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NATIONAL DAM SAFETY PROGRAM, LAKE ASHROE DAM (NJ00023), DELAWAR--ETC(U)
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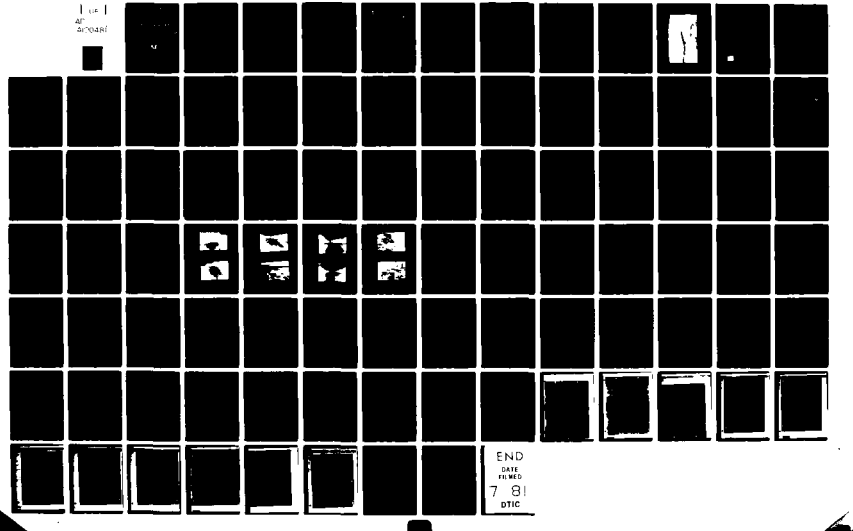

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DELAWARE RIVER BASIN
BRANCH OF BIG FLAT BROOK
SUSSEX COUNTY
NEW JERSEY

LAKE ASHROE DAM
NJ 00023

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PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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DEPARTMENT OF THE ARMY
Philadelphia District
Corps of Engineers
Philadelphia, Pennsylvania

REPT. NO: DAEN/NAP-53842/NJ00023-81/03

MARCH 1981

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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4. TITLE (and Subtitle) Phase I Inspection Report National Dam Safety Program Lake Ashroe Dam NJ 00023 Sussex County, NJ		5. TYPE OF REPORT & PERIOD COVERED FINAL 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Yu, K. Peter		8. CONTRACT OR GRANT NUMBER(s) DACW61-79-C-0011
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11. CONTROLLING OFFICE NAME AND ADDRESS NJ Department of Environmental Protection Division of Water Resources P.O. Box CN029 Trenton, NJ 08625		12. REPORT DATE March 1981 13. NUMBER OF PAGES 60
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17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Copies are obtainable from National Technical Information Service, Springfield, Virginia 22151.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dams
Embankments
Visual Inspection
Structural Analysis
National Dam Safety Program
Lake Ashroe Dam, NJ
Outlet works
Spillways

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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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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

IN REPLY REFER TO
NAPEN-N

29 MAY 1981

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

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Lake Ashroe Dam in Sussex 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, Lake Ashroe Dam, 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 fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to 15 percent of the Probable Maximum Flood would cause the dam to be overtopped. 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 six 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 six months from the date of approval of this report the following remedial actions should be initiated:

(1) Investigate the operating condition of the low level outlet and repair if necessary.

(2) Determine the drawdown capacity of the 12 inch diameter pipe using more precise procedures and increase drawdown capability if necessary.

c. The following remedial actions should be initiated within twelve months from the date of approval of this report:

(1) Clear vegetation downstream of the drop outlet pipe to provide an unobstructed discharge channel.

(2) Evaluate the hydraulic effect of the Struble Road causeway on the dam and modify the causeway if necessary.

(3) Consider providing emergency spillway facilities.

(4) Perform additional investigation to determine the engineering properties of the dam and foundation and whether or not conventional safety margins exist under more severe stress conditions than those observed during the inspection, and what modifications may be required to achieve such safety margins.

d. 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.

e. An emergency action plan 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. 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 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,

Kenneth R. Moser

KENNETH R. MOSER
Major, Corps of Engineers
Acting District Engineer

1 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

LAKE ASHROE DAM (NJ00025)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 26 September and 11 December 1980 by Langan Engineering Associates, 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.

Lake Ashroe Dam, 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 fair overall condition. The dam's spillway is considered inadequate because a flow equivalent to 15 percent of the Probable Maximum Flood would cause the dam to be overtopped. 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 six 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 six months from the date of approval of this report the following remedial actions should be initiated:

(1) Investigate the operating condition of the low level outlet and repair if necessary.

(2) Determine the drawdown capacity of the 12 inch diameter pipe using more precise procedures and increase drawdown capability if necessary.

c. The following remedial actions should be initiated within twelve months from the date of approval of this report:

(1) Clear vegetation downstream of the drop outlet pipe to provide an unobstructed discharge channel.

(2) Evaluate the hydraulic effect of the Struble Road causeway on the dam and modify the causeway if necessary.

(3) Consider providing emergency spillway facilities.

(4) Perform additional investigation to determine the engineering properties of the dam and foundation and whether or not conventional safety margins exist under more severe stress conditions than those observed during the inspection, and what modifications may be required to achieve such safety margins.

d. 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.

e. An emergency action plan 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: Kenneth R. Moser

KENNETH R. MOSER
Major, Corps of Engineers
Acting District Engineer

DATE: 29 May 1981

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

NAME OF DAM:	LAKE ASHROE DAM
ID NUMBER:	FED ID No NJ 00023
STATE LOCATED:	NEW JERSEY
COUNTY LOCATED:	SUSSEX
STREAM:	BRANCH OF BIG PLAT BROOK
RIVER BASIN:	DELAWARE
DATE OF INSPECTION:	SEPTEMBER 1980

ASSESSMENT OF GENERAL CONDITIONS

Lake Ashroe Dam, classified as having significant hazard potential, is less than 9 years old and in fair overall condition. The dam appeared stable under conditions existing at the time of our inspection. However, inadequate engineering data is available to assess the actual degree of stability of the dam and appurtenances. Additional investigation is necessary to adequately evaluate the future performance of the dam.

The spillway capacity as determined by the Corps of Engineers Screening criteria is inadequate. The dam can adequately pass only 14% of the PMF.

The following are recommended to be done soon:

Investigate the operating condition of the low level outlet and repair if necessary. Determine the drawdown capacity of the 12-in diameter pipe using more precise procedures and increase drawdown capability if necessary. Develop written operational procedures to ensure the safety of the dam.

The following are recommended to be done in the near future:

Clear vegetation downstream of the drop outlet pipe to provide unobstructed discharge channel. Evaluate the hydraulic effect of the Struble Road causeway on the dam; modify the causeway if necessary. Provide emergency spillway facilities. Perform additional investigation to determine the engineering properties of the dam and foundation; whether or not conventional safety margins exist under more severe stress conditions than those observed during our inspection, and what modifications may be required to achieve such safety margins.

APPROVED FOR RELEASE; K. Peter Yu, P.E.
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OVERALL VIEW
LAKE ASHROE DAM

26 September 1980

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PHASE I INSPECTION REPORT

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NAME OF DAM: Su[illegible] x ounty,	LAKE ASHROE DAM
ID NUMBER: New Jersey, Ph[illegible] I Inspection Report,	FED ID No NJ 00023
STATE LOCATED:	NEW JERSEY
COUNTY LOCATED:	SUSSEX
STREAM:	BRANCH OF BIG FLAT BROOK
RIVER BASIN:	DELAWARE
DATE OF INSPECTION:	SEPTEMBER 1980

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LANGAN ENGINEERING ASSOCIATES, INC.

Consulting Civil Engineers
990 CLIFTON AVENUE
CLIFTON, NEW JERSEY
201-472-9366

CONTENTS

NATIONAL DAM SAFETY REPORT

LAKE ASHROE DAM FED ID NO NJ 00023

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 reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

SECTION 1 PROJECT INFORMATION

1.1 General

Authority to perform the Phase I Safety Inspection of Lake Ashroe Dam was received from the State of New Jersey, Department of Environmental Protection, Division of Water Resources by letter dated 12 August 1980. This Authority was given pursuant to the National Dam Inspection Act, Public Law 92-367 and by agreement between the State and the US Army Engineers District, Philadelphia.

The purpose of the Phase I Investigation is to develop an assessment of the general conditions with respect to safety of Lake Ashroe Dam and appurtenances based upon available data and visual inspection, and determine any need for emergency measures and conclude if additional studies, investigations and analyses are necessary and warranted. The assessment is made using screening criteria established in Recommended Guidelines for Safety Inspection of Dams prepared by the Department of Army, Office of the Chief of Engineers. It is not the purpose of the inspection report to imply that a dam meeting or failing to meet the screening criteria is, per se, certainly adequate or inadequate.

1.2 Project Description

a. Description of Dam and Appurtenances

Lake Ashroe Dam is a 220 ft long, 19 1/2 ft high earthfill dam with a top width of 30 ft and upstream and downstream slopes of 3H:1V built in 1972. It has a concrete drop inlet spillway with inside riser dimensions of 6 x 2 ft and 24 inch dia RCP discharge. There is a 12 inch diameter valved CMP low level outlet which discharges into the spillway riser. A toe drain system which involved 4-inch diameter perforated asbestos-cement pipes and a rock fill toe blanket is reported to exist at the downstream toe of the embankment. An old dam structure exists below normal lake level across

the stream channel approximately 1200 ft upstream of the present earth dam. Struble Road lies across the lake between the old and the present dam structures. A 48-inch corrugated metal pipe is reported to exist under the causeway for Struble Road.

b. Location

Lake Ashroe Dam is located just east of Struble Road off Rt 206 in the Sakawawin Boy Scout Camp in Stokes State Forest, Sussex County, New Jersey. It is located at north latitude 41°11.0' and west longitude 74°48.7'. A regional vicinity map is given in Figure 1.

c. Size Classification

Lake Ashroe Dam is classified as "Small" on the basis of its maximum height of 19 1/2 ft which is less than 40 feet. It is classified as "Small" on the basis of its maximum storage capacity of 697 ac-ft which is more than 50 ac-ft but less than 1,000 ac ft. Accordingly the dam is classified as "Small" in size.

d. Hazard Classification

In the National Inventory of Dams, Lake Ashroe has been classified as having "High Hazard Potential". Visual inspection of the dam indicates no residences or properties exist immediately downstream. Review of the U.S.G.S. topographic map shows that a few scattered houses and a secondary roadway exist more than a mile downstream. Therefore, it is proposed to change the Hazard Potential Classification to "Significant".

e. Ownership

Ownership of Lake Ashroe Dam is by the Boy Scouts of America, Thomas A. Edison Council, P. O. Drawer L, Edison, New Jersey 08817.

f. Purpose of Dam

The purpose of the dam is recreation.

g. Design and Construction History

Lake Ashroe Dam was designed by the U. S. Department of Agriculture, Soil Conservation Service. The plans are dated 1969. Actual construction appears to have been in 1972. Based on available information, the dam was built to replace the upstream old deteriorated dam. This old dam appears to have been built in 1921 and still exists at its original location just below normal lake level.

h. Normal Operational Procedures

No operating procedures for the dam have been found.

1.3 Pertinent Data

a. Drainage Areas — 1.2 sq. mi.

b. Discharge at Damsite

Maximum known flood at damsite	unknown
Drop inlet spillway capacity at max. pool elevation	62.4 cfs
Total spillway capacity at maximum pool elevation	62.4 cfs

c. Elevation (ft. above MSL, adopted from original design drawings)

Top Dam	798.0
Original design high water	795.9
Recreation pool	794.0 (Assumed to be spillway crest)
Spillway crest	794.0
Streambed at centerline of dam	Approx el 778.5
Maximum tailwater	Unknown

d. Reservoir

Length of maximum pool	Approx 4,130 ft
Length of recreation pool	Approx 3,930 ft

e. Storage (acre-feet)	
Recreation pool	469 ac ft (Assumed to be spillway crest)
Top of dam	697 ac ft
f. Reservoir Surface (acres)	
Top dam	60.8
Maximum pool	60.8 (Assumes top of dam)
Recreation pool	48.2 (Assumed to be spillway crest)
Spillway crest	48.2
g. Dam	
Type	Earthfill
Length	220'
Height	19.5'
Top Width	30'
Side Slopes	Downstream 3H:1V Upstream 3H:1V
Zoning	None indicated on plans
Impervious Core	None indicated on plans
Cutoff	Cutoff trench, 10 ft below base of dam or to Bedrock whichever is higher
Grout curtain	None indicated on plans
h. Spillway	
Type	Reinforced concrete drop inlet with 24" dia RCP discharge

	Length of weir	N/A, inside rise dimension 6' x 2'
	Crest elevation	794.0
	Gates	None
	U/S Channel	N/A
	D/S Channel	24" dia RCP discharge invert 778.5
i.	Regulating Outlets	12" dia valved low level outlet discharges into drop inlet riser.

SECTION 2 ENGINEERING DATA

The available information concerning the design of the dam consist of plans prepared by the U. S. Department of Agriculture, Soil Conservation Service for Sakawawin Scout Reservation, Middlesex Council, Boy Scouts of America, Sussex County, New Jersey, Drawing No. NJ-01-726, dated 1969.

Very little information is available concerning the construction of the dam. Harold E. Pellow & Associates, Inc., Consulting Engineers of 100 Main Street, Sussex, New Jersey 07461 signed the completion report for the Lake Ashroe Dam and described the foundation and dam material in a letter dated 24 April 1973.

No construction records for the dam have been found, therefore the validity of the above drawings cannot be ascertained.

No engineering data concerning the material properties of the dam and foundation could be located as informed by the office of the Soil Conservation Service. The available information is not adequate to perform a thorough evaluation of the dam.

SECTION 3 VISUAL INSPECTION

Lake Ashroe Dam appears to be in fair overall condition. There is minor surface sloughing and erosion of the downstream embankment. Much of the

surface erosion has been maintained by filling with cobbles and boulders. No seepage was observed on the downstream face or toe during our inspection. The embankments are sparsely covered with grass. No trees or brush are growing on the dam proper. The toe blanket was not found to exist and no outlet of the toe drain was located. There were no observable movements of the dam alignment. The drop inlet spillway was unobstructed at the time of our inspection. The reservoir shoreline is gently sloping and forested.

There is a wooden grate at the discharge of the outlet pipe of the drop inlet. Downstream of the grate, the discharge channel is lined with boulders and then flows into densely vegetated forest. No residences are visible immediately downstream of the dam.

SECTION 4 OPERATIONAL PROCEDURES

There is no available information concerning operational procedures for Lake Ashroe Dam. The surface of the dam appears to be reasonably maintained as no brush or trees were growing on the dam embankments and areas of substantial erosion have been repaired by the placement of cobbles and boulders. There appeared to be no warning system in effect.

SECTION 5 HYDRAULIC/HYDROLOGIC

Available information indicates the dam was designed to have about 2 ft of freeboard for a storm equivalent to 4.1 inches of rainfall with a peak inflow of 758 cfs. The pertinent design data is included in Appendix 4.

The hydraulic/hydrologic evaluation is based on a Spillway Design Flood (SDF) equal to one-half of the Probable Maximum Flood chosen in accordance with the evaluation guidelines for dams classified as significant hazard and small in size. The PMF has been determined by developing a synthetic hydrograph

based on the probable maximum precipitation of 22.0 inches (200 sq. mi. - 24 hour). The Corps of Engineers has recommended the use of the SCS triangular unit hydrograph with the curvilinear transformation. Hydrologic computations are presented in Appendix 3. The 1/2 PMF peak inflow determined for the subject watershed is 2,558 cfs.

The capacity of the spillway at maximum pool elevation 798 is 62.4 cfs which is significantly less than the SDF. Flood routing for the 1/2 PMF indicates the dam will overtop by 1.99 ft. Therefore the spillway is inadequate. We estimate the dam can adequately pass only 14% of the PMF.

The present drawdown structure consists of a valved 12-inch diameter corrugated metal pipe which discharges into the riser of the drop inlet spillway at approximately invert elevation 784. Its operating condition is unknown.

Drawdown of the reservoir has been evaluated assuming that the drawdown structure is operable. Our calculations indicate that the lake level could be lowered 2 ft in about 10 days.

Computations by the Soil Conservation Service indicated that the flood level from a 25 year storm event would not overtop the causeway for Struble Road at elevation 797. The hydraulic effect of the causeway on the dam should be further studied in future investigation.

SECTION 6 STRUCTURAL STABILITY

Based on visual observations, Lake Ashroe Dam appears stable under conditions at the time of our inspection. Based on available information, the dam appears to have been constructed in accordance with the engineering specifications. However, no construction records nor information concerning the engineering properties of the foundation and dam materials have been located

during our inspection. Consequently, analysis of the degree of stability of the dam cannot be made without gross assumptions concerning the properties of the materials.

