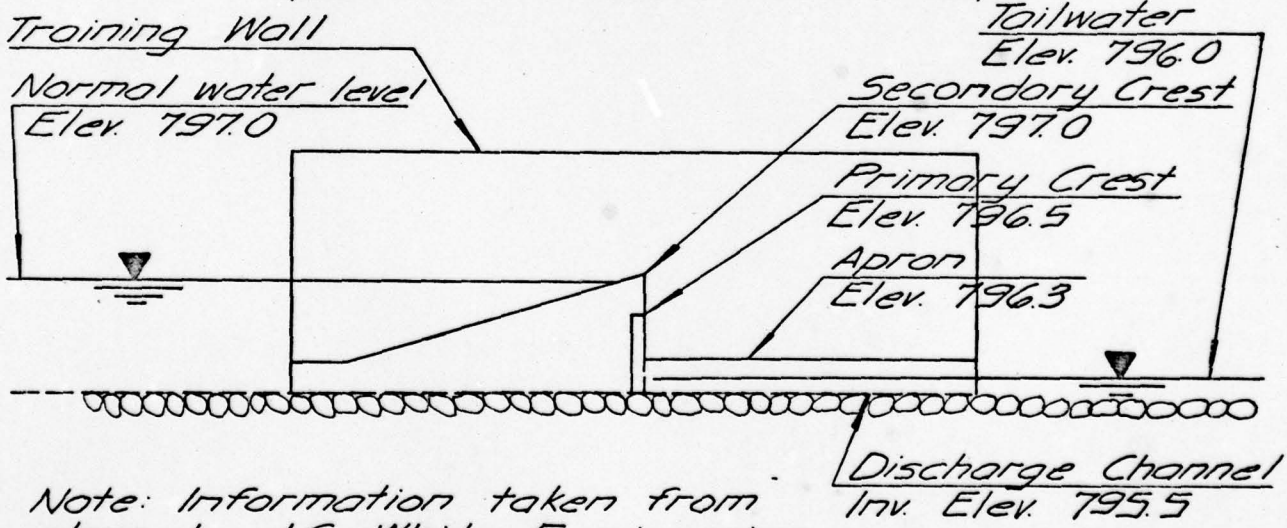
INSPECTION AND EVALUATION OF DAMS

GENERAL PLAN

MT. HOPE LAKE DAM

I.D. N.J. 00464	SCALE: NOT TO SCALE
	DATE: MAY 2, 1979

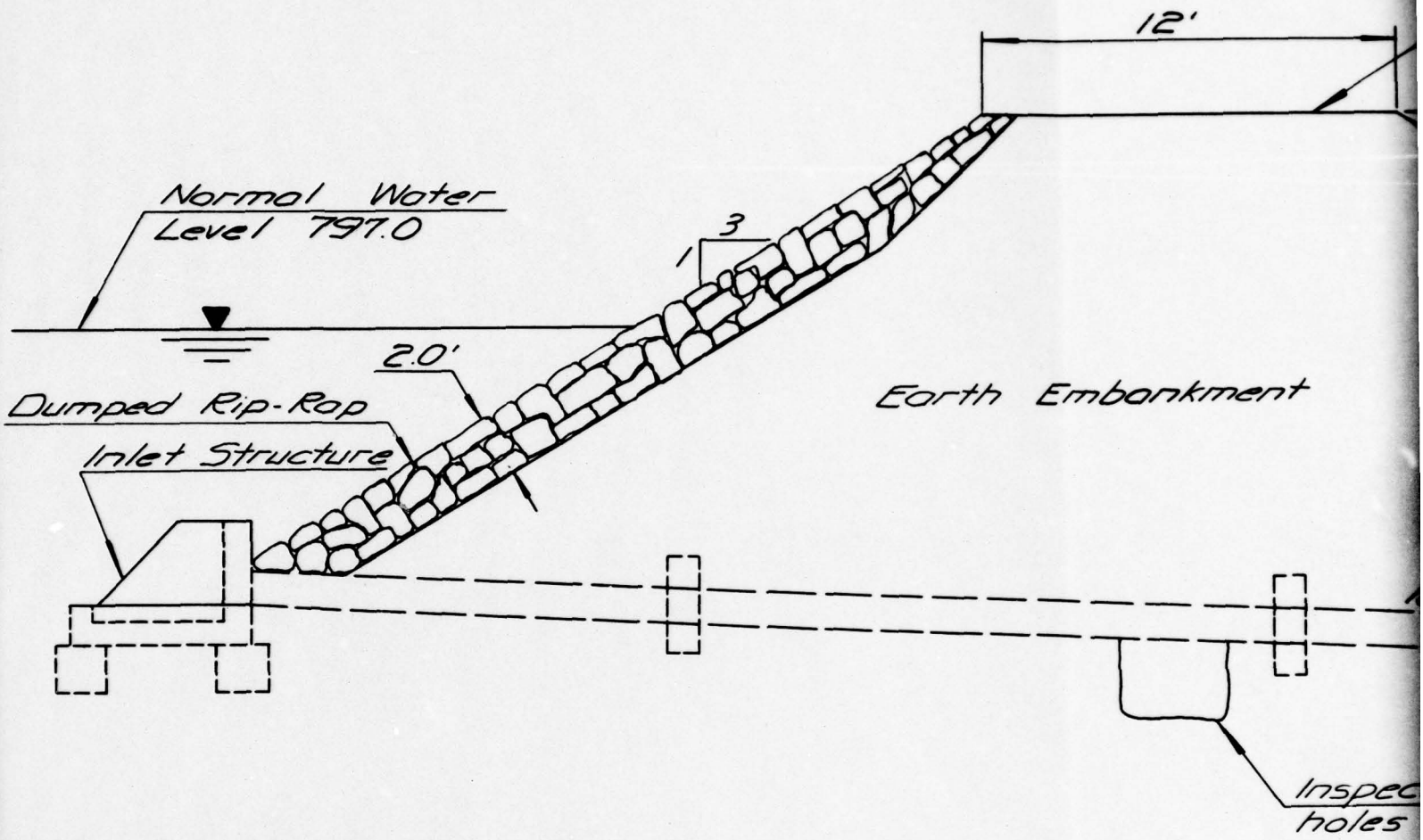




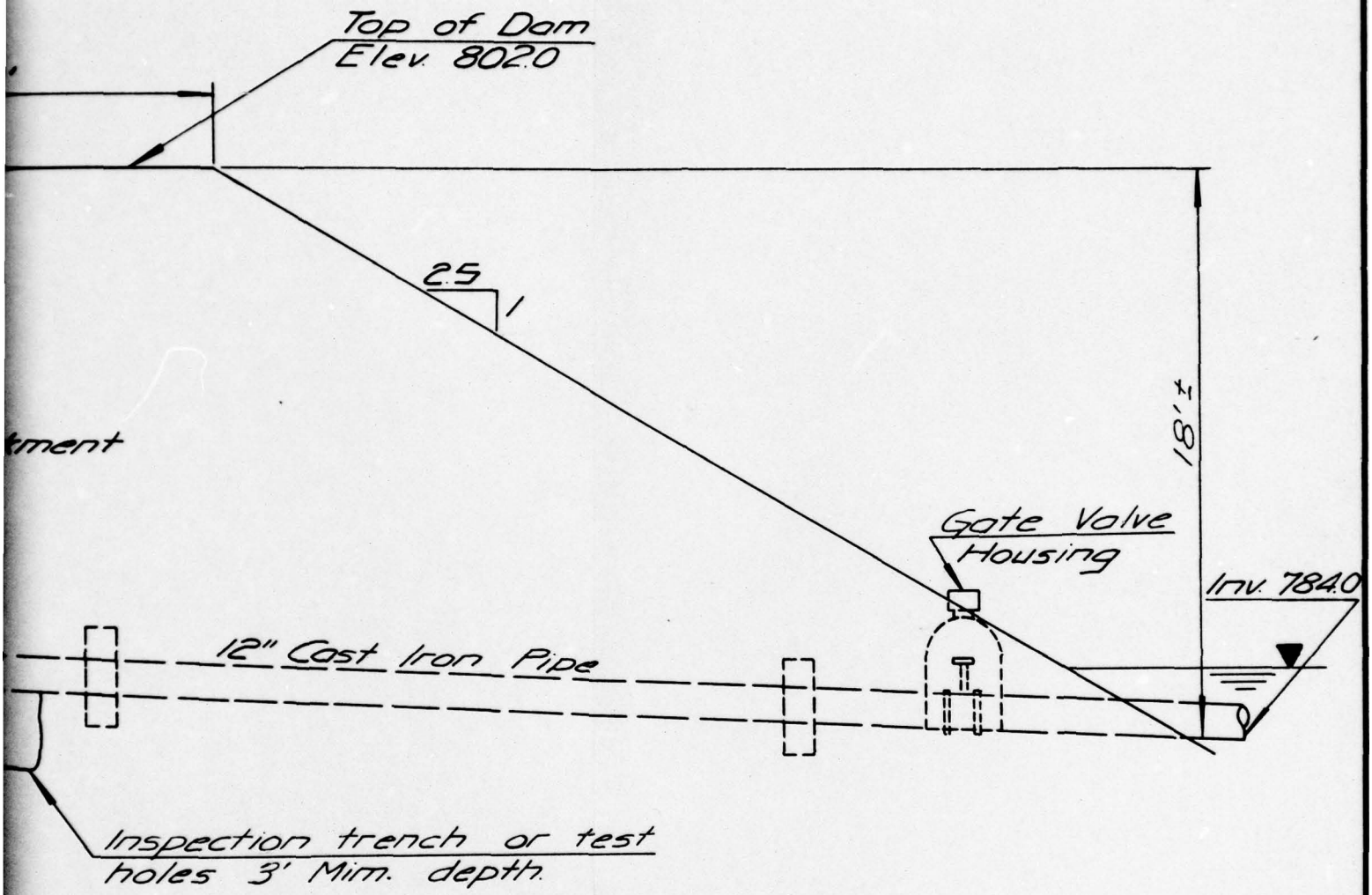
Note: Information taken from plans by J.G. White Engineering Corp., dated 1942 and field inspection May 2, 1979.

PLATE 5

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	INSPECTION AND EVALUATION OF DAMS SPILLWAY PLAN AND SECTION MT. HOPE LAKE DAM
DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY	I.D. N.J. 00464 — SCALE: NOT TO SCALE DATE: MAY, 1979



Note: Information taken from plans by J.G. White Engineering Corp., dated 1942 and field inspection May 2, 1979.



2

PLATE 6

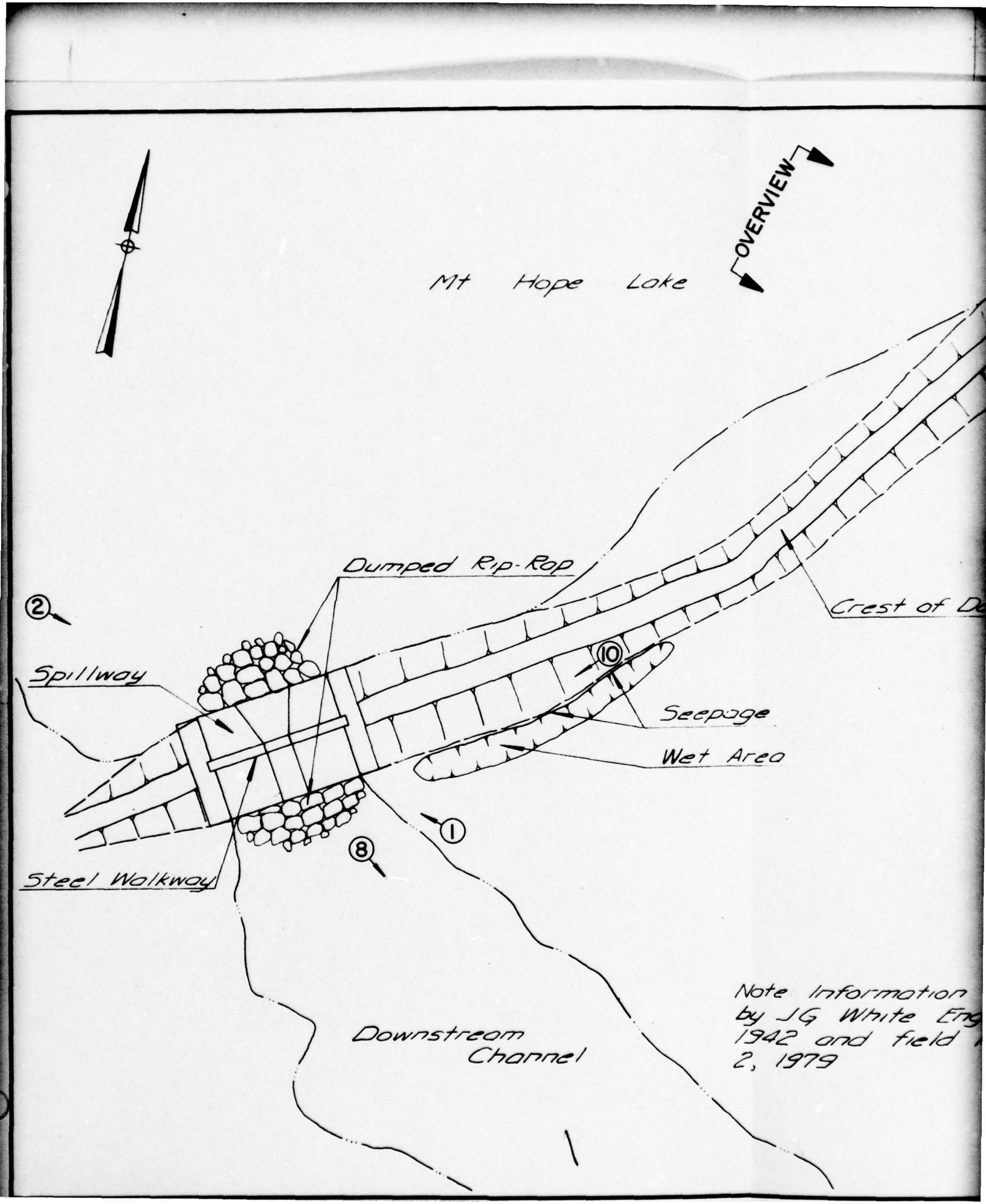
STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY

