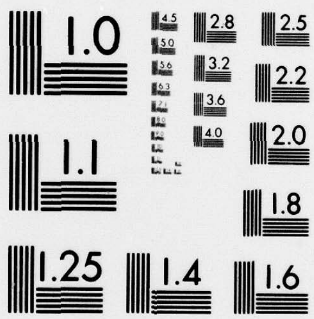
AD-A077 446   NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY   F/G 13/13
NATIONAL DAM SAFETY PROGRAM. DAM NUMBER 5 (MINETTO) (INVENTORY --ETC(U)
SEP 79   J B STETSON   DACW51-79-C-0001

UNCLASSIFIED   NL

1 OF 2
AD
A077446



MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS-1963-A

OSWEGO RIVER BASIN

DAM № 5 (MINETTO)

OSWEGO COUNTY
NEW YORK

INVENTORY № NY 402

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

CONTRACT NO. DACW-51-79-C0001

NEW YORK DISTRICT CORPS OF ENGINEERS

JULY 1979

DISCLAIMER NOTICE

AD A077446

LEVEL II

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* Phase I Inspection Report Dam No. 5 (Minetto) Oswego River Basin, Oswego County, New York Inventory No. NY 402		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) (10) John B. Stetson, P.E.		8. CONTRACT OR GRANT NUMBER(s) (15) DACW-51-79-C-0001
9. PERFORMING ORGANIZATION NAME AND ADDRESS Stetson-Dale Engineering Company Bankers Trust Building Utica, New York 13501		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation/ 50 Wolf Road Albany, New York 12233		(11) 12. REPORT DATE 28 Sep[redacted]79
		13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS *(if different from Controlling Office)* Department of the Army 26 Federal Plaza/ New York District, CofE New York, New York 10007		15. SECURITY CLASS. *(of this report)* UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

Approved for public release: Distribution unlimited.

(12) 164

DDC RECEIVED NOV 1979 E

17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

(6) National Dam Safety Program. Dam Number 5 (Minetto) (Inventory Number (NY 402), Oswego River Basin, Oswego County, New York. Phase I Inspection Report (9)

18. SUPPLEMENTARY NOTES

79 11 26 068

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

- Dam Safety
- National Dam Safety Program
- Visual Inspection
- Hydrology, Structural Stability
- Dam No. 5 (Minetto)
- Oswego County
- Seneca Hill

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

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED 393 970

SECURITY CLASSIFICATION OF THIS PAGE *(When Data Entered)*

1. Within one year of notification, complete the following investigations:

   a. Perform in-depth stability analysis including borings to determine existing structural condition of the concrete in the dam, since the surface of the spillway is severely deteriorated.

   b. Evaluate effects of overtopping and assessment of dam failure potential at the abutments.

   c. Evaluate the leakage and under the wall seepage in the forebay wall to determine proper measures to repair the wall.

   d. Evaluate the potential of upstream flooding from the 1/2 PMF due to the presence of the dam.

2. The remaining deficiencies requiring remedial work should be completed within the next construction season. The following improvement needs have been identified and should be performed based on the results of the aforementioned investigations.

   a. Repair the spillway system. The deteriorated concrete should be removed prior to resurfacing the spillway.

   b. Repair the concrete at the lock structure particularly where it may relate to adverse structural effects to the dam and the west abutment.

   c. Provide improvements, if needed to insure against dam failure due to overtopping and the erosion of the west abutment due to the 1/2 PMF.

   d. Repair the forebay wall which leaks and is deteriorating.

   e. Provide improvements where the presence of the dam creates significant additional upstream flooding under the 1/2 PMF.

Computations prepared according to the Corps of Engineers' Screening Criteria establish the spillway capacity of 37,500 cfs at 40% of the PMF. The PMF and 1/2 PMF flows are 81,900 cfs and 46,800 cfs respectively. The spillway is not considered seriously inadequate, based on the Corps of Engineers' Screening Criteria, since the dam is a gravity structure, and the stability analysis indicate that the dam is stable during the 1/2 PMF event.

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 Test 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.

TABLE OF CONTENTS

FIGURES

APPENDIX

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam Minetto, Dam at Lock 5, NY402

State Located	New York
County Located	Oswego
Stream	Oswego River
Date of Inspection	May 31, June 13, 1979

ASSESSMENT OF GENERAL CONDITIONS

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property. However, additional studies should be undertaken to further evaluate conditions affecting the dam.

1. Within one year of notification, complete the following investigations:

   a. Perform in-depth stability analysis including borings to determine existing structural condition of the concrete in the dam, since the surface of the spillway is severely deteriorated.

   b. Evaluate effects of overtopping and assessment of dam failure potential at the abutments.

   c. Evaluate the leakage and under the wall seepage in the forebay wall to determine proper measures to repair the wall.

   d. Evaluate the potential of upstream flooding from the 1/2 PMF due to the presence of the dam.

2. The remaining deficiencies requiring remedial work should be completed within the next construction season. The following improvement needs have been identified and should be performed based on the results of the aforementioned investigations.

   a. Repair the spillway system. The deteriorated concrete should be removed prior to resurfacing the spillway.

   b. Repair the concrete at the lock structure particularly where it may relate to adverse structural effects to the dam and the west abutment.

c. Provide improvements, if needed to insure against dam failure due to overtopping and the erosion of the west abutment due to the 1/2 PMF.

d. Repair the forebay wall which leaks and is deteriorating.

e. Provide improvements where the presence of the dam creates significant additional upstream flooding under the 1/2 PMF.

Computations prepared according to the Corps of Engineers' Screening Criteria establish the spillway capacity of 37,500 cfs at 40% of the PMF. The PMF and 1/2 PMF flows are 81,900 cfs and 46,800 cfs respectively. The spillway is not considered seriously inadequate, based on the Corps of Engineers' Screening Criteria, since the dam is a gravity structure, and the stability analysis indicate that the dam is stable during the 1/2 PMF event.

Dale Engineering Company

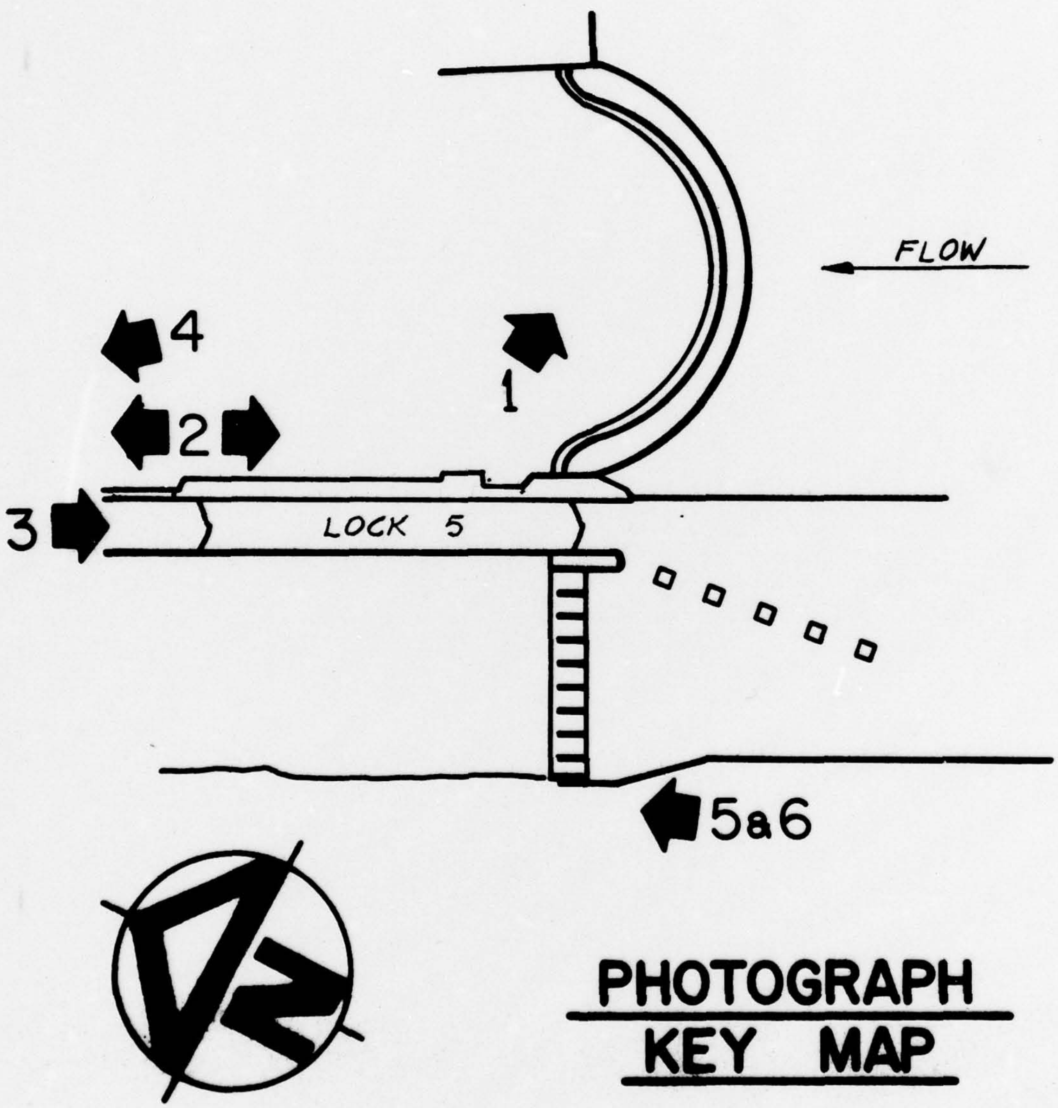
John B. Stetson, President

Approved By:
Date: 28 Sept 79

Col. Clark H. Benn
New York District Engineer

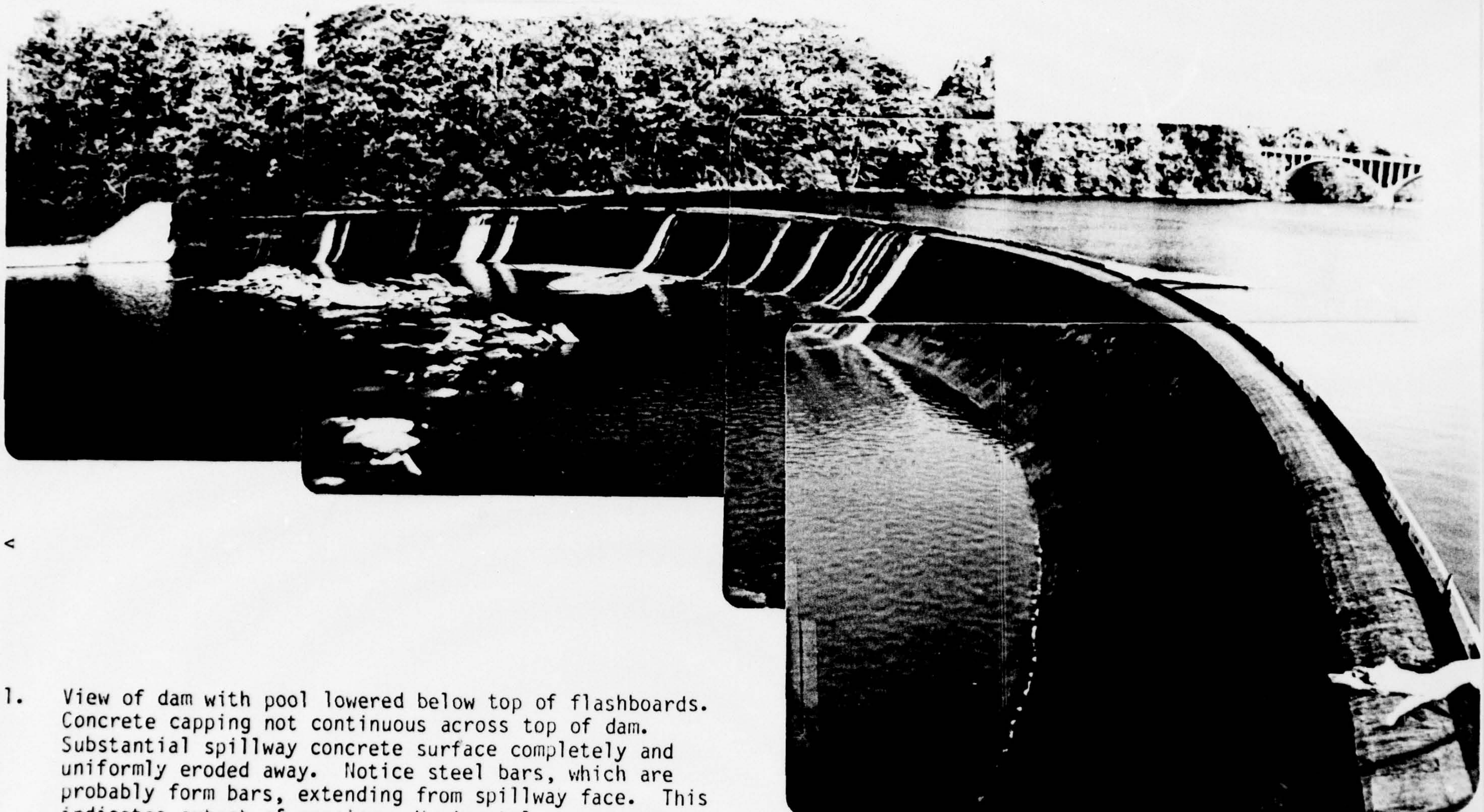
Overview of curved concrete gravity dam at Minetto, New York, on Oswego River at Lock 0-5, mile 9.5.

MINETTO - DAM No 5



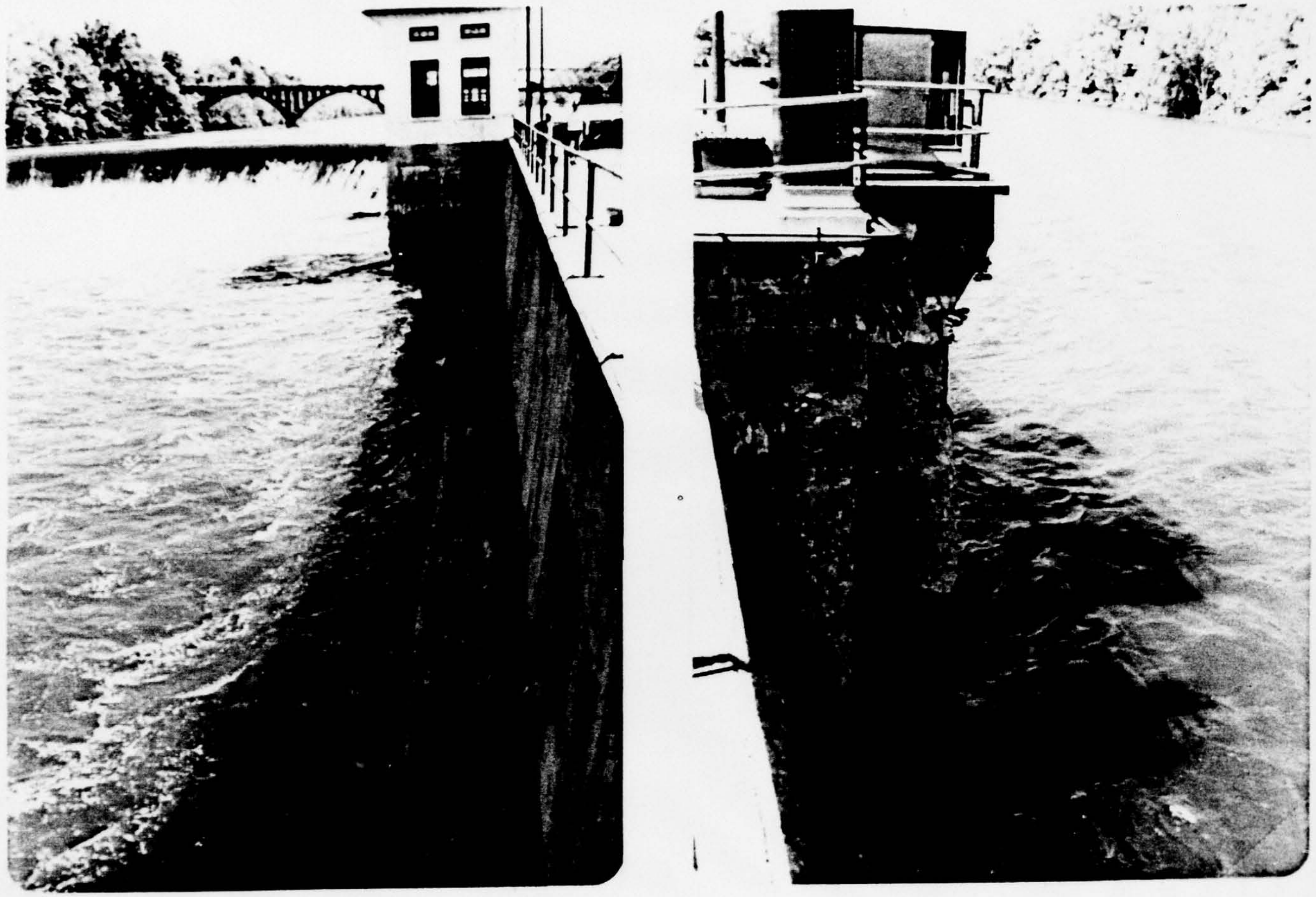
PHOTOGRAPH KEY MAP

STETSON • DALE	DATE 7.17.79	DRAWN JPG	iv
	JOB 2305	APP'D	

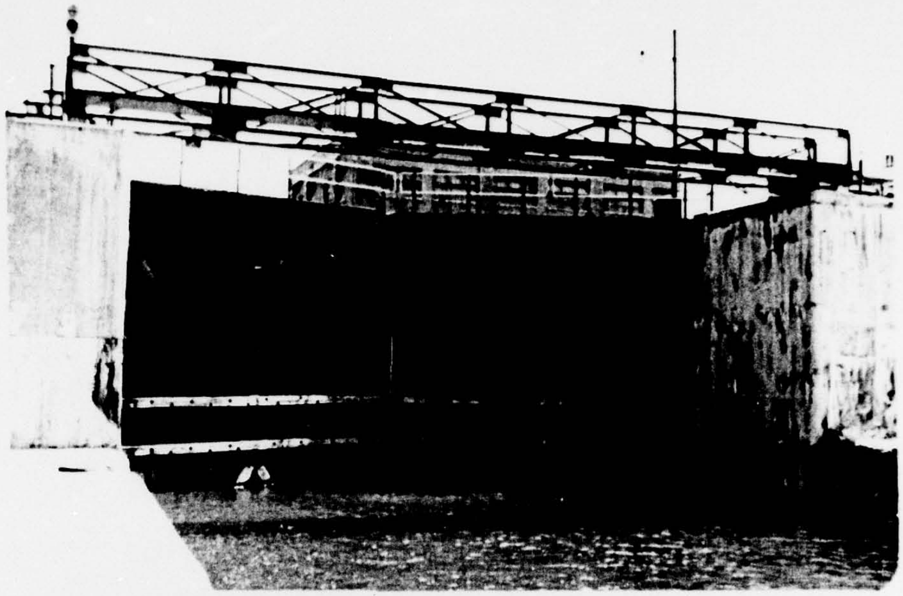


v

1. View of dam with pool lowered below top of flashboards. Concrete capping not continuous across top of dam. Substantial spillway concrete surface completely and uniformly eroded away. Notice steel bars, which are probably form bars, extending from spillway face. This indicates extent of erosion. Horizontal construction joints can be seen across dam.

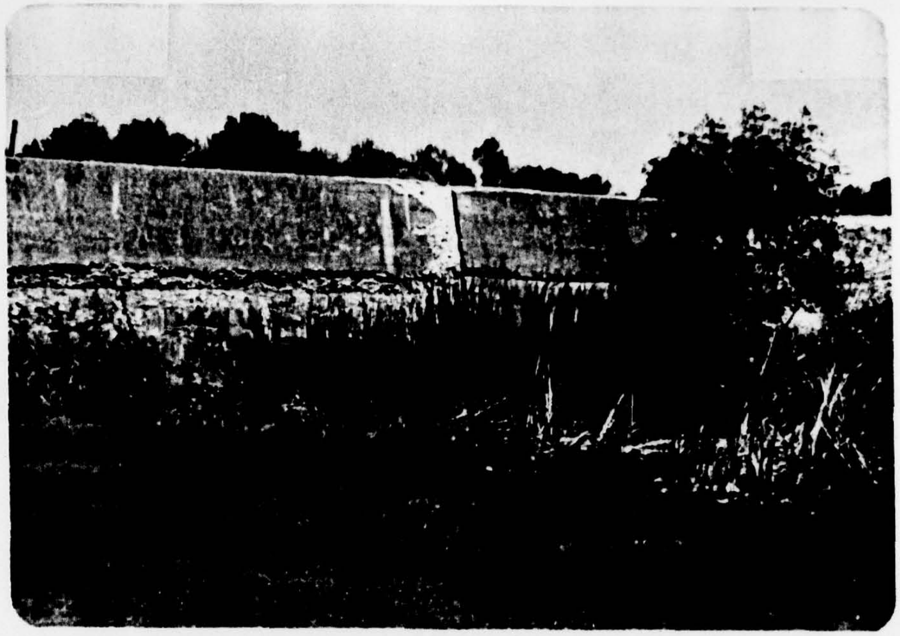


2. Riverside wall of lock shows advanced surface deterioration and some seepage.

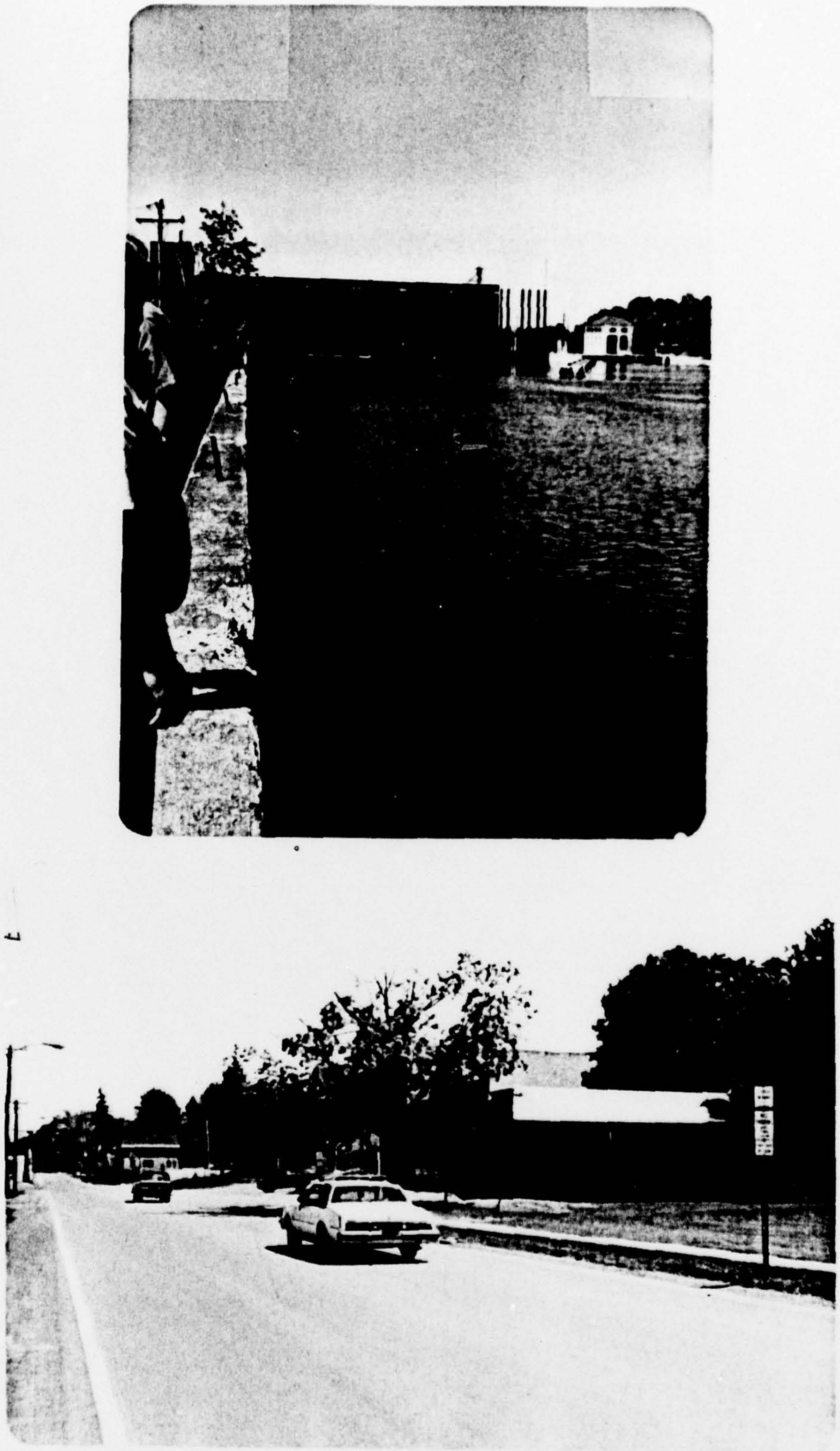


3. Deterioration of concrete wall surface at lower gate.

4. Downstream channel looking north towards the City of Oswego.



5. Deteriorated concrete wall surface at hydropower intake channel on west side of river. Pictures taken on both sides of tree.



6. Pictures showing depth of water stored in intake channel and hazard area across the street from the wall.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - MINETTO - LOCK NO. 5 ID# - NY 402

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

Authority for this report is provided by the National Dam Inspection Act, Public Law 92-367 of 1972. It has been prepared in accordance with a contract for professional services between Dale Engineering Company and the New York State Department of Environmental Conservation.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Minetto Dam - Lock No. 5 and appurtenant structures, owned by the New York State Department of Transportation, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the New York State Department of Environmental Conservation.

This Phase I inspection report does not relieve an Owner or Operator of a dam of the legal duties, obligations or liabilities associated with the ownership or operation of the dam. In addition, due to the limited scope of services for these Phase I investigations, the investigators had to rely upon the data furnished to them. Therefore, this investigation is limited to visual inspection, review of data prepared by others, and simplified hydrologic, hydraulic and structural stability evaluations where appropriate. The investigators do not assume responsibility for defects or deficiencies in the dam or in the data provided.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Minetto Dam at Lock No. 5 consists of a 500-foot long concrete gravity spillway type structure, which has its east abutment on the bank of the Oswego River. This dam forms a weir crest that is formed in a curve with a radius of 192 feet and a cord length of 370 feet. The west abutment of the dam is at the wall of Lock No. 5 of the Oswego Canal. The Minetto Power Generating Station is located just to the west of Lock No. 5. Flow to the forebay of the Minetto Power Generating Station is controlled through a sluice gate structure 190 feet long with 9 gates. The dam is a concrete gravity structure constructed on a rock foundation. The combination of dam, lock and power generating station spans the entire width of the Oswego River. The dam is the fourth in a series of six dams which regulate the flow in the Oswego River for use in navigation and power generation.

b. Location

The Minetto Dam at Lock No. 5 is located near the Hamlet of Minetto, and in the towns of Minetto and Volney, Oswego County, New York.

c. Size Classification

The maximum height of the dam is approximately 22-1/2 feet. The storage volume of the impoundment is approximately 6400 acre/feet. Therefore, the dam is in the Intermediate Size Classification as defined by The Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

The Oswego River flows through the City of Oswego, downstream from Minetto. The Oswego River is also used for navigational purposes. Therefore, the dam is in the high hazard category as defined by The Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The dam is owned by the New York State Department of Transportation.

Waterway Maintenance Subdivision:

New York State - DOT
Main Office - State Campus
1220 Washington Avenue
Albany, New York 12232
Director - Mr. Joseph Stellato
(518) 457-4420

Region Three:

New York State - DOT
Syracuse State Office
333 E. Washington Street
Syracuse, New York 13202
Engineer - Mr. Leo Burns
(315) 473-8194

f. Purpose of the Dam

The dam is used to regulate flow in the Oswego River for navigational use and power generation.

g. Design and Construction History

The dam and lock at Minetto was constructed in approximately 1914.

h. Normal Operational Procedures

The facility is operated by the New York State Department of Transportation in cooperation with the Niagara Mohawk Power Corporation. The main function of this facility is to provide adequate pool elevations for navigation in the Oswego Canal. The secondary function of the facility is for power generation at the Niagara Mohawk Power generating facility. In order to fulfill the primary function of the facility, it is necessary to maintain the upstream water level at the elevation of spillway crest. In order to maintain this level and have adequate flows for power generation, the Niagara Mohawk Power Corporation places flashboards on the dam each spring to provide sufficient impounded water during the low run-off periods. The gates which control the flow to the forebay of the power generating station are owned and operated by the New York State Department of Transportation. These gates may be closed to shut off the flow to the generating facility. Representatives of The New York State Department of Transportation indicate that it has been unnecessary to manipulate these gates in order to regulate the generating flow. The gates are used only to dewater the forebay channel for maintenance purposes.

1.3 PERTINENT DATA (Elevations: Barge Canal Datum (USGS + 0.99 Feet)

a. Drainage Area

The drainage area of Minetto Dam - Lock No. 5 is 5100 square miles.

b. Discharge at Dam Site

Peak discharge records at USGS Gage 0424900 at Lock No. 7.

28 March 1936	37,500 cfs
10 April 1940	35,000 cfs
27 June 1972	32,300 cfs

(See Appendix C for other values for annual peaks.)

Computed Discharges:

Ungated Spillway, Top of Dam	37,500 cfs
Ungated Spillway, Design Flood	30,000 cfs
PMF	81,900 cfs
1/2 PMF	46,800 cfs
Maximum Navigation Pool	18,000 cfs
Gated Drawdown Through Niagara Mohawk Power Plant	6,250 cfs

c. Elevation*

Top of Dam	315.5
Maximum Pool	
PMF	320.0
1/2 PMF	316.0
Maximum Navigation Pool (from plans)	312.4
Spillway Crest	
Navigation season with flashboards	309.1
Winter season without flashboards	308.0
Stream Bed at Centerline of Dam	288.0±

*Stages for flood flow conditions assume failure of flashboards under these stages.

d. Reservoir (Up to Lower Fulton Dam at Lock No. 3)

Length of Maximum Pool	34,200 ft. (1/2 PMF)
Length of Normal Pool	34,200 ft.

e. Reservoir Area

Top of Dam	641.9 ± acres
Maximum Pool	641.9 ± acres
Spillway Pool	641.9 ± acres

f. Dam

Type - Concrete
Length - 500 feet
Height - 22.5 feet

Freeboard between normal reservoir and top of dam - 6.5 feet
Top width - See plans for crest dimensions
Side slopes - Upstream: Vertical

g. Spillway

Type - Crested spillway
Length - 500 feet
Crest elevation - 308.0 feet
Gates - Gates control flow to hydropower facility

h. Regulating Outlets

Maximum discharge through powerhouse	6250 cfs

SECTION 2 - ENGINEERING DATA

2.1 DESIGN

The information available for evaluation of this dam has been included in this report. The information consisting of contract drawings is contained in Figures 2 through 10. No information on design of the dam was available.

2.2 CONSTRUCTION

Details regarding the construction of this facility are included in Figures 2 through 10 along with previous inspection reports on the dam by the New York State Department of Environmental Conservation and New York State Department of Transportation. Modifications and major maintenance activities by the Department of Transportation are also included through 1968. The last recorded New York State Department of Conservation inspection was dated 1915.

2.3 OPERATION

No operation manual is known to exist for this structure.

2.4 EVALUATION

The data available for review is adequate to complete this Phase 1 investigation. Therefore, no additional requirements for data is given by this time.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The Minetto Dam at Lock No. 5 was inspected on May 31, 1979 and again on June 13, 1979. The Dale Engineering Company inspection team was accompanied on both inspections by Richard Aldrich of the New York State Department of Transportation, Region 3, and on the second inspection by Robert McCarty of the New York State Department of Environmental Conservation Dam Safety Section, and by Robert Levett and John Brennan of Niagara Mohawk Power Corporation.

b. Dam

At the time of the first inspection, water was cresting the dam and obscured the spillway surface from view. A subsequent inspection was made with the upstream pool drawn down to expose the downstream face of the dam. The dam is heavily eroded over its entire face. The photographs show the extent of this erosion. The abutments of the dam are severely deteriorated at the waterline. At the time of the inspection, flashboards were in place on the dam to a height of 14 inches. Visual inspection of the dam indicates no evidence of movement of the structural elements of the dam. The depth of the water in the downstream pool obscured the toe of the dam from view so that no observation was made regarding the foundation conditions at the toe of the dam, nor was it possible to observe any indication of seepage through the dam foundation.

c. Appurtenant Structures

The wall of Lock No. 5 which separates the lock from the river channel shows advanced surface deterioration and some signs of seepage. The concrete in the lock structure can be described as being in generally poor condition. The upstream channel to the forebay of the power generating station is formed by a concrete retaining wall (also described herein as a land wall) that parallels a state highway through the Hamlet of Minetto. This wall is in a deteriorated condition near its southern end. Severe surface spalling and leakage is noted in the outside face of the wall. Leakage has promoted the growth of swamp grasses in the area adjacent to the wall (See Photograph No. 5.). The sluice gates controlling the flow into the forebay of the power generating station are in operating condition. All of the gates were in the full open position at the time of the inspections.

d. Control Outlet

Outlet from the impounded area is controlled by regulating the flow to the power generating station and by the placement of flashboards on the dam. Partial drawdown of the impoundment for the second inspection was accomplished by increasing the flow through the power generating station. The power generating station is presently in use by Niagara Mohawk Power Corporation.

e. Reservoir Area

The reservoir area extends approximately 6-1/2 miles upstream to another run of river dam which performs a function similar to this facility. There are no known areas of bank instability noted along this course.

f. Downstream Channel

The downstream channel is founded in bedrock. Tail water pool elevations precluded observation of the condition of the downstream channel.

3.2 EVALUATION

Visual inspection reveals erosion of the face of the curved dam and severe erosion of the concrete abutments of the structure. Both the lockwalls and the wall which forms the west bank of the forebay channel to the power generating station are severely spalled on the surface and show evidence of leakage in many areas. No major deformation of the alignment of the structure was noted in the visual inspection. The sluice gates controlling the flow into the forebay of the power generating station appear to be in operating condition.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The main operational procedure is to control water levels in the impoundment upstream from the dam for navigational purposes in the Oswego River. A secondary operational procedure is the utilization of excess water for power generating purposes. The total operational procedure is under the control of the New York State Department of Transportation. This operation is done in cooperation with Niagara Mohawk Power Corporation.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the New York State Department of Transportation. The flashboards are put in place by Niagara Mohawk Power Corporation. Once every two years a visual inspection is made of the structure by the New York State Department of Transportation inspectors and a report on the condition of the structure is filed in the Department of Transportation Central Office in Albany. Maintenance to the structure is scheduled in a priority basis partly as a result of the bi-annual inspections.

4.3 MAINTENANCE OF OPERATING FACILITIES

The gates controlling the entrance to the forebay of the power generating station are under the control of the New York State Department of Transportation. These gates are operated infrequently and are used only to accommodate Niagara Mohawk when dewatering of the forebay is required.

4.4 DESCRIPTION OF WARNING SYSTEMS

No warning system is in effect at present.

4.5 EVALUATION

The dam and appurtenant structures are inspected at regular intervals by the New York State Department of Transportation. Little maintenance has been done on the structural elements of this installation. The operating mechanisms of the navigation lock are in good condition. The deteriorated condition of concrete indicates that past maintenance has not been adequate.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Oswego River Basin is located in central New York State, with a drainage area of approximately 5,100 square miles. It flows northerly discharging into Lake Ontario in the City of Oswego. The complex river system includes the seven Finger Lakes; Oneida Lake, Onondaga Lake, the Barge Canal and outlets from the lakes to the canal. The basin's major rivers, the Seneca, Oswego and Oneida, are incorporated into the Barge Canal System as are Oneida, Cayuga and Seneca Lake. All of the lakes have regulated outlets except Onondaga.

5.2 ANALYSIS CRITERIA

The purpose of this investigation is to evaluate the dam and spillway with respect to their flood control potential and adequacy. Where the structure is integrated with hydropower and navigation lock facilities, interrelationships from a hydrologic standpoint have been considered. In general, in this screening analysis, control structures and gates used for the latter two purposes are not considered as flood control devices.

The flood control potential is assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the dam's spillway system.

The PMF event is that hypothetical flow induced by the most critical combination of precipitation, minimum infiltration loss and concentration run-off of a specific location that is considered reasonably possible for a particular drainage area. Since this dam is in the Intermediate Dam Category and is a High Hazard, the guidelines criteria (Ref. 1) require that the dam be capable of passing one-half the Probable Maximum Flood.

The hydrologic analysis was performed using the unit hydrograph method to develop the flood hydrograph. Due to the limited scope of this Phase I investigation, certain assumptions, based on experience were used in this analysis and in the determination of the dam's spillway capacity to pass the PMF.

An HEC-1 computer model for the basin was obtained from the New York State Department of Environmental Conservation. This model has been developed over the years through a number of study efforts by the Department with assistance from the U.S. Army Corps of Engineers, Buffalo District. The model was calibrated by D.E.C. to a peak flood event, Hurricane Agnes, June 20-26, 1972. The dam investigation team briefly reviewed these findings, it then obtained the flood records at USGS gage at Lock 7 near the dam sites. Within the constraints of this scope of work, verification of the existing model was obtained (See Figure C-8). The sub-basin designation, 6-hour unit hydrographs routing methods, and loss rates for the model (those used for Hurricane Agnes) were all adopted. This information was recorded into a new HEC-1DB PMF model. In reviewing the regulated outlet rating curves, it was determined the high discharges for this PMF analysis were not adequately described. Therefore, an accounting for these flows was performed by increasing the modified Puls Method rating curves for these outlets (See Appendix C). In one instance, a rating curve developed for one of these outlets and used by the inspection team on a previous inspection report was substituted into the model.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB was utilized to evaluate the PMF hydrology. The Probable Maximum Precipitation (PMP) was 21.5 inches, according to Hydrometeorological Report (HMR #51) for a 24-hour duration, 200 square mile basin. Loss rates used from the D.E.C. model were in the range of 1.0 inch initial abstraction and 0.1 inches/hour continuous loss rate. Actual values used were those calibrated during the storm of June 20-26, 1972. Only one analysis was performed on the PMP. It distributed the rainfall over the 5,100 square mile area. If further in depth investigations are undertaken, should attempt to center the storm for critical flows since the major sub-basins lend themselves to such an analysis and a potential for greater run-off. This work effort would be a refinement of the analysis provided herein.

This dam investigation at Lock 5 is one of six dam investigations on the Oswego River. The dams are located at Locks 1, 2, 3, 5, 6, and 7. The hydrologic analysis provides flood flows up to Lock 1 at Phoenix, New York (Lock 7 is near the mouth of the river at Oswego). It assumes the discharges from the 6-hour time increment PMF hydrographs will effectively be the same for all the dam sites since the upstream run-off area is over 5,000 square miles and the downstream run-off area is about 100 square miles. The results of the analysis have been compared to USGS gage discharge-frequency results at Lock 7 (See Figure 12).

5.3 SPILLWAY CAPACITY

The spillway is a crested spillway which reaches across the effective width of the river, a distance of 370.0 feet. Since the dam is a curved gravity dam, the effective crest length is 500 feet. The spillway crest shape design head was estimated from the geometry of the section at 8.00 feet. Subsequently, discharge coefficients were computed in the range of 3.30 to 4.23. At the top of dam elevation, the spillway capacity was computed at 37,500 cfs. Certain plans for the six dams, some of which were constructed under a single contract, call out the average design flood as 30,000 cfs. This dam's plans call out a design flood of 30,000 cfs, a value of 37,500 for top of dam capacity was computed from the geometry. The gage at Lock 7 has recorded at least 4 events greater in magnitude than the design flood. The PMF flood magnitude was computed at 81,900 cfs while the 1/2 PMF flood was computed at 46,800 cfs. It was assumed that the existing flashboards would fail at these high flood flow pressures and therefore, they were not considered in the analysis.

SPILLWAY CAPACITY

	Discharge	Capacity as % of PMF
PMF	81,900 cfs	46%
1/2 PMF	46,800 cfs	80%

5.4 RESERVOIR CAPACITY

The reservoir storage at top of dam is estimated at approximately 6400 acre feet in the river channel.

