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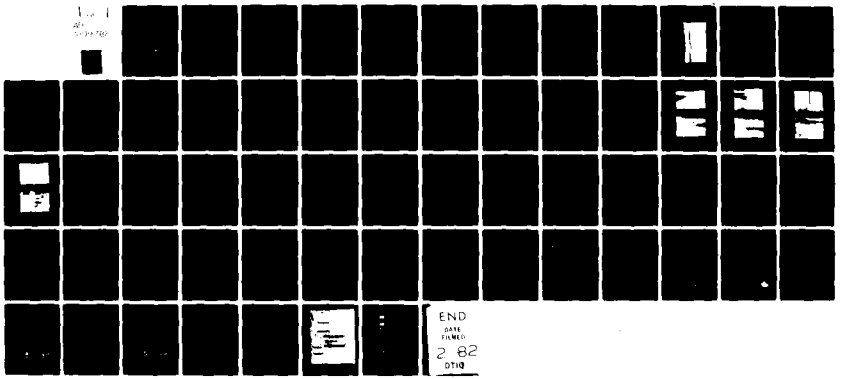

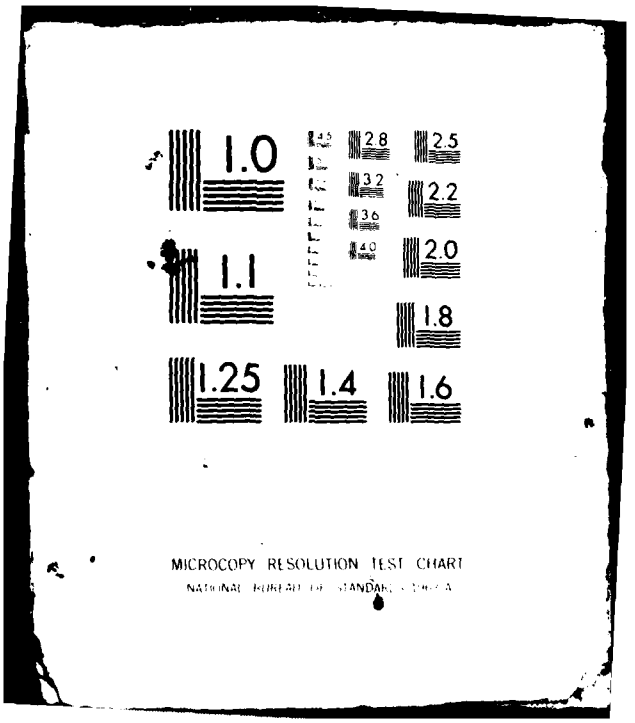
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SUSQUEHANNA RIVER BASIN

ALEXANDER LAKE DAM

TIOGA COUNTY, NEW YORK

INVENTORY NO. N.Y. 936

PREPARED FOR

NEW YORK DISTRICT CORPS OF ENGINEERS

JULY 1981

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE	READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A109 282 / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report Alexander Lake Dam Seneca River Basin, Tioga County, NY Inventory No. 839	5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) LAWRENCE D. ANDERSEN	8. CONTRACT OR GRANT NUMBER(s) DACW51-81-C-0011
9. PERFORMING ORGANIZATION NAME AND ADDRESS D'Appolonia Consulting Engineers, Inc. 10 Duff Road Pittsburgh, PA 15235	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Army 26 Federal Plaza New York District, CofE New York, New York 10278	12. REPORT DATE 14 August 1981 13. NUMBER OF PAGES
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18. SUPPLEMENTARY NOTES

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National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Alexander Lake Dam
Seneca River Basin
Tioga County

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides [illegible] and analysis of the physical condition of the dam [illegible] of the report [illegible] information and analysis are based on visual inspection of the dam by the performing organization.

Based on the evaluation of the existing conditions, the condition of Alexander Lake Dam is considered to be fair. A minor seepage area and some wet areas are located along the downstream toe. The vertical and horizontal alignment of the dam crest is irregular. However, the [illegible]

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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

observed conditions are not consistent to significantly affect the overall performance of the dam at this time.

The owner's representative reported that the low level outlet pipe for the embankment was plugged by concrete prior to the filling of the dam, as required by the design drawings. Therefore, the dam has no functional low level outlet facilities that could draw down the reservoir in the event of an emergency.

The spillway capacity was evaluated according to the recommended procedure and was found to pass 80 percent of the Probable Maximum Flood (PMF) without overtopping the dam and full PMF with a minor overtopping of the embankment. The spillway capacity of the dam is rated to be inadequate because the spillway cannot pass the recommended spillway design flood of full PMF without overtopping the dam.

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. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. 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.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
ALEXANDER LAKE DAM
N.Y. 936
DEC I.D. NO. 6Aa-1302
SUSQUEHANNA RIVER BASIN
TIOGA COUNTY, NEW YORK

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TABLE OF CONTENTS
(Continued)

[redacted] See also Enclosure from the Bank of [redacted]

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	[illegible]
State Located:	[illegible]
County Located:	[illegible]
Stream:	[illegible]
Date of Inspection:	[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

1. [illegible]

2. [illegible]

3. The crest of the dam should be surveyed and the low spots filled to provide a uniform dam crest level. In conjunction with this work, the upstream face of the dam should be reshaped and the need for placing erosion protection should be evaluated by the owner.

4. An emergency action plan showing the downstream inundation limits existing systems to alert the downstream residents in the event of an emergency.

5. The dam and appurtenant structures should be inspected regularly and necessary maintenance should be performed

Approved by: [illegible]
[illegible] Division Engineer

Date: [illegible]

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
ALEXANDER LAKE DAM
N.Y. 936
DEC I.D. NO. [illegible]
SUSQUEHANNA RIVER BASIN
TIOGA COUNTY, NEW YORK

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority
The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection
The inspection was to evaluate the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to life and property, and recommend remedial measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Dam and Appurtenances
The Alexander Lake Dam consists of an earth embankment approximately [illegible] feet long with a maximum height of [illegible] feet from the downstream toe and a crest width of [illegible] feet. Both the upstream and downstream faces of the dam are covered with grass and have 2 horizontal to 1 vertical slopes.

The spillways for the dam consist of a [illegible] type primary spillway located near the left abutment (looking downstream) and a [illegible] emergency spillway located on the left abutment. The primary spillway [illegible] discharge through a [illegible] at the downstream toe of the dam. The [illegible] drawings indicate that the primary spillway [illegible] with a [illegible]. The emergency spillway channel has a base width of [illegible] feet. [illegible] the low level outlet gate of the dam which is located at the center of the dam through the embankment [illegible]. Therefore, the dam does not have an emergency drawdown facility.

b. Location

The dam is located on an unnamed tributary of the East Branch of Owega Creek about one mile west of Newark Valley in Tioga County, New York. Plate 1 illustrates the location of the dam.

c. Size Classification

The dam is classified as a small dam based on 12-foot height and a maximum storage capacity of 158 acre-feet.

d. Hazard Classification

The dam is classified to be in the high hazard category. Approximately one mile downstream from the dam, the stream flows through a rural residential area. At least five houses are considered to be within the potential floodplain of the stream.

It is estimated that a failure of the dam would cause loss of more than a few lives and appreciable property damage in this area.

e. Ownership

The dam is owned and operated by Newark Valley Central School District, Newark Valley, N.Y. 13811, (604) 642-3221.

f. Purpose of Dam

Recreation

g. Design and Construction History

The dam was designed by Mr. Howard Ward, Consulting Engineer, from Candor, New York, in 1965. The dam was constructed under a state construction permit application dated May 7, 1965.

h. Normal Operating Procedure

The reservoir is normally maintained at the crest level of the uncontrolled primary spillway at Elevation 1263. The emergency spillway crest is located at Elevation 1264.8.

1.3 PERTINENT DATA

Elevations referred to in subsequent sections of the report were calculated based on field measurements assuming the primary spillway crest level to be at Elevation 1263 (USGS Datum) which was interpolated from the USGS 7.5-minute Newark Valley Court quadrangle as the normal pool level for the lake. Elevations shown in design drawings appear to be relative to an arbitrary site datum.

a. Drainage Area (acres) 263(1)

(1) Planimetered from USGS topographic map.

b. Discharge at Dam (cfs)

Principal spillway at top of dam	5(estimated)
Auxiliary spillway at top of dam	1032
Total spillway capacity at top of dam	1037

c. Elevation (USGS Datum) (feet)

Top of dam	1267.6
Auxiliary spillway crest	1264.8
Principal spillway crest	1263.0

d. Reservoir (acres)

Surface area at top of dam	21.1
Surface area at crest of auxiliary spillway	20.0
Surface area at crest of principal spillway	19.3

e. Storage Capacity (acre-feet)

Top of dam	158
Auxiliary spillway crest	108
Principal spillway crest	65

f. Dam

Type	Earth embankment
Length	450 feet
Height	12 feet
Top width	9 feet
Side slopes	Downstream: 3H:1V Upstream: 3H:1V
Zoning	No
Impervious core	No
Cutoff	Yes
Grout curtain	No

g. Primary Spillway

Type	3-foot-diameter corrugated metal pipe drop inlet
Length	9-foot perimeter
Crest elevation	1263

h. Emergency Spillway

Type	Vegetated trapezoidal earth channel
Length	60 feet (as measured)
Crest elevation	1264.8

i. Reservoir Drain

The dam has no functional reservoir drain facility.

SECTION 2: ENGINEERING DATA

2.1 DATA AVAILABLE

Available information was obtained from New York State Department of Environmental Conservation, Dam Safety Division files. Available information consists of three design drawings. No other information or reference to such information was located. Mr. Donald Alexander, the owner's representative, was interviewed to obtain additional information on the design and construction of the dam.

2.2 GEOLOGY

The Alexander Lake Dam is located in the glaciated Allegheny Plateau section of the Appalachian Plateau Province. This section is characterized as a maturely dissected plateau with the features modified by continental glaciation, including deposition of glacial till in the valleys.