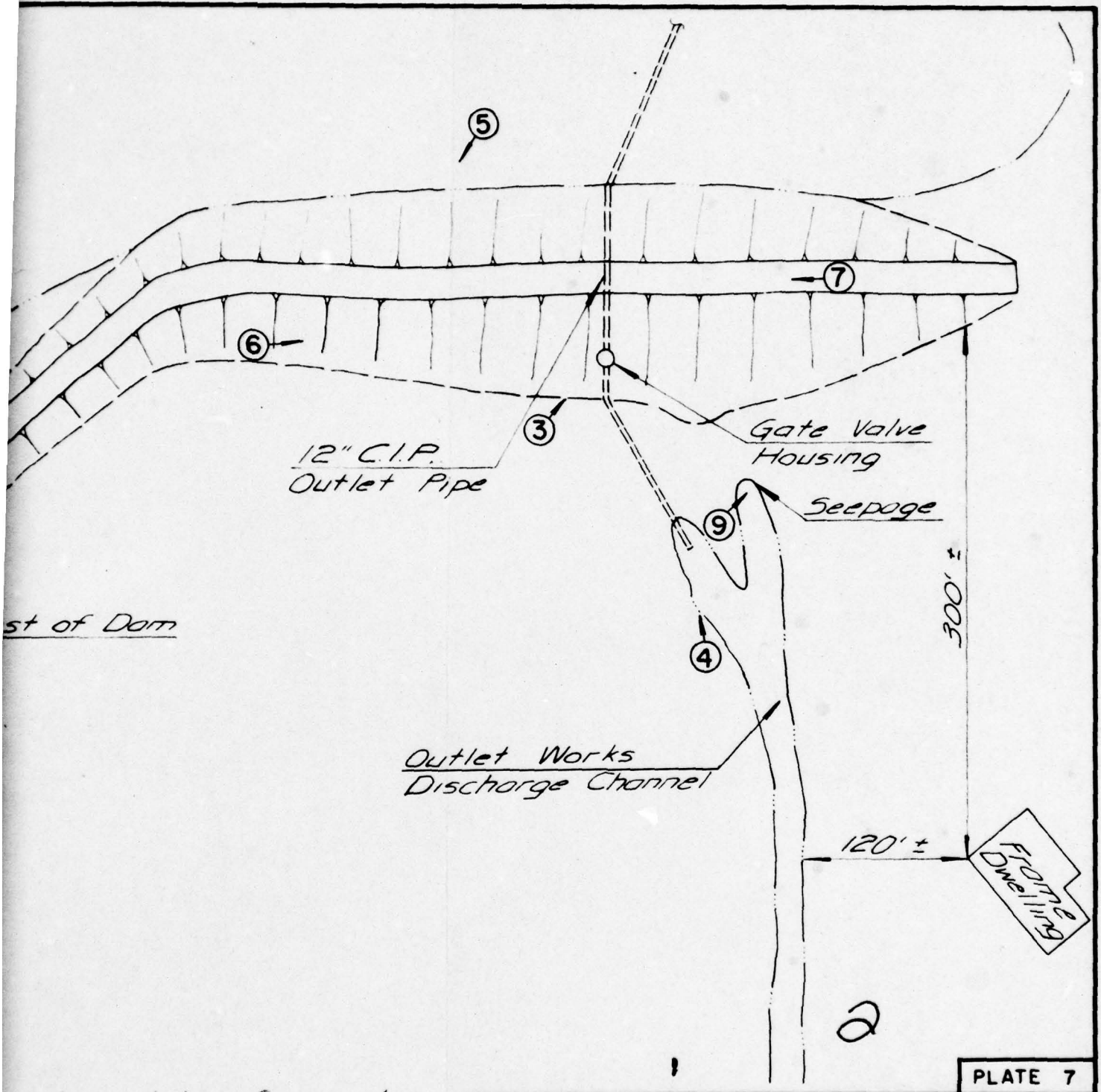
INSPECTION AND EVALUATION OF DAMS

DAM SECTION AT OUTLET WORKS

MT. HOPE LAKE DAM

I.D. N.J 00464	SCALE: NOT TO SCALE
	DATE: MAY 2, 1979


OVERVIEW
Mt Hope Lake
Dumped Rip-Rap
Crest of D
2
Spillway
10
Seepage
Wet Area
1
8
Steel Walkway
Downstream Channel
Note Information
by JG White Eng
1942 and field
2, 1979



st of Dam

mation taken from plan
ute Engineering Corp
field inspection May

PLATE 7

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

PHOTO LOCATION PLAN

MT. HOPE LAKE DAM

I.D. N.J. 00464	SCALE: NOT TO SCALE
	DATE: MAY 2, 1979

APPENDIX 1

Check List - Visual Inspection

Check List - Engineering Data

Check List
Visual Inspection
Phase I

Name of Dam Mt. Hope Lake County Morris State New Jersey Coordinators NJDEP

Date(s) Inspection 5/2/79
6/6/79 Weather Fair Temperature 70°F

Pool Elevation at Time of Inspection 797.0 M.S.L. Tailwater at Time of Inspection 796.0 M.S.L.

Inspection Personnel:

John Gribbin David Hoyt Andrew Miller

Ronald Lai Joseph Fox

Richard McDermott

John Gribbin Recorder

Present: Charles Penzenik, Mine Superintendent, Halecrest Corp.

CONCRETE/MASONRY DAMS

ISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ENERAL	N.A.	
TRUCTURE TO BUTMENT/EMBANKMENT UNCTIONS	N.A.	
RAINS	N.A.	
ATER PASSAGES	N.A.	
OUNDATION	N.A.	
ERTICAL AND HORIZONTAL LIGNMENT	N.A.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N.A.	
STRUCTURAL CRACKING	N.A.	
CONSTRUCTION JOINTS	N.A.	
MONOLITH JOINTS	N.A.	
LEAKAGE	N.A.	
SEEPAGE	N.A.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
GENERAL	Embankment covered with dense stand of trees and brush. Foot path located along crest.	Recommend removal of trees.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Junction between embankment and concrete spillway appeared satisfactory.	
ANY NOTICEABLE SEEPAGE	Seepage was discharging as a trickle from toe of embankment approz. 25' east of outlet works at point where original stream flowed. Orange deposits noted at discharge point. Two zones of seepage observed at toe of dam as orange deposits in standing water in swale immediately downstream from dam along west portion of dam.	Recommend monitoring of seepage.
STAFF GAGE AND RECORDER	Staff gage immediately upstream from spillway appeared to be in good condition.	Water level at time of inspection at 1.0 foot on gage. Top of scale 3.3 feet.
DRAINS	None observed	

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	No sloughing observed. Erosion on crest of embankment appeared to be due to pedestrian traffic.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Vertical: Generally level (slight variations in elevation) Horizontal: Generally S-shaped - appeared to be aligned true to the construction drawings.	
RIPRAP FAILURES	Riprap located along entire length of upstream slope of embankment. Overall condition of riprap is fair. Thickness of riprap coverage varies significantly along embankment. Condition of riprap below water level appears better than that above water surface.	

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SURFACES IN OUTLET CONDUIT	N.A.	
INTAKE STRUCTURE	Not observed	Submerged
OUTLET STRUCTURE	Outlet end of pipe obscured by pool. Pipe appeared to be intact.	Submerged in pool of standing water.
OUTLET CHANNEL	Natural streambed of principal stream flowing through lake site prior to construction of dam. 20-foot wide streambed lined with rocks and boulders.	
GATE AND GATE HOUSING	Steel housing protecting gate operating stem was locked and significantly rusted. It did not appear to have been recently operated. Gate and gate housing are buried and could not be observed.	Gate not operated at time of inspection.

SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Condition of concrete surface appears to be satisfactory.	Conc. weir comprises secondary crest.
TIMBER WEIR	Appears to be in satisfactory condition. East slot in concrete weir into which timber flashboard is placed is broken off.	Timber flashboard obscured by overflow. Timber flashboard comprises primary crest.
DISCHARGE CHANNEL	Appears to be in satisfactory condition.	Discharge channel composed of downstream apron and 4-foot wide channel between apron slabs.
GENERAL	Concrete training walls are in fair condition. Upstream end of east training wall is severely spalled with reinforcing rods exposed. West training wall spalled near waterline.	
WALKWAY	Steel walkway constructed with wire grate surface appeared to be structurally adequate. However, one section of grate is absent.	Absent grate section results in a hazardous condition

INSTRUMENTATION

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	Staff gage appeared to be in good condition.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Slopes surrounding lake range from 2% to 25% with an average slope of approx. 10%.	
SEDIMENTATION	Unknown	
STRUCTURES ALONG BANKS	Structures connected with the Mt. Hope Mining Co. are located along the north shore. A few homes are located along the west shore across a local road.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	The spillway downstream channel is a winding shallow natural stream. Trees, weeds, rocks and debris are present in the stream and comprise a significant obstruction to flow.	Recommend clearing of stream.
SLOPES	Banks of stream are generally flat in area of dam. Stream flows through swampy area.	
STRUCTURES ALONG BANKS	Two homes along spillway downstream channel 1000' from dam. Three homes along outlet works discharge channel 300' from dam - first floor 9' above channel bottom.	Area downstream from outlet works is significant hazard area for dam.

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
DAM - PLAN	Plans titled "Plan of Proposed Dam & Spillway" and "Detail of Dam and Spillway" prepared by The J. G. White Engineering Co., dated April 2, 1942.
SECTIONS	
SPILLWAY - PLAN	J. G. White Engineering Co. plans.
SECTIONS	
DETAILS	
OPERATING EQUIPMENT PLANS & DETAILS	J. G. White Engineering Co. plans.
OUTLETS - PLAN	J. G. White Engineering Co. plans.
DETAILS	
CONSTRAINTS	
DISCHARGE RATINGS	
HYDRAULIC/HYDROLOGIC DATA	Not available
RAINFALL/RESERVOIR RECORDS	Not available
CONSTRUCTION HISTORY	Not available
LOCATION MAP	Not available

ITEM	REMARKS
DESIGN REPORTS	Not available
GEOLOGY REPORTS	Not available
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Not available
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	Not available
POST-CONSTRUCTION SURVEYS OF DAM	Not available
BORROW SOURCES	Not available

ITEM	REMARKS
MONITORING SYSTEMS	Staff gage - no records available
MODIFICATIONS	Not available
HIGH POOL RECORDS	Not available
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Not available
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Not available
MAINTENANCE OPERATION RECORDS	Not available