5.5 FLOOD OF RECORD

Floods have been measured at USGS gaging station 04249000 at Lock 7. The gage datum is 246.0 ft., the drainage area of the gage is 5121 sq. mi.; the period of record is from 1934 to present. The records through 1974 show that 4 events have had flood discharges in excess of the dam's design flood.

March 28, 1936	37,500 cfs
April 10, 1940	35,000 cfs
June 27, 1972	34,300 cfs
April 4, 1960	31,200 cfs

A Corps of Engineers' investigation entitled Post Hurricane Agnes June 20-26, 1972 indicates only $14,000 in damages occurred in the reach from Lock 1 through Lock 7 to Lake Ontario.

5.6 OVERTOPPING ANALYSIS

The HEC1-DB analysis indicates that the dam would be overtopped as follows:

	OVERTOPPING IN FEET
PMF	4.5
1/2 PMF	0.5

According to this analysis, the dam may not have been overtopped to date since the top of dam discharge capacity is 37,500 cfs as is the flood of record peak discharge.

A number of homes and small businesses along Route 48 adjacent to the dam on the west bank of the river would be flooded by overtopping of the dam. The overtopping would occur along a hydropower intake channel. At normal pool, this structure is already approximately 6-8 feet above the street elevation.

5.7 EVALUATION

The spillway is inadequate to pass the 1/2 Probable Maximum Flood (PMF) without overtopping the dam. However, based on the Corps of Engineers' Screening Criteria, it is not considered seriously inadequate since the stability analysis which was conducted (See Section 6) determined that the resultant of the loads falls within the middle third of the spillway base.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations And Data Review

The dam structure was observed when the upstream water level was being drawn down below the spillway crest flashboards. Limited quantities of upstream water were passing over the dam, but most of the downstream face of the spillway was visible. The upstream side of the dam was submerged. Under normal operation this main dam functions as an overflow spillway. The dam visually retains stability at this time with no indication of misalignment, displacement or other structural movement.

The downstream concrete face of the dam visually has experienced substantial surface deterioration and spalling. No signs of through-the-dam seepage were noted. The western half of the dam, approximately, is provided with a cap block whereas the cap section is missing, either removed, lost or never installed, for the easterly half. The exposed face of about half the dam shows a loss or removal of a relatively uniform, several inches thick concrete surface. One conjecture is that the condition represents an incomplete maintenance operation where the facing was prepared for a new surface but didn't receive it. Another is that the surface has uniformly eroded.

The surface of the concrete channel wall between the navigation lock/approach and river section immediately downstream of the dam is deteriorated and spalled, some severely, along much of its exposed area, including the foundation for the powerhouse - structure integrated into the channel wall. Some through-the-wall seepage was noted.

A land wall upstream of the dam on the west side of the river and adjacent to a Minetto Village street permits the dam's upstream water level to be maintained above the elevation of the street. The concrete in the land side of this wall has experienced significant deterioration and spalling, and through-the-wall leakage occurs. It also appears that seepage below ground level occurs. No indication of structural instability was noted. Sections of this wall may be supported on pile foundations.

b. Geology and Seismic Stability

Minetto Dam, in the Oswego River drainage basin, is located within the Ontario Lowland which is part of the Central Lowland Province. Bedrock in the vicinity of the dam is a reddish sandstone. It is either the Queenston Formation of Upper Ordovician age or the Grimsby Sandstone of the Lower Silurian age, the latter being more probable. These rock units have a similar appearance in this area. Bedding is essentially horizontal, less than 1° to the south.

According to the 1915 Dam Report, the dam is sited on solid rock. The details of east abutment, Dam 5, 1912 and of Dam 5, 1910, as shown in the 1978 inspection report, indicate that test holes were to be drilled not less than 10 feet into rock under all masonry to ascertain its soundness.

There are no known faults or shear zones in the vicinity of the dam according to the N.Y.S. Geologic Map (1970). The Preliminary Brittle Structures Map of the N.Y.S. Geologic Survey (1977) indicates a possible fault zone located about 2 miles NNE of the dam, based on drill hole data.

Although the area is located near the border of the Zone 2 - Zone 3 Designation on the Seismic Probability Map, it is most properly designated Zone 2. No earthquake activity has been recorded in the vicinity of the dam. The closest earthquake, intensity IV (modified Mercalli scale) occurred in 1954 about 27 miles southwest of the dam. Several other earthquakes of intensity III have occurred in the region, none more recent than that of 1954.

c. Data Review and Stability Evaluation

Design drawings available for review show plan layout and cross-sections for the various structural elements comprising the dam-lock facility, but do not include information on the properties of the dam and foundation materials, nor stability analysis. As part of the present study, stability evaluations have been performed for the dam/spillway sections. Actual properties of the dam's construction materials and foundations were not determined as part of this study; where information on properties were necessary for computations but lacking, assumptions believed to be practical were made. These stability computations assumed a dam cross-section based on dimensions indicated by the plans included in this report. The analysis also assumed the dam section to be a monolithic possessing necessary internal resistance to shearing and bending occurring as a result of loading. It should be considered that in areas where deterioration has occurred, the section dimensions would be less than indicated by the plans with some adverse effect on the structural strength expected.

The results of the stability computations are summarized in the table below. The stability analyses are included in Appendix D.

RESULTS OF STABILITY COMPUTATIONS

	Loading Condition	Factor of Safety* Overturning	Sliding**	Location of Resultant*** Passing through Base
(I)	Water elevations at normal operating levels, uplift plus 7.5 kip per lineal feet ice load acting.	1.36±	11±	0.48b
(II)	Water elevations at 1/2 PMF levels, uplift acting on base as computed for normal operating conditions.	1.57±	9.7±	0.46b
(III)	Water elevations at PMF levels, uplift acting on base as computed for normal operating conditions.	1.57±	8.1±	0.41b

*These factors of safety indicate the ratio of moments causing overturning to those moments resisting, and the ratio of forces causing sliding to those resisting.

**As determined applying the friction-shear method.

***Indicated in terms of the dam's base dimension, b, measured from the toe of the dam.

The analysis indicate the dam structure is stable under normal operating conditions, and the 1/2 PMF and PMF events.

Critical to the analysis and resulting indication of stability are the items of uplift water pressure acting on the base of the dam and the relative permeabilities of the site's foundation rock. For the "normal operating conditions" case, the analysis uplift force was based on full headwater hydrostatic pressure acting on the dam's upstream corner and a full tailwater hydrostatic pressure acting at the dam's downstream corner. Uplift pressures were assumed to vary linearly between the dam's upstream corners, and act upon 100 percent of the dam base. The resulting uplift force represents a condition that is significant in arriving at the indicated factor of safety against overturning.

Uplift as computed for the normal operating condition was also assigned for the flood conditions studied, it being assumed that uplift pressures would not increase significantly over a relatively short flood stage time period, because of expected low foundation rock permeability.

Although stability of the dam is implied from the computational analysis, repair is indicated for the cap and downstream surface. The dam design includes a significant width of structural spillway apron. For the dam monolith, the apron dimension has an important effect on the computed factors of safety against overturning. A stability computation,* assuming a fracture in the apron, so the "toe" is shifted upstream indicates the importance of structural integrity for the lower downstream section of the dam; this assumption results in an unsatisfactory factor of safety against overturning according to Corps of Engineers' evaluation criteria. Means to evaluate the condition of the dam's upstream face also should be undertaken to ascertain the possible need for corrective maintenance.

Concrete repairs should be accomplished for the deteriorated surfaces of the navigation channel walls and lock structure to prevent progressive deterioration and related adverse structural affects.

In addition to maintenance repairs to correct the surface deterioration which has occurred in the concrete land wall protecting Village property from the river upstream of the dam, the below ground seepage occurrence should be investigated to ascertain the cause and provide measures for correction of the condition.

*This computation is presented in Appendix D but the results are not included in the Results of Stability Computations tabulation.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

The Phase I inspection of Minetto Dam at Lock 5 on the Oswego River did not indicate conditions which constitute an immediate hazard to human life or property. The hydrologic investigation has determined that the dam would be overtopped at 46 percent of the PMF. Stability computations indicate that the dam is stable according to Corps of Engineers' Screening Criteria. However, the condition of concrete deterioration of the spillway surface and riverside lock walls appurtenant to the dam may lead to development of hazardous conditions. Further deterioration of the concrete spillway apron could lead to unsatisfactory stability under the 1/2 PMF. Additional stability analysis should be performed using information developed from borings and material testing of the spillway concrete at each monolith.

The following specific safety assessments are based on the Phase I visual examination, analysis of hydrology and hydraulics, and analysis of structural stability:

1. The exposed downstream surface of the spillway shows severe erosion of concrete material (it may have been removed for repairs which were not performed). Form bars were observed extending 4 inches from the concrete. The upstream face of the dam was not observed.

2. The concrete cap on the top of the spillway is missing on the eastern half of the spillway.

3. The wall of Lock No. 5 which separates the lock from the river channel shows advanced surface deterioration and some signs of seepage. The concrete in portions of the lock structure, as well as that of the attached powerhouse, is in generally poor condition.

4. The intake channel to the forebay, an above grade concrete land wall is deteriorated with severe surface spalling and leakage. A small marsh area has developed adjacent to the wall. Some seepage may be occurring beneath or through the wall. At normal pool, the water elevation is 6-8 feet above the highway which has commercial and residential structures adjacent to it. The wall would be overtopped by a 1/2 PMF event. The possibility exists that upstream flooding would occur during 1/2 PMF.

5. The mechanical equipment at the dam is in operating condition. The dam can be partially drawn down through the adjacent power-

house. A full draw down reportedly would damage the hydropower equipment.

6. The dam, observed from atop the lock, visually conforms to the details provided on the construction drawings. There are no visual signs of deformation or structural distress to the dam.

b. Adequacy of Information

The information available is adequate for purpose of this Phase I investigation. Design and construction information is limited to construction plans.

c. Urgency

The effects of the deteriorated concrete at the site on the structural integrity of the dam and appurtenant structures needs to be evaluated. Further investigation of these items should be undertaken immediately and completed within one year from notification. Upon completion of the investigation phase, construction should commence and the remedial work should be completed within two years of notification.

d. Need for Additional Investigation

To prevent the development of potentially hazardous conditions, the aforementioned more in depth stability analysis including borings should be performed to determine the existing structural condition of the dam. The effects of overtopping and assessment of dam failure at the abutment due to a 1/2 PMF should also be further evaluated. The forebay wall which leaks and has under wall seepage should be investigated to determine proper measures to repair the wall. The pool of the dam may be a source of upstream inundation due to the 1/2 PMF, and the impact of this upstream flood inundation should be investigated.

7.2 REMEDIAL MEASURES

a. Results of the aforementioned stability analysis and evaluation of failure potential at the abutments due to overtopping by a 1/2 PMF event will determine the remedial measures required.

The following improvement needs have been identified:

1. Repair the spillway system. The deteriorated concrete should be removed prior to resurfacing the spillway.

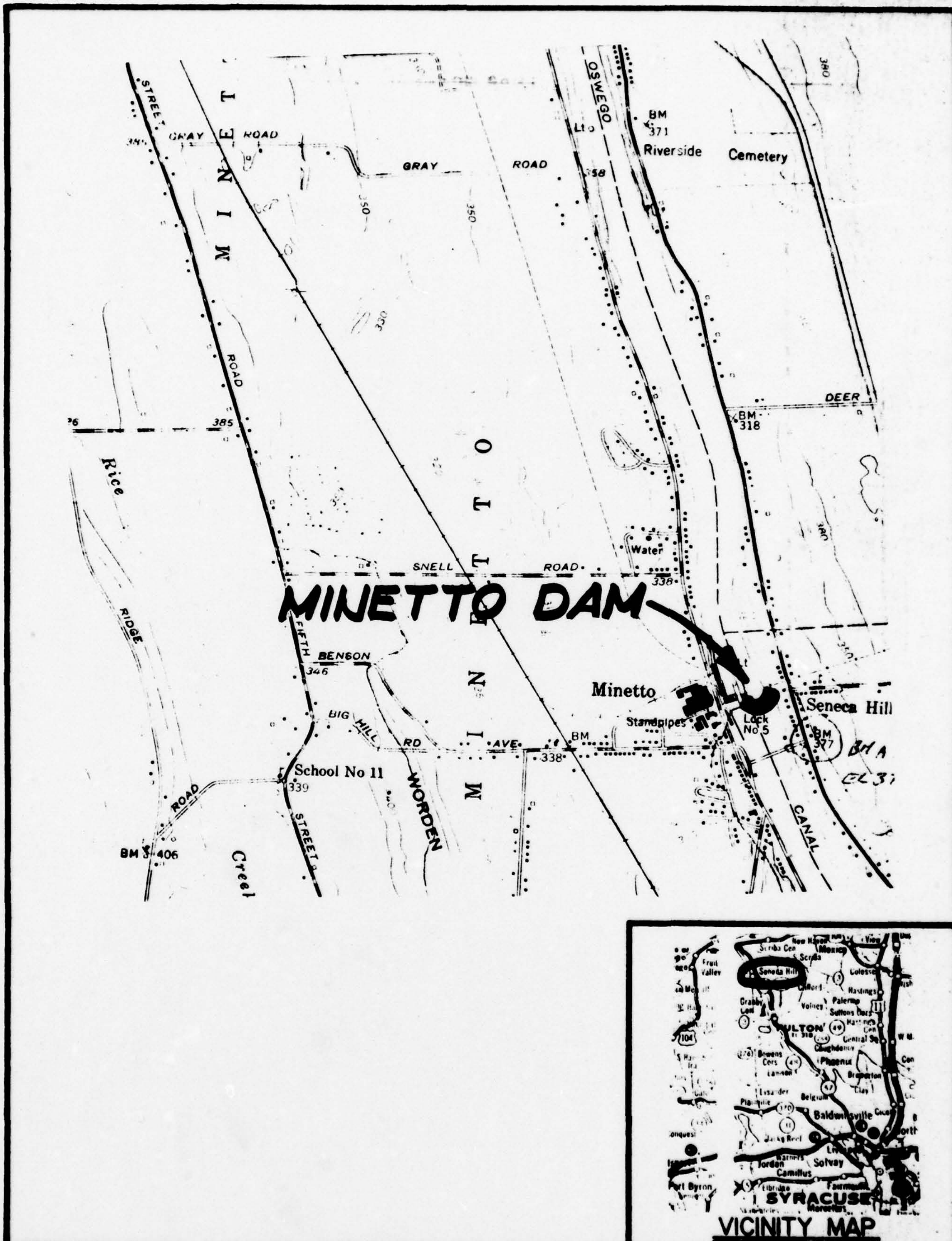
2. Concrete repairs should be performed for the deteriorated surfaces of the navigation channel walls and lock structure to pre-

vent progressive deterioration and related adverse structural effects to the dam and the west abutment.

3. Overtopping on the east abutment section of the dam may be a potential source of dam failure, and remedial measures may be required.

4. Repair is needed to correct the surface deterioration which has occurred in the concrete wall protecting Village property from the river upstream of the dam should be performed.

5. Inundation potential upstream of the dam caused by 1/2 PMF dam pool may require remedial measures. If damage potential exists, measures should be considered to restrict 1/2 PMF flows from leaving the river channel.



LOCATION PLAN

FIGURE 1

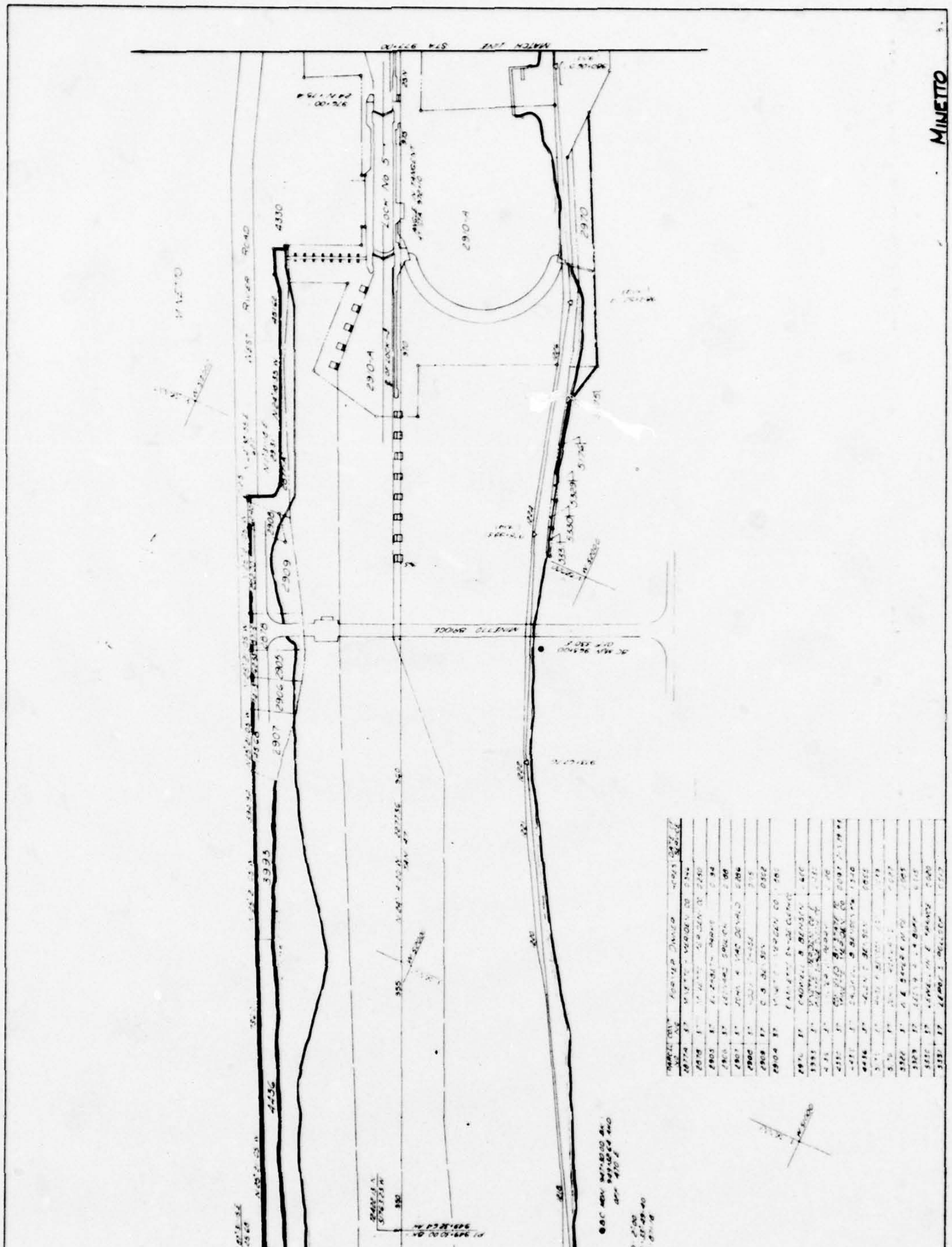


FIGURE 2

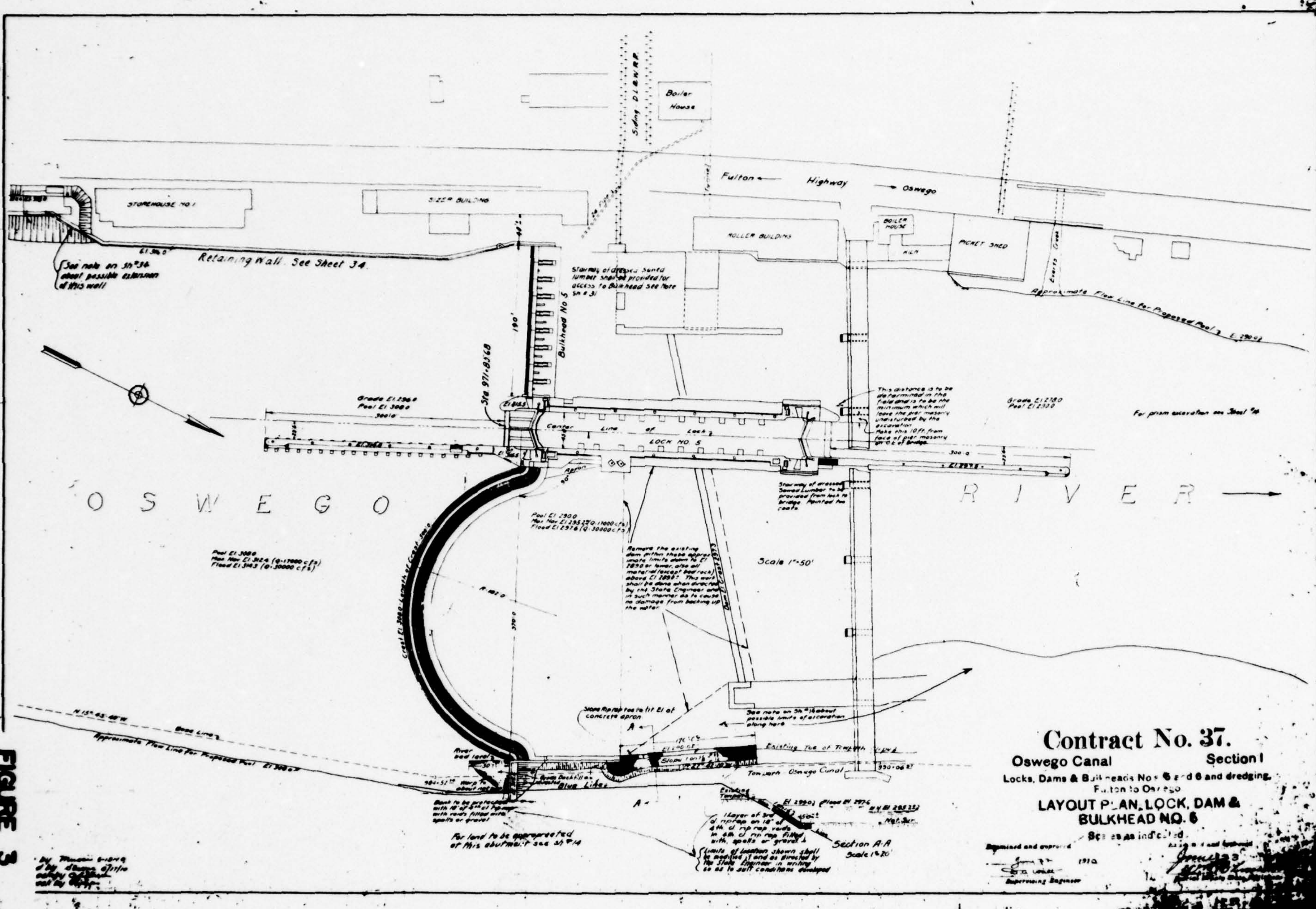
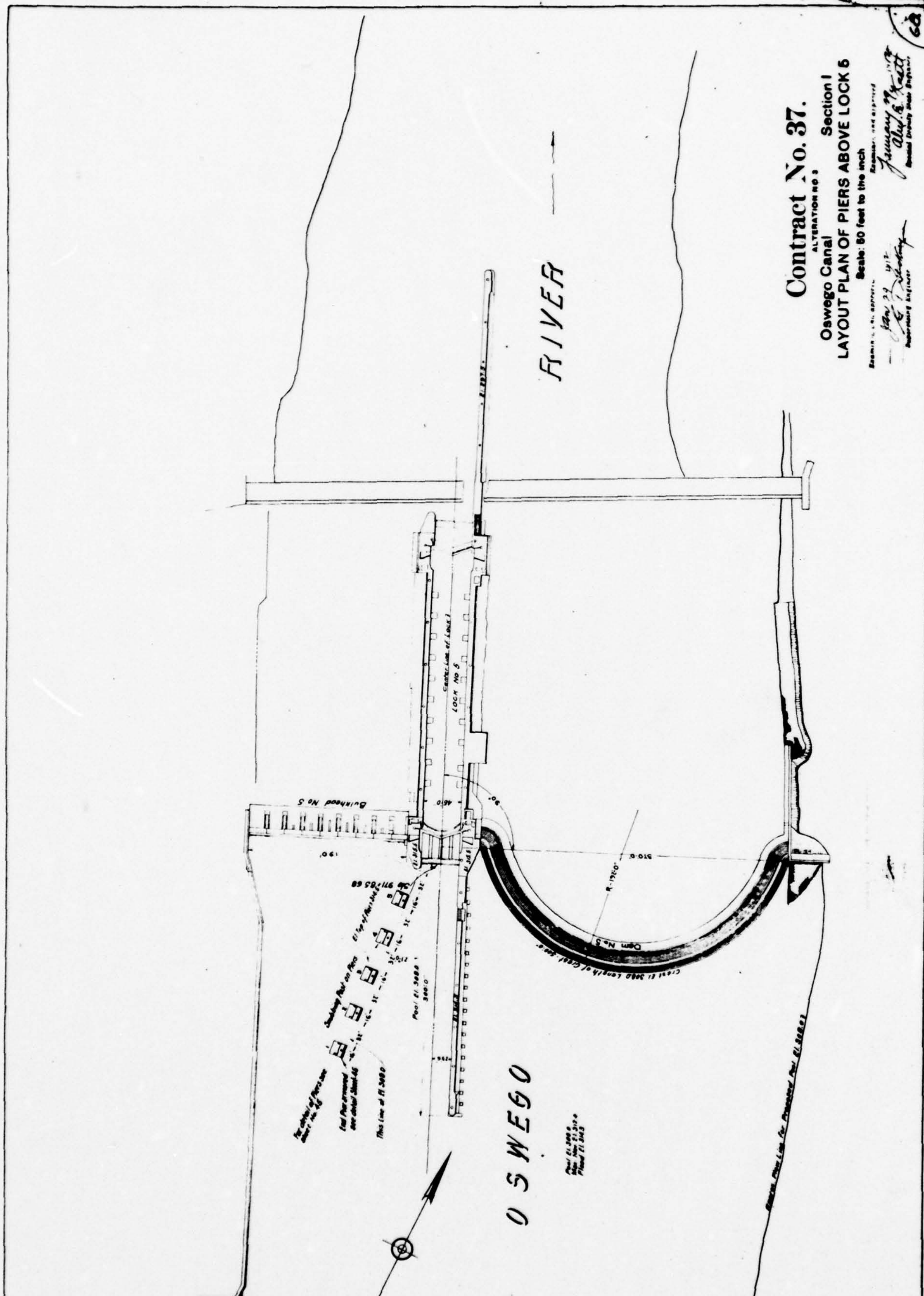

Contract No. 37.
Oswego Canal
Section I
Locks, Dams & Bulkheads Nos 5 and 6 and dredging,
Fulton to Oswego
LAYOUT PLAN, LOCK, DAM & BULKHEAD NO. 6
Scales as indicated.
Supervising Engineer
OSWEGO
RIVER
Fulton
Highway
Oswego
Boiler House
Storehouse No. 1
Roller Building
Picket Shed
Retaining Wall. See Sheet 34.
Bulkhead No 5
Lock No 5
Center Line of Lock
Scale 1"=50'
Section A-A
Towpath Oswego Canal
Existing Toe of Towpath Slope
Base Line
For prism excavation see Sheet 16
For land to be appropriated at this abutment see Sh 14

FIGURE 3



Contract No. 37.
ALTERATION NO 3
Oswego Canal
Section I
LAYOUT PLAN OF PIERS ABOVE LOCK 5
Scale: 50 feet to the inch
68
RIVER
OSWEGO
Bulkhead No 5
Lock No 5
Dam No 5

FIGURE 4

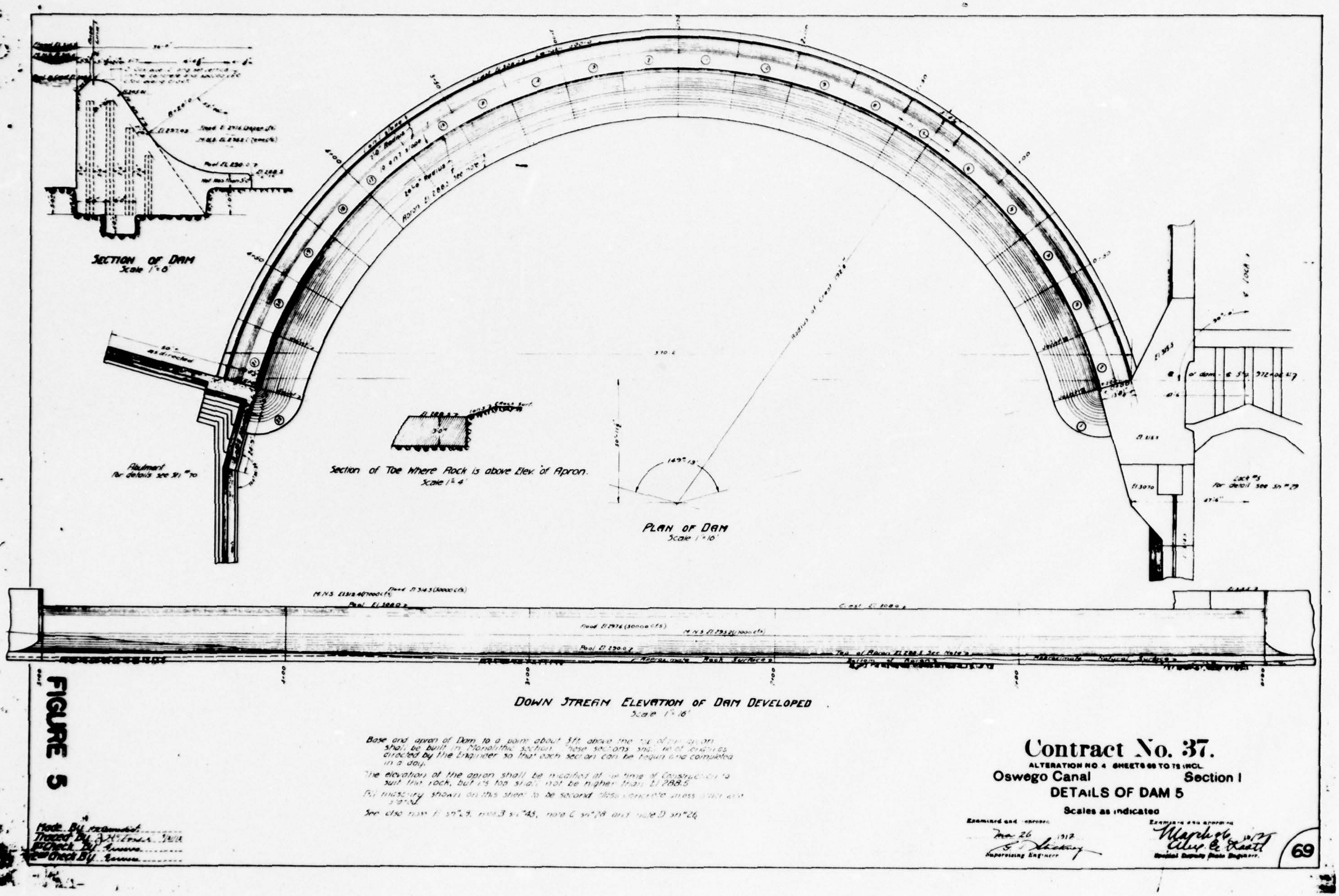

SECTION OF DAM
Scale 1"=8'
Abutment
For details see Sh. No. 70
Section of Toe Where Rock is above Elev. of Apron.
Scale 1"=4'
PLAN OF DAM
Scale 1"=16'
Radius of Crest 192.6'
149° 13'
Lock No. 5
For detail see Sh. No. 29
DOWN STREAM ELEVATION OF DAM DEVELOPED
Scale 1"=16'
Crest El. 308.0
Pool El. 290.0
Top of Apron El. 288.5 See Note
Approximate Rock Surface
Bottom of Apron
Approximate Natural Surface
Base and apron of Dam to a point about 3 ft. above the top of the apron shall be built in Monolithic sections. These sections shall be of lengths directed by the Engineer so that each section can be begun and completed in a day.
The elevation of the apron shall be modified at the time of Construction to suit the rock, but it's top shall not be higher than El. 288.5
All masonry shown on this sheet to be second class concrete unless otherwise stated.
See also note A Sh. No. 9, note B Sh. No. 45, note C Sh. No. 28 and note D Sh. No. 24
Contract No. 37.
ALTERATION NO. 4 SHEETS 68 TO 73 INCL.
Oswego Canal
Section I
DETAILS OF DAM 5
Scales as indicated
Examined and approved
Supervising Engineer
Special Deputy State Engineer
69
Made By
Traced By
Checked By

FIGURE 5

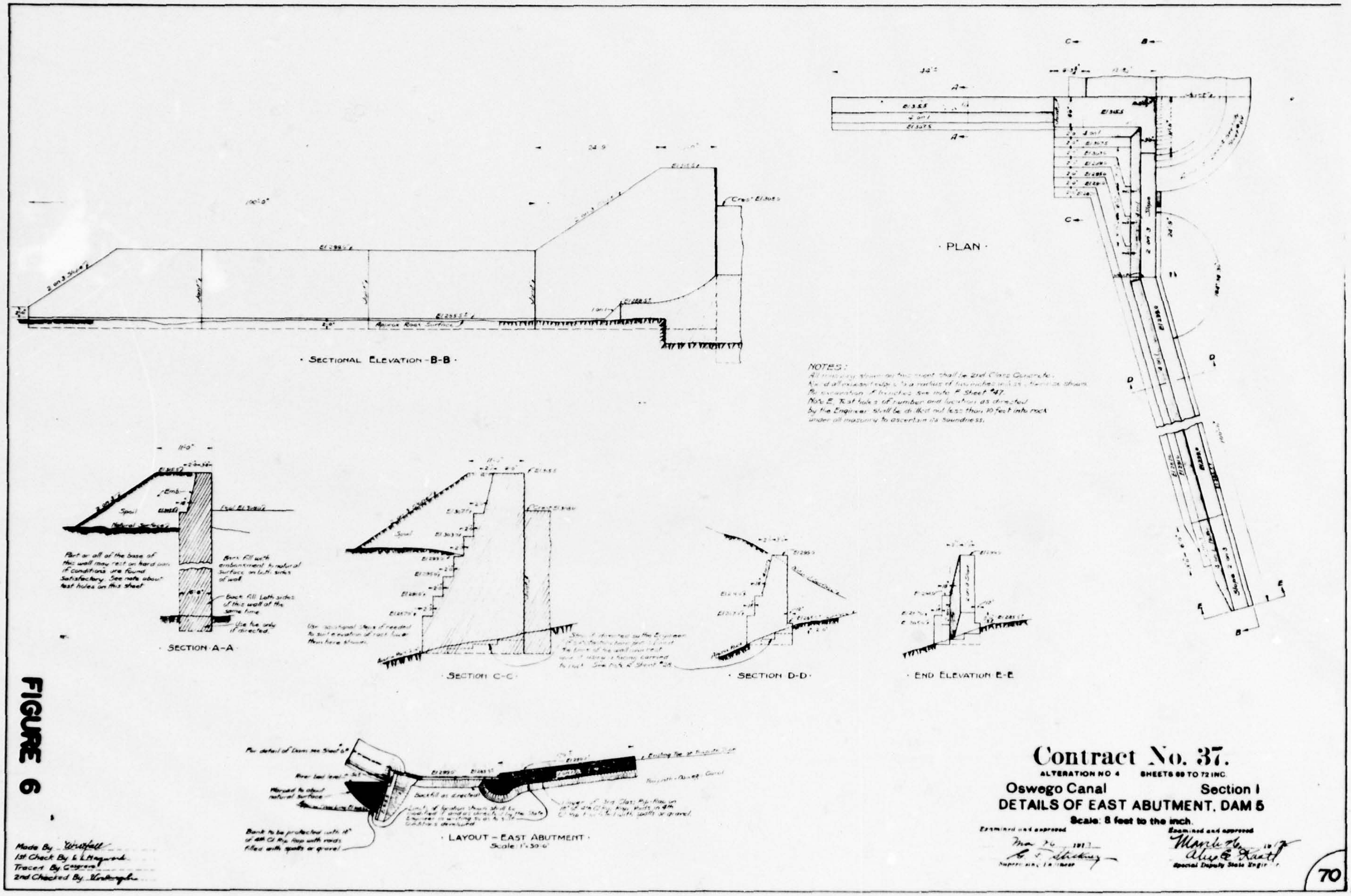
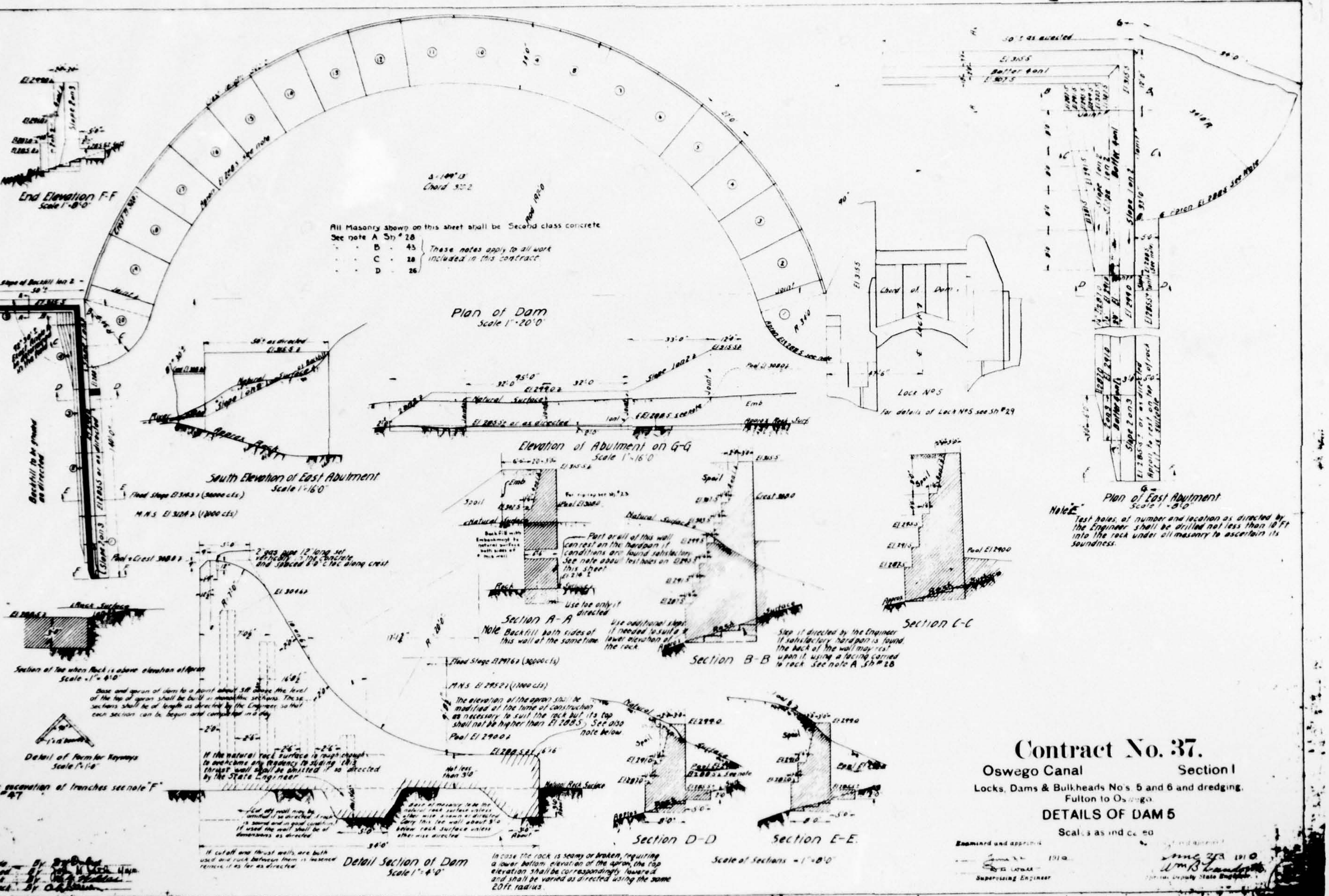

PLAN
SECTIONAL ELEVATION - B-B
SECTION A-A
SECTION C-C
SECTION D-D
END ELEVATION E-E
LAYOUT - EAST ABUTMENT
Scale 1" = 30'-0"
NOTES:
Contract No. 37.
ALTERATION NO 4 SHEETS 69 TO 72 INC.
Oswego Canal Section I
DETAILS OF EAST ABUTMENT, DAM 5
Scale: 8 feet to the inch.
Examined and approved
Special Deputy State Engineer
Made By
1st Check By
Traced By
2nd Checked By
70

