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NATIONAL DAM INSPECTION PROGRAM. ALDER MARSH DAM (NDI ID NUMBER--ETC(U)
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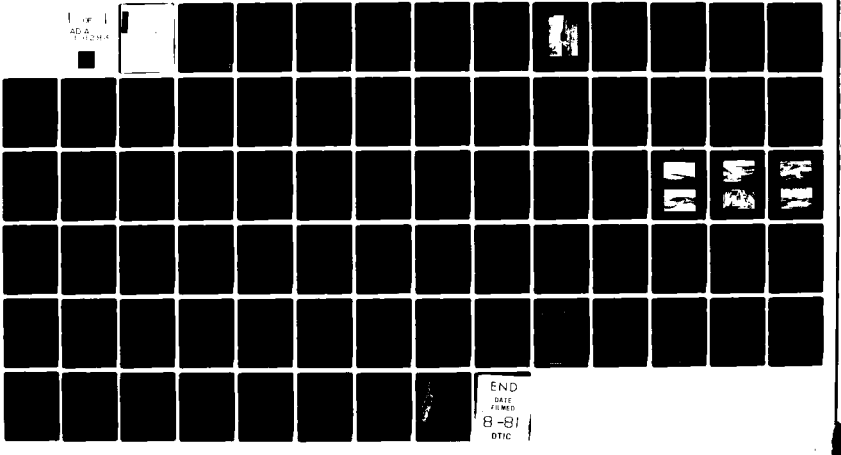

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DELAWARE RIVER BASIN

ALDER MARSH BROOK, WAYNE COUNTY

PENNSYLVANIA

ALDER MARSH DAM

NDI ID No. PA-00153
DER ID No. 64-150

PENNSYLVANIA GAME COMMISSION

6

National Dam Inspection Program. Alder Marsh Dam (NDI ID Number PA-00153, DER ID Number 64-150), Delaware River Basin, Alder Marsh Brook, Wayne County, Pennsylvania. Phase I Inspection Report.

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

Prepared by

GANNETT FLEMING CORDDRY AND CARPENTER, INC.
Consulting Engineers
P.O. Box 1963
Harrisburg, Pennsylvania 17105

Contract DACW31-81-C-0018
For

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

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PREFACE

This report is prepared under guidance contained in 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 investigations, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

ALDER MARSH DAM

NDI ID No. PA-00153; DER ID No. 64-150

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

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APPENDICES

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION

AND

RECOMMENDED ACTION

Name of Dam:	Alder Marsh Dam NDI ID No. PA-00153 DER ID No. 64-150
Size:	Small (10 feet high; 266 acre-feet)
Hazard Classification:	Significant
Owner:	Pennsylvania Game Commission Division of Land Management 8000 Derry Street P.O. Box 1567 Harrisburg, PA 17120 Attn: Mr. R. W. Kurtz
State Located:	Pennsylvania
County Located:	Wayne
Stream:	Alder Marsh Brook
Date of Inspection:	4 December 1980

Based on available records, visual inspection, calculations, and past operational performance, Alder Marsh Dam is judged to be in good condition. Considering the size and hazard classification of the dam, the recommended Spillway Design Flood (SDF) varies between the 100-year flood and the 1/2 Probable Maximum Flood (PMF). The 1/2 PMF was, in this case, selected as the SDF. The existing spillway will pass approximately 44 percent of the PMF before overtopping of the dam occurs and is, accordingly, rated as inadequate. If the emergency spillway channel were widened to its design width and the crest lowered to its design elevation, the spillway would pass about 70 percent of the PMF. The spillway would then be rated as adequate.

No stability problems were observed at the dam. Overall, maintenance of the dam has been adequate.

The following remedial measures, listed in approximate order of priority, are recommended to be undertaken by the Owner without delay.

(1) Widen the emergency spillway channel and/or lower the spillway crest to make the spillway adequate.

(2) Fill in the low areas on the embankment slopes to the design grade.

(3) Monitor the depressions located beyond the toe of the dam. Take appropriate action if any changes are detected.

In addition, the Owner should institute the following operational and maintenance procedures:

(1) Develop a detailed emergency operation and warning system for Alder Marsh Dam. When warnings of a major storm are given by the National Weather Service, the Owner should activate the emergency operation and warning system.

(2) During periods of unusually heavy rains, provide round-the-clock surveillance of the dam.

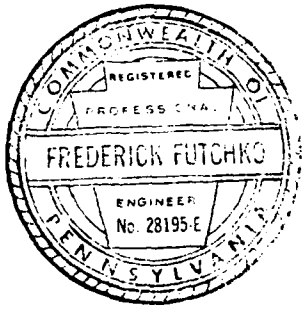
(3) Initiate an inspection program such that the dam is inspected on a regular basis. As presently required by the Commonwealth, the inspection program should include a formal annual inspection by a professional engineer experienced in the design and construction of dams. Utilize the inspection results to determine if remedial measures are necessary.

(4) Continue the existing maintenance program and develop a formal maintenance manual so that all features of the dam are properly maintained.

ALDER MARSH DAM

Submitted by:

GANNETT FLEMING CORDDRY
AND CARPENTER, INC.



FREDERICK FUTCHKO
Project Manager, Dam Section

Date: 13 April 1981

Approved by:

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF
ENGINEERS

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

Date: 11 MAY 81

ALDER MARSH DAM

Overview

ALDER MARSH DAM

NDI ID No. PA-00153; DER ID No. 64-150

PHASE I INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

SECTION 1

PROJECT INFORMATION

1.1 General.

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

b. Purpose. The purpose of the inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project.

a. Dam and Appurtenances. Alder Marsh Dam is a zoned-earthfill structure approximately 250 feet long (including both spillways) and 10 feet high. The impervious core of the dam has a base width equal to one-third of the total base width of the embankment and extends to the top of the embankment where it has a width of four feet. The design plans show that a cutoff trench was to be excavated to impervious material along the centerline of the embankment. The trench was to have minimum base and top widths of 6 and 8 feet, respectively. An 18-inch layer of hand-placed riprap, with a minimum size of 12 inches, was placed on the upstream slope to within 2 feet of the top of the dam. The dam has a crest width of about 12 feet and side slopes of 1V on 3H upstream and 1V on 2H downstream.

The principal spillway consists of a rectangular channel, with concrete side walls and a grouted stone floor, constructed through the left end of the dam. A double row of stoplogs near the center of the channel are used to control the reservoir pool elevation. The area between the stoplogs is filled with soil and rock to reduce leakage. A three-foot wide concrete cutoff wall was to be constructed a minimum of 6 feet beneath the center of the spillway. Concrete cutoff walls were also constructed 6 feet into the embankment on both sides of the spillway. A two-foot wide grouted stone cutoff wall extending to impervious material was to be constructed at the downstream end of the spillway.

The emergency spillway is a trapezoidal-shaped, vegetated channel located at the right abutment of the dam. The existing spillway, different from that shown on the plans, has a minimum bottom width of 53 feet and average side slopes of 1V on 3H. A small earth dike, which diverts discharges away from the embankment, is located along the left side of the spillway.

b. Location. Alder Marsh Dam is located on Alder Marsh Brook in Lebanon Township, Wayne County, approximately two miles northwest of Rileyville, Pennsylvania. The dam is shown on USGS Quadrangle, Galilee, Pennsylvania at latitude N 41° 44.5' and longitude W 75° 14.9'. A location map is shown on Plate E-1.

c. Size Classification. Small (10 feet high, 266 acre-feet).

d. Hazard Classification. Downstream conditions indicate that a significant hazard classification is warranted for Alder Marsh Dam (Paragraphs 3.1g and 5.1c).

e. Ownership. Pennsylvania Game Commission, Division of Land Management, 8000 Derry Street, P.O. Box 1567, Harrisburg, PA 17120, Attn: Mr. R. W. Kurtz.

f. Purpose of Dam. Waterfowl propagation.

g. Design and Construction History. The dam was designed and constructed by the Pennsylvania Game Commission during the period 1946 to 1948. No other pertinent information is available.

h. Normal Operational Procedure. The reservoir level is maintained at, or near, the principal spillway crest. Excess inflows to the reservoir are discharged through the spillway. No operating equipment is located at the damsite.

1.3 Pertinent Data.

a.	Drainage Area. (square miles)	0.91
b.	Discharge at Damsite. (cfs.)	
	Maximum known flood	Unknown
	Principal spillway capacity at maximum pool	158
	Emergency spillway capacity at maximum pool	528

c. Elevation. (feet above msl.)[1]

Top of dam	1496.0
Maximum pool	1496.0
Emergency spillway crest	1494.0
Normal pool (principal spillway crest)	1492.0
Streambed at toe of dam	1486.0

d. Reservoir Length. (miles)

Normal pool	0.70
Maximum pool	0.81

e. Storage. (acre-feet)

Normal pool	78
Maximum pool	266

f. Reservoir Surface. (acres)

Normal pool	39
Maximum pool	57

g. Dam.

Type	Zoned - earthfill
Length (feet) (including both spillways)	250
Height (feet)	10
Top Width (feet)	12
Side Slopes	
Upstream	1V on 3H
Downstream	1V on 2H
Zoning	Impervious core with base width equal to 1/3 of embankment base width and top width of 4 feet

[1]Elevations referenced to those shown on USGS quadrangle, Galilee, PA. Add 1402 feet to elevations shown on plates E-2 and E-3 to adjust to USGS datum.

g.	Dam (Cont'd.)	
	Cutoff	Trench at center of embankment excavated to impervious material
	Grout Curtain	None
h.	Diversion and Regulating Tunnel.	None
i.	Principal Spillway.	
	Type	Rectangular channel with concrete side walls and grouted stone floor
	Length of weir (feet)	6
	Crest Elevation (feet)	1492.0
	Upstream Channel	Reservoir
	Downstream Channel	Natural stream channel
j.	Emergency Spillway.	
	Type	Vegetated trapezoidal channel
	Bottom width at control section (feet)	53
	Average side slopes	1V on 3H
	Crest Elevation	1494.0
	Upstream channel	Vegetated trapezoidal channel
	Downstream channel	Vegetated trapezoidal channel
k.	Regulating Outlets.	None

SECTION 2

ENGINEERING DATA

2.1 Design.

a. Data Available. Design plans are available for Alder Marsh Dam. However, no calculations are available.

b. Design Features. The project is described in Paragraph 1.2a. The various features of the dam are shown on the photographs in Appendix C and on the plates in Appendix E.

c. Design Considerations. The information available is sufficient to make a reasonable assessment of the design.

2.2 Construction.

a. Data Available. No construction data are available.

b. Construction Considerations. There are insufficient data to assess the construction of the dam.

2.3 Operation. There are no formal records of operation. An inspection of the dam was performed by the Commonwealth in 1965. No deficiencies were reported during this inspection.

2.4 Evaluation.

a. Availability. Engineering data were provided by the Bureau of Dams and Waterway Management, Department of Environmental Resources, Commonwealth of Pennsylvania (PennDER). The Owner's representative was available for information during the visual inspection.

b. Adequacy. The type and amount of available design data and other engineering data are somewhat limited. The assessment of the dam must, therefore, be based on the combination of available data, visual inspection, performance history, hydrologic and hydraulic assumptions, and calculations developed for this report.

c. Validity. There is no reason to question the validity of the available data.

SECTION 3

VISUAL INSPECTION

3.1 Findings.

a. General. The dam and its appurtenant structures were found to be in good overall condition at the time of the inspection. Noteworthy deficiencies observed are described in the following paragraphs. The complete visual inspection checklist and field sketch are given in Appendix B. The reservoir level was at the spillway crest on the date of the inspection.

b. Embankment. The embankment was found to be in generally good condition. Low areas were found on the right side of the principal spillway on the upstream slope and on the upper half of the downstream slope. These areas vary from about 6 to 12 inches below the design elevations. Several depressions, approximately 2 feet in diameter and 1 to 2 feet deep, were observed beyond the toe of the dam. The depression nearest to the dam is about 12 feet from the downstream toe and 3 feet (±) below the normal pool level. These depressions are not considered to be linked to deficiencies at the dam. Although their exact cause is unknown, they may have been caused by settlement of uncompacted fill placed during construction of the dam.

The top of the dam was surveyed during the field inspection and was found to be essentially at the design elevation, except at the left end of the dam which is higher than shown on the design plans. The embankment slopes were also found to be reasonably close to the design conditions.

c. Appurtenant Structures. Both spillways are in generally good condition. The area between the principal spillway stoplogs has been filled with soil and rock to reduce seepage through the stoplogs. The emergency spillway channel is well vegetated. A small dike, not shown on the design plans, was constructed along the left side of the spillway channel to prevent erosion along the toe of the embankment. The emergency spillway approach channel is smaller and has a crest elevation approximately one foot above that shown on the design plans. The existing channel has a bottom width of 53 feet and a crest elevation of 1494.0 feet, as compared with the design bottom width of 65 feet and design crest elevation of 1493.0 feet.

d. Reservoir Area. The reservoir is situated in a wooded area and has generally moderate slopes. The hills in the watershed area rise to a maximum of about 500 feet above the reservoir surface.

e. Downstream Conditions. Alder Marsh Brook meanders through a relatively undeveloped valley downstream from the dam. One residence is located in a low-lying area 1.8 miles from the dam just downstream from the Newburgh Turnpike (State Route 371). Several other residences are located further downstream, but are situated above flood elevations which would occur as a result of a failure of Alder Marsh Dam. It is probable that few lives would be lost in the event of a failure of the dam.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedure. Operation of the Alder Marsh Dam and reservoir is an automatic function. The reservoir is maintained at or near the crest of the principal spillway. Normal inflows to the reservoir are discharged through the principal spillway. The emergency spillway is activated when the reservoir level rises two feet above the principal spillway crest. The reservoir can be drawn down by removing the stoplogs in the principal spillway.

4.2 Maintenance of Dam. The dam is visited approximately twice monthly by Game Commission Land Management personnel. The grass is mowed and brush is removed from the dam during the warmer months. All other maintenance is performed as required.

4.3 Maintenance of Operating Facilities. There are no operating facilities to maintain.

4.4 Warning Systems in Effect. There is no emergency operation and warning system for the dam.

4.5 Evaluation of Operational Adequacy. The maintenance of the dam is generally adequate. Regular formal inspections are necessary to detect potentially hazardous conditions at the dam. A detailed emergency operation and warning system is necessary to reduce risk of dam failure should adverse conditions develop and to prevent loss of life should the dam fail.