The dam site is near the axis of a northeast trending anticline (approximately north 70 degrees east). The folding is gentle with the maximum dip of the limbs one to two degrees. The strata at the dam are nearly horizontal and the dip of the strata are affected locally by the folding; however, regionally, the rock strata dip south to southwest at approximately 100 to 150 feet per mile. Regional discontinuities trend approximately east-west and north-east.

The rock strata in the area consist of unconsolidated Pleistocene glacial till (Wisconsin Drift) underlain by strata of the Lower West Falls Group (Upper Devonian Age). The glacial till consists of a mixture of clay and silt with varying amounts of gravel. The glacial till is relatively thin on hilltops and slopes and thicker in the valleys. The bedrock consists of the Gardeau Formation and the Rorich Glen Shale, a thick sequence of interbedded very dark gray shale and thin siltstone.

The abutment slopes are relatively gentle and not susceptible to landslide slope movement.

2.3 SUBSURFACE INVESTIGATION

No reference was found to indicate a subsurface investigation was conducted in conjunction with the design of the dam. A note included on the design drawing shown in Plate 2 suggests that some test pits may have been excavated to classify the soils in the area.

2.4 EMBANKMENT AND APPURTENANT STRUCTURES

Plate 2 illustrates the typical cross section of the dam. The dam appears to consist of homogeneous fill with a central cutoff

trench. The dam was designed to have a slope of 2 horizontal to 1 vertical downstream and 3 horizontal to 1 vertical upstream. The valley cross section of the dam is included in Plate 3.

The appurtenant structures include a drop inlet primary spillway and open-channel emergency spillway located on the left abutment. Details of the primary spillway are illustrated in Plate 2.

2.5 CONSTRUCTION RECORDS

No records are available on the construction of the dam. According to the owner's representative, the dam was constructed under the supervision of the design engineer.

2.6 OPERATING RECORDS

No operating records are maintained for the dam. The dam is maintained by the owner's personnel.

2.7 EVALUATION OF DATA

The available information does not provide any quantitative data for the assessment of structural, geotechnical and hydraulic features of the dam. The design drawings indicate the low level and primary spillway outlet pipes consist of metal pipes. Because metal pipes are subject to corrosion and failure of one of these pipes may cause distress in the embankment, concern exists as to the structural condition of the facilities. Therefore, the owner should evaluate the structural adequacy of the facilities.

The available information includes no hydrology and hydraulic analysis. Plate 4 shows the design maximum pool level. In the construction permit application to the state, the design capacity of the spillway is noted to be 454 cfs.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspections of Alexander Lake Dam were conducted on March 27 and April 30, 1981. The pool level on the dates of inspection was approximately at the primary spillway level.

b. Embankment

In general, the condition of the dam is considered to be fair. Field observations are illustrated in Plate 5. Two wet areas were observed along the downstream toe of the dam. No seepage flow appeared to be associated with the wet areas. A minor seepage was located on the downstream toe in an area which appeared to be the discharge channel of the low level outlet facility. The upstream slope shoreline was found to be irregular and lacked erosion protection. However, no significant erosion due to wave action was noted.

The dam crest was surveyed relative to the primary spillway crest elevation and was found to have some vertical irregularities. While the design freeboard for the dam is 4 feet, the field survey indicated freeboard ranging from 4.3 to 5.8 feet. The lowest area is at the center of the embankment. The dam crest profile according to field measurements is illustrated in Plate 6.

c. Primary Spillway

The primary spillway consists of a 3-foot-diameter corrugated metal pipe drop inlet structure which discharges into a 24-inch metal pipe terminating at the downstream toe of the dam. Although visible portions of the primary spillway facilities were found to be in good condition, concern exists as to the condition of the metal pipe through the embankment.

d. Emergency Spillway

The emergency spillway is a trapezoidal vegetated earth channel located on the left abutment. The emergency spillway channel was found to be in good condition. The grass cover is well established and adequately maintained. The approach and discharge channel were found to be free of brush and trees or debris which might pose a potential for blockage of the spillway.

e. Reservoir Drain

The dam does not have a functional reservoir drain pipe. The owner's representative indicated that the upstream end of the reservoir drain pipe was plugged with concrete prior to the filling of the dam.

f. Downstream Channel

Downstream channel below the primary spillway outlet pipe is an unprotected earth channel which flows parallel to the toe of the dam for approximately 100 feet and then joins the natural streambed. The channel appears to be stable in the near vicinity of the dam.

g. Reservoir

The reservoir slopes are gentle and no sign of instability was observed.

3.2 EVALUATION

The overall condition of the dam is considered to be fair. The following conditions were observed which require action by the owner:

1. The condition and structural adequacy of the spillway outlet pipe and reservoir drain pipe should be evaluated by the owner.

2. The crest of the dam should be surveyed and low spots filled to provide a uniform dam crest level.

3. The upstream face of the dam should be reshaped and the need for providing erosion protection should be evaluated. The wet areas and the seepage point below the toe of the dam should be periodically observed to document if significant seepage is developing.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The reservoir is normally maintained at the primary spillway crest level with excess inflow discharging through the primary spillway. The dam has no formal operating procedure.

4.2 MAINTENANCE OF THE DAM

The dam is maintained by the owner's personnel. The crest and upstream and downstream faces of the dam and the emergency spillway are covered with grass and were found to be adequately maintained.

4.3 WARNING SYSTEM IN EFFECT

No formal warning system exists for the dam.

4.4 EVALUATION

The maintenance condition of the dam is considered to be fair. The development of a formal warning system is considered to be advisable. Further, in view of a lack of a functional low level outlet facility to drain the lake in the event of an emergency, it is recommended that the owner should develop plans to draw down the reservoir in the event an emergency.

SECTION 5 [illegible]

5.1 DRAINAGE AREA CHARACTERISTICS

The dam has a watershed of 0.4 square mile. The drainage area is comprised of woodlands and farmlands. Relief ranges from gentle to moderate.

5.2 ANALYSIS CRITERIA

As previously stated, Alexander Lake Dam is classified as a small dam in the high hazard category. Under the recommended criteria for evaluation of emergency spillway discharge capacity, such impoundments are required to pass one-half to full PMF. In view of the high downstream damage potential, full PMF was selected as the spillway design flood.

The PMF inflow for the reservoir was determined using the dam safety version of the HEC-1 computer program developed by the Hydrologic Engineering Center of the U.S. Army Corps of Engineers. The data used for the computer input are presented in Appendix D. The PMF inflow hydrograph was found to have a peak flow of 1799 cfs. Computer outputs are also included in Appendix D.

5.3 SPILLWAY CAPACITY

The spillway facilities for the dam consist of primary and emergency spillways. The emergency spillway is a trapezoidal earth channel with a base width of 60 feet and side slopes of 3 horizontal to 1 vertical on the abutment side and about 8 horizontal to 1 vertical on the embankment side. The primary spillway is a 30-inch-diameter corrugated metal riser discharging into a 24-inch corrugated metal pipe. The PMF inflow hydrograph was routed through the reservoir and it was found that the dam can pass 90 percent of the PMF without overtopping the low spots on the crest of the dam. Because the capacity of the primary spillway is negligible compared to the emergency spillway, only the emergency spillway capacity was used in the calculations. For full PMF, it was found the low spots on the crest of the dam would be overtopped for 1.3 hours with a maximum depth of about 0.2 foot. Based on the available head relative to the low spot on the crest of the dam, capacity of the emergency spillway was calculated to be 1032 cfs. Emergency spillway rating calculations are also included in Appendix D.

5.4 RESERVOIR CAPACITY

The dam impounds a reservoir with a storage capacity of 65 acre-feet at the primary spillway crest level, 100 acre-feet at the emergency spillway crest level, and 150 acre-feet at the level of the low spot on the crest of the dam.

[redacted]

[redacted]

[redacted]