No post construction changes were observed during our visual inspection.

Lake Ashroe Dam is located in Seismic Zone 1 of the Seismic Zone Map of Contiguous States. As inadequate engineering data is available, the actual degree of stability of the dam and appurtenances under stress conditions more severe than those observed during our inspection and its future performance cannot be evaluated without additional investigation.

SECTION 7 ASSESSMENT, RECOMMENDATIONS/REMEDIAL MEASURES

7.1 Dam Assessment

Lake Ashroe Dam is less than 9 years old and in fair overall condition. The dam appeared stable under conditions existing at the time of our inspection. However, inadequate engineering data is available to assess the actual degree of stability of the dam and appurtenances. Additional investigation is necessary to adequately evaluate the future performance of the dam.

The spillway capacity as determined by the Corps of Engineers Screening criteria is inadequate. The dam can adequately pass only 14% of the PMF.

7.2 Recommendations/Remedial Measures

The following are recommended to be done soon:

1. Investigate the operating condition of the low level outlet and repair if necessary.
2. Determine the drawdown capacity of the 12-in diameter pipe using more precise procedures and increase drawdown capability if necessary.
3. Develop written operational procedures to ensure the safety of the dam.

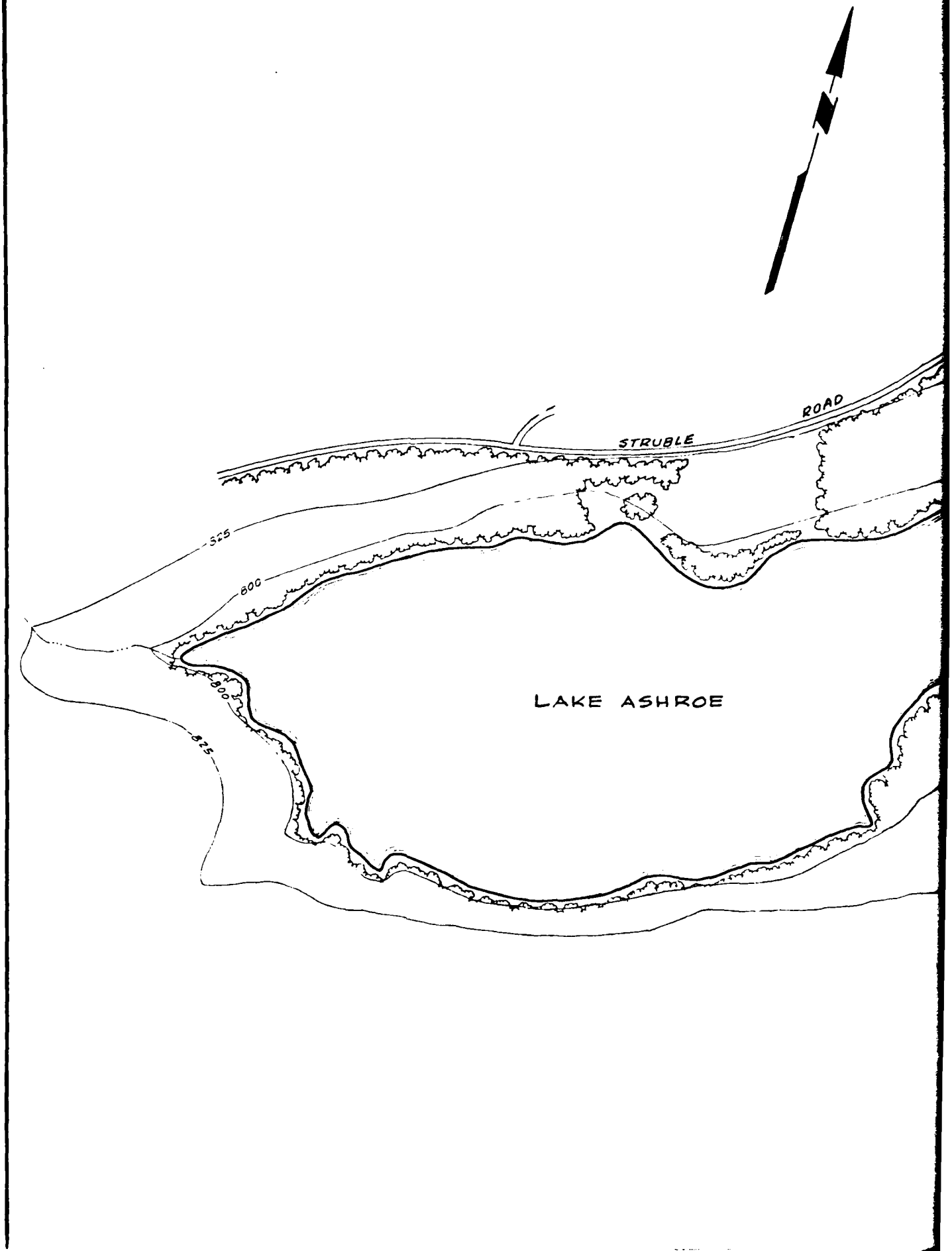
The following are recommended to be done in the near future:

1. Clear vegetation downstream of the drop outlet pipe to provide unobstructed discharge channel.
2. Evaluate the hydraulic effect of the Struble Road causeway on the dam; modify the causeway if necessary.
3. Provide emergency spillway facilities.
4. Perform additional investigation to determine the engineering properties of the dam and foundation; whether or not conventional safety margins exist under more severe stress conditions than those observed during our inspection, and what modifications may be required to achieve such safety margins.

FIGURES

BY _____ DATE _____ REGIONAL VICINITY MAP JOB NO. 80145

CKD _____ DATE _____ LAKE ASHROE FIGURE 1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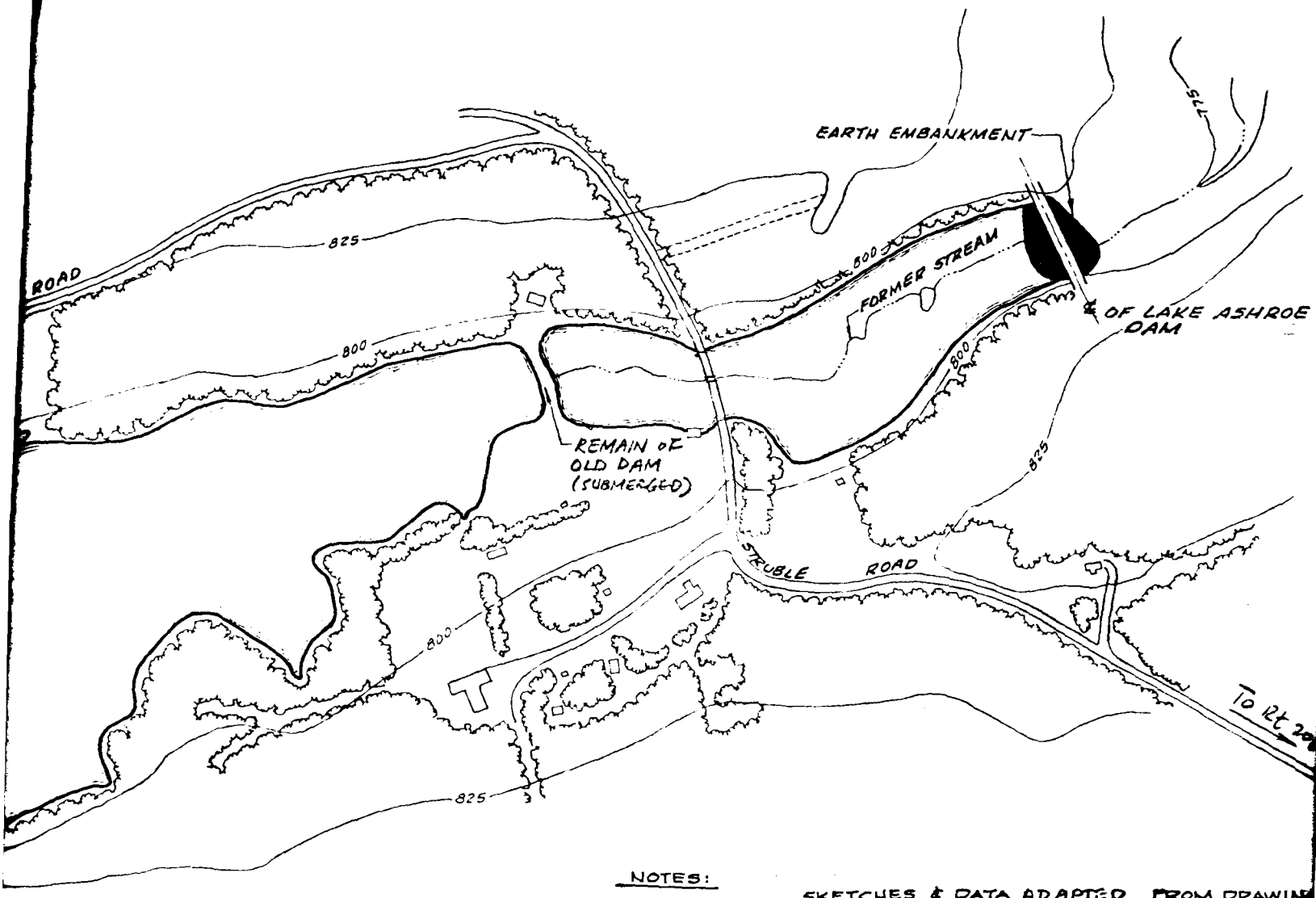


NOTES:

SKETCHES & DATA ADAPTED FROM DRAWING BY THE U.S. DEPT. OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE POND & LAKE FOR THE SAKAWAWIN SCOUT RESERVATION AT LAKE ASHROE (N.J.-01-726) DATED MAY, 1969.

DAMSITE AND LAKE AREA

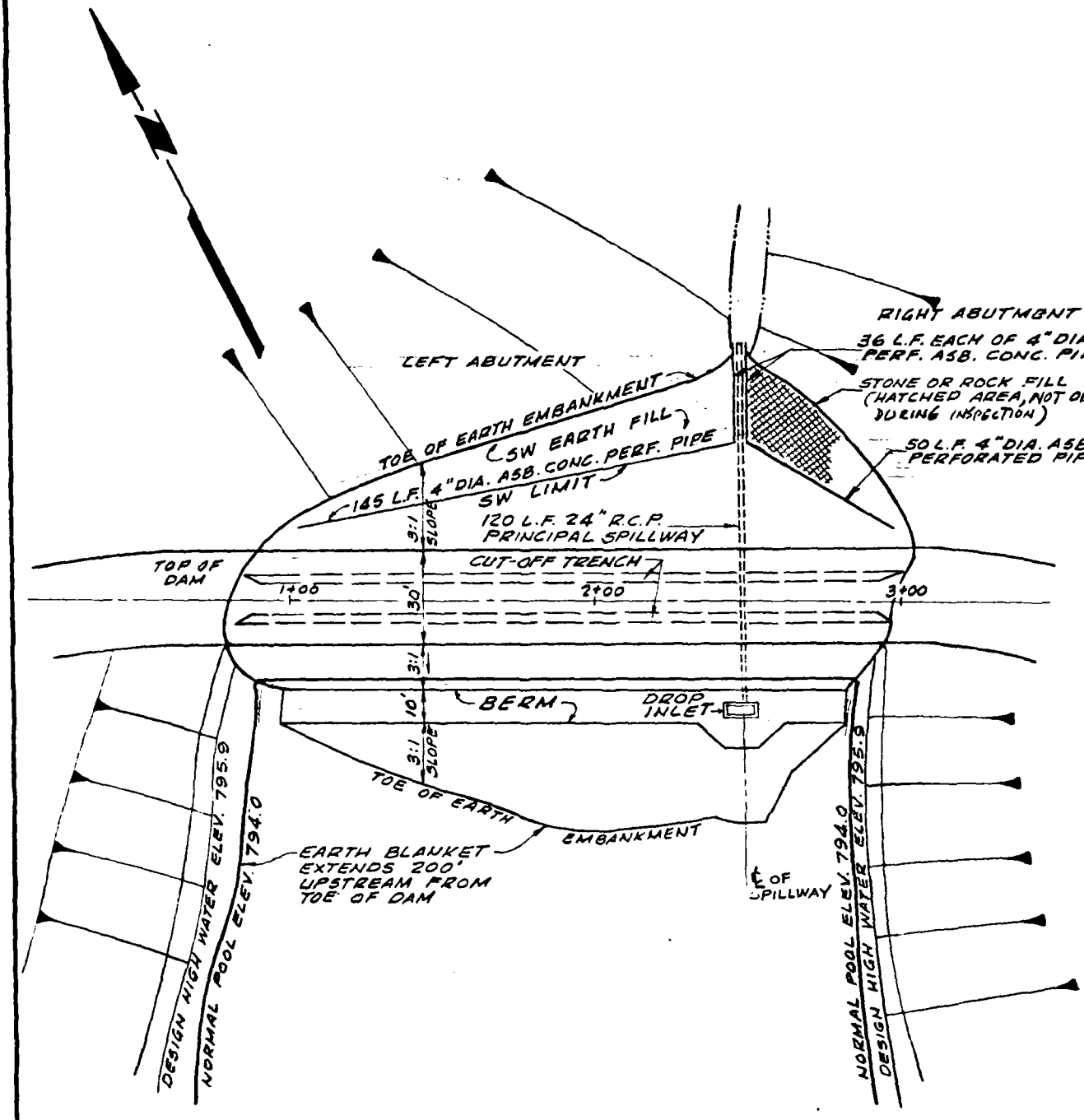
LAKE ASHROE DAM(00023)

LAKE ASHROE SUSSEX COUNTY, N.J.

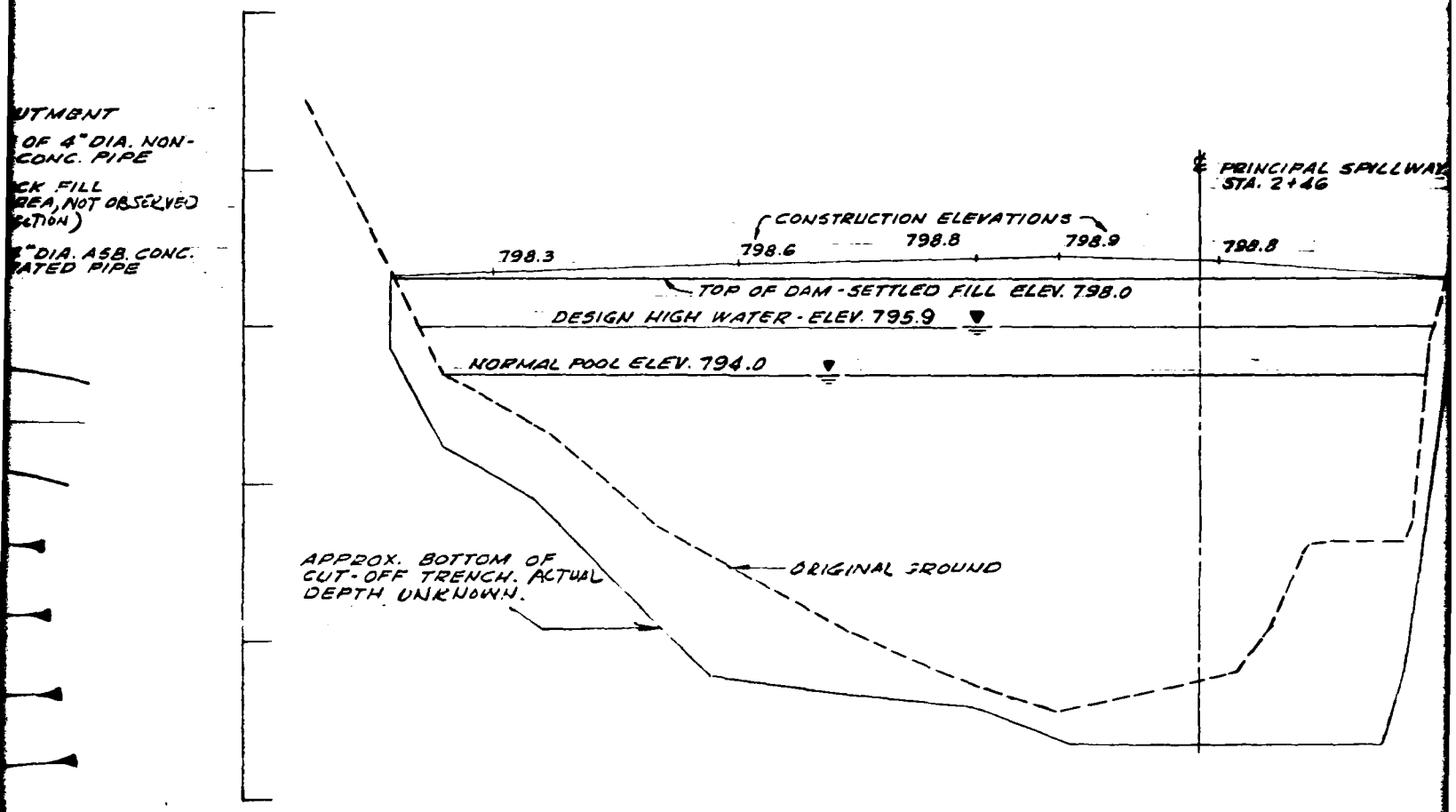
LANGAN ENGINEERING ASSOCIATES, INC.