SECTION 5

HYDROLOGY AND HYDRAULICS

5.1 Evaluation of Features.

a. Design Data. There are no hydrologic or hydraulic design calculations available for Alder Marsh Dam. The combined capacity of the two spillways at the dam is approximately 686 cubic feet per second (cfs).

b. Experience Data. The maximum reservoir level is reported to have been just above the emergency spillway crest. No rainfall or reservoir stage records are maintained.

c. Visual Observations.

(1) General. The visual inspection of Alder Marsh Dam, which is described in Section 3, resulted in a number of observations relevant to hydrology and hydraulics.

(2) Embankment. No deficiencies were observed that would affect the hydraulic capacity of the reservoir or spillways.

(3) Appurtenant Structures. No conditions were observed that would indicate that either of the spillways could not operate satisfactorily in the event of a flood. The emergency spillway approach channel is smaller than that shown on the design plans and, therefore, has a correspondingly lower discharge capacity.

(4) Reservoir Area. The reservoir is situated on Pennsylvania State Game Lands. The area surrounding the reservoir is moderately sloping and entirely wooded.

(5) Downstream Conditions. Alder Marsh Brook meanders through a relatively undeveloped area downstream from the dam. One residence is located in a low-lying area 1.8 miles from the dam, just downstream from the Newburgh Turnpike (State Route 371). This indicates that a significant hazard classification is warranted for Alder Marsh Dam.

d. Overtopping Potential.

(1) Spillway Design Flood. According to the criteria established by the Office of the Chief of Engineers (OCE), the Spillway Design Flood (SDF) for the size (small) and hazard potential (significant) of Alder Marsh Dam is between the 100-year flood and one-half of the Probable Maximum Flood (PMF). Because of the possibility of loss of

life downstream the 1/2 PMF is selected as the SDF. The watershed and reservoir were modeled with the U.S. Army Corps of Engineers' HEC-1DB computer program, a description of which is included in Appendix D. The hydrologic and hydraulic assessment of the dam is based on existing conditions; the effects of future development were not considered.

(2) Summary of Results. Pertinent results are tabulated at the end of Appendix D. The analysis reveals that Alder Marsh Dam can, under existing conditions, pass 44 percent of the PMF before overtopping of the dam occurs.

(3) Spillway Adequacy. The criteria used to evaluate the spillway adequacy are described in Appendix D. Since the spillway passes less than the 1/2 PMF it is rated as inadequate. If the emergency spillway channel were widened to its design width and the crest lowered to its design elevation, the spillway would pass about 70 percent of the PMF. The spillway would then be rated as adequate.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability.

a. Visual Inspection.

(1) General. The visual inspection of Alder Marsh Dam, which is described in Section 3, resulted in a number of observations relevant to structural stability. These observations are evaluated herein for the various features.

(2) Embankment. The overall condition of the embankment is good. The low areas on the slopes do not create any concern for the stability of the dam.

(3) Appurtenant Structures. The condition of both spillways is good. No structural deficiencies were observed.

b. Design and Construction Data. Design plans are available for assessing the structural stability of the dam and its appurtenant structures. No construction data is available.

c. Operating Records. There are no formal records of operation. According to the Owner's representative, no stability problems are known to have occurred during the operational history of the dam.

d. Post-Construction Changes. No post-construction changes have been made to the dam.

e. Seismic Stability. Alder Marsh Dam is located in Seismic Zone 1. Earthquake loadings are not considered to be significant for small dams located in Zone 1 when there are no readily apparent stability problems at the dam. Since there are no readily apparent stability problems, the ability of the embankment to withstand an earthquake is assumed to be adequate.

SECTION 7

ASSESSMENT, RECOMMENDATIONS, AND PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment.

a. Safety.

(1) Based on available records, visual inspection, calculations, and past operational performance, Alder Marsh Dam is judged to be in good condition. Considering the size and hazard classification of the dam, the recommended SDF varies between the 100-year flood and the 1/2 PMF. The 1/2 PMF was, in this case, selected as the SDF. The spillway and reservoir, under existing conditions, will pass approximately 44 percent of the PMF before overtopping of the dam occurs. Therefore, the spillway is rated as inadequate.

(2) No stability problems were observed at the dam.

(3) Overall, maintenance of the dam has been adequate.

(4) A summary of the features of the dam and observed deficiencies is listed below:

Feature	Observed Deficiency
Embankment	Depressions on upstream and downstream slope adjacent to principal spillway; several depressions beyond the toe of the dam.
Principal Spillway	None observed
Emergency Spillway	Channel width smaller than design plans; crest elevation higher than design plans.

b. Adequacy of Information. The information available is such that the condition of the dam can be

assessed from the combination of available data, visual inspection, past performance, and computations performed as part of this study.

c. Urgency. The recommendations in Paragraph 7.2 should be implemented without delay.

d. Necessity for Further Investigations. Further investigations by the Owner will not be required to accomplish the remedial measures outlined in Paragraph 7.2.

7.2 Recommendations and Remedial Measures.

a. The following remedial measures, listed in approximate order of priority, are recommended to be undertaken by the Owner without delay.

(1) Widen the emergency spillway channel and/or lower the spillway crest to make the spillway adequate.

(2) Fill in the low areas on the embankment slopes to the design grade.

(3) Monitor the depressions located beyond the toe of the dam. Take appropriate action if changes are detected.

In addition, the Owner should institute the following operational and maintenance procedures:

(1) Develop a detailed emergency operation and warning system for Alder Marsh Dam. When warnings of a major storm are given by the National Weather Service, the Owner should activate the emergency operation and warning system.

(2) During periods of unusually heavy rains, provide round-the-clock surveillance of the dam.

(3) Initiate an inspection program such that the dam is inspected on a regular basis. As presently required by the Commonwealth, the inspection program should include a formal annual inspection by a professional engineer experienced in the design and construction of dams. Utilize the inspection results to determine if remedial measures are necessary.

(4) Continue the existing maintenance program and develop a formal maintenance manual so that all features of the dam are properly maintained.

APPENDIX A

CHECKLIST - ENGINEERING DATA

CHECKLIST

ENGINEERING DATA

DESIGN, CONSTRUCTION, AND OPERATION
PHASE I

NAME OF DAM: Alder Marsh Dam

NDI ID NO.: PA-00153 DER ID NO.: 64-150

Sheet 1 of 4

ITEM	REMARKS
AS-BUILT DRAWINGS	None - Design plans are included in Appendix E.
REGIONAL VICINITY MAP	See Plate E-1
CONSTRUCTION HISTORY	Constructed in 1947 and 1948 by the Pennsylvania Game Commission; no other information is available.
TYPICAL SECTIONS OF DAM	See Plate E-2
OUTLETS: Plan Details Constraints Discharge Ratings	See Plate E-2

ENGINEERING DATA

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	None
DESIGN REPORTS	Report by the Commonwealth, dated January 1947, contains a description of the project.
GEOLOGY REPORTS	None
DESIGN COMPUTATIONS: Hydrology and Hydraulics Dam Stability Seepage Studies	None
MATERIALS INVESTIGATIONS: Boring Records Laboratory Field	None
POSTCONSTRUCTION SURVEYS OF DAM	None

ENGINEERING DATA

ITEM	REMARKS
BORROW SOURCES	Unknown
MONITORING SYSTEMS	None
MODIFICATIONS	None
HIGH POOL RECORDS	None; maximum pool level reported to be slightly above emergency spillway crest.
POSTCONSTRUCTION ENGINEERING STUDIES AND REPORTS	None
PRIOR ACCIDENTS OR FAILURE OF DAM: Description Reports	None

ENGINEERING DATA

ITEM	REMARKS
MAINTENANCE AND OPERATION RECORDS	None
SPILLWAY: Plan Sections Details	See Plate E- , Appendix E.
OPERATING EQUIPMENT: Plans Details	No operating equipment
PREVIOUS INSPECTIONS Dates Deficiencies	17 March 1965 - No deficiencies noted.

APPENDIX B

CHECKLIST - VISUAL INSPECTION

CHECKLIST

VISUAL INSPECTION

PHASE I

Name of Dam: Alder Marsh Dam County: Wayne State: Pennsylvania

NDI ID No.: PA-00153 DER ID No.: 64-150

Type of Dam: Earthfill Hazard Category: Significant

Date(s) Inspection: 4 December 1980 Weather: Clear, windy Temperature: 15°F

Pool Elevation at Time of Inspection: 1492.0 ft. msl/Tailwater at Time of Inspection: 1487.7 ft. msl

Note: Elevations referenced to USGS quadrangle, Galilee, Pennsylvania

Inspection Personnel:

R.E. Holderbaum (GFCC)	W.R. Peoples (PGC) (Part-time)	
D.B. Wilson (GFCC)		

R.E. Holderbaum Recorder

EMBANKMENT

Sheet 1 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	Several depressions beyond toe ~ 2 feet deep; minimum distance from toe about 12 ft.; 3 ft (I) below pool level.	Cause of depressions unknown; may be caused by settlement of uncompacted fill placed during construction.
SLOUGHING OR EROSION: Embankment Slopes Abutment Slopes	None	
CREST ALIGNMENT: Vertical Horizontal	Good	
RIPRAP FAILURES	None	

EMBANKMENT

Sheet 2 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT WITH: Abutment Spillway Other Features	Low areas on upstream slope and upper half of downstream slope on right side of principal spillway; 6-12 inches low.	Should be filled to the design grade.
ANY NOTICEABLE SEEPAGE	None	
STAFF GAGE AND RECORDER	None	
DRAINS	None	

(PRINCIPAL SPILLWAY)

UNGATED SPILLWAY

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Concrete walls are in good condition; area between stop logs has been filled in with soil and stone.	
APPROACH CHANNEL	Lake - unobstructed	
DISCHARGE CHANNEL	Natural stream channel; no obstructions.	
BRIDGE AND PIERS	small wooden bridge spans spillway; low chord is at top of dam elevation.	Bridge does not reduce spillway capacity.
OTHER	Lake can be drawn down by removing wooden stop logs.	

(EMERGENCY SPILLWAY)

UNGATED SPILLWAY

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Vegetated channel at right end of dam.	Crest is approximately one foot higher than shown on design plans.
APPROACH CHANNEL	Well vegetated - no deficiencies observed.	Channel is narrower than shown on design plans; bottom width ≈ 53 feet.
DISCHARGE CHANNEL	Good - no obstructions.	Dyke along left side of channel prevents erosion of embankment toe.
BRIDGE AND PIERS	None	

INSTRUMENTATION

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER		

DOWNSTREAM CHANNEL

Sheet 1 of 1

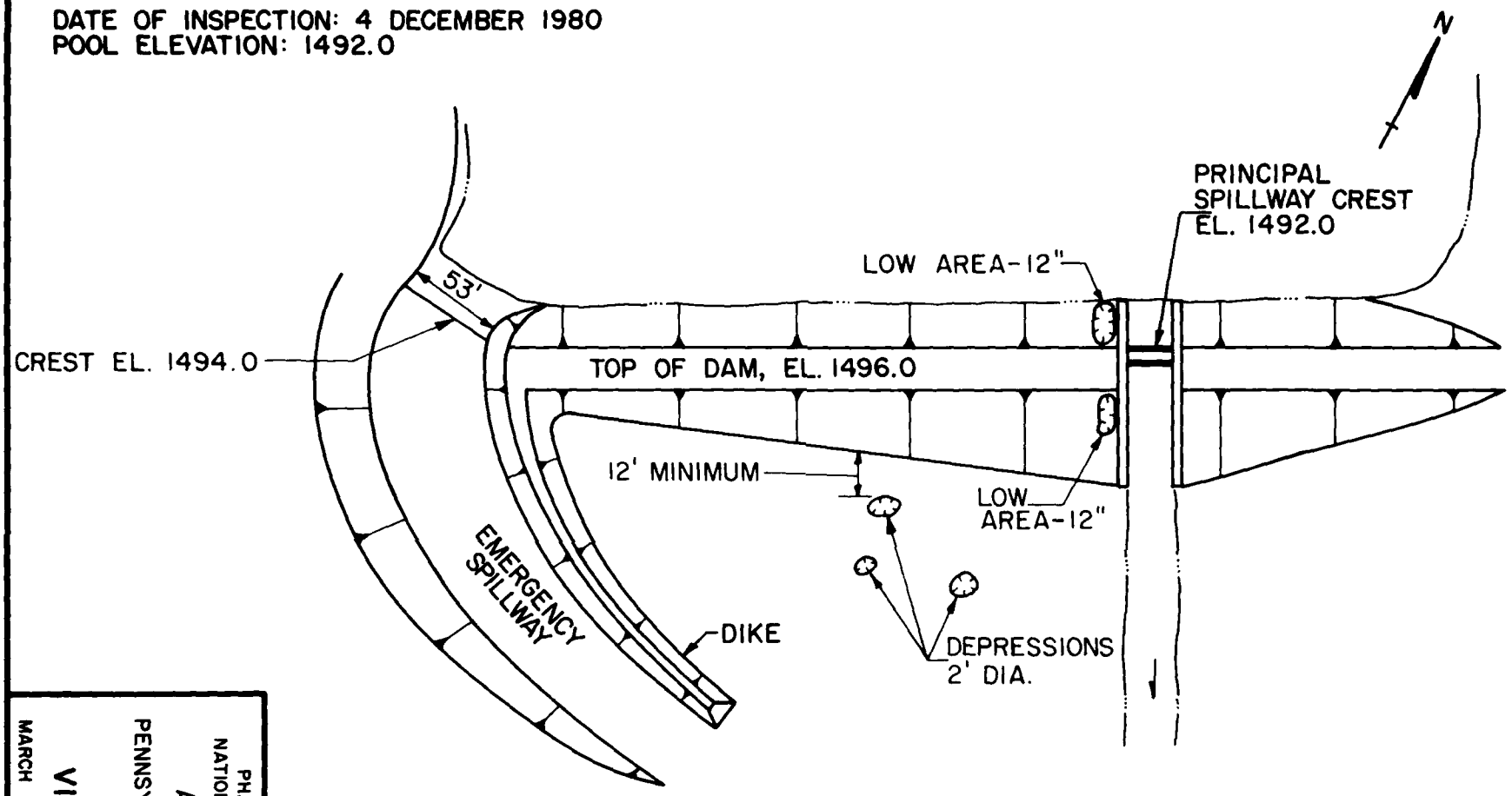
VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION: **Obstructions** **Debris** **Other**	None that would limit the discharge capacity of the spillways.	Nearest bridge is located approximately 1.8 miles downstream. (S.R. 371)
SLOPES	Streambed averages ~2% between dam and damage center.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	One residence approximately 1.8 miles downstream in low-lying area. (2-3 persons)	

RESERVOIR AND WATERSHED

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Moderate, wooded	
SEDIMENTATION	Unknown	Probably minor considering nature of watershed.
WATERSHED DESCRIPTION	Entirely wooded, moderately sloping.	