[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
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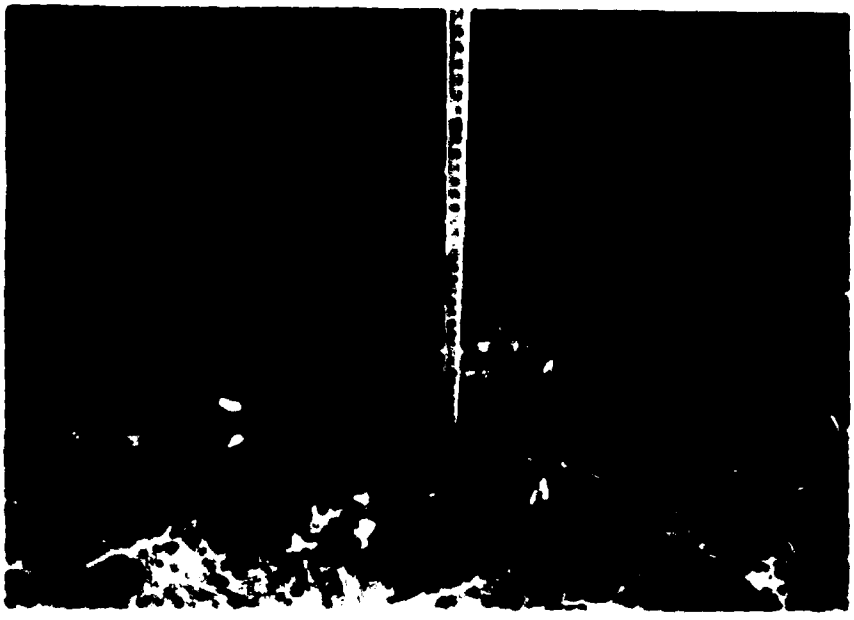
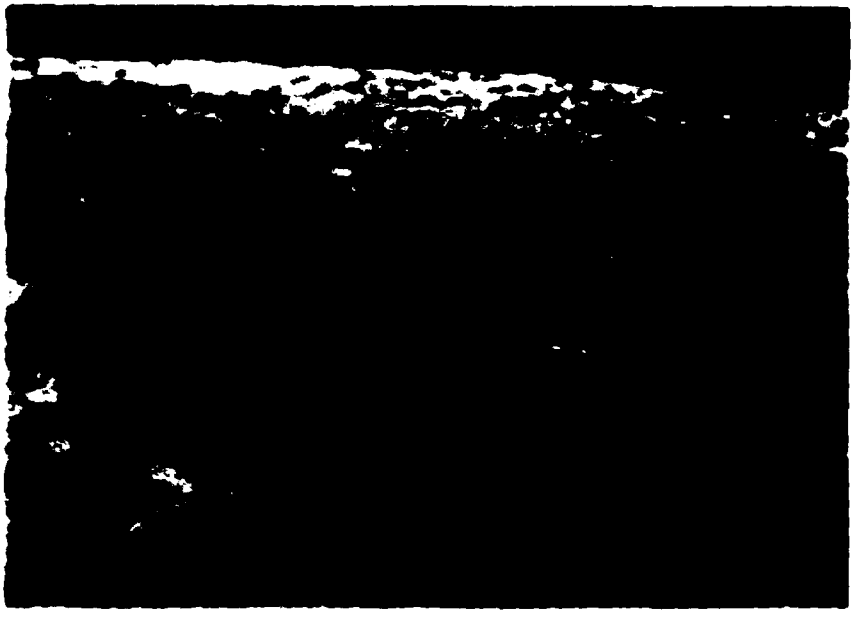
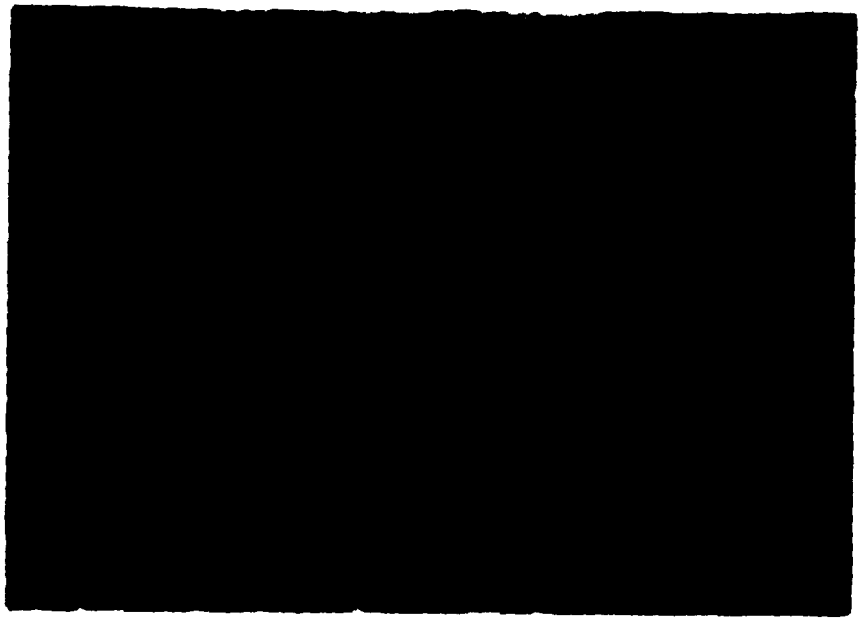


PHOTOGRAPH NO. 5
Primary Spillway Intake Structure



PHOTOGRAPH NO. 6
Primary Spillway Discharge Pipe



[illegible] No. 1
Wet and Overgrown Area Along Dam

PHOTOGRAPH No. 2
Downstream Residential Area
(approximately 1.0 mile downstream)

APPENDIX B

VISUAL INSPECTION CHECKLIST

APPENDIX B

VISUAL INSPECTION CHECKLIST

1) **Basic Data**

a. General

Name of Dam: Alexander Lake Dam

Fed. I.D. # N.Y. 930 DEC Dam No. [illegible]

River Basin: Susquehanna River Basin

Location: Town Newark Valley County Tioga

Stream Name: Unnamed

Tributary of: East Branch Owego Creek

Latitude (N) 42° [illegible] Longitude (W) [illegible]

Type of Dam: Earth

Hazard Category: High

Date(s) of Inspection: March 27 and April 30, 1981

Weather Conditions: Partly Cloudy, Temp 40's and 50's

Reservoir Level at Time of Inspection: Normal Pool El. 1293.0 (1) (USGS Datum)

b. Inspection Personnel: Lawrence Andersen, P.E., [illegible], P.E., [illegible], P.E., [illegible], P.E., and Arthur [illegible]

c. Persons Contacted (Including Address & Phone No.)

(1) Dr. William [illegible], Superintendent of Schools, Newark Valley Central School District, Newark Valley, N.Y. 13811 (607) [illegible]

(2) Owner's Representative: Mr. Donald Alexander

(1) Elevation interpolated from USGS 7.5 minute Newark Valley, New York quadrangle, [illegible], as normal pool level

c. History

Date Constructed [illegible] Date(s) Reconstructed N/A

Designer [illegible]

Constructed by [illegible]

Owner [illegible] Valley Central School District

2) **Embankment**

a. Characteristics

(1) Embankment Material Earth

(2) Cutoff Type [illegible]

(3) Impervious Core None

(4) Internal Drainage System None

(5) Miscellaneous [illegible]

b. Crest

(1) Vertical Alignment [illegible]

(2) Horizontal Alignment [illegible]

(3) Surface Cracks None

(4) Miscellaneous [illegible]

c. Upstream Slope

(1) Slope (Estimate) [illegible]

(2) Undesirable Growth or Debris, Animal Burrows None

(3) Sloughing, Subsidence or Depressions None

(4) Slope Protection: Required slope

(5) Surface Cracks or Movement at Toe: None

b. Embankment Slope

(1) Slope (Specify): Dirt (no vegetation)

Dirt (no vegetation)

(2) Undesirable Growth or Trees, Brush: None

(3) Sloughing, Subsidence or Depressions: None

(4) Surface Cracks or Movement at Toe: None

(5) Seepage: None

(6) External Drainage System (Ditches, Trenches, Blanket): None

(7) Condition around Outlet Structure: Downstream end of outlet pipe could not be located.

(8) Seepage Beyond Toe: Dry grass and overgrown. See Photo 5 for location.

c. Abutments - Embankment Contacts: No problems observed.

(1) Extent of contact: None

(2) Damages during Construction: None

j) Drainage System

- Description of System: The site has no internal drainage system.
- Condition of System: N/A
- Discharge from Drainage System: N/A

k) Investigations (Examination/Surveys, Observation Wells, Tests, Procedures, Etc.): None

d) __Reservoir__

a. Slopes __Gentle to moderate__

b. Sedimentation __Unknown, no noticeable problems.__

c. Unusual Conditions Which Affect Dam __None__

e) __Area Downstream of Dam__

a. Downstream Hazard (No. of Homes, Highways, etc.) __At least five homes are ... downstream.__

b. Seepage, Unusual Growth __None__

c. Evidence of Movement Beyond Toe of Dam __None__

d. Condition of Downstream Channel __Fair. A small natural streambed.__

f) __Spillway(s) (Including Discharge Conveyance Channel)__

__In good condition.__

a. General __Service Spillway: 3-foot-diameter CMP riser discharges into a 24-inch outlet pipe.__

__Auxiliary Spillway: Vegetated earth channel on left abutment.__

b. Condition of Service Spillway __Good. Trash rack vulnerable to blockage by debris.__

c. Condition of Auxiliary Spillway: Good

d. Condition of Discharge Conveyance Channel: Discharge from emergency spillway would initially follow the downstream toe of dam.

4) Reservoir Drain

Type: Pipe X Conduit ____ Other ____

Material: Concrete ____ Metal ____ Other Corrugated metal pipe

Size: 8 inches Length: 30 feet

Invert Elevations: Entrance Unknown Exit Unknown

Physical Condition (Describe): Unobservable X

Material: N/A

Joints: ____ Alignment: N/A

Structural Integrity: Unknown

Hydraulic Capability: Destroyed and plugged with concrete. Not accessible.

Means of Control: Gate N/A Valve N/A Uncontrolled X

Operation: Operable N/A Inoperable X Other N/A

Present Condition (Describe): See note above.

3) [redacted]

a. [redacted] [redacted]

b. [redacted] N/A

c. [redacted] N/A

d. [redacted] N/A

e. [redacted] N/A

f. [redacted] N/A

g. [redacted] N/A

[redacted]

[illegible] [illegible]

a. [illegible] [illegible]

[illegible]

[illegible]

[redacted]

	[redacted]	[redacted]	[redacted]
1) [redacted]	[redacted]	[redacted]	[redacted]
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4) [redacted]	[redacted]	[redacted]	[redacted]
5) [redacted]	[redacted]	[redacted]	[redacted]

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5) [redacted]	[redacted]
6) [redacted]	[redacted]
7) [redacted]	[redacted]
8) [redacted]	[redacted]
9) [redacted]	[redacted]

[redacted]

Dam: Alexander Lake Dam

CREST ELEVATION: 1267.0 (measured low spot)

Type: Earth

Width: 9 feet Length: 420 feet

Spillways: Drop inlet and vegetated earth channel

Location: Drop inlet: Near left abutment; Earth channel: Left abutment

Appurtenant

SERVICE		AUXILIARY
1260.0	Elevation	1264.8
Drop inlet	Type	Vegetated Earth Channel
2-foot-diameter	Width	60 feet
	Type of Control	
Uncontrolled	Uncontrolled	Uncontrolled
	Controlled	
N/A	Type (Flashboards, gate)	N/A
N/A	Number	N/A
N/A	Size/Length	60 feet wide
	Invert Material	Vegetated Earth
	Anticipated Length of Operating Service	Unknown
90 ±	Chute Length	N/A
1 ± feet	Height Between Spillway Crest and Approach Channel Invert (Weir Flow)	2 ± feet

Hydrometeorological Gages

Type: None

Location: N/A

Records:

Date - N/A

Max. Reading - N/A

FLOODWATER CONTROL SYSTEM

Warning System: None

Method of Controlled Releases (mechanism)

None

DRAINAGE AREA: [illegible] square mile

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: [illegible]

Terrain - Relief: Moderate

Surface - Soil: Low permeability soil

Runoff Potential (existing or planned extensive alterations to existing surface or subsurface conditions)

High runoff potential due to moderate slope and low infiltration rate.