990 CLIFTON AVENUE CLIFTON, N.J.07013

DRN. BY: RD	SCALE: N.T.S.	JOB No. 80145
CK'D BY: V.U	DATE: 9-5-80	F.B. No.


RIGHT ABUTMENT
36 L.F. EACH OF 4" DIA. NON-PERF. ASB. CONC. PIPE
STONE OR ROCK FILL (HATCHED AREA, NOT OBSERVED DURING INSPECTION)
50 L.F. 4" DIA. ASB. CONC. PERFORATED PIPE
LEFT ABUTMENT
TOE OF EARTH EMBANKMENT
SW EARTH FILL
SW LIMIT
185 L.F. 4" DIA. ASB. CONC. PERF. PIPE
120 L.F. 24" R.C.P. PRINCIPAL SPILLWAY
TOP OF DAM
CUT-OFF TRENCH
1+00
2+00
3+00
30'
3:1 SLOPE
3:1
10'
BERM
DROP INLET
3:1 SLOPE
TOE OF EARTH EMBANKMENT
EARTH BLANKET EXTENDS 200' UPSTREAM FROM TOE OF DAM
℄ OF SPILLWAY
DESIGN HIGH WATER ELEV. 795.9
NORMAL POOL ELEV. 794.0
NORMAL POOL ELEV. 794.0
DESIGN HIGH WATER ELEV. 795.9

PLAN



PROFILE THRU ℄ OF DAM

NOTES:

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BY THE U.S. DEPT. OF AGRICULTURE SOIL CONSERVATIO
SERVICE FOR THE POND & DAM FOR THE SAKAWAWE
SCOUT RESERVATION AT LAKE ASHROE (N.J.-01-726
DATED MAY, 1969.

PLAN AND PROFILE OF DAM

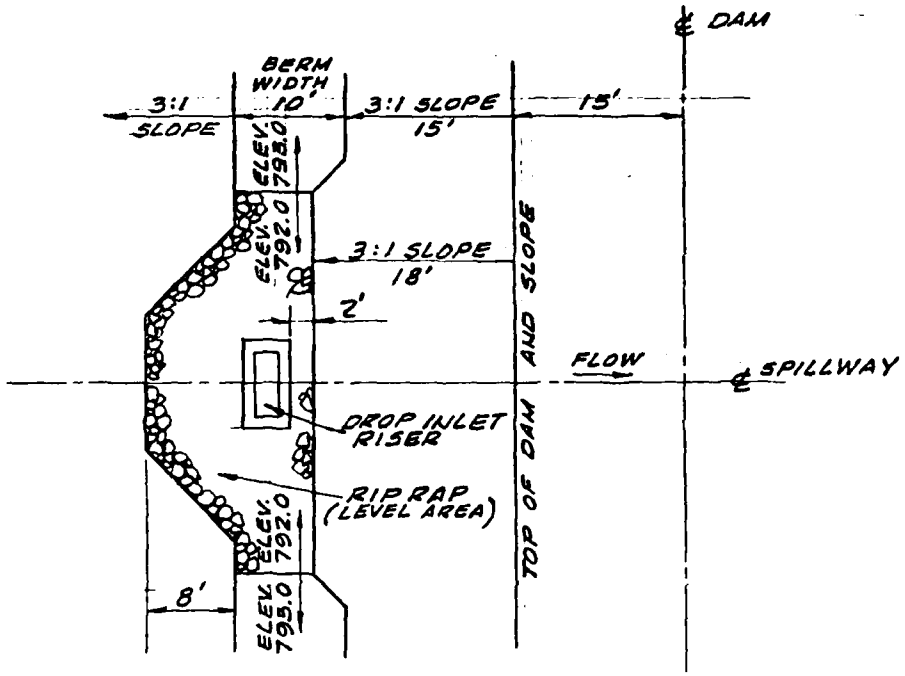
LAKE ASHROE DAM (00023)

LAKE ASHROE SUSSEX COUNTY, N.

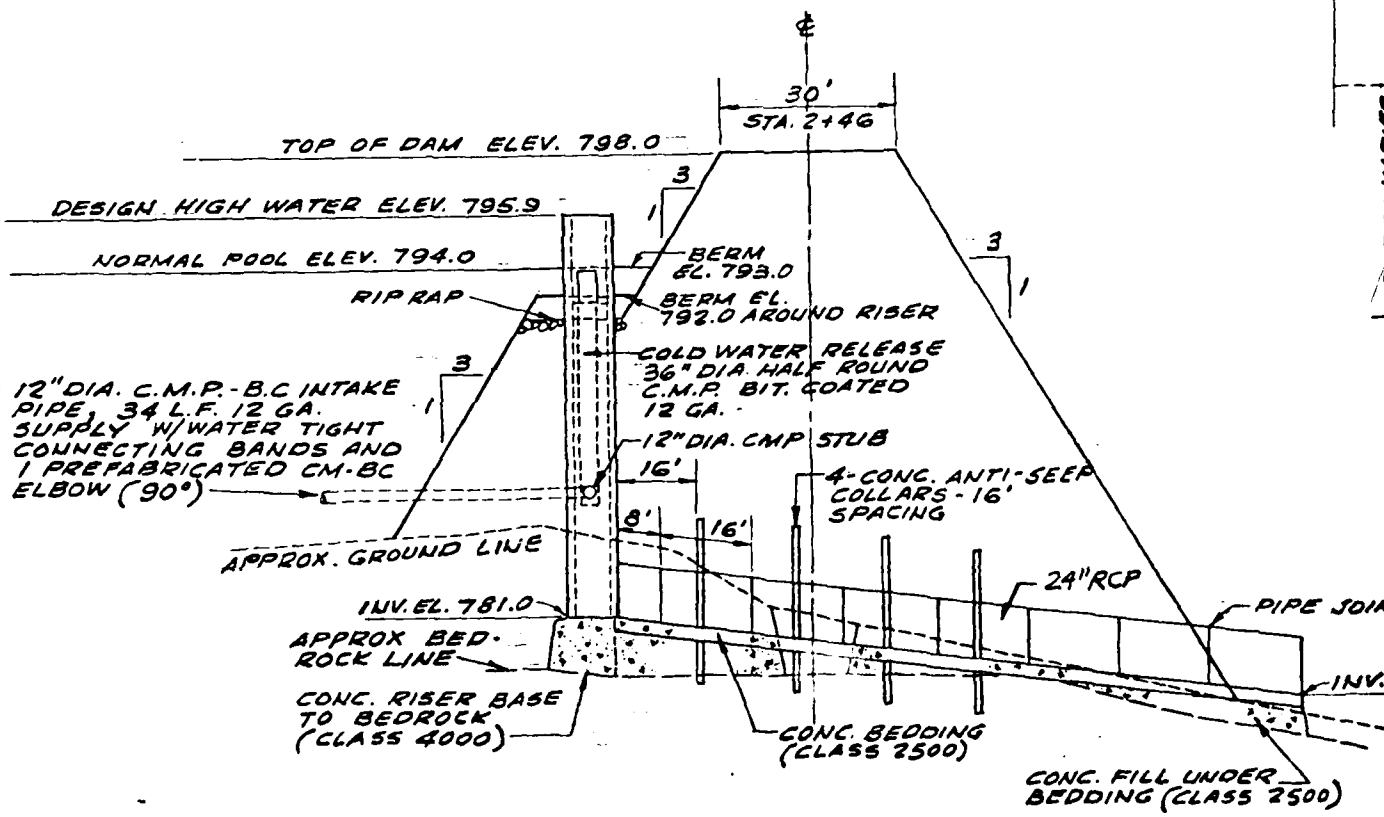
LANGAN ENGINEERING ASSOCIATES, INC.

990 CLIFTON AVENUE CLIFTON, N.J. 07013

DRN. BY: RD	SCALE: N.T.S.	JOB No. 80145
CK'D. BY: V.U.	DATE: 9-12-80	FIG. No. 3



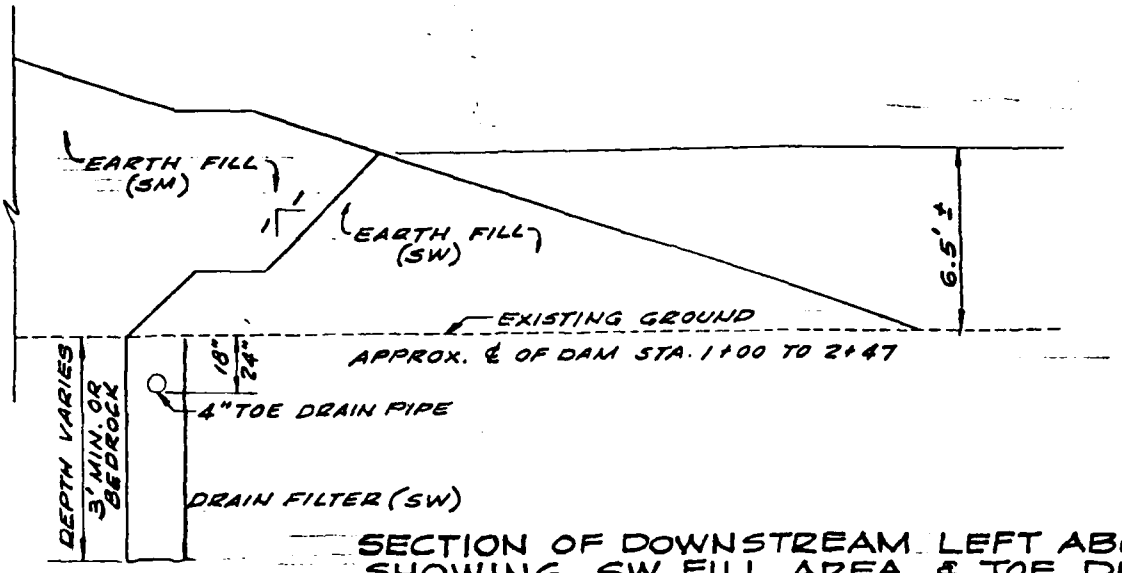
PLAN OF BERM AROUND RISER



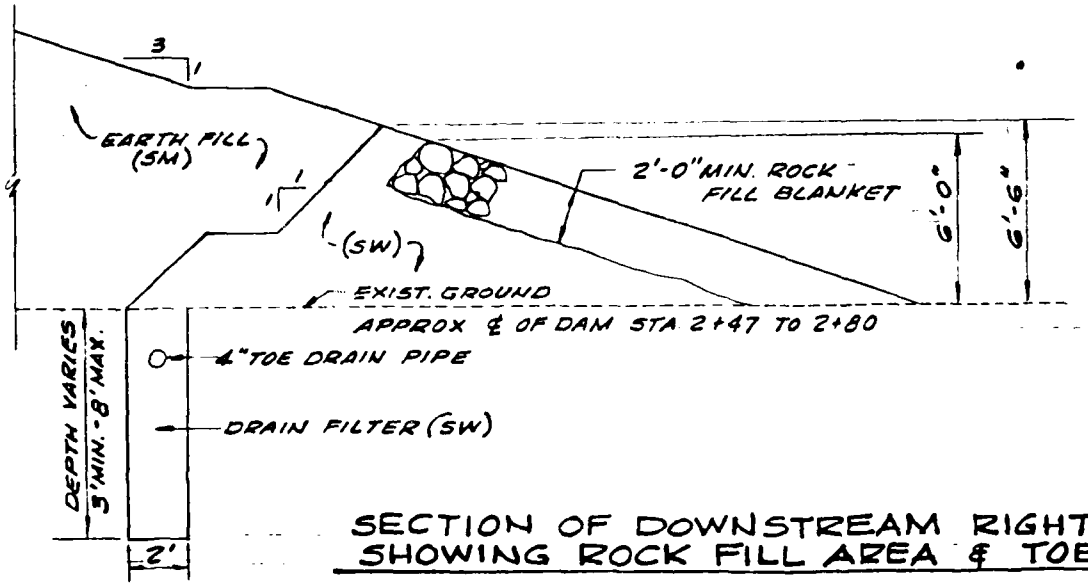
PROFILE THRU ℄ OF SPILLWAY

DEPTH VARIES

DEPTH VARIES



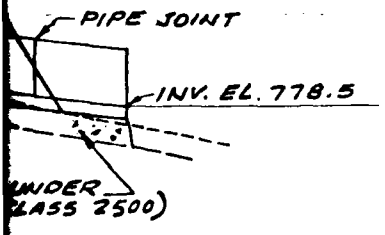
SECTION OF DOWNSTREAM LEFT ABUTMENT SHOWING SW FILL AREA & TOE DRAIN



SECTION OF DOWNSTREAM RIGHT ABUTMENT SHOWING ROCK FILL AREA & TOE DRAIN

NOTES:

SKETCHES & DATA ADAPTED FROM DRAWINGS BY THE U.S. DEPT. OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE POND & DAM FOR THE SAKAWAWIN SCOUT RESERVATION AT LAKE ASHROE (N.J.-01-726) DATED MAY, 1969.



DETAILS

LAKE ASHROE DAM (00023)

LAKE ASHROE SUSSEX COUNTY, N.J.

LANGAN ENGINEERING ASSOCIATES, INC.

990 CLIFTON AVENUE CLIFTON, N.J. 07013

DRN. BY: RD	SCALE: N.T.S.	JOB No. 80145
CK'D. BY: V.U	DATE: 9-11-80	FIG. No 4

APPENDIX 1

CHECK LIST - HYDROLOGIC AND HYDRAULIC DATA

CHECK LIST - VISUAL INSPECTION

CHECK LIST - ENGINEERING DATA

CHECK LIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: 1.20 sq. mi., avg. slope 5% wood & forest land

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 794.0 (469 ac-ft.)
OF DAM

ELEVATION TOP ~~FLOOD CONTROL~~ POOL (STORAGE CAPACITY): 798 (697 ac-ft)

ELEVATION MAXIMUM DESIGN POOL: 795.9 (original design high water)

ELEVATION TOP DAM: 798

CREST: Spillway

a. Elevation 794
b. Type concrete drop inlet
c. Width 2' x 6' Drop inlet with 24" RCP outlet pipe (120 ft.)
d. Length N/A
e. Location Spillover Right abutment of dam
f. Number and Type of Gates None

OUTLET WORKS:

a. Type 12" CMP intake pipe (34 lf) thru drop inlet to 24" RCP outlet pipe
b. Location in drop inlet spillway
c. Entrance inverts 784 ±
d. Exit inverts 778.5
e. Emergency draindown facilities Same

HYDROMETEOROLOGICAL GAGES: None Observed
a. Type
b. Location
c. Records

MAXIMUM NON-DAMAGING DISCHARGE: 62.4 cfs (water at top of dam)

Check List
Visual Inspection
Phase 1

Name Dam LAKE ASHROE County SUSSEX State N. J. Coordinators NJ DEP

Date(s) Inspection 9/26/80 Weather Clear Temperature Low 70's°F

Pool Elevation at Time of Inspection Approx 793 M.S.L. Tailwater at Time of Inspection Dry M.S.L.

Inspection Personnel:

R. W. Greene 9/26/80
D. Leary 12/11/80
V. Urban 9/26/80
K. P. Yu 12/11/80

R. W. Greene Recorder

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	MINOR SLOUGHING AND EROSION OF DOWNSTREAM EMBANKMENT IN VARIOUS AREAS. EROSION AND SLOUGHS REPAIRED WITH COBBLES & BOULDERS.	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	NO APPARENT DEFICIENCIES OBSERVED.	
RIPRAP FAILURES	NONE OBSERVED.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
	EMBANKMENTS HAVE SPARSE GROWTH OF GRASS & LOW WEEDS. NO TREES OR BRUSH.	
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	NO APPARENT DEFICIENCIES OBSERVED.	
ANY NOTICEABLE SEEPAGE	NONE OBSERVED.	
STAFF GAGE AND RECORDER	NONE OBSERVED.	
DRAINS	NONE VISIBLE.	TOE DRAINS REPORTED TO EXIST.