DATE OF INSPECTION: 4 DECEMBER 1980
POOL ELEVATION: 1492.0



NOT TO SCALE

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

ALDER MARSH DAM

PENNSYLVANIA GAME COMMISSION

RESULTS OF VISUAL INSPECTION

MARCH 1981

EXHIBIT B-1

APPENDIX C

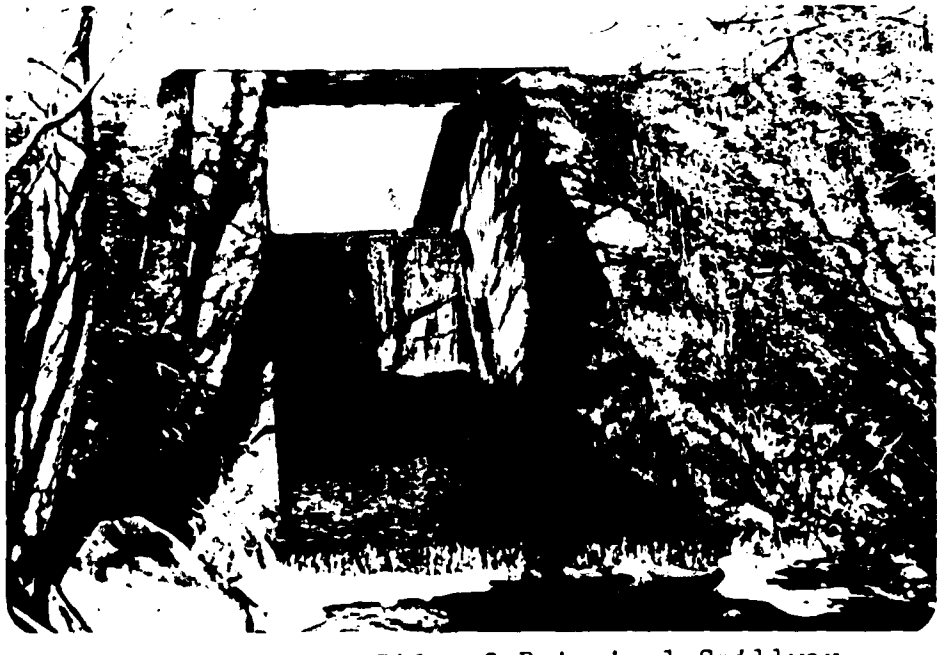
PHOTOGRAPHS

ALDER MARSH DAM

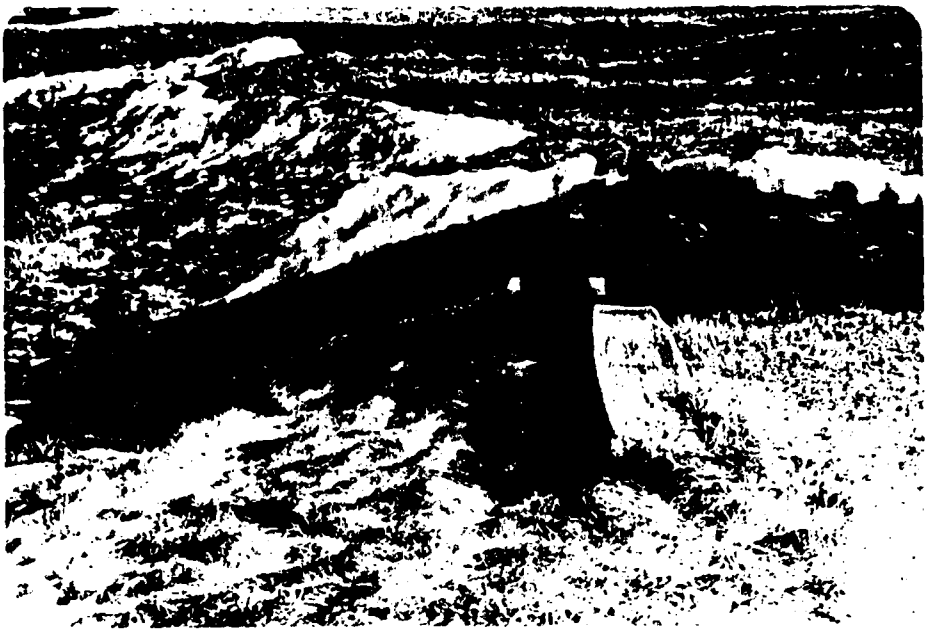
A. Upstream Slope and Left Abutment of Dam

B. Downstream Slope Looking Toward Right Abutment

C. Principal Spillway Entrance

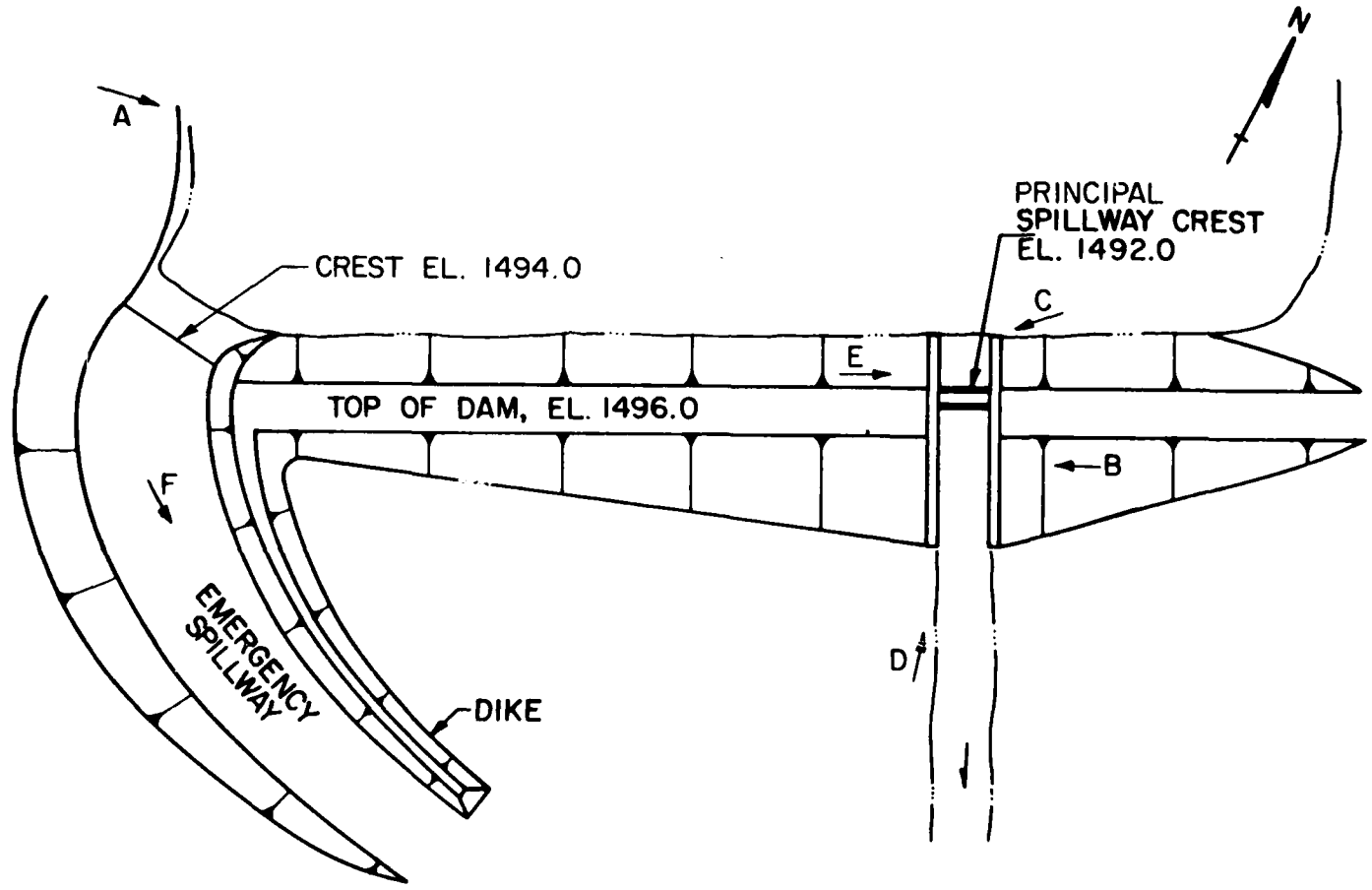


D. Downstream Side of Principal Spillway



E. Low Area Adjacent to Principal Spillway

F. Emergency Spillway Channel
(Looking Downstream)



NOT TO SCALE

← LOCATION AND ORIENTATION OF CAMERA

A PHOTOGRAPH IDENTIFICATION LETTER

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

ALDER MARSH DAM

PENNSYLVANIA GAME COMMISSION

GUIDE TO LOCATION OF PHOTOGRAPHS

MARCH 1981

EXHIBIT C-1

APPENDIX D

HYDROLOGY AND HYDRAULICS

APPENDIX D

HYDROLOGY AND HYDRAULICS

Spillway Capacity Rating:

In the recommended Guidelines for Safety Inspection of Dams, the Department of the Army, Office of the Chief of Engineers (OCE), established criteria for rating the capacity of spillways. The recommended Spillway Design Flood (SDF) for the size (small, intermediate, or large) and hazard potential (low, significant, or high) classification of a dam is selected in accordance with the criteria. The SDF for those dams in the high hazard category varies between one-half of the Probable Maximum Flood (PMF) and the PMF. If the dam and spillway are not capable of passing the SDF without overtopping failure, the spillway capacity is rated as inadequate. If the dam and spillway are capable of passing one-half of the PMF without overtopping failure, or if the dam is not in the high hazard category, the spillway capacity is not rated as seriously inadequate. A spillway capacity is rated as seriously inadequate if all of the following conditions exist:

(a) There is a high hazard to loss of life from large flows downstream of the dam.

(b) Dam failure resulting from overtopping would significantly increase the hazard to loss of life downstream from the dam from that which would exist just before overtopping failure.

(c) The dam and spillway are not capable of passing one-half of the PMF without overtopping failure.

Description of Model:

If the Owner has not developed a PMF for the dam, the watershed is modeled with the HEC-1DB computer program, which was developed by the U.S. Army Corps of Engineers. The HEC-1DB computer program calculates a PMF runoff hydrograph (and percentages thereof) and routes the flows through both reservoirs and stream sections. In addition, it has the capability to simulate an overtopping dam failure. By modifying the rainfall criteria, it is also possible to model the 100-year flood with the program.

APPENDIX D

DELAWARE River Basin
Name of Stream: ALDER MARSH BROOK
Name of Dam: ALDER MARSH DAM
NDI ID No.: PA-00153
DER ID No.: 64-150
Latitude: N 41° 44.5' Longitude: W 75° 14.9'
Top of Dam Elevation: 1496.0 FEET
Streambed Elevation: 1486.0 FT. Height of Dam: 10 ft
Reservoir Storage at Top of Dam Elevation: 266 acre-ft
Size Category: SMALL
Hazard Category: SIGNIFICANT (see Section 5)
Spillway Design Flood: 100-YEAR TO 1/2 PMF

UPSTREAM DAMS (NONE)

Name	Distance from Dam (miles)	Height (ft)	Storage at top of Dam Elevation (acre-ft)	Remarks

DOWNSTREAM DAMS (NONE)

DELAWARE River Basin

Name of Stream: ALDER MARSH BROOK

Name of Dam: ALDER MARSH DAM

DETERMINATION OF PMF RAINFALL & UNIT HYDROGRAPH

UNIT HYDROGRAPH DATA:

Sub-area	Drainage Area (square miles)	Cp (1)	Ct (2)	L miles (3)	L_{ca} miles (4)	L' miles (5)	Tp hours (6)	Map Area (7)	Plate (8)
A-1	0.91	0.45	1.23	—	—	1.09	1.30	1	A
Total	0.91								

(See Sketch on Sheet D-4)

(1) & (2): Snyder Unit Hydrograph coefficients supplied by Baltimore District, Corps of Engineers on maps and plates referenced in (7) & (8)

The following are measured from the outlet of the subarea:

(3): Length of main watercourse extended to divide

(4): Length of main watercourse to the centroid

The following is measured from the upstream end of the reservoir at normal pool:

(5): Length of main watercourse extended to divide

(6): $Tp=C_t \times (L \times L_{ca})^{0.3}$, except where the centroid of the subarea is located in the reservoir. Then $Tp=C_t \times (L')^{0.6}$

