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NATIONAL DAM SAFETY PROGRAM. PHOENIX DAM-LOCK 1 (INVENTORY NUMB--ETC(U)
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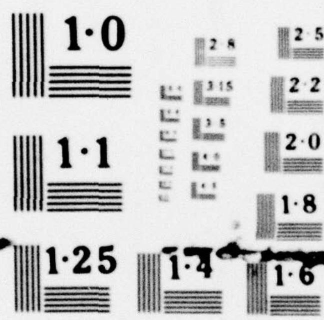

NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

OSWEGO RIVER BASIN

PHOENIX DAM-LOCK 1

OSWEGO COUNTY
NEW YORK

INVENTORY № NY 773

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

CONTRACT NO. DACW-51-79-C0001

NEW YORK DISTRICT CORPS OF ENGINEERS

JULY 1979

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Phoenix Dam-Lock 1
Oswego County
Phoenix

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. These include: (over)

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cont

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

a. Perform additional stability analysis on the dam, since the resultant force for the ice loading condition falls outside the middle third of the base of the dam. This additional analysis should include borings to supply data determining uplift pressure.

b. Investigate the structural condition of the tainter gate system or initiate action to replace it,

c. Evaluate effects of overtopping and assessment of a dam failure potential at the abutments and flooding due to the 1/2 PMF, and

(2) The remaining deficiencies requiring remedial work should be completed within the next constructed season. The following improvement needs have been identified:

a. Complete remedial work which may be required as a result of the investigations.

b. Repair or replace the tainter gate system.

c. Repair deteriorated concrete at the abutments.

Computations prepared according to the Corps of Engineers' Screening Criteria establish the spillway capacity at 32,500 cfs which is 40 percent of PMF. The PMF and 1/2 PMF flows are 81,900 cfs and 46,800 cfs respectively. The spillway is therefore inadequate to pass the PMF. 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. Three historic events in 50 years of record have likely overtopped this structure.

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 Phoenix Dam at Lock 1, NY773

State Located New York
County Located Oswego
Stream Oswego River
Date of Inspection June 7, 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 additional stability analysis on the dam, since the resultant force for the ice loading condition falls outside the middle third of the base of the dam. This additional analysis should include borings to supply data determining uplift pressure.

    b. Investigate the structural condition of the tainter gate system or initiate action to replace it.

    c. Evaluate effects of overtopping and assessment of a dam failure potential at the abutments and flooding due to the 1/2 PMF.

2. The remaining deficiencies requiring remedial work should be completed within the next constructed season. The following improvement needs have been identified:

    a. Complete remedial work which may be required as a result of the investigations.

    b. Repair or replace the tainter gate system.

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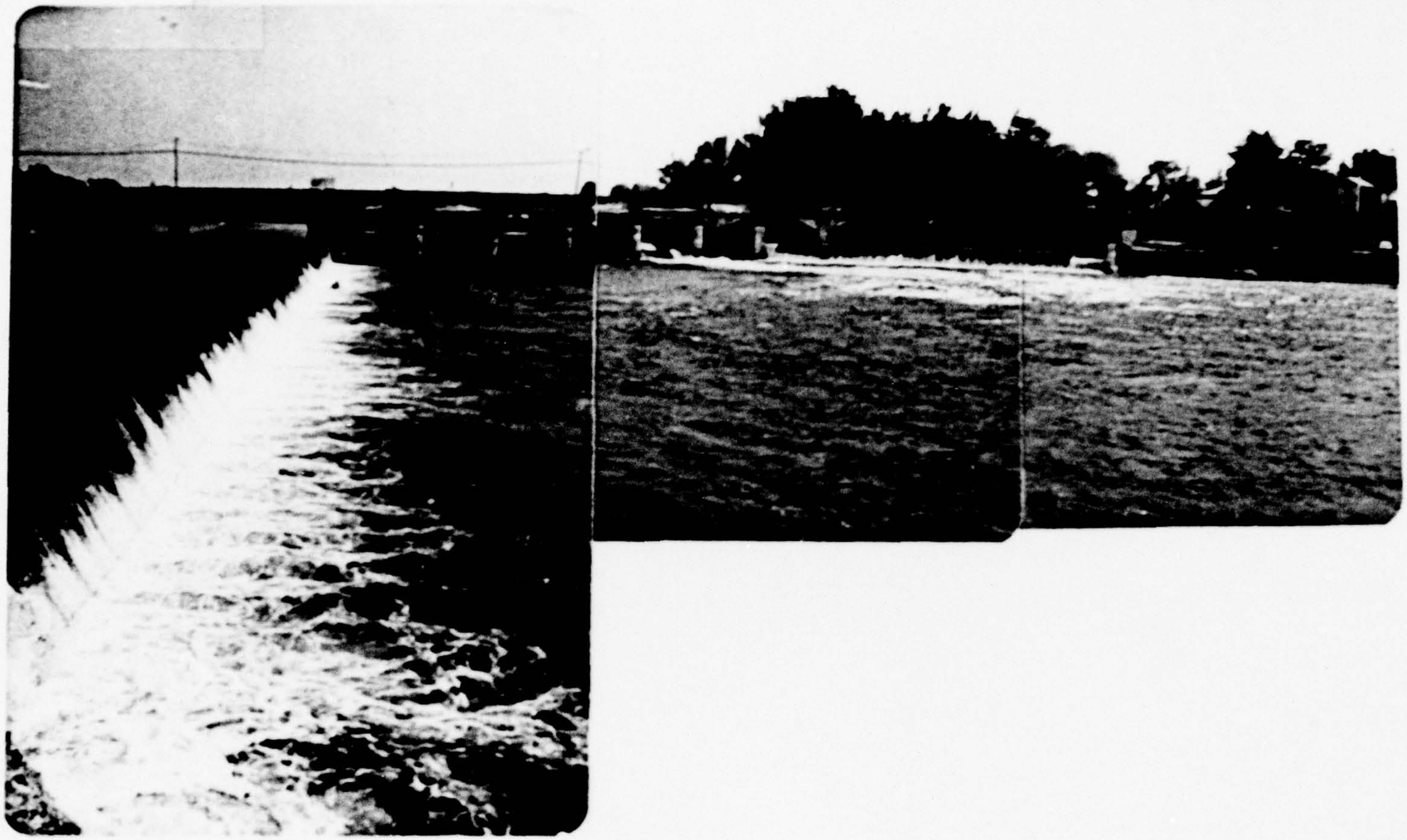
Computations prepared according to the Corps of Engineers' Screening Criteria establish the spillway capacity at 32,500 cfs which is 40 percent of PMF. The PMF and 1/2 PMF flows are 81,900 cfs and 46,800 cfs respectively. The spillway is therefore inadequate to pass the PMF. The spillway is not considered 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. Three historic events in 50 years of record have likely overtopped this structure.

Dale Engineering Company

John B. Stetson, President

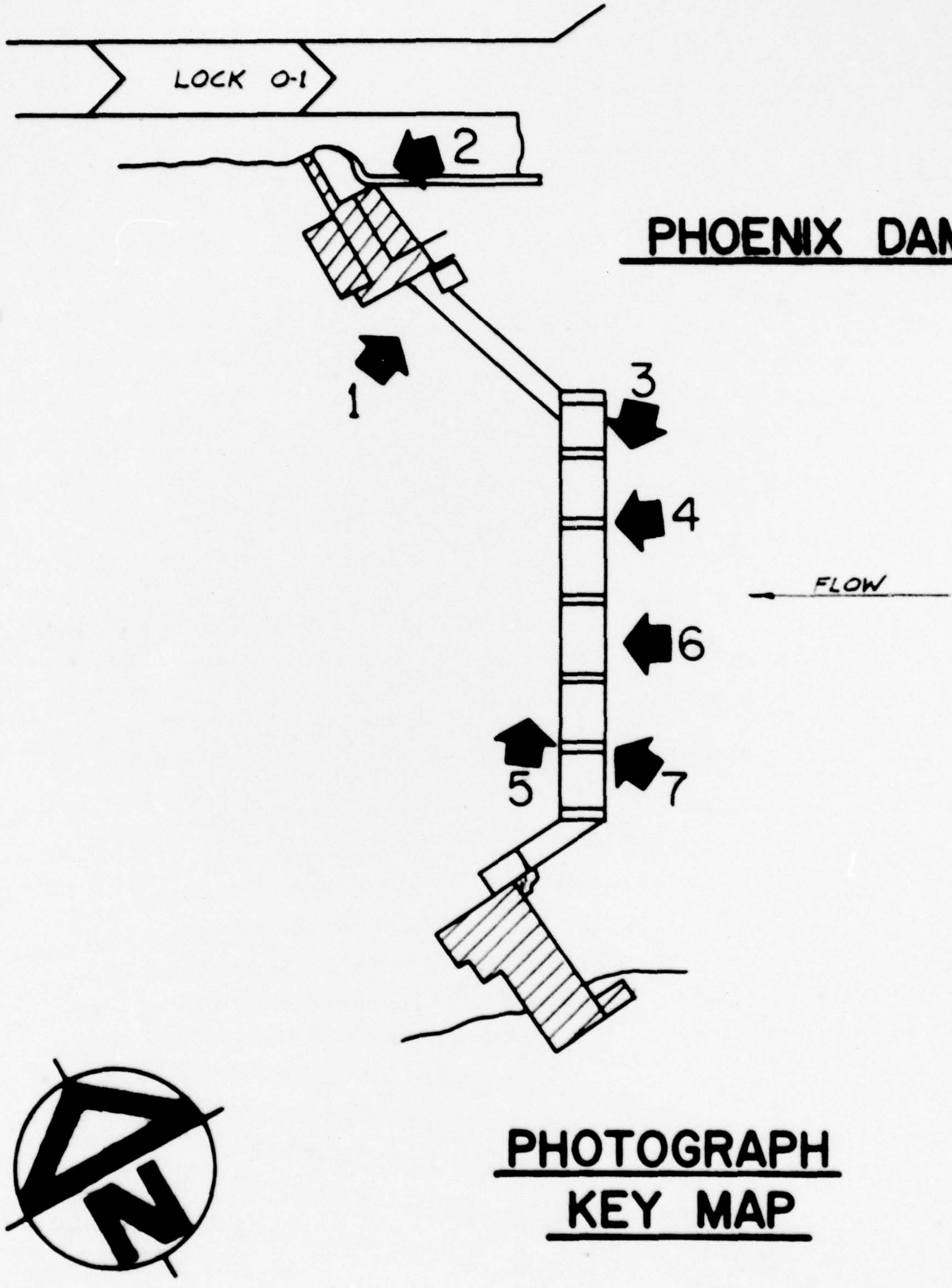
Approved By:
Date: 28 Sept 79

Col. Clark H. Benn
New York District Engineer



Overview of concrete gravity dam at Lock O-1 on Oswego River at Phoenix, New York.

PHOENIX DAM



PHOTOGRAPH KEY MAP

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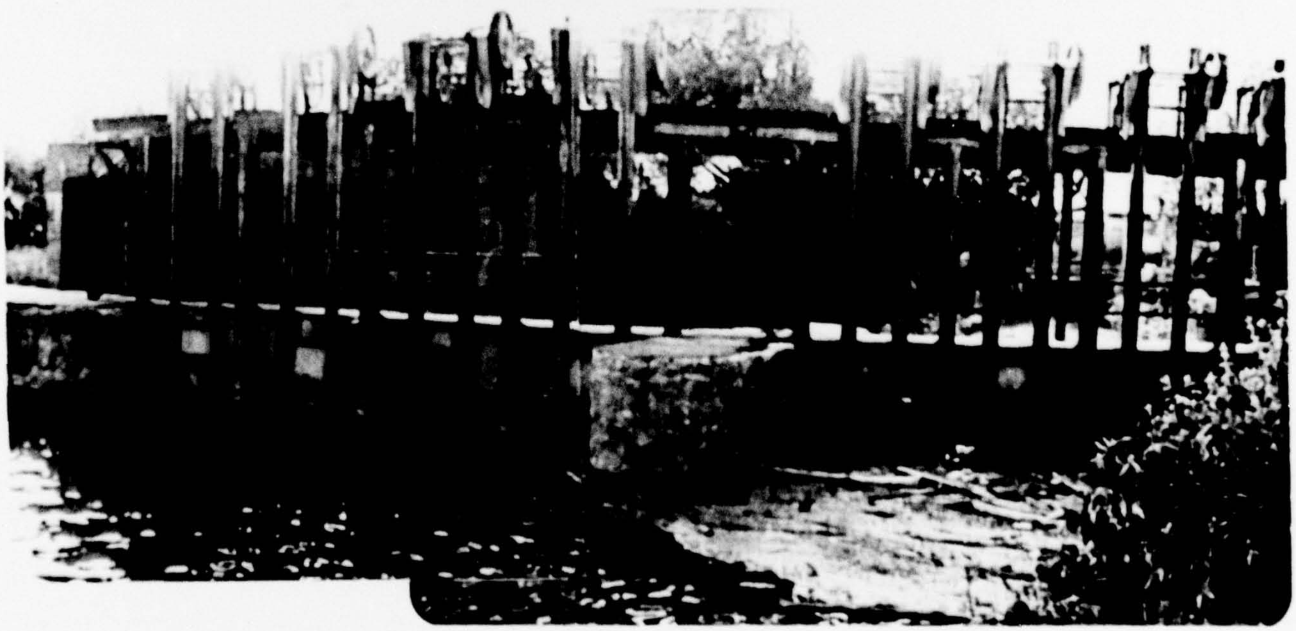
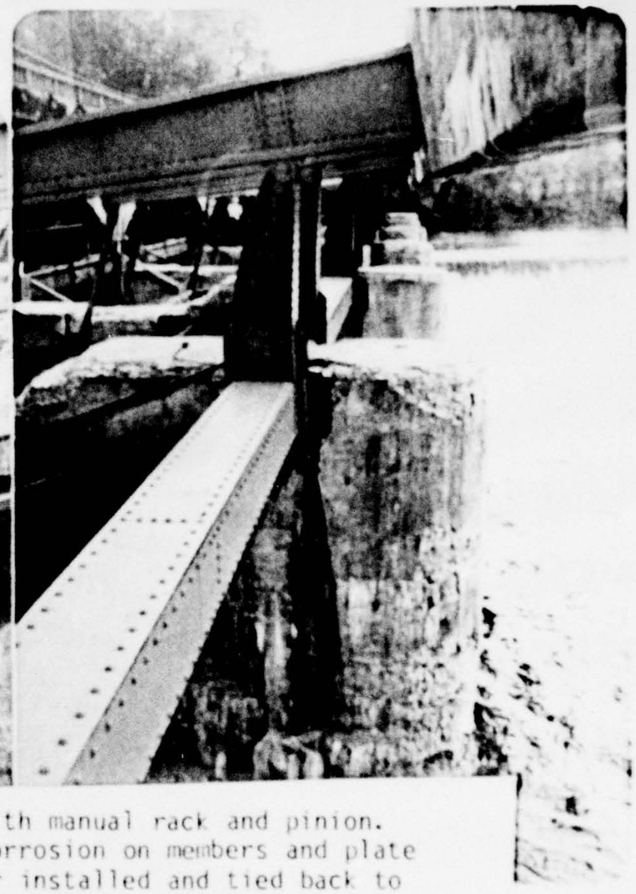
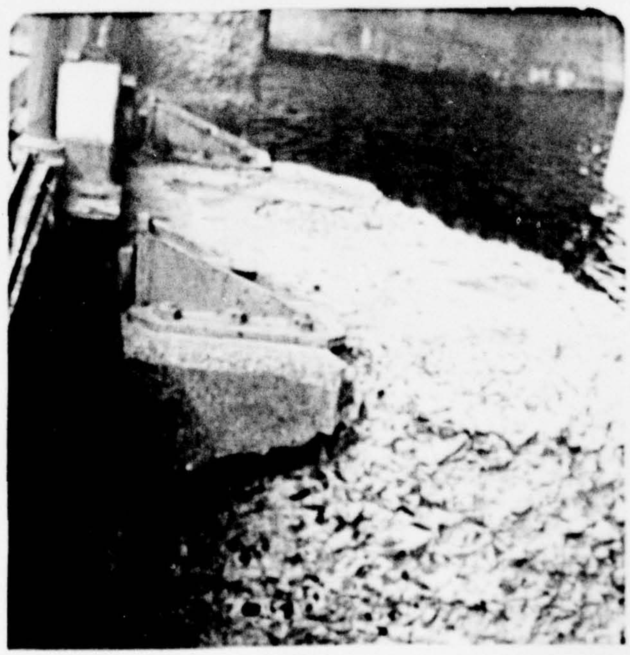
1. Closeup of deteriorated spillway section adjacent to entrance to Lock O-1 located on east side of river.



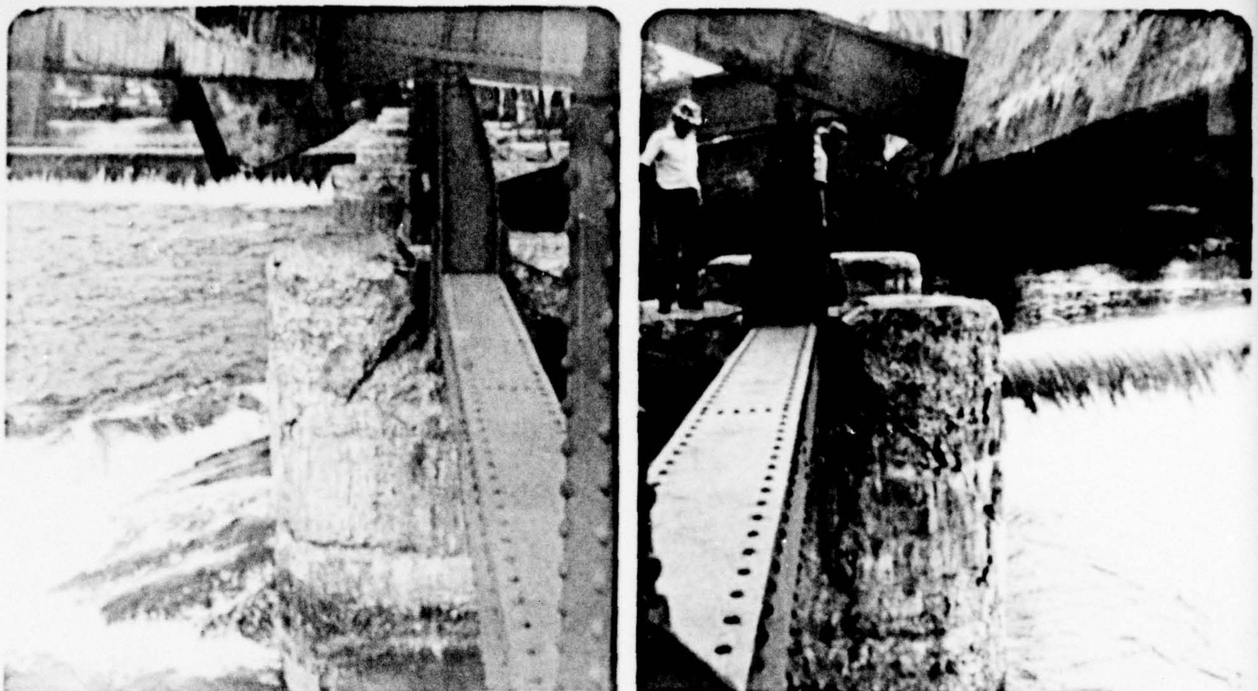
2. Sluice gates to auxiliary discharge canal adjacent to Lock O-1 on east side of river.



3. Tainter gates operated with manual rack and pinion. Gates have substantial corrosion on members and plate area. Notice tension bar installed and tied back to concrete soldier beam from gate support as can be seen along top of pier.

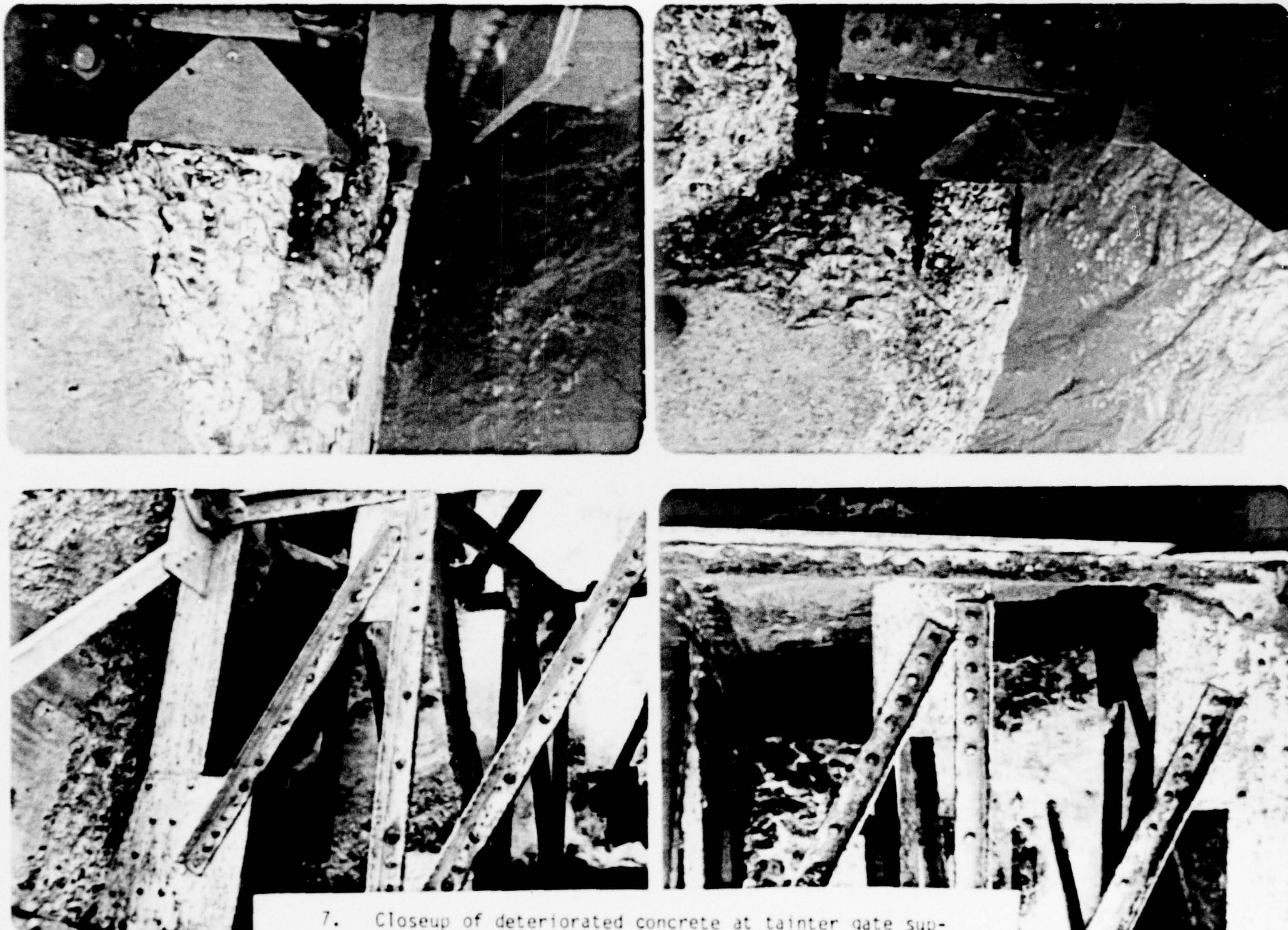


4. Detail of hold down plate along upstream side of tainter gates. Condition of concrete is typical to all six tainter gates apparently offering little resistance to uplift forces. Horizontal forces towards downstream, resisted by pier concrete. See Picture 3, left portion below manual control device.