FIGURE 6



Contract No. 37.
Oswego Canal
Section I
Locks, Dams & Bulkheads No's 5 and 6 and dredging.
Fulton to Oswego.
DETAILS OF DAM 5
Plan of Dam
Scale 1" = 20'0"
All Masonry shown on this sheet shall be Second class concrete
These notes apply to all work included in this contract.
End Elevation F-F
South Elevation of East Abutment
Elevation of Abutment on G-G
Plan of East Abutment
Lock No 5
For details of Lock No 5 see Sh No 29
Section A-A
Note Backfill both sides of this wall at the same time.
Section B-B
Section C-C
Section D-D
Section E-E
Detail Section of Dam
Detail of Form for Keyways
Section of Toe when Rock is above elevation of Apron
Test holes of number and location as directed by the Engineer shall be drilled not less than 10 Ft into the rock under all masonry to ascertain its soundness.
In case the rock is seamy or broken, requiring a lower bottom elevation of the apron, the top elevation shall be correspondingly lowered and shall be varied as directed using the same 20 ft. radius.
Supervising Engineer

FIGURE 7

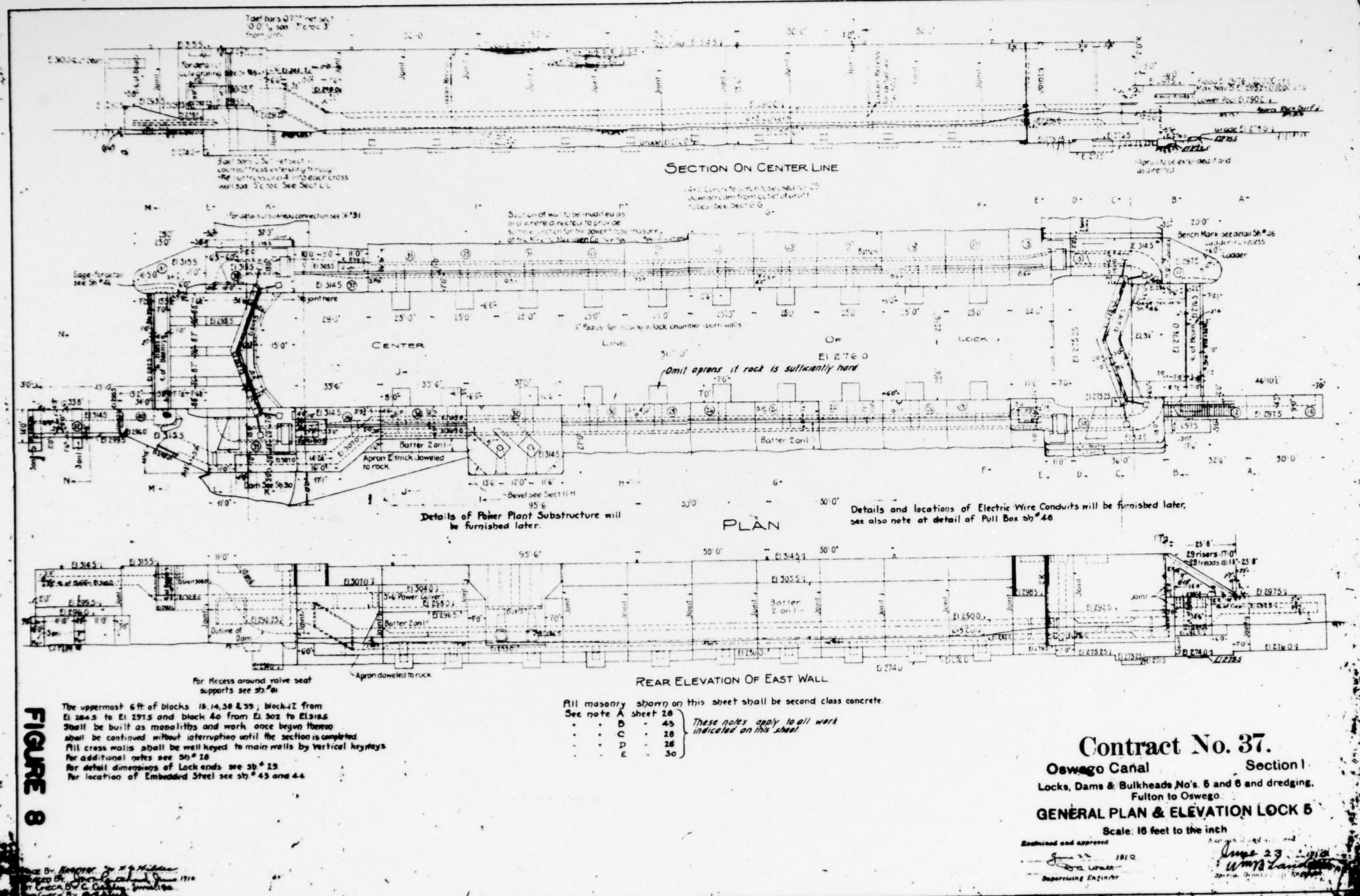

Section On Center Line
Plan
Center
Line
Of
Lock
El 276.0
Omit aprons if rock is sufficiently hard
Details of Power Plant Substructure will be furnished later.
Details and locations of Electric Wire Conduits will be furnished later, see also note at detail of Pull Box sh. 46
Rear Elevation Of East Wall
For Recess around valve seat supports see sh. 61
The uppermost 6 ft of blocks 13, 14, 38 & 39; block 12 from El 284.5 to El 297.5 and block 40 from El 302 to El 315.5 Shall be built as monoliths and work once begun thereon shall be continued without interruption until the section is completed.
All cross walls shall be well keyed to main walls by vertical keyways
For additional notes see sh. 28
For detail dimensions of Lock ends see sh. 23
For location of Embedded Steel see sh. 43 and 44
All masonry shown on this sheet shall be second class concrete.
See note A sheet 28
B 43
C 28
D 26
E 30
These notes apply to all work indicated on this sheet.
Contract No. 37.
Oswego Canal
Section I
Locks, Dams & Bulkheads No's. 5 and 6 and dredging.
Fulton to Oswego
GENERAL PLAN & ELEVATION LOCK 5
Scale: 16 feet to the inch
Examined and approved
Supervising Engineer

FIGURE 8

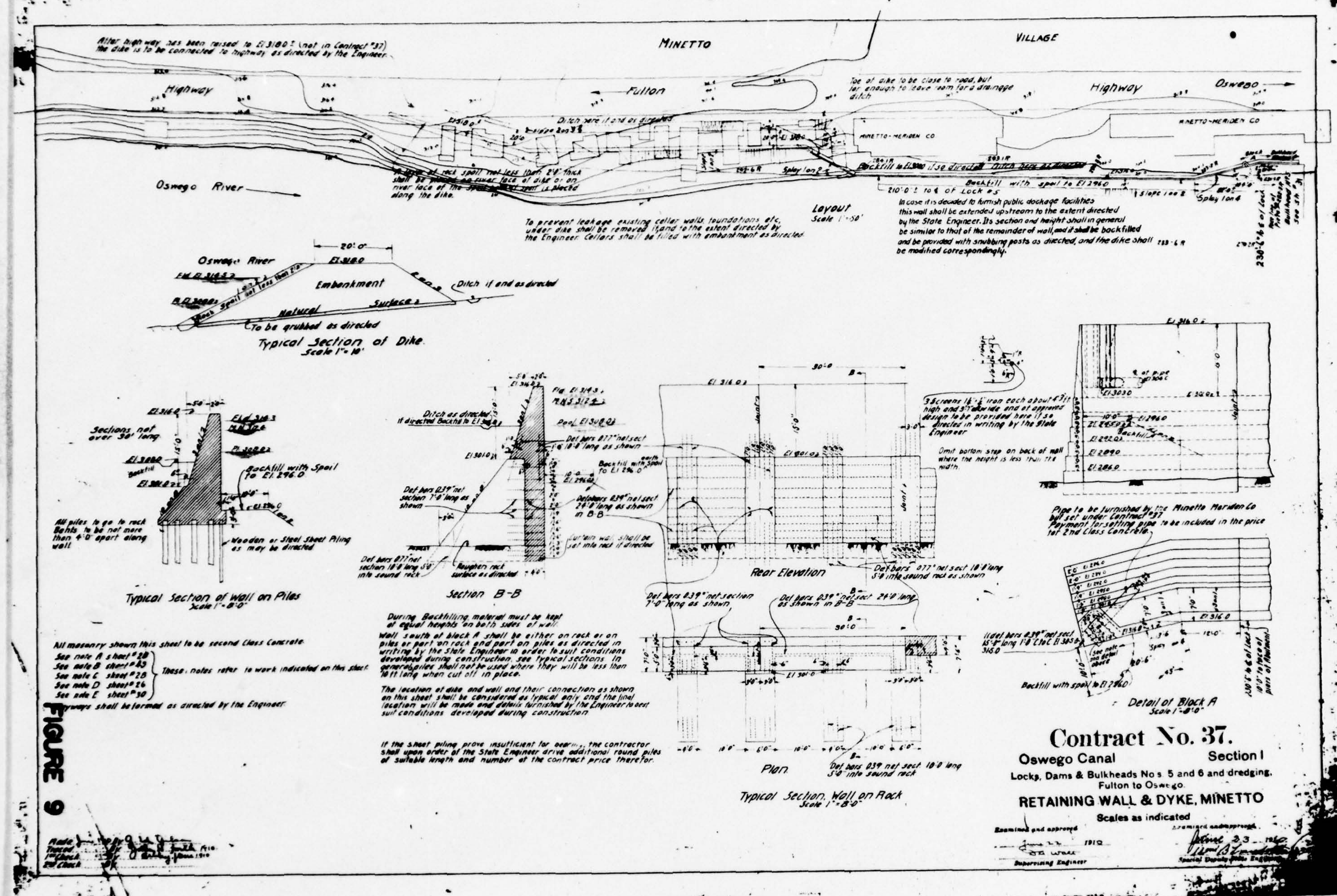

After highway has been raised to El. 318.0± (not in Contract #37) the dike is to be connected to highway as directed by the Engineer.
MINETTO
VILLAGE
Highway
Fulton
Oswego
Toe of dike to be close to road, but far enough to leave room for a drainage ditch
MINETTO-MERIDEN CO
Ditch here if and as directed
Oswego River
Layout
Scale 1"=50'
To prevent leakage existing cellar walls foundations etc. under dike shall be removed if and to the extent directed by the Engineer. Cellars shall be filled with embankment as directed.
In case it is decided to furnish public dockage facilities this wall shall be extended upstream to the extent directed by the State Engineer. Its section and height shall in general be similar to that of the remainder of wall, and it shall be backfilled and be provided with snubbing posts as directed, and the dike shall be modified correspondingly.
Oswego River
Embankment
Natural Surface
Ditch if and as directed
To be grubbed as directed
Typical Section of Dike
Scale 1"=10'
Sections not over 30' long
Backfill with Spoil to El. 296.0
All piles to go to rock. Bents to be not more than 4'0" apart along wall
Wooden or Steel Sheet Piling as may be directed
Typical Section of Wall on Piles
Scale 1"=8'0"
Section B-B
Rear Elevation
Plan
Typical Section, Wall on Rock
Scale 1"=8'0"
Omit bottom step on back of wall where the height is less than the width.
Pipe to be furnished by the Minetto Meriden Co but set under Contract #37. Payment for setting pipe to be included in the price for 2nd Class Concrete.
Detail of Block A
Scale 1"=8'0"
Backfill with spoil to El. 296.0
All masonry shown this sheet to be second Class Concrete.
See note A sheet #28
See note B sheet #43
See note C sheet #28
See note D sheet #26
See note E sheet #30
These notes refer to work indicated on this sheet.
Runways shall be formed as directed by the Engineer.
During Backfilling material must be kept at equal heights on both sides of wall.
Wall south of block A shall be either on rock or on piles or part on rock and part on piles as directed in writing by the State Engineer in order to suit conditions developed during construction, see typical sections. In general piles shall not be used where they will be less than 10 ft long when cut off in place.
The location of dike and wall and their connection as shown on this sheet shall be considered as typical only and the final location will be made and details furnished by the Engineer to best suit conditions developed during construction.
If the sheet piling prove insufficient for bearing, the contractor shall upon order of the State Engineer drive additional round piles of suitable length and number at the contract price therefor.
Contract No. 37.
Oswego Canal
Section I
Locks, Dams & Bulkheads No s. 5 and 6 and dredging.
Fulton to Oswego.
RETAINING WALL & DYKE, MINETTO
Scales as indicated
Examined and approved
Supervising Engineer
Special Deputy State Engineer

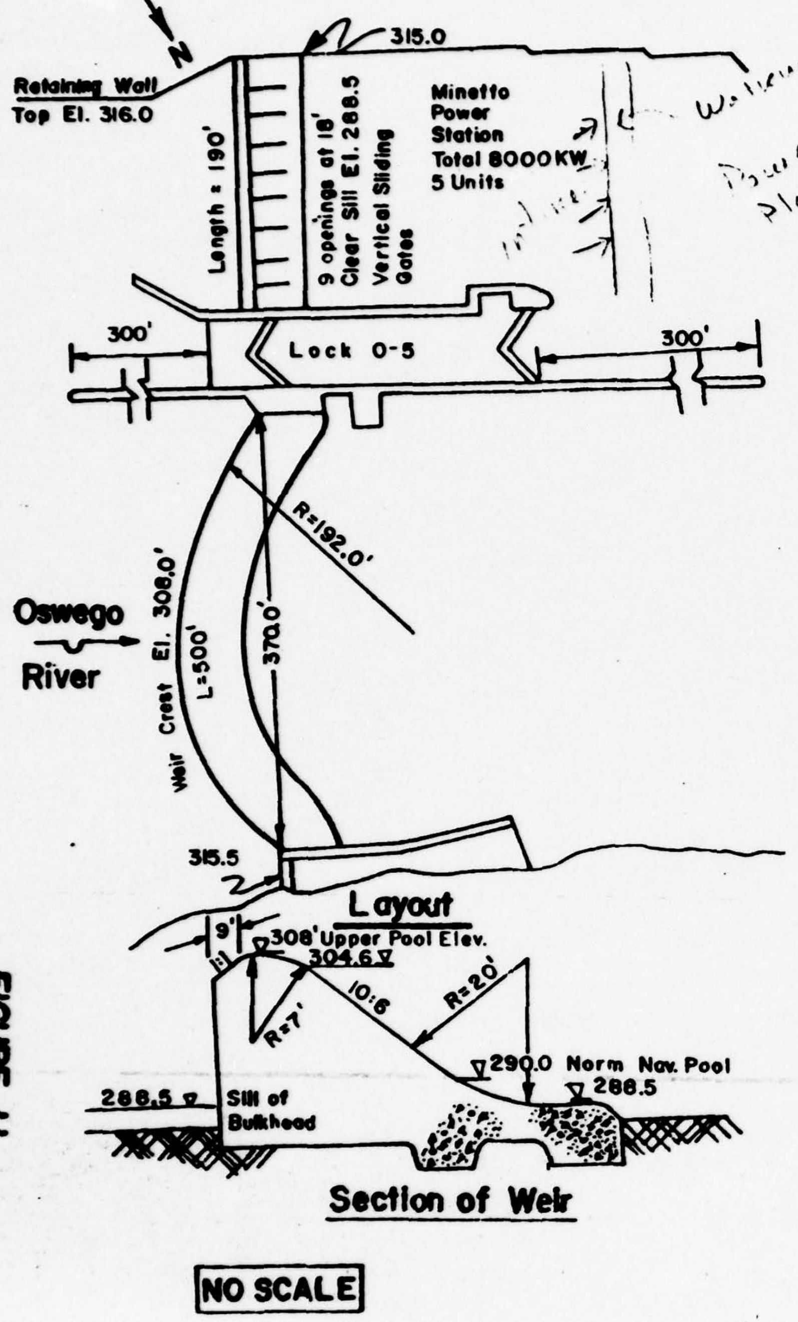
FIGURE 9

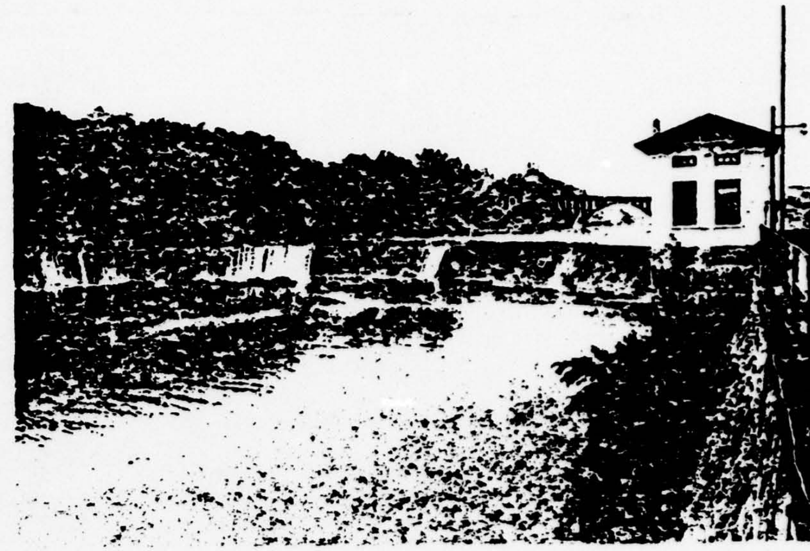

Contract No. 37.
Section
Oswego Canal
Locks, Dams & Bulkheads No's. 5 and 6 and dredging, Fulton to Oswego.
CONTOUR MAP OF SITE OF LOCK, DAM & BULKHEAD NO. 5
MINETTO
HIGHWAY
PLANT OF THE MINETTO-MERIDEN CO.
BRIDGE
OSWEGO RIVER
OSWEGO CANAL

FIGURE 10

CONTROL STRUCTURE FOR LOCK O-5, MINETTO

(From N.Y.S. D.E.C.)





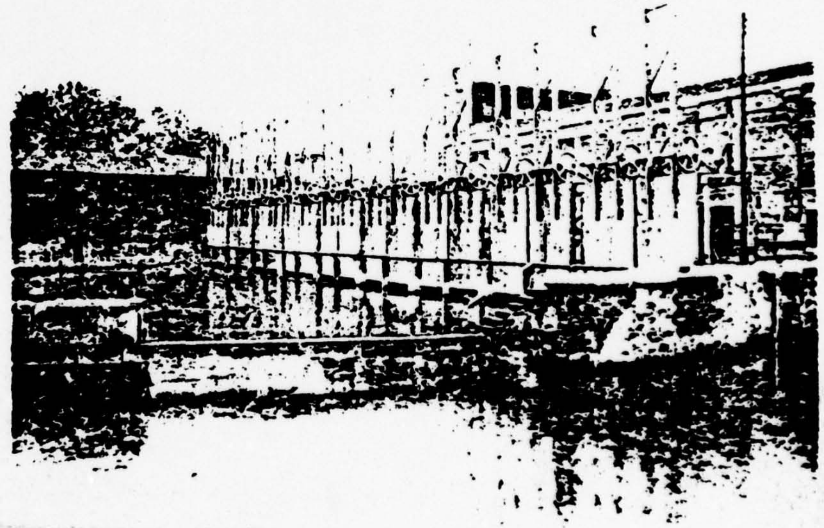
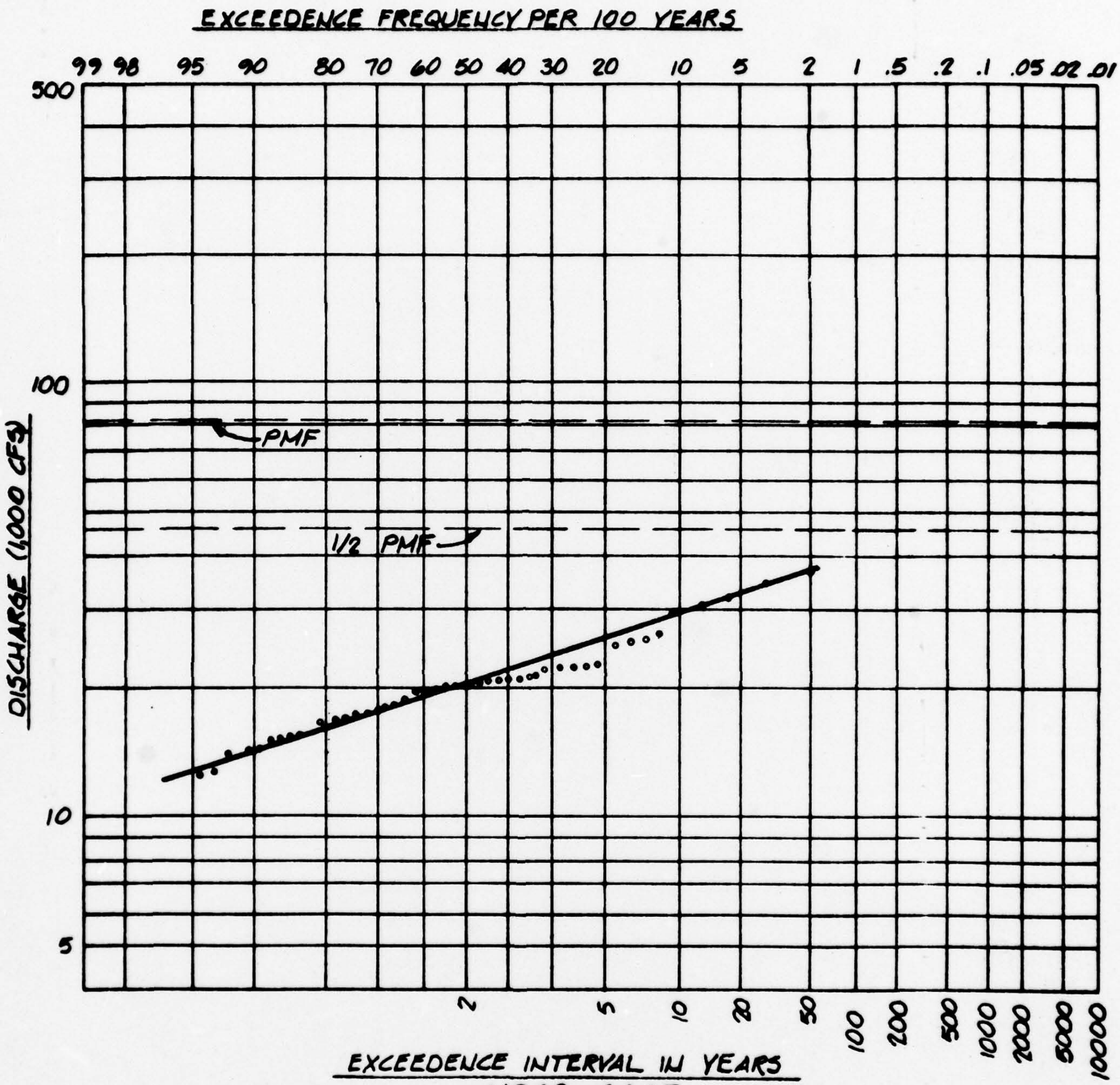


FIGURE 11



USGS GAGE
STATION 04249000
TOTAL DRAINAGE AREA = 5121 SQ MI
GAGE DATUM = 246.0 FT
PERIOD OF RECORD = 1934 - 1974

DISCHARGE - FREQUENCY CURVE

STETSON • DALE	DATE 6·28·79	DRAWN JPG	OSWEGO RIVER LOCK #7
	JOB 2305	FIGURE 12	

APPENDIX A

FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam Minetto at Lock 5 **County** Oswego **State** New York **ID #** 402

Type of Dam Concrete Gravity Crested Spillway **Hazard Category** High

Date(s) Inspection (1) May 31, 1979 (2) June 13,1979 **Weather** Sunny **Temperature** 70's

Pool Elevation at Time of Inspection (1) 311.5 (2) 308.8 M.S.L.* **Tailwater at Time of Inspection** (1) 290.0+ feet (2) 290.0+ feet

Use of Dam: Hydro Power, Navigation Lift: Locks 5 to 3 (one lift) 18.0 feet

This inspection does not pertain to an independent evaluation of the condition of the lock and hydropower facility.

Inspection Personnel:

(1),(2) F.W. Byszewski - Stetson-Dale	(1),(2) Richard Aldrich	N.Y.S.D.O.T., Region 3 Office
(1),(2) N.F. Dunlevy - Stetson-Dale	(2) Robert McCarty	N.Y.S.D.E.C., Dam Safety Section
(1),(2) D.F. McCarthy - Stetson-Dale	(2) Robert Levett	Niagara Mohawk Power Corporation
(1),(2) H. Muskatt - Stetson-Dale	(2) John Brennan	Niagara Mohawk Power Corporation
(2) B. Colwell - Stetson-Dale		

N. F. Dunlevy **Recorder**

* Barge Canal Datum (USGS +0.99 feet)

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	Hydropower intake channel wall on west bank has seepage through wall. Concrete is severely deteriorated. Significant flooding of property would occur from breach of wall.	Wall should be repaired.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Some erosion at juncture of spillway and walls. Typically surface erosion has taken place on a substantial portion of exposed concrete walls.	Concrete surfaces should be repaired. If eroded concrete surfaces are not repaired, the condition could lead to a partial failure of the concrete spillway system.
DRAINS	None.	
WATER PASSAGES	None.	
FOUNDATION	Not Visible	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	The concrete spillway surface is eroded completely and uniformly away. Some erosion is occuring along horizontal construction joints. The concrete capping not continuous across top of dam. Spillway face could have been removed for refacing work which was not done.	Concrete capping should be repaired. The spillway surface should be repaired before deterioration leads to potential partial spillway system failure.
STRUCTURAL CRACKING	No large cracks observed on spillway, however, due to tailwater conditions, close observations could not be made.	Close examination should be performed as part of future evaluations.
VERTICAL & HORIZONTAL ALIGNMENT	Alignment of spillway system appears in good form.	None
MONOLITH JOINTS	Not observable.	
CONSTRUCTION JOINTS	Some erosion appearances in center portion of spillway.	Closer examination should be pertinent as part of future evaluations.
STAFF GAGE OF RECORDER	At lock system. Is in working condition.	None

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	N/A	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	N/A	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	N/A	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	N/A	
RIPRAP FAILURES	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	N/A	
ANY NOTICEABLE SEEPAGE	N/A	
STAFF GAGE AND RECORDER	N/A	
DRAINS	N/A	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR CRESTED	See comments, Sheet 3, under Surface Cracks.	
APPROACH CHANNEL	Upstream face of dam and complete section of river.	None
DISCHARGE CHANNEL	Downstream face of dam and complete section of river.	None
BRIDGE AND PIERS	None	

GATED SPILLWAY

Gates regulate flow to hydro power facility, since navigation has first rights to water during low flow.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Above gates not inspected independently.	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A	
BRIDGE AND PIERS	N/A	
GATES AND OPERATION EQUIPMENT	N/A	

OUTLET WORKS

Only outlets are through powerhouse and lock. Neither of these can completely draw down reservoir, however, capacity exists to draw down below crest.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	None	
INTAKE STRUCTURE	None	
OUTLET STRUCTURE	None	
OUTLET CHANNEL	None	
EMERGENCY GATE	None	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Channel clear, unobstructed	None
SLOPES	No slope conditions.	None
APPROXIMATE NO. OF HOMES AND POPULATION	Approximately 5 miles of river to Lock 6. Substantial property (residential mostly) above river with docks, recreational boating, fishing, etc.	Since dam is located across a navigable waterway heavily used for recreation, a high hazard rating is appropriate.
	Loss of life potential could be more than 4 people either from a flood flow or normal operating situation with a dam break. A substantially high loss of life potential not	
	forseeable. Economic hazard is rated at significant $100,000 - $1,000,000.	

INSTRUMENTATION

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

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Upstream river channel has no slopes of concern.	None
SEDIMENTATION	None observed	None

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

NAME OF DAM Minetto (Lock 5)

ID # 402

ITEM	REMARKS
AS-BUILT DRAWINGS	See this report
REGIONAL VICINITY MAP	See this report
CONSTRUCTION HISTORY	No data
TYPICAL SECTIONS OF DAM	See this report
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See this report
RAINFALL/RESERVOIR RECORDS	No data

ITEM	REMARKS
DESIGN REPORTS	No data
GEOLOGY REPORTS	No data
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	No data
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	No data
POST-CONSTRUCTION SURVEYS OF DAM	No data
BORROW SOURCES	N/A

ITEM	REMARKS
MONITORING SYSTEMS	Information available at Lock on its operation and at hydro-power station on its operation.
MODIFICATIONS	None
HIGH POOL RECORDS	No data
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	No data. Limited to information on previous inspection reports, See this report.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	No data
MAINTENANCE OPERATION: RECORDS	Same comment as above for monitoring system.

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	See this report
OPERATING EQUIPMENT PLANS & DETAILS	See this report. More information available for New York State Department of Transportation. See card file of maintenance and improvements.

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

Elevations: Barge Canal Datum

DRAINAGE AREA CHARACTERISTICS: 5100 + square miles

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 308

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): ----

ELEVATION MAXIMUM DESIGN POOL: ----

ELEVATION TOP DAM: 315.5 B.C. Datum

CREST: Barge Canal Datum (USGS + 0.99 ft.)

a. Elevation 308
b. Type Circular Crested Spillway
c. Width See report for sketch
d. Length 500 feet
e. Location Spillover Entire width of dam
f. Number and Type of Gates None

OUTLET WORKS:

a. Type 6200 cfs maximum through powerhouse
b. Location West side river
c. Entrance Inverts ----
d. Exit Inverts ----
e. Emergency Draindown Facilities limited use through powerhouse. Reservoir cannot be drawn down. Cannot draw through locks without incurring damage to gates.

HYDROMETEOROLOGICAL GATES:

a. Type ----
b. Location ----
c. Records ----

MAXIMUM NON-DAMAGING DISCHARGE: Flood Flow 60,00 cfs (estimated)
(Significant) Normal Operation 0 cfs

APPENDIX B

PREVIOUS INSPECTION REPORTS/RELEVANT CORRESPONDENCE

MAINTENANCE / REPAIRS RECORD " M 64-2

Lower Pool 290.00 Upper Mitre Sill 293.5
Upper Pool 308.00 Lower Mitre Sill 276.5
6 x 8 valves

1930 - Foot bridge along powerhouse replanked "A" frames gate anchors installed.
1931 - 12 x 12 fender timbers placed on the S.E. approach wall. Construction of piers in river so. of Lock started. Lock signal light system installed. Placed checker plates over gate anchor rods or No. end.
1932 - Replaced top slab upper Lt. cor. and extended anchor rods. Replaced timbers on W. side piers and So. app. wall. Placed pipe railing on W. side wall at mill race. Placed hand rail along powerhouse.
1935 - Completely rewired.
1936 - Pumped & overhauled.
1939 - Foot bridge along side of powerhouse rebuilt with steel grating.
1941 - Pumped - replaced all timbers, pivots & saucers. Overhauled gate & valve machinery. Repaired leak from power tunnel.
1944 - Overhead buffer beams & towers erected. Capstans raised to wall level.
1946-7 - Valves replaced, No. #1 generator repaired, new shafts & bearings.
1948 - New bevel gears of one governor drive.
1949 - Miter sill repaired - nav. lights on Minetto Br. were connected to lock power circuit.

1950 - Pumped, valves overhauled, new right sill installed on lower end, patched several places of bad conc. in tunnel. Sandblasted & painted gates. Replaced rub sticks on lower gates.
1953 - Painted inside powerhouse - completed cleaning of gate & valve panels. New walk over upper gates. Replaced walk over cable bridge. Replaced rub sticks. Dismantled generator.
1954 - Painted outside powerhouse. Set dam up end. Replaced Up gate sills with angle iron & 8" oak seal on gates. New steel & wooden guides between piers & upper approach. Rub sticks on W. wall & replaced on gates. Replaced mitre post up. gate.
1955 - Repaired flume to waterwheel. Repaired stoplogs & wheel pits. A.C. power installed. Oil heat plant installed in shop & powerhouse. Replaced 500' of timbers on approach wall. Built new stairs. Built new heat room. Remodeled interior of Lockhouse. Repaired piers & placed new conc. Up. W. app. wall. Rub timbers on up. app. wall replaced. New stairs at lower end. Set new steel & repaired conc. piers on E. approach. New Aux. generator installed. New oil tanks. New stop logs.
1956 - New roof for powerhouse & lockhouse. Replaced conc. around upper Rt. & Lower Lt. valves. Painted powerhouse & shop inst. 150' oak timbers on E. app. wall. 4 motors overhauled.
1957 - Oil furnaces inst. in lockhouse & powerhouse. Rub sticks replaced. New walk for cable bridge. Motors overhauled.
1959 - Up. gates, lock valves and pits repaired. Waterwheels overhauled. Elect. service relocated. New workbench.
1961 - Pumped, valve repair, steel sill angle, new pivots, sockets, timbers, gates patched, conc. repaired. New lower sill-steel. New septic tank. Portable trash gate installed. W. walk resurfaced.

MINETTO (CONTD.)

1962 - Waterwheels overhauled and repaired; rewired limit switches, anchor & motor arm pits repaired. Lock limit signs installed. Painted interior power house.
1964 - Contract M64-2 - Lock rehabilitated.
1966 - Conc. repairs to up. app. wall.
1967 - Rebushed anchor arms. Repaired conc. & installed new rubsticks on Up. Rt. appr.

LOCK 0-5

1968 - Maint. forces refacing those portions of lock not included in rehabilitation contract.

Form IW51. 11-6-14-1000 (16-1036)

(NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.)

STATE OF NEW YORK

CONSERVATION COMMISSION

ALBANY

DAM REPORT

50 Os'go

5/24/ 1915 (Date)

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the Minetto Dam.

This dam is situated upon the Oswego River (Give name of stream)

in the Town of Oswego, Oswego County,

~~about~~ in (State distance) ~~from~~ the Village ~~or City~~ of Minetto

The distance down (Up or down) stream from the dam, to the Minetto Bridge, (Give name of nearest important stream or of a bridge)

is about 500 ft. (State distance)

The dam is now owned by State of New York (Give name and address in full)

and was built in or about the year 1914, and was extensively repaired or reconstructed during the year —

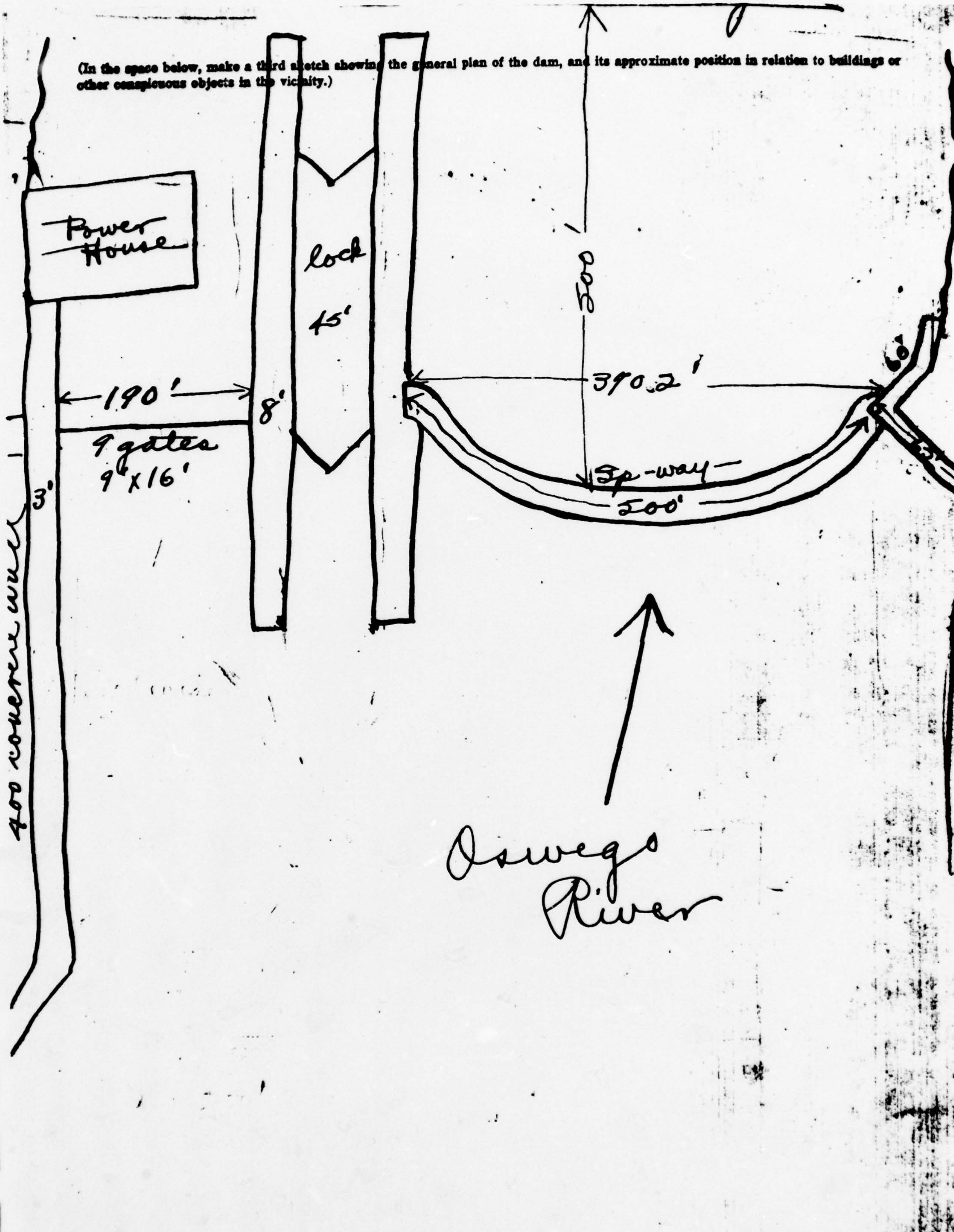
As it now stands, the spillway portion of this dam is built of concrete (State whether of masonry, concrete or timber)

and the other portions are built of concrete (State whether of masonry, concrete, earth or timber with or without rock fill)

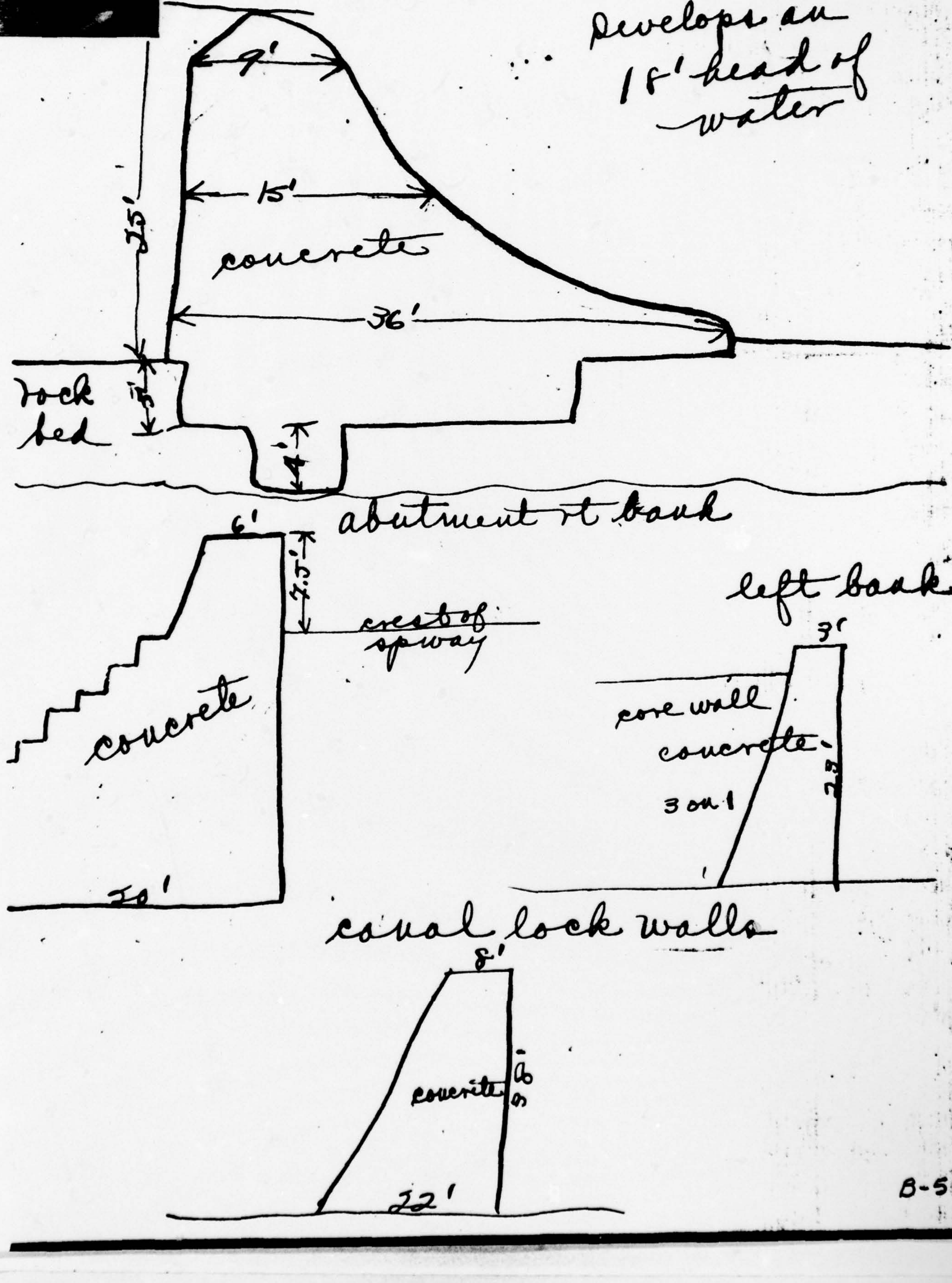
As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is solid rock and under the remaining portions such foundation bed is solid rock.