Initial flow is assumed at 1.5 cfs/sq. mile

Computer Data: QRCSN = -0.05 (5% of peak flow)
RTIOR = 2.0

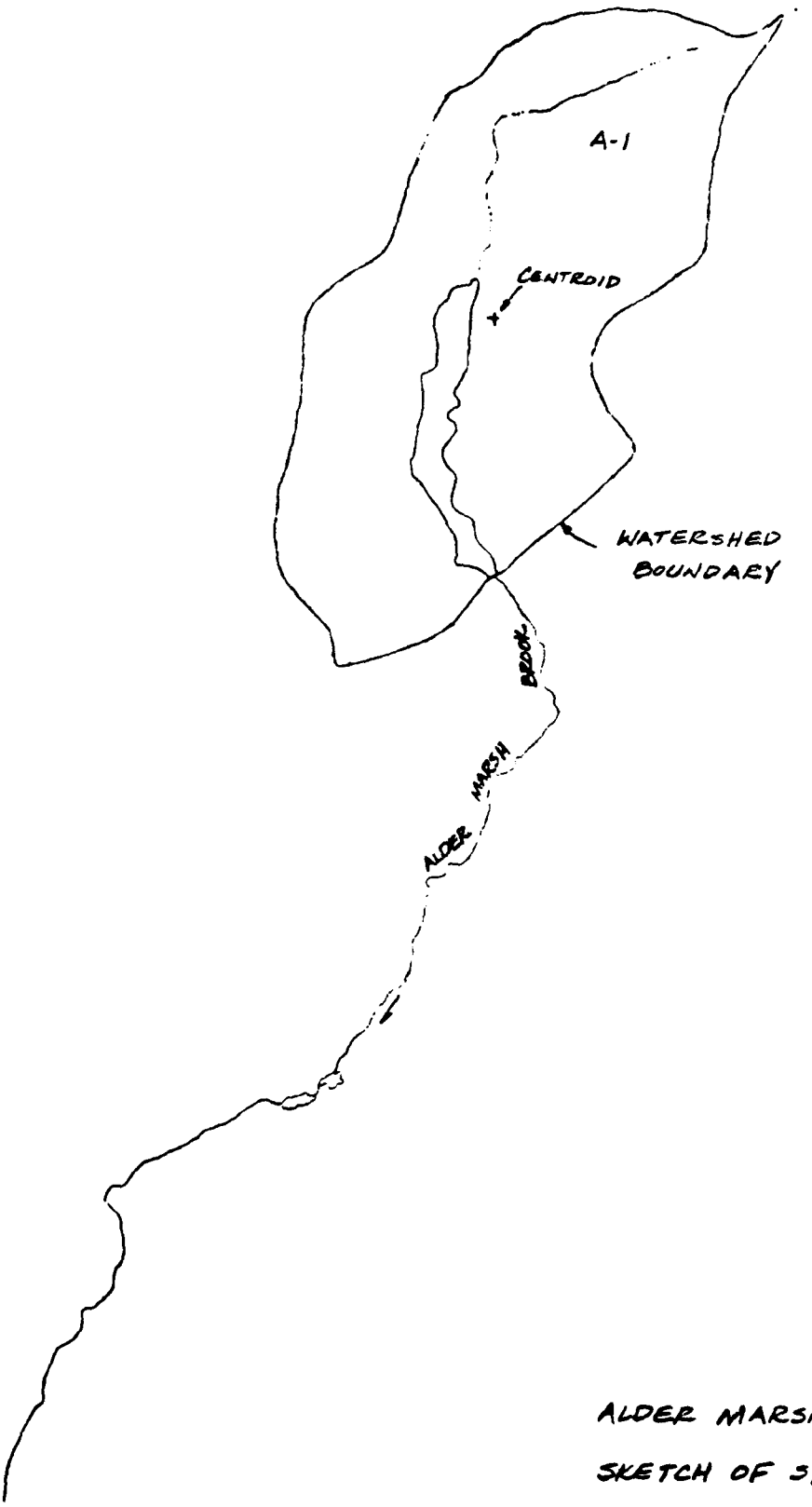
RAINFALL DATA:

PMF Rainfall Index= 21.0 in., 24 hr., 200 sq. mile

	Hydromet. 40 (Susquehanna Basin)	Hydromet. 33 (Other Basins)
Zone:	N/A	/
Geographic Adjustment Factor:		1.0
Revised Index Rainfall:		21.0

RAINFALL DISTRIBUTION (percent)

Time	Percent
6 hours	111
12 hours	123
24 hours	133
48 hours	142
72 hours	N/A
96 hours	N/A



ALDER MARSH DAM

SKETCH OF SYSTEM

1" = 2000'

Data for Dam at Outlet of Subarea A-1 (See sketch on Sheet D-4)

Name of Dam: ALDER MARSH DAM

STORAGE DATA:

	Elevation		Area (acres)		Storage million gals	acre-ft		Remarks
	1486.0	=ELEVO	0		0	0		FROM DESIGN PLANS
**	1492.0	=ELEV1	39	=A1	87	266	=S1	NORMAL POOL
**	1500.0		75					

* ELEVO = ELEV1 - $(3S_1/A_1)$

** Planimetered contour (USGS Quad)

Reservoir Area at Normal Pool is 7 percent of subarea watershed.

BREACH DATA: BREACH ANALYSIS NOT REQUIRED

See Appendix B for sections and existing profile of the dam.

Soil Type from Visual Inspection: _____

Maximum Permissible Velocity (Plate 28, EM 1110-2-1601) _____ fps
(from $Q = CLH^{3/2} = V \cdot A$ and depth = (2/3) x H) & A = L·depth

HMAX = $(4/9\ V^2/C^2)$ = _____ ft., C = ____ Top of Dam El.= ____

HMAX + Top of Dam El. = _____ = FAILEL
(Above is elevation at which failure would start)

Dam Breach Data:

BRWID = _____ ft (width of bottom of breach)
Z = _____ (side slopes of breach)
ELBM = _____ (bottom of breach elevation, minimum of zero storage elevation)
WSEL = _____ (normal pool elevation)
T FAIL= _____ mins = _____ hrs (time for breach to develop)

Data for Dam at Outlet of Subarea A-1

Name of Dam: ALDER MARSH DAM

SPILLWAY DATA:	Existing Conditions	Design Conditions
Top of Dam Elevation	1496.0	1496.0
Spillway Crest Elevation	1492.0	1492.0
Spillway Head Available (ft)	4.0	4.0
Type Spillway	CONCRETE SWICEWAY	
"C" Value - Spillway	3.3	UNKNOWN
Crest Length - Spillway (ft)	6.0	6.0
Spillway Peak Discharge (cfs)	158	UNKNOWN
Auxiliary Spillway Crest Elev.	1494.0	1493.0
Auxiliary Spill. Head Avail. (ft)	2.0	3.0
Type Auxiliary Spillway	VEGETATED CHANNEL	
"C" Value - Auxiliary Spill. (ft)	3.09	UNKNOWN
Crest Length - Auxil. Spill. (ft)	53	65
Auxiliary Spillway Peak Discharge (cfs)	528	UNKNOWN
Combined Spillway Discharge (cfs)	686	UNKNOWN

Spillway Rating Curve: SEE PAGES D-7 THROUGH D-9 (EXISTING CONDITIONS)

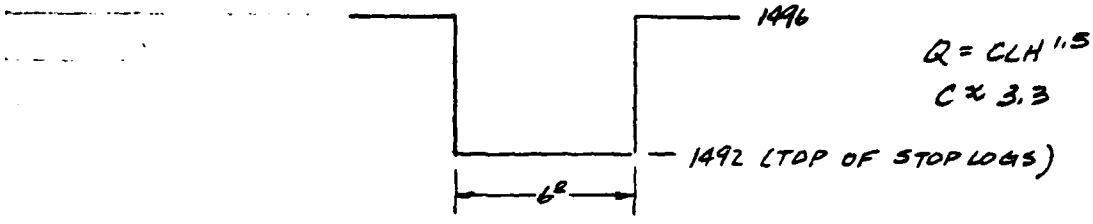
Elevation	Q Spillway (cfs)	Q Auxiliary Spillway (cfs)	Combined (cfs)
1492.0			0
1492.5			7
1493.0			20
1493.5			36
1494.0			56
1494.5			137
1495.0			274
1495.5			460
1496.0			686
1496.5			940
1497.0			1245
1497.4			1507

OUTLET WORKS RATING:	Outlet 1	Outlet 2	Outlet 3
Invert of Outlet	(N/A)	(N/A)	(N/A)
Invert of Inlet			
Type			
Diameter (ft) = D			
Length (ft) = L			
Area (sq. ft) = A			
N			
K Entrance			
K Exit			
K Friction=$29.1_N{}^2L/R^{4/3}$			
Sum of K			
$(1/K)^{0.5}$ = C			
Maximum Head (ft) = HM			
$Q = CA\sqrt{2g(HM)}$(cfs)			
Q Combined (cfs)			

BY _____ DATE _____ SUBJECT ALDER MARSH DAM SHEET NO _____ OF _____

CHKD BY _____ DATE _____ JOB NO _____

PRINCIPAL SPILLWAY RATING



$Q = CLH^{1.5}$

$C \approx 3.3$

COMBINED SPILLWAY RATING (EXISTING CONDITIONS)

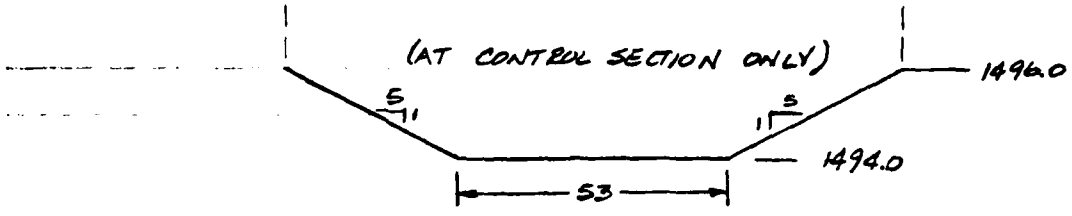
ELEV.	H	Q_S	Q_E*	Q_T
1492.00	0.0	0		0
1492.50	0.5	7.0		7
1493.00	1.0	19.8		20
1493.50	1.5	36.4		36
1494.00	2.0	56.0		56
1494.45	2.45	75.9	50.1	126
1494.88	2.88	96.8	143.9	241
1495.32	3.32	119.8	268.3	388
1495.74	3.74	143.2	419.3	562
1496.17	4.17	168.6	594.9	764
1496.59	4.59	194.7	793.9	989
1497.01	5.01	222.0	1022.7	1245
1497.4	5.40	248.5	1259.0	1507

* SEE NEXT PAGE

BY _____ DATE _____ SUBJECT ALDER MARSH DAM SHEET NO _____ OF _____

CHKD BY _____ DATE _____ JOB NO _____

EMERGENCY SPILLWAY RATING (EXISTING CONDITIONS)



Y_c	A	T	Q	V	$V^2/2g$	Pool Elev.
0.3	16.35	56	50.1	3.07	0.15	1494.45
0.6	33.60	59	143.9	4.28	0.28	94.88
0.9	51.75	62	268.3	5.18	0.42	95.32
1.2	70.80	65	419.3	5.92	0.54	95.74
1.5	90.75	68	594.9	6.56	0.67	96.17
1.8	111.60	71	793.9	7.11	0.79	96.59
2.1	133.35	73	1022.7	7.67	0.91	97.01
2.4	156.00	77	1259.0	8.07	1.01	97.41

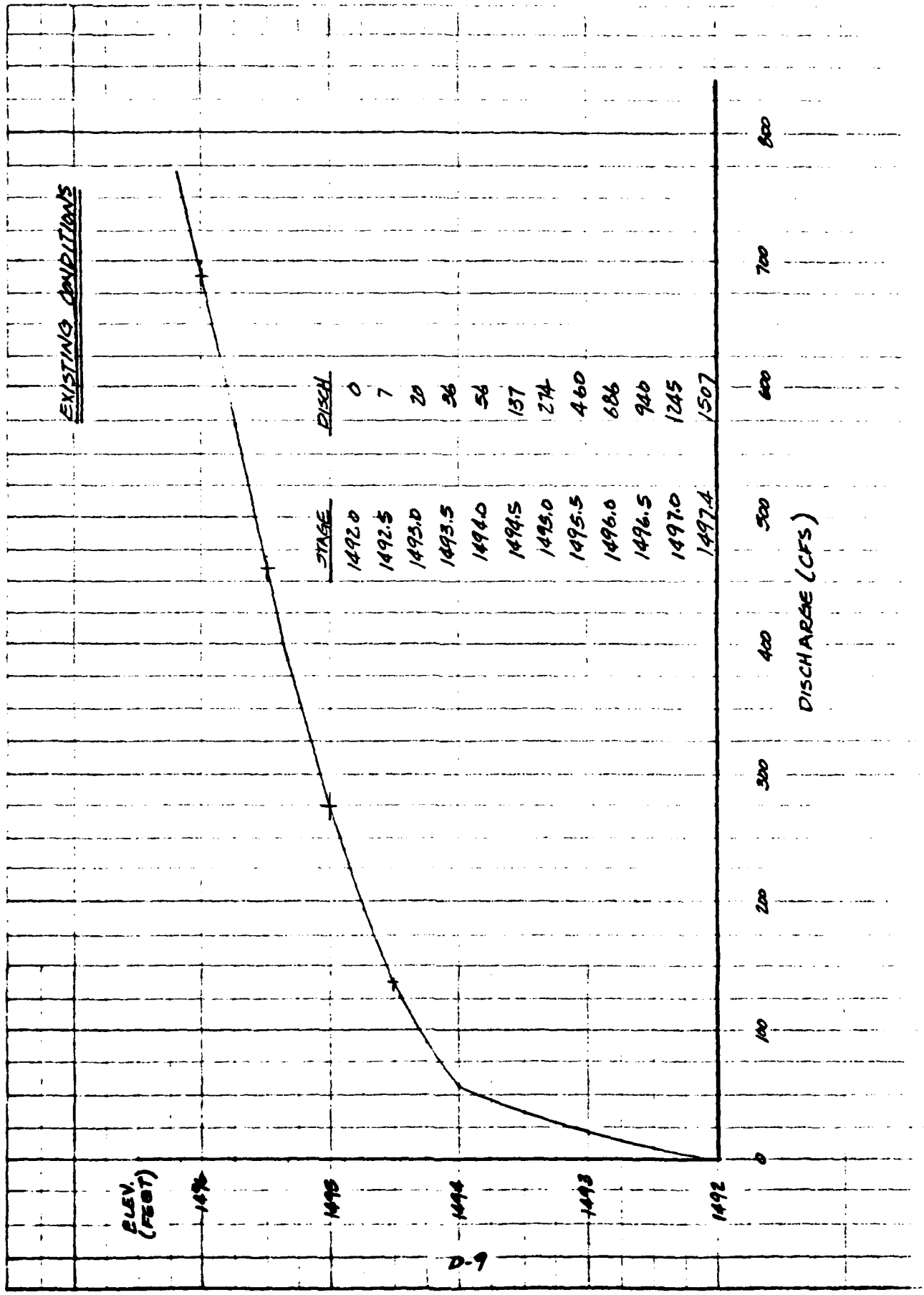
$$A = \left[\frac{10(y_c) + 2(53)}{2}\right] y_c = 5y_c^2 + 53y_c$$

$$T = 10\,y_c + 53$$

$$Q = A\sqrt{\frac{A}{T}} \cdot \sqrt{g}$$

BY _____ DATE _____ SUBJECT ALDER MARSH DAM STAGE - DISCHARGE CURVE SHEET NO _____ OF _____

CHKD. BY _____ DATE _____ JOB NO _____

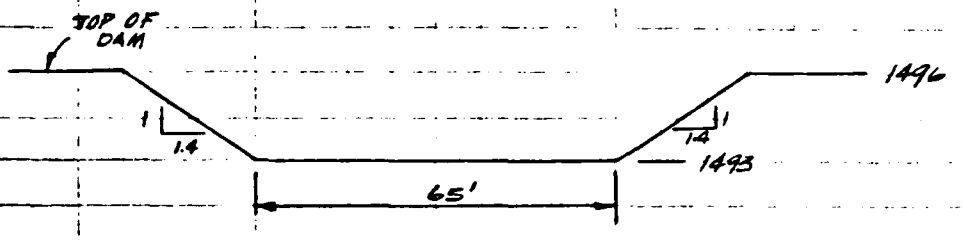


BY REH DATE 1/22/81 SUBJECT ALDER MARSH DAM SHEET NO ____ OF ____

CHKD BY ____ DATE ____ SPILLWAY CAPACITY JOB NO ____

(EMERGENCY)