Potential Sedimentation problem areas (natural or man-made, present or future)

None observed.

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

None observed.

Dikes - Floodwalls (overflow and non-overflow) - Low reaches along the Reservoir perimeter:

Location: None

Elevation:

Reservoir:

Length @ Maximum Pool: 1,300 ± feet

Length of Shoreline @ Spillway Crest: 2,900 ± feet

APPENDIX B

[illegible] AND [illegible] ANALYSIS

[redacted]

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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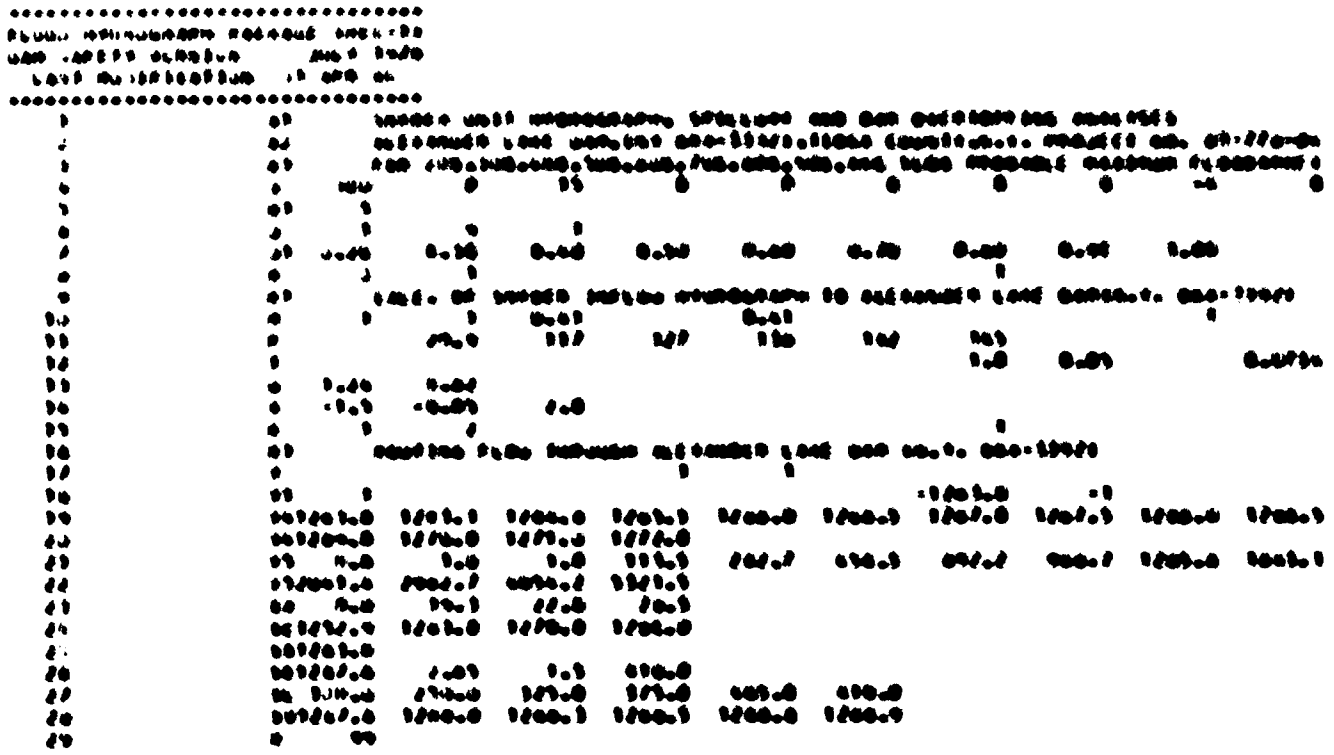


PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1 .20	RATIO 2 .30	RATIO 3 .40	RATIO 4 .50	RATIO 5 .60	RATIO 6 .70	RATIO 7 .80	RATIO 8 .90	RATIO 9 1.00
				RATIOS APPLIED TO FLOWS								
HYDROGRAPH AT	1	.61	1	260.	390.	520.	650.	780.	909.	1039.	1169.	1299.
	(	1.58)	(	7.36)(	11.04)(	14.72)(	18.40)(	22.08)(	25.76)(	29.43)(	33.11)(	36.79)
ROUTED TO	2	.61	1	172.	313.	440.	575.	701.	832.	956.	1092.	1232.
	(	1.58)	(	4.87)(	8.86)(	12.46)(	16.28)(	19.85)(	23.56)(	27.07)(	30.92)(	34.89)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

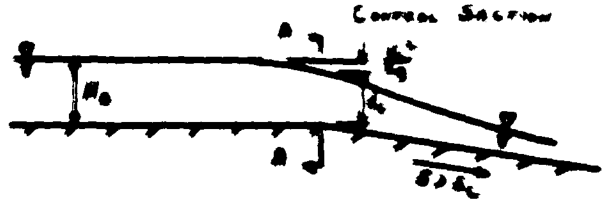
	ELEVATION	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
	STORAGE	1261.00	1265.00	1267.00
	OUTFLOW	65.	65.	150.
		0.	0.	1032.

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
.20	1265.09	0.00	110.	172.	0.00	42.25	0.00
.30	1266.11	0.86	127.	313.	0.75	41.75	0.00
.40	1266.47	0.00	134.	445.	0.00	41.50	0.00
.50	1266.75	0.00	140.	571.	0.00	41.25	0.00
.60	1267.02	0.00	146.	701.	0.00	41.25	0.00
.70	1267.25	0.00	150.	832.	0.00	41.25	0.00
.80	1267.48	0.00	155.	956.	0.00	41.25	0.00
.90	1267.68	.68	159.	1092.	.75	41.25	0.00
1.00	1267.84	.74	163.	1232.	1.25	41.25	0.00

OVERTOPPING ANALYSIS SUMMARY

D'APPOLONIA
CONSULTING ENGINEERS INC

By MB Date 5/2/81 Subject Alexander Lake Dam Sheet No. 1 of 1
Chkd. By WTC Date 5/7/81 NY 864 - 3392 Proj. No. 80-778-04



Spillway Capacity

Ref: "Design of Small Dams", 2nd Ed., Pg. 583

$$V_c = \sqrt{\left(\frac{b+2d_c}{b+2.8d_c}\right) d_c g} \qquad \text{(Eq. 1)}$$

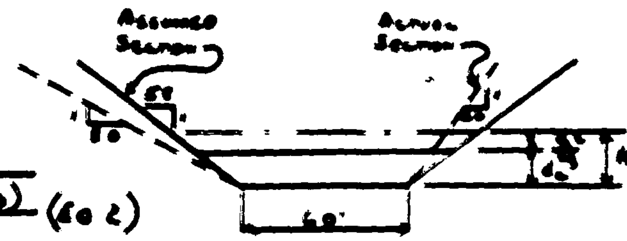
$$H_e = d_c + \frac{V_c^2}{2g} = d_c + \left(\frac{b+2d_c}{b+2.8d_c}\right)(d_c g)\left(\frac{1}{2g}\right)$$

$$= \left(\frac{3b+5.6d_c}{2b+4.8d_c}\right) d_c$$

$$d_c = \frac{-(3b-4H_e 2) + \sqrt{(3b-4H_e 2)^2 + (4H_e 2)(10b)}}{10\,2} \qquad \text{(Eq. 2)}$$