B-3

(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)



elow, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this
ond sketch showing the same information for a cross section through the other portion of the dam. **Show particularly**
ght of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)



The total length of this dam is 685 feet. The spillway or waste-weir portion, is about (~~500 on curve~~) 370 feet long, and the crest of the spillway is about 7 feet below the top of the dam.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: none except head gates through flumes & canal lock

At the time of this inspection the water level above the dam was 1 ft. 6 in. ~~below~~ above the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

This dam is in excellent condition —

Reported by C.W.H. Douglass
(Signature)

115 Standart St.,
(Address—Street and number, P. O. Box or R. F. D. route)

Syracuse, N.Y.
(Name of place)

(1)

STRUCTURE INVENTORY - GENERAL LISTING

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATON
W5 FOF1 701 2A	F						BRIDGE ACROSS LIMESTONE FEEDER
W5 FOR5 701 2A	F						FARM BRIDGE OVER LIMESTONE CREEK
W5 0002 701 2B	O	116+50				103	LOCK ST BR PHOENIX
W5 0003 701 2B	C	122+65				85	BRIDGE ST BR PHOENIX
W5 0004 701 2B	O	126+30	352.8			167	CULVERT ST BR PHOENIX
W5 0007 701 2B	O	613+65				117	SWING BR AT LOCK 02
W5 0001 701 2C	E						BRIDGE OVER OLD CAUGHDENOY LOCK
W5 FOB1 701 2C	F						ANDREWS ROAD BRIDGE
W5 FOB2 701 2C	F						FARM BR. S. OF ANDREWS RD., BUTTERNUT FEEDER
W5 FOD1 701 2C	F						TWIN PIPE CULV S.LAKE RD - DERUYTER
W5 FOD2 701 2C	F						BOX CULV. E. LAKE ROAD DERUYTER
W5 FOD3 701 2C	F						FARM BRIDGE , DERUYTER INLET
W5 FOD4 701 2C	F						FARM BRIDGE , DERUYTER INLET
W5 FOD5 701 2C	F						BRIDGE OVER DERUYTER OVERFLOW
W5 0024 701 3A	E	3932+00	374.0	13.2		45	BALDWINSVILLE DAM
W5 FOB1 701 3A	F			5.0			BUTTERNUT CREEK DIVERSION DAM
W5 FOD1 701 3A	F		1288.0	70.0			DERUYTER DAM
W5 FOD2 701 3A	F						DERUYTER INLET DIVERSION DAM
W5 FOF1 701 3A	F		430.0	6.5			LIMESTONE CREEK DIVERSION DAM
W5 FOJ1 701 3A	F		645.5				JAMESVILLE DAM
W5 0001 701 3A	O	117+00	363.0	11.0	6	80	PHOENIX DAM *Total Dams*
W5 0002 701 3A	O	608+60				10	UPPER DAM FULTON *"*
W5 0003 701 3A	O	641+00	335.0	17.0		10	LOWER DAM - FULTON *Key*
W5 0005 701 3A	O	971+00	308.0	19.5		37	DAM 5 AT MINETTO
W5 0006 701 3A	O	1146+25	290.0	33.0		37	DAM 6 -HIGH DAM AT LOCK 06 - OSWEGO

31 5 (1a)

FINAL DATA 1977 STRUCTURE ID NO			FOUND + STRUCT			SPILLWAYS					D/S-CONC					DAMS EARTH			WTR CNTRL DEVICES						GATE HOUSE					GEN RECOMMEND	
SECTION NO	SITE NO	TYPE																													
5	0024	3A	X	X	5	5	X	7	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	Joints (~~Joinst~~) need grouting
5	FOB1	3A	N	X	0	7	X	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	Washout under W. Wingwall resulting in collapse
#33 5	FOD1	3A	N	N	N	N	N	N	N	N	N	N	N	N	N	7	7	7	N	N	N	N	N	N	7	7	N	7	5	7	Underdrains plugged - need repair or replacement
#34 5	FOD2	3A	N	3	7	7	7	7	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	apron planks miss, leaks thru stone in crest
5	FOF1	3A	N	3	4	7	X	7	X	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	East W. wall settling
	--		X	N	N	7	X	3	O	N	7	5	1	O	N	N	N	N	N	N	N	N	N	N	5	7	X	N	7	1	bulge in downstream face, increased leak, west side, pt. jts., remove br-
#1 5	G001	3A	X	X	5	7	X	7	X	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
#14 5	G002	3A	X	7	7	5	X	3	X	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	
#18 5	G003	3A	X	N	3	3	X	3	3	N	3	X	3	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	
#24 5	G005	3A	X	X	3	3	X	3	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	
#26 5	G006	3A	X	X	3	3	X	3	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	
#28 5	G007	3A	X	7	7	7	X	7	5	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
5	X001	3A	3	N	3	1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	
5	Y001	3A	X	5	5	3	3	3	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	

(3)

[redacted]

STRUCTURE ID NO SEC/HIST TYPE	CANAL	STATION - APPROX STRUCTURE CENTER	POOL ELEV (LOW/ONLY)	LIFT/ HIGHT	TUNNEL SZ/ NO GATES	ORIG CONTRACT	HISTORICAL NAME AND LOCATON
WS 0002 701 3D	O	1191+00	255.8			M64	SIDE SPILLWAY BETWEEN LOCKS 07 & 08
WS 0003 701 3D	O	1203+71	255.8			M64	SIDE SPILLWAY WEST WALL ABOVE LOCK 8
WS Y001 701 3D	Y	60+15				T20	ONONDAGA CREEK SPILLWAY
WS 0224 701 3E	E	3931+90				208	TAINTOR GATE NW POWER RACE 530 FT L
WS F001 701 3E	F						OVERFLOW FLUME -DERUYTER DAM
WS F002 701 3E	F						DERUYIER OUTLET FLUME
WS 0051 701 3E	O	118+80			3	80	SOUTH HEADGATE NO 1 PLUGGED Key G
WS 0061 701 3E	O	119+10			4	80	SOUTH HEADGATE NO 2 PLUGGED " "
WS 0071 701 3E	O	119+40			3	80	SOUTH HEADGATE NO 3 PLUGGED " "
WS 0011 701 3E	O	121+80	352.0	13.3	8	80	NORTH HEADGATE NO 1 Raceway SILL
WS 0021 701 3E	O	121+56			3	80	NORTH HEADGATE NO 2 PLUGGED Key C
WS 0031 701 3E	O	121+42			3	80	NORTH HEADGATE NO 3 PLUGGED " "
WS 0041 701 3E	O	121+28			3	80	NORTH HEADGATE NO 4 PLUGGED " "
WS 0053 701 3E	O	640+00				108	POWER FOREBAY - LOCK 03 - FULTON Key D
WS 0043 701 3E	O	640+35			2	108	BULKHEAD NO 4 W SIDE LOWER DAM Key M
WS 0033 701 3E	O	640+50			.10	108	BULKHEAD NO 3 W SIDE LOWER DAM " "
WS 0023 701 3E	O	642+20			3	108	BULKHEAD NO 2 E SIDE LOWER DAM Key H
WS 0063 701 3E	O	652+00				10	POWER TAILRACE BELOW LOCK 03 Key P
WS 0005 701 3E	O	972+15				37	BULKHFAD NO 5 - MINETTO
WS 0052 701 3E	O				17	10	BULKHEAD NO 5 (UPPER DAM) Key G
WS 0006 701 3E	O	1145+90			24	37	BULKHEAD NO 6 - HIGH DAM - OSWEGO
WS 0077 701 3E	O	1169+06			24		BULKHEAD NO7 - CURVED DAM - OSWEGO
WS 0017 701 3E	O	1185+00				35	HYDRAULIC CANAL BULKHEAD (SEALED)
WS 0001 701 4A	E		369.0			T28	CLEVELAND TERMINAL
WS 0002 701 4A	E						DOCK-FRENCHMANS IS

3E-546 (3a)

SLUICE GATES SPILLWAYS WASTE WEIRS - 1977

	STRUCTURE ID NO			CONCRETE						SUPER STRUCTURE			MACHINERY			SL GATES					GATES FLSHBRDS		STPLGS		ELECT			
	SCTN	HSTRC	TYPE	ABTMNTS	PIERS BLKHDS	UPSTRM APRON	DWNSTRM APRN	SPLLWY SRFCE	SPHN INTRIOR	OPRTNG TRSTLE	CATWALKS	RAILINGS	STEM GEARING	FLR STD ETC	SPHN VLVL LNR	GATE FRAMES	GATES SKNPLATE	GATE SEALS	SEATS	GUIDES	BOARDS	ANCHORAGE	STOPLOGS	GUIDES	MOTORS	WIRINGS	TRACKS RACKS	GEN RECOMMEND
	5	0224	3E	5	N	X	X	X	N	7	7	7	7	7	N	6	6	X	X	N	3	3	N	N	N	N	N	5
[illegible]	5	FOD1	3E	N	N	N	N	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3
#6	5	FOD2	3E	7	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	9
#7	5	0051	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
#8	5	0061	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
#9	5	0071	3E	5	7	N	N	N	N	N	N	7	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
#10	5	0011	3E	5	5	X	X	N	N	7	5	3	7	3	N	3	3	3	3	3	N	N	N	N	N	N	N	3
#11	5	0021	3E	5	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
#12	5	0031	3E	5	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
#13	5	0041	3E	5	5	X	X	N	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
#19	5	0053	3E	6	6	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	9
#20	5	0043	3E	7	5	X	X	N	N	N	N	7	3	5	N	X	X	X	X	X	N	N	N	N	N	N	N	5
#21	5	0033	3E	7	5	X	X	N	N	N	N	7	3	5	N	X	X	X	X	X	N	N	N	N	N	N	N	5
[illegible]	5	0023	3E	3	3	X	X	N	N	N	N	1	3	3	N	X	X	X	X	X	N	N	N	N	X	3	3	3
#23	5	0063	3E	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3
#25	5	0005	3E	5	3	N	N	N	N	7	3	7	3	N	N	3	1	3	N	N	N	N	N	N	N	N	N	3
[illegible]	5	0052	3E	7	3	X	X	N	N	N	7	N	3	3	N	3	X	X	X	X	N	N	N	N	N	N	N	3
[illegible]	5	0006	3E	3	5	N	N	N	N	7	7	N	N	3	N	5	4	X	X	5	N	N	N	N	N	N	N	5
#31	5	0077	3E	7	7	X	X	N	N	5	N	7	N	3	N	5	5	X	X	5	N	N	N	N	3	N	N	5
[illegible]	5	0017	3E	5	5	X	X	N	N	N	N	N	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	7
	6	S002	3E	5	5	N	X	N	N	N	N	5	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	7
	6	S001	3E	7	7	N	X	N	N	N	7	N	7	7	N	6	6	6	6	N	N	N	N	N	N	N	N	7
	6	Y001	3E	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7

13IK [illegible] dump fill + debris breach in [illegible] to Canal disc at [illegible]

APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

HYDROLOGY

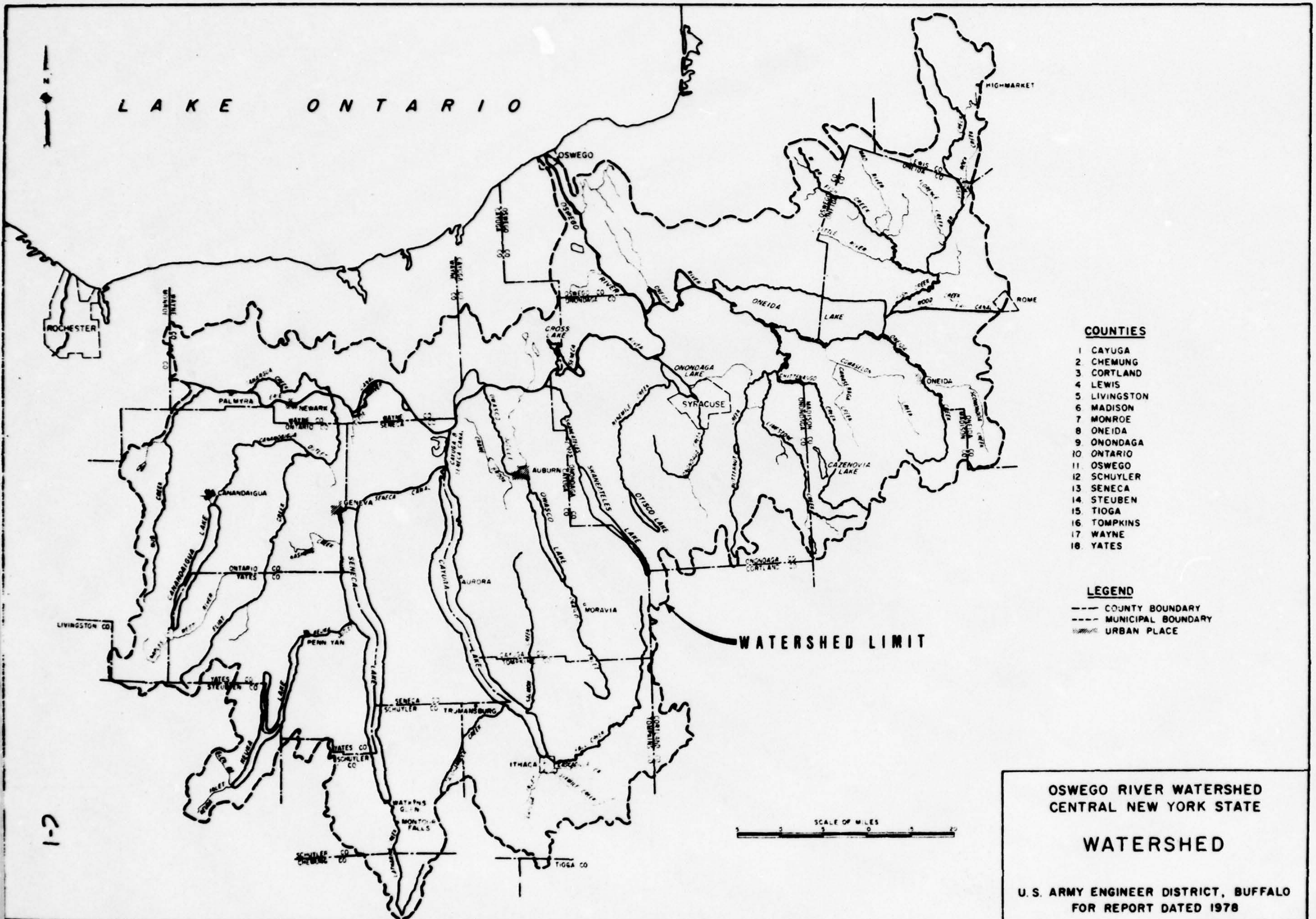
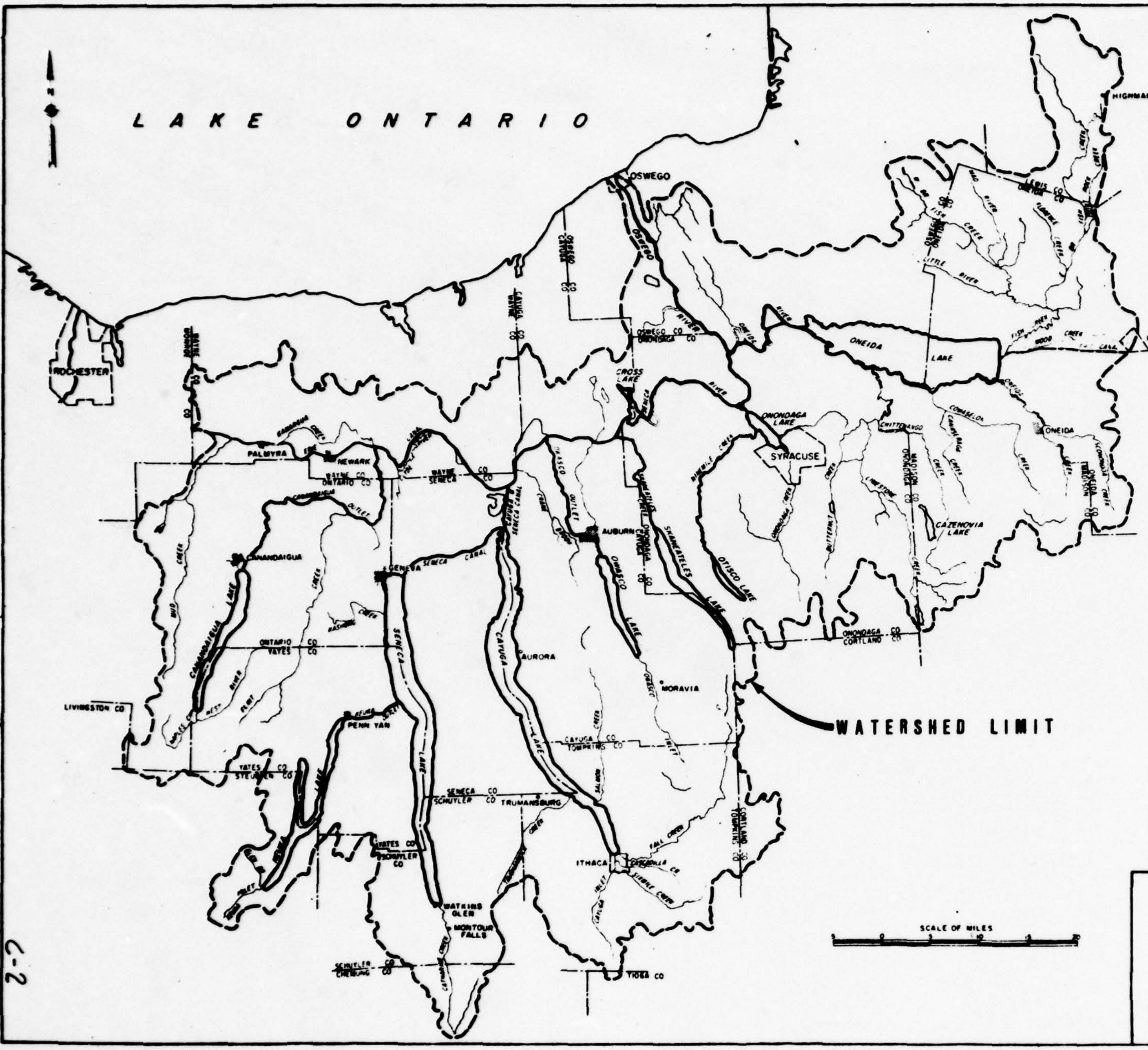

LAKE ONTARIO
N
OSWEGO
ROCHESTER
SYRACUSE
ONONDAGA LAKE
ONEIDA LAKE
CROSS LAKE
SKANEATELES LAKE
OTISCO LAKE
OWASCO LAKE
CAYUGA LAKE
SENECA LAKE
CANANDAIGUA LAKE
CAZENOVIA LAKE
AUBURN
GENEVA
CANANDAIGUA
PALMYRA
NEWARK
PENN YAN
ITHACA
AURORA
MORAVIA
TRUMANSBURG
WATKINS GLEN
MONTOUR FALLS
ROME
HIGHMARKET
ONEIDA
LIVINGSTON CO
TIOGA CO
ONONDAGA CO / CORTLAND CO
ONTARIO CO / YATES CO
YATES CO / STEUBEN CO
SENECA CO / SCHUYLER CO
WATERSHED LIMIT
SCALE OF MILES
COUNTIES
1 CAYUGA
2 CHEMUNG
3 CORTLAND
4 LEWIS
5 LIVINGSTON
6 MADISON
7 MONROE
8 ONEIDA
9 ONONDAGA
10 ONTARIO
11 OSWEGO
12 SCHUYLER
13 SENECA
14 STEUBEN
15 TIOGA
16 TOMPKINS
17 WAYNE
18 YATES
LEGEND
COUNTY BOUNDARY
MUNICIPAL BOUNDARY
URBAN PLACE
OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE
WATERSHED
U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

PLATE 1



PRINCIPAL DRAINAGE SYSTEM

RESERVOIRS: CANANDAIGUA, KEUKA, SENECA, CAYUGA, OWASCO, SKANEATELES, OTISCO (FINGER LAKES RESERVOIRS), CROSS, ONONDAGA, ONEIDA

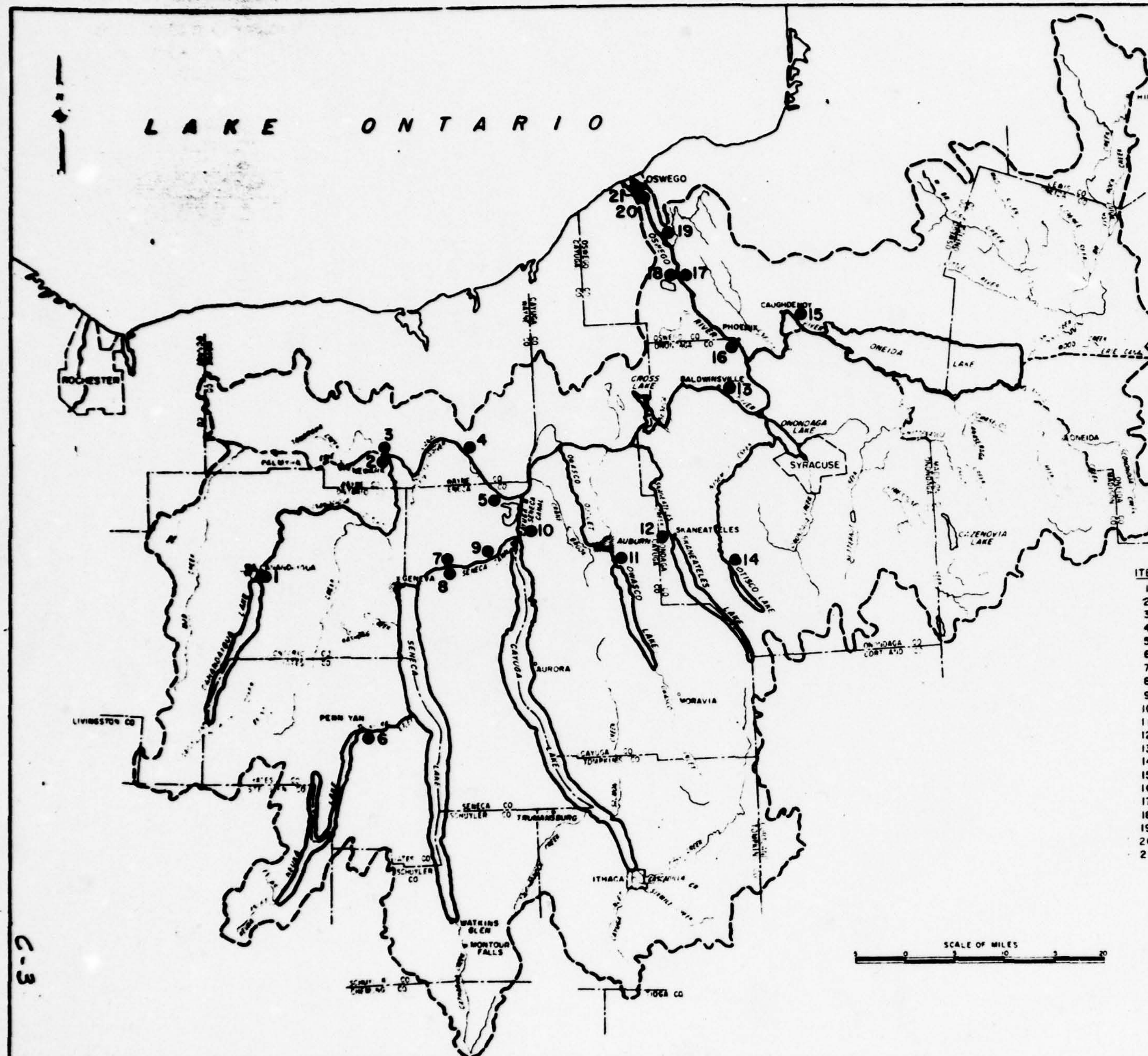
CHANNELS: CANANDAIGUA OUTLET, CLYDE RIVER, KEUKA OUTLET, SENECA RIVER & ASSOC CANALS, OWASCO OUTLET, SKANEATELES CREEK, NINEMILE CREEK, ONONDAGA OUTLET, ONEIDA RIVER & ASSOC. CANAL, OSWEGO RIVER

OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE

PRINCIPAL DRAINAGE SYSTEM

U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

PLATE 3



WATER MANAGEMENT FACILITY

ITEM	DESCRIPTION	LOCATION
1	GATED LAKE OUTLET	CANANDAIGUA
2	GATED RIVER DAM	LYONS
3	GATED RIVER DAM	LYONS
4	GATED RIVER DAM	CLYDE
5	GATED RIVER DAM	MAYS-POINT
6	GATED LAKE OUTLET	PENN YAN
7	GATED HYDRO-PLANT SPILLWAY	WATERLOO
8	GATED RIVER DAM	WATERLOO
9	GATED RIVER DAM	SENECA FALLS
10	GATED LAKE OUTLET	MUD LOCK
11	GATED LAKE OUTLET	AUBURN
12	GATED LAKE OUTLET	SKANEATELES
13	GATED RIVER DAM	BALDWINSVILLE
14	GATED LAKE OUTLET	MARIETTA
15	GATED RIVER DAM	CAUGHDENOY
16	GATED RIVER DAM	PHOENIX
17	GATED RIVER DAM	FULTON
18	GATED RIVER DAM	FULTON
19	GATED RIVER DAM	MINETTO
20	GATED RIVER DAM	OSWEGO
21	GATED RIVER DAM	OSWEGO

OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE

WATER RESOURCE MANAGEMENT
FACILITIES OF THE
PRINCIPAL DRAINAGE SYSTEM

U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978

PLATE 5

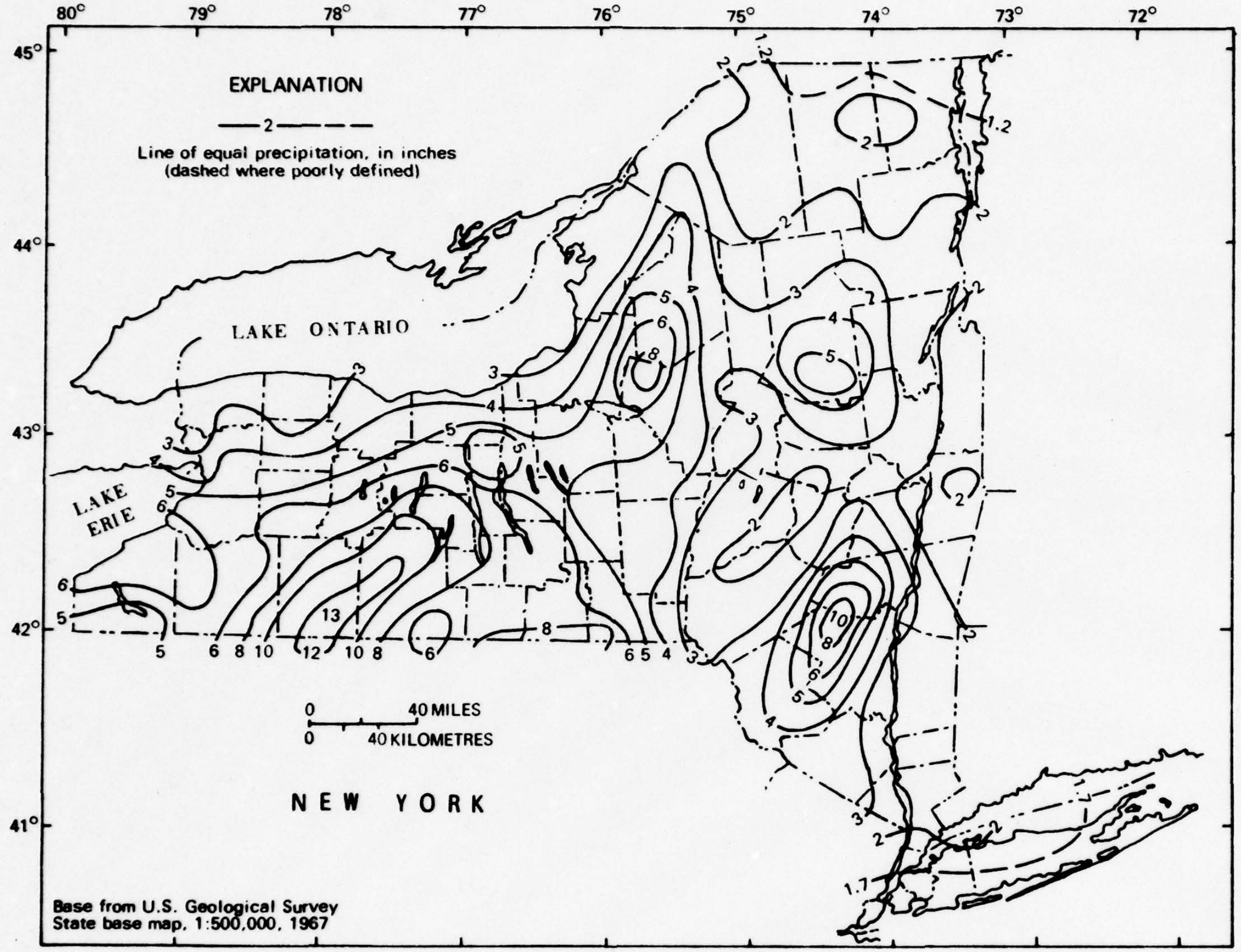
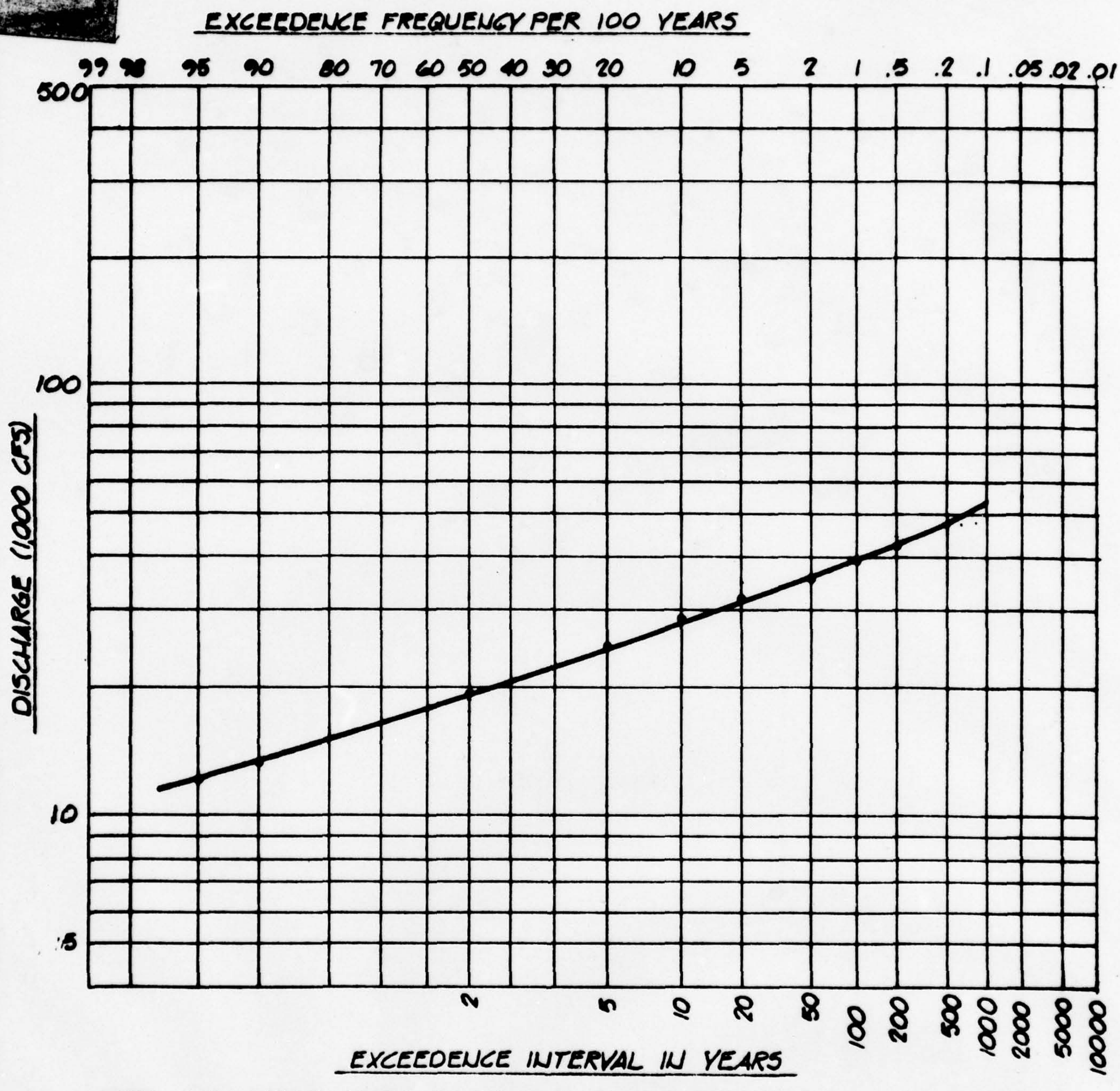


Figure 3.--Precipitation in New York, June 20-25. (Adapted from map furnished by A. B. Pack, Climatologist, National Weather Service, Ithaca, New York.)