5. Views of second pier from west side showing sheared concrete pier section on both sides. Apparently, crack goes clear through section. Notice double tension rods in right picture located at foot of dam inspector.

6. Counterbalance with large crack in concrete.



7. Closeup of deteriorated concrete at tainter gate support. Vertical dead load of gate is supported on pier which is in partially deteriorated concrete.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - PHOENIX DAM - LOCK NO. 1 ID# - NY773

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 Phoenix Dam - Lock No. 1 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 State of New York.

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 Phoenix Dam at Lock No. 1 on the Oswego River consists of a series of structures. Lock No. 1 is situated along the east bank of the river immediately downstream from the Lock Street Bridge in the Village of Phoenix. The west wall of the lock is founded on a small island, upon which are located a number of industrial-type buildings. The island is divided by an abandoned raceway to what may have been a power generating station on the island. The gates controlling the flow into the forebay of the power generating station are presently in a closed position, although some small amount of seepage takes place around these gates. There are some deteriorated industrial buildings along the west bank of this island. The principal spillway structure begins at the southwest corner of the island and extends in an upstream direction approximately 390 feet to a tainter gate structure, which is constructed just downstream from the Lock Street

Bridge. This spillway structure is a concrete gravity dam 11 feet in height across the crest shaped spillway. The tainter gate structure runs perpendicular to the flow of the river. It consists of six tainter gates, each with separate mechanical operators. At the west end of the tainter gate structure, a second overflow weir-type concrete gravity dam extends to the west bank of the river. This overflow weir is also oriented in a skewed downstream direction. On the west bank of the river is situated an abandoned sluice gate structure which formerly served a power generating facility but has since been demolished. Plans indicate that this structure is founded entirely on bedrock. The dam is the first in a series of six dams which regulate flow in the Oswego River for use in navigation and power generation.

b. Location

The Phoenix Dam is located in the Village of Phoenix and in the Towns of Schroeppel in Oswego County and the Town of Lysander in Onondaga County, New York.

c. Size Classification

The maximum height of the dam is approximately 12 feet. The storage volume of the impoundment is approximately 5500 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 Village of Phoenix and through the Cities of Fulton and Oswego. The Oswego River is also used for navigational and recreational 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:	Region Three:
New York State - DOT Main Office - State Campus 1220 Washington Avenue Albany, New York 12232 Director - Mr. Joseph Stellato (518) 457-4420	New York State - DOT Syracuse State Office 333 E. Washington Street Syracuse, New York 13202 Engineer - Mr. Leo Burns (315) 473-8194

*This is the volume of the navigable river channel 15 miles in length, 300 feet in width and an average of 10 feet in depth.

f. Purpose of the Dam

The dam is used to regulate flows in the Oswego River for navigational use and power generation. The Oswego River is also used for recreational purposes.

g. Design and Construction History

The dam was constructed in approximately 1914.

h. Normal Operational Procedures

The facility is operated by the New York State Department of Transportation. 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 to maintain flows for power generation at the Niagara Mohawk Power generating facilities, located downstream in the Oswego River. In order to fulfill the primary function of the facility, navigation, it is necessary to maintain the upstream water level at the elevation of the spillway crest. The tainter gates which control the flow through this facility are manipulated to provide downstream water for power generation.

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

a. Drainage Area

The drainage area of Phoenix Dam - Lock No. 1 is 4956.27 square miles.

b. Discharge at Dam Site

Peak discharge records at USGS Gage 0424900, 16 miles downstream

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

(See Appendix for other values for annual peaks.)

Computed Discharges:

(Tainter gates closed)

Ungated Spillway, Top of Dam	57,500 cfs
Ungated Spillway, Top of Lock	32,500 cfs
PMF	81,900 cfs
1/2 PMF	46,800 cfs
Maximum Navigation Pool	10,000 cfs

c. Elevation Barge Canal Datum (USGS + 0.99 Feet)

Top of Dam	371.3
Top of Lock	368.5
Maximum Pool	
PMF	373.5
1/2 PMF	370.0
Maximum Navigation Pool	366.0
Spillway Crest	363.0
Stream Bed at Centerline of Dam	352.0±

d. Reservoir (Navigable River)

Length of Maximum Pool	N-C* FT
Length of Normal Pool	N-C FT

e. Storage (Navigable River)

Top of Dam	N.C.*
Design Surcharge	N.C.
Normal Pool	N.C.

f. Reservoir Area

Top of Dam	N.C.
Maximum Pool	N.C.
Spillway Pool	N.C.

g. Dam

Type - Concrete gravity dam comprised completely of concrete crested spillway and tainter gate; crested spillway; two side channel spillways.
Length - 553
Height - 12 feet

Freeboard between normal reservoir and top of dam - 8.5 feet
Top width - See drawings in this report
Side slopes - See drawings in this report

h. Spillway

Type - Crested spillway
Length - 553 (crest), 190 (gates)
Crest elevation - 363
Tainter gates - 6 x 26.67 = 190 feet

i. Regulating Outlets

Tainter gates described above.

*Not computed. The river channel extends with little or no slope 15 miles above the dam beyond the confluence of the Seneca and Oneida Rivers which form the Oswego River at their confluence.

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 12. 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 12 along with previous inspection reports on the dam by New York State Department of Environmental Conservation and the New York State Department of Transportation. Modifications and major maintenance activities by the Department of Transportation are also included through 1967. The last recorded New York State Department of Conservation inspection was dated 1919. The hydropower generation facility shown on the west side of the river in Figure 5 no longer exists as can be seen in the right portion of the Overview Photograph on page iii.

2.3 OPERATION

No operation manual is known to exist for this structure.

2.4 EVALUATION

The data included in this report is adequate in order to complete this Phase 1 investigation. Therefore, no additional requirements for data is given at this time.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The Phoenix Dam at Lock No. 1 was inspected on May 31, 1979 and again on June 13, 1979. The Dale Engineering Inspection Team was accompanied on the inspection 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. The second inspection was undertaken to further investigate the condition of the tainter gate structure.

b. Dam

At the time of the inspections, water was cresting the spillway section of the dam so that no observation could be made of the condition of the face of the concrete structure. The east abutment of the dam has been severely eroded and a portion of the spillway has been displaced from the structure. Visual observation did not disclose other physical displacement of the alignment of the strucuture and the facility appears to be structurally stable.

c. Appurtenant Structures

The concrete surface on the tainter gate structure is severely deteriorated. Surface spalling is prevalent throughout the structure and structural cracking is indicated in some of the supports of the tainter gates (See Photograph No. 5.). Some efforts had been made to provide maintenance of the steel tainter gates. However, much of the gates are in a rusted condition and badly in need of paint.

Lock No. 1 is in generally good condition. No evidence of leakage has been noted around the lock structure.

d. Control Outlet

Outlet from the impoundment is controlled by manipulating the tainter gates.

e. Reservoir Area

The reservoir area, which is actually the river channel, extends approximately 15 miles upstream through the Oswego, Oneida, and Seneca Rivers. There are no areas of bank instability known to exist along this course.

g. Downstream Channel

The downstream channel is reputedly formed in bedrock. No evidence of recent erosion was noted.

3.2 EVALUATION

Visual inspection reveal generally deteriorated conditions on the spillway abutments and on the concrete of the tainter gate structure. The tainter gates are badly in need of paint. No major deformation of the alignment of any of the structures was noted in the visual inspection. The tainter gates appear to be in operating condition.

SECTION 4 - OPERATIONAL PROCEDURES

4.1 PROCEDURES

The primary operational procedure is to control water levels in the impoundment upstream from the dam for navigational purposes in the Oswego Canal. Six tainter gates, 26.67 feet each, are located in the center of the dam. Access to the gates is provided from a state highway bridge located adjacent to the dam. The gates are manually operated with a rack and pinion device located next to each gate. Directives are given by the Region 3 office to the lock tender to regulate flows via the tainter gates. The total operational procedure is under control of the New York State Department of Transportation.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the New York State Department of Transportation. 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 on a priority basis as a result of the bi-annual inspections.

4.3 MAINTENANCE OF OPERATING FACILITIES

The gates controlling the flow into the downstream channel are under the control of the New York State Department of Transportation. These gates are operational to regulate flows.

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. Maintenance on the structures has been minimal in recent years as evidence by the severely deteriorated conditions of the concrete. 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 located in central New York State, has 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 excepting 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 navigation lock facilities, interrelationships from a hydrologic standpoint have been evaluated. In general, in this screening analysis, control structures and gates used for the latter two purposes are not considered as flood control devices.

Different scenarios of partial dam failures, i.e., tainter gates or monolith failures, are beyond the scope of this analysis due to the fact that the dam is a run of river facility and the downstream dam break flood wave analysis is multi-dimensional. From a commentary viewpoint, the dam inspection team concludes that a partial failure under normal conditions would potentially be a navigational hazard rather than an inundation hazard.

The dam's stability and flood discharge capacity 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 runoff 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 the 1/2 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 and existing data 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 the USGS gage at Lock 7 near the dam site, and 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. The model was recorded for the HEC-1DB PMF analysis. In reviewing the regulated outlet rating curves, it was determined the high discharges for this PMF analysis were not adequately described. However, these flows were accounted for 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, 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 inches initial abstraction and 0.1 inches/hour continuous loss rate. Actual values used were those calibrated during the storm of Hurricane Agnes, June 20-26, 1972. Only one multi-plan analysis (.2, .4, .5, .6, .8, 1.0 PMP) was performed, it distributed the rainfall over the 5,100 square mile area. Further in depth investigations 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 runoff. This work effort would be a refinement of the analysis provided herein.

This dam investigation at Lock No. 1 is one of six dam investigations on the Oswego River. These 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 be effectively the same for all the dam sites since the upstream runoff area is over 5,000 square miles and the downstream runoff area is about 100 square miles. The results of the analysis have been compared to the USGS gage discharge-frequency plot results at Lock 7 (See Figure 14).

5.3 SPILLWAY CAPACITY

The spillway is a crested spillway with tainter gates and reaches across the effective width of the river. Since the spillway is skewed, the effective crest length is 363 feet, while the tainter gates are 190 feet giving a total length of 553 feet. The side channel spillway crest shape design head was estimated from photographs of the section, at 2.80 feet (no plans are available). Subsequently, discharge coefficients were computed in the range of 3.40 to 4.10. The discharge coefficient for the tainter gates in the closed position was 3.3.

Submergence was checked and found to have a minor effect up through the PMF. A control section to check submergence was established at the old dam site, immediately below the dam. At the top of dam elevation, the overflow spillway capacity with the gates closed was computed at 32,500 cfs; with the tainter gates open was 50,000 cfs according to the D.E.C. Report. Certain plans for these six dams, some of which were constructed under a single contract, call out the original design flood as 30,000 cfs. The gage at Lock 7 has recorded 3 events greater in magnitude than the total spillway top of dam capacity. The PMF magnitude was computed at 81,900 cfs while the 1/2 PMF flood was computed at 46,800 cfs.

SPILLWAY CAPACITY

		Gates Closed	Gates Open
	Discharge	Capacity as % of PMF	Capacity as % of PMF
PMF	81,900 cfs	40%	61%
1/2 PMF	46,800 cfs	69%	106%

5.4 RESERVOIR CAPACITY

The reservoir storage at top of dam was not estimated. The river is navigable for 15 miles above the dam with a channel width of 300 to 500 feet.

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 four events have had flood discharges in excess of the dam's original design flood, three were greater than existing of dam discharge capacity.

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

An investigation conducted by the Corps of Engineers entitled Post Hurricane Agnes Investigation (June 20-26, 1972) indicates that only $14,000 in damages occurred in the reach from Lock [illegible] through Lock 7 to Lake Ontario.

5.6 OVERTOPPING ANALYSIS

The HEC1-DB analysis indicates that the dam would be overtopped if tainter gates remain closed as follows:

OVERTOPPING IN FEET

PMF	5.0
1/2 PMF	1.5

The flood record data indicates the lock may have been overtopped if the tainter gates remained closed during high flows. The discharge capacity with the gates closed is approximately 2,500 cfs. It would be overtopped with a 1/2 PMF flood. The gates fully opened would pass the 1/2 PMF.

No significant effect due to overtopping of the dam would be realized downstream. Some damage would likely occur at the lock facility.

5.7 EVALUATION

The spillway is inadequate to pass the 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 indicates that the structure is stable under the 1/2 PMF event.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The major components of this dam facility consists of a tainter gate structure extending across approximately the middle half of the river, and a dam/spillway structure at both the southerly and northerly end of the gate structure. The spillway sections were being topped at the time of the field inspection and the physical condition of concrete in these structures was not fully visible for proper evaluation. Observations do indicate the spillway sections retain stability, with no indication of misalignment or displacement. However, the concrete abutment structure at the north end of the north spillway has deteriorated significantly and has had a large segment break away.

The concrete piers for the tainter gates have suffered varying degrees of deterioration, some extensive and significant, as have the gate structures. The concrete piers appear structurally stable at present, but it appears that some steel framing members for the gates could be pulled from their concrete anchoring under certain conditions of high water. Structural cracks of significance have developed in the concrete piers at some anchor plate locations, and a complete fracture is probable.

b. Geology and Seismic Stability

The Phoenix Dam, in the Oswego River drainage basin, is located within the Ontario Lowland which is part of the Central Lowland Province.

According to the 1918 Dam Report, the foundation under the spillway is rock. No notation is given for the foundation bed. The original plans included in the 1978 Inspection Report shows the dam profile along the upstream face to be sited on bedrock.

Although no rock exposures were observed in the vicinity of the dam, Gillette (1947, p. 80 and 162) reports on the rock seen by him at the dam site in 1935. He states that the bedrock is probably of uppermost Williamson Shale which is of Middle Silurian age. More recent work would now place the rock as Willowvale Shale of the same age and stratigraphically equivalent to the Williamson.

The rock seen by Gillette at Phoenix was dark-green, calcareous to slightly calcareous, platy or thinly laminated shale which contains some thin interbeds of limestone. The green shale was considered fissile. A dark, bluish-gray crumbly shale as interbeds was also present. Dip of the rock is probably less than 1° to the south, which would be consistent with the general rock dip in this region.

Shales are usually considered as weak rocks. They may, depending upon the shale, become soft, disintegrate, and exhibit large-volume changes when wetted. No class of foundation rocks varies more widely than shales.* Some shales have strengths comparable to those of good concrete. According to Burwell and Moneymaker (1950, p. 22), "If the bedding is flat-lying and there are weak or ruptured bedding contacts, the foundations may offer little shear resistance to the horizontal forces by a dam. The problem resulting therefrom resolves itself into one of designing the structure for sliding friction or of keying the structure sufficiently far into the rock to develop the inherent shear strength of the rock itself." According to Zaruba and Mencl (1976, p. 390), "The contact between concrete and excavated shales is usually uneven, so that the shear resistance between the rock and concrete is almost invariably greater than the shear strength of shales."

The original plans are unclear as to what the south end of dam abuts. If shale, it would tend to slake easily if exposed. The fissile nature of the material would also readily allow for removal downstream and thus, conceivably, erode downstream of the dam. The type of shale present could be considered as having good bearing capacity.

There are no known faults or shear zones in the vicinity of the dam according to the New York State Geologic Map (1970). The Preliminary Brittle Structures Map of the New York State Geologic Survey (1977) indicates a possible fault zone, based on drill hole data, located about 17 miles north of the dam; this map also shows several lineaments which may possibly represent faults, the closest being about 7 miles southwest of the dam.

---

*Representative Properties of Shale Materials

Material Classification	Angle of Internal Friction (degrees)	Av. Shear Strength (So) (psi)	Average Unconfined Compressive Strength (F_c) (psi)	% Shear Strength to Compressive Strength (So/Fc)
Laminated silt stone	64°	1000 psi	4,210 psi	23%
Shales	28°-64°	40-570 psi	220-8920 psi	6%-22%

Ref: Underwood, L.B. & Dixon, N.A., 1976, Dams on rock foundations; Page 125-145: in Rock Engineering for foundations and slopes: Am. Soc. Civil Engineers.

The Seismic Probability Map locates the dam in a Zone 2 Designation. No earthquake activity has been recorded in the vicinity of the dam. The most severe earthquake (intensity IV on the Modified Mercalli Scale) occurred in 1954 about 23 miles southwest of the dam. The closest earthquakes occurred about 18 miles southeast of the dam in the Syracuse area. One took place in 1925 with two more in 1927, all of intensity III. Several other minor earthquakes have occurred in the region, none closer nor more recent than those referred to above.

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 felt 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 monolith possessing necessary internal resistance to shear 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 analysis are included in Appendix D.

RESULTS OF STABILITY COMPUTATIONS

	Loading Condition	Factor of Safety* Overturning	Factor of Safety* Sliding**	Location of Resultant*** Passing through Base
(I)	Water elevations at normal operating levels, uplift on base plus 7.5 kip per lineal foot ice load acting.	1.21±	12±	0.25b
(II)	Water elevations at 1/2 PMF levels, uplift acting on base as computed for normal operating conditions.	1.92	17±	0.48b
(III)	Water elevations at PMF levels, uplift acting on base as computed for normal operating conditions.	1.97	13±	0.48b

*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 unsatisfactory stability values against overturning for the dam subject to forces possible during normal operations including ice loading according to Corps of Engineers' evaluation criteria, (e.g., where the resultant of forces acting on the dam is located outside of the middle-third of the base, tensile stresses would develop in the dam section, a condition which is structurally undesirable). The analysis indicate stability under 1/2 PMF and PMF conditions.

Critical to the analysis and resulting indication of stability are the items of uplift water pressures acting on the base of the dam and relative permeabilities of the site's foundation rock. For the "normal operating conditions" case, the analysis uplift force was based on a 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 and downstream corners, and act upon 100 percent of the dam base. The resulting uplift force represents a condition that is, to the analysis, significant in arriving at the computed low factor of safety against overturning for the normal operations condition.

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.

This report's geologic review has indicated the possibility of a foundation rock susceptible to deterioration and breakdown. The physical condition of the dam sections and their foundation bearing have not been examined closely. The analysis have assumed structural integrity for the dam section and supporting foundation material. This dam facility should be inspected under a drawn down condition to fully evaluate the spillway structure, and the foundation rock downstream and beneath the dam sections. Conditions observed would serve to indicate the need for inspection of the rock upstream. If a condition of concrete deterioration or other factors which would influence the structural integrity of the dam are observed, weir stability studies based on the noted conditions should be performed.

Corrective repairs are known to be necessary for the concrete piers in the gate structure to prevent further damage to the piers and gates. Repair should include the abutment structure at the north end of the north spillway section. The results of the inspection under drawn down conditions will be used to establish the need for repair to the spillway sections and protection/improvement of the foundation rock materials.

SECTION 7 - ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

This Phase I inspection of the Phoenix Dam at Lock 1 did not indicate conditions which constitute an immediate hazard to human life or property. The dam's tainter gate system is severely deteriorated and could develop into a hazardous condition at some time in the near future. The dam would be overtopped 1/2 PMF flood when tainter gates are closed and will safely discharge 40 percent of the PMF. Additional structural stability analysis is warranted according to the Corps of Engineers' Criteria for stability, since the resultant force of the ice loading condition falls outside the middle third of the dam. This additional analysis should include borings to supply data determining uplift pressure. According to the Criteria, the spillway is not seriously inadequate since the structure is stable during the 1/2 PMF event.

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

1. A number of significant defects were observed at the tainter gate system:

   (a) Concrete surfaces of the tainter gate structure are severely deteriorated. One pier is cracked completely through its width.

   (b) Concrete surface spalling has occured at most gate supports. Most anchor bolts are exposed.

   (c) The gates are rusted and need paint.

   (d) The concrete is eroded at the juncture or seal area of the gates and significant leakage is occurring around the gates in their normal closed position.

   (e) The gate counterbalance concrete weights are deteriorated.

2. An eight foot portion of the top of the spillway adjacent to the eastern end wall has been displaced. A large section of concrete lies below the spillway downstream of this area.

b. Adequacy of Information

The information available is adequate for this Phase I inspection purposes. Design and construction information is limited to construction plans.

c. Urgency

The tainter gates are in a severely deteriorated condition. The supports are so deteriorated that they should probably be replaced. Investigative or replacement work should be initiated immediately, with any investigative work completed within 1 year from notification. Upon completion of investigations, design and construction should commence immediately. The remedial work should be completed with 2 years of notification.

d. Need for Additional Investigation

To prevent the development of potentially hazardous conditions, investigations as described above should be undertaken to determine structural stability of the dam.

7.2 RECOMMENDED MEASURES

The following steps should be undertaken:

1. Complete the aforementioned investigations:

   a. Investigate structural integrity of the tainter gate system.