OUTLET WORKS DROP INLET SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	OUTLET CONDUIT UNDER EMBANKMENT	CANNOT BE INSPECTED.
INTAKE STRUCTURE	DROP INLET SPILLWAY WITH GATED LOW LEVEL OUTLET. MINOR SPALLING OF CONCRETE IN ONE TOP CORNER. INLETS UNOBSTRUCTED.	APPEARS SATISFACTORY
OUTLET STRUCTURE	24" REINF. CONCRETE PIPE OPEN END.	APPEARS SATISFACTORY
OUTLET CHANNEL	HEAVY BRUSH, BOULDER LINED STREAMBED.	REMOVE BRUSH.
EMERGENCY GATE	LOW LEVEL OUTLET. VALVE STEM VISIBLE.	OPERATING CONDITION UNKNOWN.

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	GENTLE SLOPES WITH TREES & LIGHT BRUSH. BOTH SIDES APPROX 10H:1V.	
SEDIMENTATION	VERY LITTLE OBSERVED.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	NO DEBRIS, HEAVILY VEGETATED. WOODED SPLASH BOARDS AT 24" RCP OUTLET, THEN BOULDER LINED STREAMBED.	CLEAR VEGETATION TO PROVIDE UNOBSTRUCTED DISCHARGE CHANNEL.
SLOPES	GENTLE, HEAVILY VEGETATED WITH TREES AND BRUSH.	
APPROXIMATE NO. OF HOMES AND POPULATION	NONE VISIBLE IMMEDIATELY DOWNSTREAM.	

CHECK LIST
-ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM	REMARKS
PLAN OF DAM	COVER SHEET - POND AND DAM PLANS, SAKAWAWIN SCOUT RESERVATION, MIDDLESEX COUNCIL, B. S. OF A - SUSSEX CO., N.J. U. S. DEPT. OF AGRICULTURE SOIL CONSERVATION SERVICE, DRAWING NO. NJ-01-726 DATED APRIL 1969 - SHEETS 1 OF 10 AND 2 OF 10.
REGIONAL VICINITY MAP	SEE FIGURE 1
CONSTRUCTION HISTORY	CONSTRUCTION SPECIFICATIONS FOR CONSERVATION ENGINEERING PRACTICES JAN 1968 NJ-01 SOURCE: N.J. DEP APPLICATION NO. 612
TYPICAL SECTIONS OF DAM	DETAIL SHEET - SAKAWAWIN SCOUT RESERVATION MIDDLESEX COUNCIL, B.S. OF A, SUSSEX CO., N.J. U. S. DEPT. OF AGRICULTURE SOIL CONSERVATION SERVICE, DRAWING NO. NJ-01-726 DATED APRIL 1969 SHEETS 2 OF 10 AND 3 OF 10
HYDROLOGIC/HYDRAULIC DATA	UNITED STATES DEPT. OF AGRICULTURE SOIL CONSERVATION SERVICE REGIMENTAL TECHNICAL SERVICE CENTER REPORT 01-726 DATED FEB 1969 LETTER ON MAY 11, 1967 FROM RAYMOND A. WEBSTER, P.E., TO MR. RICHARD H. MARSTON, P.E. ASSISTANT STATE CONSERVATION ENGINEER SOURCE: N.J. DEP APPLICATION 612.
OUTLETS - PLAN	DETAIL SHEETS/CONDUIT DETAILS SAKAWAWIN SCOUT RESERVATION
- DETAILS	MIDDLESEX COUNCIL, B.S. OF A., SUSSEX CO.. N.J.
	U. S. DEPT. OF AGRICULTURE SOIL CONSERVATION SERVICE DRAWING NO. NJ-01-726 DATE APRIL 1969 SHEET 3 OF 10 AND 4 OF 10
-CONSTRAINTS -DISCHARGE RATINGS	RISER DETAILS - SAKAWAWIN SCOUT RESERVATION MIDDLESEX COUNCIL, B.S. OF A., SUSSEX COUNTY, N.J. U. S. DEPT OF AGRICULTURE SOIL CONSERVATION SERVICE, DRAWING NO. NJ-01-726 DATED May 1969,
RAINFALL/RESERVOIR RECORDS	SHEETS 5, 6, 7, 8 OF 10
	NO INFORMATION AVAILABLE

ITEM	REMARKS
DESIGN REPORTS	NO INFORMATION AVAILABLE.
GEOLOGY REPORTS	NO INFORMATION AVAILABLE.
DESIGN COMPUTATIONS	UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE REGIMENTAL TECHNICAL SERVICE CENTER REPORT 01-726 DATED FEB 1969
HYDROLOGY & HYDRAULICS	NO INFORMATION AVAILABLE.
DAM STABILITY	NO INFORMATION AVAILABLE.
SEEPAGE STUDIES	
MATERIALS INVESTIGATIONS	
BORING RECORDS	
LABORATORY	
FIELD	TEST PIT EXCAVATION, POND AND DAM PLANS, SAKAWAWIN SCOUT RESERVATION MIDDLESEX COUNCIL, B.S. OF A., SUSSEX COUNTY, N. J. U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE DRAWING NO. NJ-01-726 DATED APRIL 1969 SHEET 2 OF 10
POST-CONSTRUCTION SURVEYS OF DAM	NO INFORMATION AVAILABLE.
BORROW SOURCES.	COVER SHEET, POND AND DAM PLANS, SAKAWAWIN SCOUT RESERVATION, MIDDLESEX COUNCIL, B.S. OF A., SUSSEX CO., N.J. U. S. DEPT. OF AGRICULTURE SOIL CONSERVATION SERVICE DRAWING NO. N.J. 01-726 DATED APRIL 1969 SHEET 1 of 10.

ITEM	REMARKS
MONITORING SYSTEMS	NO INFORMATION AVAILABLE
MODIFICATIONS	NO INFORMATION AVAILABLE
HIGH POOL RECORDS	NO INFORMATION AVAILABLE
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	NO INFORMATION AVAILABLE
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	NONE REPORTED
MAINTENANCE OPERATION RECORDS	NO INFORMATION AVAILABLE

ITEM		REMARKS
SPILLWAY PLAN	DETAIL SHEET SAKAWAWIN SCOUT RESERVATION , MIDDLESEX COUNCIL,	U.S. DEPT. OF AGRICULTURE SOIL CONSERVATION SERVICE - DRAWING NO. N.J.-01-726 DATED APRIL 1969 - SHEET 3 OF 10
SECTIONS	B.S. OF A., SUSSEX CO., N.J. CONDUIT DETAILS	U.S. DEPT. OF AGRICULTURE SOIL CONSERVATION
DETAILS	SAKAWAWIN SCOUT RESERVATION MIDDLESEX COUNCIL, B.S. OF A., SUSSEX CO., N.J.	SERVICE - DRAWING NO. N.J.-01-726 DATED APRIL 1969 - SHEET 4 OF 10
	RISER DETAILS SAKAWAWIN SCOUT RESERVATION	U.S. DEPT. OF AGRICULTURE SOIL CONSERVATION SERVICE - DRAWING NO. N.J.-01-726
OPERATING EQUIPMENT PLANS & DETAILS	MIDDLESEX COUNCIL, B.S. OF A., SUSSEX CO., N.J.	DATED APRIL 1969 - SHEETS 5, 6, 7, 8 OF 10

APPENDIX 2
PHOTOGRAPHS

View of downstream embankment 26 September 1980

Repair of eroded area by placement of cobbles and boulders on downstream embankment. 26 September 1980

Crest of dam viewed from left abutment looking to right abutment. 26 September 198

Drop inlet spillway at right abutment of dam. 26 September 198

View of upstream face of dam. 26 September 1980

View of reservoir from center of dam. 26 September 1980

24" RCP spillway discharge with wooden grate at downstream toe.

26 September 1980

24" RCP spillway discharge, wooden grate and downstream channel.

26 September 1980

APPENDIX 3

HYDROLOGICAL COMPUTATIONS

LANGAN ENGINEERING ASSOCIATES, INC.

HYDROLOGICAL COMPUTATIONS
LAKE ASHROE DAM

Location: Sussex County, N.J.

Drainage Area: 1.20 sq. mi (768 acres)

Lake Area: 48.2 acres

Classification: Size - small
Hazard - Significant

Spillway Design Flood:

Based on available information, the dam was designed to have about 2 ft of freeboard for a storm which equivalented to 4.1 inches of rainfall and had a peak inflow of 758 cfs.

In accordance with the Corps of Engineers Screening Criteria, the SDF for dams of small size and significant hazard is 100-yr flood to ½ PMF. ½ PMF is chosen for the evaluation of this dam

PMP

1. Dam located in Zone 1 (near boundary to Zone 6)
PMP = 22.0 inches (for 200 sq. mi, 24 hrs, all season envelop — HMR #33)

BY Dry DATE 4/2/81 Lake Ashroe Dam JOB NO. 80145
CKD RWG DATE 4/6/81 SHEET NO. 1 OF

2. PMF must be adjusted by a factor of 0.8* to account for the basin size being < 10 sq. mi.

% Factor (for 10 sq. mi)

Duration, hr	Zone 1	Zone 6	Avg.
0-6	111	112	112
0-12	123	123	123
0-24	133	132	133
0-48	142	142	142

* pg. 48 "Design of Small Dam"

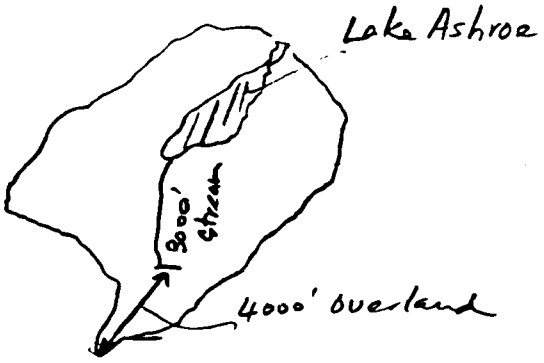
Time of Concentration, Tc

Based on copy of the routing output by SCS, Tc = 0.5 hr was used for the original analysis. Copy of the calculation of the Tc is not legible, therefore Tc is estimated as follows:

Estimated slope:

$$\text{overland} = \frac{240}{4000} = 6\%$$

$$\text{Stream} = \frac{210}{3000} = 7\%$$



BY Dry DATE 4/2/81 Lake Ashroe Dam JOB NO. 80145

CKD RWG DATE 4/6/81 SHEET NO. 2 OF

LANGAN ENGINEERING ASSOCIATES, INC.

1. Estimate T_c based on average slope and length

	slope	velocity	remarks
overland flow	6%	1 f/s	wooded & grassed
stream	7%	4.5 f/s	waterway

$$T_c = \left(\frac{4000}{1} + \frac{3000}{4.5}\right) \times \frac{1}{3600} = \underline{1.3 \text{ hrs}}$$

2. Estimate T_c by curve number method (SCS TR 55)

$$\text{Average Slope} = \frac{6 \times 4000 + 7 \times 3000}{7000}\% = 6.4\%$$

Take CN = 74, $L = 7000$, slope = 6.4%

from TR 55 Fig 3.3

$L \doteq 0.75$ hrs. or $T_c = \frac{0.75}{0.6} = \underline{1.25 \text{ hrs}}$.

Use $T_c = 1.28$ hrs.

$\therefore \boxed{L = 0.6 T_c = 0.77 \text{ hrs}}$

BY PJ DATE 4/2/81 Lake Ashroe Dam JOB NO. 80145

CKD RWC DATE 4/6/81 SHEET NO. 3 OF

LANGAN ENGINEERING ASSOCIATES, INC.

SPILLWAY CAPACITY

The existing spillway structure consists of a 2'x6' concrete drop inlet riser with a 24" RCP outflow pipe
From elevation 794 to elevation 798 only the drop inlet functions as an outflow structure. The top of dam is at elevation 798 where weir flow occurs in addition to pipe flow,

Discharge capacity of the drop inlet from el. 794 to 799 were obtained from SCS's routing input data.

Pipe flow at water level above el. 799 were calculated using $Q = C_p H^{\frac{1}{2}}$ where $C_p = 13.935$ as obtained from SCS's calculation.

Weir flow over the top of dam was calculated using $Q = CLH^{\frac{1}{2}}$ where C for broad crested weir was obtained from Table 5.3 of the Handbook of Hydraulics.

Relevant H & H design data from SCS are included in Appendix 4.

BY VM	DATE 9-29-92	Lake Ashore Dam	JOB NO. 20195
CKD. [illegible]	DATE 4/1/81	spwy capacity	SHEET NO. 1 OF

LANGAN ENGINEERING ASSOCIATES, INC.

BY [illegible] DATE 4/24/81 Lake Rebecca Dam

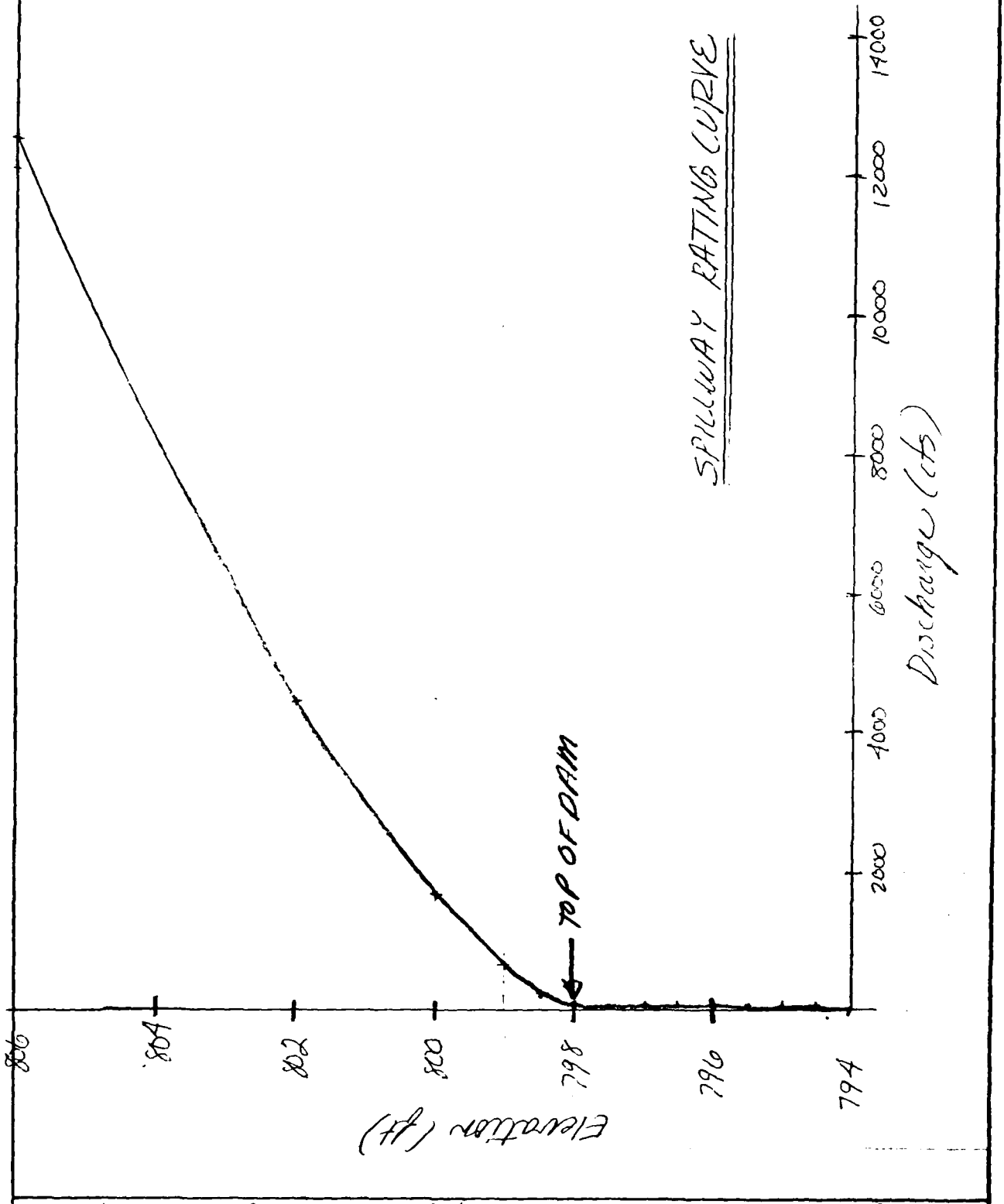
CKD [illegible] DATE 4/6/81

JOB NO. 80145

SHEET NO. 5 OF

Elevation (ft)	Drop Inlet $Q=13.935H^{\frac{3}{2}}$ for Pipe Flow		Embankment $L=210$ ft			Total Q (cfs)
	H (ft)	Q (cfs)	H (ft)	C	Q (cfs)	
794		0				0
795		31				31
795.5		57				57
796		59				59
797		60				60
798		62	0	—	0	62
799		63	1	2.63	552	615
800	22	65	2	2.63	1562	1627
802	24	68	4	2.63	4418	4486
804	26	71	6	2.63	8117	8188
806	28	74	8	2.63	12497	12571

LANGAN ENGINEERING ASSOCIATES, INC.