EMERGENCY SPILLWAY RATING (DESIGN CONDITIONS)



Y_c	A	T	Q	V	$V^2/2g$	Pool El.
0.3	19.63	65.84	60.8	3.10	0.15	1493.45
0.6	39.50	66.68	172.5	4.37	0.30	93.90
0.9	59.63	67.52	317.7	5.33	0.44	94.34
1.2	80.02	68.36	490.9	6.13	0.58	94.78
1.5	100.65	69.20	688.3	6.84	0.73	95.23
1.8	121.54	70.04	907.8	7.47	0.87	95.66
2.1	142.67	70.88	1147.7	8.04	1.00	96.10
2.4	164.06	71.72	1411.8	8.61	1.15	96.55
2.7	185.71	72.56	1684.6	9.07	1.28	96.98
3.0	207.6	73.40	1979.6	9.54	1.41	97.41

$$A = \left[\frac{2.8(y_c) + 2(65)}{2}\right] y_c = 1.4y_c^2 + 65y_c$$

$$T = 2.8y_c + 65$$

$$Q = A\sqrt{A/T}\cdot\sqrt{g}$$

BY _____ DATE _____ SUBJECT ALDER MARSH DAM SHEET NO _____ OF _____

CHKD. BY _____ DATE _____ SPILLWAY RATING JOB NO. _____

COMBINED SPILLWAY RATING (DESIGN CONDITIONS)

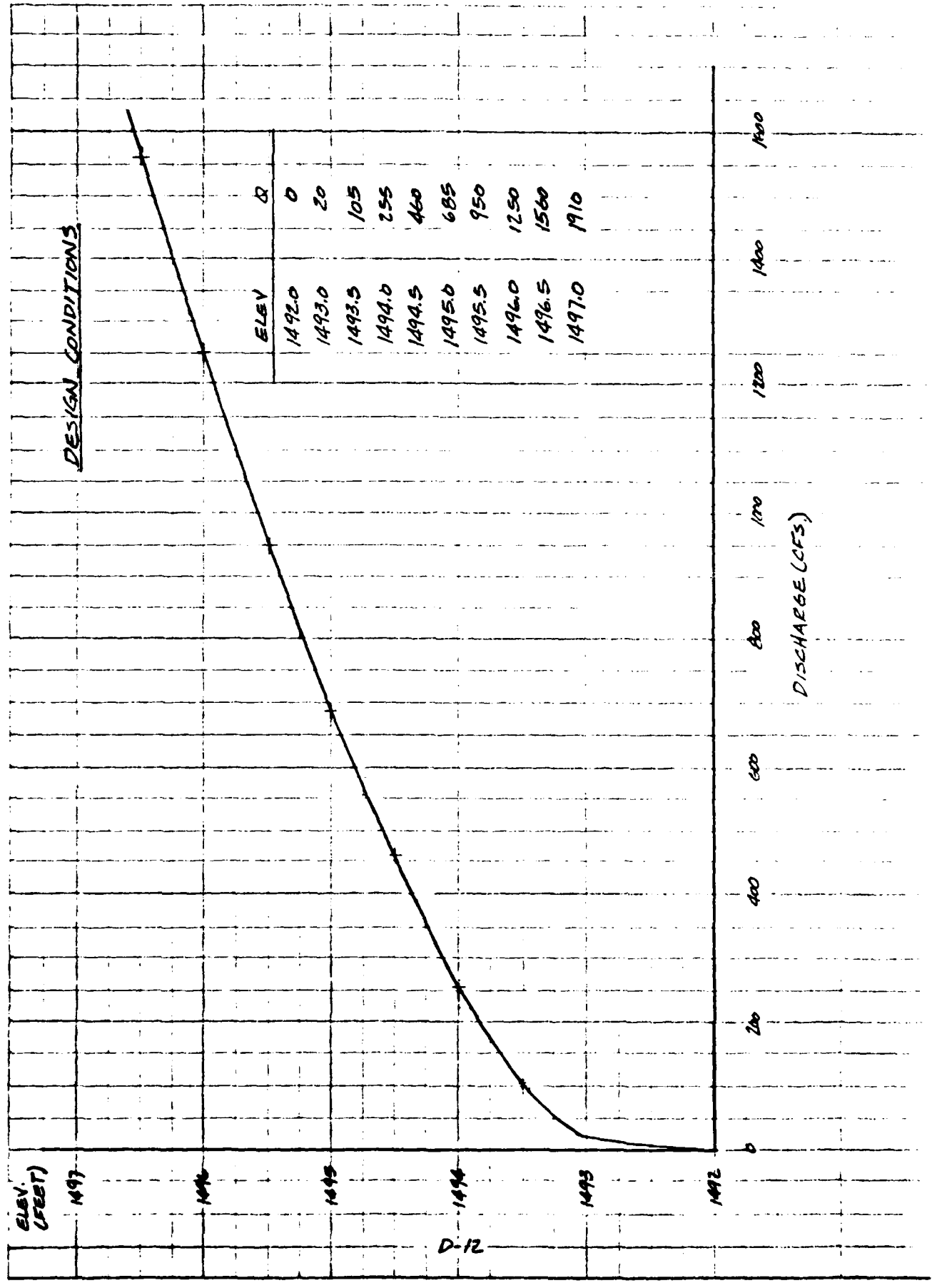
ELEV	H	Q_S	Q_E	Q_T
1492.00	0	0		0
1492.50	0.5	7.0		7
1493.00	1.0	19.8	0	20
1493.45	1.45	34.6	60.8	95
1493.90	1.90	51.8	172.5	224
1494.34	2.34	70.9	317.7	389
1494.78	2.78	91.8	490.9	583
1495.23	3.23	114.9	688.3	803
1495.66	3.66	138.6	907.8	1046
1496.10	4.10	164.4	1147.7	1312
1496.55	4.55	192.2	1411.8	1604
1496.98	4.98	220.0	1684.6	1905
1497.41	5.41	249.2	1979.6	2229

BY REH DATE 1/25/81 SUBJECT ALDER MARSH DAM SHEET NO ____ OF ____

CHKD BY ____ DATE ____ SPILLWAY RATING - DESIGN JOB NO ____

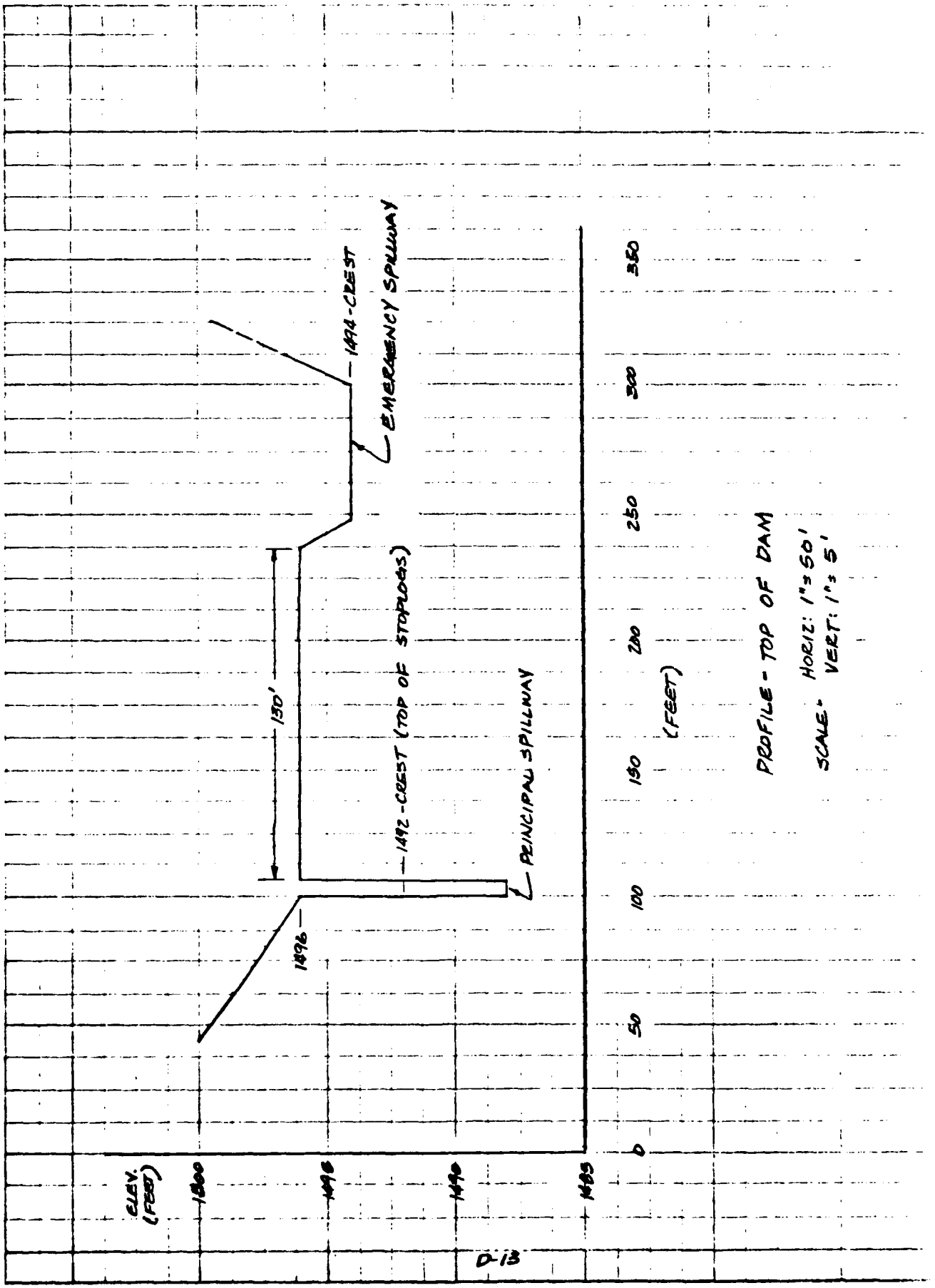
CONDITIONS

ELEV	Q
1492.0	0
1493.0	20
1493.5	105
1494.0	255
1494.5	460
1495.0	685
1495.5	950
1496.0	1250
1496.5	1560
1497.0	1910



BY REH DATE 1/14/81 SUBJECT ALDER MARSH DAM SHEET NO ____ OF ____

CHKD. BY ____ DATE ____ TOP OF DAM PROFILE JOB NO ____



BY _____ DATE _____ SUBJECT ALDER MARSH DAM SHEET NO _____ OF _____
CHKD BY _____ DATE _____ JOB NO _____

SELECTED COMPUTER OUTPUT

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********
    1                 A1                    NATIONAL DAM INSPECTION PROGRAM
    2                 A2                BALTIMORE DISTRICT CORPS OF ENGINEERS
    3                 A3                          ALDER MARSH DAM
    4                 B     300       0       15       0       0       0       0       0      -4       0
    5                 B1      5
    6                 J       1       3       1
    7                 J1    1.0     0.5     0.4
    8                 X       0       1                                               1
    9                 K1        INFLOW TO ALDER MARSH
   10                 M       1       1    0.91               0.91                                    1
   11                 P              21.0     111      123     133      142
   12                 T                                                       1.0    0.05             0.07
   13                 W    1.30    0.45
   14                 X    -1.5   -0.05     2.0
   15                 K       1       1                                               1
   16                 K1        ROUTE THROUGH ALDER MARSH DAM
   17                 Y                                       1       0
   18                 Y1      1                                                  -1492      -1
   19                 Y6 1492.0  1492.5  1493.0  1493.5  1494.0  1494.5  1495.0  1495.5  1496.0  1496.5
   20                 Y6 1497.0  1497.4
   21                 Y5      0       7      20      36      56     137     274     460     686     940
   22                 Y5   1245    1507
   23                 SA      0      39      75
   24                 SE   1486    1492    1500
   25                 SS   1492
   26                 SD   1496     3.1     1.5     130
   27                 K      99
```

O-15

MULTI-RATIO ANALYSIS

EXISTING CONDITIONS

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 1.00	RATIO 2 .50	RATIO 3 .40
HYDROGRAPH AT	1	.91	1	2178.	1089.	871.
	(	2.36)	(	61.67)(	30.84)(	24.67)(
ROUTED TO	1	.91	1	1982.	852.	624.
	(	2.36)	(	56.12)(	24.11)(	17.67)(

SUMMARY OF DAM SAFETY ANALYSIS

ALDER MARSH DAM

PLAN 1 ....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1492.00	1493.00	1496.00
STORAGE	78.	78.	266.
OUTFLOW	0.	0.	696.

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	1497.26	1.26	340.	1982.	5.75	41.75	0.00
.50	1496.24	.24	279.	852.	2.50	42.50	0.00
.40	1495.86	0.00	259.	624.	0.00	42.75	0.00