APPENDIX 2

Photographs

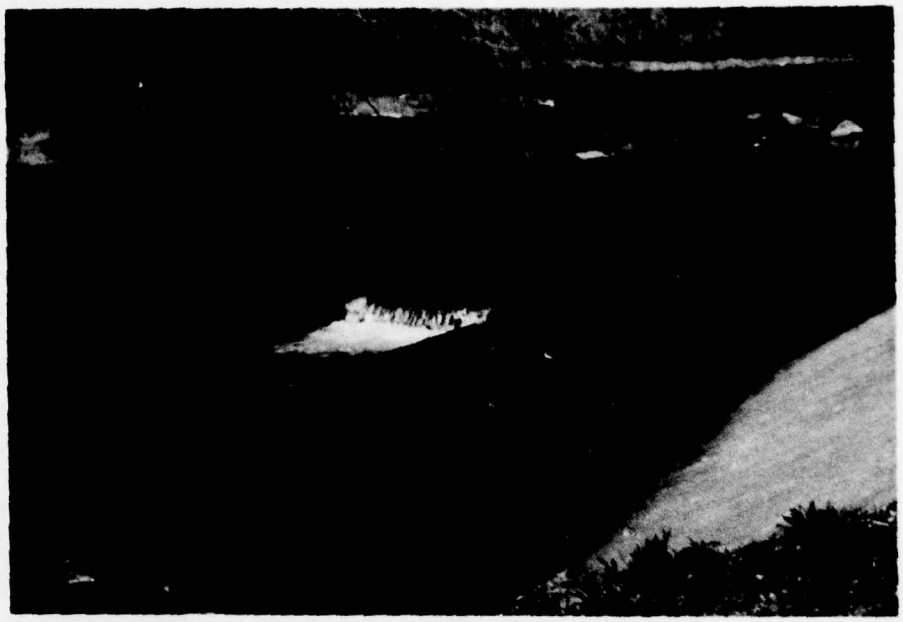


PHOTO 1

DOWNSTREAM VIEW OF SPILLWAY



PHOTO 2

UPSTREAM VIEW OF SPILLWAY

MOUNT HOPE LAKE DAM
2 MAY 1979



PHOTO 3

OUTLET WORKS OPERATING MECHANISM



PHOTO 4

DOWNSTREAM CHANNEL AT OUTLET WORKS

MOUNT HOPE LAKE DAM
2 MAY 1979



PHOTO 5

UPSTREAM FACE OF DAM



PHOTO 6

DOWNSTREAM FACE OF DAM

MOUNT HOPE LAKE DAM

2 MAY 1979



PHOTO 7

CREST OF DAM



PHOTO 8

DOWNSTREAM CHANNEL AT SPILLWAY

MOUNT HOPE LAKE DAM
2 MAY 1979

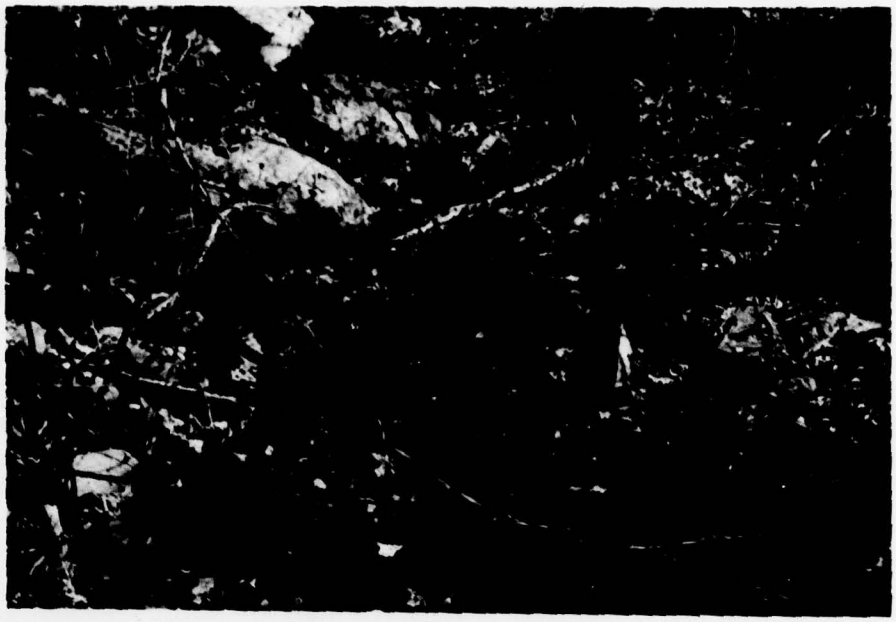


PHOTO 9

SEEPAGE NEAR OUTLET WORKS

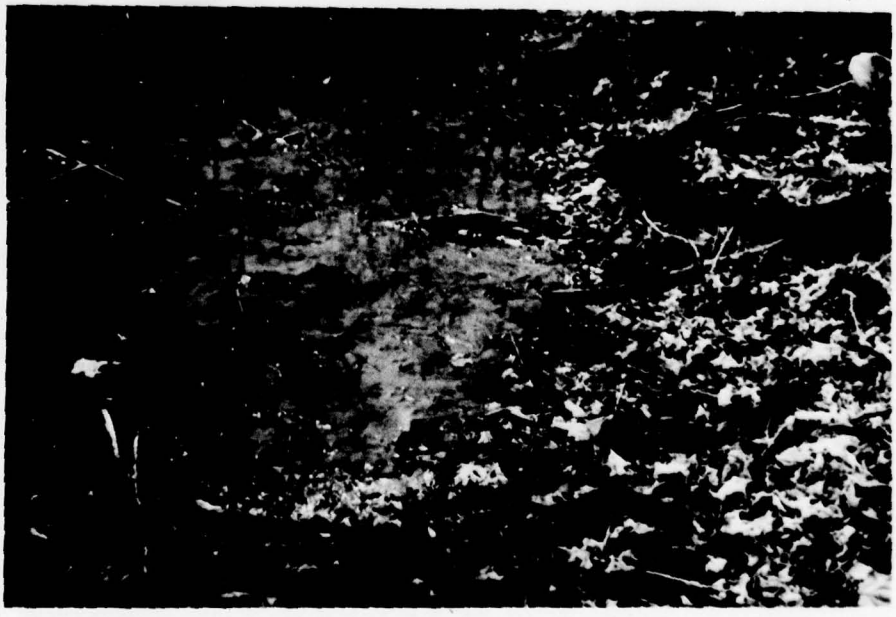


PHOTO 10

SEEPAGE IN SWALE DOWNSTREAM OF
SOUTHWEST SECTION OF DAM

MOUNT HOPE LAKE DAM
2 MAY 1979

APPENDIX 3

Engineering Data

CHECK LIST

HYDROLOGIC AND HYDRAULIC DATA

ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Mainly wooded

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 797.0 (633 acre-feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): N.A.

ELEVATION MAXIMUM DESIGN POOL: 802.6

ELEVATION TOP DAM: 802.0

SPILLWAY CREST: Concrete and Timber Weir

a. Elevation Primary: 796.5, Secondary: 797.0
b. Type Primary: Timber Flashboard, Secondary: Conc. Weir
c. Width Primary: 4", Secondary: 15' (inclined)
d. Length Primary: 4', Secondary: 18'
e. Location Spillover Center of spillway
f. Number and Type of Gates One removable flashboard

OUTLET WORKS: Gated 12" C.I.P.

a. Type Gate Valve in 12" C.I.P.
b. Location 250' from east end of dam
c. Entrance inverts 786.0
d. Exit inverts 784.0
e. Emergency draindown facilities: Open gate to draw down lake

HYDROMETEOROLOGICAL GAGES: One Gage

a. Type Graduated Staff Gage
b. Location Immediately upstream from spillway
c. Records None

MAXIMUM NON-DAMAGING DISCHARGE:

(Lake stage equal to top of dam) 858 c.f.s.

APPENDIX 4

Hydrologic Computations

STORCH ENGINEERS

Sheet 1 of 10

Project Mt Hope Lake Dam Made By KL Date 5-18-79

Chkd By DHF Date 6/4/79

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Hydrologic Analysis

Runoff hydrograph by HEC-1-DB using SCS UHG and routed by the Modified Puls method. Drainage Area = 1.9 Sq. mile

Infiltration Data

Drainage area is mainly wooded

use initial infiltration 1.5 in

constant infiltration 0.15 in/hr.

Time of Concentration By SCS TR-55

Length of overland flow = 1700 ft.
Slope = 0.12
Vel of travel = 0.9 ft/sec

Length of channel flow = 2200
Slope = 0.03
Vel of travel = 2.5 ft/sec

$$Tc = \left(\frac{1700}{0.9} + \frac{2200}{2.5}\right) \times \frac{1}{3600} = 0.77 \text{ hr.}$$

STORCH ENGINEERS

Sheet 2 of 10

Project Mt Hope Lake Dam Made By RL Date 5-18-79

Chkd By DWF Date 5/18/79

Time of concentration by "Design of Small Dam" SCS Nomograph Pg 71

$H = 240'$

$L = 3900'$

$T_c = 0.21$ hr.

Time of concentration by Kerby Pg 14-36 "Handbook of Applied Hydrology" by Chow

$$t_c^{2.14} = \frac{2}{3} \frac{Ln}{\sqrt{S}}$$

t_c = time of concentration in min
L = length of overland flow in ft
S = slope
n = 0.4 Roughness coef.

$$t_c^{2.14} = \frac{2}{3} \frac{1700 \times 0.4}{\sqrt{0.12}}$$

$t_c = 28.6$ min $= 0.48$ hr.

t_c for channel flow 0.24 hr. from previous page

$T_C = 0.48 + 0.24 = \underline{0.72}$ hr.

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For HEC - 1 input

use T_c = 0.7 hr.

Lag = 0.7 × 0.6 = 0.42 hr.

Lake Storage Volume

Information from USGS & Aerial Photos

Elev (M.S.L.)	Surface Area (Ac.)
797	190
800	294
820	420

HEC - 1 - DB program will develope storage capacity from surface area and elev.

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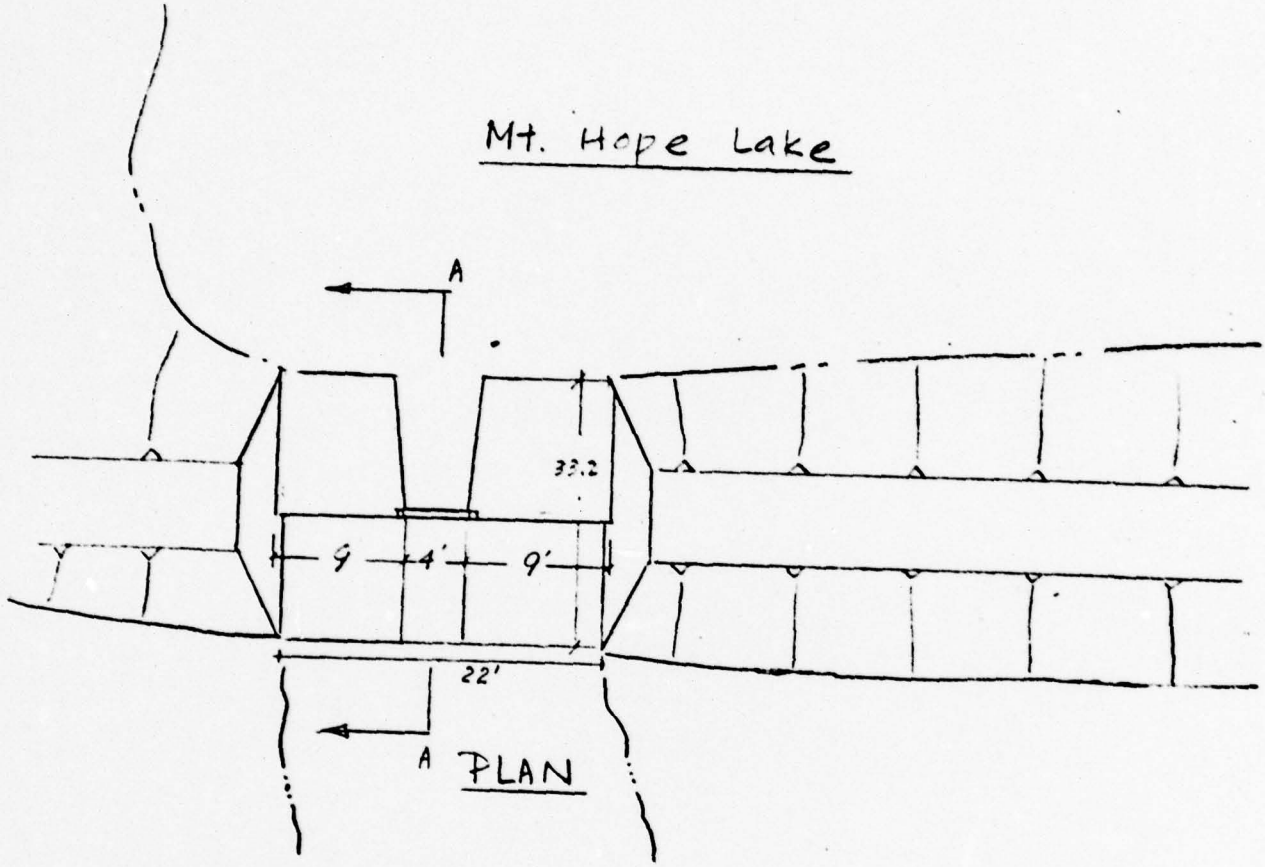
STORCH ENGINEERS

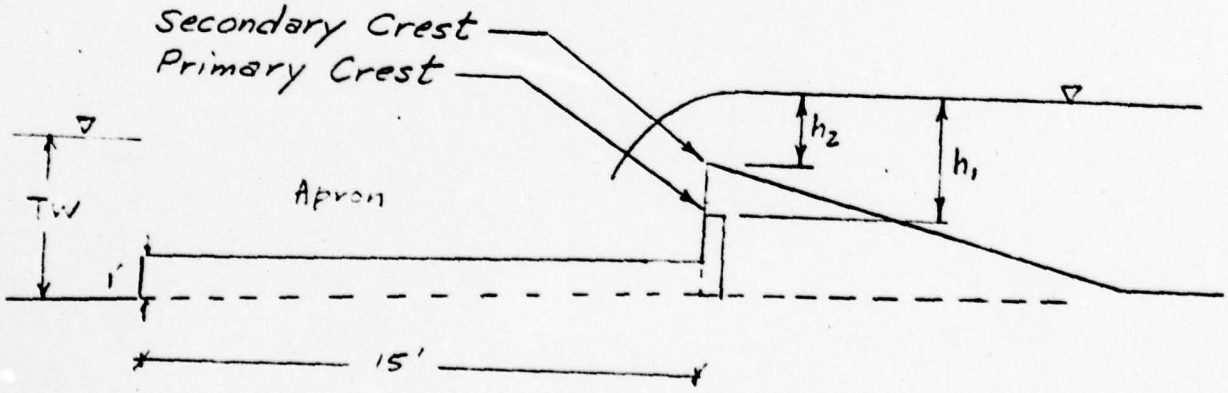
Project Mt Hope Lake Dam

Sheet 4 of 10

Made By NL Date 5-18-79

Chkd By DNF Date 6/1/79





SPILLWAY SECTION A A

SPILLWAY DISCHARGE

Spillway discharge flows over weirs at two levels with effective lengths L_1 and L_2 respectively. L_1 is a broad-crest weir and L_2 is a sharp crest weir with triangular section.