$$A_c = (2d_c + b)\,d_c \qquad \text{(Eq. 3)}$$

$$Q_c = A_c V_c \qquad \text{(Eq. 4)}$$



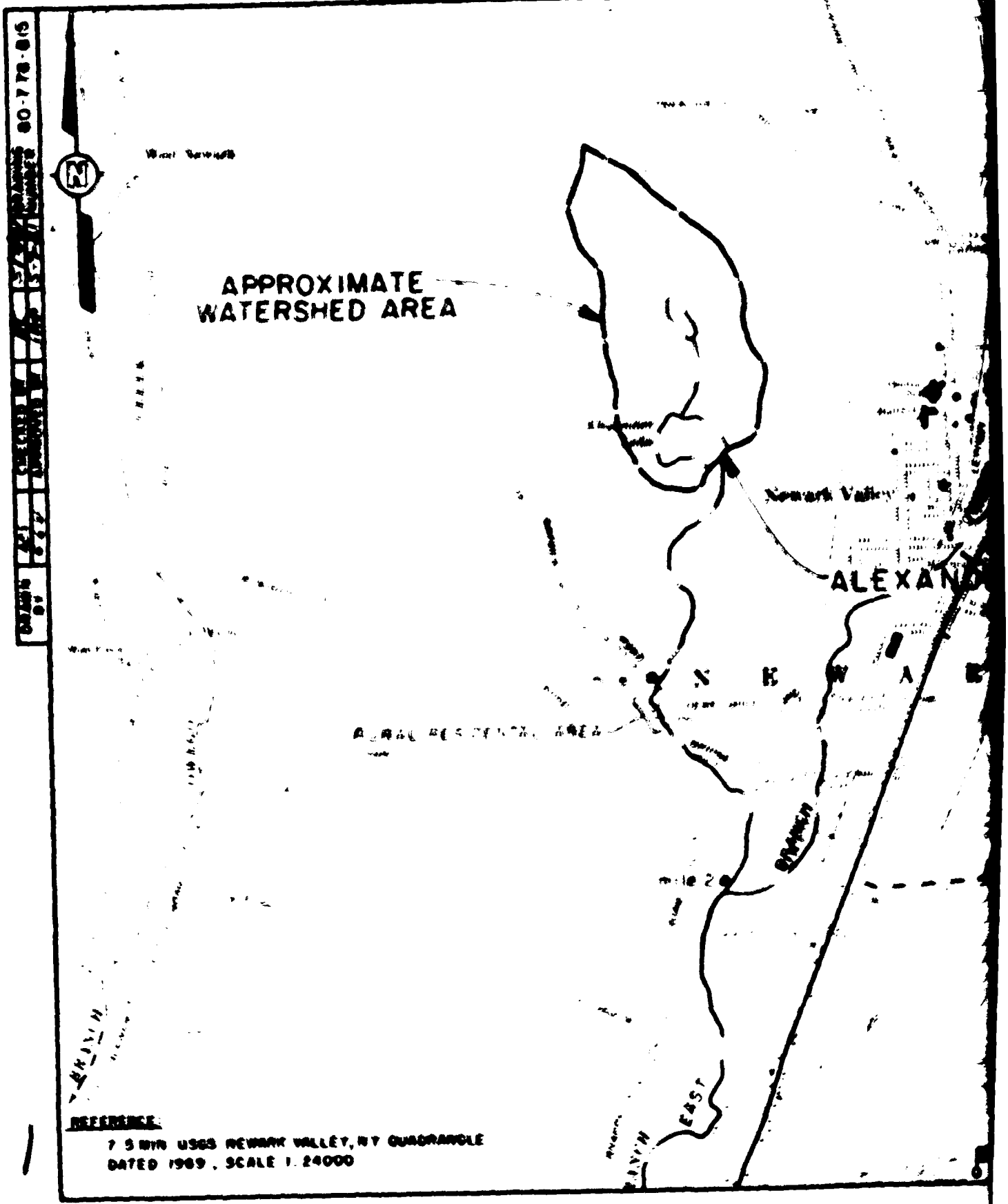
Section A-A

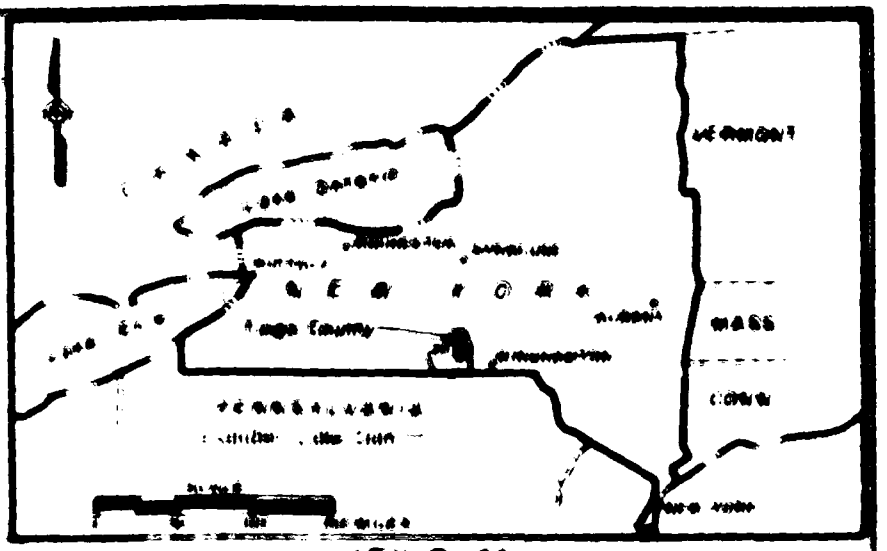
Assume 1 cfs outflow from El. 1263.1 to 1264.8 due to 6" low level pipe outlet

Lake Elevation	H_e	Eq 2 d_c	Eq 3 A_c	Eq 1 V_c	Eq 4 Q_c Spillway Capacity	
(ft)	(ft)	(ft)	(ft²)	(fps)	(cfs)	
1264.8	0	0	0	0	0	
1265.5	0.7	0.5	29.7	3.8	113.5	
1266.0	1.2	0.8	53.0	5.0	262.7	
1266.5	1.7	1.2	78.1	5.8	456.5	
1267.0	2.2	1.5	105.0	6.6	692.2	
1267.5	2.7	1.9	133.6	7.2	968.7	Top of Dam El. 1267.6
1268.0	3.2	2.2	164.1	7.8	1285.6	
1268.5	3.7	2.6	196.4	8.4	1643.1	
1269.0	4.2	3.0	230.5	8.9	2041.4	
1270.0	5.2	3.7	304.2	9.7	2962.7	
1271.0	6.2	4.5	385.2	10.5	4054.2	
1272.0	7.2	5.2	473.6	11.2	5321.5	

APPENDIX E

PLATES


APPROXIMATE
WATERSHED AREA
Newark Valley
ALEXANDRIA
EAST
REFERENCE
7 5 MIN USGS NEWARK VALLEY, NY QUADRANGLE
DATED 1969, SCALE 1:24000