```
**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  01 APR 80
**********************************
    1                A1                    NATIONAL DAM INSPECTION PROGRAM
    2                A2                BALTIMORE DISTRICT CORPS OF ENGINEERS
    3                A3                          ALDER MARSH DAM
    4                B     300       0      15       0       0       0       0       0      -4       0
    5                R1      5
    6                J       1       3       1
    7                J1    1.0    0.75     0.5
    8                K       0       1       .                               1
    9                K9        INFLOW TO ALDER MARSH
   10                M       1       1    0.91            0.91                                   1
   11                P               21.0     111     123     133     142
   12                T                                                    1.0    0.05            0.07
   13                W    1.30    0.45
   14                X    -1.5   -0.05     2.0
   15                K       1       1                                       1
   16                K9        ROUTE THROUGH ALDER MARSH DAM
   17                Y                                       1       0
   18                Y1      1                                           -1492      -1
   19                Y4   1492    1493  1493.5    1494  1494.5    1495  1495.5    1496  1496.5    1497
   20                Y5      0      20     105     255     460     685     950    1250    1560    1910
   21                SA      0      39      75
   22                SE   1486    1492    1500
   23                SS   1492
   24                SD   1496     3.1     1.5     130
   25                K      99
```

D-18

MULTI-RATIO ANALYSIS

DESIGN CONDITIONS

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 1.00	RATIO 2 .75	RATIO 3 .50
HYDROGRAPH AT	1	.91	1	2178.	1633.	1089.
	(	2.36)	(	61.67)(	46.26)(	30.84)(
ROUTED TO	1	.91	1	1934.	1379.	883.
	(	2.36)	(	54.76)(	39.06)(	25.01)(

D-19

SUMMARY OF DAM SAFETY ANALYSIS

ALDER MARSH DAM

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1492.00	1492.00	1496.00
STORAGE	78.	78.	266.
OUTFLOW	0.	0.	1250.

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	1496.70	.70	306.	1934.	3.50	42.00	0.00
.75	1496.17	.17	275.	1379.	1.75	42.25	0.00
.50	1495.37	0.00	232.	883.	0.00	42.25	0.00

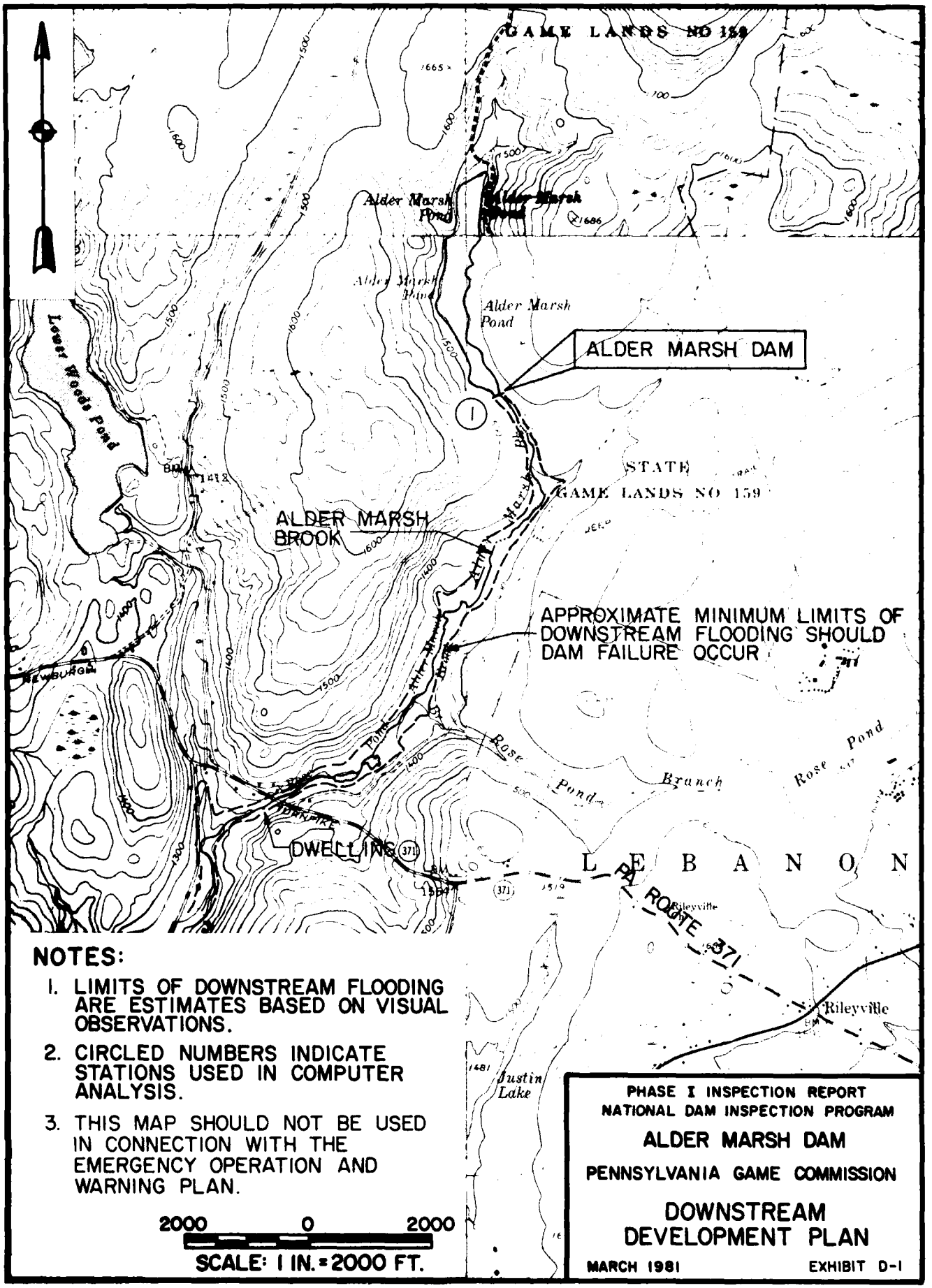
BY _____ DATE _____ SUBJECT ALDER MARSH DAM
CHKD BY _____ DATE _____ SHEET NO _____ OF _____
JOB NO _____

SUMMARY OF PERTINENT RESULTS

Multi-ratio Analysis:

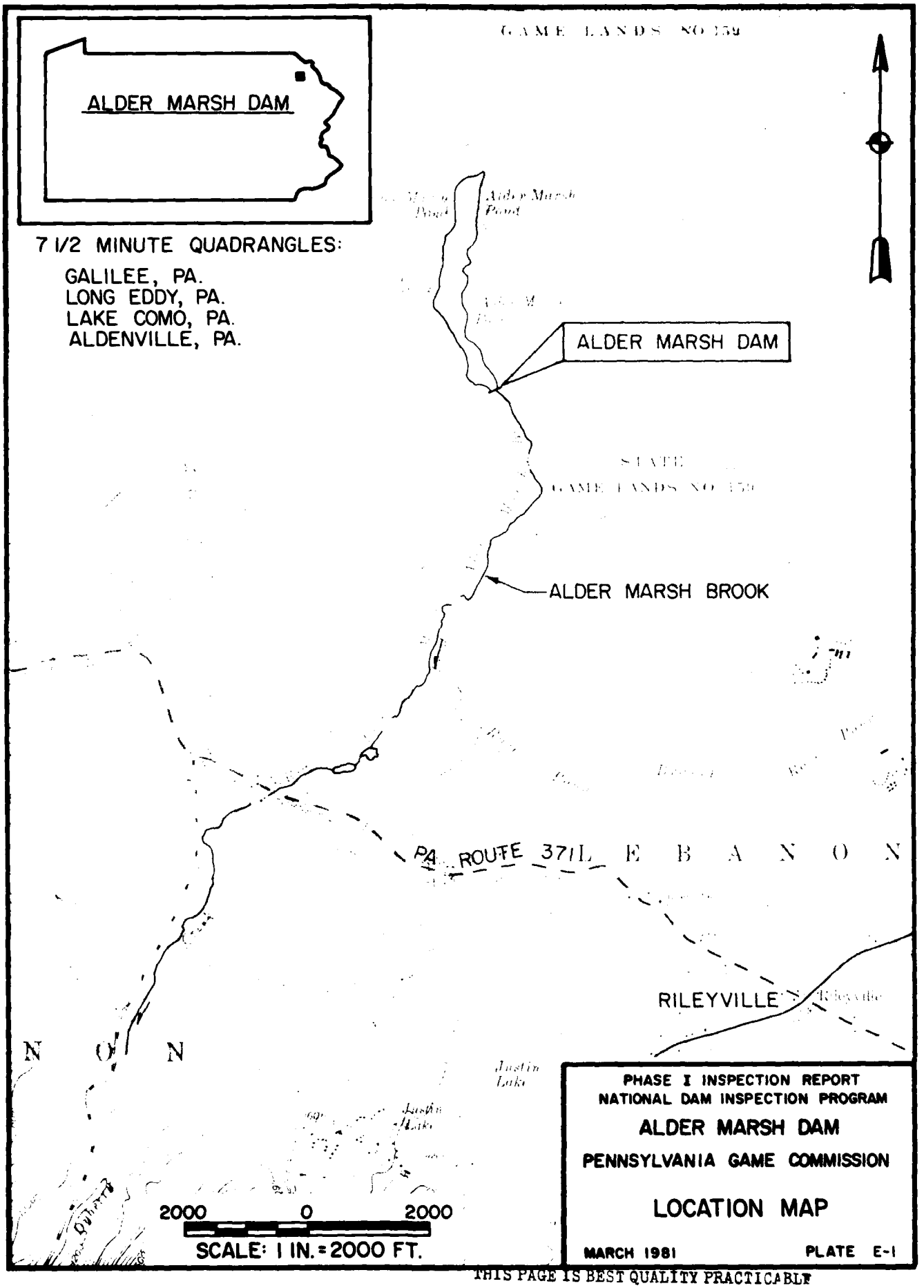
	Existing Conditions		Design Conditions	
	PMF	1/2 PMF	PMF	1/2 PMF
Rainfall (inches)	23.86	—	23.86	—
Runoff (inches)	21.64	10.82	21.64	10.82
Peak Inflow (cfs)	2178	1089	2178	1089
Peak Outflow (cfs)	1982	852	1934	883
Depth of Overtopping (feet)	1.26	0.24	0.70	0
Duration of Overtopping (hours)	5.75	2.50	3.50	0

Dr21


GAME LANDS NO 158
Alder Marsh Pond
Alder Marsh Pond
Alder Marsh Pond
ALDER MARSH DAM
Lower Woods Pond