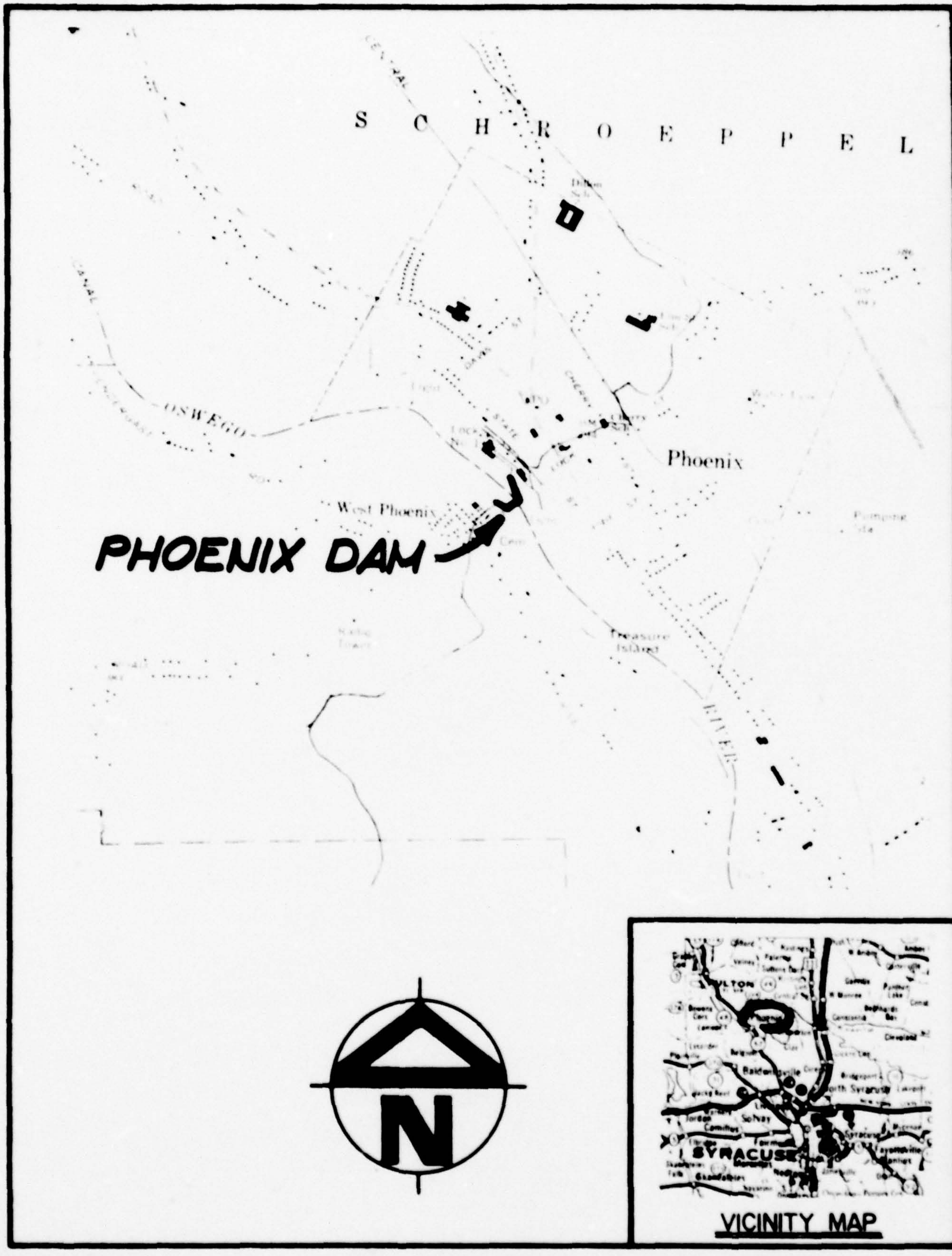
   b. Perform a detailed structural stability analysis of the spillway to determine if the dam section is still competent to resist overturning forces.

2. The following remedial measures should be completed within two years:

   a. Complete remedial work which may be required as a result of the investigations.

   b. Repair or replace the tainter gate system.

   c. Repair deteriorated concrete at the abutments and the spillway.

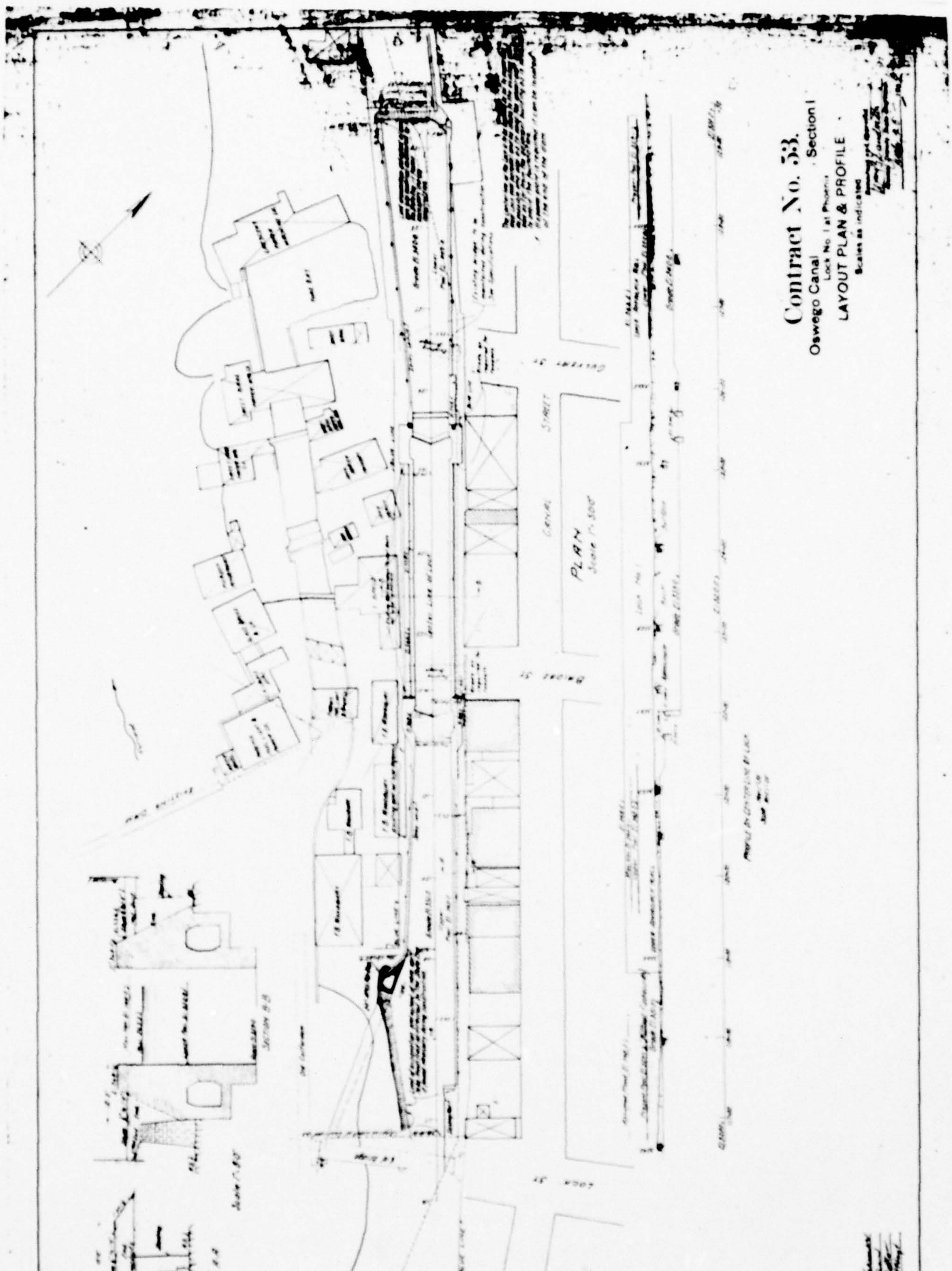


LOCATION PLAN

FIGURE 1


LYSANDER
ONONDAGA COUNTY
OSWEGO RIVER
Phoenix
OSWEGO COUNTY
Structures
Appropriated Lands

FIGURE 2



Contract No. 53.
Oswego Canal
Section I
LAYOUT PLAN & PROFILE
Scales as indicated
PLAN
CANAL STREET
BRIDGE ST.
LOCK ST.
SECTION B-B
SECTION A-A

FIGURE 3

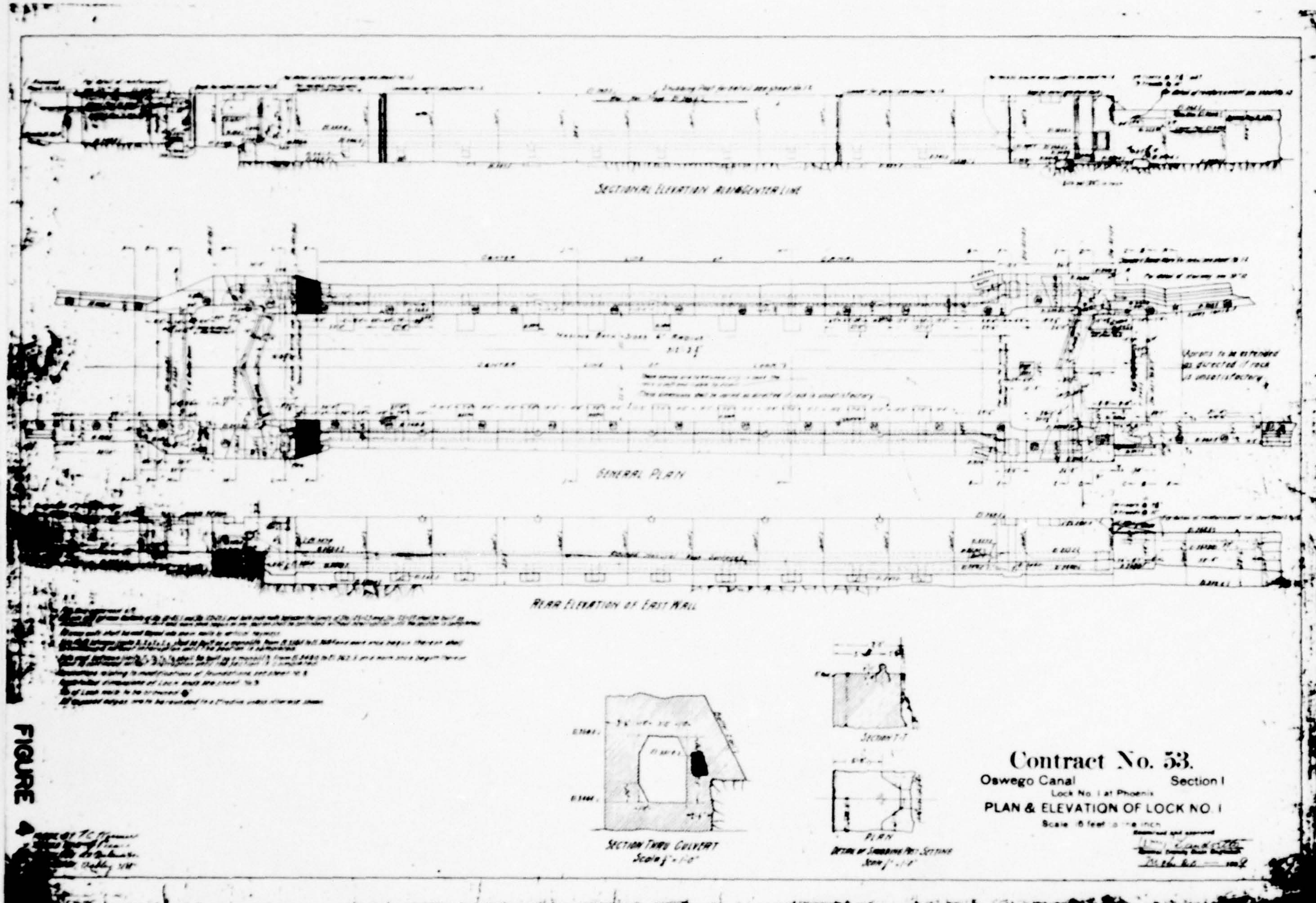

SECTIONAL ELEVATION ALONG CENTER LINE
CENTER LINE OF CANAL
Aprons to be extended as directed if rock is unsatisfactory
GENERAL PLAN
REAR ELEVATION OF EAST WALL
SECTION THRU CULVERT
Section T-T
PLAN
DETAIL OF SNUBBING POST SETTING
Contract No. 53.
Oswego Canal
Section I
Lock No. 1 at Phoenix
PLAN & ELEVATION OF LOCK NO. 1
Scale 16 feet to the inch

FIGURE 4

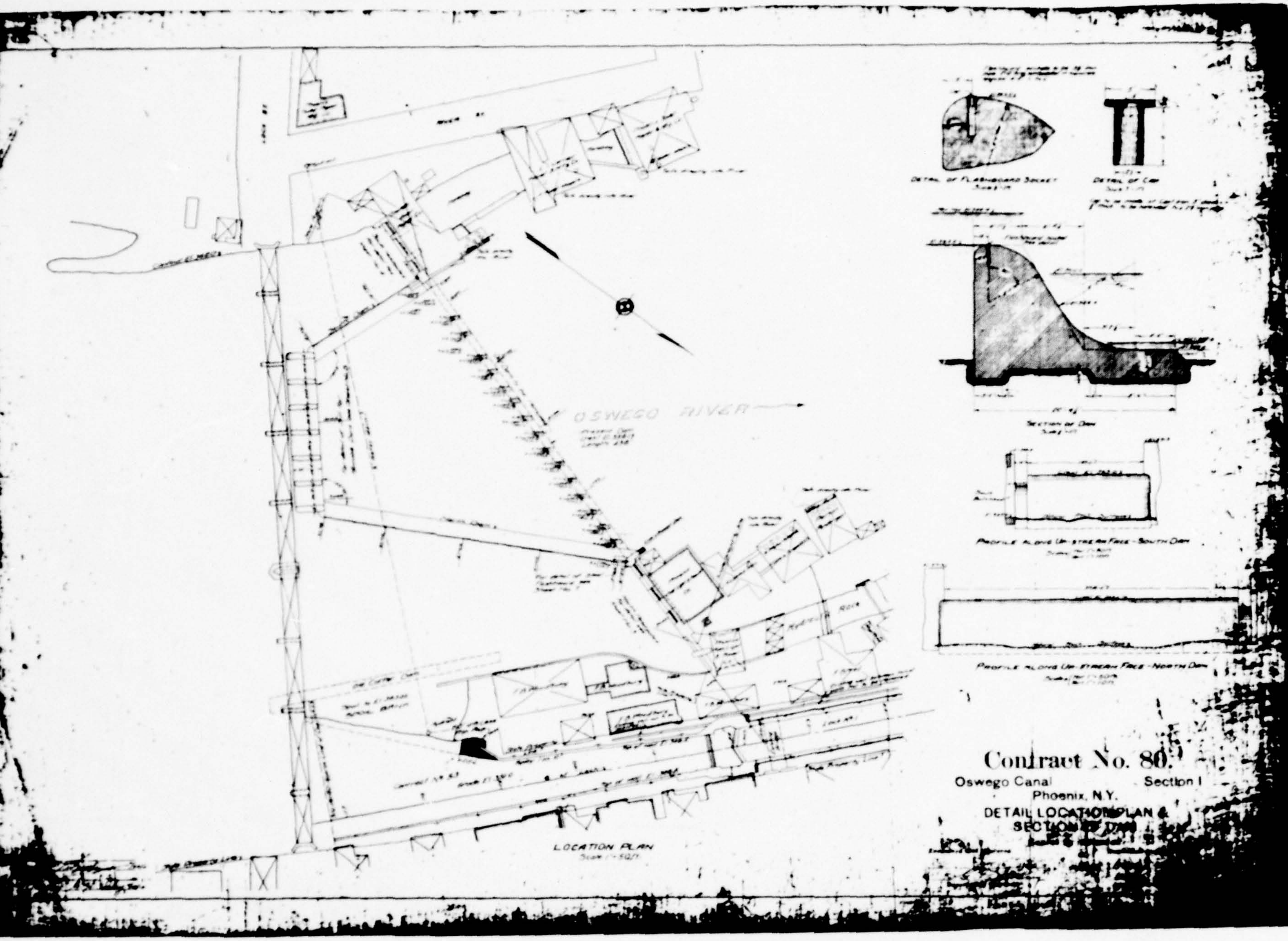
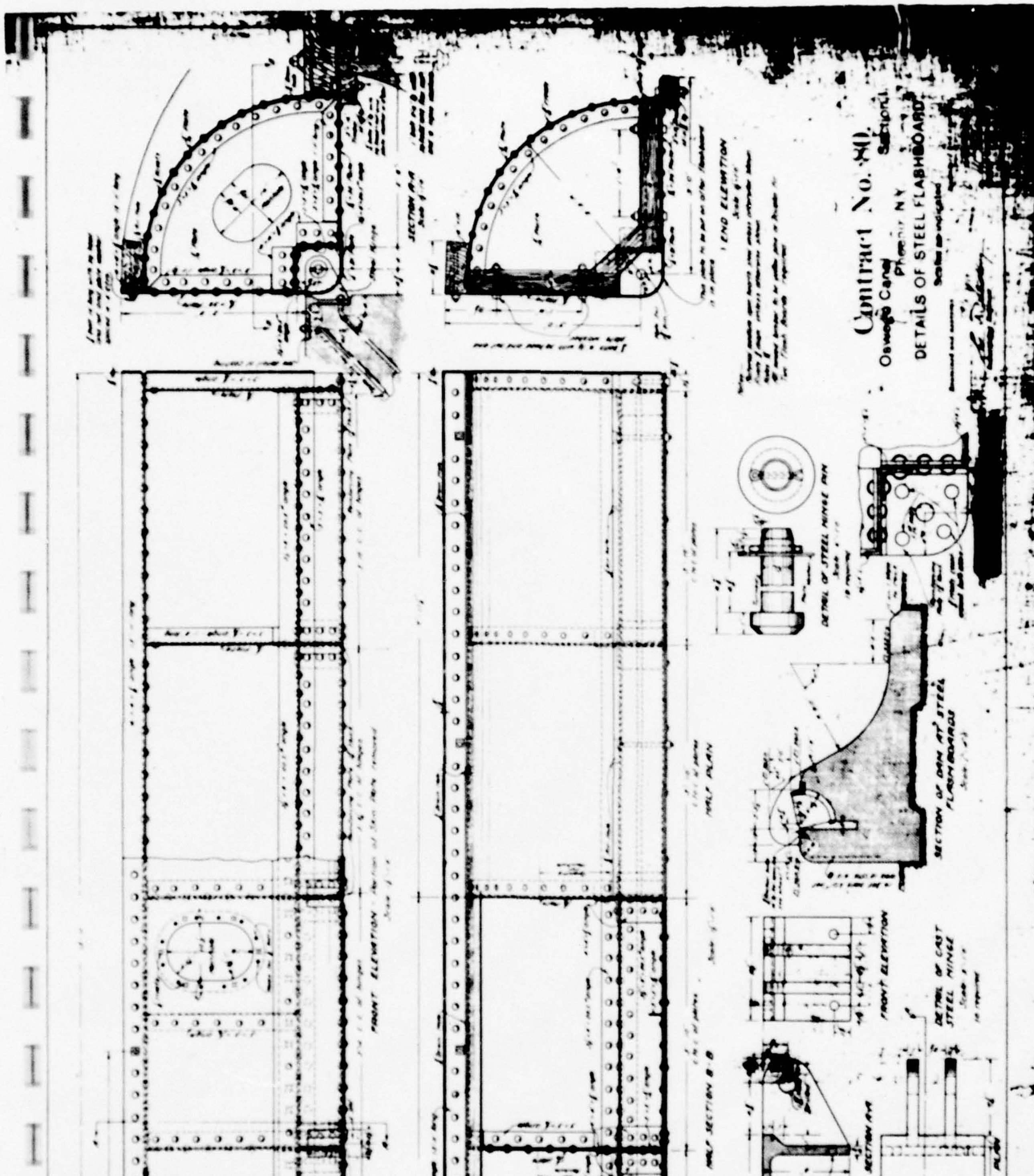

DETAIL OF FLASHBOARD SOCKET
DETAIL OF CAP
SECTION OF DAM
PROFILE ALONG UP-STREAM FACE - SOUTH DAM
PROFILE ALONG UP-STREAM FACE - NORTH DAM
OSWEGO RIVER
LOCATION PLAN
Contract No. 80.
Oswego Canal
Section I
Phoenix, N.Y.
DETAIL LOCATION PLAN &
SECTION

FIGURE 5



Contract No. 80
Oswego Canal
Phoenix N.Y.
DETAILS OF STEEL FLASHBOARD

FIGURE 6

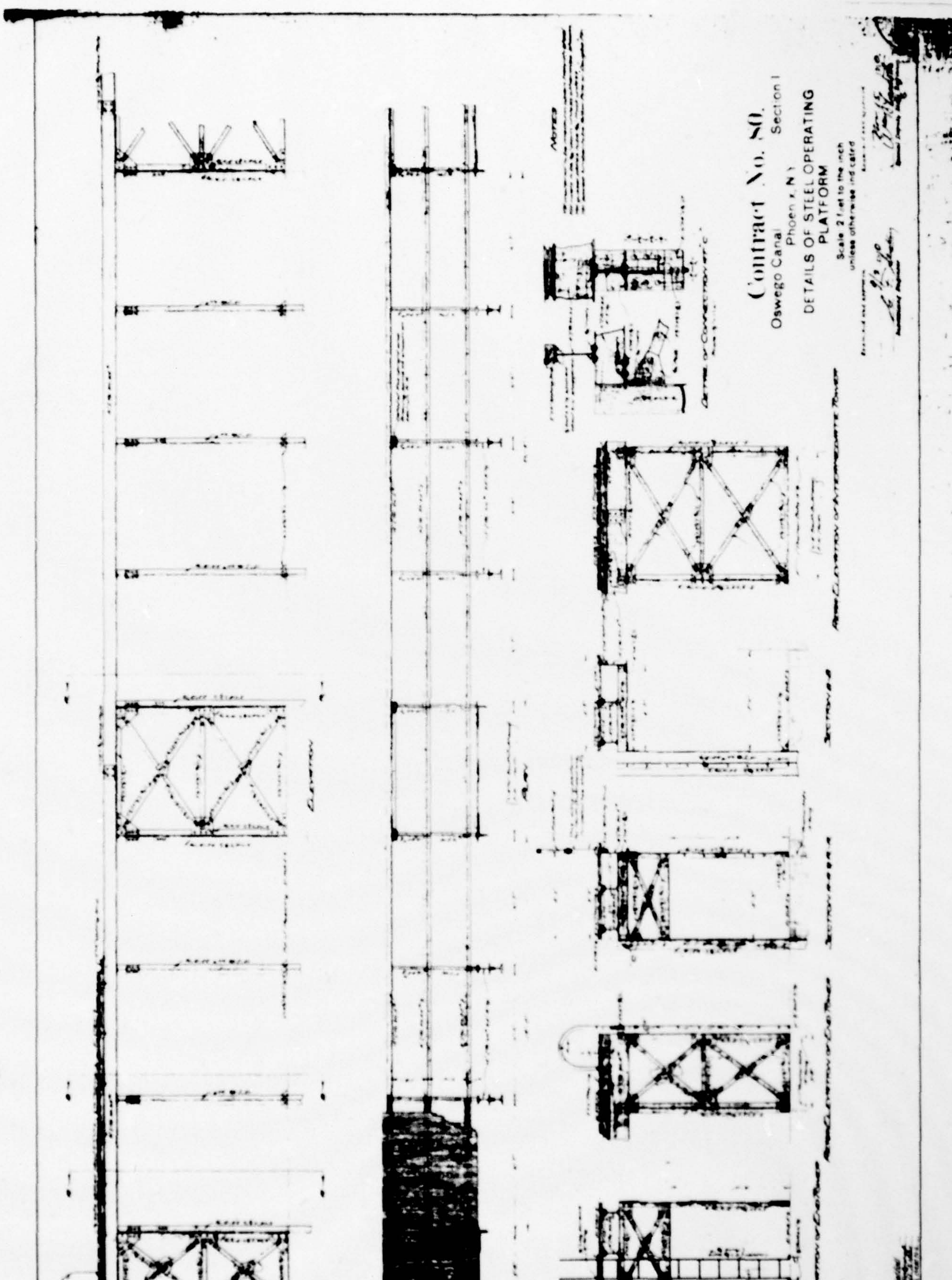

Contract No. 80
Oswego Canal
Section I
Phoenix, N.Y.
DETAILS OF STEEL OPERATING PLATFORM
Scale 2 feet to the inch unless otherwise indicated