ALEXANDER LAKE DAM

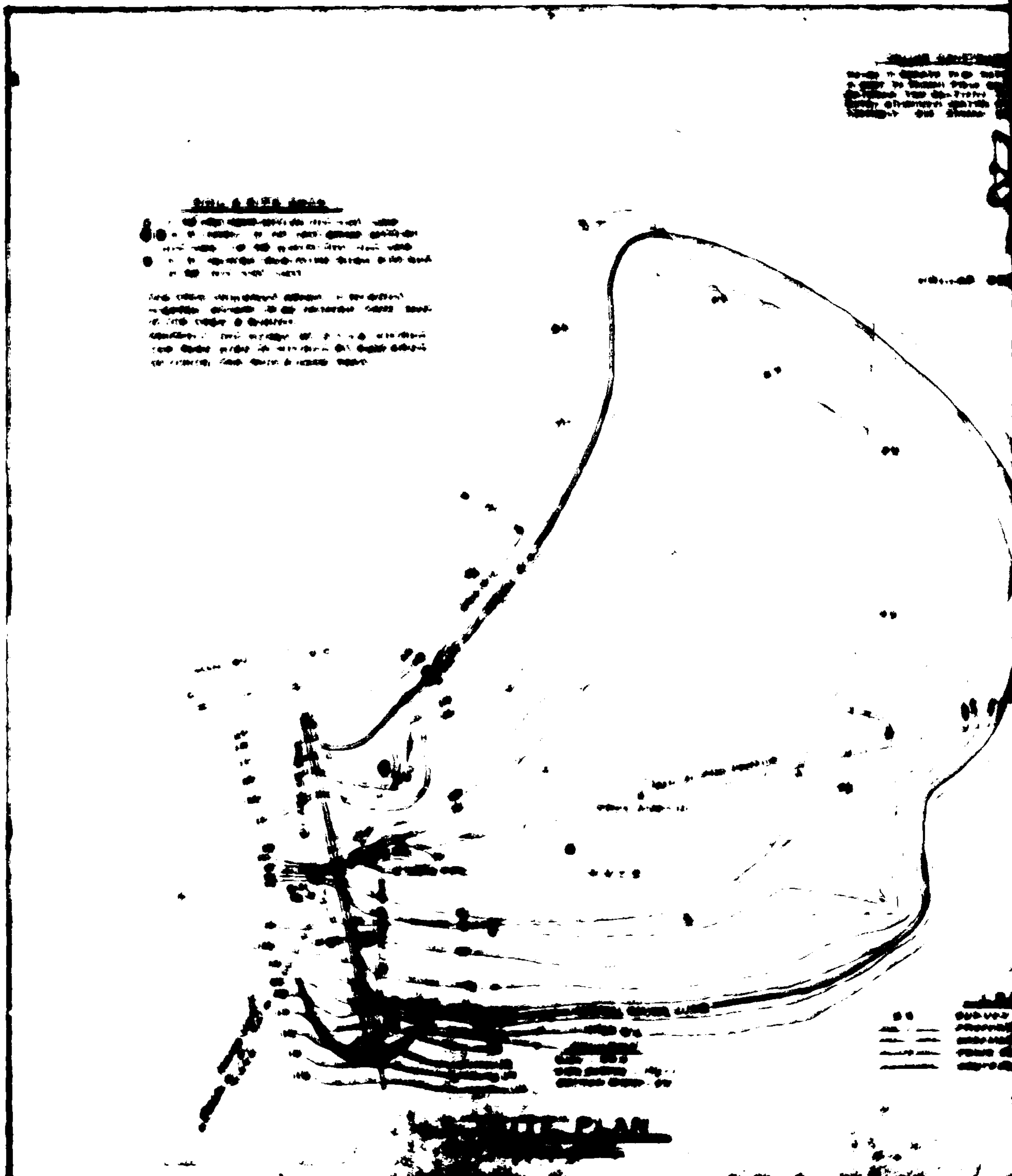
PLATE I

ALEXANDER LAKE DAM
VICINITY FLOOD PLAIN & WATERSHED MAP

SCALE
0 2000 4000 8000 FEET

DAYTONA

80-778-86



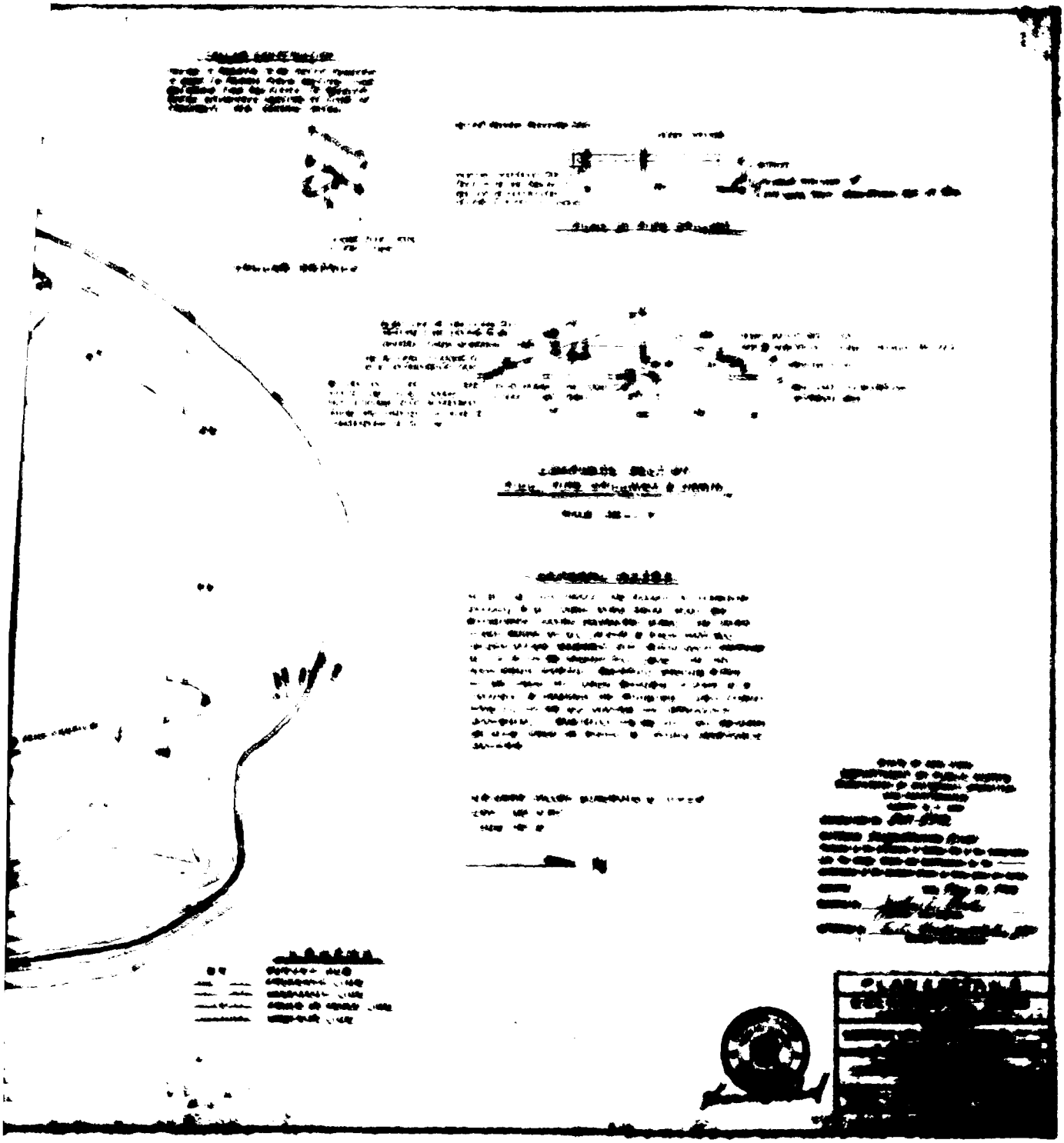
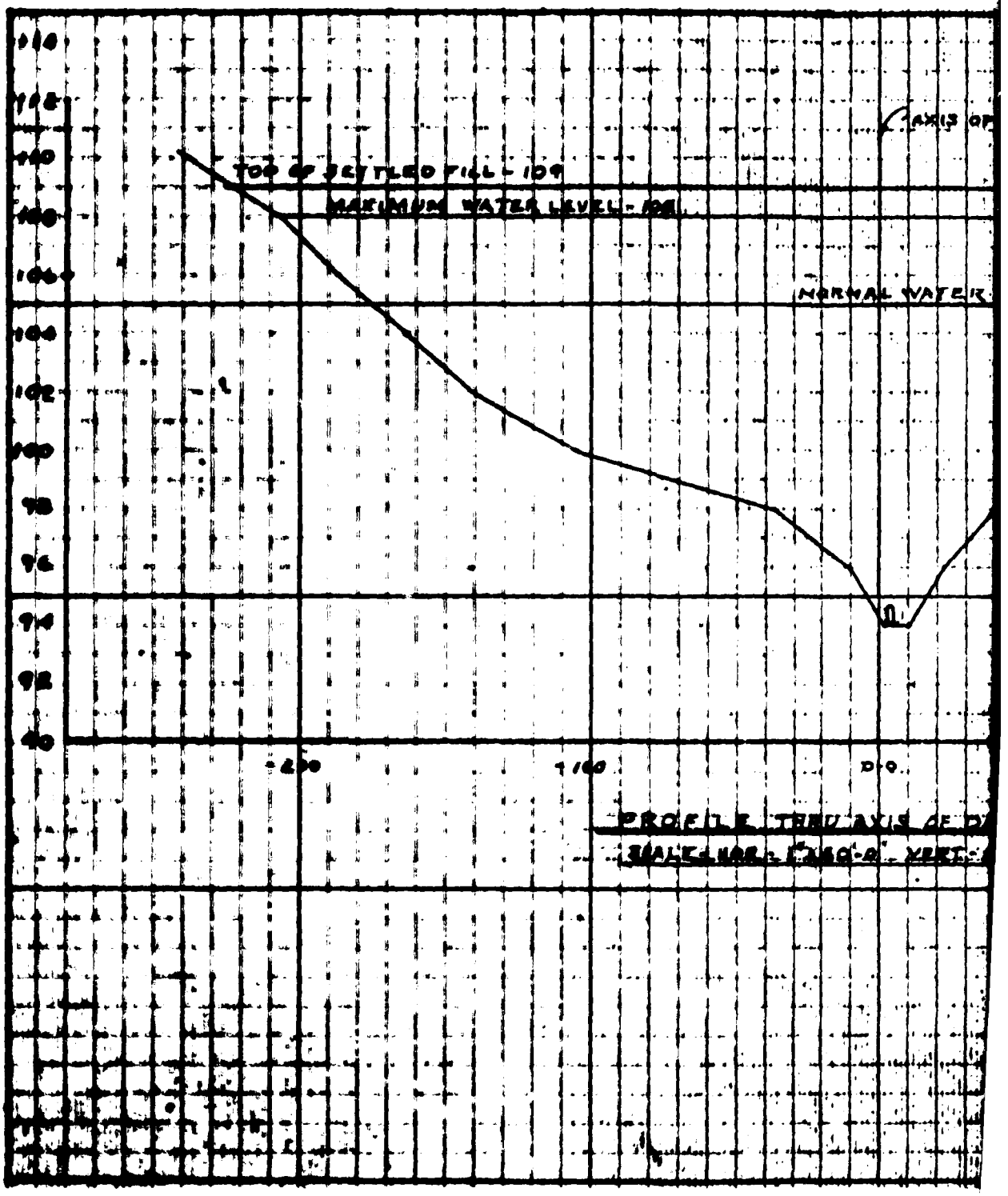


PLATE 2

DAPTOMYCIN


TOP OF SETTLED FILL - 109
MAXIMUM WATER LEVEL - 108
NORMAL WATER
PROFILE THRU AXIS OF D
SCALE: HOR. 1"=100'-0" VERT.