STATE GAME LANDS NO 159
ALDER MARSH BROOK
APPROXIMATE MINIMUM LIMITS OF DOWNSTREAM FLOODING SHOULD DAM FAILURE OCCUR
NEWBURGH
DWELLING
Rose Pond
Rose Pond Branch
LEBANON
RT. ROUTE 371
Rileyville
Justin Lake
NOTES:
1. LIMITS OF DOWNSTREAM FLOODING ARE ESTIMATES BASED ON VISUAL OBSERVATIONS.
2. CIRCLED NUMBERS INDICATE STATIONS USED IN COMPUTER ANALYSIS.
3. THIS MAP SHOULD NOT BE USED IN CONNECTION WITH THE EMERGENCY OPERATION AND WARNING PLAN.
2000 0 2000
SCALE: 1 IN. = 2000 FT.
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM
ALDER MARSH DAM
PENNSYLVANIA GAME COMMISSION
DOWNSTREAM DEVELOPMENT PLAN
MARCH 1981
EXHIBIT D-1

APPENDIX E

PLATES



MATERIAL REQUIRED

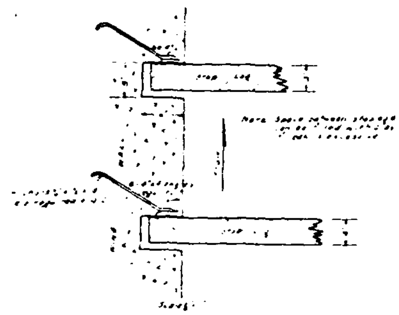
2300	Board feet [illegible]
2500	Board feet [illegible]
16 Pieces	[illegible] stop gates

CONCRETE

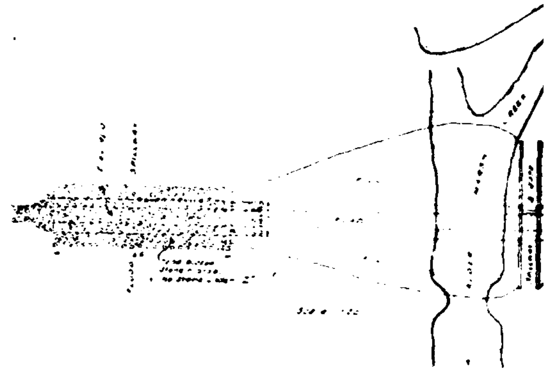
546	Bags cement
51	Cubic yards sand [illegible]
[illegible]	Cubic yards gravel

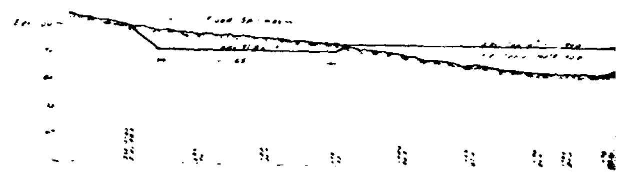
MISCELLANEOUS

300 [illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
4	[illegible]
12	Anchors [illegible]
[illegible]	Feet Rubber hose

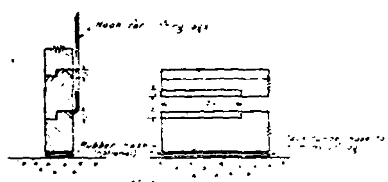


DETAIL OF GATE

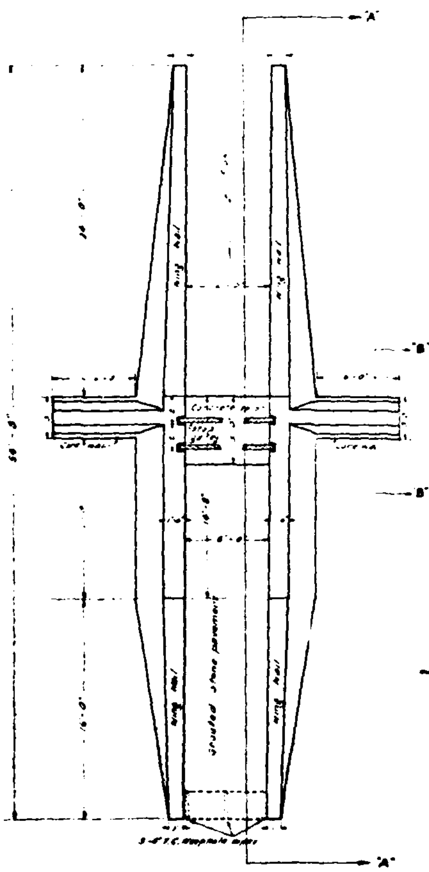




PROFILE

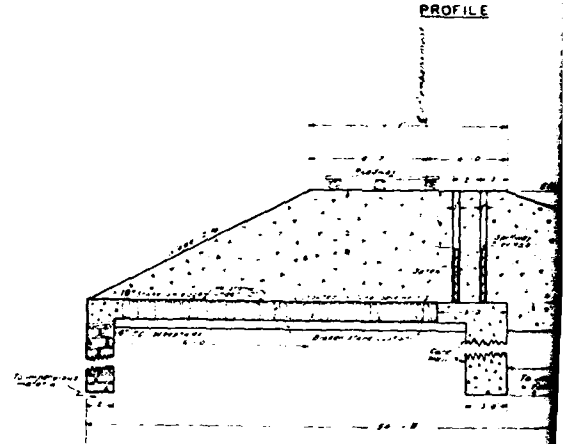


DETAILS OF BEVEL
TO AID IN REMOVAL OF LOGS

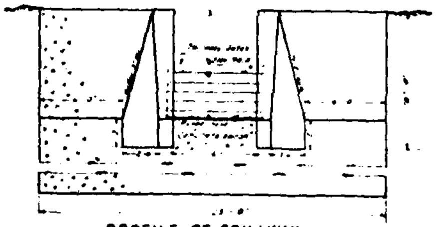


SPILLWAY PLAN

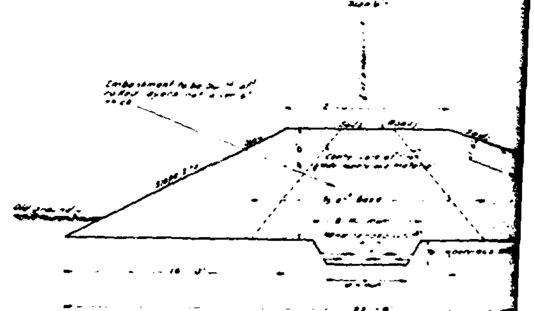
SECTION B-B



SECTION A-A



PROFILE OF SPILLWAY



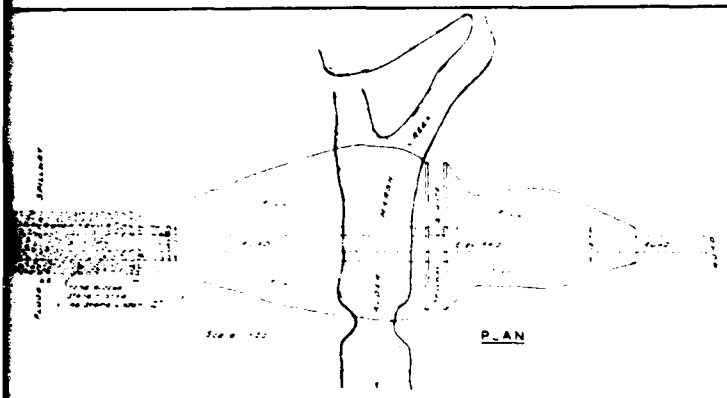
SECTION OF EMBANKMENT

Note: With this gate an emergency spillway must be provided, having a capacity equal to the balance of the peak runoff rate

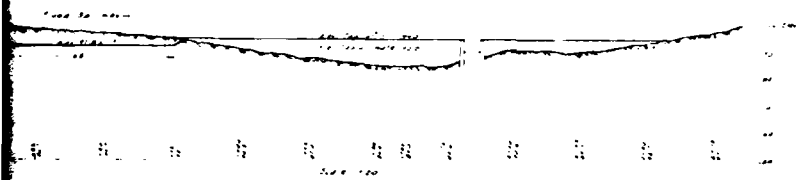
REVISED	
[illegible]	[illegible]

APPROVED BY
PENNSYLVANIA GAME COMM[illegible]
HARRISBURG, PA

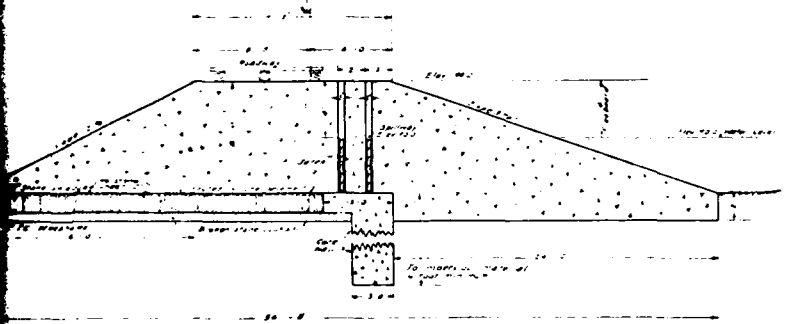
APPROVED BY
DEPARTMENT OF FORESTS & W[illegible]
WATER & POWER RESOURCES
HARRISBURG, PA



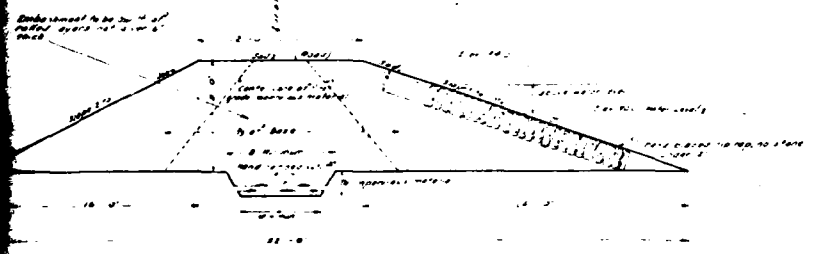
PLAN



PROFILE



SECTION A-A



SECTION OF EMBANKMENT

PENNSYLVANIA GAME COMMISSION

PROPOSED DAM
ON
ALDER MARSH CREEK
S.G.L. NO.159
LEBANON TOWNSHIP
WAYNE COUNTY

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

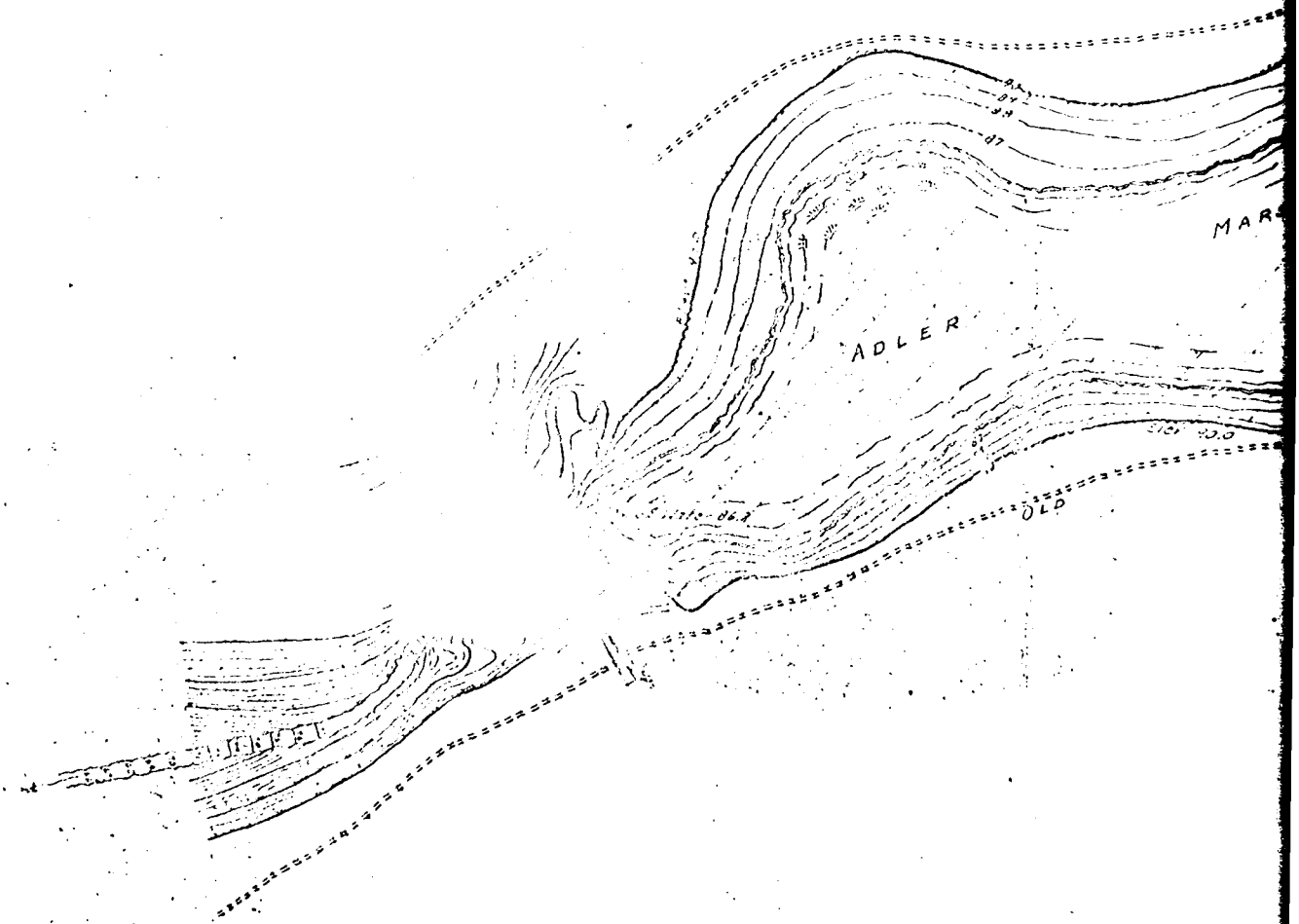
ALDER MARSH DAM

PENNSYLVANIA GAME COMMISSION

DESIGN PLAN, PROFILE AND SECTIONS

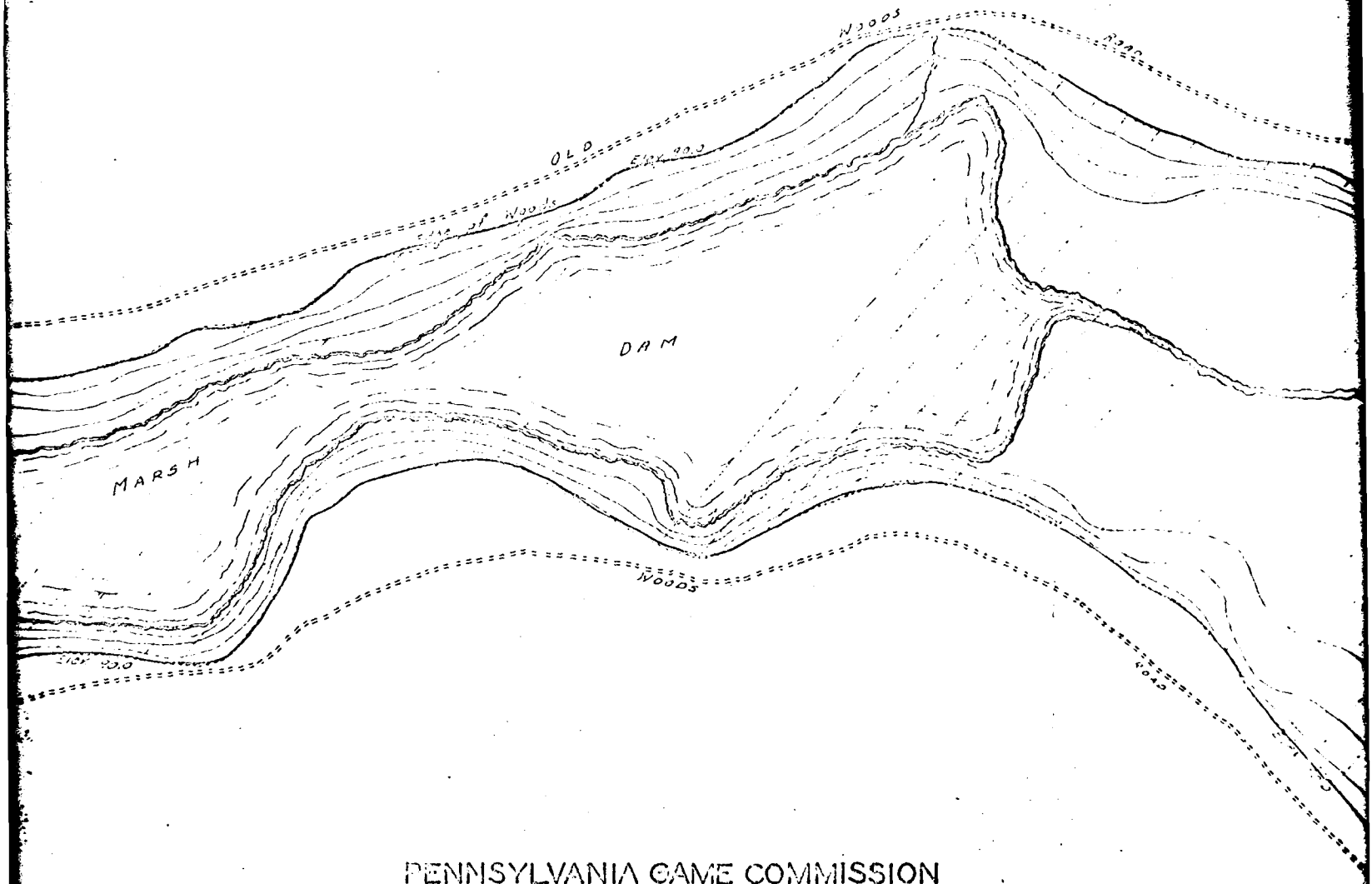
MARCH 1981 PLATE E-2

Drainage Area = 300 acres = .47 sq mi.
LAKE - 11.0 Acres at Elev 20.0
Capacity = 45,000,000 Gallons.



I certify this to be an exact copy of the original draft of survey by ..... made for the Game Commission.

..... for the Game Commission



PENNSYLVANIA GAME COMMISSION

GENERAL PLAN

ALDER MARSH CREEK DAM

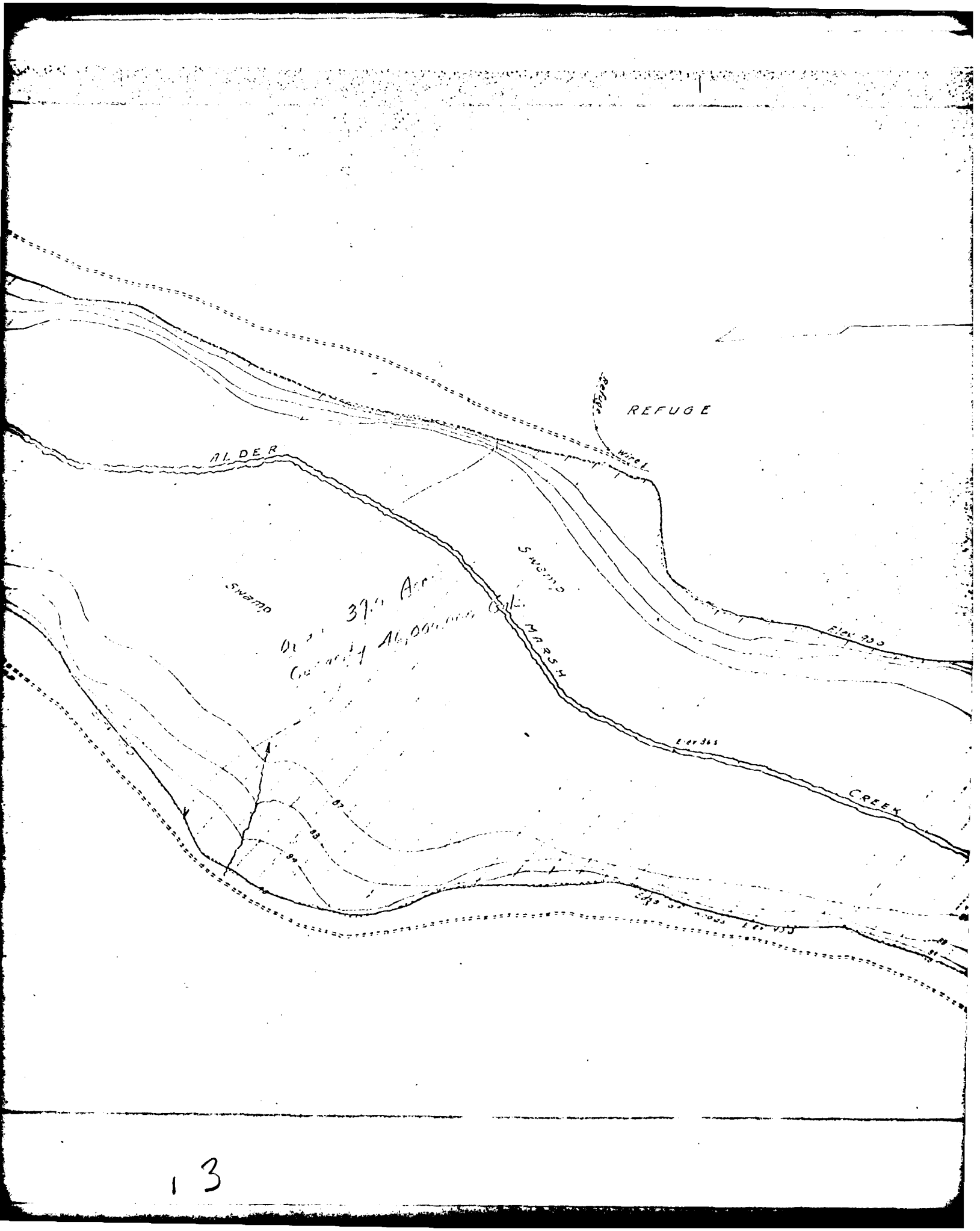
S.G.L. NO.159

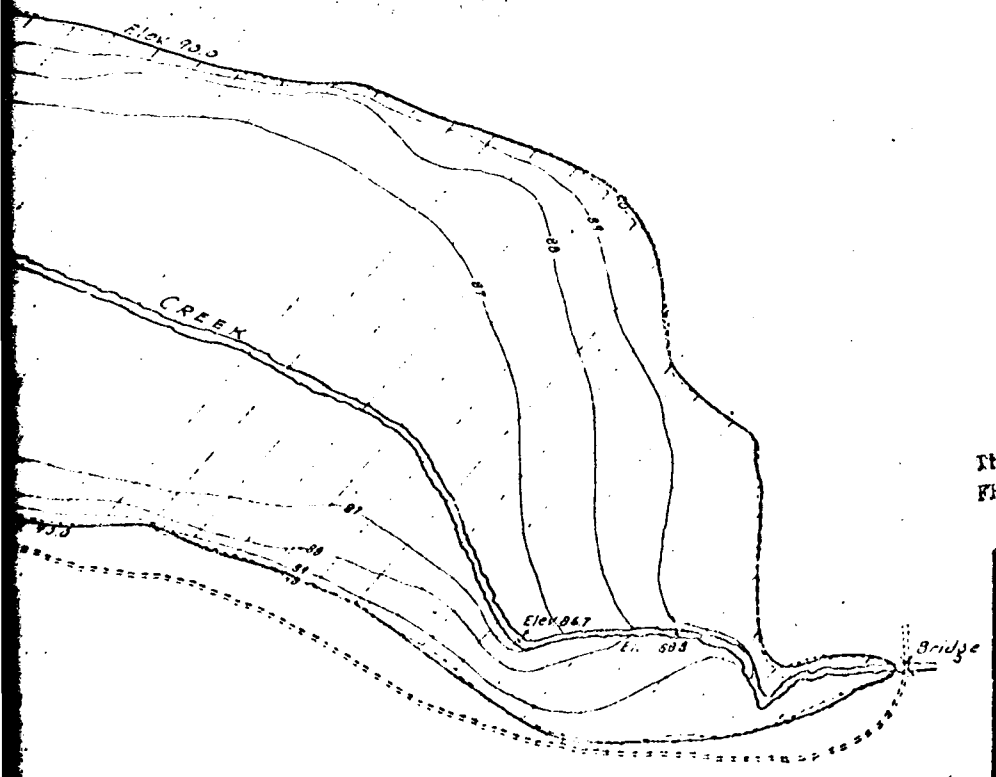
LEBANON TOWNSHIP

WAYNE COUNTY

Scale 1"=100'

.2


REFUGE
ALDER
SWAMP
SWAMP
MARSH
CREEK
Elev 90
87
88
89



PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

ALDER MARSH DAM

PENNSYLVANIA GAME COMMISSION

GENERAL PLAN

MARCH 1981 PLATE E-3

4

APPENDIX F