Discharge Q can be calculated by the following formula:

$$Q = CLh^{3/2}$$

C for primary crest use 3.1

C for secondary crest 3.

Since weir is low and downstream channel is shallow, the effect of tailwater is significant. A rough estimate of tailwater elevation is shown on the following page.

These estimates are obtained by using a section 100' downstream and Mannings equation.

STORCH ENGINEERS

Sheet 6 of 10

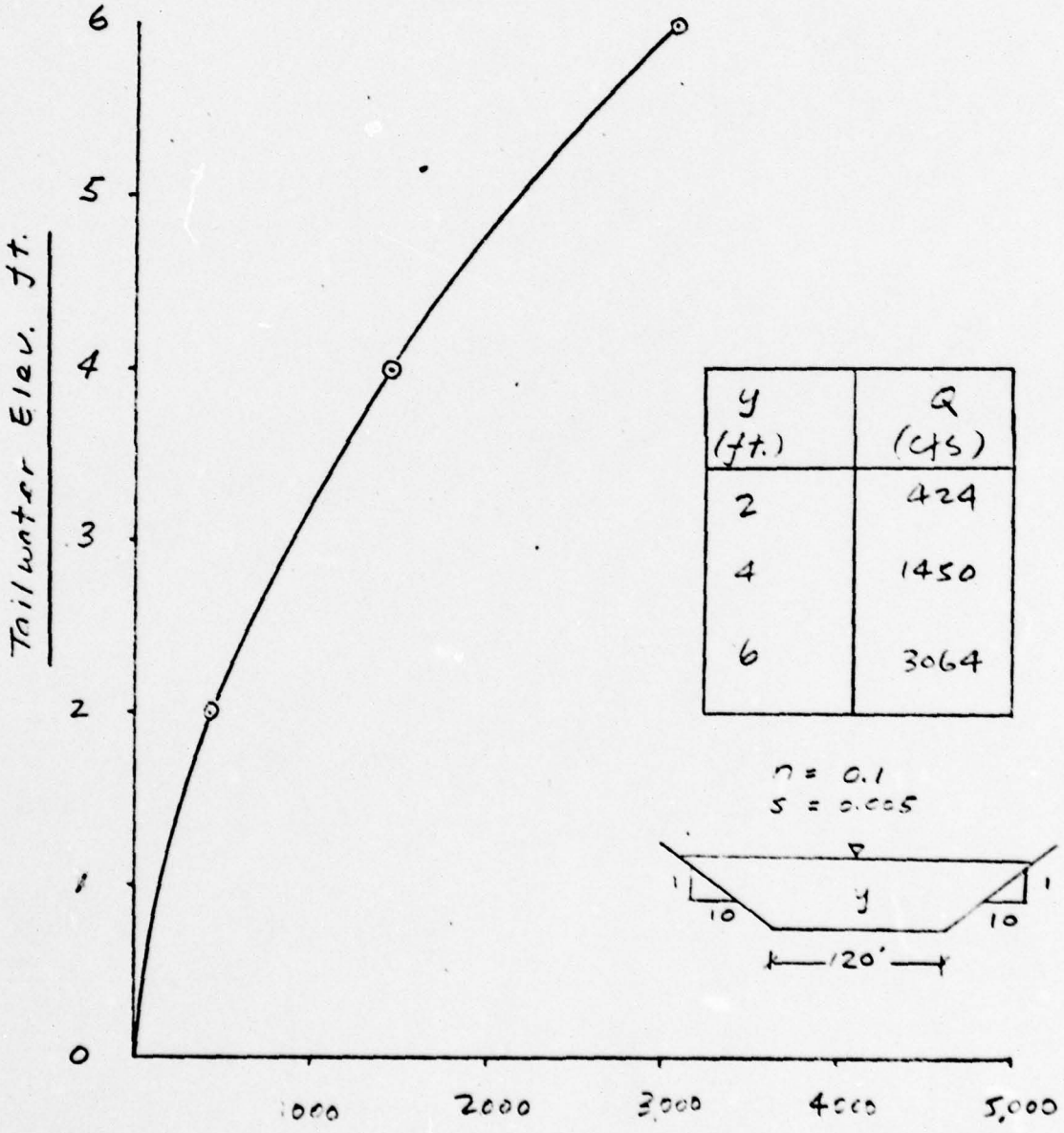
Project Mt. Hope Lake Dam

Made By RL Date 5-15-79

Chkd By DHP Date 6/1/79

Downstream Channel Tailwater

Stage Discharge Curve



y (ft.)	Q (cfs)
2	424
4	1450
6	3064

n = 0.1

S = 0.005

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STORCH ENGINEERS

Sheet 7 of 10

Project Mt. Hope Lake Dam

Made By RL Date 5-15-79

Chkd By DHF Date 6/5/79

Stage Discharge Tabulation

W.L. (ft)	h_1	h_2	Q_1 (cfs)	Q_2 (cfs)	Tailwater elev. (ft)	C adj. factor	ΣQ (cfs)
796.5	0	0	0	0	-	-	0
797.0	0.5	0	4	0	-	-	4
799.0	2.5	2.0	49	183	1.3	-	232
801.0	4.5	4.0	118	518	2.3	-	636
802.0	5.5	5.0	160	724	2.6	0.97	858
803.0	6.5	6.0	206	952	3.1	0.96	1,112
804.0	7.5	7.0	255	1200	3.9	0.95	1,382
805.0	8.5	8.0	307	1466	4.5	0.93	1,649

Note: Adjustment factor applied when weir is submerged
Ref. 5-18 Handbook of Hydraulics King et al.

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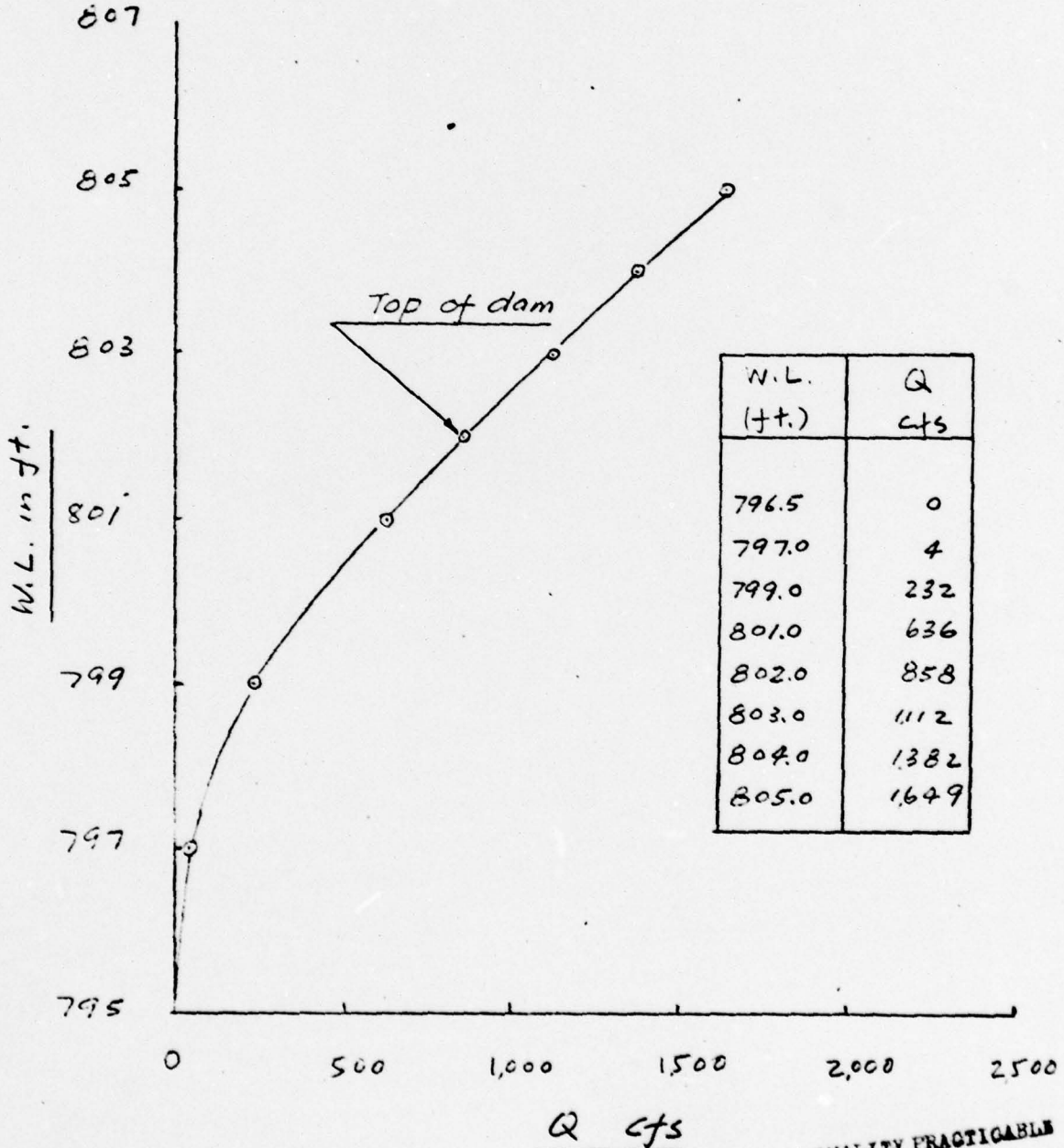
STORCH ENGINEERS

Sheet 8 of 10

Project Little Lake Dam Made By RL Date 5-18-79

Chkd By DWF Date 6/5/79

Stage Discharge Curve for Spillway



W.L. (ft.)	Q cfs
796.5	0
797.0	4
799.0	232
801.0	636
802.0	858
803.0	1112
804.0	1382
805.0	1649

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STORCH ENGINEERS

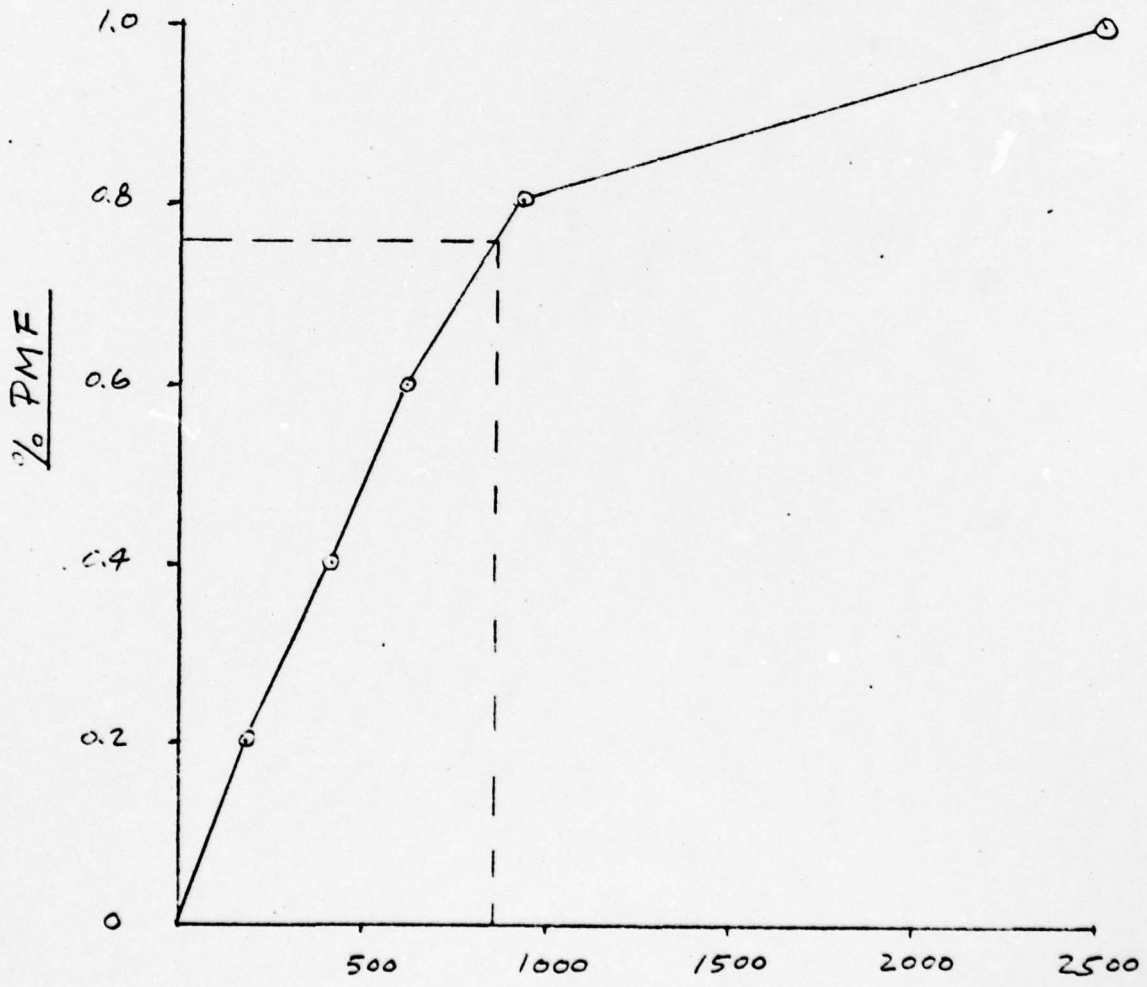
Sheet 9 of 10

Project Mt Hope Lake Dam

Made By RL Date 5-22-79

Chkd By DMP Date 6/5/79

% PMF vs Outflow



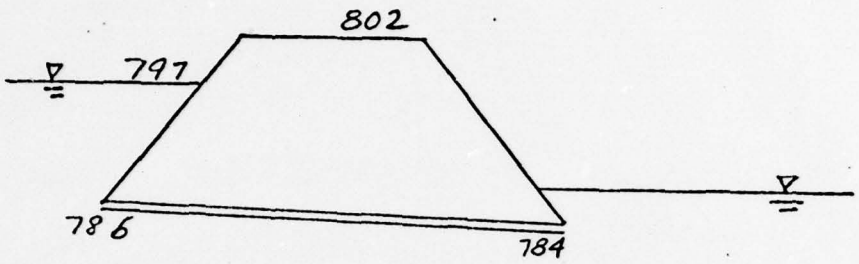
STORCH ENGINEERS

Sheet 10 of 10

Project Mt Hope Lake Dam Made By RL Date 7-31-79

Chkd By JG Date 7-31-79

Outlet Works Capacity



12" CIP

Outlet control $L = 105'$

$HW = H + 1 - 2$ $HW = 10$

$H = 10 - 1 + 2$

$= 11$ ft.