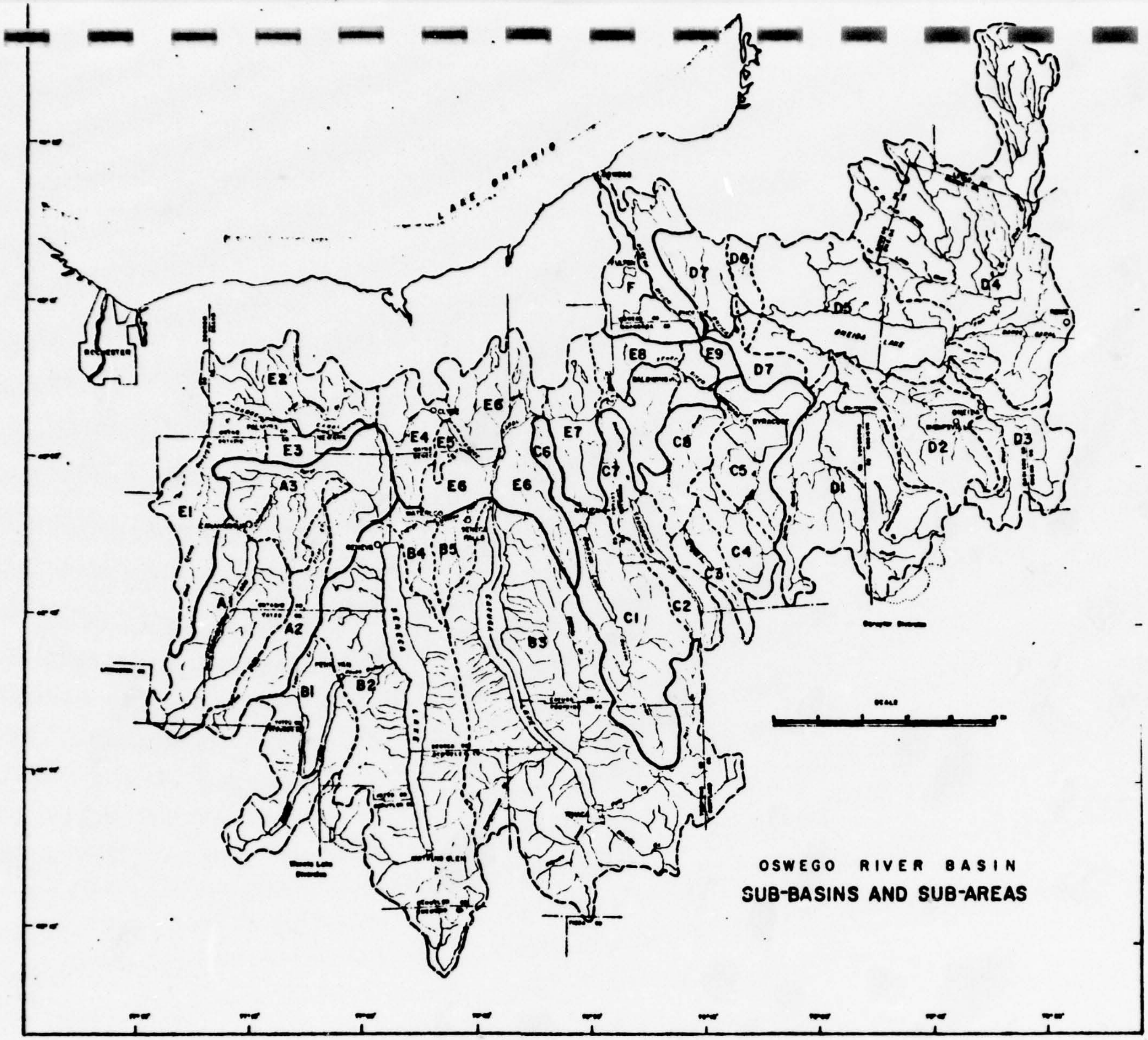


NOTE: DISCHARGE - FREQUENCY CURVE CONVERTED FROM STAGE - FREQUENCY CURVE, USING STAGE - DISCHARGE RATING CURVES DEVELOPED BY D.E.C. (FROM D.E.C. HEC-1 MODEL)

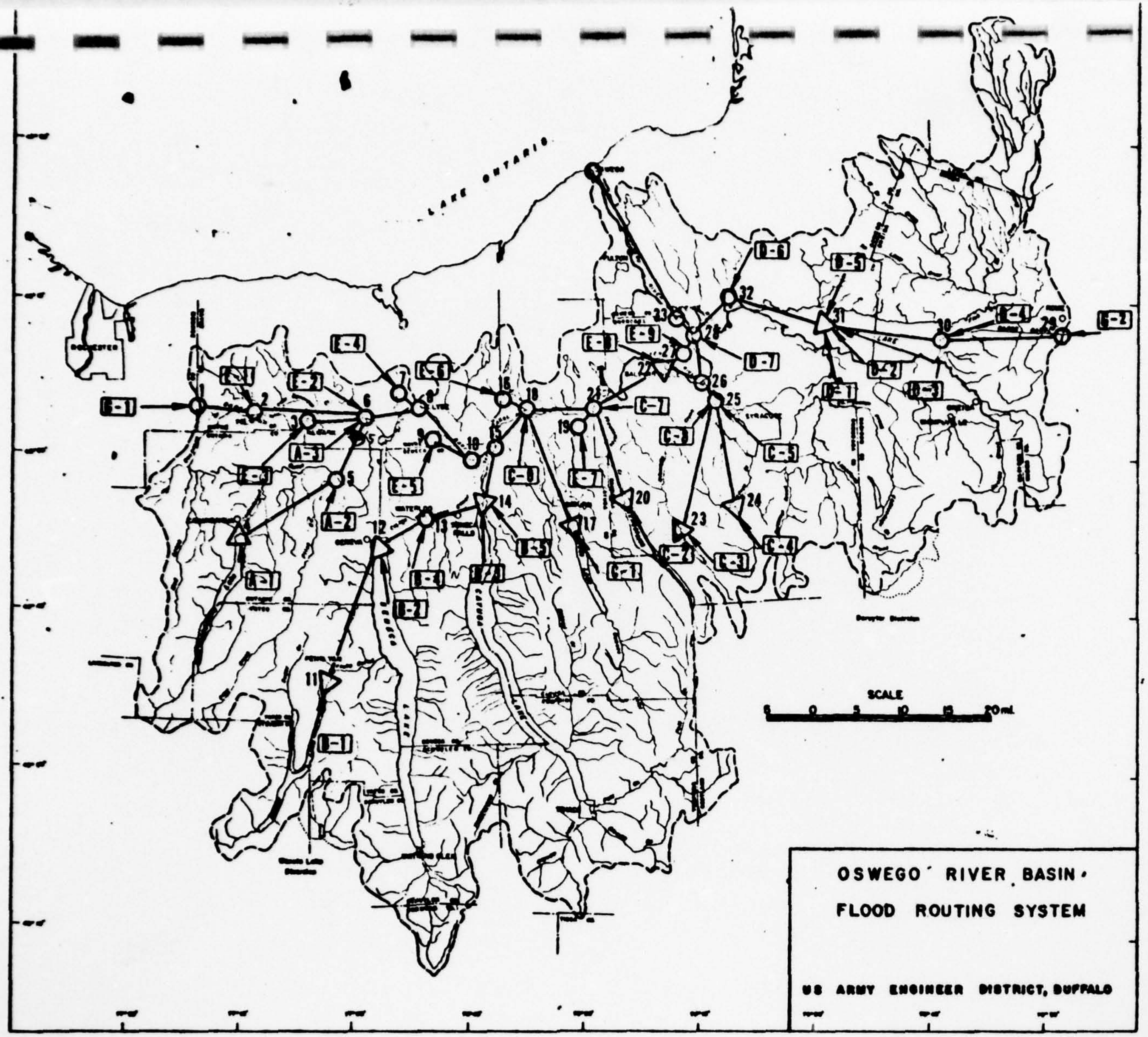
DISCHARGE - FREQUENCY CURVE

C-5

STETSON • DALE	DATE 6·27·79	DRAWN JPG	THREE RIVERS (NODE 28)
	JOB 2305	APP'D	

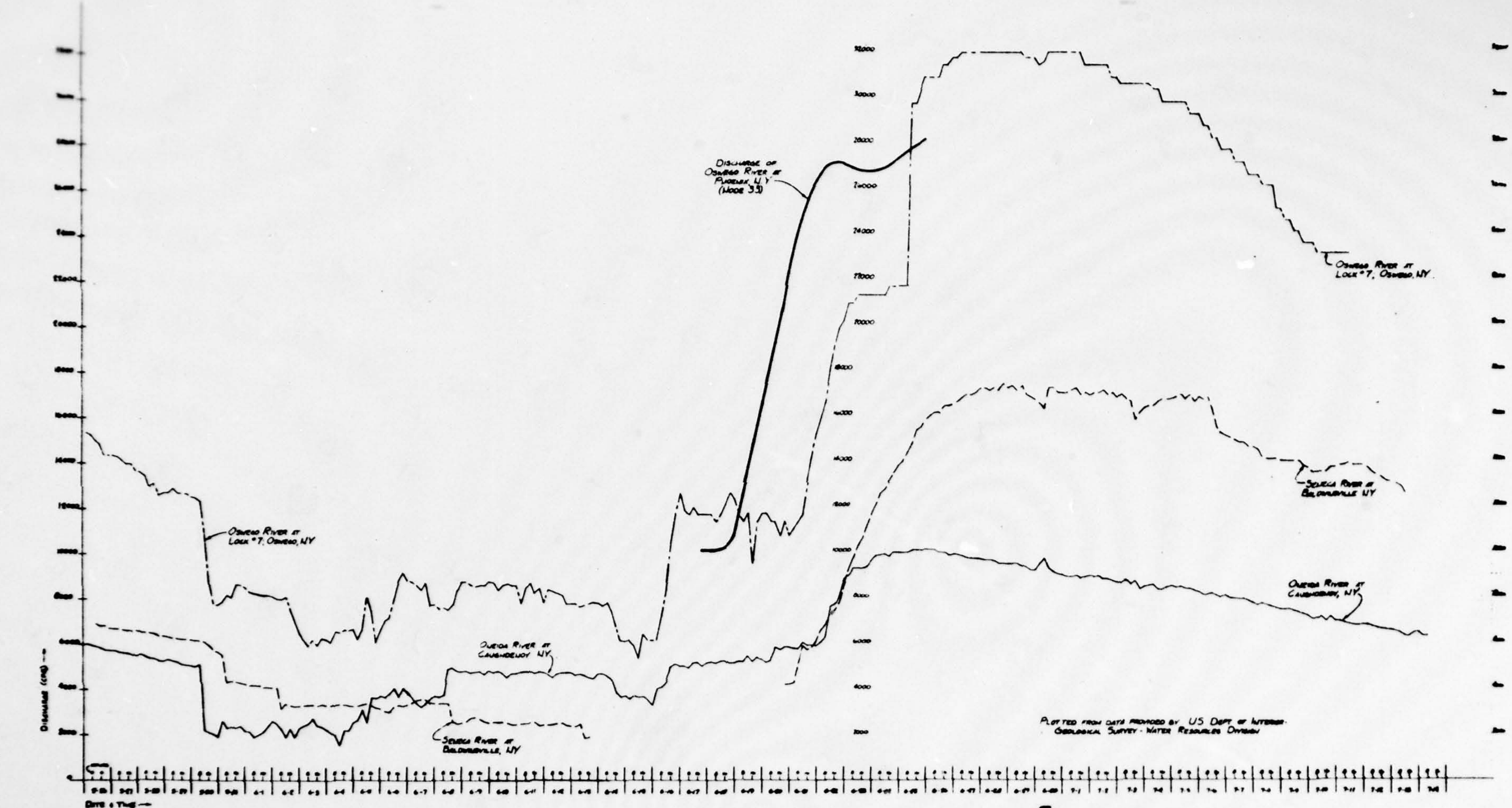


OSWEGO RIVER BASIN
SUB-BASINS AND SUB-AREAS



OSWEGO RIVER BASIN
FLOOD ROUTING SYSTEM

US ARMY ENGINEER DISTRICT, BUFFALO



= Discharge Curves =
OSWEGO RIVER WATERSHED
Water Year Ending
September 1972

STETSON-DALE

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME New York State Dam Inspection DATE 6-28-79

SUBJECT Oswego River Curved Dam - Lock #7 PROJECT NO. 2305

Discharge - Frequency Ranking DRAWN BY JPG

Water Yr	Peak Discharge	Date	Ranking	Discharge Plot Posi.
1936	37500 CFS	3·28·36	1	.02
1940	35000 CFS	4·10·40	2	.04
1972	32300 CFS	6·27·72	3	.06
1960	31200 CFS	4·4·60	4	.08
1950	29400 CFS	3·30·50	5	.11
1956	26800 CFS	4·13·56	6	.13
1942	25900 CFS	3·18·42	7	.15
1943	25400 CFS	5·15·43	8	.17
1947	25100 CFS	4·8·47	9	.19
1955	23600 CFS	3·23·55	10	.21
1951	23500 CFS	2·22·51	11	.23
1945	23400 CFS	3·26·45	12	.25
1939	23200 CFS	3·8·39	13	.28
1959	23100 CFS	4·6·59	14	.30
1973	23000 CFS	4·7·73	15	.32
1961	22700 CFS	2·26·61	16	.34
1971	22600 CFS	3·18·71	17	.36
1902	22500 CFS	3·13·02	18	.38
1904	22200 CFS	4·02·04	19	.40
1946	22000 CFS	10·4·46	20	.42
1963	21900 CFS	3·28·63	21	.45
1970	21600 CFS	4·6·70	22	.47
1905	21300 CFS	3·28·05	23	.49
1937	21200 CFS	4·24·37	24	.51
1969	20900 CFS	2·4·69	25	.53
1903	20300 CFS	3·35·03	26	.55
1954	20000 CFS	5·9·54	27	.57
1941	19900 CFS	4·7·41	28	.60
1974	19900 CFS	4·7·74	29	.62
1958	19100 CFS	4·23·58	30	.64
1952	18700 CFS	3·12·52	31	.66
1948	18400 CFS	3·26·48	32	.68

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME New York State Dam Inspection DATE 6.28.79

SUBJECT Oswego River Curved Dam - Lock #7 PROJECT NO. 2305

Discharge - Frequency Ranking DRAWN BY JPG

Water Yr	Peak Discharge	Date	Ranking	Discharge Plot Posi
1968	18100 CFS	6.30.68	33	.70
1953	18000 CFS	3.28.53	34	.72
1938	18000 CFS	3.1.38	35	.74
1966	17600 CFS	3.6.66	36	.77
1964	17500 CFS	3.18.64	37	.79
1935	16900 CFS	7.14.35	38	.81
1934	16400 CFS	4.15.34	39	.83
1949	16300 CFS	2.17.49	40	.85
1944	16000 CFS	4.14.44	41	.87
1957	15200 CFS	3.15.57	42	.89
1962	15200 CFS	3.16.62	43	.91
1906	14900 CFS	4.10.06	44	.94
1965	13200 CFS	4.26.65	45	.96
1967	12900 CFS	5.17.67	46	.98

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6-26-79

SUBJECT: EXPANSION OF STAGE - DISCHARGE CURVES TO UPPER LIMITS — PROJECT NO. 2305

DRAWN BY: JPG & NFD

SENECA LAKE $Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$ ASSUME: $n = .035$

HEIGHT	1.49/n	A	R	S	Q	STORAGE
10	42.57	10600	10	.001	66745	800000
20	42.57	24800	20	.001	248455	1200000

CANANDAIGUA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	106,500
10	42.57	10000	10	.001	62965	212,500
20	42.57	20000	20	.001	200366	319,000

KEUKA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	217000
10	42.57	10000	10	.004	111550	328550

CAYUGA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.0005	0	727000
3	42.57	15000	3	.0005	29810	854500
6	42.57	30000	6	.0005	94858	982000

OWASCO LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.006	0	119800
3	42.57	3000	3	.006	20,653	126500
6	42.57	6000	6	.006	65,720	152900
9	42.57	9000	9	.006	129,350	205700

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

[redacted]W YORK STATE DAM INSPECTION — DATE 6·27·79

[redacted]PANSION OF STAGE - DISCHARGE — PROJECT NO. 2305

CURVES TO UPPER LIMITS — DRAWN BY JPG

OTISCO LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.004	0	39,200
3	42.57	900	3	.004	5060	45700
6	42.57	1800	6	.004	16100	52300
9	42.57	2700	9	.004	31700	58800
12	42.57	3600	12	.004	51200	65300

ONONDAGA LAKE

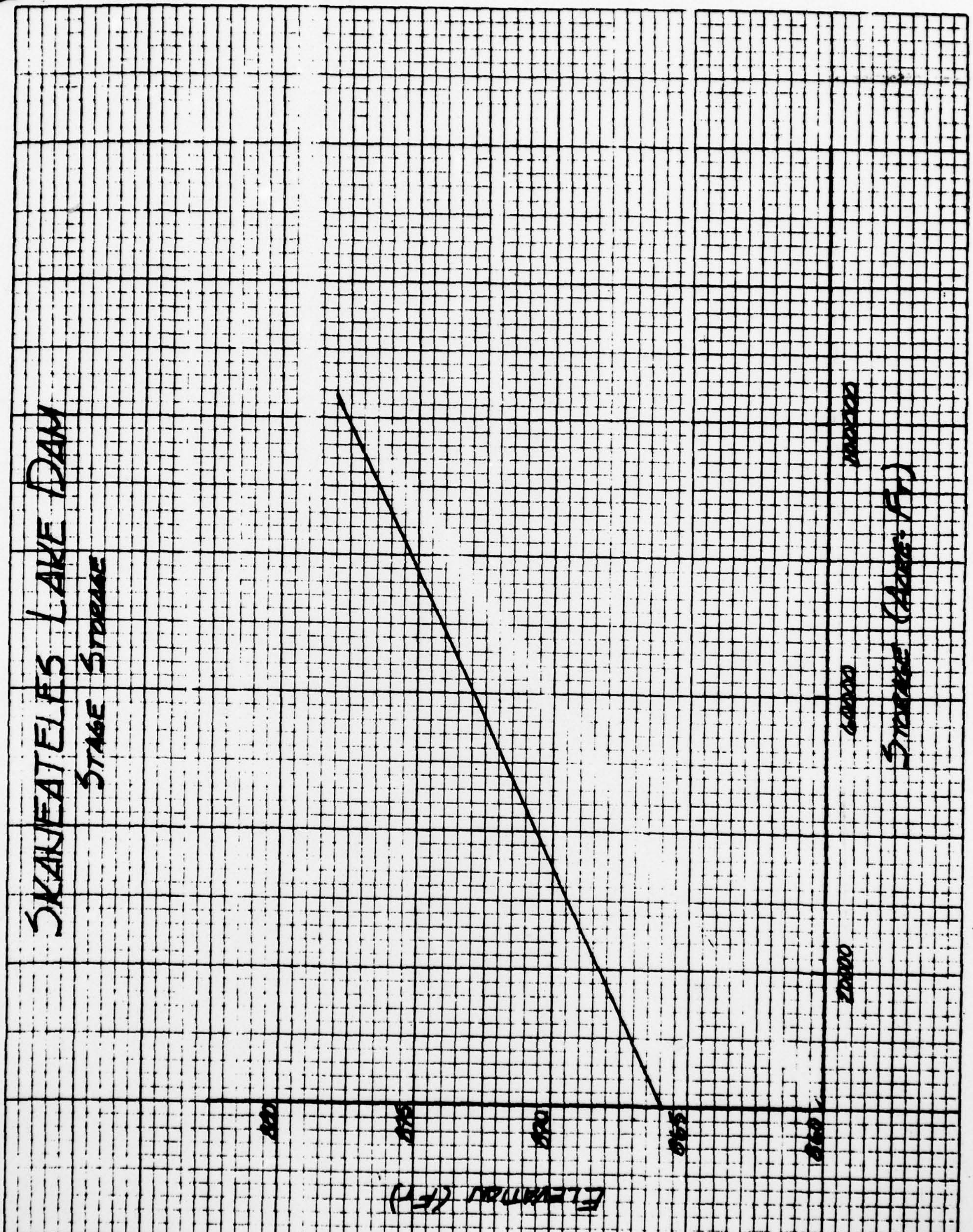
HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	32500
3	42.57	1500	3	.001	4200	43500
6	42.57	3000	6	.001	13400	52300
9	42.57	4500	9	.001	26400	62200
12	42.57	6000	12	.001	42700	72100

ONEIDA LAKE

HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	845000
3	42.57	6000	3	.001	16900	998000
6	42.57	12000	6	.001	53700	1150000
9	42.57	18000	9	.001	105600	1304000

SKANEATELES LAKE

SEE SKANEATELES DAM INSPECTION REPORT DATE: SEPT 14/78
SHEETS C-4 & C-5



SKANEATELES REPORT
(C-4)

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME: NY DAM INSPECTION — DATE: 9-15-78
SUBJECT: SKANEATELES LAKE DAM — PROJECT NO. 2210
DRAWN BY: JBG

STAGE-DISCHARGE TABULATION (FROM CREST OF SPILLWAY)

ELEV		Q PRINCIPAL SPILLWAY	Q DAM	Q TOTAL
866		—	—	—
867		124.80	—	124.80
868		352.99	—	352.99
868.5	(TOP OF DAM)	493.32	—	493.32
869		648.48	98.11	746.59
870		998.40	509.80	1508.20
871		1395.31	1096.92	2492.23
872		1834.18	1817.04	3651.22
873		2311.33	2649.00	4960.33
874		2823.90	3579.37	6403.27
875		3369.60	4598.68	7968.28
876		3946.52	5699.74	9646.26
877		4553.06	6876.88	11429.94
878		5187.84	8125.47	13313.31
879		5849.65	9441.63	15291.28
880		6537.42	10822.06	17359.48

SKANEATELES REPORT
(C-5)

```
IA                     OSWEGO RIVER BASIN
A                            HEC1DB
A                      PMF- OVERFLOW ANALYSIS
B      40      6      0      0      0      0      0      0      4
B1      5
J       1      6      1
J1     .2     .4     .5     .6     .3    1.0
K       0      1      0      0      0      0      1
K1        1 BARGE CANAL LOCK 30 AT MACEDON  (SUB AREA A1)
M      -1      0    100      0   5100      0      0      0      1
N     372    372    372    372    374    378    379    379    386    392
N     390    380    375    372    113     23     25     21     21     22
N      22     21     22     22     21     21     22     22     22      0
N
K       1      2      0      0      0      0      1
K1        2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)
Y       0      0      0      0      1
Y1      0      3      1
K       0      2      0      0      0      0      1
K1        3 CANARGUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)
M       1     -1    147      0   5100      0      0      0      1
P       0   21.5     33     47     55     65     72     74
T       0      0      0      0      0      0    0.5   0.05
U      21
1     514   1946   2958   2655   1978   1472   1095    815    515    389
1     366    250    186    138    103     76     57     42     25     25
1      21
X     140    550    1.6
K       2      2      0      0      0      0      1
K1        4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29
K       1      6      0      0      0      0      1
K1        5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS
Y       0      0      0      0      1
Y1      0      8      3
K       0      6      0      0      0      0      1
K1        6 LOWER CANARACUAL LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)
M       1     -1    118      0   5100      0      0      0      1
P       0   21.5     33     47     55     65     72     74
T       0      0      0      0      0      0    0.5   0.05
U      27
1      28    109    293    523    696    773    896    980   1246   1312
1    1218    979    764    596    465    363    283    221    173    135
1     105     82     64     50     39     35     35
X     120    470    1.6
K       2      6      0      0      0      0      1
K1        7 COMBINED AND LOCAL FLOWS AT LOCK 27
K       0      3      0      0      0      0      1
K1        8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)
M       1     -1     51      0   5100      0      0      0      1
P       0   21.5     33     47     55     65     72     74
T       0      0      0      0      0      0    0.5   0.05
U      10
1    2001   1630    844    303    174     79     36     30     25     16
X     100    200    1.6
K       1      6      0      0      0      0      1
```

```
K1      9 ROUTED FLOW E-3 TO LYONS (NODE 6)
Y       0       0       0       0       1
Y1      0       5       2
K       2       6       0       0       0       0       1
K1      10 COMBINE FLOWS AT NODE 6
K       0       4       0       0       0       0       1
K1      11 CANANDAIGUA LAKE INFLOW
M       1      -1     184       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0    1.25    0.03
U       8
I    0556    5183    3260    1507     691     316     145      30
X     300    1000     1.6
K       1       4       0       0       0       0       1
K1      12 CANANDAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD
Y       0       0       0       1       1
Y1      0       0       0       0       0       0   51000
Y2 10700   21300   31900   42500   53100   63700   74300   84900   95500  106100
Y2212500  319000
Y3     50      50      50      50     200     600    1000    1560    2250    3000
Y3 63000  200366
K       1       5       0       0       0       3       1
K1      13 ROUTED OUTFLOW TO FLINT CREEK MOUTH
Y       0       0       0       0       1
Y1      0      12       5
K       0       5       0       0       0       0       1
K1      14 FLINT CREEK INFLOW A-2
M       1      -1     102       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.5    0.06
U      26
I      93     534     903    1266    1367    1166     966     801     663     549
I     455     377     311     259     215     178     147     104     101      84
I      69      57      47      39      35      32
X      90    2000     1.6
K       2       5       0       0       0       0       1
K1      15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS
K       1      56       0       0       0       0       1
K1      16 OUTLET ROUTED TO LOCK 27
Y       0       0       0       0       1
Y1      0       7       3
K       0      56       0       0       0       0       1
K1      17 OUTLET LOCAL FLOW A-3
M       1      -1     155       0    5100       0       0       0       1
P       0    21.5      33      47      55      65      72      74
T       0       0       0       0       0       0     0.6    0.06
U      22
I      91     338     905    1348    1718    2408    2601    1921    1413    1038
I     763     562     412     303     223     164     120      90      65      48
I      35      34
X     150     200     1.6
K       2      56       0       0       0       0       1
K1      18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27
K       1       6       0       0       0       0       1
K1      19 ROUTE OUTLET TO CANAL
Y       0       0       0       0       1
Y1      0       1
K       2       6       0       0       0       0       1
K1      20 COMBINE FLOW AT 6(OUTLET FLOW + E-1, E-2, E-3)
K       1       8       0       0       0       0       1
K1      21 ROUTE FLOWS AT LOCK 27 TO NODE 8
Y       0       0       0       0       1
Y1      0       8       3
K       0       7       0       0       0       0       1
K1      22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)
M       1      -1      89       0    5100       0       0       0       1
```

```
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0   0.5  0.06
U   23
1  897  1670  1441  1144   908   721   572   454   361   287
1  227   181   143   114    90    72    57    45    36    29
1   23    23    23
X  100   360   1.6
K    1     8     0     0     0     0     1
K1      23 ROUTE FLOWS AT LOCK 26 TO NODE 8
Y    0     0     0     0     1
Y1   0     2
K    2     8     0     0     0     0     1
K1      24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 8
K    1    10     0     0     0     0     1
K1      25 ROUTE FLOWS AT NODE 8 TO NODE 10
Y    0     0     0     0     1
Y1   0     5     2
K    0     9     0     0     0     0     1
K1      26 LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)
M    1    -1    18     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0   0.5  0.06
U   21
1  171   304   313   246   193   152   119    93    73    58
1   45    35    28    22    17    13    11     8     6     5
1    4
X   90    90   1.6
K    1    10     0     0     0     0     1
K1      27 ROUTE INFLOW E-5 TO NODE 10
Y    0     0     0     0     1
Y1   0     2
K    2    10     0     0     0     0     1
K1      28 COMBINE ROUTED FLOW WITH FLOW AT NODE 10
K    1    15     0     0     0     0     1
K1      29 ROUTE FLOWS AT NODE 10 TO NODE 15
Y    0     0     0     0     1
Y1   0     5     2
K    0    11     0     0     0     0     1
K1      30 LOCAL INFLOW B-1 INTO KEUKA LAKE
M    1    -1   183     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0  1.50  0.03
U    6
1 14318  3342  1273   483   183     0
X  100   800   1.6
K    1    11     0     0     0     0     1
K1      31 KEUKA LAKE OUTFLOW W/ MODIFIED PULS
Y    0     0     0     1     1
Y1   0     0     0     0     0     0 147000
Y2107000 129500 141000 153500 172000 178000 191000 204000 217000
Y2320550
Y3 120   320   445   530   575   670   890  1130  1470
Y3126000
K    1    12     0     0     0     0     1
K1      32 ROUTE KEUKA LAKE OUTFLOWS TO 12
Y    0     0     0     0     1
Y1   0     6     2
K    0    12     0     0     0     0     1
K1      33 SENECA LAKE INFLOWS B-2
M    1    -1   524     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0   0.5  0.03
U   12
1 26993 10831  6899  4332  2720  1700  1072   673   422   266
1  167    70
X  500  2000   1.6
```

```
K     2    12     0     0     0     0     1
K1        34 COMBINE LOCAL FLOW B-2 AND ROUTED KEUKA LAKE OUTLET FLOWS
K     1    12     0     0     0     0     1
K1        35 SENECA LAKE OUTFLOWS - MODIFIED  PULS METHOD
Y     0     0     0     1     1
Y1                                  534000
Y2372000 414000 456000 500000 543000 586000 630000 650000 674000 720000
Y2000000 1200000
Y3   700    700    700    700    700    700    700   1000   3000   3000
Y3 15000  77000
K     1    13     0     0     0     0     1
K1        36 SENECA LAKE OUTFLOWS ROUTED TO 13
Y     0     0     0     0     1
Y1    0     2
K     0    13     0     0     0     0     1
K1        37 LOCAL INFLOW B-4
M     1    -1    39     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.05
U    15
1   539  1094   796   549   378   260   179   123    85    58
1    40    28    19    11    11
I    92   200   1.6
K     2    13     0     0     0     0     1
K1        38 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW B-4
K     1    14     0     0     0     0     1
K1        39 ROUTE HYDROGRAPH TO 14 (CAYUGA LAKE INFLOW)
Y     0     0     0     0     1
Y1    0     6     2
K     0    14     0     0     0     0     1
K1        40 LOCAL INFLOW B-5
M     1    -1    36     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.05
U    12
1   895  1094   692   437   277   175   110    70    44    28
1    14    10
I    92   200   1.6
K     2    14     0     0     0     0     1
K1        41 COMBINE FLOW B-5 WITH ROUTED FLOW
K     0    14     0     0     0     0     1
K1        42 CAYUGA LAKE INFLOW B-3
M     1    -1   782     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.03
U    15
I 24903 15540 13526  9524  6529  4476  3069  2104  1443   989
1   678   465   319   219    81
I  1000  1700   1.6
K     2    14     0     0     0     0     1
K1        43 COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW
K     1    14     0     0     0     0     1
K1        44 CAYUGA LAKE OUTFLOW - MODIFIED PULS
Y     0     0     0     1     1
Y1    3     0     0     0     0     0 490000
Y2375000 417000 460000 503000 546000 589500 634000 660000 727000
Y2054500 902000
Y3  1700   1700   1700   1700   3400   3400   3400   8700   8700
Y3 38510 103500
K     1    15     0     0     0     0     1
K1        45 ROUTE CAYUGA LAKE OUTFLOWS TO NODE 15
Y     0     0     0     0     1
Y1    0     3     1
K     2    15     0     0     0     0     1
K1        46 COMBINE ROUTED FLOW WITH FLOW AT NODE 15
K     1    18     0     0     0     0     1
```

```
K1      47 ROUTE FLOWS TO NODE 18
Y     0     0     0     0     1
Y1    0     8     3
K     0    16     0     0     0     0     1
K1      48 LOCAL FLOW E-6
M     1    -1   191     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U    16
1  3051  5102  3130  2469  1710  1175   808   555   381   262
1   180   123    85    75    70    27
I   140   400   1.6
K     1    18     0     0     0     0     1
K1      49 ROUTE LOCAL FLOW E-6 TO NODE 18
Y     0     0     0     0     1
Y1    0     2
K     2    18     0     0     0     0     1
K1      50 COMBINE ROUTED FLOW W/ FLOW AT NODE 18
K     0    17     0     0     0     0     1
K1      51 HEAD OWASCO INFLOW C-1
M     1    -1   201     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.75   .05
U    10
1  6633  5878  4280  2273  1200   633   334   176    93    30
I   450  1000   1.6
K     1    17     0     0     0     0     1
K1      52 OWASCO LAKE INFLOWS - MODIFIED PULS METHOD
Y     0     0     0     1     1
Y1    0     0     0     0     0     0 92000
Y2 66000  73200  79960  86500  93200  99800 106500 113200 119800 126500
Y2152900 205700
Y3   600   600   600  1100  1700  2300  2860  3400  3400  3400
Y3 24000  69100
K     1    18     0     0     0     0     1
K1      53 ROUTE OWASCO LAKE OUTLET FLOWS
Y     0     0     0     0     1
Y1    0     7     3
K     2    18     0     0     0     0     1
K1      54 COMBINE FLOWS WITH FLOWS AT NODE 18
K     0    18     0     0     0     0     1
K1      55 READ LOCAL FLOW C-6
M     1    -1    19     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U    18
1   157   368   352   268   205   156   119    91    70    53
1    40    26    23    18    14    10     8     6
I    90   200   1.6
K     2    18     0     0     0     0     1
K1      56 COMBINE  LOCAL FLOW C-6 WITH FLOW AT NODE 18
K     1    21     0     0     0     0     1
K1      57 ROUTE FLOW AT 18 TO NODE 21
Y     0     0     0     0     1
Y1    0     7     3
K     0    19     0     0     0     0     1
K1      58 LOCAL INFLOW E-7
M     1    -1    98     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U    11
1  2769  3130  1870  1115   664   396   236   141    84    50
1    19
I   120   400   1.6
K     1    21     0     0     0     0     1
K1      59 ROUTE LOCAL FLOW TO NODE 21
```

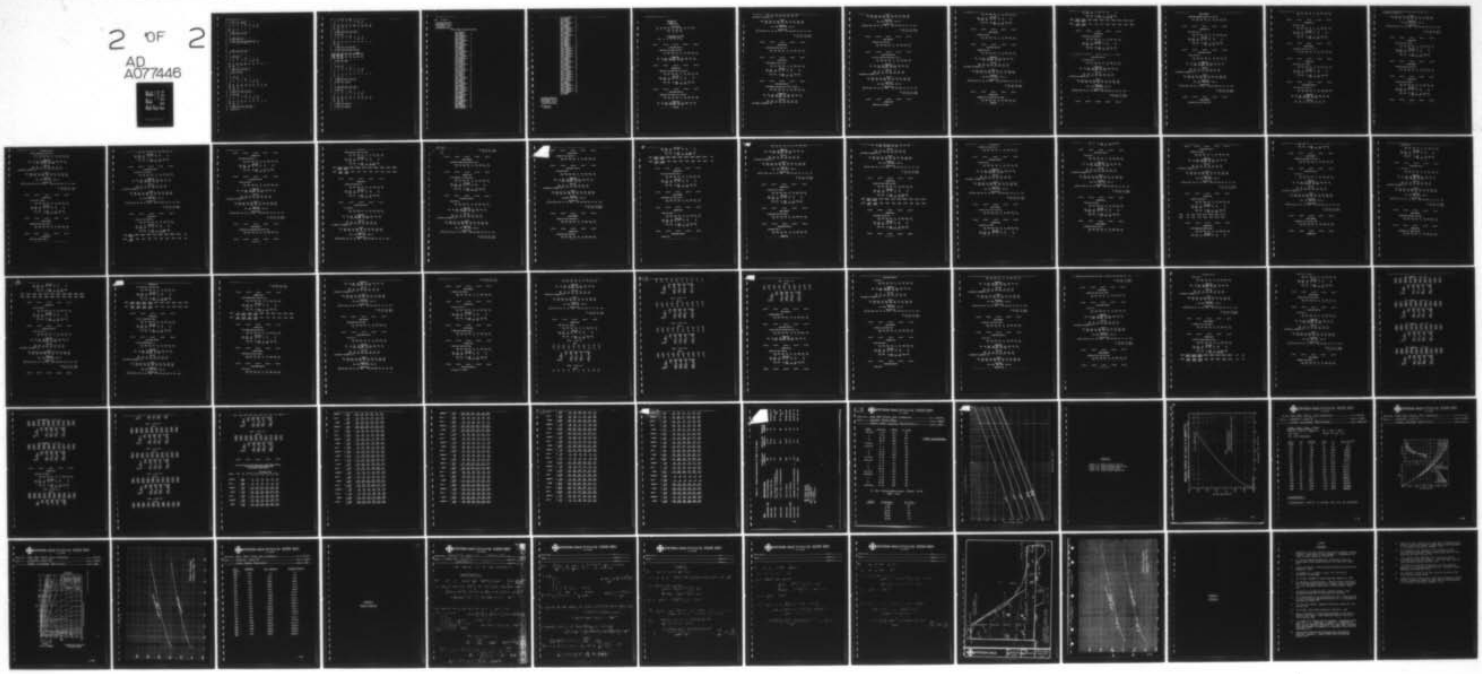
```
[redacted]     0     0     0     1
[redacted] 6     2
[redacted] 21    0     0     0     0     1
[redacted] COMBINE ROUTED FLOW WITH FLOW AT 21
[redacted] 20    0     0     0     0     1
[redacted] SKANEATELES LAKE INFLOWS
M    1    -1    74     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0  0.75  0.05
U    5
1 6839   791   232    56    10
I  250   500   1.6
K    1    20     0     0     0     0     1
K1      62 SKANEATELES LAKE OUTFLOWS
Y    0     0     0     1     1
Y1   0     0     0     0     0     0     0
Y2   0 17323 34756 52184 104368 208736 243492
Y3   0   353   747  1508  6403 13313 17359
K    1    21     0     0     0     0     1
K1      63 ROUTE SKANEATELES LAKE OUTFLOWS TO NODE 21
Y    0     0     0     0     1
Y1   0     6     2
K    2    21     0     0     0     0     1
K1      64 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE 21
K    0    21     0     0     0     0     1
K1      65 LOCAL FLOW C-7
M    1    -1    27     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0   0.5  0.06
U   11
1  496   946   581   351   212   127    77    46    28    17
1    7
I   90   200   1.6
K    2    21     0     0     0     0     1
K1      66 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE 21
K    1    22     0     0     0     0     1
K1      67 ROUTING TO NODE 22
Y    0     0     0     0     1
Y1   0     4     1
K    0    22     0     0     0     0     1
K1      68  LOCAL FLOW E-8
M    1    -1    98     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0   0.5  0.06
U    7
1 4087  3059  1402   642   259   135    42
I  120   400   1.6
K    2    22     0     0     0     0     1
K1      69 COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22
K    1    22     0     0     0     0     1
K1      70 BALDWINSVILLE POOL - MODIFIED PULS METHOD
Y    0     0     0     1     1
Y1   0     0     0     0     0     0  3250
Y2 3250  5000  8400 10000 11700 14000 17000 20000 24000 30000
Y3 3000  4000  6000  8000 10000 12000 14000 15300 16600 17000
K    1    26     0     0     0     0     1
K1      71 ROUTE FLOW TO NODE 26
Y    0     0     0     0     1
Y1   0     4     1
K    0    23     0     0     0     0     1
K1      72 INFLOW TO OTISCO LAKE C-3
M    1    -1  42.7     0  5100     0     0     0     1
P    0  21.5    33    47    55    65    72    74
T    0     0     0     0     0     0  0.75  0.05
U    6
1 3092   913   397   139    55     9
```

```
X    90    300    1.6
K     1     23      0      0      0      0      1
K1      73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD
Y     0      0      0      1      1
Y1    0      0      0      0      0      0  29300
Y2 19600  21800  23900  26100  28300  30500  32600  34800  37000  39200
Y2 45700  52300  58800  65300
Y3   200    200    200    200    200    400    900   1600   2000   2000
Y3  7060  18100  33700  53200
K     1     25      0      0      0      0      1
K1      74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25
Y     0      0      0      0      1
Y1    0     10      4
K     0     24      0      0      0      0      1
K1      75 INFLOW INTO ONONDAGA RESERVOIR   C-4
M     1     -1     68      0   5100      0      0      0      1
P     0   21.5     33     47     55     65     72     74
T     0      0      0      0      0      0    1.5   0.06
U     6
1  2018   3341   1250    435    151     57
X   250    300    1.6
K     1     24      0      0      0      0      1
K1      76 ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD
Y     0      0      0      1      1
Y1    0      0      0      0      0      0      0
Y2    0    100    700   1980   3500   7940  18200  22200  27000  32500
Y2 43400  52300  62200  72100
Y3    80    430    660    880   1070   1420   1770   1840   2000   2000
Y3  6200  15400  28400  44700
K     1     25      0      0      0      0      1
K1      77 ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25
Y     0      0      0      0      1
Y1    0      8      3
K     2     25      0      0      0      0      1
K1      78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25
K     0     25      0      0      0      0      1
K1      79 LOCAL INFLOW C-5
M     1     -1    102      0   5100      0      0      0      1
P     0   21.5     33     47     55     65     72     74
T     0      0      0      0      0      0   1.25   0.06
U    11
1  2671   3269   2030   1215    727    436    261    156     77     56
1    27
X   250    500    1.6
K     2     25      0      0      0      0      1
K1      80 COMBINE ROUTED FLOWS, LOCAL INFLOW
K     0     25      0      0      0      0      1
K1      81 LOCAL FLOW C-8
M     1     -1     72      0   5100      0      0      0      1
P     0   21.5     33     47     55     65     72     74
T     0      0      0      0      0      0    1.0    .06
U    14
1   459   1455   1854   1454    926    590    376    239    152     97
1    62     39     25     12
X   250    300    1.6
K     2     25      0      0      0      0      1
K1      82 COMBINE LOCAL FLOW AT NODE 25
K     1     26      0      0      0      0      1
K1      83 ROUTE FLOWS TO NODE 26
Y     0      0      0      0      1
Y1    0      8      3
K     2     26      0      0      0      0      1
K1      84 COMBINE ROUTED FLOW AND FLOW AT NODE 26
K     1     28      0      0      0      0      1
K1      85 ROUTE FLOWS TO NODE 28 (THREE RIVERS)
Y     0      0      0      0      1
```

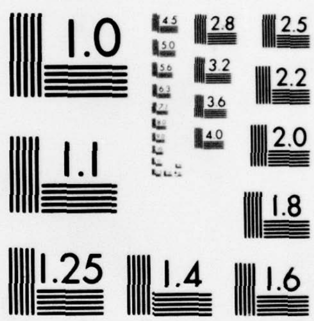
AD-A077 446 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. DAM NUMBER 5 (MINETTO) (INVENTORY --ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