GEOLOGY

ALDER MARSH DAM

APPENDIX F

GEOLOGY

Alder Marsh Dam is located in Wayne County within the Appalachian Plateau Physiographic Province. The most pronounced topographic feature in the area is Camelback Mountain, which is part of the Pocono Plateau Escarpment. The escarpment has a well-defined, south-westward trend from Camelback Mountain; but it is irregular between Camelback Mountain and Mt. Pocono, which lies to the north. Streams east of the escarpment drain directly to the Delaware River, while those to the west drain to the Lehigh River.

The Pocono Plateau Section lies to the west of the escarpment. This area is relatively flat, with local relief seldom exceeding 100 feet. The topography has been greatly influenced by continental glaciation. Many features were created by deposition of glacial materials. The entire plateau lacks well-developed drainage.

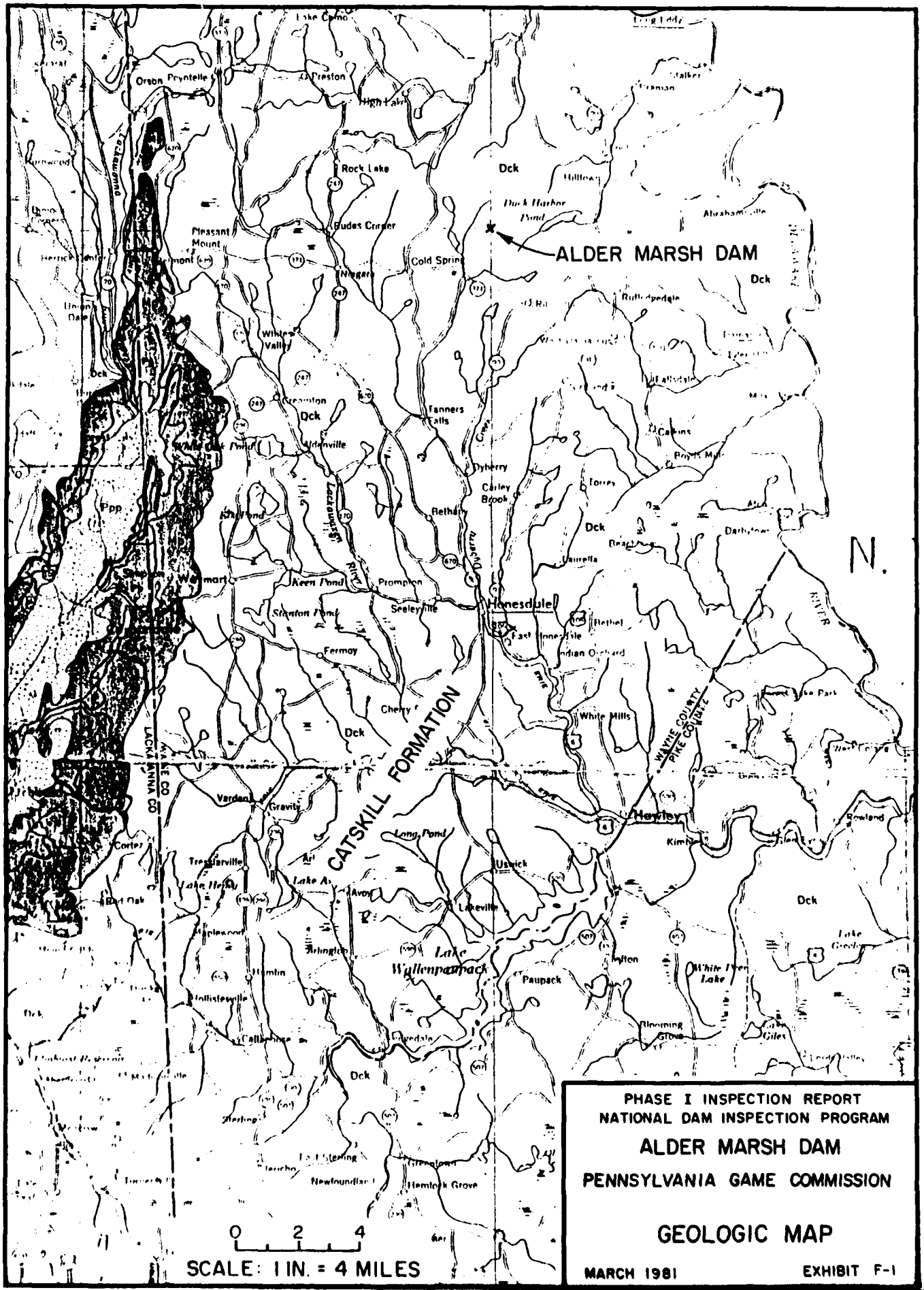
East of the escarpment is the Glaciated Low Plateaus Section of the province. This area is characterized by preglacial erosional topography with locally-thick glacial deposits. Local relief is generally 100 to 300 feet.

Bedrock units of the sections described above are the lithified sediments of offshore marine, marginal marine, deltaic environments, and fluvial environments associated with the Devonian Period. These units include siltstones of the Mahantango Formation, siltstones and shales of the Trimmers Rock Formation, and seven mapped members of the Catskill Formation. These members include sandstones, siltstones, and shales of the Towamensing Member; sandstone, siltstone and shale of the Walcksville Member; sandstones, siltstones and shale of the Beaverdam Run Member; sandstone and shale in the Long Run Member; sandstones and conglomerates in the Packerton Member; sandstones and some conglomerates in the Poplar Gap Member; and sandstones and conglomerates in the Duncannon Member.

Alder Marsh Dam is underlain by the Catskill Formation. The Catskill Formation is predominantly red to brownish gray shales and sandstone with interbedded siltstones and coarse-conglomerates. Sandstones present are thick-bedded, fine-to grained and exhibit very low primary porosity due to a clay and silica matrix. Effective porosity results from fractures and parting planes.

The rocks are well-indurated and generally are not susceptible to slope failure; however, the presence of well-developed bedding and joint planes will result in some rockfall from vertical and high-angle cut slopes.

Bedrock is entirely overlain by glacial till of Late Wisconsin Age. This till is an unsorted mixture of clay, silt, sand, and gravel. It is moderately cohesive and is generally derived locally from the sandstones of the Catskill Formation. Thickness of the till varies from 5 to 75 feet.



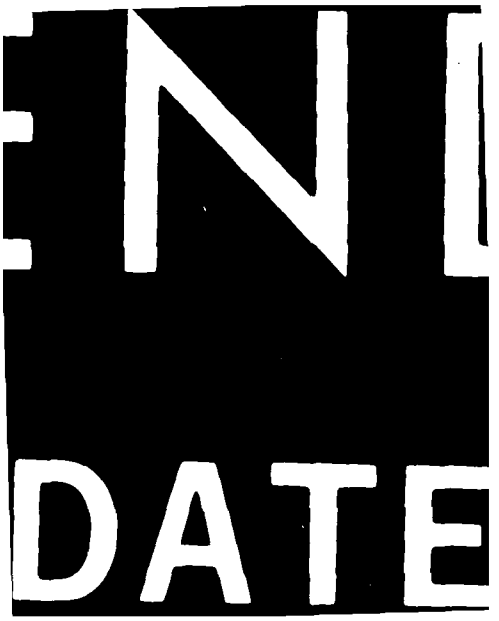
PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

ALDER MARSH DAM

PENNSYLVANIA GAME COMMISSION

GEOLOGIC MAP

MARCH 1981 EXHIBIT F-1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DATE