BY RU. DATE 9-29-80 Lake Ashore JOB NO. 80185

CKD [illegible] DATE 4/27/81 SHEET NO. 6 OF

LANGAN ENGINEERING ASSOCIATES, INC.

RESERVOIR STORAGE CAPACITY

Storage capacity will be calculated by HEC-1 from areas which are input. The following areas have been taken from original design calculations by the Soil Conservation service and are included in Appendix A.

Elevation (ft)	Area (ac)
794	46.24
795	52.38
800	66.48
805	78.38
810	88.40

BY VU DATE 9-30-80 Lake Ashore JOB NO. 80195

CKD. PM DATE 6/27/81 SHEET NO. 7 OF

LANGAN ENGINEERING ASSOCIATES, INC.

SUMMARY OF HYDROGRAPH AND FLOOD ROUTING

1) Hydrograph & routing calculated using HEC-1.

2) ½PMF for LAKE ASHROE is 2558 cfs (routed to 1615 cfs).

3) Routing of ½PMF indicates that the dam will overtop by 1.99 ft.

BY RM DATE ____ HEC-1 Summary JOB NO. 80145

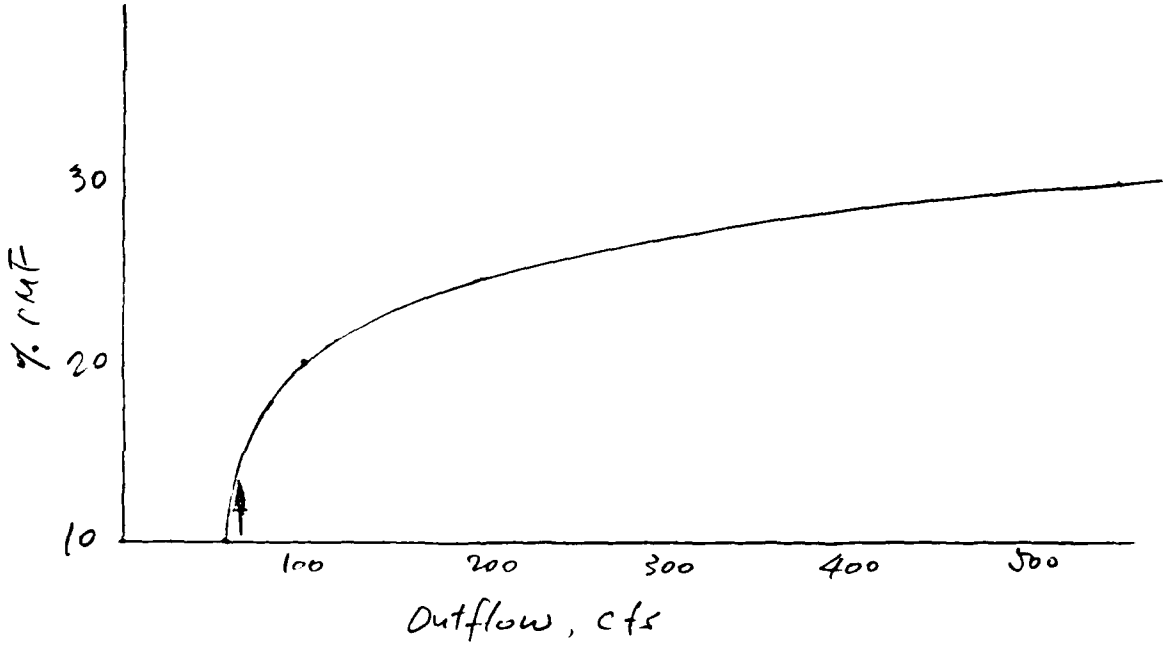
CKD PJ DATE 4/30/81 LAKE Ashroe SHEET NO. 8 OF ____

LANGAN ENGINEERING ASSOCIATES, INC.

OVERTOPPING POTENTIAL

1) Various % of PMF have been routed using HEC-1

2) Plot peak outflow vs % PMF



3) Dam overtops at elevation 798 with Q = 62 cfs

∴ dam can only pass about 14% of the PMF

BY Pyz DATE 4/21/81 Lake Ashtrae Dam JOB NO. 80145

CKD RWG DATE 4/29/81 SHEET NO. 9 OF

LANGAN ENGINEERING ASSOCIATES, INC.

DRAWDOWN ANALYSIS

Structure

The low level outlet consists of a 12"ϕ Corrugated metal pipe 34 ft in length It has an invert elevation of approximately 784± ft. For this analysis we will assume the structure to be operable.

Capacity

Outflow capacity will be based on the equation $Q = C_p H^{1/2}$ where $C_p = A_p \sqrt{\frac{2g}{1+k_m+k_p L}}$

$n = .025$ $L = 34$ ft $A_p = .785$ ft^2

$k_m = .90$, $k_p = .1157$

$\therefore C_p = 2.608$

$Q = C_p H^{1/2} = 2.608 H^{1/2}$ ℄ invert = 784.5

Elevation (ft)	Head (ft)	Q (cfs)	Qavg (cfs)
794	9.5	8	
			7.5
792	7.5	7	
			6.5
790	5.5	6	
			5.5
788	3.5	5	
			4
786	1.5	3	
			1.5
784	0	0	

BY VV DATE 9-29-80 Lake Ashroe JOB NO. 50145

CKD PZ DATE 4/5/81 drawdown SHEET NO. 10 OF

LANGAN ENGINEERING ASSOCIATES, INC.

STORAGE

Storage will be calculated using the method of equivalent squares assuming an avg slope of 2H:1V

Elev. (ft)	equiv square (ft)	area (ac)	ΔH (ft)	incr. volume (ac-ft)	volume (ac-ft)
794	1449.59	48.24			
			2	95.94	469.17
792	1441.59	47.70			
			2	94.88	373.23
790	1433.59	47.18			
			2	93.83	278.35
788	1425.59	46.65			
			2	92.78	184.52
786	1417.59	46.13			
			2	91.74	91.74
784	1409.59	45.61			

BY VV DATE 9-29-80 Lake Ashroe JOB NO. 30145

CKD PJ DATE 9/30/80 Drawdown SHEET NO. 11 OF

LANGAN ENGINEERING ASSOCIATES, INC.

Assume inflow to be 2 cfs/sq. mi

$Q_{in} = 2 \times 1.2 \text{ sq mi} = 2.4 \text{ cfs}$

Elev. (ft)	$Q_{out\ avg}$ (cfs)	Q_{net}* (cfs)	Δstorage (hr-ft)	Δt(hr.)	$\Sigma \Delta t$(hr)	
794						
	7.5	5.1	95.94	228	228	— 9.5 days
792						
	6.5	4.1	94.88	280	508	— 21 days
790						
	5.5	3.1	93.83	366	874	— 36 days
788						
	4	1.6	92.78	702	1576	
786						
	1.5	—	—			
784						

* $Q_{net} = Q_{out\ avg} - Q_{in} = Q_{out\ avg} - 2.4$

∴ Lake can be lowered 2 ft in about 10 days

BY Rng DATE 4/27/81 Lk. Ashroe JOB NO. 80145

CKD RWC DATE 4/29/81 SHEET NO. 12 OF

DRAINAGE BASIN ASHROE DAM	MAP SOURCE USGS CULVERS GAP SCALE 1"=2000'	PROJ NO 80145 SHEET ____ OF ____

LANGAN ENGINEERING ASSOCIATES, INC.

HEC-1 OUTPUT

LAKE ASHROE DAM

```
ASHOUT     08:37 APR 15,'81

1**********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 **********************************
     1                A1                  LAKE ASHROE DAM (00023)
     2                A2                  INFLOW HYDROGRAPHY AND ROUTING
     3                A3                  N J DAM INSPECTION
     4                B    290       0       10        0        0        0        0        0        0        0
     5                B1     5
     6                J      1       1        1
     7                J1    .5                                                    1
     8                K      0       1
     9                K1 COMPUTE HYDROGRAPH
    10                M      1       2     1.20                                .80
    11                P      0    22.0      112      123      133      142
    12                T                                                        1      .15
    13                W2           0.77
    14                X     -2               1                                 1
    15                K      1       2
    16                K1 ROUTING COMPUTATIONS
    17                Y                               1                                -1
    18                Y1     1
    19                Y4   794     795     795.5      796      797      798      799      800      802      804
    20                Y4   806
    21                Y5     0      31       57       59       60       62      615     1627     4406     8108
    22                Y5 12571
    23                $A 40.24   52.28    66.48    78.38    88.40
    24                $E   794     795      800      805      810
    25                $$ 794.0
    26                $D 798.0
    27                K     99

1                              PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                     RUNOFF HYDROGRAPH AT          1
                                     ROUTE HYDROGRAPH TO           2
                                     END OF NETWORK


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

  RUN  DATE: 81/04/15.
       TIME: 08.35.11.


                                LAKE ASHROE DAM (00023)
                                INFLOW HYDROGRAPHY AND ROUTING
                                N J DAM INSPECTION

                                          JOB SPECIFICATION
                      NO      NHR     NMIN     IDAY      IHR     IMIN    METRC     IPLT     IPRT    NSTAN
                     290       0       10        0        0        0        0        0        0        0
                                       JOPER      NWT    LROPT    TRACE
                                           8        0        0        0
```

NPLAN= 1 NRTIO= 1 LRTIO= 1

RTIOS= .50

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

SUB-AREA RUNOFF COMPUTATION

COMPUTE HYDROGRAPH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	1.20	0.00	1.20	.80	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.00	112.00	123.00	133.00	142.00	0.00	0.00

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	1.00	.15	0.00	0.00

UNIT HYDROGRAPH DATA

TC= 0.00 LAG= .77

RECESSION DATA

STRTQ= -2.00 QRCSN= 0.00 RTIOR= 1.00

UNIT HYDROGRAPH 25 END OF PERIOD ORDINATES, TC= 0.00 HOURS, LAG= .77 VOL= 1.00

66. 203. 430. 618. 678. 643. 548. 411. 285. 206.
153. 111. 81. 59. 43. 31. 23. 17. 12. 9.
7. 5. 3. 2. 1.

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.10	1	.00	0.00	.00	2.	1.02	.20	146	.02	0.00	.02	2.
1.01	.20	2	.00	0.00	.00	2.	1.02	.30	147	.02	0.00	.02	2.
1.01	.30	3	.00	0.00	.00	2.	1.02	.40	148	.02	0.00	.02	2.
1.01	.40	4	.00	0.00	.00	2.	1.02	.50	149	.02	0.00	.02	2.
1.01	.50	5	.00	0.00	.00	2.	1.02	1.00	150	.02	0.00	.02	2.
1.01	1.00	6	.00	0.00	.00	2.	1.02	1.10	151	.02	0.00	.02	2.
1.01	1.10	7	.00	0.00	.00	2.	1.02	1.20	152	.02	0.00	.02	2.
1.01	1.20	8	.00	0.00	.00	2.	1.02	1.30	153	.02	0.00	.02	2.
1.01	1.30	9	.00	0.00	.00	2.	1.02	1.40	154	.02	0.00	.02	2.
1.01	1.40	10	.00	0.00	.00	2.	1.02	1.50	155	.02	0.00	.02	2.
1.01	1.50	11	.00	0.00	.00	2.	1.02	2.00	156	.02	0.00	.02	2.
1.01	2.00	12	.00	0.00	.00	2.	1.02	2.10	157	.02	0.00	.02	2.
1.01	2.10	13	.00	0.00	.00	2.	1.02	2.20	158	.02	0.00	.02	2.
1.01	2.20	14	.00	0.00	.00	2.	1.02	2.30	159	.02	0.00	.02	2.
1.01	2.30	15	.00	0.00	.00	2.	1.02	2.40	160	.02	0.00	.02	2.
1.01	2.40	16	.00	0.00	.00	2.	1.02	2.50	161	.02	0.00	.02	2.
1.01	2.50	17	.00	0.00	.00	2.	1.02	3.00	162	.02	0.00	.02	2.
1.01	3.00	18	.00	0.00	.00	2.	1.02	3.10	163	.02	0.00	.02	2.
1.01	3.10	19	.00	0.00	.00	2.	1.02	3.20	164	.02	0.00	.02	2.
1.01	3.20	20	.00	0.00	.00	2.	1.02	3.30	165	.02	0.00	.02	2.
1.01	3.30	21	.00	0.00	.00	2.	1.02	3.40	166	.02	0.00	.02	2.
1.01	3.40	22	.00	0.00	.00	2.	1.02	3.50	167	.02	0.00	.02	2.
1.01	3.50	23	.00	0.00	.00	2.	1.02	4.00	168	.02	0.00	.02	2.
1.01	4.00	24	.00	0.00	.00	2.	1.02	4.10	169	.02	0.00	.02	2.
1.01	4.10	25	.00	0.00	.00	2.	1.02	4.20	170	.02	0.00	.02	2.