UNCLASSIFIED NL

2 OF 2
AD
A077446



END
DATE
FILMED
1 -80
DDC



MICROCOPY RESOLUTION TEST CHART

NATIONAL BUREAU OF STANDARDS-1963-A

```
Y1     0     6     2
K      0    27     0     0     0     0     1
K1      86 LOCAL FLOW  (E-9)  AT NODE 27
M      1    -1    37     0  5100     0     0     0     1
P      0  21.5    33    47    55    65    72    74
T      0     0     0     0     0     0   0.5  0.06
U      6
1   2140  1119   437   171    67    11
X    100   150   1.6
K      1    28     0     0     0     1
K1      87 ROUTE LOCAL FLOW E-9 TO NODE 28
Y      0     0     0     0     1
Y1     0     3     1
K      2    28     0     0     0     0     1
K1      88 COMBINE HYDROGRAPHS AT 28
K      0    29     0     0     0     0     1
K1      89 INFLOWS TO BARGE CANAL FROM EASTERN END OF BASIN   (G-2)
M     -1     0   100     0  5100     0     0     0     1
M
M
M
M
K      1    30     0     0     0     0     1
K1      90 ROUTE FLOW AT NODE 29 TO NODE 30
Y      0     0     0     0     1
Y1     0     7     3
K      0    30     0     0     0     0     1
K1      91 LOCAL INFLOW D-4
M      1    -1   529     0  5100     0     0     0     1
P      0  21.5    33    47    55    65    72    74
T      0     0     0     0     0     0  0.25  0.06
U     15
1    940  4797 11098 12780 10280  6513  4014  2473  1524   939
1    579   356   220   140   102
X    800  3960   1.6
K      2    30     0     0     0     0     1
K1      92 COMBINE LOCAL FLOW WITH ROUTED FLOW
K      1    31     0     0     0     0     1
K1      93 ROUTE FLOWS TO NODE 31
Y      0     0     0     0     1
Y1     0     1
K      0    31     0     0     0     0     1
K1      94 LOCAL FLOW D-3
M      1    -1   144     0  5100     0     0     0     1
P      0  21.5    33    47    55    65    72    74
T      0     0     0     0     0     0  0.25  0.06
U     24
1    370  1076  2155  2396  2356  1742  1289   953   705   522
1    386   286   183   156   115    85    63    47    34    30
1     30    30    30    24
X    320  1000   2.0
K      2    31     0     0     0     0     1
K1      95 COMBINE LOCAL FLOW WITH FLOW AT NODE 31
K      0    31     0     0     0     0     1
K1      96 LOCAL FLOW D-2
M      1    -1   105     0  5100     0     0     0     1
P      0  21.5    33    47    55    65    72    74
T      0     0     0     0     0     0  0.25  0.06
U     14
1    353  1862  2750  2357  1484   929   581   363   227   142
1     89    49    35    18
X    240   800   1.6
K      2    31     0     0     0     0     1
K1      97 COMBINE LOCAL FLOW D-2 WITH FLOW AT NODE 31
K      0    31     0     0     0     0     1
K1      98 LOCAL FLOW D-1
```

```
M     1    -1   280     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.06
U    24
I   103   504  1042  1512  2516  3758  4112  4139  3602  2645
I  1916  1204   866   727   527   320   276   200   145   105
I    76    55    50    50
X   600  2160   1.6
K     2    31     0     0     0     0     1
K1       99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31
K     0    31     0     0     0     0     1
K1      100 LOCAL FLOW D-5
M     1    -1   269     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0  0.25  0.05
U    12
I 12227  5835  4245  2585  1574   958   583   355   216   132
I    80    36
X   540  2000   1.6
K     2    31     0     0     0     0     1
K1      101 COMBINE LOCAL D-5 WITH FLOW AT NODE 31
K     1    31     0     0     0     0     1
K1      102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD
Y     0     0     0     1     1
Y1    0     0     0     0     0     0 670000
Y2442000 635000 640000 650000 680000 735000 806000 845000
Y2990000 1150000 1304000
Y3 1000  1000  2000  4000  6000  8000 10000 11000
Y3 27900 64700 116600
K     1    32     0     0     0     0     1
K1      103 ROUTE FLOWS TO NODE 32
Y     0     0     0     0     1
Y1    0     1
K     0    32     0     0     0     0     1
K1      104 LOCAL FLOW D-6
M     1    -1    28     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    74
T     0     0     0     0     0     0   0.5  0.06
U    15
I   274   531   681   491   338   233   160   110    76    53
I    36    25    18    12     7
X    70   210   1.6
K     2    32     0     0     0     0     1
K1      105 COMBINE LOCAL FLOW D-6 WITH FLOW AT 32
K     1    28     0     0     0     0     1
K1      106 ROUTE FLOW AT 32 TO NODE 28
Y     0     0     0     0     1
Y1    0     6     2
K     2    28     0     0     0     0     1
K1      107 COMBINE ROUTED FLOW WITH FLOW AT NODE 28
K     0    28     0     0     0     0     1
K1      108 LOCAL FLOW D-7
M     1    -1   110     0  5100     0     0     0     1
P     0  21.5    33    47    55    65    72    77
T     0     0     0     0     0     0   0.5  0.06
U    24
I   602  1403  1808  1872  1496  1127   849   536   402   363
I   273   206   155   117    88    67    50    38    28    22
I    20    20    20     0
X   250   800   2.0
K     2    28     0     0     0     1     1
K1      109 COMBINE WITH FLOW AT NODE 28
K     1    33     0     0     0     1     1
K1      110 ROUTE FLOW AT 28 TO NODE 33
Y     0     0     0     0     1
Y1    0     3     1
```

```
DROUT       14:31 JUN 27,'79

1********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 ********************************
1                                  PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

                                          RUNOFF HYDROGRAPH AT           1
                                          ROUTE HYDROGRAPH TO            2
                                          RUNOFF HYDROGRAPH AT           2
                                          COMBINE  2 HYDROGRAPHS AT      2
                                          ROUTE HYDROGRAPH TO            6
                                          RUNOFF HYDROGRAPH AT           6
                                          COMBINE  2 HYDROGRAPHS AT      6
                                          RUNOFF HYDROGRAPH AT           3
                                          ROUTE HYDROGRAPH TO            6
                                          COMBINE  2 HYDROGRAPHS AT      6
                                          RUNOFF HYDROGRAPH AT           4
                                          ROUTE HYDROGRAPH TO            4
                                          ROUTE HYDROGRAPH TO            5
                                          RUNOFF HYDROGRAPH AT           5
                                          COMBINE  2 HYDROGRAPHS AT      5
                                          ROUTE HYDROGRAPH TO           56
                                          RUNOFF HYDROGRAPH AT          56
                                          COMBINE  2 HYDROGRAPHS AT     56
                                          ROUTE HYDROGRAPH TO            6
                                          COMBINE  2 HYDROGRAPHS AT      6
                                          ROUTE HYDROGRAPH TO            8
                                          RUNOFF HYDROGRAPH AT           7
                                          ROUTE HYDROGRAPH TO            8
                                          COMBINE  2 HYDROGRAPHS AT      8
                                          ROUTE HYDROGRAPH TO           10
                                          RUNOFF HYDROGRAPH AT           9
                                          ROUTE HYDROGRAPH TO           10
                                          COMBINE  2 HYDROGRAPHS AT     10
                                          ROUTE HYDROGRAPH TO           15
                                          RUNOFF HYDROGRAPH AT          11
                                          ROUTE HYDROGRAPH TO           11
                                          ROUTE HYDROGRAPH TO           12
                                          RUNOFF HYDROGRAPH AT          12
                                          COMBINE  2 HYDROGRAPHS AT     12
                                          ROUTE HYDROGRAPH TO           12
                                          ROUTE HYDROGRAPH TO           13
                                          RUNOFF HYDROGRAPH AT          13
                                          COMBINE  2 HYDROGRAPHS AT     13
                                          ROUTE HYDROGRAPH TO           14
                                          RUNOFF HYDROGRAPH AT          14
                                          COMBINE  2 HYDROGRAPHS AT     14
                                          RUNOFF HYDROGRAPH AT          14
                                          COMBINE  2 HYDROGRAPHS AT     14
                                          ROUTE HYDROGRAPH TO           14
                                          ROUTE HYDROGRAPH TO           15
                                          COMBINE  2 HYDROGRAPHS AT     15
                                          ROUTE HYDROGRAPH TO           18
                                          RUNOFF HYDROGRAPH AT          16
                                          ROUTE HYDROGRAPH TO           18
                                          COMBINE  2 HYDROGRAPHS AT     18
                                          RUNOFF HYDROGRAPH AT          17
                                          ROUTE HYDROGRAPH TO           17
                                          ROUTE HYDROGRAPH TO           18
                                          COMBINE  2 HYDROGRAPHS AT     18
                                          RUNOFF HYDROGRAPH AT          18
                                          COMBINE  2 HYDROGRAPHS AT     18
```

```
COMBINE  2 HYDROGRAPHS AT    18
ROUTE HYDROGRAPH TO          21
RUNOFF HYDROGRAPH AT         19
ROUTE HYDROGRAPH TO          21
COMBINE  2 HYDROGRAPHS AT    21
RUNOFF HYDROGRAPH AT         20
ROUTE HYDROGRAPH TO          20
ROUTE HYDROGRAPH TO          21
COMBINE  2 HYDROGRAPHS AT    21
RUNOFF HYDROGRAPH AT         21
COMBINE  2 HYDROGRAPHS AT    21
ROUTE HYDROGRAPH TO          22
RUNOFF HYDROGRAPH AT         22
COMBINE  2 HYDROGRAPHS AT    22
ROUTE HYDROGRAPH TO          22
ROUTE HYDROGRAPH TO          26
RUNOFF HYDROGRAPH AT         23
ROUTE HYDROGRAPH TO          23
ROUTE HYDROGRAPH TO          25
RUNOFF HYDROGRAPH AT         24
ROUTE HYDROGRAPH TO          24
ROUTE HYDROGRAPH TO          25
COMBINE  2 HYDROGRAPHS AT    25
RUNOFF HYDROGRAPH AT         25
COMBINE  2 HYDROGRAPHS AT    25
RUNOFF HYDROGRAPH AT         25
COMBINE  2 HYDROGRAPHS AT    25
ROUTE HYDROGRAPH TO          26
COMBINE  2 HYDROGRAPHS AT    26
ROUTE HYDROGRAPH TO          28
RUNOFF HYDROGRAPH AT         27
ROUTE HYDROGRAPH TO          28
COMBINE  2 HYDROGRAPHS AT    28
RUNOFF HYDROGRAPH AT         29
ROUTE HYDROGRAPH TO          30
RUNOFF HYDROGRAPH AT         30
COMBINE  2 HYDROGRAPHS AT    30
ROUTE HYDROGRAPH TO          31
RUNOFF HYDROGRAPH AT         31
COMBINE  2 HYDROGRAPHS AT    31
RUNOFF HYDROGRAPH AT         31
COMBINE  2 HYDROGRAPHS AT    31
RUNOFF HYDROGRAPH AT         31
COMBINE  2 HYDROGRAPHS AT    31
RUNOFF HYDROGRAPH AT         31
COMBINE  2 HYDROGRAPHS AT    31
ROUTE HYDROGRAPH TO          31
ROUTE HYDROGRAPH TO          32
RUNOFF HYDROGRAPH AT         32
COMBINE  2 HYDROGRAPHS AT    32
ROUTE HYDROGRAPH TO          28
COMBINE  2 HYDROGRAPHS AT    28
RUNOFF HYDROGRAPH AT         28
COMBINE  2 HYDROGRAPHS AT    28
ROUTE HYDROGRAPH TO          33
END OF NETWORK
```

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

RUN  DATE# 79/06/27.
     TIME# 13.35.35.
```

OSWEGO RIVER BASIN
HEC1DB
PMF- OVERFLOW ANALYSIS

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
40	6	0	0	0	0	0	0	4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1
RTIOS= .20 .40 .50 .60 .80 1.00

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

SUB-AREA RUNOFF COMPUTATION

1 BARGE CANAL LOCK 30 AT MACEDON (SUB AREA A1)

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	100.00	0.00	5100.00	0.00	0.000	0	1	0

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

HYDROGRAPH ROUTING

2 BARGE CANAL LOCK 29 PALMYRA (ROUTED FLOW FROM LOCK 30)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

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

SUB-AREA RUNOFF COMPUTATION

3 GANARGUA CREEK LOCAL INFLOWS TO LOCK 29 (SUB-AREA E-1)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	147.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 140.00 QRCSN= 550.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.56	3.30	186787.
										(377.)	(294.)	(84.)	(5289.22)

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

COMBINE HYDROGRAPHS

4 COMBINED ROUTED AND LOCAL FLOWS AT LOCK 29

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

5 ROUTED HYDROGRAPH TO LOCK 27 AT LYONS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

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

SUB-AREA RUNOFF COMPUTATION

6 LOWER CANARACUAL LOCAL INFLOWS VICINITY OF LOCK 27 (SUB-AREA E-2)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	110.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 120.00 QRCSN= 470.00 RTIOR= 1.60

0 END-OF-PERIOD FLOW

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

SUM 14.86 11.56 3.30 147318.
(377.)(294.)(84.)(4171.58)

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

COMBINE HYDROGRAPHS

7 COMBINED AND LOCAL FLOWS AT LOCK 27

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

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

SUB-AREA RUNOFF COMPUTATION

8 LOCAL FLOW E-3 (AREA LOCAL TO BARGE CANAL E-29 TO E-27)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	51.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 100.00 QRCSN= 200.00 RTIOR= 1.60

0 END-OF-PERIOD FLOW

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

SUM 14.86 11.56 3.30 65053.
(377.)(294.)(84.)(1842.10)

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

HYDROGRAPH ROUTING

9 ROUTED FLOW E-3 TO LYONS (NODE 6)

```
                       ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                           6      1      0      0      0      0      1      0      0
                                      ROUTING DATA
                QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                  0.0  0.000   0.00      0      1      0      0             0

                       NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                           0      5      2  0.000  0.000  0.000     0.      0


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

                                COMBINE HYDROGRAPHS

                10 COMBINE FLOWS AT NODE 6

                       ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                           6      2      0      0      0      0      1      0      0


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

                              SUB-AREA RUNOFF COMPUTATION

                11 CANANDAIGUA LAKE INFLOW

                       ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                           4      0      0      0      0      0      1      0      0

                                     HYDROGRAPH DATA
              IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
                  1     -1 184.00   0.00 5100.00  0.00  0.000      0      1      0

                                       PRECIP DATA
                   SPFE    PMS     R6    R12    R24    R48    R72    R96
                   0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                        LOSS DATA
          LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
              0   0.00   0.00   1.00   0.00   0.00   1.00   1.25    .03   0.00   0.00

                                     RECESSION DATA
                        STRTQ=  300.00   QRCSN= 1000.00   RTIOR= 1.60

     0                                END-OF-PERIOD FLOW
   MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q     MO.DA  HR.MN  PERIOD  RAIN  EXCS  LOSS   COMP Q


                                                                   SUM  14.86  12.00  2.86  252691.
                                                                      ( 377.)( 305.)(  73.)( 7155.41)


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

                                   HYDROGRAPH ROUTING

                12 CANANDAIGUA LAKE OUT FLOW USING MODIFIED PULS METHOD

                       ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                           4      1      0      0      0      0      1      0      0
                                      ROUTING DATA
```

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

                           NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                               0      0      0  0.000  0.000  0.000 51000.      0

STORAGE   10700.00   21300.00   31900.00   42500.00   53100.00   63700.00   74300.00   84900.00   95500.00  106100.00
         212500.00  319000.00

OUTFLOW      50.00      50.00      50.00      50.00     200.00     600.00    1000.00    1560.00    2250.00    3000.00
          63000.00  200366.00


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

                                          HYDROGRAPH ROUTING

                    13 ROUTED OUTFLOW TO FLINT CREEK MOUTH

                           ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                               5      1      0      0      0      0      1      0      0
                                             ROUTING DATA
                    QLOSS  CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
                      0.0  0.000   0.00      0      1      0      0             0

                           NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA ISPRAT
                               0     12      5  0.000  0.000  0.000     0.      0


                                      SUB-AREA RUNOFF COMPUTATION

                    14 FLINT CREEK INFLOW A-2

                           ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                               5      0      0      0      0      0      1      0      0

                                             HYDROGRAPH DATA
                 IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
                     1     -1 102.00   0.00 5100.00  0.00  0.000      0      1      0

                                               PRECIP DATA
                      SPFE    PMS     R6    R12    R24    R48    R72    R96
                      0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                LOSS DATA
              LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
                  0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                                              RECESSION DATA
                           STRTQ=   90.00   QRCSN= 2000.000   RTIOR= 1.60

                                            END-OF-PERIOD FLOW
      MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS   COMP Q     MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS   COMP Q

                                                                       SUM  14.86  11.08   3.78  133487.
                                                                          ( 377.)( 281.)(  96.)( 3779.93)


     *********           *********           *********           *********           *********
```

```
                              COMBINE HYDROGRAPHS

                  15 COMBINE ROUTED CANANDAIGUA OUTFLOWS AND FLINT CR INFLOWS

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            5       2       0       0       0       0       1       0       0



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

                              HYDROGRAPH ROUTING

                  16 OUTLET ROUTED TO LOCK 27

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           56       1       0       0       0       0       1       0       0
                                              ROUTING DATA
                  QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                    0.0   0.000    0.00       0       1       0       0               0

                        NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                            0       7       3   0.000   0.000   0.000      0.       0



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

                              SUB-AREA RUNOFF COMPUTATION

                  17 OUTLET LOCAL FLOW A-3

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           56       0       0       0       0       0       1       0       0

                                              HYDROGRAPH DATA
              IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1      -1  155.00    0.00 5100.00    0.00   0.000       0       1       0

                                                PRECIP DATA
                      SPFE     PMS      R6     R12     R24     R48     R72     R96
                      0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
  TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                 LOSS DATA
              LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                  0    0.00    0.00    1.00    0.00    0.00    1.00     .60     .06    0.00    0.00

                                               RECESSION DATA
                             STRTQ=  150.00   QRCSN=  200.00   RTIOR= 1.60

          0                                 END-OF-PERIOD FLOW
      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                       SUM  14.86  11.06   3.80  187176.
                                                                          ( 377.)( 281.)(  97.)( 5300.23)



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

                              COMBINE HYDROGRAPHS

                  18 COMBINE LOCAL FLOW A-3 WITH FLOW AT LOCK 27
```

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
56	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

19 ROUTE OUTLET TO CANAL

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	1	0	0	0	0	1	0	0

ROUTING DATA

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

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

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

COMBINE HYDROGRAPHS

20 COMBINE FLOW AT 6(OUTLET FLOW + E-1, E-2, E-3)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
6	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

21 ROUTE FLOWS AT LOCK 27 TO NODE 8

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

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

SUB-AREA RUNOFF COMPUTATION

22 LOCAL INFLOW LOCK 27 TO LOCK 26 (E-4)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
7	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	89.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

```
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                        LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .06    0.00    0.00

                                      RECESSION DATA
                        STRTQ=  100.00   QRCSN=  360.00   RTIOR= 1.60

   0                                 END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                          SUM  14.86  11.08   3.78   109181.
                                                                             ( 377.)( 281.)(  96.)( 3091.66)


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

                                      HYDROGRAPH ROUTING

              23 ROUTE FLOWS AT LOCK 26 TO NODE 8

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            8       1       0       0       0       0       1       0       0
                                        ROUTING DATA
              QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0    0.000    0.00       0       1       0       0               0

                        NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                            0       2       0   0.000   0.000   0.000      0.       0


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

                                      COMBINE HYDROGRAPHS

              24 COMBINE ROUTED AND LOCAL FLOWS AT NODE 8

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                            8       2       0       0       0       0       1       0       0


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

                                      HYDROGRAPH ROUTING

              25 ROUTE FLOWS AT NODE 8 TO NODE 10

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           10       1       0       0       0       0       1       0       0
                                        ROUTING DATA
              QLOSS    CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0    0.000    0.00       0       1       0       0               0

                        NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                            0       5       2   0.000   0.000   0.000      0.       0


          **********      **********      **********      **********      **********
```

26 LOCAL FLOW BETWEEN LOCK 26 AND LOCK 25 (E-5)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
9	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	18.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 90.00 QRCSN= 90.00 RTIOR= 1.60

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	23275.
										(377.)	(281.)	(96.)	(659.07)

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

HYDROGRAPH ROUTING

27 ROUTE INFLOW E-5 TO NODE 10

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

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

COMBINE HYDROGRAPHS

28 COMBINE ROUTED FLOW WITH FLOW AT NODE 10

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
10	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

29 ROUTE FLOWS AT NODE 10 TO NODE 15

ISTAQ ICOMP IECON ITAPE JPLT JPRT INAME ISTAGE IAUTO

```
                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                    15      1      0      0      0      0      1      0      0
                                      ROUTING DATA
           QLOSS   CLOSS     AVC    IRES  ISAME    IOPT   IPMP          LSTR
             0.0   0.000    0.00       0      1       0      0             0

                 NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                     0      5      2  0.000  0.000  0.000     0.       0


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

                              SUB-AREA RUNOFF COMPUTATION

           30 LOCAL INFLOW B-1 INTO KEUKA LAKE

                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                    11      0      0      0      0      0      1      0      0

                                     HYDROGRAPH DATA
         IHYDG   IUHG  TAREA   SNAP  TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
             1     -1 183.00   0.00 5100.00  0.00  0.000      0      1      0

                                       PRECIP DATA
              SPFE    PMS     R6    R12    R24    R48    R72    R96
              0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                        LOSS DATA
      LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
          0   0.00   0.00   1.00   0.00   0.00   1.00   1.50    .03   0.00   0.00

                                      RECESSION DATA
                         STRTQ=  100.00   QRCSN=  800.00   RTIOR= 1.60

     0                                END-OF-PERIOD FLOW
  MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA HR.MN PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                              SUM  14.86  11.79   3.07  242812.
                                                                 ( 377.)( 299.)(  78.)( 6875.67)


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

                                   HYDROGRAPH ROUTING

           31 KEUKA LAKE OUTFLOW W/ MODIFIED PULS

                 ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                    11      1      0      0      0      0      1      0      0
                                      ROUTING DATA
           QLOSS   CLOSS     AVC    IRES  ISAME    IOPT   IPMP          LSTR
             0.0   0.000    0.00       1      1       0      0             0

                 NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
                     0      0      0  0.000  0.000  0.000 147000.      0

STORAGE   107000.00  129500.00  141000.00  153500.00  172000.00  178000.00  191000.00  204000.00  217000.00       0.00
          328550.00

OUTFLOW      120.00     320.00     445.00     530.00     575.00     670.00     890.00    1130.00    1470.00       0.00
          126000.00
```

```
**********          **********          **********          **********          **********

                              HYDROGRAPH ROUTING

          32 ROUTE KEUKA LAKE OUTFLOWS TO 12

                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      12       1       0       0       0       0       1       0       0
                                        ROUTING DATA
          QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
            0.0   0.000    0.00       0       1       0       0               0

                  NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                      0       6       2   0.000   0.000   0.000      0.       0


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

                              SUB-AREA RUNOFF COMPUTATION

          33 SENECA LAKE INFLOWS B-2

                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      12       0       0       0       0       0       1       0       0

                                        HYDROGRAPH DATA
     IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
         1      -1  524.00    0.00 5100.00    0.00   0.000       0       1       0

                                        PRECIP DATA
                 SPFE     PMS      R6     R12     R24     R48     R72     R96
                 0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                        LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .03    0.00    0.00

                                        RECESSION DATA
                    STRTQ=  500.00    QRCSN= 2000.00    RTIOR= 1.60

          0                             END-OF-PERIOD FLOW
 MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS     COMP Q

                                                                           SUM  14.86  12.52   2.34   741890.
                                                                              ( 377.)( 318.)(  59.)(21007.99)


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

                              COMBINE HYDROGRAPHS

          34 COMBINE LOCAL FLOW B-2 AND ROUTED KEUKA LAKE OUTLET FLOWS

                   ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                      12       2       0       0       0       0       1       0       0


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

                              HYDROGRAPH ROUTING
```

```
                                   HYDROGRAPH ROUTING

            35 SENECA LAKE OUTFLOWS - MODIFIED  PULS METHOD

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       12       1       0       0       0       0       1       0       0
                                         ROUTING DATA
              QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0   0.000    0.00       1       1       0       0               0

                    NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                        0       0       0   0.000   0.000   0.000 534000.       0

STORAGE   372000.00  414000.00  456000.00  500000.00  543000.00  586000.00  630000.00  650000.00  674000.00  720000.00
          800000.00 1200000.00

OUTFLOW      700.00     700.00     700.00     700.00     700.00     700.00     700.00    1000.00    3000.00    3000.00
           15000.00   77000.00


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

                                   HYDROGRAPH ROUTING

            36 SENECA LAKE OUTFLOWS ROUTED TO 13

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       13       1       0       0       0       0       1       0       0
                                         ROUTING DATA
              QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0   0.000    0.00       0       1       0       0               0

                    NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                        0       2       0   0.000   0.000   0.000      0.       0


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

                                 SUB-AREA RUNOFF COMPUTATION

            37 LOCAL INFLOW B-4

                    ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                       13       0       0       0       0       0       1       0       0

                                       HYDROGRAPH DATA
          IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
              1      -1   39.00    0.00 5100.00    0.00   0.000       0       1       0

                                         PRECIP DATA
                 SPFE     PMS      R6     R12     R24     R48     R72     R96
                 0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                          LOSS DATA
        LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
            0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .05    0.00    0.00

                                       RECESSION DATA
                       STRTQ=   92.00   QRCSN=  200.00   RTIOR= 1.60

     0                                 END-OF-PERIOD FLOW
   MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q
```

SUM 14.86 11.56 3.30 51530.
(377.)(294.)(84.)(1459.17)

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

COMBINE HYDROGRAPHS

38 COMBINE ROUTED SENECA LAKE OUTFLOW AND LOCAL FLOW B-4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
13	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

39 ROUTE HYDROGRAPH TO 14 (CAYUGA LAKE INFLOW)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

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

SUB-AREA RUNOFF COMPUTATION

40 LOCAL INFLOW B-5

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
14	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	36.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.05	0.00	0.00

RECESSION DATA

STRTQ= 92.00 QRCSN= 200.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

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

SUM 14.86 11.56 3.30 47972.
(377.)(294.)(84.)(1358.42)

```
**********      **********      **********      **********      **********

                         COMBINE HYDROGRAPHS

           41 COMBINE FLOW B-5 WITH ROUTED FLOW

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    14       2       0       0       0       0       1       0       0


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

                       SUB-AREA RUNOFF COMPUTATION

           42 CAYUGA LAKE INFLOW B-3

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    14       0       0       0       0       0       1       0       0

                               HYDROGRAPH DATA
           IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO  ISNOW   ISAME   LOCAL
               1      -1  782.00    0.00 3100.00    0.00   0.000      0       1       0

                                 PRECIP DATA
                   SPFE     PMS      R6     R12     R24     R48     R72     R96
                   0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                  LOSS DATA
        LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
            0    0.00    0.00    1.00    0.00    0.00    1.00     .50     .03    0.00    0.00

                                RECESSION DATA
                  STRTQ= 1000.00      QRCSN= 1700.00      RTIOR= 1.60

     0                          END-OF-PERIOD FLOW
MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                         SUM  14.86  12.52   2.34  1081195.
                                                                            ( 377.)( 318.)(  59.)(30616.03)


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

                         COMBINE HYDROGRAPHS

           43 COMBINE LOCAL INFLOW B-3 AND ROUTED FLOW

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    14       2       0       0       0       0       1       0       0


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

                          HYDROGRAPH ROUTING

           44 CAYUGA LAKE OUTFLOW - MODIFIED PULS

                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    14       1       0       0       0       0       1       0       0
```

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

                      NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                          0       0       0   0.000   0.000   0.000 490000.       0

STORAGE   375000.00   417000.00   460000.00   503000.00   546000.00   589500.00   634000.00   680000.00   727000.00        0.00
          854500.00   902000.00

OUTFLOW     1700.00     1700.00     1700.00     1700.00     3400.00     3400.00     3400.00     8700.00     8700.00        0.00
           38510.00   103500.00


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

                                   HYDROGRAPH ROUTING

              45 ROUTE CAYUGA LAKE OUTFLOWS TO NODE 15

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         15       1       0       0       0       0       1       0       0
                                        ROUTING DATA
              QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0   0.000    0.00       0       1       0       0               0

                      NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                          0       3       1   0.000   0.000   0.000      0.       0


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

                                   COMBINE HYDROGRAPHS

              46 COMBINE ROUTED FLOW WITH FLOW AT NODE 15

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         15       2       0       0       0       0       1       0       0


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

                                   HYDROGRAPH ROUTING

              47 ROUTE FLOWS TO NODE 18

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         18       1       0       0       0       0       1       0       0
                                        ROUTING DATA
              QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                0.0   0.000    0.00       0       1       0       0               0

                      NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                          0       0       3   0.000   0.000   0.000      0.       0


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

                                SUB-AREA RUNOFF COMPUTATION

              48 LOCAL FLOW E-6
```

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
16	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	191.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 140.00 QRCSN= 400.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	227590.
										(377.)(	281.)(	96.)(	6444.63)

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

HYDROGRAPH ROUTING

49 ROUTE LOCAL FLOW E-6 TO NODE 18

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	2	0	0.000	0.000	0.000	0.	0

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

COMBINE HYDROGRAPHS

50 COMBINE ROUTED FLOW W/ FLOW AT NODE 18

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
18	2	0	0	0	0	1	0	0

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

SUB-AREA RUNOFF COMPUTATION

51 HEAD QUASCO INFLOW C-1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
17	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

```
                    IHYDG   IUHG  TAREA    SNAP   TRSDA   TRSPC   RATIO  ISNOW  ISAME  LOCAL
                        1     -1  201.00   0.00 5100.00    0.00   0.000      0      1      0

                                              PRECIP DATA
                           SPFE     PMS      R6     R12     R24     R48     R72     R96
                           0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                              LOSS DATA
                LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
                    0   0.00   0.00   1.00   0.00   0.00   1.00    .75    .05   0.00   0.00

                                            RECESSION DATA
                              STRTQ=  450.00   QRCSN= 1000.00   RTIOR= 1.60

        0                                 END-OF-PERIOD FLOW
  MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                             SUM  14.86  11.46   3.39  264013.
                                                                ( 377.)( 291.)(  86.)( 7490.67)



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

                                          HYDROGRAPH ROUTING

                     52 OWASCO LAKE INFLOWS - MODIFIED PULS METHOD

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 17       1       0       0       0       0       1       0       0
                                                  ROUTING DATA
                     QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                       0.0   0.000    0.00       1       1       0       0               0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  0       0       0   0.000   0.000   0.000  92000.       0

STORAGE     66000.00    73200.00    79900.00    86500.00    93200.00    99800.00   106500.00   113200.00   119800.00   126500.00
           152900.00   205700.00

OUTFLOW       600.00      600.00      600.00     1100.00     1700.00     2300.00     2860.00     3400.00     3400.00     3400.00
            24000.00    69100.00


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

                                          HYDROGRAPH ROUTING

                     53 ROUTE OWASCO LAKE OUTLET FLOWS

                              ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                                 18       1       0       0       0       0       1       0       0
                                                  ROUTING DATA
                     QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                       0.0   0.000    0.00       0       1       0       0               0

                              NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                  0       7       3   0.000   0.000   0.000      0.       0


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

                                          COMBINE HYDROGRAPHS
```

```
                                   COMBINE HYDROGRAPHS

                  54 COMBINE FLOWS WITH FLOWS AT NODE 18

                              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                                 18      2      0      0      0      0      1      0      0


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

                                  SUB-AREA RUNOFF COMPUTATION

                  55 READ LOCAL FLOW C-6

                              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                                 18      0      0      0      0      0      1      0      0

                                        HYDROGRAPH DATA
                  IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO  ISNOW   ISAME  LOCAL
                      1      -1   19.00    0.00 5100.00    0.00   0.000      0       1      0

                                          PRECIP DATA
                         SPFE     PMS      R6     R12     R24     R48     R72     R96
                         0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                           LOSS DATA
             LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
                 0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                                         RECESSION DATA
                          STRTQ=   90.00   QRCSN=  200.00   RTIOR= 1.60

          0                              END-OF-PERIOD FLOW
     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q


                                                                     SUM  14.86  11.08   3.78   25088.
                                                                        ( 377.)( 281.)(  96.)(  710.41)



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

                                      COMBINE HYDROGRAPHS

                  56 COMBINE  LOCAL FLOW C-6 WITH FLOW AT NODE 18

                              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                                 18      2      0      0      0      0      1      0      0


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

                                      HYDROGRAPH ROUTING

                  57 ROUTE FLOW AT 18 TO NODE 21

                              ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
                                 21      1      0      0      0      0      1      0      0
                                          ROUTING DATA
                      QLOSS   CLOSS     AVG   IRES   ISAME   IOPT   IPMP          LSTR
                        0.0   0.000    0.00      0       1      0      0             0
```

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

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

SUB-AREA RUNOFF COMPUTATION

58 LOCAL INFLOW E-7

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
19	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	90.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 120.00   QRCSN= 400.00   RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	122486.
										(377.)	(281.)	(96.)	(3468.42)

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

HYDROGRAPH ROUTING

59 ROUTE LOCAL FLOW TO NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

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

COMBINE HYDROGRAPHS

60 COMBINE ROUTED FLOW WITH FLOW AT 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	2	0	0	0	0	1	0	0

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

SUB-AREA RUNOFF COMPUTATION

61 SKANEATELES LAKE INFLOWS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	74.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.75	.05	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 500.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

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

SUM 14.86 11.46 3.39 100549.
(377.)(291.)(86.)(2847.23)

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

HYDROGRAPH ROUTING

62 SKANEATELES LAKE OUTFLOWS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
20	1	0	0	0	0	1	0	0

ROUTING DATA

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

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

STORAGE	0.00	17323.00	34756.00	52184.00	104368.00	208736.00	243492.00
OUTFLOW	0.00	353.00	747.00	1508.00	6403.00	13313.00	17359.00

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

HYDROGRAPH ROUTING

63 ROUTE SKANEATELES LAKE OUTFLOWS TO NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

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

COMBINE HYDROGRAPHS

64 COMBINE ROUTED LAKE OUTFLOW WITH FLOW AT NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	2	0	0	0	0	1	0	0

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

SUB-AREA RUNOFF COMPUTATION

65 LOCAL FLOW C-7

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	27.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 90.00   QRCSN= 200.00   RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	35566.
										(377.)	(281.)	(96.)	(1007.12)

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

COMBINE HYDROGRAPHS

66 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE 21

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
21	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

```
67 ROUTING TO NODE 22

          ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
             22      1      0      0      0      0      1       0      0
                             ROUTING DATA
  QLOSS   CLOSS    AVG   IRES  ISAME   IOPT   IPMP          LSTR
    0.0   0.000   0.00      0      1      0      0             0

          NSTPS  NSTDL    LAG  AMSKK      X    TSK  STORA  ISPRAT
              0      4      1  0.000  0.000  0.000     0.      0


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

                       SUB-AREA RUNOFF COMPUTATION

68  LOCAL FLOW E-8

          ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
             22      0      0      0      0      0      1       0      0

                            HYDROGRAPH DATA
   IHYDG   IUHG  TAREA   SNAP   TRSDA  TRSPC  RATIO  ISNOW  ISAME  LOCAL
       1     -1  90.00   0.00 5100.00   0.00  0.000      0      1      0

                              PRECIP DATA
          SPFE    PMS     R6    R12    R24    R48    R72    R96
          0.00  21.50  33.00  47.00  55.00  65.00  72.00  74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                               LOSS DATA
   LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
       0   0.00   0.00   1.00   0.00   0.00   1.00    .50    .06   0.00   0.00

                             RECESSION DATA
                 STRTQ=  120.00   QRCSN=  400.00   RTIOR= 1.60

        0                   END-OF-PERIOD FLOW
MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS  COMP Q   MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                         SUM  14.86  11.08   3.78  122095.
                                                            ( 377.)( 281.)(  96.)( 3457.35)


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

                          COMBINE HYDROGRAPHS

69 COMBINE ROUTED FLOW AND LOCAL FLOW AT NODE 22

          ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
             22      2      0      0      0      0      1       0      0


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

                          HYDROGRAPH ROUTING

70 BALDWINSVILLE POOL - MODIFIED PULS METHOD

          ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME  ISTAGE  IAUTO
```

```
                                22      1      0      0      0      0      1      0      0
                                          ROUTING DATA
                QLOSS   CLOSS     AVC    IRES  ISAME    IOPT    IPMP             LSTR
                  0.0   0.000    0.00       1      1       0       0                0

                        NSTPS   NSTDL     LAG  AMSKK       X     TSK   STORA  ISPRAT
                            0       0       0  0.000   0.000   0.000   3250.       0

STORAGE   3250.00   5000.00   8400.00  10000.00  11700.00  14000.00  17000.00  20000.00  24000.00  30000.00

OUTFLOW   3000.00   4000.00   6000.00   8000.00  10000.00  12000.00  14000.00  15300.00  16600.00  17000.00


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

                                   HYDROGRAPH ROUTING

                71 ROUTE FLOW TO NODE 26

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           26       1       0       0       0       0       1       0       0
                                          ROUTING DATA
                QLOSS   CLOSS     AVC    IRES  ISAME    IOPT    IPMP             LSTR
                  0.0   0.000    0.00       0      1       0       0                0

                        NSTPS   NSTDL     LAG  AMSKK       X     TSK   STORA  ISPRAT
                            0       4       1  0.000   0.000   0.000      0.       0


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

                                SUB-AREA RUNOFF COMPUTATION

                72 INFLOW TO OTISCO LAKE C-3

                        ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           23       0       0       0       0       0       1       0       0

                                         HYDROGRAPH DATA
             IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                 1      -1   42.70    0.00 5100.00    0.00   0.000       0       1       0

                                           PRECIP DATA
                    SPFE     PMS      R6     R12     R24     R48     R72     R96
                    0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                            LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.00    0.00    0.00    1.00     .75     .05    0.00    0.00

                                         RECESSION DATA
                        STRTQ=   90.00   QRCSN=  300.00   RTIOR= 1.60

        0                               END-OF-PERIOD FLOW
     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q     MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                              SUM  14.86  11.46   3.39   57020.
                                                                                 ( 377.)( 291.)(  86.)( 1637.51)


          *********      *********      *********      *********      *********
```

HYDROGRAPH ROUTING

73 OTISCO LAKE OUTFLOWS - MODIFIED PULS METHOD

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
23	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	0	0	0.000	0.000	0.000	29300.	0

STORAGE	19600.00	21800.00	23900.00	26100.00	28300.00	30500.00	32600.00	34800.00	37000.00	39200.00
	45700.00	52300.00	58800.00	65300.00						
OUTFLOW	200.00	200.00	200.00	200.00	200.00	400.00	900.00	1600.00	2000.00	2000.00
	7040.00	10100.00	33700.00	53200.00						

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

HYDROGRAPH ROUTING

74 ROUTE OTISCO LAKE OUTFLOWS TO NODE 25

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	10	4	0.000	0.000	0.000	0.	0

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

SUB-AREA RUNOFF COMPUTATION

75 INFLOW INTO ONONDAGA RESERVOIR C-4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
24	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	68.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 300.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

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

```
                                                        SUM  14.86  10.60   4.26    83772.
                                                           ( 377.)( 269.)( 108.)( 2372.16)


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

                                      HYDROGRAPH ROUTING

                  76 ROUTE ONONDAGA RESERVOIR - MODIFIED PULS METHOD

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         24       1       0       0       0       0       1       0       0
                                            ROUTING DATA
                QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                  0.0   0.000    0.00       1       1       0       0               0

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

STORAGE      0.00      100.00      700.00     1900.00     3500.00     7940.00    18200.00    22200.00    27000.00    32500.00
         43400.00    52300.00    62200.00    72100.00

OUTFLOW     80.00      430.00      660.00      880.00     1070.00     1420.00     1770.00     1840.00     2000.00     2000.00
          6200.00    15400.00    28400.00    44700.00


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

                                      HYDROGRAPH ROUTING

                  77 ROUTE ONONDAGA RESERVOIR OUTFLOWS TO NODE 25

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         25       1       0       0       0       0       1       0       0
                                            ROUTING DATA
                QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP            LSTR
                  0.0   0.000    0.00       0       1       0       0               0

                      NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                          0       8       3   0.000   0.000   0.000      0.       0


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

                                      COMBINE HYDROGRAPHS

                  78 COMBINE ROUTED FLOW WITH FLOW AT NODE 25

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         25       2       0       0       0       0       1       0       0


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

                                    SUB-AREA RUNOFF COMPUTATION

                  79 LOCAL INFLOW C-5

                      ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                         25       0       0       0       0       0       1       0       0
```

```
                                   HYDROGRAPH DATA
              IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1      -1  102.00    0.00 5100.00    0.00   0.000       0       1       0

                                     PRECIP DATA
                     SPFE     PMS      R6     R12     R24     R48     R72     R96
                     0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                      LOSS DATA
          LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
              0   0.00   0.00   1.00   0.00   0.00   1.00   1.25    .06   0.00   0.00

                                    RECESSION DATA
                       STRTQ=  250.00   QRCSN=  500.00   RTIOR= 1.60

      0                            END-OF-PERIOD FLOW
    MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q     MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                                   SUM  14.86  10.77  4.08  126945.
                                                                      ( 377.)( 274.)( 104.)( 3594.68)


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

                                 COMBINE HYDROGRAPHS

               80 COMBINE ROUTED FLOWS, LOCAL INFLOW

                      ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                         25      2      0      0      0      0      1      0      0


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

                              SUB-AREA RUNOFF COMPUTATION

               81 LOCAL FLOW C-8

                      ISTAQ  ICOMP  IECON  ITAPE   JPLT   JPRT  INAME ISTAGE  IAUTO
                         25      0      0      0      0      0      1      0      0

                                   HYDROGRAPH DATA
              IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                  1      -1   72.00    0.00 5100.00    0.00   0.000       0       1       0

                                     PRECIP DATA
                     SPFE     PMS      R6     R12     R24     R48     R72     R96
                     0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                      LOSS DATA
          LROPT  STRKR  DLTKR  RTIOL  ERAIN  STRKS  RTIOK  STRTL  CNSTL  ALSMX  RTIMP
              0   0.00   0.00   1.00   0.00   0.00   1.00   1.00    .06   0.00   0.00

                                    RECESSION DATA
                       STRTQ=  250.00   QRCSN=  300.00   RTIOR= 1.60

      0                            END-OF-PERIOD FLOW
    MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q     MO.DA HR.MN PERIOD  RAIN  EXCS  LOSS   COMP Q