FIGURE 7

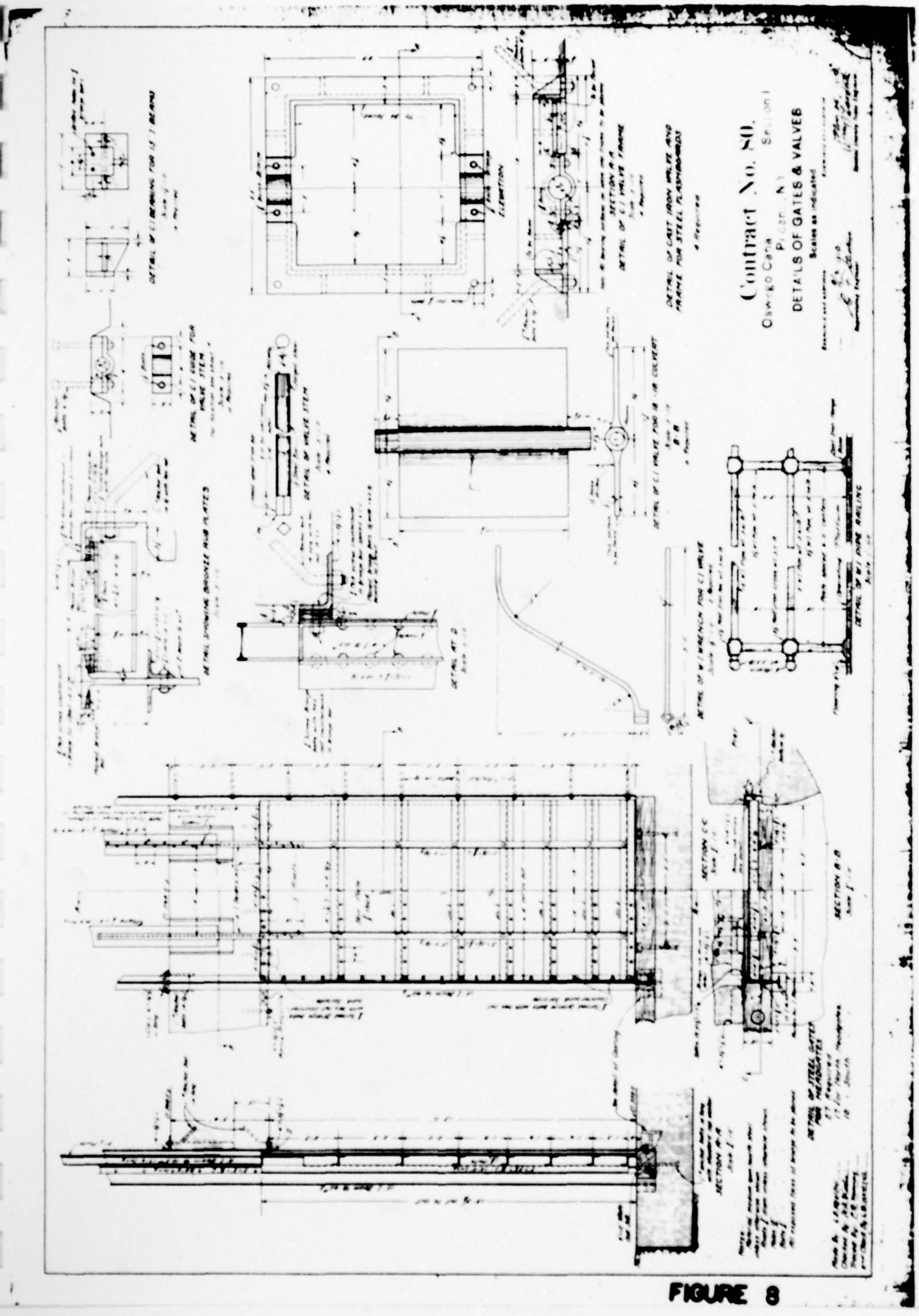

Contract No. 80
Oswego Canal Section 1
DETAILS OF GATES & VALVES
Scales as indicated
ELEVATION
SECTION A-A
SECTION B-B
SECTION C-C

FIGURE 8

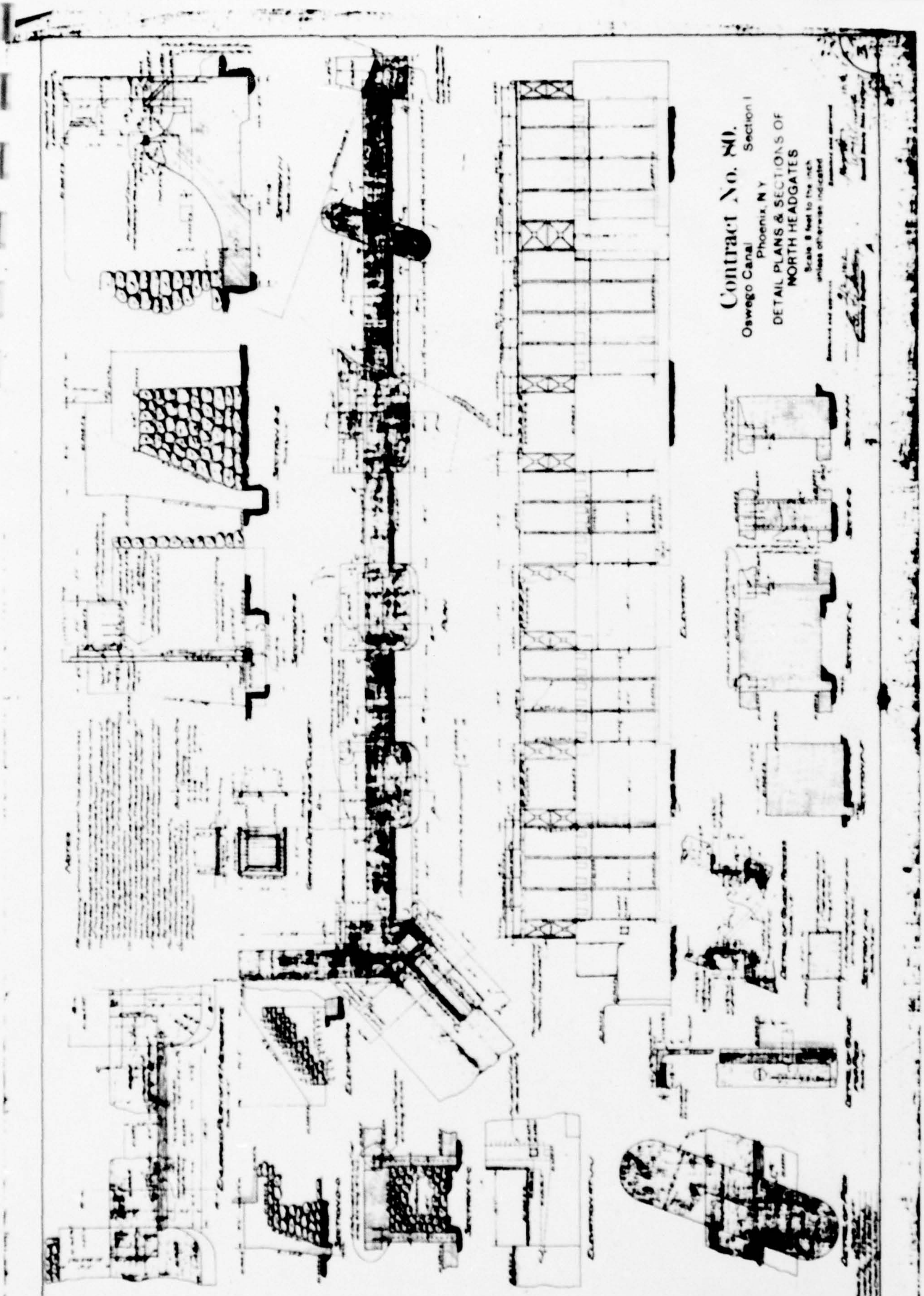
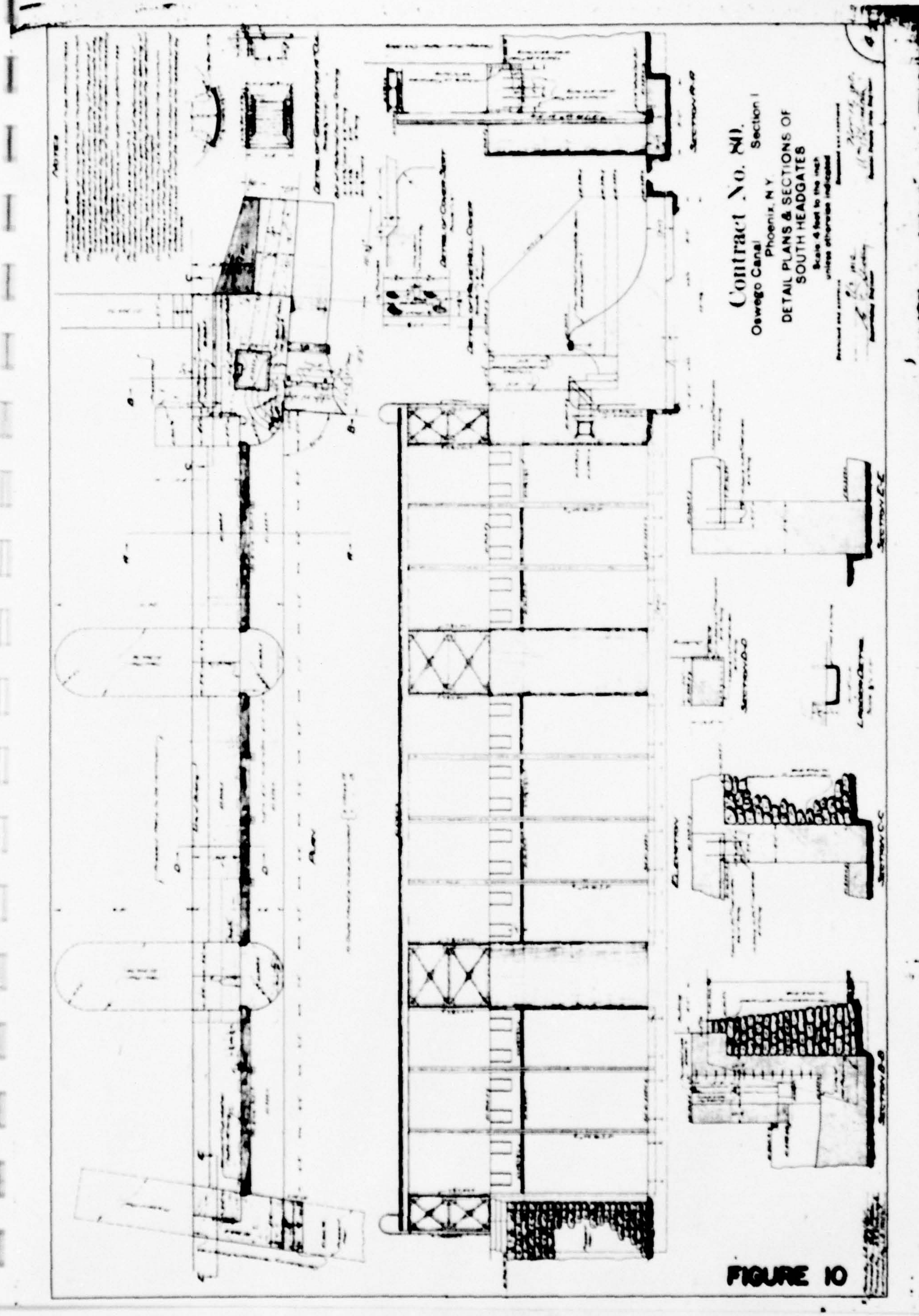

Contract No. 80.
Oswego Canal
Section I
Phoenix, N.Y.
DETAIL PLANS & SECTIONS OF
NORTH HEADGATES
Scale 8 feet to the inch
unless otherwise indicated

FIGURE 9



Contract No. 80.
Oswego Canal
Section I
Phoenix, N.Y.
DETAIL PLANS & SECTIONS OF
SOUTH HEADGATES
Scale 4 feet to the inch
unless otherwise indicated

FIGURE 10

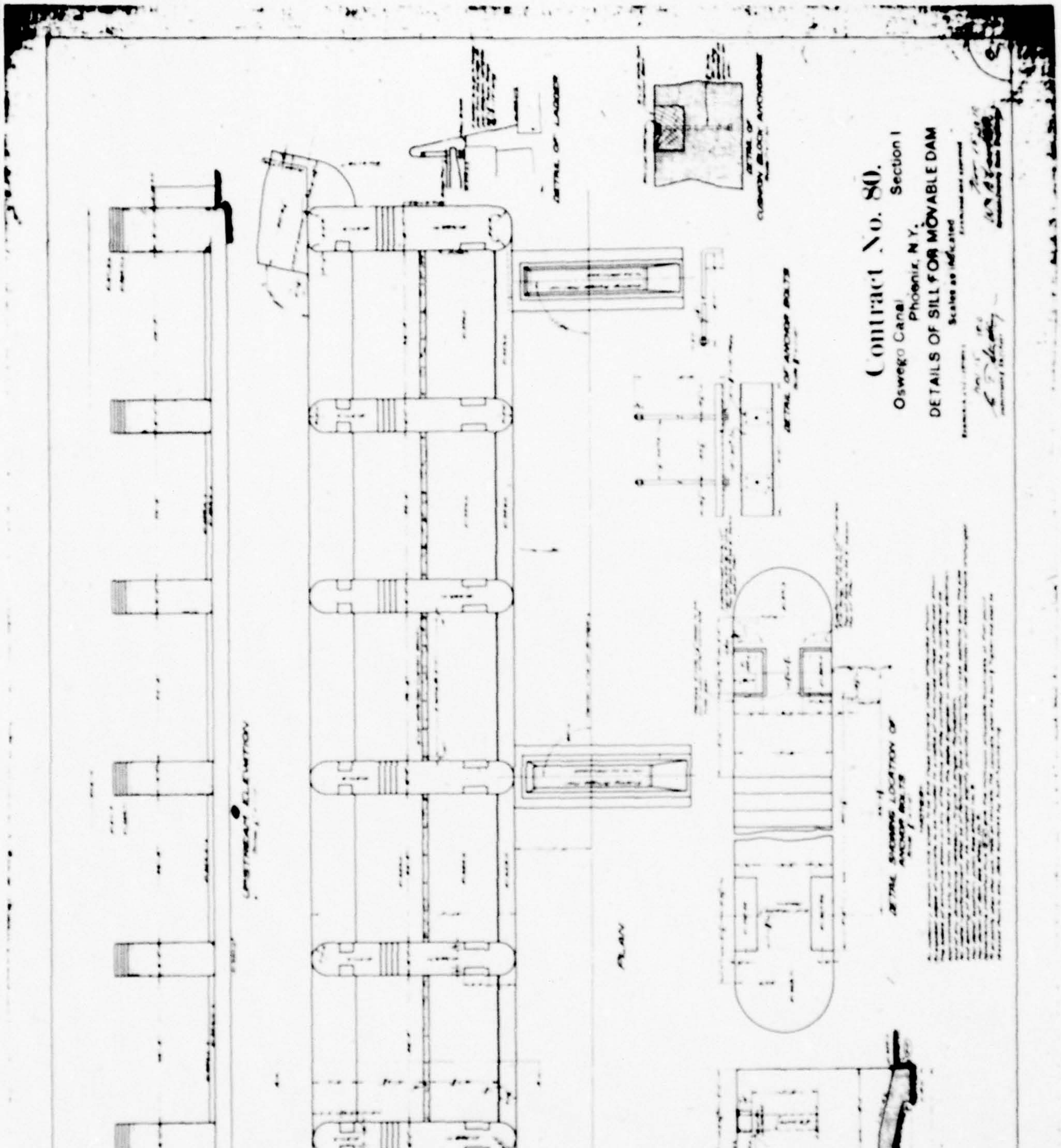

Contract No. 80.
Oswego Canal
Section I
Phoenix, N.Y.
DETAILS OF SILL FOR MOVABLE DAM
Scales as indicated
UPSTREAM ELEVATION
PLAN
SECTION A-A
DETAIL OF LADDER
DETAIL OF CUSHION BLOCK ANCHORAGE
DETAIL OF ANCHOR BOLTS
DETAIL SHOWING LOCATION OF ANCHOR BOLTS

FIGURE 11

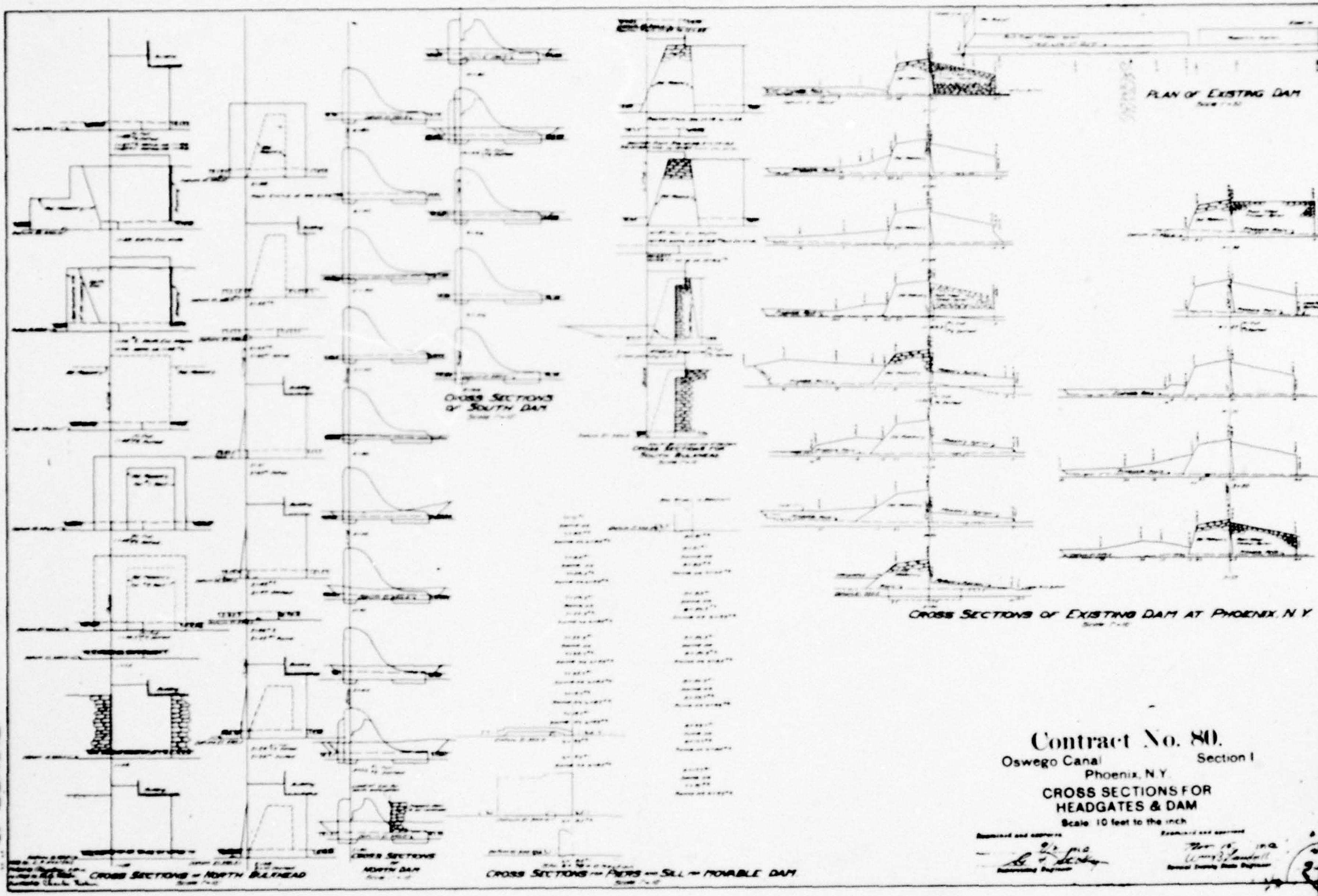
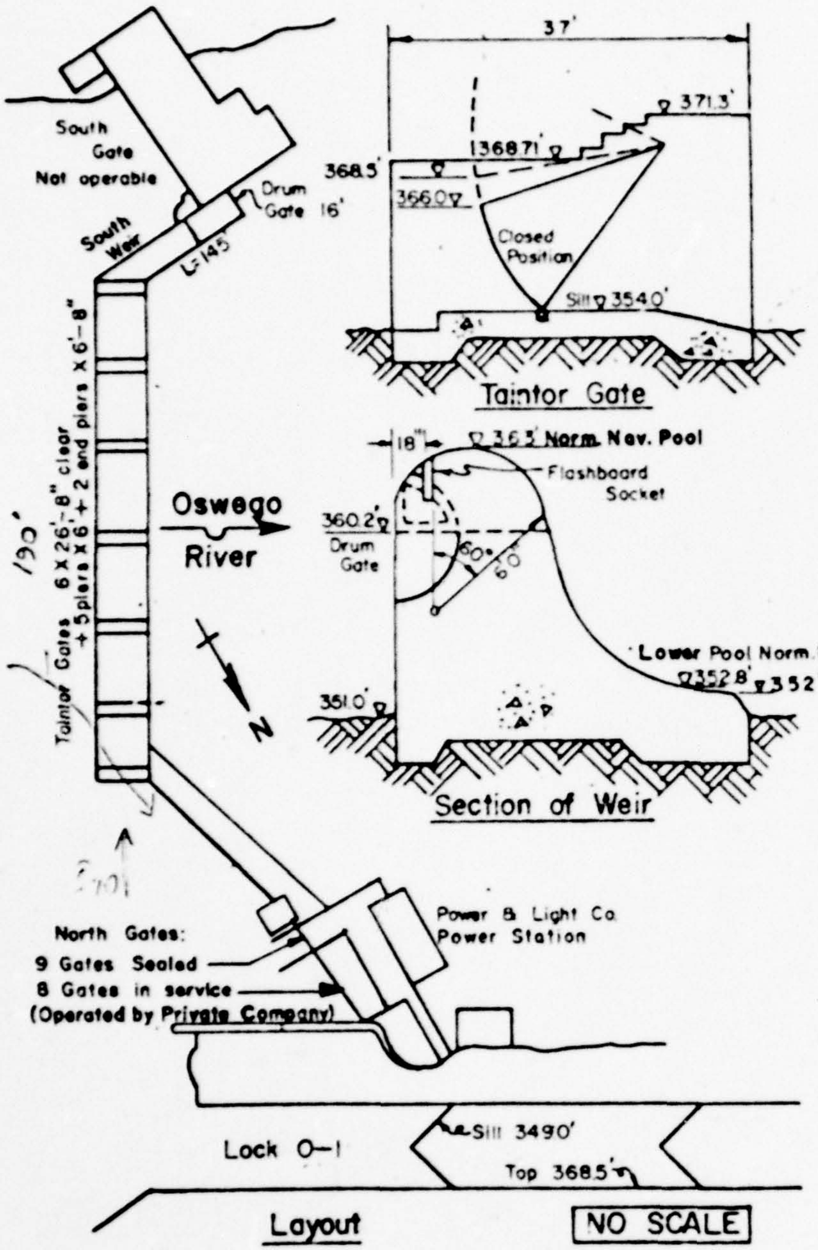