1.01	4.30	27	.00	0.00	.00	2.	1.02	4.40	172	.02	0.00	.02	2.
1.01	4.40	28	.00	0.00	.00	2.	1.02	4.50	173	.02	0.00	.02	2.
1.01	4.50	29	.00	0.00	.00	2.	1.02	5.00	174	.02	0.00	.02	2.
1.01	5.00	30	.00	0.00	.00	2.	1.02	5.10	175	.02	0.00	.02	2.
1.01	5.10	31	.00	0.00	.00	2.	1.02	5.20	176	.02	0.00	.02	2.
1.01	5.20	32	.00	0.00	.00	2.	1.02	5.30	177	.02	0.00	.02	2.
1.01	5.30	33	.00	0.00	.00	2.	1.02	5.40	178	.02	0.00	.02	2.
1.01	5.40	34	.00	0.00	.00	2.	1.02	5.50	179	.02	0.00	.02	2.
1.01	5.50	35	.00	0.00	.00	2.	1.02	6.00	180	.02	0.00	.02	2.
1.01	6.00	36	.00	0.00	.00	2.	1.02	6.10	181	.05	.03	.03	4.
1.01	6.10	37	.00	0.00	.00	2.	1.02	6.20	182	.05	.03	.03	10.
1.01	6.20	38	.00	0.00	.00	2.	1.02	6.30	183	.05	.03	.03	23.
1.01	6.30	39	.00	0.00	.00	2.	1.02	6.40	184	.05	.03	.03	40.
1.01	6.40	40	.00	0.00	.00	2.	1.02	6.50	185	.05	.03	.03	60.
1.01	6.50	41	.00	0.00	.00	2.	1.02	7.00	186	.05	.03	.03	78.
1.01	7.00	42	.00	0.00	.00	2.	1.02	7.10	187	.05	.03	.03	94.
1.01	7.10	43	.00	0.00	.00	2.	1.02	7.20	188	.05	.03	.03	106.
1.01	7.20	44	.00	0.00	.00	2.	1.02	7.30	189	.05	.03	.03	114.
1.01	7.30	45	.00	0.00	.00	2.	1.02	7.40	190	.05	.03	.03	120.
1.01	7.40	46	.00	0.00	.00	2.	1.02	7.50	191	.05	.03	.03	124.
1.01	7.50	47	.00	0.00	.00	2.	1.02	8.00	192	.05	.03	.03	128.
1.01	8.00	48	.00	0.00	.00	2.	1.02	8.10	193	.05	.03	.03	130.
1.01	8.10	49	.00	0.00	.00	2.	1.02	8.20	194	.05	.03	.03	132.
1.01	8.20	50	.00	0.00	.00	2.	1.02	8.30	195	.05	.03	.03	133.
1.01	8.30	51	.00	0.00	.00	2.	1.02	8.40	196	.05	.03	.03	134.
1.01	8.40	52	.00	0.00	.00	2.	1.02	8.50	197	.05	.03	.03	134.
1.01	8.50	53	.00	0.00	.00	2.	1.02	9.00	198	.05	.03	.03	135.
1.01	9.00	54	.00	0.00	.00	2.	1.02	9.10	199	.05	.03	.03	135.
1.01	9.10	55	.00	0.00	.00	2.	1.02	9.20	200	.05	.03	.03	136.
1.01	9.20	56	.00	0.00	.00	2.	1.02	9.30	201	.05	.03	.03	136.
1.01	9.30	57	.00	0.00	.00	2.	1.02	9.40	202	.05	.03	.03	136.
1.01	9.40	58	.00	0.00	.00	2.	1.02	9.50	203	.05	.03	.03	136.
1.01	9.50	59	.00	0.00	.00	2.	1.02	10.00	204	.05	.03	.03	136.
1.01	10.00	60	.00	0.00	.00	2.	1.02	10.10	205	.05	.03	.03	136.
1.01	10.10	61	.00	0.00	.00	2.	1.02	10.20	206	.05	.03	.03	136.
1.01	10.20	62	.00	0.00	.00	2.	1.02	10.30	207	.05	.03	.03	136.
1.01	10.30	63	.00	0.00	.00	2.	1.02	10.40	208	.05	.03	.03	136.
1.01	10.40	64	.00	0.00	.00	2.	1.02	10.50	209	.05	.03	.03	136.
1.01	10.50	65	.00	0.00	.00	2.	1.02	11.00	210	.05	.03	.03	136.
1.01	11.00	66	.00	0.00	.00	2.	1.02	11.10	211	.05	.03	.03	136.
1.01	11.10	67	.00	0.00	.00	2.	1.02	11.20	212	.05	.03	.03	136.
1.01	11.20	68	.00	0.00	.00	2.	1.02	11.30	213	.05	.03	.03	136.
1.01	11.30	69	.00	0.00	.00	2.	1.02	11.40	214	.05	.03	.03	136.
1.01	11.40	70	.00	0.00	.00	2.	1.02	11.50	215	.05	.03	.03	136.
1.01	11.50	71	.00	0.00	.00	2.	1.02	12.00	216	.05	.03	.03	136.
1.01	12.00	72	.00	0.00	.00	2.	1.02	12.10	217	.33	.30	.03	154.
1.01	12.10	73	.02	0.00	.02	2.	1.02	12.20	218	.33	.30	.03	210.
1.01	12.20	74	.02	0.00	.02	2.	1.02	12.30	219	.33	.30	.03	328.
1.01	12.30	75	.02	0.00	.02	2.	1.02	12.40	220	.33	.30	.03	498.
1.01	12.40	76	.02	0.00	.02	2.	1.02	12.50	221	.33	.30	.03	684.
1.01	12.50	77	.02	0.00	.02	2.	1.02	13.00	222	.33	.30	.03	861.
1.01	13.00	78	.02	0.00	.02	2.	1.02	13.10	223	.39	.37	.03	1016.
1.01	13.10	79	.03	0.00	.03	2.	1.02	13.20	224	.39	.37	.03	1142.
1.01	13.20	80	.03	0.00	.03	2.	1.02	13.30	225	.39	.37	.03	1240.
1.01	13.30	81	.03	0.00	.03	2.	1.02	13.40	226	.39	.37	.03	1346.
1.01	13.40	82	.03	0.00	.03	2.	1.02	13.50	227	.39	.37	.03	1432.
1.01	13.50	83	.03	0.00	.03	2.	1.02	14.00	228	.39	.37	.03	1505.
1.01	14.00	84	.03	0.00	.03	2.	1.02	14.10	229	.49	.47	.03	1570.
1.01	14.10	85	.03	0.00	.03	2.	1.02	14.20	230	.49	.47	.03	1633.
1.01	14.20	86	.03	0.00	.03	2.	1.02	14.30	231	.49	.47	.03	1706.
1.01	14.30	87	.03	0.00	.03	2.	1.02	14.40	232	.49	.47	.03	1789.
1.01	14.40	88	.03	0.00	.03	2.	1.02	14.50	233	.49	.47	.03	1872.
1.01	14.50	89	.03	0.00	.03	2.	1.02	15.00	234	.49	.47	.03	1947.
1.01	15.00	90	.03	0.00	.03	2.	1.02	15.10	235	.45	.42	.03	2007.
1.01	15.10	91	.03	0.00	.03	2.	1.02	15.20	236	.75	.72	.03	2068.

1.01	15.30	93	.09	0.00	.09	2.	1.02	15.40	238	3.37	3.35	.03	2559.
1.01	15.40	94	.23	.06	.16	7.	1.02	15.50	239	.97	.95	.03	3243.
1.01	15.50	95	.07	.04	.03	18.	1.02	16.00	240	.60	.57	.03	4160.
1.01	16.00	96	.04	.02	.03	40.	1.02	16.10	241	.46	.43	.03	4878.
1.01	16.10	97	.03	.01	.03	64.	1.02	16.20	242	.46	.43	.03	5116.
1.01	16.20	98	.03	.01	.03	80.	1.02	16.30	243	.46	.43	.03	4945.
1.01	16.30	99	.03	.01	.03	86.	1.02	16.40	244	.46	.43	.03	4497.
1.01	16.40	100	.03	.01	.03	83.	1.02	16.50	245	.46	.43	.03	3908.
1.01	16.50	101	.03	.01	.03	74.	1.02	17.00	246	.46	.43	.03	3371.
1.01	17.00	102	.03	.01	.03	62.	1.02	17.10	247	.36	.34	.03	2991.
1.01	17.10	103	.02	0.00	.02	53.	1.02	17.20	248	.36	.34	.03	2713.
1.01	17.20	104	.02	0.00	.02	46.	1.02	17.30	249	.36	.34	.03	2476.
1.01	17.30	105	.02	0.00	.02	39.	1.02	17.40	250	.36	.34	.03	2273.
1.01	17.40	106	.02	0.00	.02	32.	1.02	17.50	251	.36	.34	.03	2103.
1.01	17.50	107	.02	0.00	.02	25.	1.02	18.00	252	.36	.34	.03	1963.
1.01	18.00	108	.02	0.00	.02	19.	1.02	18.10	253	.03	.00	.03	1833.
1.01	18.10	109	.00	0.00	.00	15.	1.02	18.20	254	.03	.00	.03	1685.
1.01	18.20	110	.00	0.00	.00	11.	1.02	18.30	255	.03	.00	.03	1485.
1.01	18.30	111	.00	0.00	.00	9.	1.02	18.40	256	.03	.00	.03	1239.
1.01	18.40	112	.00	0.00	.00	7.	1.02	18.50	257	.03	.00	.03	983.
1.01	18.50	113	.00	0.00	.00	6.	1.02	19.00	258	.03	.00	.03	748.
1.01	19.00	114	.00	0.00	.00	5.	1.02	19.10	259	.03	.00	.03	551.
1.01	19.10	115	.00	0.00	.00	4.	1.02	19.20	260	.03	.00	.03	401.
1.01	19.20	116	.00	0.00	.00	4.	1.02	19.30	261	.03	.00	.03	296.
1.01	19.30	117	.00	0.00	.00	3.	1.02	19.40	262	.03	.00	.03	219.
1.01	19.40	118	.00	0.00	.00	3.	1.02	19.50	263	.03	.00	.03	162.
1.01	19.50	119	.00	0.00	.00	3.	1.02	20.00	264	.03	.00	.03	123.
1.01	20.00	120	.00	0.00	.00	3.	1.02	20.10	265	.03	.00	.03	95.
1.01	20.10	121	.00	0.00	.00	3.	1.02	20.20	266	.03	.00	.03	75.
1.01	20.20	122	.00	0.00	.00	3.	1.02	20.30	267	.03	.00	.03	60.
1.01	20.30	123	.00	0.00	.00	2.	1.02	20.40	268	.03	.00	.03	49.
1.01	20.40	124	.00	0.00	.00	2.	1.02	20.50	269	.03	.00	.03	41.
1.01	20.50	125	.00	0.00	.00	2.	1.02	21.00	270	.03	.00	.03	35.
1.01	21.00	126	.00	0.00	.00	2.	1.02	21.10	271	.03	.00	.03	31.
1.01	21.10	127	.00	0.00	.00	2.	1.02	21.20	272	.03	.00	.03	29.
1.01	21.20	128	.00	0.00	.00	2.	1.02	21.30	273	.03	.00	.03	26.
1.01	21.30	129	.00	0.00	.00	2.	1.02	21.40	274	.03	.00	.03	25.
1.01	21.40	130	.00	0.00	.00	2.	1.02	21.50	275	.03	.00	.03	23.
1.01	21.50	131	.00	0.00	.00	2.	1.02	22.00	276	.03	.00	.03	23.
1.01	22.00	132	.00	0.00	.00	2.	1.02	22.10	277	.03	.00	.03	23.
1.01	22.10	133	.00	0.00	.00	2.	1.02	22.20	278	.03	.00	.03	23.
1.01	22.20	134	.00	0.00	.00	2.	1.02	22.30	279	.03	.00	.03	23.
1.01	22.30	135	.00	0.00	.00	2.	1.02	22.40	280	.03	.00	.03	23.
1.01	22.40	136	.00	0.00	.00	2.	1.02	22.50	281	.03	.00	.03	23.
1.01	22.50	137	.00	0.00	.00	2.	1.02	23.00	282	.03	.00	.03	23.
1.01	23.00	138	.00	0.00	.00	2.	1.02	23.10	283	.03	.00	.03	23.
1.01	23.10	139	.00	0.00	.00	2.	1.02	23.20	284	.03	.00	.03	23.
1.01	23.20	140	.00	0.00	.00	2.	1.02	23.30	285	.03	.00	.03	23.
1.01	23.30	141	.00	0.00	.00	2.	1.02	23.40	286	.03	.00	.03	23.
1.01	23.40	142	.00	0.00	.00	2.	1.02	23.50	287	.03	.00	.03	23.
1.01	23.50	143	.00	0.00	.00	2.	1.03	0.00	288	.03	.00	.03	23.
1.02	0.00	144	.00	0.00	.00	2.	1.03	.10	289	0.00	0.00	0.00	22.
1.02	.10	145	.02	0.00	.02	2.	1.03	.20	290	0.00	0.00	0.00	21.
									SUM	24.99	20.16	4.83	94199.
										(635.)	(512.)	(123.)	(2667.42)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5116.	2325.	647.	325.	94241.
CMS	145.	66.	18.	9.	2669.
INCHES		18.02	20.06	20.29	20.29
MM		457.71	509.53	515.45	515.45
AC-FT		1153.	1283.	1298.	1298.
THOUS CU M		1422.	1583.	1601.	1601.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	3.	9.	20.	32.	40.	43.	41.
37.	31.	26.	23.	19.	16.	13.	10.	7.	6.
4.	4.	3.	2.	2.	2.	2.	2.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
2.	5.	11.	20.	30.	39.	47.	53.	57.	60.
62.	64.	65.	66.	66.	67.	67.	67.	68.	68.
68.	68.	68.	68.	68.	68.	68.	68.	68.	68.
68.	68.	68.	68.	68.	68.	77.	105.	164.	249.
342.	430.	508.	571.	624.	673.	716.	753.	785.	817.
853.	894.	936.	974.	1004.	1032.	1089.	1200.	1622.	2080.
2439.	2558.	2472.	2249.	1954.	1686.	1496.	1356.	1238.	1137.
1051.	982.	916.	843.	743.	619.	492.	374.	275.	201.
148.	109.	81.	62.	48.	37.	30.	25.	21.	18.
16.	14.	13.	12.	12.	11.	11.	11.	11.	11.
11.	11.	11.	11.	11.	11.	11.	11.	11.	11.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2558.	1162.	323.	162.	47121.
CMS	72.	33.	9.	5.	1334.
INCHES		9.01	10.03	10.15	10.15
MM		228.85	254.77	257.72	257.72
AC-FT		576.	642.	649.	649.
THOUS CU M		711.	791.	801.	801.

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

HYDROGRAPH ROUTING

ROUTING COMPUTATIONS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	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	0	0	0		0

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

STAGE	794.00	795.00	795.50	796.00	797.00	798.00	799.00	800.00	802.00
	806.00								
FLOW	0.00	31.00	57.00	59.00	60.00	62.00	615.00	1627.00	4486.00
	12871.00								

CAPACITY=	0.	50.	346.	708.	1125.
ELEVATION=	794.	795.	800.	805.	810.

CREL	SPWID	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
794.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
798.0	0.0	0.0	0.

STATION 2, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

MO.DA	HR.MN	PERIOD	HOURS	INFLOW	OUTFLOW	STORAGE	STAGE
1.01	.10	1	.17	1.	0.	0.	794.0
1.01	.20	2	.33	1.	0.	0.	794.0
1.01	.30	3	.50	1.	0.	0.	794.0
1.01	.40	4	.67	1.	0.	0.	794.0
1.01	.50	5	.83	1.	0.	0.	794.0
1.01	1.00	6	1.00	1.	0.	0.	794.0
1.01	1.10	7	1.17	1.	0.	0.	794.0
1.01	1.20	8	1.33	1.	0.	0.	794.0
1.01	1.30	9	1.50	1.	0.	0.	794.0
1.01	1.40	10	1.67	1.	0.	0.	794.0
1.01	1.50	11	1.83	1.	0.	0.	794.0
1.01	2.00	12	2.00	1.	0.	0.	794.0
1.01	2.10	13	2.17	1.	0.	0.	794.0
1.01	2.20	14	2.33	1.	0.	0.	794.0
1.01	2.30	15	2.50	1.	0.	0.	794.0
1.01	2.40	16	2.67	1.	0.	0.	794.0
1.01	2.50	17	2.83	1.	0.	0.	794.0
1.01	3.00	18	3.00	1.	0.	0.	794.0
1.01	3.10	19	3.17	1.	0.	0.	794.0
1.01	3.20	20	3.33	1.	0.	0.	794.0
1.01	3.30	21	3.50	1.	0.	0.	794.0
1.01	3.40	22	3.67	1.	0.	0.	794.0
1.01	3.50	23	3.83	1.	0.	0.	794.0
1.01	4.00	24	4.00	1.	0.	0.	794.0
1.01	4.10	25	4.17	1.	0.	0.	794.0
1.01	4.20	26	4.33	1.	0.	0.	794.0
1.01	4.30	27	4.50	1.	0.	0.	794.0
1.01	4.40	28	4.67	1.	0.	0.	794.0
1.01	4.50	29	4.83	1.	0.	0.	794.0
1.01	5.00	30	5.00	1.	0.	0.	794.0
1.01	5.10	31	5.17	1.	0.	0.	794.0
1.01	5.20	32	5.33	1.	0.	0.	794.0
1.01	5.30	33	5.50	1.	0.	0.	794.0
1.01	5.40	34	5.67	1.	0.	0.	794.0
1.01	5.50	35	5.83	1.	0.	0.	794.0
1.01	6.00	36	6.00	1.	0.	1.	794.0
1.01	6.10	37	6.17	1.	0.	1.	794.0
1.01	6.20	38	6.33	1.	0.	1.	794.0
1.01	6.30	39	6.50	1.	0.	1.	794.0
1.01	6.40	40	6.67	1.	0.	1.	794.0
1.01	6.50	41	6.83	1.	0.	1.	794.0
1.01	7.00	42	7.00	1.	0.	1.	794.0
1.01	7.10	43	7.17	1.	0.	1.	794.0
1.01	7.20	44	7.33	1.	0.	1.	794.0
1.01	7.30	45	7.50	1.	0.	1.	794.0
1.01	7.40	46	7.67	1.	0.	1.	794.0
1.01	7.50	47	7.83	1.	0.	1.	794.0