                                                                   [illegible]
```

SUM 14.86 10.94 3.92 91383.
(377.)(278.)(100.)(2587.60)

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

COMBINE HYDROGRAPHS

82 COMBINE LOCAL FLOW AT NODE 25

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
25	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

83 ROUTE FLOWS TO NODE 26

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
26	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	8	3	0.000	0.000	0.000	0.	0

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

COMBINE HYDROGRAPHS

84 COMBINE ROUTED FLOW AND FLOW AT NODE 26

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
26	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

85 ROUTE FLOWS TO NODE 28 (THREE RIVERS)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

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

SUB-AREA RUNOFF COMPUTATION

86 LOCAL FLOW (E-9) AT NODE 27

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
27	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	37.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 100.00 QRCSN= 150.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	46874.
										(377.)(	281.)(	96.)(	1327.32)

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

HYDROGRAPH ROUTING

07 ROUTE LOCAL FLOW E-9 TO NODE 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	1	0	0	0	1	0	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

STATION 28, PLAN 1, RTIO 1

OUTFLOW

19.	19.	18.	17.	17.	37.	168.	235.	280.	528.
1549.	2110.	1986.	996.	473.	259.	173.	74.	37.	28.
27.	26.	25.	24.	22.	21.	20.	20.	19.	18.
17.	16.	15.	15.	14.	13.	13.	12.	12.	11.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2110.	2048.	1602.	734.	9368.
CMS	60.	58.	45.	21.	265.
INCHES		.51	1.61	2.22	2.36
MM		13.00	40.91	56.28	59.82
AC-FT		1015.	3177.	4370.	4645.
THOUS CU M		1253.	3919.	5390.	5730.

STATION 28, PLAN 1, RTIO 2

OUTFLOW

38.	38.	36.	35.	33.	75.	337.	470.	559.	1056.

3090.	4221.	3971.	1993.	940.	318.	340.	140.	74.	37.
54.	52.	49.	47.	45.	43.	41.	39.	37.	36.
34.	32.	31.	29.	28.	27.	26.	24.	23.	23.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4221.	4096.	3203.	1469.	18736.
CMS	120.	116.	91.	42.	531.
INCHES		1.03	3.22	4.43	4.71
MM		26.16	81.83	112.55	119.65
AC-FT		2031.	6354.	8740.	9291.
THOUS CU M		2505.	7037.	10780.	11460.

STATION 28, PLAN 1, RTIO 3

OUTFLOW

40.	47.	46.	43.	41.	93.	421.	588.	699.	1320.
3872.	5276.	4964.	2491.	1182.	647.	432.	185.	92.	71.
68.	65.	62.	59.	56.	54.	51.	49.	47.	44.
42.	40.	39.	37.	35.	33.	32.	30.	29.	28.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5276.	5120.	4004.	1836.	23420.
CMS	149.	145.	113.	52.	663.
INCHES		1.29	4.03	5.54	5.89
MM		32.69	102.28	140.69	149.56
AC-FT		2539.	7942.	10925.	11613.
THOUS CU M		3131.	9797.	13475.	14325.

STATION 28, PLAN 1, RTIO 4

OUTFLOW

57.	56.	55.	52.	50.	112.	505.	705.	839.	1504.
4646.	6331.	5957.	2989.	1419.	777.	519.	222.	111.	85.
81.	78.	74.	71.	67.	64.	61.	59.	56.	53.
51.	48.	46.	44.	42.	40.	38.	37.	35.	34.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6331.	6144.	4805.	2203.	28105.
CMS	179.	174.	136.	62.	796.
INCHES		1.54	4.83	6.65	7.07
MM		39.23	122.74	168.83	179.47
AC-FT		3046.	9531.	13109.	13936.
THOUS CU M		3758.	11756.	16170.	17190.

STATION 28, PLAN 1, RTIO 5

OUTFLOW

76.	75.	73.	70.	66.	149.	674.	940.	1118.	2112.
6195.	8441.	7942.	3906.	1891.	1036.	692.	296.	148.	114.
108.	103.	99.	94.	90.	86.	82.	78.	74.	71.
68.	65.	62.	59.	56.	54.	51.	49.	47.	45.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8441.	8192.	6407.	2937.	37473.
CMS	239.	232.	181.	83.	1061.
INCHES		2.06	6.44	8.86	9.42
MM		52.31	163.65	225.10	239.30
AC-FT		4062.	12708.	17479.	18582.
THOUS CU M		5010.	15675.	21560.	22920.

STATION 28, PLAN 1, RTIO 6

OUTFLON

95.	94.	91.	87.	83.	187.	842.	1175.	1398.	2640.
7744.	10551.	9928.	4982.	2364.	1295.	864.	370.	184.	142.
136.	129.	123.	118.	112.	107.	102.	98.	93.	89.
85.	81.	77.	74.	70.	67.	64.	61.	58.	56.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10551.	10240.	8009.	3672.	46841.
CMS	299.	290.	227.	104.	1326.
INCHES		2.57	8.05	11.08	11.78
MM		65.39	204.57	281.38	299.12
AC-FT		5077.	15885.	21849.	23227.
THOUS CU M		6263.	19594.	26950.	28650.

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

COMBINE HYDROGRAPHS

88 COMBINE HYDROGRAPHS AT 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	2	0	0	0	0	1	0	0

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

SUB-AREA RUNOFF COMPUTATION

89 INFLOWS TO BARGE CANAL FROM EASTERN END OF BASIN (C-2)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
29	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	100.00	0.00	5100.00	0.00	0.000	0	1	0

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

HYDROGRAPH ROUTING

90 ROUTE FLOW AT NODE 29 TO NODE 30

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	7	3	0.000	0.000	0.000	0.	0

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

SUB-AREA RUNOFF COMPUTATION

91 LOCAL INFLOW B-4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	529.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTQ= 800.00 QRCSN= 3960.00 RTIOR= 1.60

0
END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	14.86	11.08	3.78	681577.
										(377.)	(281.)	(96.)	(19300.11)

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

COMBINE HYDROGRAPHS

92 COMBINE LOCAL FLOW WITH ROUTED FLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
30	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

93 ROUTE FLOWS TO NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	1	0	0	0	0	1	0	0

ROUTING DATA

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

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

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

SUB-AREA RUNOFF COMPUTATION

94 LOCAL FLOW B-3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	144.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTQ= 320.00 QRCSN= 1000.00 RTIOR= 2.00

0 END-OF-PERIOD FLOW

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

SUM 14.86 11.08 3.78 176726.
(377.)(281.)(96.)(5004.32)

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

COMBINE HYDROGRAPHS

95 COMBINE LOCAL FLOW WITH FLOW AT NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

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

SUB-AREA RUNOFF COMPUTATION

96 LOCAL FLOW D-2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	105.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTQ= 240.00 QRCSN= 800.00 RTIOR= 1.60

0 END-OF-PERIOD FLOW

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

NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.08 3.78 136512.
(377.)(281.)(96.)(3865.59)

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

COMBINE HYDROGRAPHS

97 COMBINE LOCAL FLOW D-2 WITH FLOW AT NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

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

SUB-AREA RUNOFF COMPUTATION

98 LOCAL FLOW D-1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	200.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	74.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.25	.06	0.00	0.00

RECESSION DATA

STRTQ= 600.00 QRCSN= 2160.00 RTIOR= 1.60

0

END-OF-PERIOD FLOW

NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q NO.DA HR.MN PERIOD RAIN EXCS LOSS COMP Q

SUM 14.86 11.08 3.78 361788.
(377.)(281.)(96.)(10244.70)

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

COMBINE HYDROGRAPHS

99 COMBINE LOCAL FLOW D-1 WITH FLOW AT NODE 31

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
31	2	0	0	0	0	1	0	0

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

SUB-AREA RUNOFF COMPUTATION

```
                    100 LOCAL FLOW D-5

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               31       0       0       0       0       0       1       0       0

                                               HYDROGRAPH DATA
                  IHYDG    IUHG   TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
                      1      -1  269.00    0.00 5100.00    0.00   0.000       0       1       0

                                                 PRECIP DATA
                         SPFE     PMS      R6     R12     R24     R48     R72     R96
                         0.00   21.50   33.00   47.00   55.00   65.00   72.00   74.00
TRSPC COMPUTED BY THE PROGRAM IS  .934

                                                  LOSS DATA
             LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                 0    0.00    0.00    1.00    0.00    0.00    1.00     .25     .05    0.00    0.00

                                               RECESSION DATA
                            STRTQ=  540.00    QRCSN= 2000.00    RTIOR= 1.60

          0                                 END-OF-PERIOD FLOW
      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q      MO.DA  HR.MN  PERIOD   RAIN   EXCS   LOSS    COMP Q

                                                                           SUM  14.86  11.56   3.30   363523.
                                                                              ( 377.)( 294.)(  84.)(10293.83)


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

                                             COMBINE HYDROGRAPHS

                    101 COMBINE LOCAL D-5 WITH FLOW AT NODE 31

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               31       2       0       0       0       0       1       0       0


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

                                             HYDROGRAPH ROUTING

                    102 ONEIDA LAKE OUTFLOW BY MODIFIED PULS METHOD

                            ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               31       1       0       0       0       0       1       0       0
                                                ROUTING DATA
                      QLOSS   CLOSS     AVG    IRES   ISAME    IOPT    IPMP             LSTR
                        0.0   0.000    0.00       1       1       0       0                0

                            NSTPS   NSTDL     LAG   AMSKK       X     TSK   STORA  ISPRAT
                                0       0       0   0.000   0.000   0.000 670000.       0

 STORAGE    442000.00   635000.00   640000.00   650000.00   680000.00   735000.00   806000.00   845000.00        0.00        0.00
            990000.00  1150000.00  1304000.00

 OUTFLOW      1000.00     1000.00     2000.00     4000.00     6000.00     8000.00    10000.00    11000.00        0.00        0.00
             27900.00    64700.00   116600.00