Using "Hydraulic charts for the Selection of Highway culverts"

$Q = \underline{\underline{10 \text{ cfs}}}$

Total storage at normal pool 633 Ac-ft

$633 \times 43560 = 27,573,480$ cu. ft.

Averge outflow through pipe = 5 cfs

Drawdown time $= \dfrac{27,573,480}{5 \times 24} \times \dfrac{1}{3600}$

$\doteq \underline{\underline{64 \text{ days.}}}$

HEC-1-DB COMPUTATIONS

```
A1                    NATIONAL DAM SAFETY PROGRAM
A2                 MT. HOPE LAKE DAM     NEW JERSEY
A3                      MULTI RATIO PMF ROUTING
B     150         0         5                                    0         0         3
B1      5
J       1         5         1
J1    1.0       0.8       0.6       0.4       0.2
K       0      LAKE                   0         0         1
K1                    INFLOW HYDROGRAPH TO MT. HOPE LAKE DAM
M       1         2       1.9                 1.9         0                              1
P       0        25       100       109       117
R                                                        1.5      0.15
R2                0.42
X     -1.0     -0.05       2.0
K       1       DAM                   0         0         1
K1                    ROUTE DISCHARGE THRU DAM
Y                                     1         1
Y1      1                                                       -797        -1
Y4  796.5       797       799       801       802       803       804       805
Y5      0         4       232       636       858      1112      1382      1649
SA      0       190       294       420
SE    787       797       800       820
SS  796.5
SD    802      2.63       1.5      1252
K      99
A
A
A
A
A
```