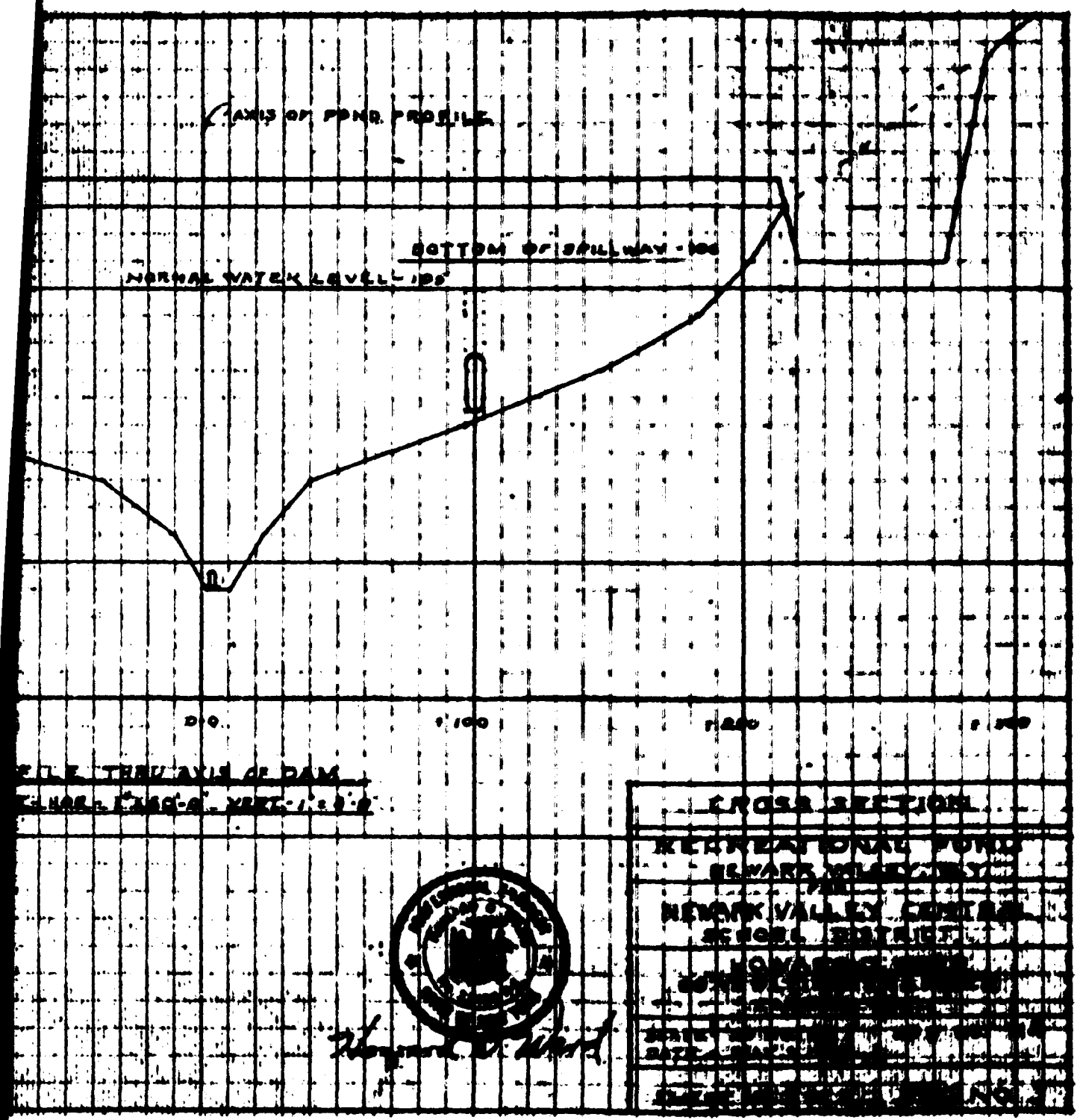
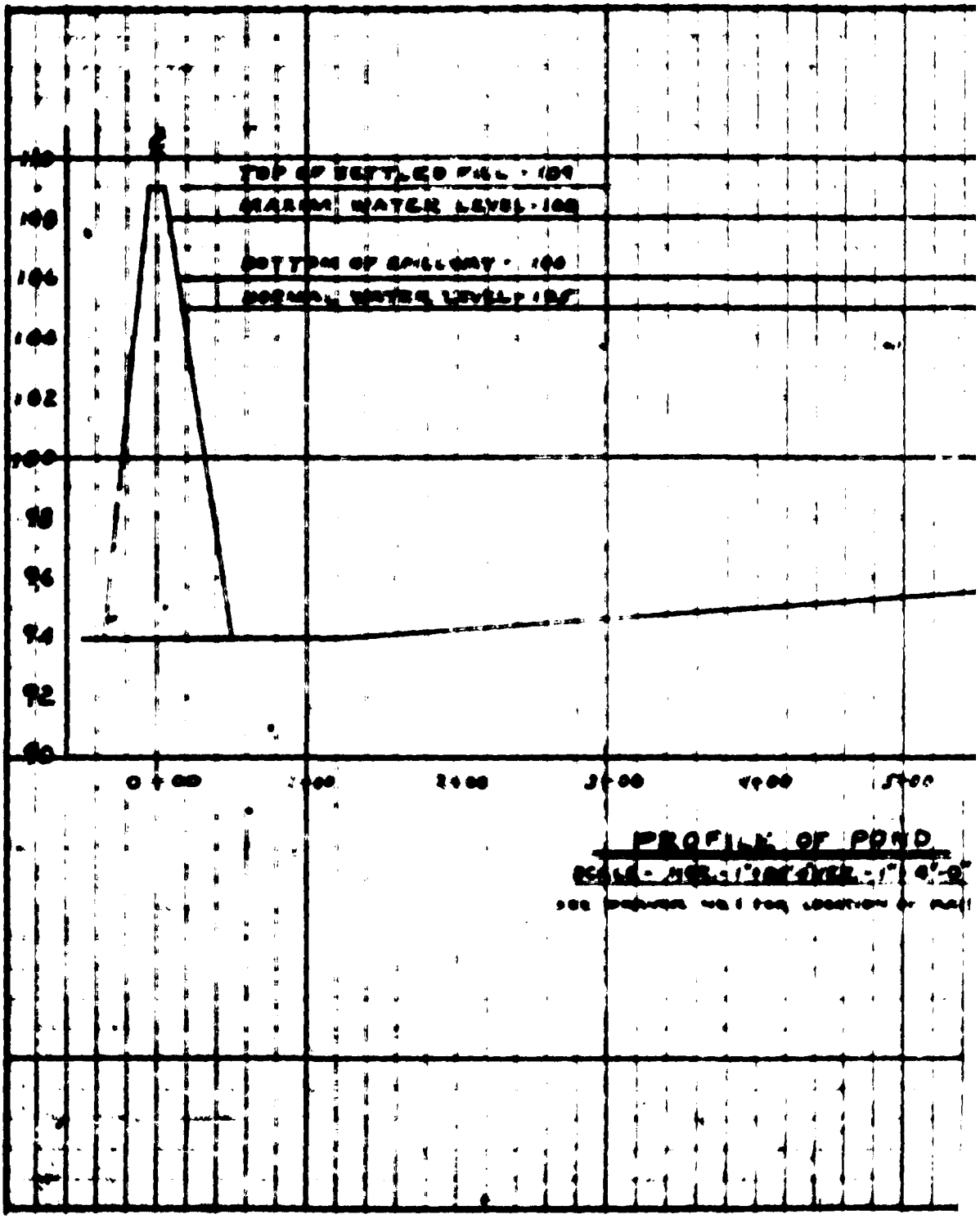
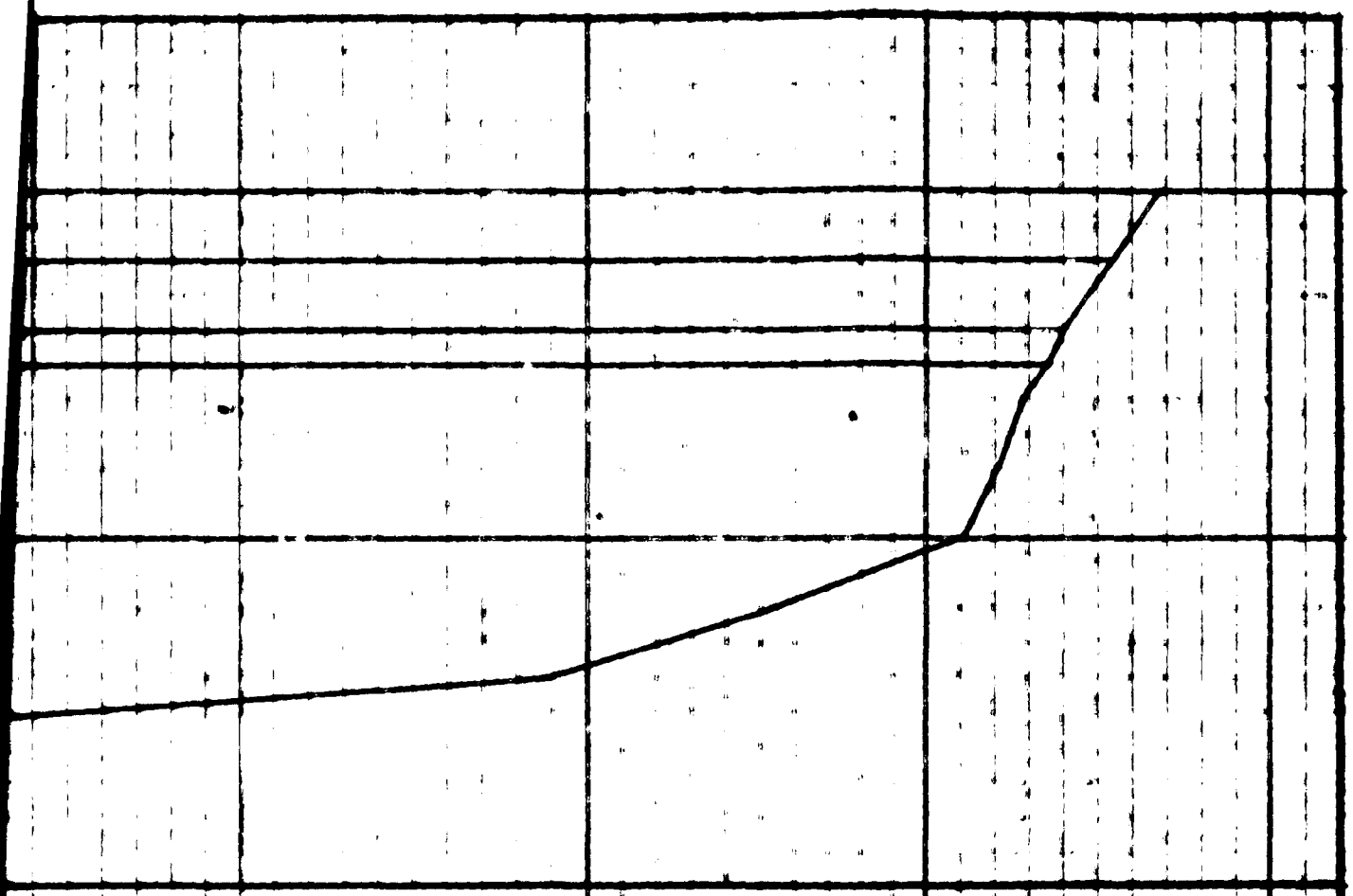


PLATE 3

DAPTOMNA


TOP OF SETTLED FILL - 104
SEASON WATER LEVEL - 100
BOTTOM OF SPILLWAY - 100
SEASON WATER LEVEL - 98
104
102
100
98
96
94
92
90
0+00
2+00
3+00
4+00
5+00
PROFILE OF POND