PLAN OF EXISTING DAM
CROSS SECTIONS OF EXISTING DAM AT PHOENIX, N.Y.
CROSS SECTIONS OF SOUTH DAM
CROSS SECTIONS — NORTH BULKHEAD
CROSS SECTIONS OF NORTH DAM
CROSS SECTIONS — PIERS — SILL — MOVABLE DAM
Contract No. 80.
Oswego Canal
Section I
Phoenix, N.Y.
CROSS SECTIONS FOR
HEADGATES & DAM
Scale 10 feet to the inch

FIGURE 12

CONTROL STRUCTURE AT LOCK O-1, PHOENIX
(FROM N.Y.S.D.E.C.)



PHOENIX

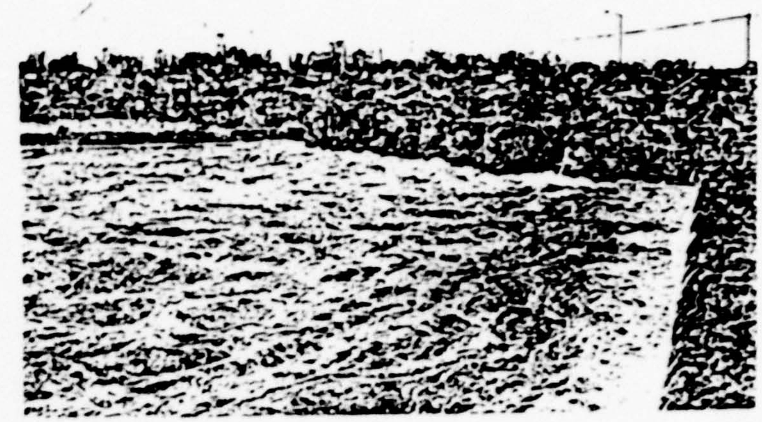
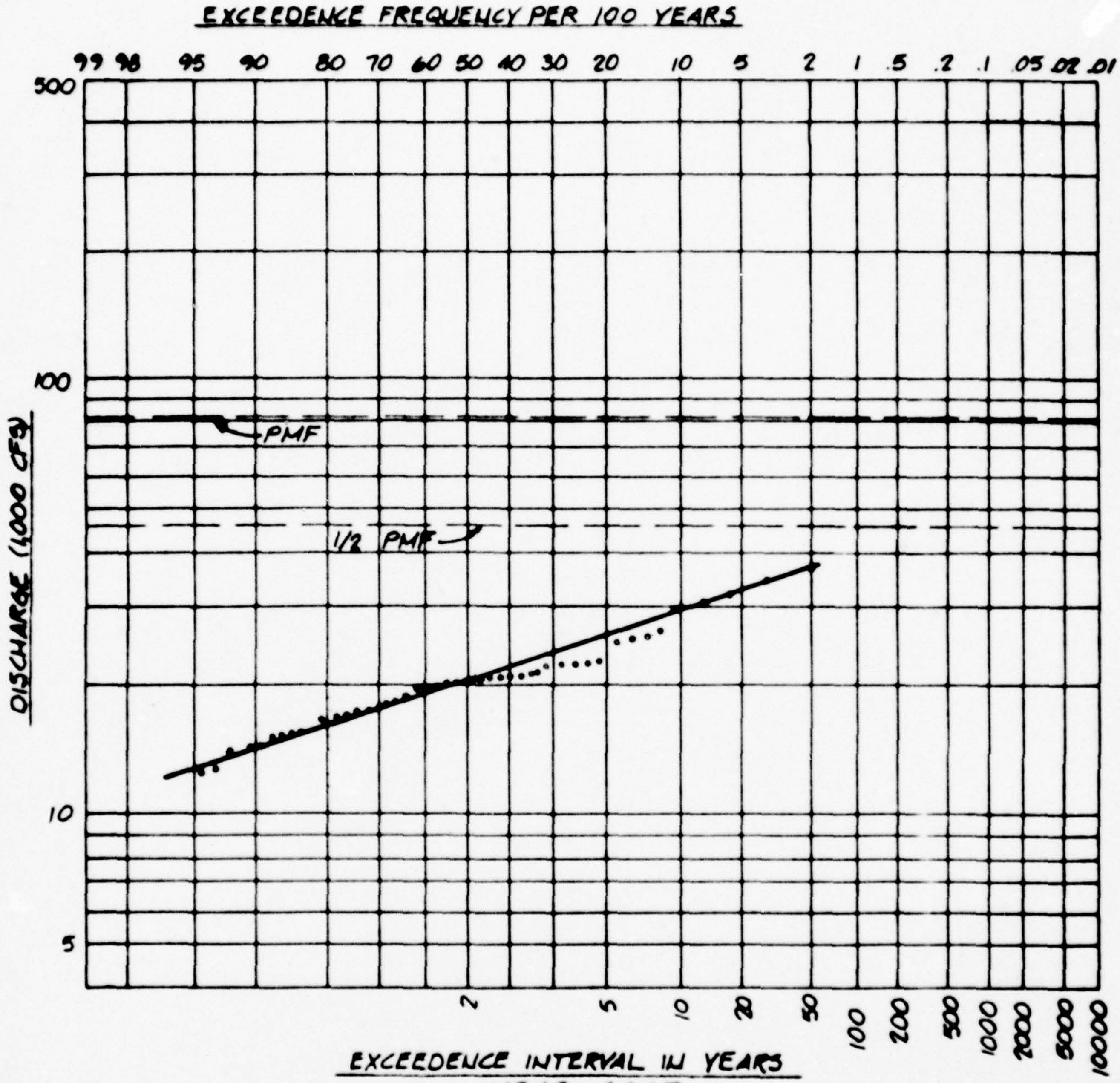


FIGURE 13



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 14	

APPENDIX A

FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam Dam at Lock 1, Phoenix **County** Oswego **State** New York **ID #** 773

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

Date(s) Inspection (1) June 7, 1979 (2) June 13, 1979 **Weather** Sunny **Temperature** 70's

Pool Elevation at Time of Inspection (1) 363.5* (2) --- **M.S.L.** **Tailwater at Time of Inspection** (1) 354.50* (2) ---

*Gage readings at Lock, Barge Canal Datum. Lift: 10.2 feet

Use of Dam Navigation

This inspection does not pertain to an independent evaluation of the condition of Lock 1.

Inspection Personnel:

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

N. F. Dunlevy **Recorder**

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	None observed. Spillways overflowing at time of inspection.	No remarks.
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	Some deterioration at eastern end of spillway at both the spillway and wall section.	A large concrete mass is located near this area below the spillway. Further investigation should inspect this area.
DRAINS	None	
WATER PASSAGES	None	
FOUNDATION	No observation.	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	Spillway at eastern end has some erosion at crest.	Same recommendations as Sheet 2.
STRUCTURAL CRACKING	None observed.	No Remarks.
VERTICAL & HORIZONTAL ALIGNMENT	No movement or alignment problems observed.	No Remarks.
MONOLITH JOINTS	Spillway overflowing, however the crest shows smooth nappe flow.	No recommendations to lower pool below crest for additional inspection of joints.
CONSTRUCTION JOINTS	Spillway overflowing, however the crest shows smooth nappe flow.	No recommendations to lower pool below crest for additional inspection of joints.
STAFF GAGE OF RECORDER	Operating at lock.	No Remarks.

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

Crested spillway extends across the eastern half of the river and on the western side on a side channel adjacent to tainter gates.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	See Comments 2 and 3	Side channel spillway on both sides river spillway also on east side of river.
APPROACH CHANNEL	River channel.	Tainter gate occupies west side of river.
DISCHARGE CHANNEL	River channel.	
BRIDGE AND PIERS	------	

GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Observation conditions poor. Tainter gates leak significantly. Mostly along side panels.	No recommendation.
APPROACH CHANNEL	Upstream face of dam, west side of river.	No recommendation.
DISCHARGE CHANNEL	Downstream face of dam, west side of river.	No recommendation.
BRIDGE AND PIERS	Concrete deterioration bad at gate side seals. Spalling of concrete. Spalling at fasteners of gates.	Piers need to be repaired or replaced. Cracks completely through top of pier #2 from west bank at 45 degrees.
GATES AND OPERATION EQUIPMENT	Gates have corrosion of skinplates and and members estimated at less than 10 percent. Anchors modified due to apparent poor condition of concrete piers Counterheights concrete deteriorated.	Repairs needed to gates.

OUTLET WORKS

Outlet Works Through Tainter Gate

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	See Sheet 7	
INTAKE STRUCTURE		
OUTLET STRUCTURE		
OUTLET CHANNEL		
EMERGENCY GATE		

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Channel clear and unobstructed	No remarks
SLOPES	Channel slopes towards Upper Fulton Dam 10 miles downstream. Channel navigable.	No remarks
APPROXIMATE NO. OF HOMES AND POPULATION	The downstream reach was not visually inspected. The immediate area has the Village of Phoenix on the east bank above the dam.	Since the dam is located across a navigable waterway, heavily used for recreational travel, a high hazard rating is appropriate.
	The following are potential hazards: Lock 1, residential, commercial property, docks and boats. Loss of life potential could be more than 4 people from either a flood flow or normal operating situation dam breach. A substantially higher loss of life potential is not foreseeable.	

INSTRUMENTATION

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

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Overbank area above pool area relatively flat.	No remarks.
SEDIMENTATION	No sedimentation build-up observed.	No remarks.

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

NAME OF DAM Lock 1 Dam at Phoenix

ID # ---

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	Not obtained for this inspection.

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.
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 from N.Y.S.D.O.T. See card file on maintenance and improvements in this report.

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

Elevations: Barge Canal Datum (USGS + 0.99 feet)

DRAINAGE AREA CHARACTERISTICS: 4950 (+) square miles.

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 363.0

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

ELEVATION MAXIMUM DESIGN POOL: ---

ELEVATION TOP DAM: 371.5

CREST:

a. Elevation 363
b. Type Crested spillway - see report
c. Width Crested spillway - see report
d. Length 533
e. Location Spillover East and West side river
f. Number and Type of Gates 6 @ 20.67 190 feet Tainter

OUTLET WORKS:

a. Type Tainter gates described in (f.) above.
b. Location
c. Entrance Inverts
d. Exit Inverts
e. Emergency Draindown Facilities 32,000 cfs at spillway crest.

HYDROMETEOROLOGICAL GATES:

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

MAXIMUM NON-DAMAGING DISCHARGE: ---

APPENDIX B

PREVIOUS INSPECTION REPORTS/RELEVANT CORRESPONDENCE

OSWEGO
LOCK NO. 1 PHOENIX STA. 121

Con. [redacted] 53
Equip. " [redacted] 97A - 90
" U.S. 93

Lower Pool 352.80
Upper Pool 363.00

Upper Mitre Sill 348.5
Lower Mitre Sill 339.5

x 7 Valves

NOTE: Village Waterline under Lock is at Sta. 121+80.5 (from Cont. 53 notes).

1927 - Painted complete.
1929 - Anchors for gate A frames installed. Started building boathouse.
1931 - Boathouse painted.
N.W. cor. of Lk. wall chipped & new 8" slab placed - new recesses to extend gate anchor rods. N.E. cor. of Lk. wall chipped & new anchor rod recesses & cable trench built in conc. Lock signal light system installed.
1932 - Cut away top & face of W. Lk. chamber wall from Br. 03 north to end of Lk. & placed new top and face slabs.
Extended gate anchor rods on N.E. cor. Built seven piers in river just So. of Br. 02
1933 - Pulled lower left valve and placed new side seal strip.
1943 - Overhead type Buffer Beam placed upper end.
1944 - Overhead type Buffer Beam placed lower end.
1944-5 - Lock completely overhauled
1947 - Gate & Valve motors overhauled.

1948 - Left gate machinery reanchored, new cable for signal lights, interior shop build remodeled.
1953 - Gate & valve motors overhauled, new rub sticks at lower end, new Kentile floor.
1954-5 - Unwatered - overhauled, replaced sills with angle iron, replaced valves, Z & seating rails. Installed recesses for guard gate at upper end. Guard gate tower reinforced,counterweight basket reinforced, tower and up and low gates scraped and painted. Replaced rub sticks. Replaced 8" oak seal on gates. Installed sealing strip for bottom of gate. New door for workshop.
1956 - 246 ft. of upper approach wall repaired.
1957 - Oil furnaces installed lockhouse & powerhouse. Rub sticks replaced. Limit switch panels replaced.
1958-9 - Contract U.S. 93, sills lowered & gates extended. Valves overhauled by state forces. New lockhouse, lockers & benches. Old lockhouse removed. New bumper blocks, new storm windows. Lower W. wall repairs. Removed old conc. & placed blacktop on W. Lock wall. New storm windows. New control stand house.
1962 - Lower gate & valve motors overhauled, limit switches overhauled, crossing gate motors repaired, gate machinery rebuilt, old building removed.
1963 - Addition to lockhouse constructed, motor generator installed, old powerhouse razed, lock rewired, four valves replaced also chains,cupwheels & shafts Upper gates & anchor arms repaired, timbers refitted, new type half-quoins and miters, rubber seal strips, installed 4 rebuilt valves, refaced with conc. 250' along E. chamber wall, repaired lower E. approach wall.
1965 - 250' of conc. repaired on E. chamber wall, 350' of E. lock wall blacktopped, motors repaired, buildings & cabinets painted.
1967 - Repaired bullgear for lower left gate.

1969-70 O-1 Replaced light gate machinery with reconditioned heavy machinery salvaged from Lock O-8; Winter repairs 1969-70 - install rebuilt valves fitted for cable operation, renew rails, wheels & counterweights, repair and paint gates, patch concrete; new wood seals & miters.

(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 F0F1 701 2A	F						BRIDGE ACROSS LIMESTONE FEEDER
W5 F0R5 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 F0R1 701 2C	F						ANDREWS ROAD BRIDGE
W5 F0R2 701 2C	F						FARM BR. S. OF ANDREWS RD., BUTTERNUT FEEDER
W5 F0D1 701 2C	F						TWIN PIPE CULV S.LAKE RD - DERUYTER
W5 F0D2 701 2C	F						BOX CULV. E. LAKE ROAD DERUYTER
W5 F0D3 701 2C	F						FARM BRIDGE , DERUYTER INLET
W5 F0D4 701 2C	F						FARM BRIDGE , DERUYTER INLET
W5 F0D5 701 2C	F						BRIDGE OVER DERUYTER OVERFLOW
W5 0024 701 3A	E	3932+00	374.0	13.2		45	BALDWINSVILLE DAM
W5 F0B1 701 3A	F			5.0			BUTTERNUT CREEK DIVERSION DAM
W5 F0D1 701 3A	F		1288.0	70.0			DERUYTER DAM
W5 F0D2 701 3A	F						DERUYTER INLET DIVERSION DAM
W5 F0F1 701 3A	F		430.0	6.5			LIMESTONE CREEK DIVERSION DAM
W5 F0J1 701 3A	F		645.5				JAMESVILLE DAM
W5 0001 701 3A	O	117+00	363.0	11.0	6	80	PHOENIX DAM *Total Dam*
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 J*
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)

FIELD DATA 1977

#	STRUCTURE ID NO	TYPE	POND + STREAM			SPILLWAYS					D/S SLOPE					D/S BERM			OUTLET CONTROL DEVICES						GATE HOUSE					GENERAL	Comments
	5 0024	M	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 need grouting
	5 F0B1	M	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 F0D1	M	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 F0D2	M	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 F0F1	M	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	0	N	7	5	1	0	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 [illegible]001	M	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 [illegible]002	M	X	7	7	3	X	3	X	3	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	3	
#18	5 [illegible]003	M	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 [illegible]005	M	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 [illegible]006	M	X	X	3	5	X	5	X	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	
#28	5 [illegible]007	M	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 L001	M	3	N	3	7	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 T001	M	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	

(k)

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
WS 0037 701 3A	O	1166+00	270.0	12.0		35	CURVED DAM AT LOCK 07 - OSWEGO
WS X001 701 3A	X						CARPENTER BROOK DIVERSION DAM (NOT NEEDED)
WS Y002 701 3A	Y	5090+00	375.4			5	OWASCO CREEK ENTRANCE 550FT LEFT
WS 0023 701 3C	E		369.9	8.0		H93	CAUGHDENOY DAM
WS 0124 701 3D	E	3931+50			1	635	TAINTAR GATE CONT H63-5
WS F002 701 3D	F				1		WASTE GATE - BUTTERNUT AQUEDUCT
WS F081 701 3D	F				2		BUTTERNUT FEEDER BULKHEAD
WS F004 701 3D	F				4		DERUYTER INLET HEADGATES
WS F003 701 3D	F			5.0			STREAM ENT. - DERUYTER INLET
WS F001 701 3D	F		1280.0	3.0			DERUYTER DAM SPILLWAY
WS F002 701 3D	F				3		DERUYTER DAM OUTLET GATES
WS F0F1 701 3D	F				4		LIMESTONE FEEDER BULKHEAD
WS F001 701 3D	F				1		WASTE GATE - LIMESTONE AQUEDUCT
WS F0J1 701 3D	F						JAMESVILLE DAM SPILLWAY
WS F0J2 701 3D	F				3		JAMESVILLE DAM OUTLET GATES
WS 0031 701 3D	O		363.0	12.0	6	80	TAINTAR GATES Key E, Movable Crest
WS 0021 701 3D	O		363.0			80	NORTH AUTO FLASHBOARD BLOCKED TOP Key D
WS 0051 701 3D	O		363.0			80	SOUTH AUTO FLASHBOARD BLOCKED TOP Key E
WS 0011 701 3D	O		363.0	11.0		80	NORTH SPILLWAY Key D
WS 0041 701 3D	O		363.0	11.0		80	SOUTH SPILLWAY Key F
WS 0012 701 3D	O		352.8	10.3		10A	SPILLWAYS Key H
WS 0022 701 3D	O				6	10A	TAINTOR GATES Key I
WS 0001 701 3D	O	661+00	311.0			205	SPILLWAY IN DIKE BELOW LOCK 03
WS 0005 701 3D	O	1180+75				35	BY-PASS CULVERT ABOVE LK 07 2 GATES
WS 0007 701 3D	O	1184+80			1	709	FEED GATE - LOCK 07

SLUICE GATES, SPILLWAYS, WASTE WEIRS - 1977

3D-5 (2a)