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

RUN  DATE# 79/05/21.
     TIME# 10.13.09.
```

NATIONAL DAM SAFETY PROGRAM
MT. HOPE LAKE DAM NEW JERSEY
MULTI RATIO PMF ROUTING

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
150	0	5	0	0	0	0	0	3	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 5 LRTIO= 1

RTIOS= 1.00 .80 .60 .40 .20

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH TO MT. HOPE LAKE DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
LAKE	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	1.90	0.00	1.90	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	25.00	100.00	109.00	117.00	0.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.50	.15	0.00	0.00

UNIT HYDROGRAPH DATA
TC= 0.00 LAG= .42

RECESSION DATA
STRTQ= -1.00 QRCSN= -.05 RTIOR= 2.00

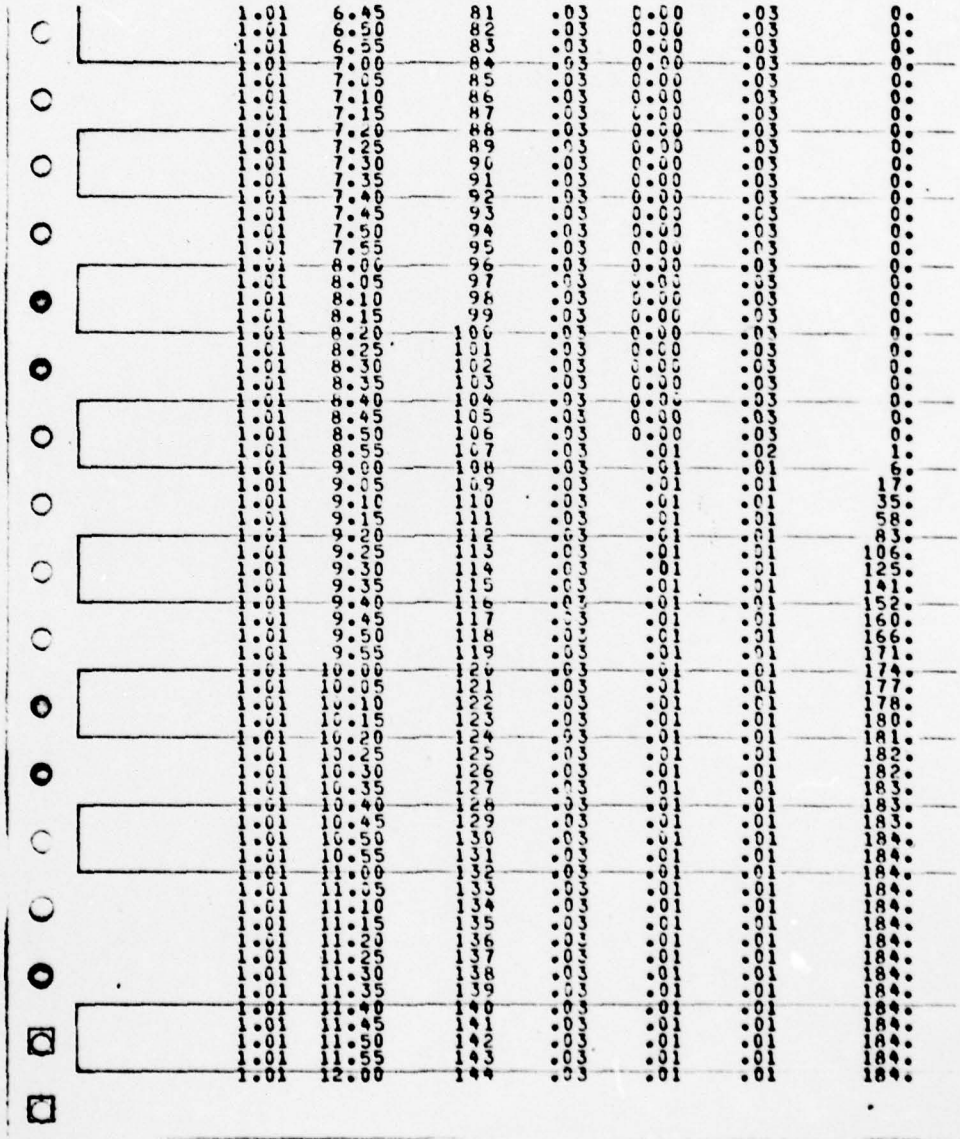
UNIT HYDROGRAPH 27 END OF PERIOD ORDINATES, TC= 0.00 HOURS, LAG= .42 VOL= 1.00

171.	523.	1090.	1676.	1966.	1969.	1758.	1461.	1063.	768.
570.	436.	324.	241.	180.	134.	99.	74.	55.	41.
30.	23.	18.	14.	10.	6.	3.			

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.05	1	.01	0.00	.01	0.
1.01	.10	2	.01	0.00	.01	0.
1.01	.15	3	.01	0.00	.01	0.
1.01	.20	4	.01	0.00	.01	0.
1.01	.25	5	.01	0.00	.01	0.
1.01	.30	6	.01	0.00	.01	0.
1.01	.35	7	.01	0.00	.01	0.
1.01	.40	8	.01	0.00	.01	0.
1.01	.45	9	.01	0.00	.01	0.
1.01	.50	10	.01	0.00	.01	0.
1.01	.55	11	.01	0.00	.01	0.
1.01	1.00	12	.01	0.00	.01	0.
1.01	1.05	13	.01	0.00	.01	0.
1.01	1.10	14	.01	0.00	.01	0.
1.01	1.15	15	.01	0.00	.01	0.
1.01	1.20	16	.01	0.00	.01	0.
1.01	1.25	17	.01	0.00	.01	0.
1.01	1.30	18	.01	0.00	.01	0.
1.01	1.35	19	.01	0.00	.01	0.
1.01	1.40	20	.01	0.00	.01	0.
1.01	1.45	21	.01	0.00	.01	0.
1.01	1.50	22	.01	0.00	.01	0.
1.01	1.55	23	.01	0.00	.01	0.
1.01	2.00	24	.01	0.00	.01	0.
1.01	2.05	25	.01	0.00	.01	0.
1.01	2.10	26	.01	0.00	.01	0.
1.01	2.15	27	.01	0.00	.01	0.
1.01	2.20	28	.01	0.00	.01	0.
1.01	2.25	29	.01	0.00	.01	0.
1.01	2.30	30	.01	0.00	.01	0.
1.01	2.35	31	.01	0.00	.01	0.
1.01	2.40	32	.01	0.00	.01	0.
1.01	2.45	33	.01	0.00	.01	0.
1.01	2.50	34	.01	0.00	.01	0.
1.01	2.55	35	.01	0.00	.01	0.
1.01	3.00	36	.01	0.00	.01	0.
1.01	3.05	37	.01	0.00	.01	0.
1.01	3.10	38	.01	0.00	.01	0.
1.01	3.15	39	.01	0.00	.01	0.
1.01	3.20	40	.01	0.00	.01	0.
1.01	3.25	41	.01	0.00	.01	0.
1.01	3.30	42	.01	0.00	.01	0.
1.01	3.35	43	.01	0.00	.01	0.
1.01	3.40	44	.01	0.00	.01	0.
1.01	3.45	45	.01	0.00	.01	0.
1.01	3.50	46	.01	0.00	.01	0.
1.01	3.55	47	.01	0.00	.01	0.
1.01	4.00	48	.01	0.00	.01	0.
1.01	4.05	49	.01	0.00	.01	0.
1.01	4.10	50	.01	0.00	.01	0.
1.01	4.15	51	.01	0.00	.01	0.
1.01	4.20	52	.01	0.00	.01	0.
1.01	4.25	53	.01	0.00	.01	0.
1.01	4.30	54	.01	0.00	.01	0.
1.01	4.35	55	.01	0.00	.01	0.
1.01	4.40	56	.01	0.00	.01	0.
1.01	4.45	57	.01	0.00	.01	0.
1.01	4.50	58	.01	0.00	.01	0.
1.01	4.55	59	.01	0.00	.01	0.
1.01	5.00	60	.01	0.00	.01	0.
1.01	5.05	61	.01	0.00	.01	0.
1.01	5.10	62	.01	0.00	.01	0.
1.01	5.15	63	.01	0.00	.01	0.
1.01	5.20	64	.01	0.00	.01	0.
1.01	5.25	65	.01	0.00	.01	0.
1.01	5.30	66	.01	0.00	.01	0.
1.01	5.35	67	.01	0.00	.01	0.
1.01	5.40	68	.01	0.00	.01	0.
1.01	5.45	69	.01	0.00	.01	0.
1.01	5.50	70	.01	0.00	.01	0.
1.01	5.55	71	.01	0.00	.01	0.
1.01	6.00	72	.01	0.00	.01	0.
1.01	6.05	73	.03	0.00	.03	0.
1.01	6.10	74	.03	0.00	.03	0.
1.01	6.15	75	.03	0.00	.03	0.
1.01	6.20	76	.03	0.00	.03	0.
1.01	6.25	77	.03	0.00	.03	0.
1.01	6.30	78	.03	0.00	.03	0.
1.01	6.35	79	.03	0.00	.03	0.
1.01	6.40	80	.03	0.00	.03	0.

END-OF-PERIOD FLOW



MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	6.45	81	.03	0.00	.03	0.
1.01	6.50	82	.03	0.00	.03	0.
1.01	6.55	83	.03	0.00	.03	0.
1.01	7.00	84	.03	0.00	.03	0.
1.01	7.05	85	.03	0.00	.03	0.
1.01	7.10	86	.03	0.00	.03	0.
1.01	7.15	87	.03	0.00	.03	0.
1.01	7.20	88	.03	0.00	.03	0.
1.01	7.25	89	.03	0.00	.03	0.
1.01	7.30	90	.03	0.00	.03	0.
1.01	7.35	91	.03	0.00	.03	0.
1.01	7.40	92	.03	0.00	.03	0.
1.01	7.45	93	.03	0.00	.03	0.
1.01	7.50	94	.03	0.00	.03	0.
1.01	7.55	95	.03	0.00	.03	0.
1.01	8.00	96	.03	0.00	.03	0.
1.01	8.05	97	.03	0.00	.03	0.
1.01	8.10	98	.03	0.00	.03	0.
1.01	8.15	99	.03	0.00	.03	0.
1.01	8.20	100	.03	0.00	.03	0.
1.01	8.25	101	.03	0.00	.03	0.
1.01	8.30	102	.03	0.00	.03	0.
1.01	8.35	103	.03	0.00	.03	0.
1.01	8.40	104	.03	0.00	.03	0.
1.01	8.45	105	.03	0.00	.03	0.
1.01	8.50	106	.03	0.00	.03	0.
1.01	8.55	107	.03	.01	.02	1.
1.01	9.00	108	.03	.01	.01	16.
1.01	9.05	109	.03	.01	.01	17.
1.01	9.10	110	.03	.01	.01	55.
1.01	9.15	111	.03	.01	.01	58.
1.01	9.20	112	.03	.01	.01	83.
1.01	9.25	113	.03	.01	.01	106.
1.01	9.30	114	.03	.01	.01	125.
1.01	9.35	115	.03	.01	.01	141.
1.01	9.40	116	.03	.01	.01	152.
1.01	9.45	117	.03	.01	.01	160.
1.01	9.50	118	.03	.01	.01	166.
1.01	9.55	119	.03	.01	.01	171.
1.01	10.00	120	.03	.01	.01	174.
1.01	10.05	121	.03	.01	.01	177.
1.01	10.10	122	.03	.01	.01	178.
1.01	10.15	123	.03	.01	.01	180.
1.01	10.20	124	.03	.01	.01	181.
1.01	10.25	125	.03	.01	.01	182.
1.01	10.30	126	.03	.01	.01	182.
1.01	10.35	127	.03	.01	.01	183.
1.01	10.40	128	.03	.01	.01	183.
1.01	10.45	129	.03	.01	.01	183.
1.01	10.50	130	.03	.01	.01	184.
1.01	10.55	131	.03	.01	.01	184.
1.01	11.00	132	.03	.01	.01	184.
1.01	11.05	133	.03	.01	.01	184.
1.01	11.10	134	.03	.01	.01	184.
1.01	11.15	135	.03	.01	.01	184.
1.01	11.20	136	.03	.01	.01	184.
1.01	11.25	137	.03	.01	.01	184.
1.01	11.30	138	.03	.01	.01	184.
1.01	11.35	139	.03	.01	.01	184.
1.01	11.40	140	.03	.01	.01	184.
1.01	11.45	141	.03	.01	.01	184.
1.01	11.50	142	.03	.01	.01	184.
1.01	11.55	143	.03	.01	.01	184.
1.01	12.00	144	.03	.01	.01	184.

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	12.05	145	.17	.15	.01	208.
1.01	12.10	146	.17	.15	.01	282.
1.01	12.15	147	.17	.15	.01	437.
1.01	12.20	148	.17	.15	.01	674.
1.01	12.25	149	.17	.15	.01	953.
1.01	12.30	150	.17	.15	.01	1232.
0.00	0.00	151	.17	.15	.01	1481.
0.00	0.00	152	.17	.15	.01	1688.
0.00	0.00	153	.17	.15	.01	1838.
0.00	0.00	154	.17	.15	.01	1947.
0.00	0.00	155	.17	.15	.01	2028.
0.00	0.00	156	.17	.15	.01	2090.
0.00	0.00	157	.20	.19	.01	2141.
0.00	0.00	158	.20	.19	.01	2193.
0.00	0.00	159	.20	.19	.01	2255.
0.00	0.00	160	.20	.19	.01	2330.
0.00	0.00	161	.20	.19	.01	2409.
0.00	0.00	162	.20	.19	.01	2485.
0.00	0.00	163	.20	.19	.01	2552.
0.00	0.00	164	.20	.19	.01	2606.
0.00	0.00	165	.20	.19	.01	2646.
0.00	0.00	166	.20	.19	.01	2675.
0.00	0.00	167	.20	.19	.01	2697.
0.00	0.00	168	.20	.19	.01	2713.
0.00	0.00	169	.25	.24	.01	2734.
0.00	0.00	170	.25	.24	.01	2769.
0.00	0.00	171	.25	.24	.01	2830.
0.00	0.00	172	.25	.24	.01	2918.
0.00	0.00	173	.25	.24	.01	3020.
0.00	0.00	174	.25	.24	.01	3121.
0.00	0.00	175	.25	.24	.01	3210.
0.00	0.00	176	.25	.24	.01	3285.
0.00	0.00	177	.25	.24	.01	3339.
0.00	0.00	178	.25	.24	.01	3378.
0.00	0.00	179	.25	.24	.01	3407.
0.00	0.00	180	.25	.24	.01	3429.
0.00	0.00	181	.15	.14	.01	3429.
0.00	0.00	182	.30	.29	.01	3416.
0.00	0.00	183	.30	.29	.01	3398.
0.00	0.00	184	.46	.44	.01	3432.
0.00	0.00	185	.53	.52	.01	3592.
0.00	0.00	186	1.29	1.28	.01	4037.
0.00	0.00	187	2.13	2.12	.01	5045.
0.00	0.00	188	.84	.82	.01	6641.
0.00	0.00	189	.53	.52	.01	8667.
0.00	0.00	190	.46	.44	.01	10487.
0.00	0.00	191	.30	.29	.01	11482.
0.00	0.00	192	.30	.29	.01	11570.
0.00	0.00	193	.23	.22	.01	10936.
0.00	0.00	194	.23	.22	.01	9825.
0.00	0.00	195	.23	.22	.01	8478.
0.00	0.00	196	.23	.22	.01	7282.
0.00	0.00	197	.23	.22	.01	6328.
0.00	0.00	198	.23	.22	.01	5579.
0.00	0.00	199	.23	.22	.01	4993.
0.00	0.00	200	.23	.22	.01	4547.
0.00	0.00	201	.23	.22	.01	4216.
0.00	0.00	202	.23	.22	.01	3968.
0.00	0.00	203	.23	.22	.01	3784.
0.00	0.00	204	.23	.22	.01	3647.
0.00	0.00	205	.18	.17	.01	3537.
0.00	0.00	206	.18	.17	.01	3435.
0.00	0.00	207	.18	.17	.01	3324.
0.00	0.00	208	.18	.17	.01	3199.
0.00	0.00	209	.18	.17	.01	3071.
0.00	0.00	210	.18	.17	.01	2948.
0.00	0.00	211	.18	.17	.01	2839.
0.00	0.00	212	.18	.17	.01	2749.
0.00	0.00	213	.18	.17	.01	2681.
0.00	0.00	214	.18	.17	.01	2633.
0.00	0.00	215	.18	.17	.01	2600.
0.00	0.00	216	.18	.17	.01	2577.
0.00	0.00	217	.01	.00	.01	2530.
0.00	0.00	218	.01	.00	.01	2429.
0.00	0.00	219	.01	.00	.01	2234.
0.00	0.00	220	.01	.00	.01	1943.
0.00	0.00	221	.01	.00	.01	1603.
0.00	0.00	222	.01	.00	.01	1265.
0.00	0.00	223	.01	.00	.01	963.
0.00	0.00	224	.01	.00	.01	713.

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
0.00	0.00	225	.01	.00	.01	568.
0.00	0.00	226	.01	.00	.01	530.
0.00	0.00	227	.01	.00	.01	495.
0.00	0.00	228	.01	.00	.01	462.
0.00	0.00	229	.01	.00	.01	431.
0.00	0.00	230	.01	.00	.01	402.
0.00	0.00	231	.01	.00	.01	375.
0.00	0.00	232	.01	.00	.01	350.
0.00	0.00	233	.01	.00	.01	326.
0.00	0.00	234	.01	.00	.01	305.
0.00	0.00	235	.01	.00	.01	284.
0.00	0.00	236	.01	.00	.01	265.
0.00	0.00	237	.01	.00	.01	247.
0.00	0.00	238	.01	.00	.01	231.
0.00	0.00	239	.01	.00	.01	215.
0.00	0.00	240	.01	.00	.01	201.
0.00	0.00	241	.01	.00	.01	187.
0.00	0.00	242	.01	.00	.01	175.
0.00	0.00	243	.01	.00	.01	163.
0.00	0.00	244	.01	.00	.01	152.
0.00	0.00	245	.01	.00	.01	142.
0.00	0.00	246	.01	.00	.01	133.
0.00	0.00	247	.01	.00	.01	124.
0.00	0.00	248	.01	.00	.01	115.
0.00	0.00	249	.01	.00	.01	108.
0.00	0.00	250	.01	.00	.01	100.
0.00	0.00	251	.01	.00	.01	94.
0.00	0.00	252	.01	.00	.01	87.
0.00	0.00	253	.01	.00	.01	82.
0.00	0.00	254	.01	.00	.01	76.
0.00	0.00	255	.01	.00	.01	71.
0.00	0.00	256	.01	.00	.01	66.
0.00	0.00	257	.01	.00	.01	62.
0.00	0.00	258	.01	.00	.01	58.
0.00	0.00	259	.01	.00	.01	54.
0.00	0.00	260	.01	.00	.01	50.
0.00	0.00	261	.01	.00	.01	47.
0.00	0.00	262	.01	.00	.01	44.
0.00	0.00	263	.01	.00	.01	41.
0.00	0.00	264	.01	.00	.01	38.
0.00	0.00	265	.01	.00	.01	36.
0.00	0.00	266	.01	.00	.01	33.
0.00	0.00	267	.01	.00	.01	31.
0.00	0.00	268	.01	.00	.01	29.
0.00	0.00	269	.01	.00	.01	27.
0.00	0.00	270	.01	.00	.01	25.
0.00	0.00	271	.01	.00	.01	23.
0.00	0.00	272	.01	.00	.01	22.
0.00	0.00	273	.01	.00	.01	20.
0.00	0.00	274	.01	.00	.01	19.
0.00	0.00	275	.01	.00	.01	18.
0.00	0.00	276	.01	.00	.01	17.
0.00	0.00	277	.01	.00	.01	15.
0.00	0.00	278	.01	.00	.01	14.
0.00	0.00	279	.01	.00	.01	13.
0.00	0.00	280	.01	.00	.01	13.
0.00	0.00	281	.01	.00	.01	12.
0.00	0.00	282	.01	.00	.01	12.
0.00	0.00	283	.01	.00	.01	12.
0.00	0.00	284	.01	.00	.01	12.
0.00	0.00	285	.01	.00	.01	12.
0.00	0.00	286	.01	.00	.01	12.
0.00	0.00	287	.01	.00	.01	12.
0.00	0.00	289	.01	.00	.01	12.
		SUM	23.40	19.63	3.77	294265.
			(594.)	(499.)	(96.)	(8332.66)

HYDROGRAPH ROUTING

ROUTE DISCHARGE THRU DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
DAM	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-797.	-1

STAGE	796.50	797.00	799.00	801.00	802.00	803.00	804.00	805.00
FLOW	0.00	4.00	232.00	636.00	858.00	1112.00	1382.00	1649.00
SURFACE AREA=	0.	190.	294.	420.				
CAPACITY=	0.	633.	1354.	8456.				
ELEVATION=	787.	797.	800.	820.				

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
796.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
802.0	2.6	1.5	1252.

STATION DAM, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	4.	4.	4.	4.	5.	6.	6.	7.	7.
8.	9.	10.	10.	11.	12.	12.	13.	14.	14.
15.	16.	16.	17.	18.	18.	19.	20.	20.	21.
22.	22.	23.	24.	24.	25.	27.	29.	32.	36.
41.	47.	54.	61.	68.	75.	83.	91.	98.	106.
114.	122.	131.	139.	148.	156.	164.	173.	181.	189.
198.	206.	215.	224.	233.	249.	265.	282.	298.	314.
329.	345.	360.	375.	390.	407.	427.	452.	486.	529.
576.	628.	682.	731.	773.	809.	839.	880.	1036.	1221.
1405.	1578.	1738.	1882.	2013.	2129.	2230.	2315.	2383.	2437.
2476.	2503.	2521.	2533.	2540.	2545.	2545.	2540.	2522.	2484.
2423.	2340.	2239.	2125.	2009.	1897.	1795.	1700.	1613.	1533.
1459.	1390.	1327.	1269.	1215.	1165.	1119.	1076.	1038.	1002.
970.	941.	915.	893.	875.	861.	856.	852.	848.	845.
841.	837.	833.	830.	826.	822.	818.	814.	811.	807.
803.	799.	795.	792.	788.	784.	780.	777.	773.	769.
765.	762.	758.	754.	750.	747.	743.	739.	736.	732.
728.	725.	721.	718.	714.	711.	707.	704.		

STORAGE

633.	633.	633.	633.	633.	633.	633.	633.	633.	633.
633.	633.	633.	633.	633.	633.	633.	633.	633.	633.
633.	633.	633.	633.	633.	633.	633.	633.	633.	633.
633.	633.	633.	633.	633.	633.	632.	632.	632.	632.
632.	632.	632.	632.	632.	632.	632.	632.	632.	632.
632.	632.	632.	632.	632.	632.	632.	632.	632.	632.
632.	632.	632.	632.	632.	632.	632.	632.	632.	632.
632.	632.	632.	632.	631.	631.	631.	631.	631.	631.
631.	631.	631.	631.	631.	631.	631.	631.	631.	631.
631.	631.	631.	631.	631.	631.	631.	631.	631.	631.
631.	631.	631.	631.	631.	631.	631.	631.	631.	631.
631.	632.	632.	633.	634.	635.	636.	637.	638.	639.
640.	641.	643.	644.	645.	646.	647.	648.	650.	651.
652.	653.	654.	655.	657.	658.	659.	660.	661.	662.
663.	664.	665.	667.	668.	669.	672.	675.	681.	688.
697.	707.	719.	732.	748.	758.	772.	787.	801.	816.
832.	848.	864.	881.	898.	915.	932.	950.	957.	985.
1003.	1021.	1040.	1060.	1080.	1100.	1121.	1143.	1164.	1185.
1207.	1228.	1249.	1270.	1291.	1315.	1343.	1380.	1430.	1492.
1564.	1639.	1712.	1779.	1837.	1886.	1927.	1962.	1992.	2017.
2038.	2056.	2071.	2084.	2095.	2105.	2113.	2120.	2126.	2130.
2133.	2135.	2136.	2137.	2138.	2138.	2138.	2138.	2136.	2133.
2129.	2122.	2114.	2105.	2095.	2085.	2076.	2067.	2059.	2051.
2043.	2036.	2029.	2022.	2016.	2010.	2003.	1998.	1992.	1996.
1981.	1975.	1970.	1965.	1960.	1955.	1950.	1945.	1940.	1935.
1930.	1925.	1919.	1914.	1909.	1904.	1899.	1893.	1888.	1883.
1878.	1873.	1867.	1862.	1857.	1852.	1847.	1842.	1836.	1831.
1826.	1821.	1816.	1811.	1806.	1801.	1796.	1791.	1786.	1781.
1776.	1771.	1766.	1761.	1756.	1752.	1747.	1742.		

STAGE

797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0	797.0
797.0	797.0	797.0	797.1	797.1	797.1	797.1	797.1	797.1	797.1
797.1	797.1	797.1	797.1	797.1	797.1	797.1	797.1	797.1	797.1
797.2	797.2	797.2	797.2	797.2	797.2	797.2	797.2	797.2	797.3
797.3	797.4	797.4	797.5	797.6	797.6	797.7	797.8	797.8	797.9
798.0	798.0	798.1	798.2	798.3	798.3	798.4	798.5	798.6	798.6
798.7	798.8	798.8	798.9	799.0	799.1	799.2	799.2	799.3	799.4
799.5	799.6	799.6	799.7	799.8	799.9	800.0	800.1	800.3	800.5
800.7	801.0	801.2	801.4	801.6	801.8	801.9	802.0	802.1	802.2
802.3	802.3	802.4	802.4	802.5	802.5	802.5	802.5	802.6	802.6
802.6	802.6	802.6	802.6	802.6	802.6	802.6	802.6	802.6	802.6
802.6	802.5	802.5	802.5	802.5	802.4	802.4	802.4	802.3	802.3
802.3	802.3	802.2	802.2	802.2	802.2	802.2	802.1	802.1	802.1
802.1	802.1	802.1	802.0	802.0	802.0	802.0	802.0	802.0	801.9
801.9	801.9	801.9	801.9	801.9	801.8	801.8	801.8	801.8	801.8
801.8	801.7	801.7	801.7	801.7	801.7	801.7	801.6	801.6	801.6
801.6	801.6	801.5	801.5	801.5	801.5	801.5	801.5	801.4	801.4
801.4	801.4	801.4	801.4	801.4	801.3	801.3	801.3		

PEAK OUTFLOW IS 2545. AT TIME 18.08 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2545.	1451.	461.	461.	132909.
CMS	72.	41.	13.	13.	3764.
INCHES		7.10	9.04	9.04	9.04
MM		180.44	229.56	229.56	229.56
AC-FT		719.	915.	915.	915.
THOUS CU M		887.	1129.	1129.	1129.