1.01	8.20	50	8.33	1.	0.	1.	794.0
1.01	8.30	51	8.50	1.	0.	1.	794.0
1.01	8.40	52	8.67	1.	0.	1.	794.0
1.01	8.50	53	8.83	1.	0.	1.	794.0
1.01	9.00	54	9.00	1.	0.	1.	794.0
1.01	9.10	55	9.17	1.	0.	1.	794.0
1.01	9.20	56	9.33	1.	0.	1.	794.0
1.01	9.30	57	9.50	1.	0.	1.	794.0
1.01	9.40	58	9.67	1.	0.	1.	794.0
1.01	9.50	59	9.83	1.	0.	1.	794.0
1.01	10.00	60	10.00	1.	0.	1.	794.0
1.01	10.10	61	10.17	1.	0.	1.	794.0
1.01	10.20	62	10.33	1.	1.	1.	794.0
1.01	10.30	63	10.50	1.	1.	1.	794.0
1.01	10.40	64	10.67	1.	1.	1.	794.0
1.01	10.50	65	10.83	1.	1.	1.	794.0
1.01	11.00	66	11.00	1.	1.	1.	794.0
1.01	11.10	67	11.17	1.	1.	1.	794.0
1.01	11.20	68	11.33	1.	1.	1.	794.0
1.01	11.30	69	11.50	1.	1.	1.	794.0
1.01	11.40	70	11.67	1.	1.	1.	794.0
1.01	11.50	71	11.83	1.	1.	1.	794.0
1.01	12.00	72	12.00	1.	1.	1.	794.0
1.01	12.10	73	12.17	1.	1.	1.	794.0
1.01	12.20	74	12.33	1.	1.	1.	794.0
1.01	12.30	75	12.50	1.	1.	1.	794.0
1.01	12.40	76	12.67	1.	1.	1.	794.0
1.01	12.50	77	12.83	1.	1.	1.	794.0
1.01	13.00	78	13.00	1.	1.	1.	794.0
1.01	13.10	79	13.17	1.	1.	1.	794.0
1.01	13.20	80	13.33	1.	1.	1.	794.0
1.01	13.30	81	13.50	1.	1.	1.	794.0
1.01	13.40	82	13.67	1.	1.	1.	794.0
1.01	13.50	83	13.83	1.	1.	1.	794.0
1.01	14.00	84	14.00	1.	1.	1.	794.0
1.01	14.10	85	14.17	1.	1.	1.	794.0
1.01	14.20	86	14.33	1.	1.	1.	794.0
1.01	14.30	87	14.50	1.	1.	1.	794.0
1.01	14.40	88	14.67	1.	1.	1.	794.0
1.01	14.50	89	14.83	1.	1.	1.	794.0
1.01	15.00	90	15.00	1.	1.	1.	794.0
1.01	15.10	91	15.17	1.	1.	1.	794.0
1.01	15.20	92	15.33	1.	1.	1.	794.0
1.01	15.30	93	15.50	1.	1.	1.	794.0
1.01	15.40	94	15.67	3.	1.	1.	794.0
1.01	15.50	95	15.83	9.	1.	1.	794.0
1.01	16.00	96	16.00	20.	1.	1.	794.0
1.01	16.10	97	16.17	32.	1.	2.	794.0
1.01	16.20	98	16.33	40.	1.	2.	794.0
1.01	16.30	99	16.50	43.	2.	3.	794.1
1.01	16.40	100	16.67	41.	2.	3.	794.1
1.01	16.50	101	16.83	37.	2.	4.	794.1
1.01	17.00	102	17.00	31.	3.	4.	794.1
1.01	17.10	103	17.17	26.	3.	5.	794.1
1.01	17.20	104	17.33	23.	3.	5.	794.1
1.01	17.30	105	17.50	19.	3.	5.	794.1
1.01	17.40	106	17.67	16.	3.	5.	794.1
1.01	17.50	107	17.83	13.	3.	5.	794.1
1.01	18.00	108	18.00	10.	4.	6.	794.1
1.01	18.10	109	18.17	7.	4.	6.	794.1
1.01	18.20	110	18.33	6.	4.	6.	794.1
1.01	18.30	111	18.50	4.	4.	6.	794.1
1.01	18.40	112	18.67	4.	4.	6.	794.1
1.01	18.50	113	18.83	3.	4.	6.	794.1
1.01	19.00	114	19.00	2.	4.	6.	794.1

1.01	19.20	116	19.33	2.	4.	6.	794.1
1.01	19.30	117	19.50	2.	4.	6.	794.1
1.01	19.40	118	19.67	2.	4.	6.	794.1
1.01	19.50	119	19.83	1.	4.	6.	794.1
1.01	20.00	120	20.00	1.	4.	5.	794.1
1.01	20.10	121	20.17	1.	3.	5.	794.1
1.01	20.20	122	20.33	1.	3.	5.	794.1
1.01	20.30	123	20.50	1.	3.	5.	794.1
1.01	20.40	124	20.67	1.	3.	5.	794.1
1.01	20.50	125	20.83	1.	3.	5.	794.1
1.01	21.00	126	21.00	1.	3.	5.	794.1
1.01	21.10	127	21.17	1.	3.	5.	794.1
1.01	21.20	128	21.33	1.	3.	5.	794.1
1.01	21.30	129	21.50	1.	3.	5.	794.1
1.01	21.40	130	21.67	1.	3.	5.	794.1
1.01	21.50	131	21.83	1.	3.	5.	794.1
1.01	22.00	132	22.00	1.	3.	5.	794.1
1.01	22.10	133	22.17	1.	3.	5.	794.1
1.01	22.20	134	22.33	1.	3.	5.	794.1
1.01	22.30	135	22.50	1.	3.	5.	794.1
1.01	22.40	136	22.67	1.	3.	5.	794.1
1.01	22.50	137	22.83	1.	3.	5.	794.1
1.01	23.00	138	23.00	1.	3.	5.	794.1
1.01	23.10	139	23.17	1.	3.	5.	794.1
1.01	23.20	140	23.33	1.	3.	5.	794.1
1.01	23.30	141	23.50	1.	3.	5.	794.1
1.01	23.40	142	23.67	1.	3.	5.	794.1
1.01	23.50	143	23.83	1.	3.	5.	794.1
1.02	0.00	144	24.00	1.	3.	5.	794.1
1.02	.10	145	24.17	1.	3.	5.	794.1
1.02	.20	146	24.33	1.	3.	5.	794.1
1.02	.30	147	24.50	1.	3.	5.	794.1
1.02	.40	148	24.67	1.	3.	5.	794.1
1.02	.50	149	24.83	1.	3.	5.	794.1
1.02	1.00	150	25.00	1.	3.	5.	794.1
1.02	1.10	151	25.17	1.	3.	5.	794.1
1.02	1.20	152	25.33	1.	3.	5.	794.1
1.02	1.30	153	25.50	1.	3.	5.	794.1
1.02	1.40	154	25.67	1.	3.	5.	794.1
1.02	1.50	155	25.83	1.	3.	5.	794.1
1.02	2.00	156	26.00	1.	3.	5.	794.1
1.02	2.10	157	26.17	1.	3.	4.	794.1
1.02	2.20	158	26.33	1.	3.	4.	794.1
1.02	2.30	159	26.50	1.	3.	4.	794.1
1.02	2.40	160	26.67	1.	3.	4.	794.1
1.02	2.50	161	26.83	1.	3.	4.	794.1
1.02	3.00	162	27.00	1.	3.	4.	794.1
1.02	3.10	163	27.17	1.	3.	4.	794.1
1.02	3.20	164	27.33	1.	3.	4.	794.1
1.02	3.30	165	27.50	1.	3.	4.	794.1
1.02	3.40	166	27.67	1.	3.	4.	794.1
1.02	3.50	167	27.83	1.	3.	4.	794.1
1.02	4.00	168	28.00	1.	3.	4.	794.1
1.02	4.10	169	28.17	1.	3.	4.	794.1
1.02	4.20	170	28.33	1.	3.	4.	794.1
1.02	4.30	171	28.50	1.	3.	4.	794.1
1.02	4.40	172	28.67	1.	3.	4.	794.1
1.02	4.50	173	28.83	1.	3.	4.	794.1
1.02	5.00	174	29.00	1.	3.	4.	794.1
1.02	5.10	175	29.17	1.	3.	4.	794.1
1.02	5.20	176	29.33	1.	3.	4.	794.1
1.02	5.30	177	29.50	1.	3.	4.	794.1
1.02	5.40	178	29.67	1.	3.	4.	794.1
1.02	5.50	179	29.83	1.	3.	4.	794.1
1.02	6.00	180	30.00	1.	3.	4.	794.1

1.02	6.20	182	30.33	5.	3.	4.	794.1
1.02	6.30	183	30.50	11.	3.	4.	794.1
1.02	6.40	184	30.67	20.	3.	4.	794.1
1.02	6.50	185	30.83	30.	3.	5.	794.1
1.02	7.00	186	31.00	39.	3.	5.	794.1
1.02	7.10	187	31.17	47.	4.	6.	794.1
1.02	7.20	188	31.33	53.	4.	6.	794.1
1.02	7.30	189	31.50	57.	4.	7.	794.1
1.02	7.40	190	31.67	60.	5.	8.	794.2
1.02	7.50	191	31.83	62.	5.	8.	794.2
1.02	8.00	192	32.00	64.	6.	9.	794.2
1.02	8.10	193	32.17	65.	6.	10.	794.2
1.02	8.20	194	32.33	66.	7.	11.	794.2
1.02	8.30	195	32.50	66.	7.	12.	794.2
1.02	8.40	196	32.67	67.	8.	12.	794.3
1.02	8.50	197	32.83	67.	8.	13.	794.3
1.02	9.00	198	33.00	67.	9.	14.	794.3
1.02	9.10	199	33.17	68.	9.	15.	794.3
1.02	9.20	200	33.33	68.	10.	16.	794.3
1.02	9.30	201	33.50	68.	10.	16.	794.3
1.02	9.40	202	33.67	68.	11.	17.	794.4
1.02	9.50	203	33.83	68.	11.	18.	794.4
1.02	10.00	204	34.00	68.	12.	19.	794.4
1.02	10.10	205	34.17	68.	12.	20.	794.4
1.02	10.20	206	34.33	68.94.4			
1.02	10.30	207	34.50	68.	13.	21.	794.4
1.02	10.40	208	34.67	68.	14.	22.	794.4
1.02	10.50	209	34.83	68.	14.	23.	794.5
1.02	11.00	210	35.00	68.	15.	23.	794.5
1.02	11.10	211	35.17	68.	15.	24.	794.5
1.02	11.20	212	35.33	68.	16.	25.	794.5
1.02	11.30	213	35.50	68.	16.	25.	794.5
1.02	11.40	214	35.67	68.	16.	26.	794.5
1.02	11.50	215	35.83	68.	17.	27.	794.5
1.02	12.00	216	36.00	68.	17.	28.	794.6
1.02	12.10	217	36.17	77.	18.	28.	794.6
1.02	12.20	218	36.33	105.	18.	29.	794.6
1.02	12.30	219	36.50	164.	19.	31.	794.6
1.02	12.40	220	36.67	249.	21.	34.	794.7
1.02	12.50	221	36.83	342.	23.	37.	794.7
1.02	13.00	222	37.00	430.	26.	42.	794.8
1.02	13.10	223	37.17	508.	30.	48.	795.0
1.02	13.20	224	37.33	571.	36.	55.	795.1
1.02	13.30	225	37.50	624.	44.	63.	795.2
1.02	13.40	226	37.67	673.	52.	71.	795.4
1.02	13.50	227	37.83	716.	57.	80.	795.6
1.02	14.00	228	38.00	753.	58.	89.	795.7
1.02	14.10	229	38.17	785.	59.	99.	795.9
1.02	14.20	230	38.33	817.	59.	109.	796.1
1.02	14.30	231	38.50	853.	59.	120.	796.3
1.02	14.40	232	38.67	894.	59.	131.	796.5
1.02	14.50	233	38.83	936.	60.	143.	796.7
1.02	15.00	234	39.00	974.	60.	155.	796.9
1.02	15.10	235	39.17	1004.	60.	168.	797.1
1.02	15.20	236	39.33	1032.	61.	181.	797.4
1.02	15.30	237	39.50	1089.	61.	195.	797.6
1.02	15.40	238	39.67	1280.	62.	211.	797.9
1.02	15.50	239	39.83	1622.	150.	229.	798.2
1.02	16.00	240	40.00	2080.	348.	251.	798.5
1.02	16.10	241	40.17	2439.	567.	276.	798.9
1.02	16.20	242	40.33	2558.	912.	300.	799.3
1.02	16.30	243	40.50	2472.	1223.	320.	799.6
1.02	16.40	244	40.67	2249.	1442.	334.	799.8
1.02	16.50	245	40.83	1954.	1567.	343.	799.9
1.02	17.00	246	41.00	1686.	1615.	346.	800.0

1.02	17.20	248	41.33	1356.	1576.	343.	799.9
1.02	17.30	249	41.50	1238.	1523.	340.	799.9
1.02	17.40	250	41.67	1137.	1459.	335.	799.8
1.02	17.50	251	41.83	1051.	1389.	331.	799.8
1.02	18.00	252	42.00	982.	1318.	326.	799.7
1.02	18.10	253	42.17	916.	1247.	322.	799.6
1.02	18.20	254	42.33	843.	1176.	317.	799.6
1.02	18.30	255	42.50	743.	1102.	312.	799.5
1.02	18.40	256	42.67	619.	1020.	307.	799.4
1.02	18.50	257	42.83	492.	930.	301.	799.3
1.02	19.00	258	43.00	374.	833.	295.	799.2
1.02	19.10	259	43.17	275.	733.	289.	799.1
1.02	19.20	260	43.33	201.	636.	283.	799.0
1.02	19.30	261	43.50	148.	574.	277.	798.9
1.02	19.40	262	43.67	109.	524.	271.	798.8
1.02	19.50	263	43.83	81.	475.	265.	798.7
1.02	20.00	264	44.00	62.	429.	260.	798.7
1.02	20.10	265	44.17	48.	386.	255.	798.6
1.02	20.20	266	44.33	37.	346.	251.	798.5
1.02	20.30	267	44.50	30.	310.	247.	798.4
1.02	20.40	268	44.67	25.	277.	243.	798.4
1.02	20.50	269	44.83	21.	248.	240.	798.3
1.02	21.00	270	45.00	18.	221.	237.	798.3
1.02	21.10	271	45.17	16.	197.	234.	798.2
1.02	21.20	272	45.33	14.	176.	232.	798.2
1.02	21.30	273	45.50	13.	157.	230.	798.2
1.02	21.40	274	45.67	12.	140.	228.	798.1
1.02	21.50	275	45.83	12.	125.	226.	798.1
1.02	22.00	276	46.00	11.	112.	225.	798.1
1.02	22.10	277	46.17	11.	100.	224.	798.1
1.02	22.20	278	46.33	11.	89.	222.	798.0
1.02	22.30	279	46.50	11.	80.	221.	798.0
1.02	22.40	280	46.67	11.	72.	221.	798.0
1.02	22.50	281	46.83	11.	65.	220.	798.0
1.02	23.00	282	47.00	11.	62.	219.	798.0
1.02	23.10	283	47.17	11.	62.	218.	798.0
1.02	23.20	284	47.33	11.	62.	218.	798.0
1.02	23.30	285	47.50	11.	62.	217.	798.0
1.02	23.40	286	47.67	11.	62.	216.	797.9
1.02	23.50	287	47.83	11.	62.	216.	797.9
1.03	0.00	288	48.00	11.	62.	215.	797.9
1.03	.10	289	48.17	11.	62.	214.	797.9
1.03	.20	290	48.33	11.	62.	213.	797.9

PEAK OUTFLOW IS 1615. AT TIME 41.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1615.	801.	218.	109.	31636.
CMS	46.	23.	6.	3.	896.
INCHES		6.21	6.77	6.81	6.81
MM		157.67	171.96	173.03	173.03
AC-FT		397.	433.	436.	436.
THOUS CU M		490.	534.	537.	537.

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

1

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

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO 1
				.50
HYDROGRAPH AT	1	1.20	1	2558.
		(3.11)		(72.44)(
ROUTED TO	2	1.20	1	1615.
		(3.11)		(45.74)(

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	794.00	794.00	798.00
STORAGE	0.	0.	219.
OUTFLOW	0.	0.	62.

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
.50	799.99	1.99	346.	1615.	7.17	41.00	0.00

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

ASH5OUT 15:40 MAY 11,'01

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

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT 1
ROUTE HYDROGRAPH TO 2
END OF NETWORK

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

RUN DATE= 01/05/11.
TIME= 14.34.56.

LAKE ASHRDE DAM (00023)
INFLOW HYDROGRAPHY AND ROUTING
N J DAM INSPECTION

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
290	0	10	0	0	0	0	0	4	0

	JOPER	NWT	LROPT	TRACE
	5	0	0	0

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

RTIOS= .10 .20 .30 .40 .50

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

SUB-AREA RUNOFF COMPUTATION

COMPUTE HYDROGRAPH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	2	1.20	0.00	1.20	.80	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.00	112.00	123.00	133.00	142.00	0.00	0.00

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	1.00	.15	0.00	0.00

RECESSION DATA
STRTQ= -2.00 QRCSN= 0.00 RTIOR= 1.00

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
			SUM	24.99	20.16	4.83	94199.
				(635.)	(512.)	(123.)	(2667.42)

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q

****

HYDROGRAPH ROUTING

ROUTING COMPUTATIONS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	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	0	0	0	0

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

STAGE	794.00	795.00	795.50	796.00	797.00	798.00	799.00	800.00	802.00
	806.00								
FLOW	0.00	31.00	57.00	59.00	60.00	62.00	615.00	1627.00	4486.00
	12571.00								
SURFACE AREA=		48.	52.	66.	78.	88.			
CAPACITY=		0.	50.	346.	708.	1125.			
ELEVATION=		794.	795.	800.	805.	810.			

CREL	SPWID	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
794.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
798.0	0.0	0.0	0.