	STRUCTURE ID NO			CONCRETE						SUPER STRUCTURE			MACHINERY		SL GATES						GATES FLSHBRDS		STPLGS		ELECT				
	S CTB	STRC NO	TYPE	ABTMNTS	PIERS BLKHDS	UPSTRM APRON	DWNTRM APRON	SPLLWY SRFCE	SPHN INTRIOR	OPRTNG TRSTLE	CATWALKS	RAILINGS	STEM GEARING	FLR STD ETC	SPHN VLV LVLLER	GATE FRAME	GATE SKIN PLATE	GATE SEALS	SEATS	GUIDES	BOARDS	ANCHORS	STOPLOGS	GUIDES	MOTORS	WIRING	TRASH RACKS	GEN RECOMMEND	
	5	0124	3D	7	7	X	X	7	N	7	7	7	7	N	N	7	7	7	7	7	N	N	N	N	7	7	N	7	N. cable frayed
	5	F002	3D	7	N	N	N	N	N	N	N	N	N	N	N	7	7	7	6	7	N	N	N	7	N	N	N	7	
	5	F001	3D	7	7	X	X	X	N	N	N	N	N	N	N	X	X	X	X	7	N	N	N	7	N	N	N	7	
#25	5	F00A	3D	7	7	X	7	N	N	7	7	7	7	7	N	7	7	7	7	7	7	7	N	N	N	N	7	7	clear brush out of walls, clear silt + debris above
#26	5	F003	3D	7	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	some stones moved
#27	5	F001	3D	7	N	7	7	6	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	5	broken floor stand
#28	5	F002	3D	N	N	N	N	N	N	7	N	N	5	1	N	X	X	7	7	X	N	N	N	N	N	N	N	3	
	5	F0?1	3D	7	5	X	7	N	N	N	7	7	N	N	N	N	N	N	N	N	N	N	7	7	N	N	N	7	
	5	F00?	3D	7	N	N	N	N	N	N	N	N	N	N	N	N	5	5	5	5	N	N	N	N	N	N	N	5	
	5	F0J1	3D	7	N	X	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	Abutment needs pointing
	5	F0J2	3D	N	N	N	N	N	N	3	N	N	3	3	N	X	X	X	X	X	N	N	N	N	N	N	N	3	
#2	5	0031	3D	1	1	N	X	N	N	N	3	3	5	5	N	1	1	1	1	N	N	N	N	N	N	N	N	1	main anch poor, elect poor, finish paint, all conc poor
#3	5	[illegible]	3D	3	N	N	X	7	N	N	N	N	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N	N	N	N	N	N	N	7	
#4	5	0051	3D	3	N	N	X	3	N	N	N	N	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N	N	N	N	N	N	N	7	
#5	5	0010	3D	3	N	N	3	7	N	N	N	N	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N	N	N	N	N	N	N	7	
#7	5	0041	3D	3	N	N	3	3	N	N	N	N	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N	N	N	N	N	N	N	7	
#15	5	0012	3D	3	1	N	5	1	N	N	N	N	N	N	N	N	N	N	N	N	7	3	N	N	N	N	N	3	6"/- of surface worn away, copper pier & poor, hole in spill crest
#16	5	0022	3D	7	7	X	7	N	N	N	7	7	7	7	N	5	5	3	7	N	N	N	N	N	N	N	N	5	Align. racks & pinion, paint, leakage thru abut wall
	5	0001	3D	3	N	N	X	1	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	1	
#29	5	0005	3D	7	7	N	X	X	N	6	N	N	7	7	N	7	7	7	7	7	N	N	N	N	N	N	N	5	
#30	5	0007	3D	7	N	X	N	N	N	7	N	N	7	7	N	7	7	7	7	7	N	N	N	N	7	7	7	7	
	5	0002	3D	5	N	N	N	7	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	Paint frame holding grating
	5	0003	3D	7	N	N	N	7	N	N	7	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	
	5	Y001	3D	5	N	N	N	7	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7	

(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			H64	SIDE SPILLWAY BETWEEN LOCKS 07 & 08
WS 0003 701 3D	O	1203+71	255.8			H64	SIDE SPILLWAY WEST WALL ABOVE LOCK 8
WS Y001 701 3D	Y	60+15				720	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						DERUYTER 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	BULKHEAD 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			728	CLEVELAND TERMINAL
WS 0002 701 4A	E						DOCK-FRENCHMANS IS

3E-5-6

(3a)

SLUICE GATES SPILLWAYS WASTE WEIRS - 1977

	STRUCTURE ID NO: SCTN	HSTRC	TYPE	CONCRETE: ABTMNTS	PIERS BLKHDS	UPSTRM APRONS	DWNSTRM APRN	SPLLWY SRFCE	SPHN INTRIOR	SUPER STRUCTURE: OPRTNG TRSTLE	CATWALKS	RAILINGS	MACHINERY: STEM GEARING	FLR STD ETC	SPHN VLV LNR	SL GATES: GATE FRAME	GTE SKN PLATE	GATE SEALS	SEATS	GUIDES	GATES FLSHBRDS: BOARDS	ANCHORAGE	STPLGS: STOPLOGS	GUIDES	ELECT: 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
	5	F001	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
	5	F002	3E	7	N	N	U	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	3	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	[illegible]	7	N	N	N	N	N	N	[illegible]	N	N	N	X	X	X	X	X	N	N	N	N	N	N	N	9
•9	5	0071	3E	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9
•10	5	0010	3E	3	3	X	X	N	N	7	3	3	7	3	N	3	3	3	3	3	N	N	N	N	N	N	N	3
•11	5	0024	3E	3	3	X	X	N	N	N	N	[illegible]	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
•12	5	0031	3E	3	3	X	X	N	N	N	N	[illegible]	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	7
•13	5	0041	3E	3	3	X	X	N	N	N	N	[illegible]	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	[illegible]
•14	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	3	X	X	N	N	N	N	7	3	3	N	X	X	X	X	X	N	N	N	N	N	N	N	5
•21	5	0033	3E	7	3	X	X	N	N	N	N	7	3	3	N	X	X	X	X	X	N	N	N	N	N	N	N	3
•22	5	0023	3E	3	3	X	X	N	N	N	N	7	3	3	N	X	X	X	X	X	N	N	N	N	X	3	3	5
•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	,	3	N	N	N	N	N	N	N	N	N	3
•1	5	0052	3E	7	5	X	X	N	N	N	7	N	3	3	N	3	X	X	X	X	N	N	N	N	N	N	N	5
•7	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
•21	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
•2	5	0017	3E	3	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	3	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

III [illegible] dump fill + debris [illegible]

S-72-200.

Form W31. 5-12-16-3000 (16-16736) Acc. 980

(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

August 6, 1918
(Date)

CONSERVATION COMMISSION,

DIVISION OF WATERS.

GENTLEMEN:

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

This dam is situated upon the Oswego River (Give name of stream) in the Town of Lysander, Onondaga Co County, about in (State distance) from the Village or City of Phoenix

The distance — (Up or down) stream from the dam, to the Oswego River Bridge (Give name of nearest important stream or of a bridge), is about 0 miles (State distance).

The dam is now owned by State of N. Y. (Give name and address in full) and was built in or about the year —, and was extensively repaired or reconstructed during the year —

As it now stands, the spillway portion of this dam is built of concrete & masonry (State whether of masonry, concrete or timber). and the other portions are built of (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 rock and under the remaining portions such foundation bed is

B-9

The total length of this dam is ——— feet. The spillway or waste-weir portion, is about ——— feet long, and the crest of the spillway is about .... feet below the abutment.

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: ....

....

At the time of this inspection the water level above the dam was .... ft. 6 in. ~~below~~ above ~~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 or erosions which you may have observed.)

The dam is in fine condition
U.S. Troops. did not want me to take measurements

Reported by Roger Johnson
(Signature)

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

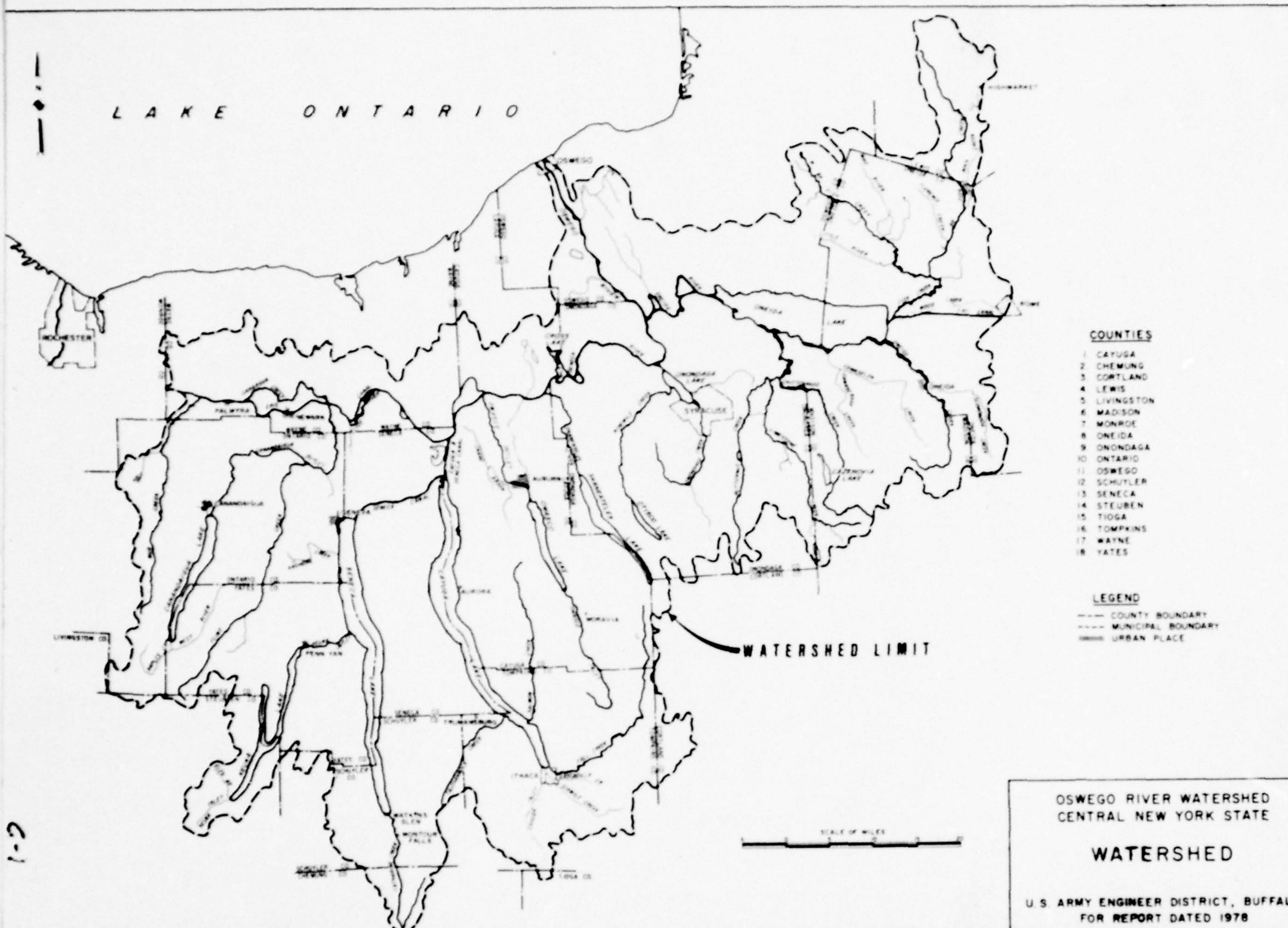
N. Y.
(Name of place)

B-10

APPENDIX C

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

HYDROLOGY



LAKE ONTARIO
OSWEGO
ROCHESTER
PALMYRA
NEWARK
SYRACUSE
ONEIDA LAKE
ROME
CANANDAIGUA
PENN YAN
WATKINS GLEN
MONTOUR FALLS
ITHACA
AUBURN
MORAVIA
WATERSHED LIMIT
LIVINGSTON CO.
TIOGA CO.
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

C-1

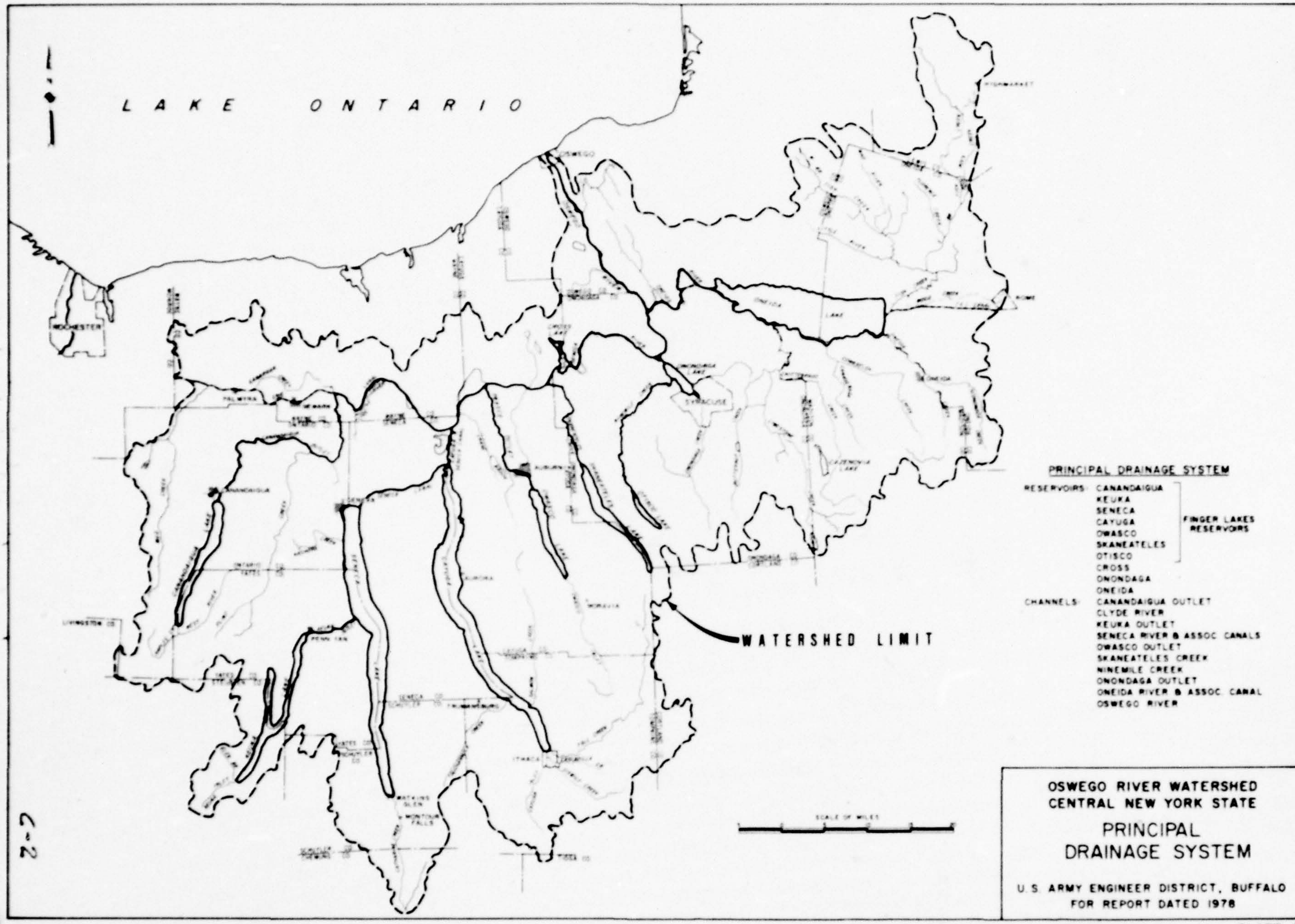
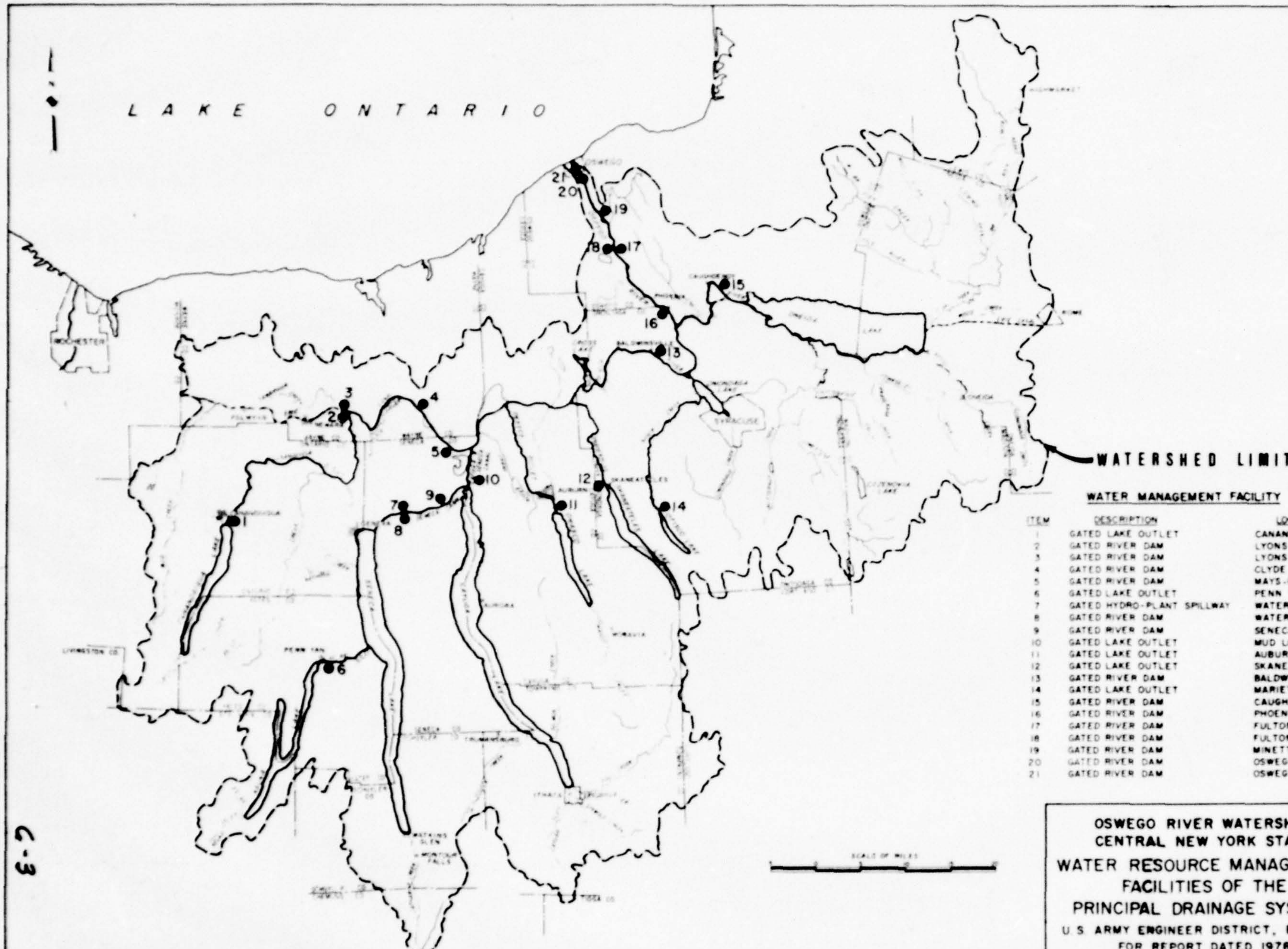

LAKE ONTARIO
OSWEGO
ROCHESTER
SYRACUSE
ITHACA
AUBURN
WATKINS GLEN
MONTOUR FALLS
PENN YAN
PALMYRA
NEWARK
ROME
ONEIDA LAKE
ONONDAGA LAKE
WATERSHED LIMIT
PRINCIPAL DRAINAGE SYSTEM
RESERVOIRS: CANANDAIGUA
KEUKA
SENECA
CAYUGA
OWASCO
SKANEATELES
OTISCO
CROSS
ONONDAGA
ONEIDA
FINGER LAKES RESERVOIRS
CHANNELS: CANANDAIGUA OUTLET
CLYDE RIVER
KEUKA OUTLET
SENECA RIVER & ASSOC. CANALS
OWASCO OUTLET
SKANEATELES CREEK
NINEMILE CREEK
ONONDAGA OUTLET
ONEIDA RIVER & ASSOC. CANAL
OSWEGO RIVER
SCALE OF MILES
OSWEGO RIVER WATERSHED
CENTRAL NEW YORK STATE
PRINCIPAL
DRAINAGE SYSTEM
U.S. ARMY ENGINEER DISTRICT, BUFFALO
FOR REPORT DATED 1978
C-2