```
A1                    NATIONAL DAM SAFETY PROGRAM
A2                 MT. HOPE LAKE DAM    NEW JERSEY
A3                    PMF BREACH AND CHANNEL ROUTING
B     250          0         5                                  0         0         3
B1      5
J       1        .1         1
J1      1
K       0      LAKE                          0         0         1
K1                    INFLOW HYDROGRAPH TO MT. HOPE LAKE DAM
M       1         2       1.9                1.9         0                             1
P       0        25       100       109      117
T                                                                1.5      0.15
W2              0.42
X    -1.0     -0.05       2.0
K       1       DAM                          0         0         1
K1                    ROUTE DISCHARGE THRU DAM
Y                                        1         1
Y1      1                                                       -797        -1
Y4  796.5       797       799       801      802       803       804       805
Y5      0         4       232       636      858      1112      1382      1649
SA      0       190       294       420
SE    787       797       800       820
$$  796.5
SD    802      2.63       1.5      1252
SB    120         2       792         1      797       802
K       1         1                                                1
K1                    CHANNEL ROUTING REACH 1
Y                                        1         1
Y1      1
Y6    0.1      0.05       0.1       784      796       160      0.03
Y7      0       796        60       790       75       790       170       788       184       784
Y7    195       788       295       790      360       796
K      99
A
A
A
A
A
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DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
120.	2.00	792.00	1.00	797.00	802.00

STATION DAM, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

MO.DA	HR.MN	PERIOD	HOURS	INFLOW	OUTFLOW	STORAGE	STAGE
1.01	.05	1	.08	2.	4.	633.	797.0
1.01	.10	2	.17	2.	4.	633.	797.0
1.01	.15	3	.25	2.	4.	633.	797.0
1.01	.20	4	.33	1.	4.	633.	797.0
1.01	.25	5	.42	1.	4.	633.	797.0
1.01	.30	6	.50	1.	4.	633.	797.0
1.01	.35	7	.58	1.	4.	633.	797.0
1.01	.40	8	.67	1.	4.	633.	797.0
1.01	.45	9	.75	1.	4.	633.	797.0
1.01	.50	10	.83	1.	4.	633.	797.0
1.01	.55	11	.92	1.	4.	633.	797.0
1.01	1.00	12	1.00	1.	4.	633.	797.0
1.01	1.05	13	1.08	1.	4.	633.	797.0
1.01	1.10	14	1.17	1.	4.	633.	797.0
1.01	1.15	15	1.25	1.	4.	633.	797.0
1.01	1.20	16	1.33	1.	4.	633.	797.0
1.01	1.25	17	1.42	1.	4.	633.	797.0
1.01	1.30	18	1.50	1.	4.	633.	797.0
1.01	1.35	19	1.58	1.	4.	633.	797.0
1.01	1.40	20	1.67	0.	4.	633.	797.0
1.01	1.45	21	1.75	0.	4.	633.	797.0
1.01	1.50	22	1.83	0.	4.	633.	797.0
1.01	1.55	23	1.92	0.	4.	633.	797.0
1.01	2.00	24	2.00	0.	4.	633.	797.0
1.01	2.05	25	2.08	0.	4.	633.	797.0
1.01	2.10	26	2.17	0.	4.	633.	797.0
1.01	2.15	27	2.25	0.	4.	633.	797.0
1.01	2.20	28	2.33	0.	4.	633.	797.0
1.01	2.25	29	2.42	0.	4.	633.	797.0
1.01	2.30	30	2.50	0.	4.	633.	797.0
1.01	2.35	31	2.58	0.	4.	633.	797.0
1.01	2.40	32	2.67	0.	4.	633.	797.0
1.01	2.45	33	2.75	0.	4.	633.	797.0
1.01	2.50	34	2.83	0.	4.	633.	797.0
1.01	2.55	35	2.92	0.	4.	633.	797.0
1.01	3.00	36	3.00	0.	4.	633.	797.0
1.01	3.05	37	3.08	0.	4.	632.	797.0
1.01	3.10	38	3.17	0.	4.	632.	797.0
1.01	3.15	39	3.25	0.	4.	632.	797.0
1.01	3.20	40	3.33	0.	4.	632.	797.0
1.01	3.25	41	3.42	0.	4.	632.	797.0
1.01	3.30	42	3.50	0.	4.	632.	797.0
1.01	3.35	43	3.58	0.	4.	632.	797.0
1.01	3.40	44	3.67	0.	4.	632.	797.0
1.01	3.45	45	3.75	0.	4.	632.	797.0
1.01	3.50	46	3.83	0.	4.	632.	797.0
1.01	3.55	47	3.92	0.	4.	632.	797.0
1.01	4.00	48	4.00	0.	4.	632.	797.0
1.01	4.05	49	4.08	0.	4.	632.	797.0
1.01	4.10	50	4.17	0.	4.	632.	797.0
1.01	4.15	51	4.25	0.	4.	632.	797.0
1.01	4.20	52	4.33	0.	4.	632.	797.0
1.01	4.25	53	4.42	0.	4.	632.	797.0
1.01	4.30	54	4.50	0.	4.	632.	797.0
1.01	4.35	55	4.58	0.	4.	632.	797.0
1.01	4.40	56	4.67	0.	4.	632.	797.0
1.01	4.45	57	4.75	0.	4.	632.	797.0
1.01	4.50	58	4.83	0.	4.	632.	797.0
1.01	4.55	59	4.92	0.	4.	632.	797.0
1.01	5.00	60	5.00	0.	4.	632.	797.0
1.01	5.05	61	5.08	0.	4.	632.	797.0
1.01	5.10	62	5.17	0.	4.	632.	797.0
1.01	5.15	63	5.25	0.	4.	632.	797.0
1.01	5.20	64	5.33	0.	4.	632.	797.0
1.01	5.25	65	5.42	0.	4.	632.	797.0
1.01	5.30	66	5.50	0.	4.	632.	797.0
1.01	5.35	67	5.58	0.	4.	632.	797.0
1.01	5.40	68	5.67	0.	4.	632.	797.0
1.01	5.45	69	5.75	0.	4.	632.	797.0
1.01	5.50	70	5.83	0.	4.	632.	797.0
1.01	5.55	71	5.92	0.	4.	632.	797.0
1.01	6.00	72	6.00	0.	4.	632.	797.0
1.01	6.05	73	6.08	0.	4.	632.	797.0
1.01	6.10	74	6.17	0.	4.	632.	797.0
1.01	6.15	75	6.25	0.	4.	631.	797.0
1.01	6.20	76	6.33	0.	4.	631.	797.0
1.01	6.25	77	6.42	0.	4.	631.	797.0
1.01	6.30	78	6.50	0.	4.	631.	797.0
1.01	6.35	79	6.58	0.	4.	631.	797.0
1.01	6.40	80	6.67	0.	4.	631.	797.0
1.01	6.45	81	6.75	0.	4.	631.	797.0
1.01	6.50	82	6.83	0.	4.	631.	797.0
1.01	6.55	83	6.92	0.	4.	631.	797.0
1.01	7.00	84	7.00	0.	4.	631.	797.0
1.01	7.05	85	7.08	0.	4.	631.	797.0
1.01	7.10	86	7.17	0.	4.	631.	797.0
1.01	7.15	87	7.25	0.	4.	631.	797.0
1.01	7.20	88	7.33	0.	4.	631.	797.0
1.01	7.25	89	7.42	0.	4.	631.	797.0
1.01	7.30	90	7.50	0.	4.	631.	797.0
1.01	7.35	91	7.58	0.	4.	631.	797.0
1.01	7.40	92	7.67	0.	4.	631.	797.0
1.01	7.45	93	7.75	0.	4.	631.	797.0
1.01	7.50	94	7.83	0.	4.	631.	797.0