PEAK OUTFLOW IS 59. AT TIME 43.17 HOURS

PEAK OUTFLOW IS 100. AT TIME 43.17 HOURS

PEAK OUTFLOW IS 552. AT TIME 42.17 HOURS

PEAK OUTFLOW IS 1085. AT TIME 41.33 HOURS

PEAK OUTFLOW IS 1615. AT TIME 41.00 HOURS

1

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

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .10	RATIO 2 .20	RATIO 3 .30	RATIO 4 .40	RATIO 5 .50
HYDROGRAPH AT	1	1.20	1	512.	1023.	1535.	2047.	2558.
	(	3.11)	(	14.49)(	28.98)(	43.46)(	57.95)(	72.44)(
ROUTED TO	2	1.20	1	59.	100.	552.	1085.	1615.
	(	3.11)	(	1.67)(	2.84)(	15.64)(	30.73)(	45.74)(

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	794.00	794.00	798.00
STORAGE	0.	0.	219.
OUTFLOW	0.	0.	62.

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
.10	796.04	0.00	106.	59.	0.00	43.17	0.00
.20	798.07	.07	224.	100.	1.83	43.17	0.00
.30	798.89	.89	274.	552.	5.67	42.17	0.00
.40	799.46	1.46	311.	1085.	6.50	41.33	0.00
.50	799.99	1.99	346.	1615.	7.17	41.00	0.00

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

APPENDIX 4

PERTINENT DATA

1. Letter from Harold E. Pellow & Associates, Inc. to the Department of Environmental Protection, New Jersey.

2. Pertinent data from Dam Application File, NJ DEP.

3. Hydraulic/Hydrologic computations by Soil Conservation Service 1969.

HAROLD E. PELLOW & ASSOCIATES, INC.
CONSULTING ENGINEERS
100 MAIN STREET
SUSSEX, NEW JERSEY 07461
TELEPHONE
875-4563

April 24, 1973

Mr. Dirk C. Hofman, P.E.
Chief, Bureau of Water Control
Department of Enviornmental Protection
Division of Water Resources
Trenton, New Jersey 08625

Re: Lake Ashroe Dam Application No. 612

Dear Mr. Hofman:

In reference to your letter dated March 26, 1973 relative to the subject matter, I make the following comments.

1. The foundation of the dam was not inspected by a representative of your division due to an oversight on my part.

2. The embankment area was stripped of all topsoil and organic material which ranged in depth from 6 inches to 18 inches.

3. The cutoff trench was excavated to bedrock as shown on the profile of the dam. All loose rock was removed from the bottom of the cutoff trench before it was backfilled with SM material from the Borrow Area No. 1. We used the most impermeable material from this Borrow Area No. 1 backfilling the cutoff trench including some CL material.

4. The foundation for the embankment consisted mainly of SM material with some CL and SP areas. This area was then compacted with a vibratory compactor prior to placing of any fill.

5. The embankment material consisted mainly of SM material which was obtained from Borrow Area No. 1.

6. I hope this answers any questions you might have concerning this dam. I hope you have not been inconvenienced by this oversight.

Very truly yours,

Harold E. Pellow

Harold E. Pellow
Consulting Engineer

HEP:mrh
cc: Kenneth W. Davis

[illegible]:

D.A. = 1.2) sq. miles
Use mean of North and Central Jersey curves. Q50 = 765 cfs

Hydraulics:

[illegible] maximum [illegible] of 75 second-feet was suppressed to 53 second feet [illegible] of 24.7 per cent.

Structure:

Similar to other structures for modification of [illegible] standard drawing.

Foundation:

[illegible] condition is sandstone and quartzite bedrock [illegible] surface on the left abutment. The right abutment is [illegible] covered by 2-3 feet of silt, sand of [illegible] gravel.

[illegible] material, seepage flow through the foundation is [illegible] [illegible] foundation.

By [illegible]
Date [illegible]

Job No. NJ-01-72

RUNOFF CURVE NUMBER AND TIME OF CONCENTRATION (Tc)

Sheet 1 of

WORK SHEET

Watershed _____ State _____ County _____ Reservoir No. _____

Drainage Area _____ Acres _____ Sq. Mi. Class _____

Weighted Curve Number				
(1) Soil Group	(2) Complex (Land Use)	(3) Complex No.	(4) Acres	(5) (3) x (4)
[illegible]	[illegible]	[illegible]	[illegible]	23760
[illegible]		[illegible]	[illegible]	7720
	[illegible]		[illegible]	4800
		Sum	[illegible]	[illegible]60

Weighted Curve II $\frac{(5)}{(4)}$ = _____ 73

Weighted Curve I _____

Weighted Curve III _____

(1) Elev. at Beginning of Reach	(2) Desc. of course of Runoff water	(3) Length(1) Of Course(ft)	(4) Slope of Course ( )	(5) Hydra. radius	(6) "n" value	(7) Vel. of Runoff Water (v) (ft/sec)	(8) Time (sec) (3)÷(4) (7)
						[illegible]	[illegible]
						[illegible]	512
						Sum	[illegible]

Tc = $\frac{1}{v \times 3600}$ = hrs.

COMPUTATION SHEET
SCS-523 REV 5 58

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

STATE [illegible] PROJECT [illegible], Middlesex Co. B.S.A.
BY DLA DATE 2-3-69 CHECKED BY [illegible] DATE [illegible] JOB NO. N.J.-01-726
SUBJECT Hydraulics, Drainage Calculations SHEET [illegible] OF [illegible]

24" dia R.C. Pipe w/ 2'x3' Curb Drop Inlet

$Q_p = C_p \cdot H^{1/2}$

$C_p = \frac{6.4d\,(3.-)^{1.5}}{1.0 + 1.0 + (.0105 S_0 \times 120)}$

$= \frac{24.48 \times [illegible]}{[illegible]}$

$= \frac{[illegible]}{5.37}$

$= [illegible]$

$C_p = 13.93$

$L_p = 120'$

$A_p = 3.14\ \square'$

$K_f = .01058$

$K_o = 1.0$

$K_o = 1.0$

Free outlet on Rock.

STAGE	H_2	$H^{1/2}$	Q_p
794.0	16.	—	—
794.5	16.5	4.062	56.6
795.0	17	4.123	57.5
795.5	17.5	4.184	58.3
796.0	18.	4.243	59.12
796.5	18.5	4.301	59.9
797.0	19.	4.36	60.8
797.5	19.5	4.416	61.5
798.0	20.0	4.472	62.4
798.5	20.5	4.528	63.09
799.0	21.0	4.583	63.8

NOTE AT 180 ft DISCHARGE IS 58 CFS

EMERGENCY SPILLWAY & FREEBOARD HYDROGRAPH ROUTING

INPUT DATA SHEET

TSC-UD-205
4/8/88 (REV 5/88)

SHEET ___ OF ___

TITLE	CARD NO
	1

HYDROGRAPH INFORMATION									
CURVE NO.	T_c (HR)	RAINFALL DURATION	AREAL RAINFALL EMER. SPWY	AREAL RAINFALL FREEBOARD	EMER. SPWY CREST ELEV	DRAINAGE AREA (S.M.)	DESIRED H_p EMER. SPWY	DESIRED H_p FREEBOARD	CARD NO.
									2

EMERGENCY SPILLWAY INFORMATION									
CASE NO.	BOTTOM WIDTHS & ENTRANCE LENGTHS BW 1	LEN. 1	BW 2	LEN. 2	BW 3	LEN. 3	ROUTING CODE	PLOTTING CODE	CARD NO.
									3

ELEVATION (FT.)	STORAGE (AC. FT.)	DISCHARGE (CFS)	DISCHARGE (CFS)	DISCHARGE (CFS)	HP (FT)	DISCHARGE/BOTTOM WIDTH (CFS/FT)	(CFS/FT)	(CFS/FT)	CARD NO.
									4
									5
									6
									7
									8
									9
									10
									11
									12
									13
									14
									15
									16
									17
									18

VEL (FT/SEC)	LENGTH (FT)	'C'	ROUTING IS REQUIRED	CARD NO.
				19

E. S. DESIGN AND FREEBOARD ROUTINGS.

CAMP SAKAWAWIN NEW JERSEY 24INCH PRINCIPAL SPILLWAY

CURVE NO. 74. TC 0.50 STORM DURATION 6.00

EMER. SPW. RAINFALL 4.10 FREEBOARD RAINFALL 0.00

CASE NO. 1. DRAINAGE AREA 1.20 EMER. SPW. CREST 799.0

801 1. L1 1. 802 0. L2 0. 803 0. L3 0.

ELEVATION	STORAGE	CFS	CFS	CFS
794.00	0.	0.	0.	0.
795.00	50.	31.	0.	0.
795.50	54.	57.	0.	0.
796.00	104.	59.	0.	0.
797.00	160.	60.	0.	0.
798.00	220.	62.	0.	0.
799.00	283.	63.	0.	0.

CAMP SAKAWAWIN NEW JERSEY 24INCH PRINCIPAL SPILLWAY

EMER. SPW. INTERVENING HYDROGRAPH.

TIME	0.00	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.2
0.00	0.	0.	0.	0.	0.	0.	0.	0.	15.	165
2.50	558.	758.	571.	420.	356.	301.	291.	274.	220.	198
5.00	192.	192.	192.	194.	174.	105.	39.	13.	4.	1
7.50	0.	0.	0.	0.	0.	0.	0.	0.	0.	0

SCS 387 5 57
Tabular Computations

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

ACRES [illegible] FOR STAGE [illegible]

K = 100 × 100 / 43560 = 0.22956	785 □"	785 AC	790 □"	790 AC	Normal Pool 794 □"	794 AC	795 □"	795 AC	5?0 □"	5?0 AC
Sect I	22.935	5.27	25.85	5.96	28.49	6.54	34.50	7.92	47.55	10.92
Sect II	18.04	4.14	20.90	4.80	22.57	5.19	25.47	5.85	46.49	10.67
Sect III	33.54	7.70	36.80	8.45	38.94	8.94	41.75	9.58	55.13	12.66
[illegible]	49.5[illegible]	11.3[illegible]	51.75	11.88	53.14	12.20	[illegible]	[illegible]	[illegible]	[illegible]
Sect V	[illegible]	[illegible]	[illegible].05	9.19	[illegible]	9.37	42.17	9.5[illegible]	[illegible].63	[illegible].25
[illegible]	[illegible]	[illegible]	24.72	5.7[illegible]	26.[illegible]	6.01	[illegible]	[illegible]	[illegible]	[illegible]
		4[illegible]		45.95		44.74		[illegible]		[illegible]
		[illegible]	[illegible]	[illegible]	AC [illegible]	AC	[illegible]		A[illegible]	
		[illegible]	44.19	5	220.96		[illegible]			
[illegible]	[illegible]									
		[illegible]	[illegible].11	[illegible]	[illegible].44		[illegible]			
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]					
		[illegible]	50.26	1	50.26		[illegible]			
795	5[illegible]									5[illegible]
		[illegible]	57.19	5	286.[illegible]		7[illegible]			
8[illegible]	[illegible]									[illegible]
		[illegible]	72.43	5	362.15		[illegible]			
5[illegible]	75.[illegible]									70[illegible]
		[illegible]	83.39	5	416.95		15[illegible]			
[illegible]	8[illegible]									[illegible]

S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

A [illegible] - 726

Middlesex Council B.S.A.

Sakawawin Scout Reservation [illegible]

735		530		805		810					
	Ac.	□"	Ac.	□"	Ac	□"	Ac.				
0	7.72	47.55	10.72	63.15	14.50	77.33	17.75				
1	5.85	46.49	10.67	60.54	13.90	70.11	16.10				
-	9.53	55.13	12.66	63.39	14.55	71.01	16.30				
6	2.71	61.90	14.21	66.94	15.37	70.35	16.15				
7	7.10	[illegible].53	11.25	46.34	10.65	47.04	11.03				
	[illegible]	[illegible]	[illegible]	[illegible]	9.38	48.21	11.07				
	[illegible]		[illegible]		74.38		88.40				
		A[illegible]	[illegible]								
		[illegible]	[illegible]								
4[illegible]											
[illegible]											
6[illegible]											
			59.36								
[illegible]											
			147.10								
[illegible]											
			70931								
[illegible]											
			[illegible]								

EMER. SPW. DESIGN ROUTING.

CAMP SAKAWAWIN NEW JERSEY 24INCH PRINCIPAL SPILLWAY

BD = 1. L = 1.

	TIME	INFLOW	AVE IN	OUTFLOW	ELEV.
	0.25	0.	0.	0.	793.99
	0.50	0.	0.	0.	793.99
	0.75	0.	0.	0.	793.99
	1.00	0.	0.	0.	793.99
	1.25	0.	0.	0.	793.99
	1.50	0.	0.	0.	793.99
	1.75	0.	0.	0.	794.00
	2.00	15.	7.	0.	794.00
	2.25	165.	90.	1.	794.04
	2.50	558.	362.	5.	794.18
	2.75	758.	658.	14.	794.45
	3.00	571.	665.	22.	794.72
	3.25	420.	495.	28.	794.91
	3.50	356.	388.	51.	795.38
	3.75	301.	328.	57.	795.54
	4.00	291.	296.	57.	795.59
	4.25	274.	283.	57.	795.64
	4.50	220.	247.	57.	795.68
	4.75	198.	209.	57.	795.71
	5.00	192.	195.	58.	795.74
	5.25	192.	192.	58.	795.77
	5.50	192.	192.	58.	795.79
	5.75	194.	193.	58.	795.82
	6.00	174.	184.	58.	795.85
	6.25	105.	139.	58.	795.86
	6.50	39.	72.	58.	795.87
PEAK	6.75	13.	26.	58.	795.86
	7.00	4.	8.	58.	795.85
	7.25	1.	2.	58.	795.84
	7.50	0.	0.	58.	795.83

NO EMERGENCY SPILLWAY FLOW. NO FURTHER ROUTINGS MADE.

APPENDIX 5

REFERENCES

APPENDIX 5

REFERENCES

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2. United States Department of Agriculture, Soil Conservation Service, Somerset, N. J. Urban Hydrology for Small Watersheds, Technical Release No. 55 January 1975.

3. United States Department of Commerce Weather Bureau, April 1956, Hydrometeorological Report #33, Washington, D.C.

4. United States Department of Interior, Bureau of Reclamation Design of Small Dams, Second Edition 1973, Revised print 1977.

5. United States Department of Agriculture, Soil Conservation Service, Soil Survey of Sussex and Morris County, August 1975.

6. United States Army Corps of Engineers, Flood Hydrograph Package (HEC-1), Davis, Calif. September 1978.

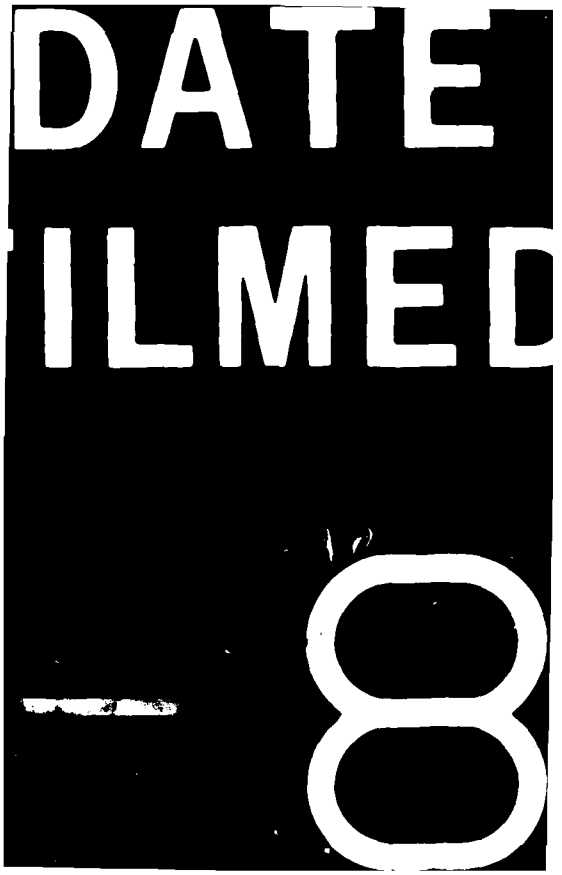
7. United States Department of Agriculture, SCS, A Method for Estimating Volume and Rate of Runoff in Small Watersheds, SCS-TP-149, Revised April 1973.

8. United States Army Corps of Engineers, Recommended Guidelines for Safety Inspection of Dams, Washington, D.C.

9. Sauls, G. A., Additional Hydrology and Hydraulics Guidance, 12 September 1978.

10. Dam Application File No. 612, Lake Ashroe, New Jersey Department of Environmental Protection.

11. Plans: Pond and Dam Plans, Sakawawin Scout Reservation, Middlesex Council, Boy Scouts of America, Sussex County, New Jersey, Drawing No. NJ-01-726, United States Department of Agriculture, Soil Conservation Service, Dated 1969.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