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

C-3

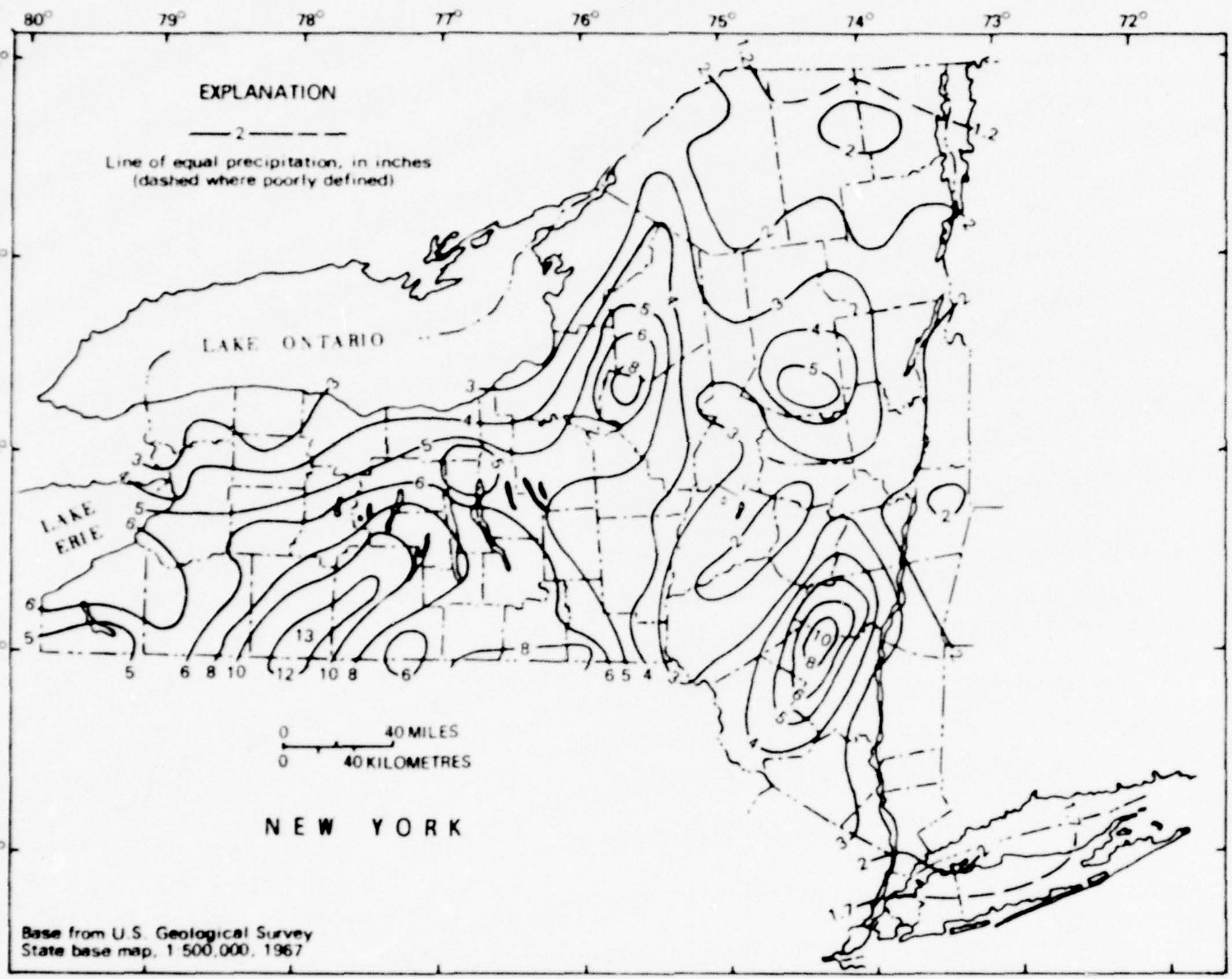
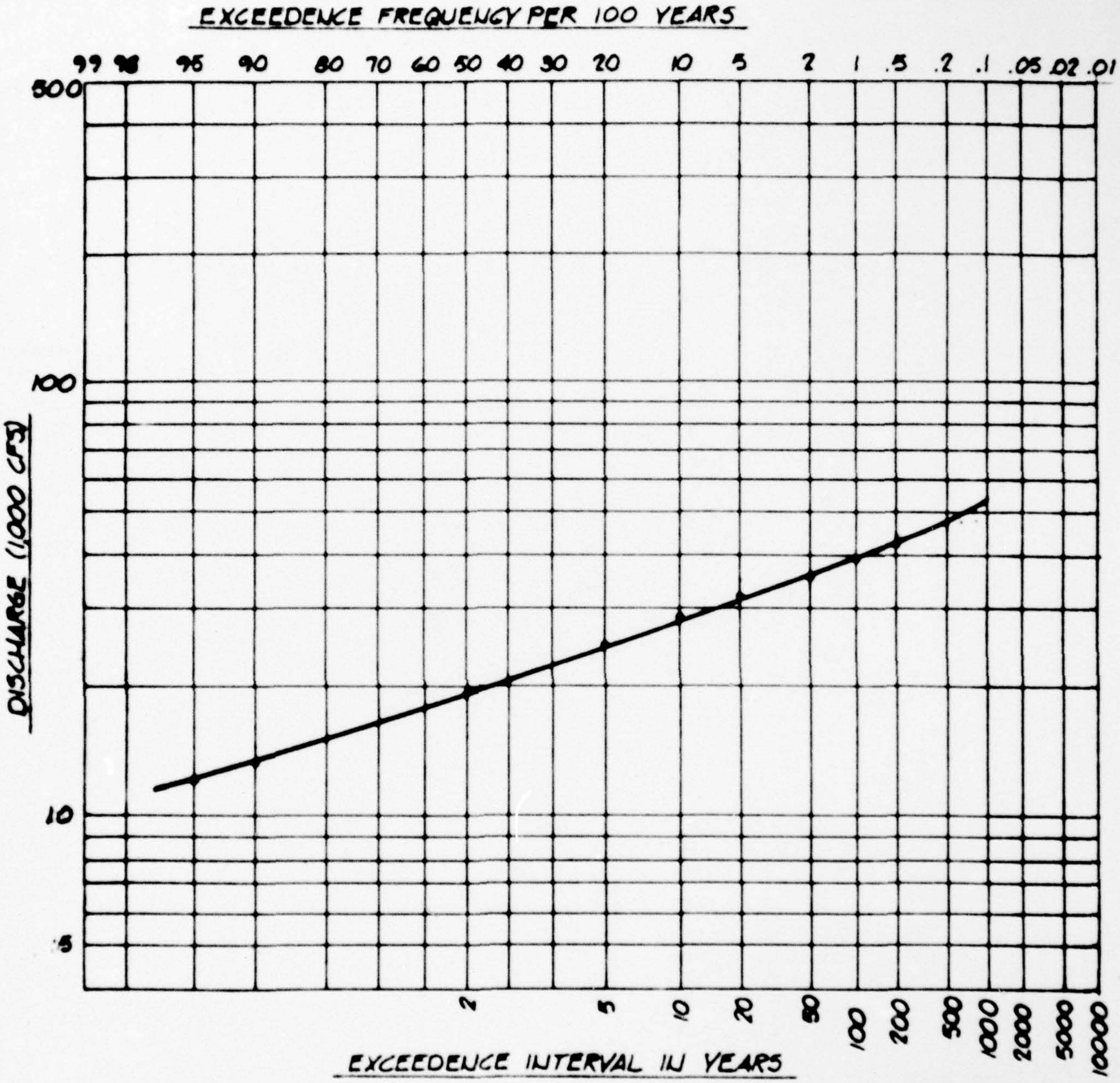


Figure 3.--Precipitation in New York, June 20-25. (Adapted from map furnished by A. B. Pack, Climatologist, National Weather Service, Ithaca, New York.)

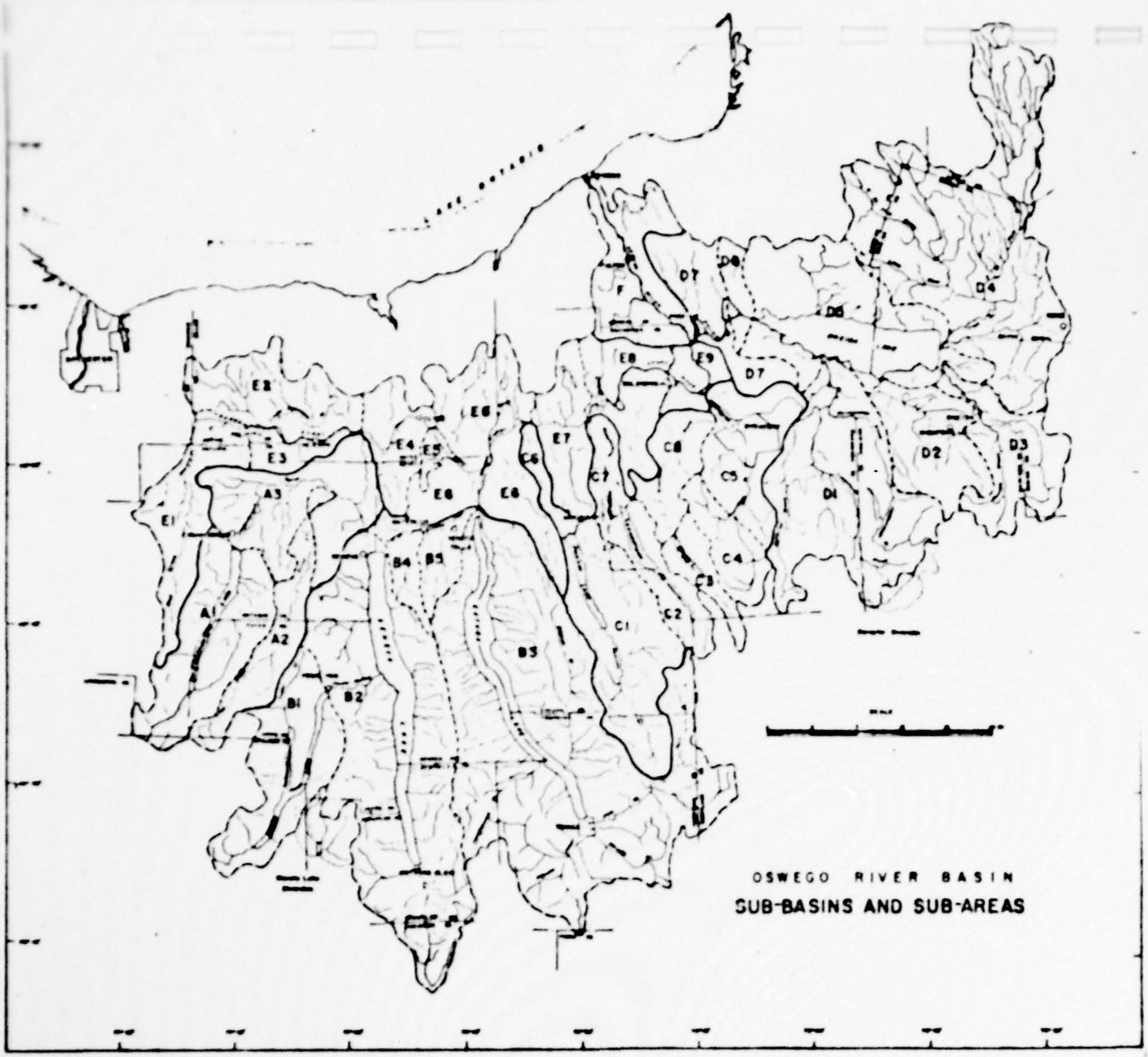


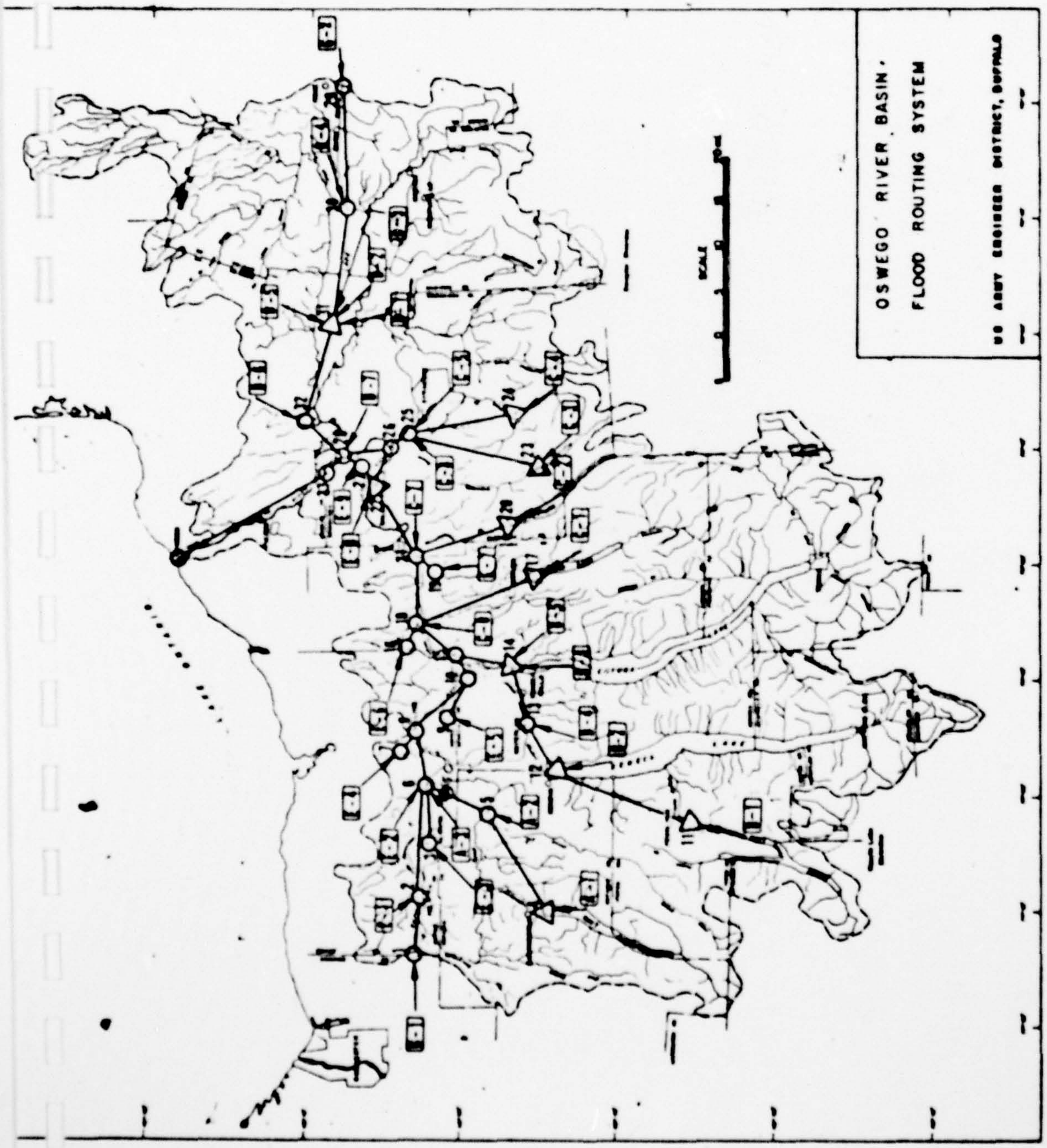
NOTE: DISCHARGE - FREQUENCY CURVE CONVERTED FROM STAGE - FREQUENCY CURVE, USING STAGE - DISCHARGE RATING CURVES DEVELOPED BY D.E.C.

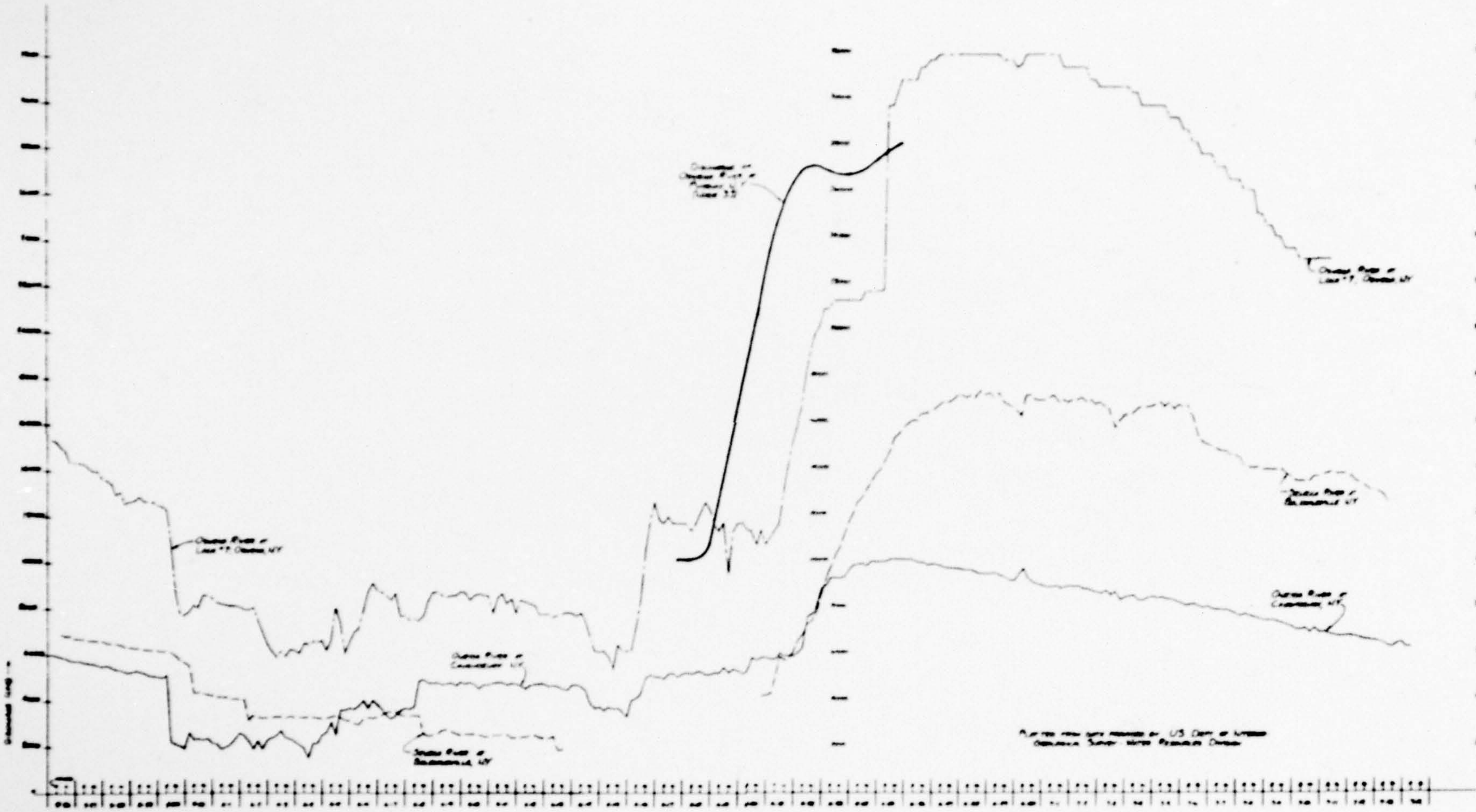
DISCHARGE - FREQUENCY CURVE

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
A1
A2
A3
B1
B2
B3
B4
B5
C1
C2
C3
C4
C5
C6
C7
C8
D1
D2
D3
D4
D6
D7
D8
E1
E2
E3
E4
E5
E6
E7
E8
E9
F


OSWEGO RIVER BASIN
FLOOD ROUTING SYSTEM
US ARMY ENGINEER DISTRICT, BUFFALO
SCALE



DISCHARGE CURVES

OSWEGO RIVER WATERSHED

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. 2205

DISCHARGE - FREQUENCY RANKING — DRAWN BY: JPG

WATER YR.	PEAK DISCHARGE	DATE	RANKING	DISCHARGE PLOT POSN.
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: JPS & NFD

Seneca Lake $Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$ 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	158900
9	42.57	9000	9	.006	129,350	205700

PROJECT NAME: NEW YORK STATE DAM INSPECTION — DATE: 6-22-79

SUBJECT: EXPANSION OF STAGE - DISCHARGE CURVES TO UPPER LIMITS — PROJECT NO: 1305

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

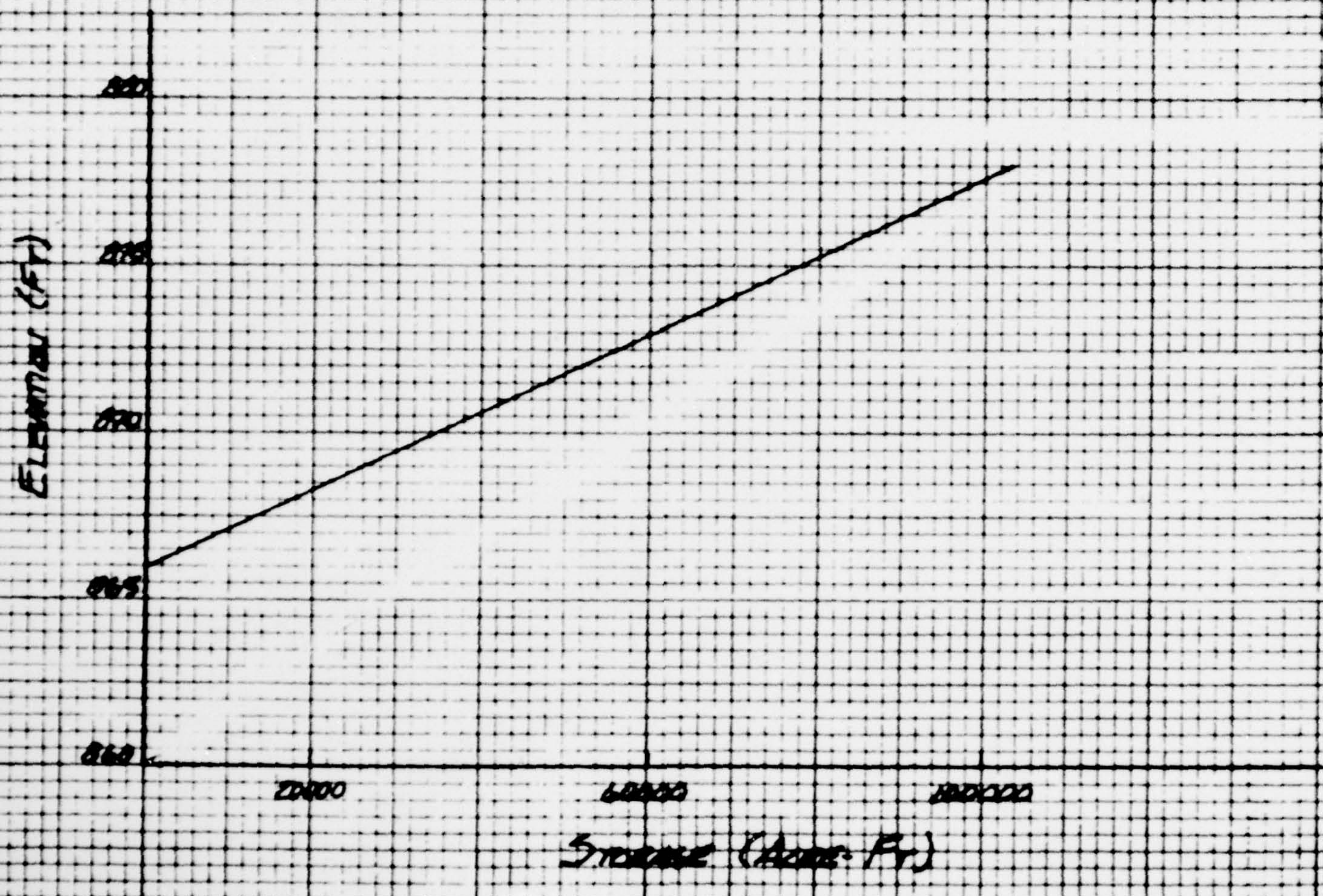
HEIGHT	1.49/n	A	R	S	Q	STORAGE (TOTAL)
0	42.57	0	0	.001	0	845000
3	42.57	6000	3	.001	16900	998000
6	42.57	12000	6	.001	53700	1150000
9	42.57	18000	9	.001	105600	1304000

SKANEATELES LAKE

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

SKANEATELES LAKE DAM

STAGE STORAGE



SKANEATELES REPORT

(C-8)