MO.DA	HR.MN	PERIOD	HOURS	INFLOW	OUTFLOW	STORAGE	STAGE
1.01	7.55	95	7.92	0.	4.	631.	797.0
1.01	8.00	96	8.00	0.	4.	631.	797.0
1.01	8.05	97	8.08	0.	4.	631.	797.0
1.01	8.10	98	8.17	0.	4.	631.	797.0
1.01	8.15	99	8.25	0.	4.	631.	797.0
1.01	8.20	100	8.33	0.	4.	631.	797.0
1.01	8.25	101	8.42	0.	4.	631.	797.0
1.01	8.30	102	8.50	0.	4.	631.	797.0
1.01	8.35	103	8.58	0.	4.	631.	797.0
1.01	8.40	104	8.67	0.	4.	631.	797.0
1.01	8.45	105	8.75	0.	4.	631.	797.0
1.01	8.50	106	8.83	0.	4.	631.	797.0
1.01	8.55	107	8.92	1.	4.	631.	797.0
1.01	9.00	108	9.00	6.	4.	631.	797.0
1.01	9.05	109	9.08	17.	4.	631.	797.0
1.01	9.10	110	9.17	35.	4.	631.	797.0
1.01	9.15	111	9.25	58.	4.	631.	797.0
1.01	9.20	112	9.33	83.	4.	632.	797.0
1.01	9.25	113	9.42	106.	4.	632.	797.0
1.01	9.30	114	9.50	125.	4.	633.	797.0
1.01	9.35	115	9.58	141.	4.	634.	797.0
1.01	9.40	116	9.67	152.	5.	635.	797.0
1.01	9.45	117	9.75	160.	6.	636.	797.0
1.01	9.50	118	9.83	166.	6.	637.	797.0
1.01	9.55	119	9.92	171.	7.	638.	797.0
1.01	10.00	120	10.00	174.	7.	639.	797.0
1.01	10.05	121	10.08	177.	8.	640.	797.0
1.01	10.10	122	10.17	178.	9.	641.	797.0
1.01	10.15	123	10.25	180.	10.	643.	797.0
1.01	10.20	124	10.33	181.	10.	644.	797.1
1.01	10.25	125	10.42	182.	11.	645.	797.1
1.01	10.30	126	10.50	182.	12.	646.	797.1
1.01	10.35	127	10.58	183.	12.	647.	797.1
1.01	10.40	128	10.67	183.	13.	648.	797.1
1.01	10.45	129	10.75	183.	14.	650.	797.1
1.01	10.50	130	10.83	184.	14.	651.	797.1
1.01	10.55	131	10.92	184.	15.	652.	797.1
1.01	11.00	132	11.00	184.	16.	653.	797.1
1.01	11.05	133	11.08	184.	16.	654.	797.1
1.01	11.10	134	11.17	184.	17.	655.	797.1
1.01	11.15	135	11.25	184.	18.	657.	797.1
1.01	11.20	136	11.33	184.	18.	658.	797.1
1.01	11.25	137	11.42	184.	19.	659.	797.1
1.01	11.30	138	11.50	184.	20.	660.	797.1
1.01	11.35	139	11.58	184.	20.	661.	797.1
1.01	11.40	140	11.67	184.	21.	662.	797.1
1.01	11.45	141	11.75	184.	22.	663.	797.2
1.01	11.50	142	11.83	184.	22.	664.	797.2
1.01	11.55	143	11.92	184.	23.	665.	797.2
1.01	12.00	144	12.00	184.	24.	667.	797.2
1.01	12.05	145	12.08	208.	24.	668.	797.2
1.01	12.10	146	12.17	282.	25.	669.	797.2
1.01	12.15	147	12.25	437.	27.	672.	797.2
1.01	12.20	148	12.33	674.	29.	675.	797.2
1.01	12.25	149	12.42	953.	32.	681.	797.2
1.01	12.30	150	12.50	1232.	36.	688.	797.3
1.01	12.35	151	12.58	1481.	41.	697.	797.3
1.01	12.40	152	12.67	1688.	47.	707.	797.4
1.01	12.45	153	12.75	1838.	54.	719.	797.4
1.01	12.50	154	12.83	1947.	61.	732.	797.5
1.01	12.55	155	12.92	2028.	68.	745.	797.6
1.01	13.00	156	13.00	2090.	75.	758.	797.6
1.01	13.05	157	13.08	2141.	83.	772.	797.7
1.01	13.10	158	13.17	2193.	91.	787.	797.8
1.01	13.15	159	13.25	2255.	98.	801.	797.8
1.01	13.20	160	13.33	2330.	106.	816.	797.9
1.01	13.25	161	13.42	2409.	114.	832.	798.0
1.01	13.30	162	13.50	2485.	122.	848.	798.0
1.01	13.35	163	13.58	2552.	131.	864.	798.1
1.01	13.40	164	13.67	2606.	139.	881.	798.2
1.01	13.45	165	13.75	2646.	148.	898.	798.3
1.01	13.50	166	13.83	2675.	156.	915.	798.3
1.01	13.55	167	13.92	2697.	164.	932.	798.4
1.01	14.00	168	14.00	2713.	173.	950.	798.5
1.01	14.05	169	14.08	2734.	181.	967.	798.6
1.01	14.10	170	14.17	2769.	189.	985.	798.6
1.01	14.15	171	14.25	2830.	198.	1003.	798.7
1.01	14.20	172	14.33	2918.	206.	1021.	798.8
1.01	14.25	173	14.42	3020.	215.	1040.	798.8
1.01	14.30	174	14.50	3121.	224.	1060.	798.9
1.01	14.35	175	14.58	3210.	233.	1080.	799.0
1.01	14.40	176	14.67	3285.	249.	1100.	799.1
1.01	14.45	177	14.75	3339.	265.	1121.	799.2
1.01	14.50	178	14.83	3378.	282.	1143.	799.2
1.01	14.55	179	14.92	3407.	298.	1164.	799.3
1.01	15.00	180	15.00	3429.	314.	1185.	799.4
1.01	15.05	181	15.08	3429.	329.	1207.	799.5
1.01	15.10	182	15.17	3416.	345.	1228.	799.6
1.01	15.15	183	15.25	3398.	360.	1249.	799.6
1.01	15.20	184	15.33	3432.	375.	1270.	799.7
1.01	15.25	185	15.42	3592.	390.	1291.	799.8
1.01	15.30	186	15.50	4037.	407.	1315.	799.9
1.01	15.35	187	15.58	5045.	427.	1343.	800.0
1.01	15.40	188	15.67	6641.	452.	1380.	800.1
1.01	15.45	189	15.75	8667.	486.	1430.	800.3
1.01	15.50	190	15.83	10487.	529.	1492.	800.5
1.01	15.55	191	15.92	11482.	578.	1564.	800.7
1.01	16.00	192	16.00	11570.	628.	1639.	801.0
1.01	16.05	193	16.08	10936.	682.	1712.	801.2
1.01	16.10	194	16.17	9825.	731.	1779.	801.4
1.01	16.15	195	16.25	8478.	773.	1837.	801.6
1.01	16.20	196	16.33	7282.	809.	1886.	801.8
1.01	16.25	197	16.42	6328.	839.	1927.	801.9
1.01	16.30	198	16.50	5579.	882.	1962.	802.0

BEGIN DAM FAILURE

AT 16.50 HOURS

MO.DA	HR.MN	PERIOD	HOURS	INFLOW	OUTFLOW	STORAGE	STAGE
1.01	16.35	199	16.58	4993.	1379.	1991.	802.1
1.01	16.40	200	16.67	4547.	2137.	2011.	802.2
1.01	16.45	201	16.75	4216.	3009.	2024.	802.2
1.01	16.50	202	16.83	3968.	3938.	2028.	802.2
1.01	16.55	203	16.92	3784.	4895.	2024.	802.2
1.01	17.00	204	17.00	3647.	5868.	2013.	802.2
1.01	17.05	205	17.08	3537.	6862.	1994.	802.1
1.01	17.10	206	17.17	3435.	7898.	1967.	802.0
1.01	17.15	207	17.25	3324.	9064.	1932.	801.9
1.01	17.20	208	17.33	3199.	10278.	1888.	801.8
1.01	17.25	209	17.42	3071.	11496.	1835.	801.6
1.01	17.30	210	17.50	2948.	12707.	1772.	801.4
1.01	17.35	211	17.58	2839.	12213.	1706.	801.2
1.01	17.40	212	17.67	2749.	11745.	1643.	801.0
1.01	17.45	213	17.75	2681.	11303.	1582.	800.8
1.01	17.50	214	17.83	2633.	10885.	1524.	800.6
1.01	17.55	215	17.92	2600.	10488.	1469.	800.4
1.01	18.00	216	18.00	2577.	10113.	1415.	800.2
1.01	18.05	217	18.08	2530.	9757.	1365.	800.0
1.01	18.10	218	18.17	2429.	9415.	1316.	799.9
1.01	18.15	219	18.25	2234.	9080.	1268.	799.7
1.01	18.20	220	18.33	1943.	8745.	1221.	799.5
1.01	18.25	221	18.42	1603.	8408.	1174.	799.4
1.01	18.30	222	18.50	1265.	8068.	1127.	799.2
1.01	18.35	223	18.58	963.	7726.	1081.	799.0
1.01	18.40	224	18.67	713.	7398.	1034.	798.8
1.01	18.45	225	18.75	568.	7073.	989.	798.6
1.01	18.50	226	18.83	530.	6757.	945.	798.5
1.01	18.55	227	18.92	495.	6452.	903.	798.3
1.01	19.00	228	19.00	462.	6157.	863.	798.1
1.01	19.05	229	19.08	431.	5872.	825.	797.9
1.01	19.10	230	19.17	402.	5597.	788.	797.8
1.01	19.15	231	19.25	375.	5333.	753.	797.6
1.01	19.20	232	19.33	350.	5079.	720.	797.4
1.01	19.25	233	19.42	326.	4834.	688.	797.3
1.01	19.30	234	19.50	305.	4599.	658.	797.1
1.01	19.35	235	19.58	284.	4375.	629.	797.0
1.01	19.40	236	19.67	265.	4173.	601.	796.8
1.01	19.45	237	19.75	247.	3978.	575.	796.7
1.01	19.50	238	19.83	231.	3789.	550.	796.5
1.01	19.55	239	19.92	215.	3608.	526.	796.4
1.01	20.00	240	20.00	201.	3434.	503.	796.3
1.01	20.05	241	20.08	187.	3266.	481.	796.1
1.01	20.10	242	20.17	175.	3104.	461.	796.0
1.01	20.15	243	20.25	163.	2949.	441.	795.9
1.01	20.20	244	20.33	152.	2800.	422.	795.7
1.01	20.25	245	20.42	142.	2657.	404.	795.6
1.01	20.30	246	20.50	133.	2521.	388.	795.5
1.01	20.35	247	20.58	124.	2389.	372.	795.4
1.01	20.40	248	20.67	115.	2264.	356.	795.3
1.01	20.45	249	20.75	108.	2144.	342.	795.1
1.01	20.50	250	20.83	100.	2030.	328.	795.0
0.00	0.00	251	20.92	94.	1921.	315.	794.9
0.00	0.00	252	21.00	87.	1817.	303.	794.8
0.00	0.00	253	21.08	82.	1718.	291.	794.7
0.00	0.00	254	21.17	76.	1624.	281.	794.6
0.00	0.00	255	21.25	71.	1535.	270.	794.5
0.00	0.00	256	21.33	66.	1450.	260.	794.4
0.00	0.00	257	21.42	62.	1369.	251.	794.3
0.00	0.00	258	21.50	58.	1293.	242.	794.3
0.00	0.00	259	21.58	54.	1220.	234.	794.2
0.00	0.00	260	21.67	50.	1152.	226.	794.1
0.00	0.00	261	21.75	47.	1087.	219.	794.0
0.00	0.00	262	21.83	44.	1026.	212.	793.9
0.00	0.00	263	21.92	41.	968.	205.	793.9
0.00	0.00	264	22.00	38.	913.	199.	793.8
0.00	0.00	265	22.08	36.	862.	193.	793.7
0.00	0.00	266	22.17	33.	813.	188.	793.7
0.00	0.00	267	22.25	31.	767.	182.	793.6
0.00	0.00	268	22.33	29.	724.	178.	793.5
0.00	0.00	269	22.42	27.	683.	173.	793.5
0.00	0.00	270	22.50	25.	645.	169.	793.4
0.00	0.00	271	22.58	23.	609.	164.	793.4
0.00	0.00	272	22.67	22.	575.	160.	793.3
0.00	0.00	273	22.75	20.	543.	157.	793.3
0.00	0.00	274	22.83	19.	513.	153.	793.2
0.00	0.00	275	22.92	18.	485.	150.	793.2
0.00	0.00	276	23.00	17.	458.	147.	793.1
0.00	0.00	277	23.08	15.	433.	144.	793.1
0.00	0.00	278	23.17	14.	410.	141.	793.1
0.00	0.00	279	23.25	13.	388.	138.	793.0
0.00	0.00	280	23.33	13.	368.	136.	793.0
0.00	0.00	281	23.42	12.	349.	134.	793.0
0.00	0.00	282	23.50	12.	331.	131.	792.9
0.00	0.00	283	23.58	12.	314.	129.	792.9
0.00	0.00	284	23.67	12.	298.	127.	792.9
0.00	0.00	285	23.75	12.	283.	126.	792.8
0.00	0.00	286	23.83	12.	269.	124.	792.8
0.00	0.00	287	23.92	12.	256.	122.	792.8
0.00	0.00	288	24.00	12.	243.	121.	792.8

PEAK OUTFLOW IS 12707. AT TIME 17.50 HOURS

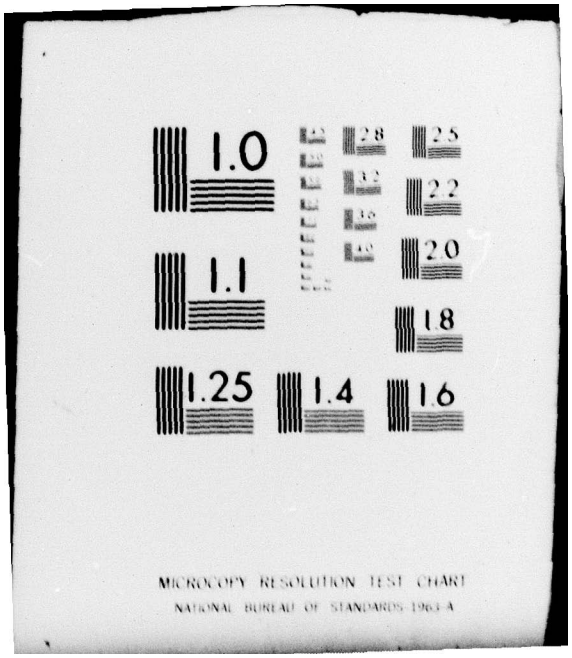
AD-A074 353 NEW JERSEY DEPT OF ENVIRONMENTAL PROTECTION TRENTON F/G 13/2
NATIONAL DAM SAFETY PROGRAM. MT. HOPE LAKE DAM (NJ-00464) PASSA--ETC(U)
JUN 79 R J MCDERMOTT, J E GRIBBIN DACW61-79-C-0011

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

SUMMARY OF DAM SAFETY ANALYSIS

•••••••••	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	797.00	796.50	802.00
STORAGE	633.	543.	1953.
OUTFLOW	4.	0.	858.

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	802.60	.60	2138.	2545.	4.08	18.08	0.00
.80	802.07	.07	1976.	944.	1.08	18.50	0.00
.60	800.98	0.00	1646.	633.	0.00	18.58	0.00
.40	799.85	0.00	1311.	404.	0.00	18.58	0.00
.20	798.57	0.00	971.	183.	0.00	18.58	0.00

SUMMARY OF DAM SAFETY ANALYSIS

•••••••	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	797.00	796.50	802.00
STORAGE	633.	543.	1953.
OUTFLOW	4.	0.	858.

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	802.24	.24	2028.	12707.	.77	17.50	16.50

PLAN 1 STATION 1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	12659.	793.4	17.50

APPENDIX 5

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