                 ..........        ..........        ..........        ..........        ..........
```

106 ROUTE FLOW AT 32 TO NODE 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	1	0	0	0	0	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	6	2	0.000	0.000	0.000	0.	0

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

COMBINE HYDROGRAPHS

107 COMBINE ROUTED FLOW WITH FLOW AT NODE 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	2	0	0	0	0	1	0	0

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

SUB-AREA RUNOFF COMPUTATION

108 LOCAL FLOW D-7

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	110.00	0.00	5100.00	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	33.00	47.00	55.00	65.00	72.00	77.00

TRSPC COMPUTED BY THE PROGRAM IS .934

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	.50	.06	0.00	0.00

RECESSION DATA

STRTQ= 250.00 QRCSN= 800.00 RTIOR= 2.00

0

END-OF-PERIOD FLOW

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

SUM 15.46 11.25 4.21 138583.
(393.)(286.)(107.)(3924.23)

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

COMBINE HYDROGRAPHS

109 COMBINE WITH FLOW AT NODE 28

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
28	2	0	0	0	1	1	0	0

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 1

8875.	8852.	8835.	8814.	8772.	8751.	8953.	9171.	9387.	10184.
12925.	15932.	18110.	19116.	20399.	22072.	23698.	24853.	25760.	26136.
26110.	25017.	25341.	24713.	24079.	23540.	23137.	22847.	22676.	22618.
22649.	22741.	22856.	22966.	23041.	23064.	23024.	22909.	22782.	22656.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26136.	26123.	25903.	24637.	753394.
CMS	740.	740.	734.	698.	21334.
INCHES		.05	.19	.54	1.37
MM		1.20	4.77	13.61	34.70
AC-FT		12954.	51379.	146600.	373584.
THOUS CU M		15978.	63375.	180828.	460809.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 2

9194.	9172.	9183.	9204.	9200.	9256.	9778.	10326.	10873.	12582.
18236.	24255.	28504.	30267.	32346.	35068.	37554.	39189.	40382.	40638.
40357.	39735.	38900.	37933.	37068.	36447.	36090.	35900.	35864.	35971.
36207.	36550.	36973.	37440.	37939.	38410.	38828.	39161.	39402.	39559.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40638.	40510.	40210.	38315.	1155580.
CMS	1151.	1147.	1139.	1085.	32722.
INCHES		.07	.29	.83	2.10
MM		1.87	7.41	21.17	53.22
AC-FT		20088.	79755.	227993.	573015.
THOUS CU M		24778.	98376.	281225.	706803.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 3

9353.	9332.	9357.	9399.	9414.	9508.	10191.	10904.	11615.	13797.
20060.	28325.	33482.	35435.	37701.	40731.	43514.	45298.	46650.	46955.
46699.	46065.	45207.	44180.	43287.	42689.	42403.	42299.	42352.	42545.
42858.	43269.	43752.	44276.	44810.	45319.	45766.	46123.	46381.	46549.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	46955.	46827.	46496.	44555.	1340699.
CMS	1330.	1326.	1317.	1262.	37964.
INCHES		.08	.34	.97	2.43
MM		2.16	8.57	24.62	61.74
AC-FT		23220.	92224.	265123.	664810.
THOUS CU M		28641.	113757.	327024.	820031.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 4

9513.	9492.	9531.	9595.	9620.	9761.	10604.	11483.	12350.	15018.
23482.	32353.	38377.	40457.	42871.	46182.	49260.	51253.	52015.	53242.
53063.	52450.	51593.	50531.	49630.	49076.	48800.	48877.	49031.	49317.
49711.	50189.	50725.	51293.	51859.	52391.	52852.	53211.	53466.	53627.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	53627.	53547.	53135.	51275.	1527493.
CMS	1519.	1516.	1505.	1452.	43254.
INCHES		.10	.39	1.12	2.77
MM		2.47	9.79	28.34	70.34
AC-FT		26552.	105391.	305106.	757435.
THOUS CU M		32751.	129998.	376342.	934282.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 5

9831.	9813.	9879.	9985.	10058.	10267.	11430.	12640.	13863.	17443.
28680.	40290.	47974.	50278.	52989.	56966.	60770.	63310.	65400.	66295.
66360.	65840.	64971.	63808.	62825.	62263.	62134.	62211.	62450.	62820.
63301.	63868.	64490.	65164.	65834.	66468.	67021.	67451.	67758.	67951.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67951.	67854.	67360.	65143.	1904358.
CMS	1924.	1921.	1907.	1845.	53925.
INCHES		.12	.49	1.42	3.45
MM		3.12	12.41	36.00	87.70
AC-FT		33647.	133606.	387626.	944310.
THOUS CU M		41503.	164801.	478129.	1164789.

SUM OF 2 HYDROGRAPHS AT 28 PLAN 1 RTIO 6

10150.	10133.	10228.	10376.	10487.	10774.	12257.	13819.	15410.	19894.
33860.	48171.	57454.	59943.	62941.	67609.	72185.	75346.	78178.	79405.
79709.	79278.	78374.	77006.	75992.	75392.	75293.	75420.	75715.	76152.
76710.	77368.	78102.	78885.	79683.	80444.	81114.	81640.	82016.	82255.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	82255.	82136.	81530.	78889.	2279043.
CMS	2329.	2326.	2309.	2234.	64535.
INCHES		.15	.59	1.72	4.13
MM		3.78	15.02	43.60	104.95
AC-FT		40728.	161712.	469421.	1130104.
THOUS CU M		50238.	199469.	579023.	1393963.

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

HYDROGRAPH ROUTING

110 ROUTE FLOW AT 28 TO NODE 33

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
33	1	0	0	0	1	1	0	0

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
0	3	1	0.000	0.000	0.000	0.	0

STATION 33, PLAN 1, RTIO 1

OUTFLOW

8875.	8860.	8854.	8834.	8807.	8779.	8825.	8958.	9171.	9581.
10832.	13014.	15656.	17719.	19200.	20529.	22056.	23541.	24770.	25503.
26002.	26021.	25756.	25291.	24711.	24111.	23505.	23175.	22887.	22713.
22640.	22669.	22749.	22854.	22954.	23024.	23043.	22999.	22905.	22824.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	26021.	26012.	25804.	24505.	739529.
CMS	737.	737.	731.	696.	20941.
INCHES		.05	.19	.53	1.34
MM		[illegible]	[illegible]	[illegible]	[illegible]

MM		1.20	4.75	13.59	[illegible]
AC-FT		12898.	51181.	146290.	366709.
THOUS CU M		15910.	63131.	180446.	452320.

STATION 33, PLAN 1, RTIO 2

OUTFLOW

9194.	9187.	9183.	9186.	9196.	9220.	9411.	9787.	10326.	11260.
13097.	18350.	23665.	27675.	30372.	32560.	34989.	37270.	39042.	40070.
40459.	40244.	39647.	38059.	37970.	37149.	36535.	36146.	35952.	35912.
36014.	36242.	36576.	36990.	37453.	37932.	38392.	38799.	39130.	39322.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40459.	40351.	40032.	38240.	1125333.
CMS	1146.	1143.	1134.	1083.	31866.
INCHES		.07	.29	.83	2.04
MM		1.86	7.37	21.13	51.82
AC-FT		20009.	79402.	227544.	558016.
THOUS CU M		24681.	97940.	280671.	688303.

STATION 33, PLAN 1, RTIO 3

OUTFLOW

9353.	9346.	9348.	9363.	9390.	9441.	9704.	10201.	10903.	12106.
15424.	20994.	27556.	32414.	35539.	37956.	40649.	43181.	45154.	46301.
46768.	46573.	45990.	45151.	44225.	43385.	42793.	42463.	42351.	42390.
42505.	42891.	43293.	43766.	44279.	44802.	45290.	45736.	46090.	46295.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	46768.	46670.	46304.	44495.	1303631.
CMS	1324.	1322.	1311.	1260.	36915.
INCHES		.08	.34	.97	2.36
MM		2.15	8.53	24.59	60.03
AC-FT		23142.	91842.	264766.	646429.
THOUS CU M		28546.	113285.	326583.	797358.

STATION 33, PLAN 1, RTIO 4

OUTFLOW

9513.	9506.	9512.	9539.	9585.	9661.	9998.	10616.	11402.	12953.
16953.	23610.	31404.	37062.	40568.	43170.	46107.	48901.	51112.	52437.
53040.	52921.	52372.	51520.	50585.	49745.	49195.	48944.	48929.	49075.
49353.	49739.	50200.	50736.	51292.	51847.	52367.	52818.	53176.	53381.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	53381.	53279.	52744.	50892.	1483502.
CMS	1512.	1509.	1494.	1441.	42008.
INCHES		.10	.38	1.11	2.69
MM		2.45	9.72	28.12	68.32
AC-FT		26419.	104616.	302829.	735621.
THOUS CU M		32588.	129042.	373533.	907375.

STATION 33, PLAN 1, RTIO 5

OUTFLOW

9831.	9825.	9841.	9892.	9974.	10103.	10585.	11446.	12644.	14648.
19995.	28007.	38984.	46183.	50413.	53411.	56900.	60349.	63186.	65028.
66045.	66168.	65726.	64876.	63068.	62965.	62407.	62203.	62265.	62494.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

62657. 63330. 63807. 64510. 65165. 65822. 66441. 66900. 67410. 67656.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67656.	67533.	66892.	64674.	1846386.
CMS	1916.	1912.	1894.	1831.	52284.
INCHES		.12	.49	1.41	3.35
MM		3.11	12.32	35.74	85.03
AC-FT		33487.	132679.	384838.	915563.
THOUS CU M		41306.	163657.	474691.	1129331.

STATION 33, PLAN 1, RTIO 6

OUTFLOW

10150.	10144.	10170.	10246.	10364.	10546.	11173.	12283.	13829.	16374.
23055.	33975.	46495.	55109.	60113.	63498.	67578.	71713.	75236.	77643.
79097.	79464.	79120.	78246.	77151.	76156.	75559.	75368.	75476.	75762.
76192.	76743.	77393.	78118.	78890.	79671.	80414.	81066.	81590.	81891.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	81891.	81740.	80963.	78329.	2207121.
CMS	2319.	2315.	2293.	2218.	62499.
INCHES		.15	.59	1.70	4.00
MM		3.76	14.91	43.29	101.64
AC-FT		40532.	160587.	466088.	1094440.
THOUS CU M		49996.	198081.	574912.	1349972.

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

(

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)

				RATIOS APPLIED TO FLOWS					
OPERATION	STATION	AREA	PLAN	RATIO 1 .20	RATIO 2 .40	RATIO 3 .50	RATIO 4 .60	RATIO 5 .80	RATIO 6 1.00
HYDROGRAPH AT	1	100.00	1	78.	157.	196.	235.	314.	392.
		(259.00)	(	2.22)(	4.44)(	5.55)(	6.66)(	8.88)(	11.10)(
ROUTED TO	2	100.00	1	78.	156.	195.	234.	311.	389.
		(259.00)	(	2.20)(	4.41)(	5.51)(	6.61)(	8.82)(	11.02)(
HYDROGRAPH AT	2	147.00	1	5716.	11432.	14291.	17149.	22865.	28581.
		(380.73)	(	161.86)(	323.73)(	404.66)(	485.59)(	647.46)(	809.32)(
2 COMBINED	2	247.00	1	5793.	11585.	14481.	17378.	23170.	28963.
		(639.73)	(	164.03)(	328.05)(	410.07)(	492.08)(	656.11)(	820.13)(
ROUTED TO	6	247.00	1	3651.	7301.	9127.	10952.	14602.	18253.
		(639.73)	(	103.37)(	206.75)(	258.43)(	310.12)(	413.50)(	516.87)(
HYDROGRAPH AT	6	118.00	1	2735.	5469.	6837.	8204.	10939.	13674.
		(305.62)	(	77.44)(	154.88)(	193.60)(	232.32)(	309.75)(	387.19)(
2 COMBINED	6	365.00	1	6222.	12444.	15555.	18666.	24888.	31110.
		(945.35)	(	176.19)(	352.38)(	440.47)(	528.57)(	704.75)(	880.94)(

HYDROGRAPH AT	3	51.00	1	3559.	7119.	8898.	10678.	14237.	17797.
		(132.09)	(	100.79)(	201.58)(	251.97)(	302.37)(	403.16)(	503.95)(
ROUTED TO	6	51.00	1	1974.	3948.	4934.	5921.	7895.	9869.
		(132.09)	(	55.89)(	111.78)(	139.73)(	167.67)(	223.56)(	279.46)(
2 COMBINED	6	416.00	1	6557.	13115.	16393.	19672.	26229.	32787.
		(1077.44)	(	185.68)(	371.36)(	464.21)(	557.05)(	742.73)(	928.41)(
HYDROGRAPH AT	4	184.00	1	14208.	28416.	35520.	42624.	56832.	71040.
		(476.56)	(	402.32)(	804.65)(	1005.81)(	1206.97)(	1609.30)(	2011.62)(
ROUTED TO	4	184.00	1	868.	1985.	2666.	5119.	11584.	18145.
		(476.56)	(	24.58)(	56.20)(	75.48)(	144.96)(	328.03)(	513.80)(
ROUTED TO	5	184.00	1	828.	1833.	2447.	3475.	6907.	10624.
		(476.56)	(	23.45)(	51.89)(	69.29)(	98.40)(	195.59)(	300.84)(
HYDROGRAPH AT	5	102.00	1	2638.	5276.	6595.	7914.	10552.	13190.
		(264.18)	(	74.70)(	149.40)(	186.75)(	224.11)(	298.81)(	373.51)(
2 COMBINED	5	286.00	1	3060.	6020.	7544.	9246.	13808.	18651.
		(740.74)	(	86.66)(	170.47)(	213.63)(	261.82)(	390.99)(	528.15)(
ROUTED TO	56	286.00	1	2577.	5093.	6405.	7999.	12497.	17263.
		(740.74)	(	72.97)(	144.22)(	181.38)(	226.50)(	353.88)(	488.83)(
HYDROGRAPH AT	56	155.00	1	4849.	9698.	12123.	14548.	19397.	24246.
		(401.45)	(	137.32)(	274.63)(	343.29)(	411.95)(	549.26)(	686.58)(
2 COMBINED	56	441.00	1	7157.	14184.	17730.	21420.	29528.	37918.
		(1142.18)	(	202.66)(	401.65)(	502.07)(	606.56)(	836.13)(	1073.71)(
ROUTED TO	6	441.00	1	7157.	14184.	17730.	21420.	29528.	37918.
		(1142.18)	(	202.66)(	401.65)(	502.07)(	606.56)(	836.13)(	1073.71)(
2 COMBINED	6	857.00	1	13498.	26867.	33585.	40445.	54894.	69626.
		(2219.62)	(	382.23)(	760.80)(	951.01)(	1145.28)(	1554.43)(	1971.59)(
ROUTED TO	8	857.00	1	11700.	23294.	29131.	35158.	48028.	61131.
		(2219.62)	(	331.29)(	659.62)(	824.91)(	995.56)(	1360.00)(	1731.02)(
HYDROGRAPH AT	7	89.00	1	3132.	6264.	7830.	9396.	12528.	15660.
		(230.51)	(	88.69)(	177.38)(	221.72)(	266.07)(	354.76)(	443.44)(
ROUTED TO	8	89.00	1	2937.	5873.	7342.	8810.	11746.	14683.
		(230.51)	(	83.16)(	166.31)(	207.89)(	249.47)(	332.62)(	415.78)(
2 COMBINED	8	946.00	1	12296.	24459.	30571.	36838.	50268.	63931.
		(2450.13)	(	348.18)(	692.59)(	865.68)(	1043.14)(	1423.43)(	1810.31)(
ROUTED TO	10	946.00	1	11829.	23528.	29410.	35496.	48475.	61680.
		(2450.13)	(	334.95)(	666.25)(	832.79)(	1005.12)(	1372.67)(	1746.58)(
HYDROGRAPH AT	9	18.00	1	608.	1217.	1521.	1825.	2433.	3042.
		(46.62)	(	17.23)(	34.45)(	43.07)(	51.68)(	68.91)(	86.13)(
ROUTED TO	10	18.00	1	601.	1201.	1502.	1802.	2403.	3003.
		(46.62)	(	17.01)(	34.02)(	42.52)(	51.03)(	68.04)(	85.05)(
2 COMBINED	10	964.00	1	11922.	23714.	29642.	35718.	48772.	62051.
		(2496.75)	(	337.58)(	671.51)(	839.37)(	1011.43)(	1381.08)(	1757.09)(
ROUTED TO	15	964.00	1	11544.	22961.	28702.	34595.	47264.	60158.
		(2496.75)	(	326.88)(	650.18)(	812.76)(	979.61)(	1338.43)(	1703.49)(

HYDROGRAPH AT	11	183.00	1	20366.	40732.	50915.	61098.	81464.	101830.
		(473.97)	(	576.70)(	1153.40)(	1441.75)(	1730.10)(	2306.80)(	2883.49)(
ROUTED TO	11	183.00	1	560.	839.	1036.	1282.	1845.	2406.
		(473.97)	(	15.85)(	23.74)(	29.34)(	36.30)(	52.23)(	68.14)(
ROUTED TO	12	183.00	1	559.	831.	1026.	1263.	1817.	2371.
		(473.97)	(	15.83)(	23.52)(	29.05)(	35.78)(	51.46)(	67.13)(
HYDROGRAPH AT	12	524.00	1	41859.	83718.	104647.	125577.	167436.	209295.
		(1357.15)	(	1185.31)(	2370.62)(	2963.28)(	3555.94)(	4741.25)(	5926.56)(
2 COMBINED	12	707.00	1	42350.	84221.	105156.	126101.	167996.	209892.
		(1831.12)	(	1199.22)(	2384.88)(	2977.69)(	3570.79)(	4757.11)(	5943.48)(
ROUTED TO	12	707.00	1	700.	2514.	3000.	4713.	12318.	19824.
		(1831.12)	(	19.82)(	71.20)(	84.95)(	133.47)(	348.82)(	561.34)(
ROUTED TO	13	707.00	1	700.	2508.	3000.	4701.	12312.	19707.
		(1831.12)	(	19.82)(	71.01)(	84.95)(	133.12)(	348.65)(	558.05)(
HYDROGRAPH AT	13	39.00	1	1958.	3915.	4894.	5873.	7831.	9789.
		(101.01)	(	55.44)(	110.87)(	138.59)(	166.31)(	221.75)(	277.18)(
2 COMBINED	13	746.00	1	2658.	4615.	5657.	7109.	13847.	21998.
		(1932.13)	(	75.26)(	130.69)(	160.19)(	201.31)(	392.09)(	622.90)(
ROUTED TO	14	746.00	1	1917.	3419.	4912.	5982.	13164.	20914.
		(1932.13)	(	54.28)(	96.83)(	139.09)(	169.39)(	372.76)(	592.22)(
HYDROGRAPH AT	14	36.00	1	1927.	3854.	4817.	5780.	7707.	9634.
		(93.24)	(	54.56)(	109.12)(	136.40)(	163.68)(	218.24)(	272.80)(
2 COMBINED	14	782.00	1	3364.	6028.	7370.	8781.	13470.	21512.
		(2025.37)	(	95.26)(	170.69)(	208.71)(	248.66)(	381.42)(	609.16)(
HYDROGRAPH AT	14	782.00	1	43279.	86557.	108197.	129836.	173114.	216393.
		(2025.37)	(	1225.51)(	2451.03)(	3063.78)(	3676.54)(	4902.05)(	6127.57)(
2 COMBINED	14	1564.00	1	46193.	91686.	114432.	137179.	182681.	228285.
		(4050.74)	(	1308.04)(	2596.25)(	3240.36)(	3884.47)(	5172.96)(	6464.31)(
ROUTED TO	14	1564.00	1	3400.	8700.	8700.	8700.	8700.	8700.
		(4050.74)	(	96.28)(	246.36)(	246.36)(	246.36)(	246.36)(	246.36)(
ROUTED TO	15	1564.00	1	3400.	8700.	8700.	8700.	8700.	8700.
		(4050.74)	(	96.28)(	246.36)(	246.36)(	246.36)(	246.36)(	246.36)(
2 COMBINED	15	2528.00	1	14944.	31661.	37402.	43295.	55966.	68858.
		(6547.49)	(	423.15)(	896.54)(	1059.12)(	1225.97)(	1584.78)(	1949.84)(
ROUTED TO	18	2528.00	1	14139.	30071.	35426.	40960.	52754.	64739.
		(6547.49)	(	400.37)(	851.52)(	1003.14)(	1159.86)(	1493.83)(	1833.21)(
HYDROGRAPH AT	16	191.00	1	8770.	17539.	21924.	26309.	35079.	43849.
		(494.69)	(	248.33)(	496.66)(	620.83)(	744.99)(	993.32)(	1241.65)(
ROUTED TO	18	191.00	1	8307.	16613.	20766.	24920.	33226.	41533.
		(494.69)	(	235.22)(	470.43)(	588.04)(	705.65)(	940.86)(	1176.08)(
2 COMBINED	18	2719.00	1	14213.	30219.	35610.	41181.	53049.	65100.
		(7042.18)	(	402.46)(	855.70)(	1008.36)(	1166.12)(	1502.18)(	1843.65)(
HYDROGRAPH AT	17	201.00	1	11920.	23840.	29801.	35761.	47681.	59601.
		(520.59)	(	337.54)(	675.09)(	843.86)(	1012.63)(	1350.17)(	1687.71)(

ROUTED TO	17	201.00	1	2523.	3400.	6860.	10899.	19286.	27153.
		(520.59)	(	71.45)(	96.28)(	194.25)(	308.61)(	546.11)(	768.87)(
ROUTED TO	18	201.00	1	2440.	3400.	5197.	8317.	14130.	20256.
		(520.59)	(	69.09)(	96.28)(	147.16)(	235.52)(	400.12)(	573.58)(
2 COMBINED	18	2920.00	1	16048.	33461.	39010.	44581.	56449.	68523.
		(7562.77)	(	454.42)(	947.51)(	1104.64)(	1262.40)(	1598.46)(	1940.35)(
HYDROGRAPH AT	18	19.00	1	708.	1416.	1770.	2124.	2831.	3539.
		(49.21)	(	20.04)(	40.09)(	50.11)(	60.13)(	80.18)(	100.22)(
2 COMBINED	18	2939.00	1	16082.	33529.	39095.	44683.	56585.	68692.
		(7611.98)	(	455.38)(	949.43)(	1107.04)(	1265.28)(	1602.30)(	1945.15)(
ROUTED TO	21	2939.00	1	15651.	32572.	37923.	43327.	54904.	66706.
		(7611.98)	(	443.19)(	922.33)(	1073.86)(	1226.88)(	1554.71)(	1888.91)(
HYDROGRAPH AT	19	98.00	1	5333.	10666.	13333.	15999.	21333.	26666.
		(253.82)	(	151.02)(	302.04)(	377.55)(	453.06)(	604.07)(	755.09)(
ROUTED TO	21	98.00	1	3197.	6395.	7993.	9592.	12789.	15986.
		(253.82)	(	90.54)(	181.07)(	226.34)(	271.61)(	362.15)(	452.68)(
2 COMBINED	21	3037.00	1	15710.	32683.	38062.	43494.	55127.	66985.
		(7865.79)	(	444.84)(	925.49)(	1077.80)(	1231.62)(	1561.02)(	1896.79)(
HYDROGRAPH AT	20	74.00	1	9096.	18191.	22739.	27287.	36383.	45478.
		(191.66)	(	257.56)(	515.12)(	643.90)(	772.68)(	1030.24)(	1287.80)(
ROUTED TO	20	74.00	1	179.	358.	456.	555.	757.	1124.
		(191.66)	(	5.06)(	10.13)(	12.93)(	15.72)(	21.44)(	31.83)(
ROUTED TO	21	74.00	1	177.	354.	451.	549.	745.	1098.
		(191.66)	(	5.01)(	10.02)(	12.78)(	15.54)(	21.08)(	31.08)(
2 COMBINED	21	3111.00	1	15877.	33016.	38484.	44007.	55821.	67932.
		(8057.45)	(	449.59)(	934.92)(	1089.74)(	1246.13)(	1580.66)(	1923.62)(
HYDROGRAPH AT	21	27.00	1	1584.	3168.	3959.	4751.	6335.	7919.
		(69.93)	(	44.85)(	89.69)(	112.12)(	134.54)(	179.39)(	224.24)(
2 COMBINED	21	3138.00	1	15903.	33065.	38545.	44079.	55918.	68053.
		(8127.38)	(	450.31)(	936.29)(	1091.46)(	1248.19)(	1583.41)(	1927.06)(
ROUTED TO	22	3138.00	1	15786.	32815.	38247.	43745.	55465.	67485.
		(8127.38)	(	447.01)(	929.21)(	1083.04)(	1238.71)(	1570.59)(	1910.96)(
HYDROGRAPH AT	22	98.00	1	7764.	15527.	19409.	23291.	31055.	38819.
		(253.82)	(	219.84)(	439.69)(	549.61)(	659.53)(	879.38)(	1099.22)(
2 COMBINED	22	3236.00	1	15827.	32898.	38351.	43869.	55630.	67692.
		(8381.20)	(	448.18)(	931.55)(	1085.97)(	1242.23)(	1575.27)(	1916.82)(
ROUTED TO	22	3236.00	1	15035.	27531.	32506.	37545.	48117.	58777.
		(8381.20)	(	425.76)(	779.59)(	920.48)(	1063.17)(	1362.53)(	1664.38)(
ROUTED TO	26	3236.00	1	14971.	27442.	32406.	37409.	47930.	58540.
		(8381.20)	(	423.92)(	777.07)(	917.62)(	1059.30)(	1357.23)(	1657.66)(
HYDROGRAPH AT	23	42.70	1	4418.	8835.	11044.	13253.	17671.	22089.
		(110.59)	(	125.10)(	250.19)(	312.74)(	375.29)(	500.38)(	625.48)(
ROUTED TO	23	42.70	1	740.	1736.	2000.	2218.	4376.	6539.
		(110.59)	(	21.10)(	49.17)(	56.63)(	62.81)(	123.91)(	185.17)(

ROUTED TO	25	42.70	1	586.	1319.	1667.	1911.	2720.	3610.
		(110.59)	(	16.59)(	37.35)(	47.21)(	54.13)(	77.03)(	102.22)(
HYDROGRAPH AT	24	68.00	1	5101.	10202.	12753.	15304.	20405.	25506.
		(176.12)	(	144.45)(	288.90)(	361.13)(	433.35)(	577.80)(	722.25)(
ROUTED TO	24	68.00	1	1160.	1518.	1628.	1743.	1909.	2000.
		(176.12)	(	32.85)(	42.98)(	46.11)(	49.35)(	54.05)(	56.63)(
ROUTED TO	25	68.00	1	1085.	1481.	1594.	1707.	1874.	2000.
		(176.12)	(	30.72)(	41.95)(	45.13)(	48.33)(	53.05)(	56.63)(
2 COMBINED	25	110.70	1	1656.	2800.	3261.	3618.	4594.	5610.
		(286.71)	(	46.91)(	79.29)(	92.33)(	102.46)(	130.09)(	158.85)(
HYDROGRAPH AT	25	102.00	1	5570.	11141.	13926.	16711.	22282.	27852.
		(264.18)	(	157.74)(	315.48)(	394.34)(	473.21)(	630.95)(	788.69)(
2 COMBINED	25	212.70	1	6264.	12169.	15086.	17971.	23907.	29854.
		(550.89)	(	177.37)(	344.58)(	427.20)(	508.89)(	676.97)(	845.38)(
HYDROGRAPH AT	25	72.00	1	3355.	6709.	8386.	10064.	13418.	16773.
		(186.48)	(	94.99)(	189.98)(	237.48)(	284.97)(	379.97)(	474.96)(
2 COMBINED	25	284.70	1	9262.	18165.	22581.	26965.	35899.	44844.
		(737.37)	(	262.26)(	514.37)(	639.43)(	763.56)(	1016.54)(	1269.85)(
ROUTED TO	26	284.70	1	5545.	10654.	13138.	15563.	20730.	25914.
		(737.37)	(	157.03)(	301.69)(	372.02)(	440.69)(	587.02)(	733.81)(
2 COMBINED	26	3520.70	1	17460.	28827.	34158.	39533.	50532.	61524.
		(9118.57)	(	494.42)(	816.30)(	967.24)(	1119.46)(	1430.91)(	1742.17)(
ROUTED TO	28	3520.70	1	16731.	28565.	33868.	39258.	50202.	61123.
		(9118.57)	(	473.76)(	808.86)(	959.02)(	1111.67)(	1421.55)(	1730.82)(
HYDROGRAPH AT	27	37.00	1	3278.	6556.	8195.	9834.	13112.	16390.
		(95.83)	(	92.82)(	185.64)(	232.06)(	278.47)(	371.29)(	464.11)(
ROUTED TO	28	37.00	1	2110.	4221.	5276.	6331.	8441.	10551.
		(95.83)	(	59.76)(	119.51)(	149.39)(	179.27)(	239.03)(	298.78)(
2 COMBINED	28	3557.70	1	16758.	28587.	33896.	39292.	50247.	61180.
		(9214.40)	(	474.52)(	809.50)(	959.82)(	1112.62)(	1422.83)(	1732.42)(
HYDROGRAPH AT	29	100.00	1	0.	0.	0.	0.	0.	0.
		(259.00)	(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(
ROUTED TO	30	100.00	1	0.	0.	0.	0.	0.	0.
		(259.00)	(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(	0.00)(
HYDROGRAPH AT	30	529.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1370.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
2 COMBINED	30	629.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1629.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
ROUTED TO	31	629.00	1	23305.	46610.	58263.	69915.	93221.	116526.
		(1629.10)	(	659.93)(	1319.86)(	1649.82)(	1979.78)(	2639.71)(	3299.64)(
HYDROGRAPH AT	31	144.00	1	4722.	9444.	11804.	14165.	18887.	23609.
		(372.96)	(	133.71)(	267.41)(	334.27)(	401.12)(	534.83)(	668.53)(
2 COMBINED	31	773.00	1	28027.	56054.	70067.	84081.	112108.	140135.
		(2002.06)	(	793.63)(	1587.27)(	1984.09)(	2380.90)(	3174.54)(	3968.17)(

Table I-1: Physical Characteristics of Lakes in the Basin

Name	Regulating Agency	Drainage Area (sq.mi.)	Surface Area (sq.mi.)	Shoreline (miles)	[illegible]
Canandaigua Lake	City of Canandaigua	184	16.57	36	[illegible]
Keuka Lake	Village of Penn Yan	179	17.43	19	WS,SQ,Rec.,P
Seneca Lake	N.Y. Electric & Gas Co. & N.Y.S. Dept. of Transportation	714	66.9	75	WS,Nav.,P,FC Rec.
Cayuga Lake	N.Y.S. Dept. of Transportation	780	66.4	85	WS, Nav., Re FC
Owasco Lake	City of Auburn	206	10.25	25	WS,WQ,FC,Rec
Skaneateles Lake	City of Syracuse	74	13.8	33	WS,SQ,FC,Rec
Otisco Lake	Onondaga County Water Authority	42.7	3.4	13	WS,SQ,FC, Re
Oneida Lake	N.Y.S. Dept. of Transportation	1382	79.8	55	Nav.,FC, Rec

WS = Water Supply
WQ = Water Quality
FC = Flood Control
Nav. = Navigation
P = Power
Rec. = Recreation

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501
TEL 315-797-5800

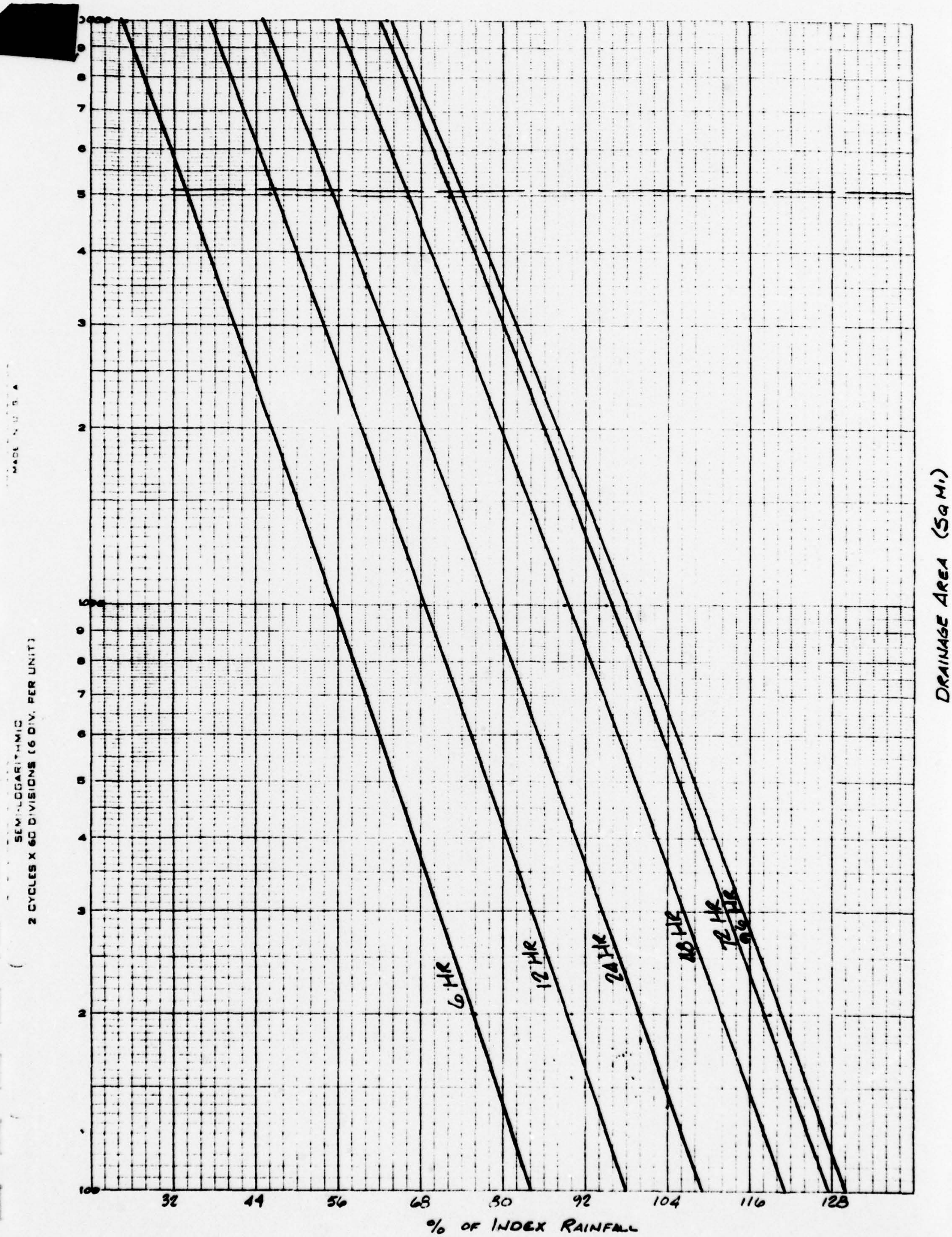
DESIGN BRIEF

PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 7.31.79
SUBJECT OSWEGO RIVER BASIN PROJECT NO. 2305
DEPTH - AREA - DURATION RELATIONSHIP * DRAWN BY JPG

AREA	DURATION	DEPTH	% INDEX
200 SQ MI	6 HR	16.0	76
↓	12 HR	19.0	90
	24 HR	21.0	100 ← PMF INDEX RAINFALL
	48 HR	23.5	112
200 SQ MI	72 HR	25.0	119
1000 SQ MI	6 HR	11.6	55
↓	12 HR	14.3	68
	24 HR	16.0	76
	48 HR	18.8	89
1000 SQ MI	72 HR	20.0	95
5000 SQ MI	6 HR	7.1	34
↓	12 HR	9.6	46
	24 HR	11.6	55
	48 HR	13.9	66
5000 SQ MI	72 HR	15.2	72
10000 SQ MI	6 HR	5.3	25
↓	12 HR	7.9	38
	24 HR	9.5	45
	48 HR	11.8	56
10000 SQ MI	72 HR	13.3	63

* FROM HYDROMETEOROLOGICAL REPORT Nº 51
SEPT 1976

PMF	DURATION	% INDEX
	6 HR	33
	12 HR	47
	24 HR	55
	48 HR	65
	72 HR	72
	96 HR	74



DRAINAGE AREA (SQ MI)
% OF INDEX RAINFALL
32
44
56
68
80
92
104
116
128
1000
100
6 HR
12 HR
24 HR
48 HR
72 HR
96 HR
SEMI-LOGARITHMIC
2 CYCLES X 60 DIVISIONS (6 DIV. PER UNIT)

HYDRAULICS

RATING CURVE AT LOCK O-5, MINETTO

(Developed by N.Y.S.D.E.C. not used in inspection PMF model)

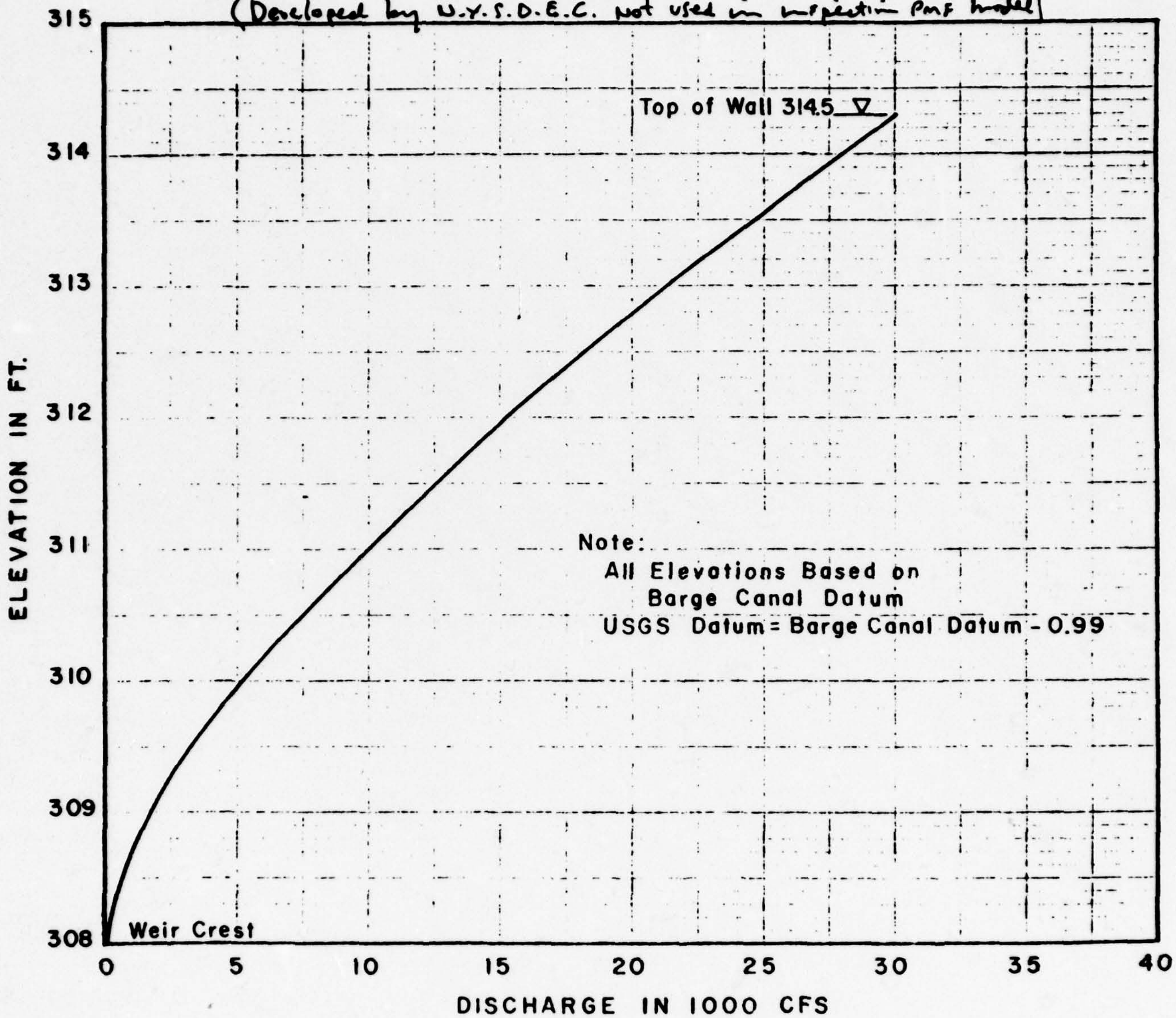


PLATE V-5(b)

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800

DESIGN BRIEF

JECT NAME NEW YORK STATE DAM INSPECTION DATE 6·20·79

JBJECT MINETTO - DAM #5 PROJECT NO. 2305

STAGE - DISCHARGE RELATIONSHIP DRAWN BY JPG & NFD

FREE WEIR FLOW (OGEE)

SPILLWAY - 500 FT LENGTH (ℓ) TOP OF SPILL = 308.0

Cd = 4.03 HEIGHT OF DAM = 15.0

Hd = 8.00' (ASSUMED)

ELEV	He	He/Hd	C/Cd	C	$Q = C\ell He^{1.5}$
308	0	0	0	0	0
310	2	.25	.82	3.30	4667
312	4	.50	.90	3.63	14520
314	6	.75	.97	3.91	28732
316	8	1.00	1.00	4.03	45594
318	10	1.25	1.04	4.19	66250
320	12	1.50	1.05	4.23	87919
322	14	1.75	1.05	4.23	110791
324	16	2.00	1.05	4.23	135360
326	18	2.25	1.05	4.23	161517
328	20	2.50	1.05	4.23	189172
330	22	2.75	1.05	4.23	218245
332	24	3.00	1.05	4.23	248673
334	26	3.25	1.05	4.23	280395
336	28	3.50	1.05	4.23	313363
338	30	3.75	1.05	4.23	347530
340	32	4.00	1.05	4.23	382856

SUBMERGENCE

SUBMERGENCE EFFECT IS MINIMAL AND CAN BE NEGLECTED

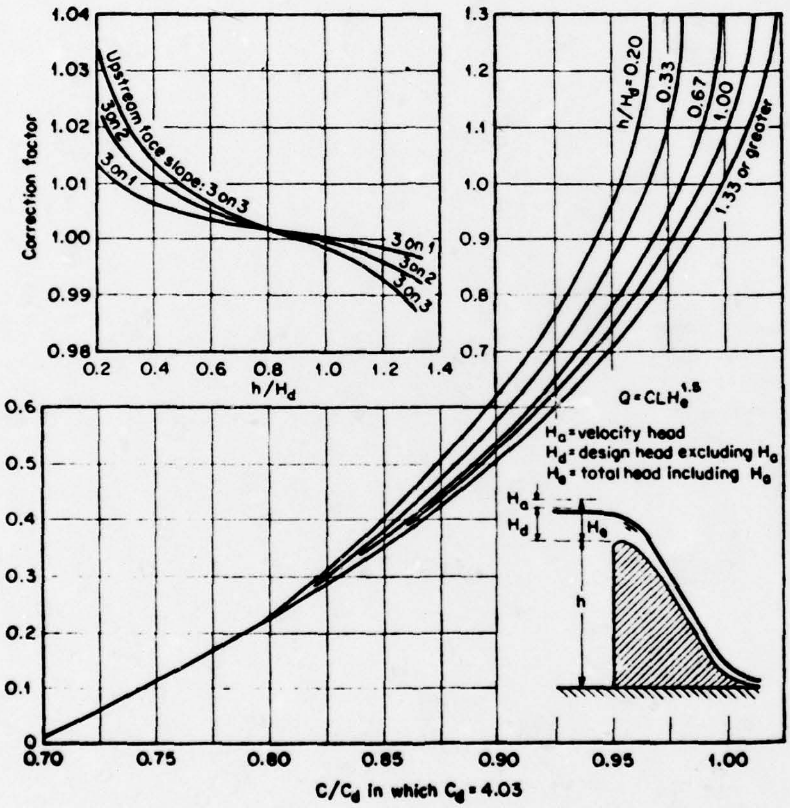
STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315•797•5800

DESIGN BRIEF

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6·20·79

SUBJECT: MINETTO - DAM #2 — PROJECT NO.: 2305

STAGE - DISCHARGE RELATIONSHIP — DRAWN BY: JPG



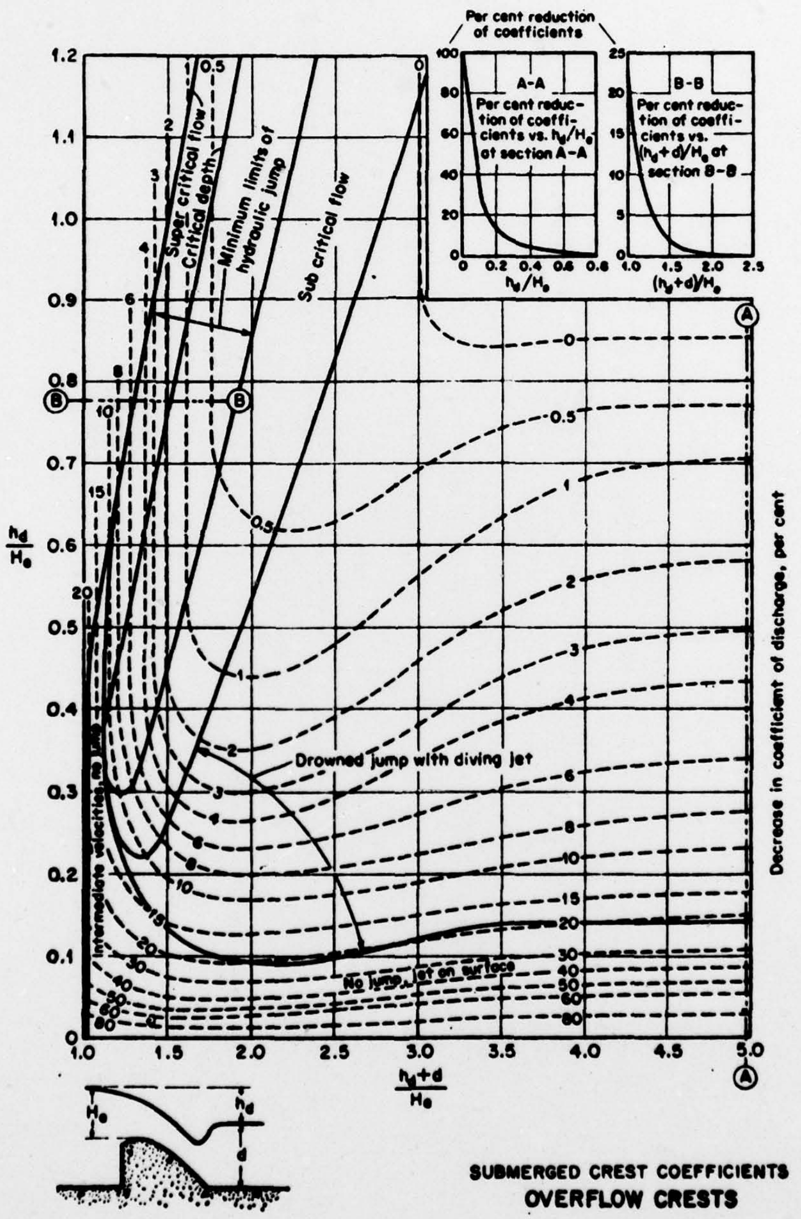
STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6.20.77

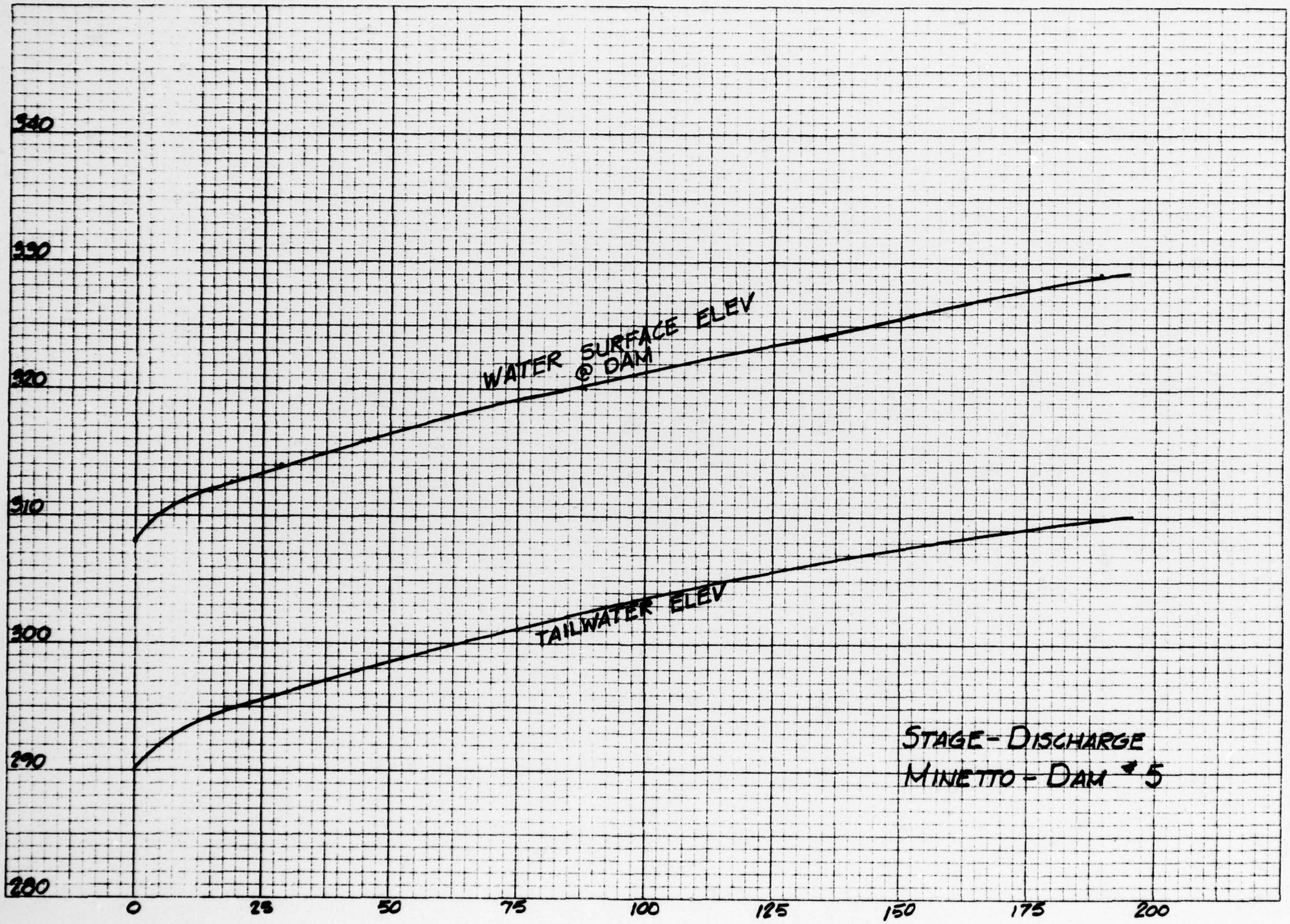
SUBJECT: MINETTO - DAM #5 — PROJECT NO. 2305

STAGE - DISCHARGE RELATIONSHIP — DRAWN BY: JPG



SUBMERGED CREST COEFFICIENTS

OVERFLOW CRESTS


WATER SURFACE ELEV
@ DAM
TAILWATER ELEV
STAGE - DISCHARGE
MINETTO - DAM # 5
340
330
320
310
300
290
280
0
25
50
75
100
125
150
175
200

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME New York State Dam Inspection DATE 6-18-79

SUBJECT Minetto - Dam #5 PROJECT NO. 2305

Stage- Storage Relationship DRAWN BY JPG

Elev	End Area	Vol (acre-ft)	Storage (acre-ft)
285.5			
	.0060	1.9	1.9
286			
	.0244	47.4	49.3
288			
	.0252	114.3	163.6
290			
	.0259	184.8	348.4
292			
	.0266	258.8	607.2
294			
	.0274	337.8	945.0
296			
	.0281	419.3	1364.3
298			
	.0288	504.5	1868.8
300			
	.0296	595.3	2464.1
302			
	.0303	688.1	3152.2
304			
	.0310	784.4	3936.6
306			
	.0318	887.3	4823.9
308			
	.0325	1062.8	5886.7
310			
	.0332	1085.6	6972.3
312			
	.0339	1108.5	8080.8
314			
	.0347	1134.7	9125.5
316			
	.0354	1157.6	10373.1
318			
	.0362	1183.7	11556.8
320			
	.0369	1206.6	12763.4
322			
	.0376	1229.5	13992.9
324			
	.0384	1255.7	15248.6
326			
	.0391	1278.6	16527.2
328			
	.0399	1304.7	17831.9
330			

APPENDIX D

STABILITY ANALYSIS

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME MINETTO -DAM #5 (OSWEGO RIVER) DATE

SUBJECT STABILITY ANALYSIS - OVERTURNING & SLIDING PROJECT NO.

DRAWN BY

\- see attached sheet for dam cross-section -

OVERTURNING

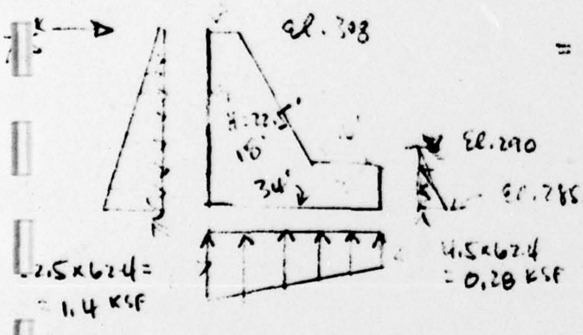
Ia WL @ normal pool (operating) level [elev. 308 up, 290 ds]

(i) moment about toe resisting ovt: mass of dam + downstream water

$$= \left[(34' \times 3' \times .15)\left(\frac{34}{2}\right) + \left(\frac{1}{2} \times 19.5 \times 13 \times .15\right)\left(16 + \frac{2}{3} \times 13\right) + (5 \times 19.5 \times .15)(31.5)\right] +$$

$$+ \left[\left(4.5 \times 62.4 \times \frac{4.5}{2} \times \frac{4.5}{3}\right)\right] = 260 + 468 + 461 + 1 = 1190^{1K}$$

(ii) moments causing ovt: horiz. water pressure + uplift + ice =



$$= \left(1.4 \times \frac{22.5}{2} \times \frac{22.5}{3}\right) + \left[\left(0.28 \times 34 \times \frac{34}{2}\right) + (1.4 - 0.28)\left(\frac{34}{2}\right)\left(\frac{2}{3} \times 34\right)\right]$$

$$+ (7.5^{k} \times 21.5') =$$

$$= 118 + 161.9 + 431.6 + 161 = 873^{1K}$$

FS against overturning =

$$\underline{FS} = \frac{1190^{1K}}{873^{1K}} = \underline{1.36^{\pm}} \quad (\text{uplift, ice acting}) \; 1.5^{t}$$

Position of resultant measured from toe of dam, $d = \frac{\Sigma M_{toe}}{\Sigma V}$

$$\underline{d} = \frac{(1190 - 873)^{1K}}{(48 - 28.6)} = \frac{317}{19.4} = \underline{16.34'}$$

$\underline{d}$ in terms of $b = \frac{16.3}{34}(b) = \underline{0.48}(b)$

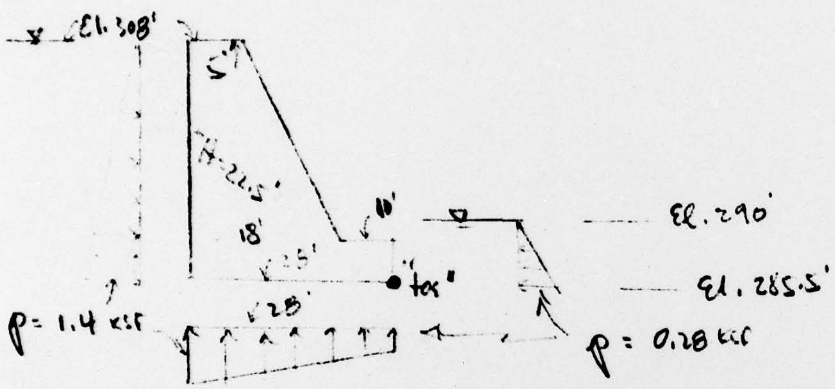
STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME ________ DATE ________

SUBJECT ________ PROJECT NO. ________

________ DRAWN BY ________

I b. Modify toe section of dam (shorten apron to evaluate effect of thin apron "moving" toe back 6')



wt. dam = (.15) [(28 × 3) + (5+18)/2 (19.5)] = 46^k

uplift force = ((1.4 + 0.28)/2)(28') = 23.5^k

(i) moment about "toe" resisting out = (28' × 3' × .15 × 28/2) + (½ × 19.5 × 13 × .15)(10 + ⅔ × 13) + (5 × 19.5 × .15)(25.5') + dc H_2O =

= 176.4 + 354.9 + 373 + 1 = 905^{1k}

(ii) moments causing out = horiz. H_2O pressure + ice + uplift

= 118^{1k} + 161^{1k} + [(0.28 × 28 × 28/2) + (1.12 × 28/2)(⅔ × 28)] = 681^k

FS against overturning = 905^{1k} / 695^{1k} = 1.30

Position of resultant measured from "toe", d = (905 - 81)^{1k} / (46^k - 23.5^k) = 10'

d in terms of b = 10/28 (b) = 0.36 (b)

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 DESIGN BRIEF

PROJECT NAME ______ DATE ______

SUBJECT ______ PROJECT NO. ______

______ DRAWN BY ______

SLIDING

I. WL @ normal pool level

(i) wt. of dam $= (34' \times 3' \times .15) + (\frac{1}{2} \times 19.5 \times 13 \times .15) + (5 \times 19.5 \times .15) = 48^k$

(ii) lateral water pressures:

upstream $= \left(1.4^{ksf} \times \frac{22.5}{2}\right) = 15.8^k$

downstream $= \left(0.28^{ksf} \times \frac{4.5}{2}\right) = 0.63^k$

(iii) uplift $= \left(\frac{1.4 + 0.28}{2}\right)(34') = 28.6^k$

FS against sliding (Friction-shear method, using 50 psi bond between dam concrete and bedrock, $\mu = 0.65$)

$$FS = \frac{\mu N + \text{bond} + \text{resist lateral water press ds}}{\text{upst water pressure} + \text{ice}}$$

$$= \frac{(0.65)(48 - 28.6)^k + (.05 \times 144 \times 34)^k + 0.63^k}{15.8^k + 7.5^k} = \frac{258}{23} = 11$$

– ok – ice + uplift acting

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501
TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME ________________ DATE ________

SUBJECT ________________ PROJECT NO. ________

________________ DRAWN BY ________

II. WL @ $\frac{1}{2}$ PMF elevations

(i) wt. of dam = 48^k

(ii) lateral water pressures:

$$\text{upstream} = \left(\frac{0.50 + 1.91}{2}\right)(22.5) = 27^k$$

$$\text{downstream} = \left(\frac{0.78 \times 12.5}{2}\right) = 4.9^k \approx 5^k$$

(iii) uplift = 28.6^k

FS against sliding (friction - shear method)

$$= \frac{\mu N + \text{bond} + \text{resistance of ds water pressure}}{\text{upstream water pressure}}$$

$$= \frac{(0.65)(48 - 28.6) + (.05 \times 144 \times 34) + 5}{27^k} = 9.7 \pm$$

STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501 TEL 315-797-5800 **DESIGN BRIEF**

PROJECT NAME ______ DATE ______

SUBJECT ______ PROJECT NO. ______

______ DRAWN BY ______

III. WL @ PMF elevations

(i) wt. of dam = 48^k

(ii) lateral water pressures:

upstream = $\left(\frac{0.75 + 2.15}{2}\right)(22.5) = 32.63^k$

downstream = $\left(1.03 \times \frac{16.5}{2}\right) = 8.5^k$

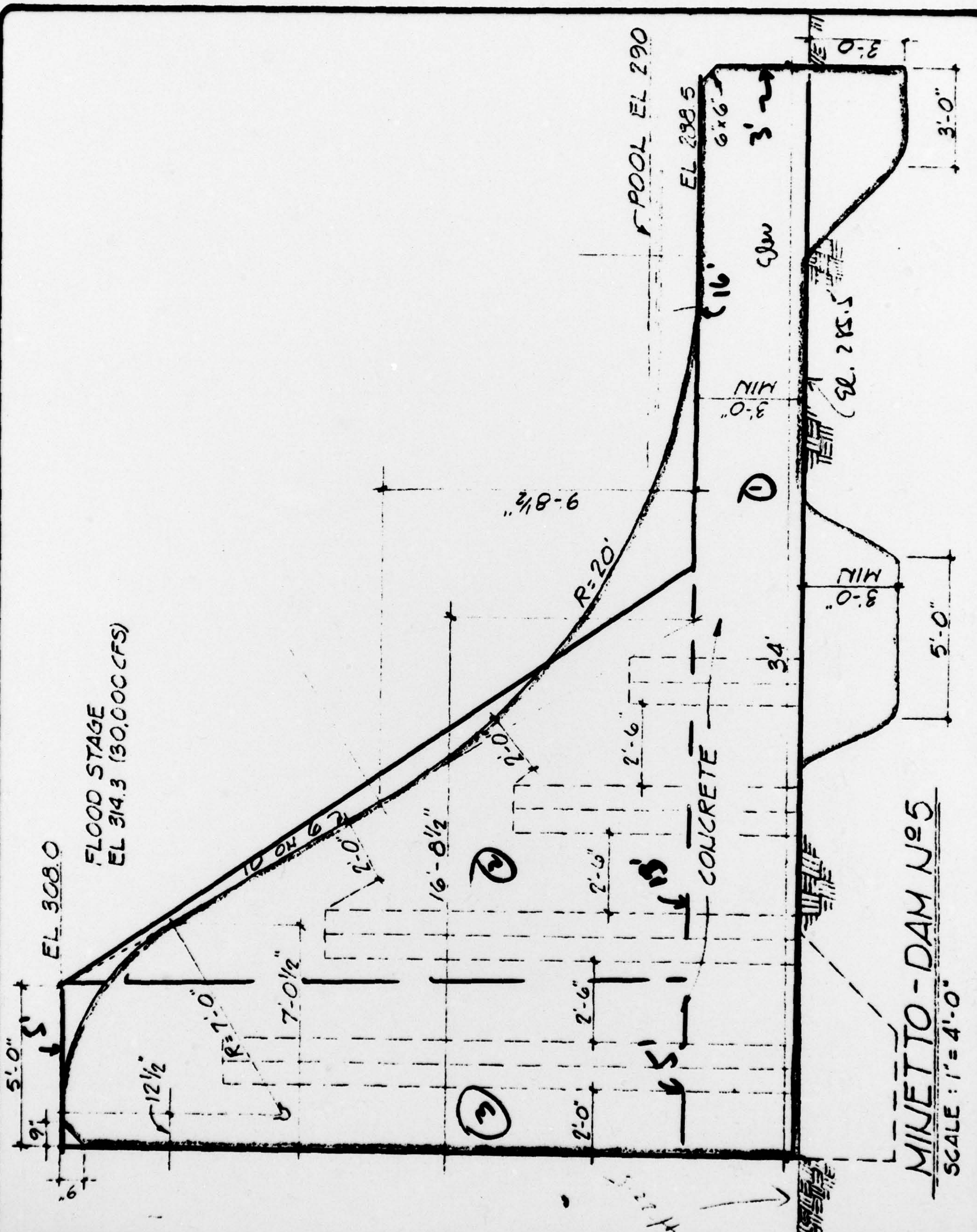
(iii) uplift = 28.6^k

FS against sliding (friction shear method)

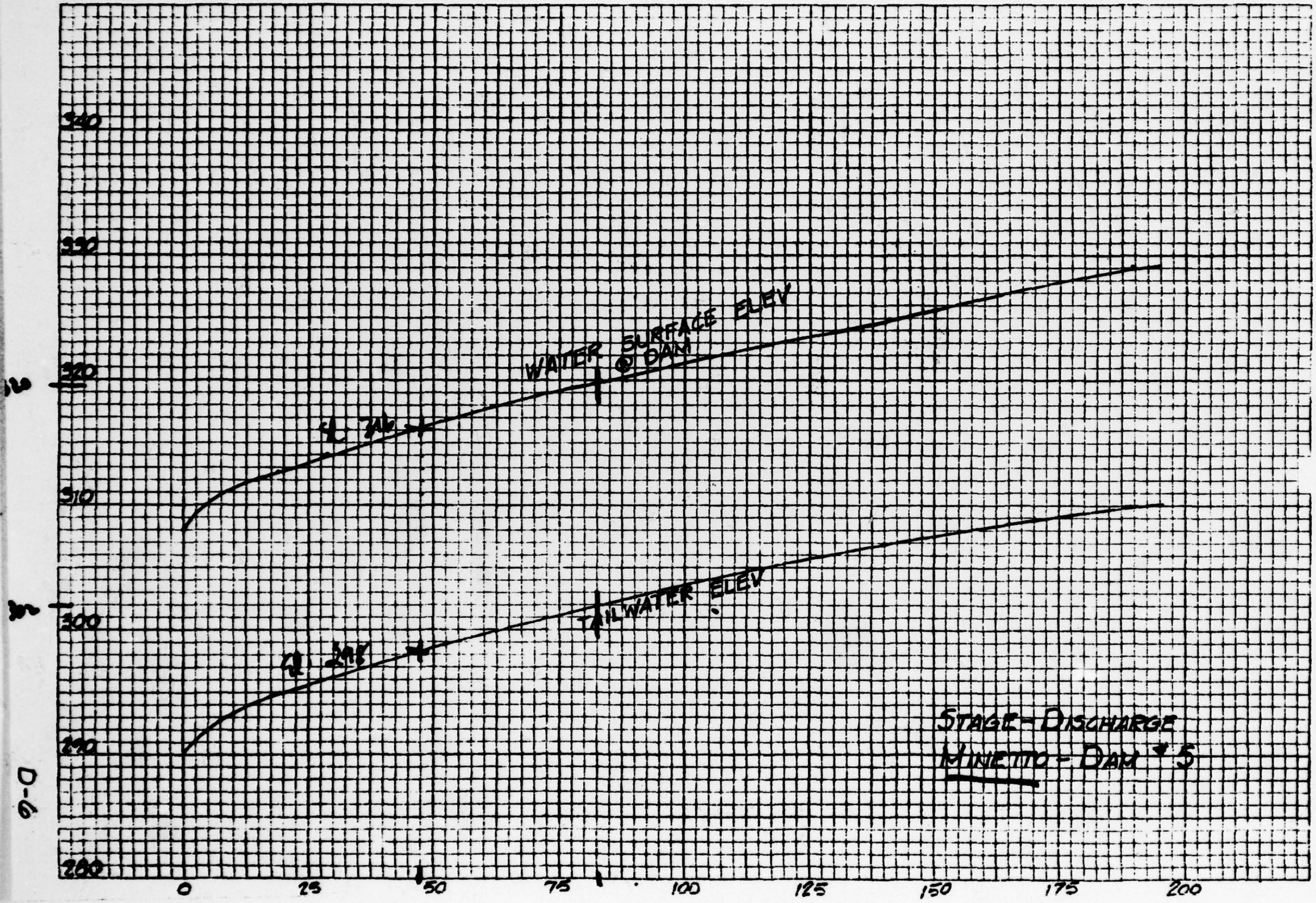
$$= \frac{\mu N + \text{bond} + \text{resis. lateral water press}}{\text{upstream lat. water press}}$$

$$= \frac{(0.65)\overset{19.4}{(48 - 28.6)}^{*} + (.05 \times 144 \times 34) + 8.5}{32.63} = \frac{266}{32.63} = 8.1$$

(uplift acts)



STETSON·DALE	DATE 6·21·79	DRAWN JPG	STRUCTURAL ANALYSIS D-5
	JOB 2305	APP'D	


WATER SURFACE ELEV @ DAM
TAILWATER ELEV
STAGE-DISCHARGE
MINETTO-DAM #5
340
330
320
310
300
290
280
0
25
50
75
100
125
150
175
200

APPENDIX E

REFERENCES

APPENDIX

REFERENCES

1. Department of the Army, Office of the Chief of Engineers. National Program of Investigation of Dams; Appendix D: Recommended Guidelines for Safety Inspection of Dams, 1976

2. U.S. Nuclear Regulatory Commission: Design Basis Floods for Nuclear Power Plants, Regulating Guide 1.59, Revision 2, August 1977

3. Linsley and Franzini: Water Resources Engineering, Second Edition, McGraw-Hill (1972)

4. W. Viessman, Jr., J. Knapp, G. Lewis, 1977, 2nd Edition, Introduction to Hydrology

5. Ven Te Chow: Handbook of Applied Hydrology, McGraw-Hill, 1964

6. The Hydrologic Engineering Center: Computer Program 723-X6-L2010, HEC-1 Flood Hydrograph Package, User's Manual, Corps of Engineers, U.S. Army, 609 Second Street, Davis, California 95616, January 1973

7. The Hydrologic Engineering Center, Computer Program: Flood Hydrograph Package (HEC-1) Users Manual For Dam Safety

8. Soil Conservation Service (Engineering Division): Urban Hydrology for Small Watersheds, Technical Release No. 55, U.S. Department of Agriculture, January 1975

9. H.W. King, E.F. Brater: Handbook of Hydraulics, McGraw-Hill, 5th Edition, 1963

10. Ven Te Chow: Open Channel Hydraulics, McGraw-Hill, 1959

11. Bureau of Reclamation, United States Department of the Interior, Design of Small Dams: A Water Resources Technical Publication, Third Printing, 1965

12. J.T. Riedel, J.F. Appleby and R.W. Schloemer: Hydrometeorological Report No. 33, U.S. Department of Commerce, U.S. Department of Army, Corps of Engineers, Washington, D.C., April 1956. Available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

13. North Atlantic Regional Water Resources Study Coordinating Committee: Appendix C, Climate, Meteorology and Hydrology, February 1972

14. Oswego River Basin, Report to U.S. Army Corps of Engineers, Buffalo District, Contract No. DACW49-76-C-0055, New York State Department of Environmental Conservation, November 1, 1977.

15. Y.W. Isachsen and W.G. McKendree, 1977, Preliminary Brittle Structures Map of New York, Hudson - Mohawk Sheet, New York State Museum Map and Chart Series No. 31B

16. Y.W. Isachsen and W.G. McKendree, 1977, Preliminary Brittle Structures Map of New York, Niagara - Finger Lakes Sheet, New York State Museum Map and Chart Series No. 31D

17. The University of the State of New York - The State Education Department - State Museum and Science Service - Geological Survey: Geological Map of New York (1970)

18. N.E. Whitford: History of the Canal System of the State of New York, New York State at Albany

19. Oswego River Basin, Report to U.S. Army Corps of Engineers, Buffalo District, Contract No. DACW49-76-C-0055, New York State Department of Environmental Conservation, November 1, 1977.