FINK OF POND

TRANSVERSE SECTION - 1

RECREATIONAL POND

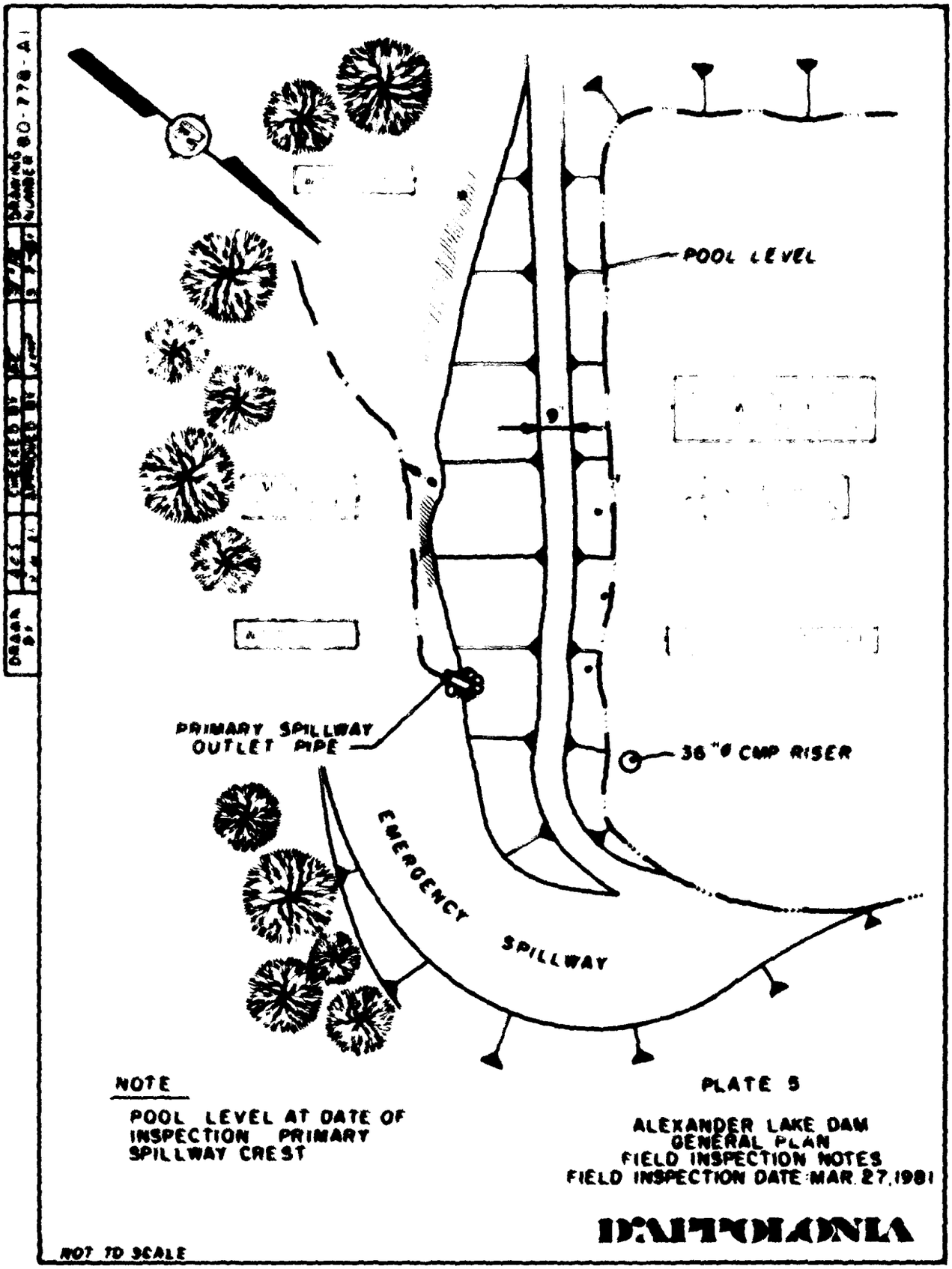
NEWARK VALLEY, N.Y.

NEWARK VALLEY CENTRAL SCHOOL DISTRICT

2

PLATE 4

DAPTOMONIA



NOTE

POOL LEVEL AT DATE OF INSPECTION PRIMARY SPILLWAY CREST

PLATE 5

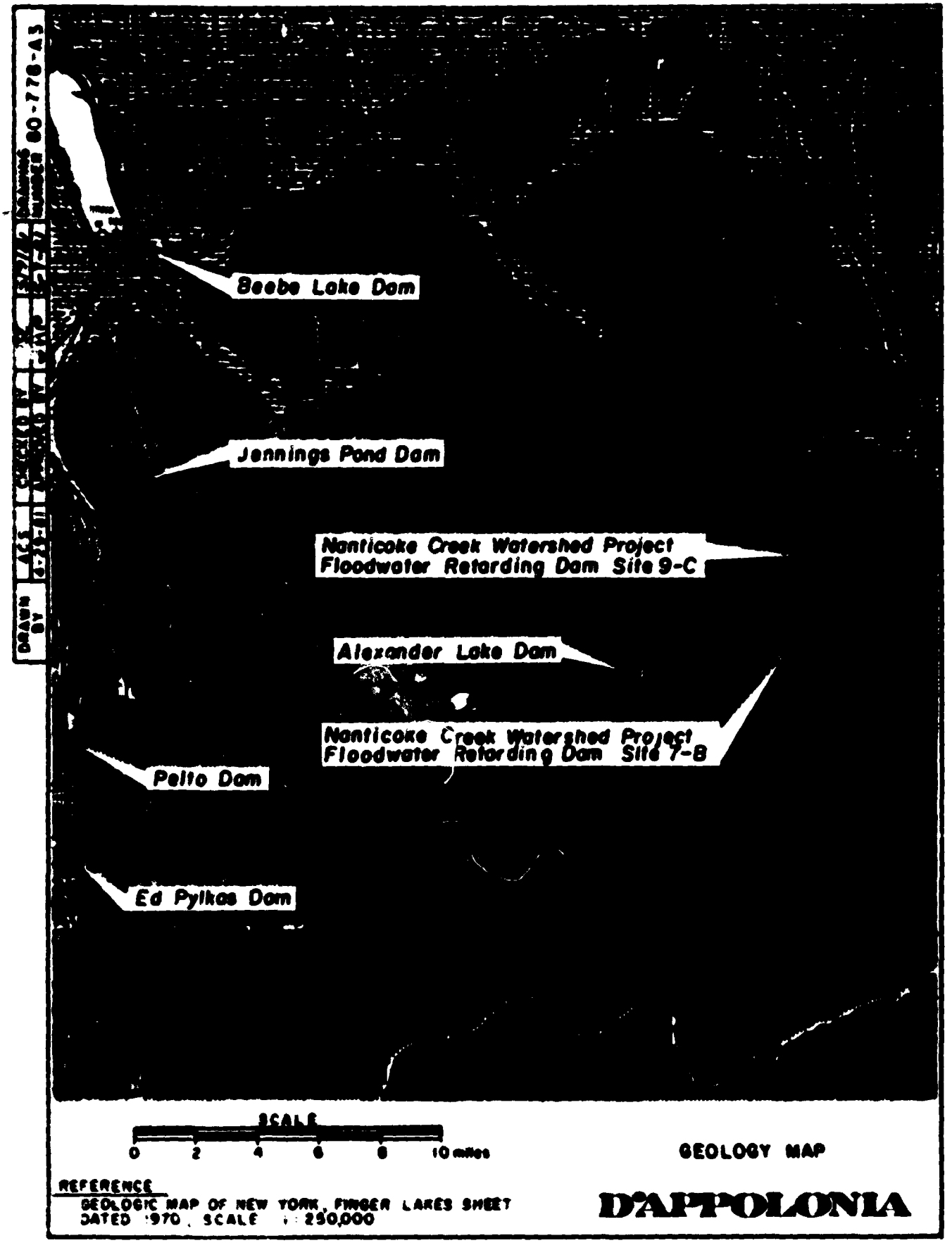
ALEXANDER LAKE DAM
GENERAL PLAN
FIELD INSPECTION NOTES
FIELD INSPECTION DATE: MAR. 27, 1981

DAYTONA

NOT TO SCALE

APPENDIX F

GEOLOGY MAP


Beebe Lake Dam
Jennings Pond Dam
Nanticoke Creek Watershed Project
Floodwater Retarding Dam Site 9-C
Alexander Lake Dam
Nanticoke Creek Watershed Project
Floodwater Retarding Dam Site 7-B
Pelto Dam
Ed Pylkas Dam
SCALE
0 2 4 6 8 10 miles
GEOLOGY MAP
REFERENCE
GEOLOGIC MAP OF NEW YORK, FINGER LAKES SHEET
DATED 1970, SCALE 1:250,000
D'APPOLONIA

LEGEND

CANADAWAY GROUP
800-1200 ft (240-370 m.)

Dcy — Machias Formation—shale, siltstone; Rushford Sandstone; Caneadea, Canisteo, and Hume Shales; Canaseraga Sandstone; South Wales and Dunkirk Shales. In Pennsylvania: Towanda Formation—shale, sandstone.

JAVA GROUP
300-700 ft (90-210 m.)

Dj — Wiscoy Formation—sandstone, shale; Hanover and Pipe Creek Shales.

WEST FALLS GROUP
1100-1600 ft (340-490 m.)

Dwr — Nunda Formation—sandstone, shale

Dwg — West Hill and Gardeau Formations—shale, siltstone; Roricks Glen Shale; upper Beers Hill Shale; Grimes Siltstone

Dwr — lower Beers Hill Shale; Dunn Hill, Millport, and Moreland Shales

Dwn — Nunda Formation—sandstone, shale; West Hill Formation—shale, siltstone; Corning Shale

Dwnm — "New Milford" Formation—sandstone, shale

Dwg — Gardeau Formation—shale, siltstone; Roricks Glen Shale

Dws — Slide Mountain Formation—sandstone, shale, conglomerate

Dwm — Beers Hill Shale; Grimes Siltstone; Dunn Hill, Millport, and Moreland Shales

SONYEA GROUP
200-1000 ft (60-300 m.)

Ds — In west: Cashaqua and Middlesex Shales. In east: Rye Point Shale; Rock Stream ("Enfield") Siltstone; Pulteney, Sawmill Creek, Johns Creek, and Montour Shales.

GENESEE GROUP AND TULLY LIMESTONE
200-1000 ft (60-300 m.)

Dg — West River Shale; Genundewa Limestone; Penn Yan and Geneseo Shales; all except Geneseo replaced eastwardly by Ithaca Formation—shale, siltstone; and Sherburne Siltstone

Dgo — Oneonta Formation—shale, sandstone

Dgu — Unadilla Formation—shale, siltstone

Dt — Tully Limestone

GEOLOGY MAP LEGEND

REFERENCE:
GEOLOGIC MAP OF NEW YORK, FINGER LAKES SHEET
DATED: 1970, SCALE 1:250,000

D'APPOLONIA