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	10 822.06	17359.48

SKANEATELES REPORT
(C-5)

```
1A                        OSWEGO RIVER BASIN
A                              HEC100
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     .8    1.0
K      0      1      0      0      0      0      1
K1         1 BARGE CANAL LOCK 30 AT MACEDON  (SUB AREA A1)
R     -1      0    100      0   5100      0      0      0      1
W    372    372    372    372    374    378    379    379    386    392
W    390    380    375    372    113     23     25     21     21     22
W     22     21     22     22     21     21     22     22     22      0
W
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 CANANDAIGUA 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
I    514   1946   2950   2655   1978   1472   1095    815    515    389
I    366    250    186    138    103     76     57     42     25     25
I     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 CANANDAGUAL 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
I     28    109    293    523    696    773    896    980   1246   1312
I   1218    979    764    596    465    363    283    221    173    135
I    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
I   2001   1630    844    383    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   104     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     0
I  8556  5103  3260  1507   691   316   145    30
I   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     0     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
I    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   330   905  1348  1718  2408  2601  1921  1413  1038
I   763   562   412   303   223   164   120    90    65    48
I    35    34
I   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     0     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
O     897    1670    1441    1144     908     721     572     454     361     287
O     227     181     143     114      90      72      57      45      36      29
O      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       0       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
O     171     304     313     246     193     152     119      93      73      58
O      45      35      28      22      17      13      11       8       6       5
O       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
O   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
Y2 107000  129500  141000  153500  172000  178000  191000  204000  217000
Y2 320550
Y3    120     320     445     530     575     670     890    1130    1470
Y3 126000
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
O   26993   10831    6099    4332    2720    1700    1072     673     422     266
O     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
X    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
X    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
1 24903 15540 13526  9524  6529  4476  3069  2104  1443   989
1   678   465   319   219    81
X  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    0     0     0     0     0     0 490000
Y2375000 417000 460000 503000 546000 589500 634000 660000 727000
Y2854500 902000
Y3 1700  1700  1700  1700  3400  3400  3400  8700  8700
Y3 30510 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    10     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  2051   5102   3130   2469   1710   1175    808    555    381    262
1   100    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   5870   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  79900  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    260    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
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AD-A077 422 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. PHOENIX DAM-LOCK 1 (INVENTORY NUMB--ETC(U)
SEP 79 J B STETSON DACW51-79-C-0001

UNCLASSIFIED NL

2 OF 2
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A077422

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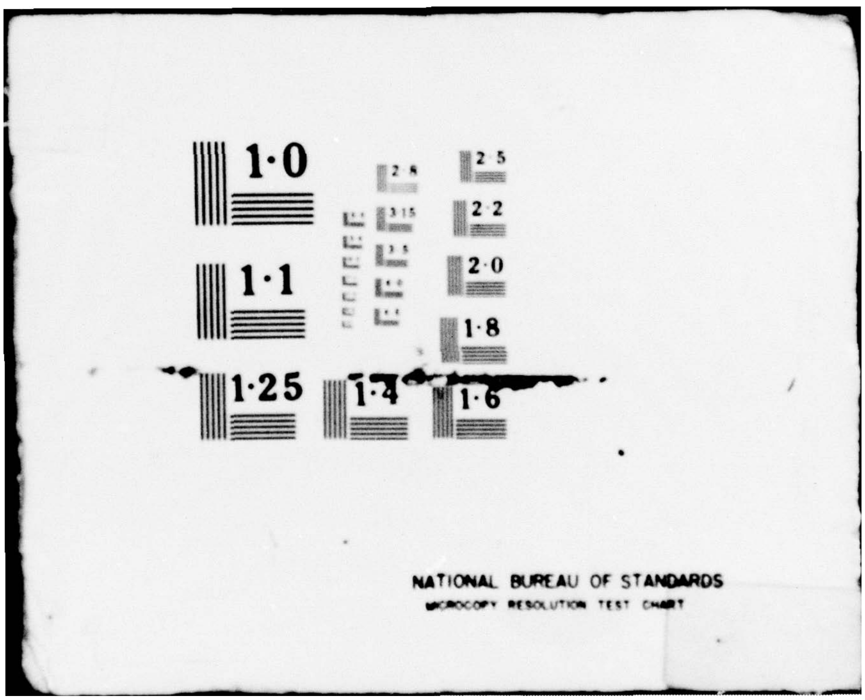
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NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

```
Y       0       0       0       0       1
Y1      0       6       2
K       2      21       0       0       0       0       1
K1        60 COMBINE ROUTED FLOW WITH FLOW AT 21
K       0      20       0       0       0       0       1
K1        61 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
I    6029     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   52104  104368  208736  243492
Y3      0     353     747    1500    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
I     496     946     501     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       6       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
I    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
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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 21000 23900 26100 28300 30500 32600 34800 37000 39200
Y2 45700 52300 58000 65300
Y3  200   200   200   200   200   400   900  1600  2000  2000
Y3 7060 10100 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
I  2010  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  1900  3500  7940 10200 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     0     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
I  2671  3269  2030  1215   727   436   261   156    77    56
I    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
I   459  1455  1854  1454   926   590   376   239   152    97
I    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     0     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
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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
I    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   (C-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 11090 12700 10200  6513  4014  2473  1524   939
1    579   356   220   140   102
I    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  2296  2356  1742  1289   953   705   522
1    386   286   183   156   115    85    63    47    34    30
1     30    30    30    24
I    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  1062  2750  2357  1404   929   581   363   227   142
1     89    49    35    18
I    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
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M       1      -1     200       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    3750    4112    4139    3402    2645
I    1916    1204     866     727     527     320     276     200     145     105
I      76      55      50      50
I     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       9    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    5035    4245    2505    1574     950     503     355     216     132
I      80      36
I     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      20       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     601     491     330     233     160     110      74      53
I      36      25      18      12       7
I      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    1800    1872    1496    1127     849     536     402     363
I     273     204     155     117      88      67      50      38      28      22
I      20      20      20       0
I     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
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JBOUT       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           16
                                          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     [illegible]
```

```
COMBINE  2 HYDROGRAPHS AT       19
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
HEC100
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       0       3   0.000   0.000   0.000      0.       0


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

                                   SUB-AREA RUNOFF COMPUTATION

              6 LOWER CANANDAGUA 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     -1 104.00   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  14.06  12.00   2.06  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-Z

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

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	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  14.66  11.06   3.80  18776.
                                                                          ( 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	0	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 9

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
9	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 9

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
9	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

25 ROUTE FLOWS AT NODE 9 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

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

SUB-AREA RUNOFF COMPUTATION

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	10.00	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
                             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       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  103.00    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=  900.00    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     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 147000.       0

STORAGE    107000.00   129500.00   141000.00   153500.00   172000.00   176000.00   191000.00   204000.00   217040.00        0.00
           320550.00

OUTFLOW       120.00      320.00      445.00      530.00      575.00      670.00      890.00     1170.00     1470.00        0.00
           126000.00
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********** ********** ********** ********** **********

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 D-Z

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 14.06 12.52 2.34 741190.
(377.)(318.)(59.)(21007.99)

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

COMBINE HYDROGRAPHS

34 COMBINE LOCAL FLOW D-Z 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

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                              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 8-4

                         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
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                                                                  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)
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**********          **********          **********          **********          **********

                              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 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=  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  660000.00  727000.00      0.00
          854500.00  982000.00

OUTFLOW     1700.00    1700.00    1700.00    1700.00    3400.00    3400.00    3400.00    8700.00    8700.00      0.00
           30510.00  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
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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  264813.
                                                                        ( 377.)( 291.)(  86.)( 7498.67)


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

                                         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    99000.00   104500.00   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


             **********      **********      **********      **********      **********
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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 25018.
(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

END-OF-PERIOD FLOW

0

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 Z1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
Z1	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 Z1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
Z1	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  100[illegible]49.
                                                                                ( 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 Z1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
Z1	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
Z1	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	35564.
										(377.)	(281.)	(96.)	(1007.12)

***

COMBINE HYDROGRAPHS

66 COMBINE LOCAL FLOW C-7 WITH FLOWS AT NODE Z1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
Z1	2	0	0	0	0	1	0	0

***

HYDROGRAPH ROUTING

67 ROUTING TO NODE ZZ

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

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
ZZ	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
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

```
                        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       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     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

                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   57828.
                                                                             ( 377.)( 291.)(  86.)( 1637.51)


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                                    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
           7060.00   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
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                                                              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

00 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

01 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

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                                                             SUM  14.86  10.94   3.92  [illegible]
                                                                ( 377.)( 276.)( 100.)( 2567.68)


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

                                   COMBINE HYDROGRAPHS

          02 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

          03 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       0       3   0.000  0.000  0.000      0.        0


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

                                   COMBINE HYDROGRAPHS

          04 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

          05 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

          06 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	33.30	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.	2040.	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

30.	30.	36.	35.	33.	75.	337.	470.	559.	1056.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	4221.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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.	7837.	10760.	11460.

STATION 28, PLAN 1, RTIO 3

OUTFLOW

48.	47.	46.	43.	41.	93.	421.	568.	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.	1584.
4646.	6331.	5957.	2909.	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.	3986.	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

OUTFLOW

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 D-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= 000.00 QRCSN= 3960.00 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 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 D-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

```
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
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                         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

        ..........      ..........      ..........      ..........      ..........
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**********   **********   **********   **********   **********

HYDROGRAPH ROUTING

103 ROUTE FLOWS TO NODE 32

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
32	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

104 LOCAL FLOW D-6

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
32	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	-1	20.00	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= 70.00 QRCSN= 210.00 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 36884.
(377.)(281.)(96.)(1044.44)

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

COMBINE HYDROGRAPHS

105 COMBINE LOCAL FLOW D-6 WITH FLOW AT 32

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
32	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

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)

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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.	23690.	24853.	25760.	26136.
26110.	25817.	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	34.78
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.	9254.	9778.	10326.	10873.	12582.
18236.	24255.	28504.	30267.	32346.	35068.	37554.	39189.	40382.	40638.
40357.	39735.	38908.	37933.	37060.	36447.	36090.	35908.	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.
20860.	28325.	33482.	35435.	37701.	40731.	43514.	45298.	46650.	46955.
46699.	46065.	45207.	44180.	43287.	42689.	42483.	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.	9628.	9761.	10604.	11463.	12358.	15018.
23482.	32353.	38377.	40457.	42871.	46182.	49268.	51253.	52815.	53242.
53063.	52458.	51593.	50531.	49630.	49076.	48880.	48877.	49021.	49317.
49711.	50109.	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

9031.	9013.	9079.	9905.	10058.	10267.	11430.	12640.	13863.	17443.
28600.	40290.	47974.	50270.	52909.	56966.	60770.	63310.	65480.	66295.
66360.	65840.	64971.	63000.	62025.	62263.	62134.	62211.	62450.	62820.
63301.	63060.	64490.	65164.	65034.	66460.	67021.	67451.	67750.	67951.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	67951.	67054.	67360.	65143.	1904350.
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.	10220.	10376.	10487.	10774.	12257.	13819.	15410.	19894.
33060.	48171.	57454.	59943.	62941.	67609.	72185.	75346.	78178.	79405.
79709.	79270.	78374.	77006.	75992.	75392.	75293.	75420.	75715.	76152.
76710.	77360.	78102.	78885.	79603.	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		40720.	161712.	469421.	1130104.
THOUS CU M		50230.	199469.	579023.	1393963.

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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.	24585.	739529.
CMS	737.	737.	731.	696.	20941.
INCHES		.05	.19	.53	1.34
MM		[illegible]	[illegible]	[illegible]	[illegible]

MM		[illegible]	[illegible]	[illegible]	[illegible]
AC-FT		12090.	51181.	146290.	366709.
THOUS CU M		15910.	63131.	180446.	452328.

STATION 33, PLAN 1, RTIO 2

OUTFLOW

9194.	9187.	9183.	9186.	9196.	9220.	9411.	9787.	10326.	11260.
13097.	18358.	23665.	27675.	30372.	32560.	34989.	37270.	39042.	40070.
40459.	40244.	39667.	38859.	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.	9344.	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.	42398.
42585.	42891.	43293.	43766.	44279.	44802.	45298.	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.	11482.	12953.
16953.	23618.	31404.	37062.	40568.	43170.	46107.	48901.	51112.	52437.
53040.	52921.	52372.	51528.	50585.	49745.	49195.	48944.	48929.	49075.
49353.	49739.	50208.	50736.	51292.	51047.	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.	28887.	38904.	46183.	50413.	53411.	56908.	60349.	63186.	65028.
66005.	66168.	65726.	64876.	63868.	62965.	62407.	62203.	62265.	62494.
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

82837. 83330. 83809. 84310. 85165. 85822. 86441. 86900. 87420. 87830.

	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.

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

OPERATION	STATION	AREA	PLAN	RATIO 1 .20	RATIO 2 .40	RATIO 3 .50	RATIO 4 .60	RATIO 5 .80	RATIO 6 1.00
				RATIOS APPLIED TO FLOWS					
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.	29418.	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.	47266.	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.	91684.	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	10	2528.00	1	14139.	30071.	35426.	40960.	52754.	64729.
		(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	10	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	10	2719.00	1	14213.	30219.	35610.	41181.	53049.	65108.
		(7042.10)	(	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	748.	1736.	2000.	2218.	4376.	6539.
		(110.59)	(	21.18)(	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)(

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HYDROGRAPH AT       31    105.00       1     5045.    10089.    12611.    15134.    20178.    25223.
                       (  271.95)      (   142.85)(  285.69)(  357.11)(  428.54)(  571.38)(  714.23)(

 2 COMBINED         31    870.00       1    32185.    64370.    80462.    96555.   128740.   160925.
                       ( 2274.01)      (   911.30)( 1822.75)( 2278.44)( 2734.13)( 3645.50)( 4556.88)(

HYDROGRAPH AT       31    280.00       1     8352.    16705.    20881.    25057.    33410.    41762.
                       (  745.92)      (   236.51)(  473.03)(  591.28)(  709.54)(  946.06)( 1182.57)(

 2 COMBINED         31   1166.00       1    36521.    73041.    91301.   109562.   146082.   182603.
                       ( 3019.93)      (  1034.15)( 2068.29)( 2585.36)( 3102.44)( 4136.58)( 5170.73)(

HYDROGRAPH AT       31    269.00       1    19077.    38153.    47691.    57230.    76306.    95383.
                       (  696.71)      (   540.19)( 1080.38)( 1350.47)( 1620.57)( 2160.75)( 2700.94)(

 2 COMBINED         31   1435.00       1    42495.    84990.   106238.   127485.   169980.   212476.
                       ( 3716.63)      (  1203.33)( 2406.65)( 3008.32)( 3609.98)( 4813.31)( 6016.64)(

ROUTED TO           31   1435.00       1     8666.    12305.    14086.    15877.    19464.    23053.
                       ( 3716.63)      (   245.38)(  348.44)(  398.87)(  449.59)(  551.15)(  652.79)(

ROUTED TO           32   1435.00       1     8666.    12305.    14086.    15877.    19464.    23053.
                       ( 3716.63)      (   245.38)(  348.44)(  398.87)(  449.59)(  551.15)(  652.79)(

HYDROGRAPH AT       32     28.00       1     1215.     2430.     3038.     3645.     4860.     6075.
                       (   72.52)      (    34.41)(   68.81)(   86.02)(  103.22)(  137.62)(  172.03)(

 2 COMBINED         32   1463.00       1     8804.    12502.    14309.    16118.    19761.    23409.
                       ( 3789.15)      (   249.30)(  354.01)(  405.18)(  456.41)(  559.58)(  662.86)(

ROUTED TO           28   1463.00       1     8756.    12431.    14229.    16032.    19659.    23289.
                       ( 3789.15)      (   247.95)(  352.02)(  402.92)(  453.98)(  556.69)(  659.47)(

 2 COMBINED         28   5028.70       1    25503.    39439.    46398.    53447.    67711.    81954.
                       (13003.55)      (   722.17)( 1116.79)( 1313.85)( 1513.45)( 1917.35)( 2320.69)(

HYDROGRAPH AT       28    110.00       1     3626.     7251.     9064.    10877.    14503.    18128.
                       (  284.90)      (   102.67)(  205.34)(  256.67)(  308.01)(  410.67)(  513.34)(

 2 COMBINED         28   5138.70       1    26134.    40638.    46955.    53627.    67951.    82255.
                       (13288.45)      (   740.08)( 1150.75)( 1329.62)( 1518.56)( 1924.16)( 2329.28)(

ROUTED TO           33   5138.70       1    26021.    40459.    46768.    53381.    67656.    81891.
                       (13288.45)      (   736.83)( 1145.67)( 1324.32)( 1511.58)( 1915.79)( 2318.89)(

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 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION     JULY 1978
   LAST MODIFICATION  26 FEB 79
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TERMINAL   325 TIME OUT.


COD= 3:24 MRU=     7.366


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

Name	Regulating Agency	Drainage Area (sq.mi.)	Surface Area (sq.mi.)	Shoreline (miles)	Principal Regulation Purpose
Canandaigua Lake	City of Canandaigua	184	16.57	36	WS,WQ,FC,Rec.
Keuka Lake	Village of Penn Yan	179	17.43	19	WS,SQ,Rec.,FC
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., Rec. 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, Rec
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

STATION 04246500 ONEIDA RIVER AT CAUGHDENOY, N.Y.

TOTAL D.A. = 1382 CONTR. D.A. =
GAGE DATUM = 362.00 FT.

WATER YEAR	ANNUAL PEAK DISCH.CFS	DATE	CODES	HIGHEST SINCE	GAGE HEIGHT OF ANNUAL PEAK,FT	CODE	ANNUAL MAX GAGE HT.FT	DATE	CODE
1903	13760	03-27-03	HD KR						
1904	11710	04-01-04	HD KR						
1905	13200	04-08-05	HD KR						
1906	6970	04-17-06	HD KR						
1907	7360	04-02-07	HD KR						
1908	7570	04-03-08	HD KR						
1909	9300	04-15-09	HD KR						
1910	10840	03-13-10	HD KR						
1911	7340	04-13-11	HD KR						
1912	10310	04-20-12	HD KR						
1948	7740	03-31-48	HD KR						
1949	5760	01-21-49	HD KR						
1950	9160	04-07-50	HD KR						
1951	8730	04-05-51	HD KR						
1952	6490	04-13-52	HD KR						
1953	6710	05-05-53	HD KR						
1954	6750	04-19-54	HD KR						
1955	7800	03-26-55	HD KR						
1956	8120	04-18-56	HD KR						
1957	4900	12-05-56	HD KR						
1958	5440	04-11-58	HD KR						
1959	8340	04-11-59	HD KR						
1960	8580	04-07-60	HD KR						
1961	5850	05-01-61	HD KR						
1962	6730	05-02-62	HD KR						
1963	7720	04-06-63	HD KR						
1964	6330	04-20-64	HD KR						
1965	7160	04-26-65	HD KR						
1966	6510	04-28-66	HD KR						
1967	6080	12-14-66	HD KR						
1968	7250	04-06-68	HD KR						
1969	8010	05-22-69	HD KR						
1970	6550	04-20-70	HD KR						
1971	7320	05-11-71	HD KR						
1972	10100	06-25-72	HD KR						
1973	7590	04-09-73	HD KR						
1974	7510	05-14-74	HD KR						
1975	7440	09-29-75	HD KR						

TATI 1423 ... IASC ... KE ... ET ... AU... N...

TOTAL D.A. = 208.00 CONTR. D.A. =
GAGE DATUM = 533.92 FT.

WATER YEAR	ANNUAL PEAK DISCH.CFS	DATE	CODES	HIGHEST SINCE	GAGE HEIGHT OF ANNUAL PEAK.FT	CODE	ANNUAL MAX GAGE HT.FT	DATE	CODE
1914	1950	04-03-14	KR		4.43				
1915	1260	02-26-15	KR		3.63				
1916	1720	04-03-16	KR		4.21				
1917	1070	06-30-17	KR		3.47				
1918	1100	03-17-18	KR		3.50				
1919	1160	04-12-19	KR		3.55				
1920	1460	03-29-20	KR		3.84				
1921	1040	03-16-21	KR		3.44				
1922	1620	06-22-22	KR		4.05				
1923	1230	03-24-23	KR		3.61				
1924	1390	01-28-24	KR		3.74				
1925	1250	02-27-25	KR		3.66				
1926	1140	04-12-26	KR		3.56				
1927	1110	03-23-27	KR		3.53				
1928	1620	12-02-27	KR		4.05				
1929	1800	04-22-29	KR		4.35				
1930	1110	06-19-30	KR		3.53				
1931	1260	04-04-31	KR		3.67				
1932	1620	04-04-32	KR		4.06				
1933	920	04-08-33	KR		3.32				
1934	696	04-05-34	KR		3.07				
1935	1080	04-20-35	KR		3.50				
1936	2090	03-19-36	KR		4.88				
1937	1040	01-28-37	KR		3.46				
1938	1350	05-29-38	KR		3.72				
1939	1060	02-28-39	KR		3.45				
1940	2090	04-09-40	KR		4.88				
1941	1300	04-08-41	KR		3.75				
1942	1510	03-17-42	KR		3.98				
1943	1610	12-31-42	KR		4.02				
1944	1210	04-13-44	KR		3.57				
1945	2030	03-22-45	KR		4.61				
1946	1000	03-09-46	KR		3.36				
1947	1420	06-07-47	KR		3.80				
1948	1400	03-22-48	KR		3.78				
1949	732	02-16-49	KR		3.04				
1950	2090	04-04-50	KR		4.72				
1951	1270	12-11-50	KR		3.63				
1952	879	02-06-52	KR		3.21				
1953	596	05-15-53	KR		2.87				
1954	1160	05-05-54	KR		3.51				
1955	1830	03-12-55	KR		4.31				
1956	1780	04-08-56	KR		4.25				
1957	800	04-25-57	KR		3.10				
1958	1900	04-08-58	KR		4.42				
1959	1280	04-09-59	KR		3.64				
1960	1970	04-05-60	KR		4.51				
1961	1650	02-28-61	KR		4.07				
1962	1550	03-31-62	KR		3.86				
1963	1750	03-29-63	KR		4.13				
1964	1760	03-16-64	KR		4.14				
1965	[illegible]	04-[illegible]-65	[illegible]		[illegible]	R[illegible]			

C-18

STATION 04235500 OWASCO LAKE OUTLET NEAR AUBURN, N.Y.

TOTAL D.A. = 208.00 CONTR. D.A. =
GAGE DATUM = 533.92 FT.

WATER YEAR	ANNUAL PEAK DISCH.CFS	DATE	CODES	HIGHEST SINCE	GAGE HEIGHT OF ANNUAL PEAK.FT	CODE	ANNUAL MAX GAGE HT.FT	DATE	CODE
1966	1270	04-28-66	KR		3.62	BW			
1967	801	04-04-67	KR		2.99				
1968	1070	06-28-68	KR		3.64				
1969	1650	04-10-69	KR		3.99				
1970	1690	04-10-70	KR		4.04				
1971	1710	04-15-71	KR		4.12				
1972	3250	06-23-72	KR		6.28				
1973	1370	12-09-72	KR		3.75				
1974	1740	04-06-74	KR		4.19				
1975	1940	09-27-75	KR		4.38				

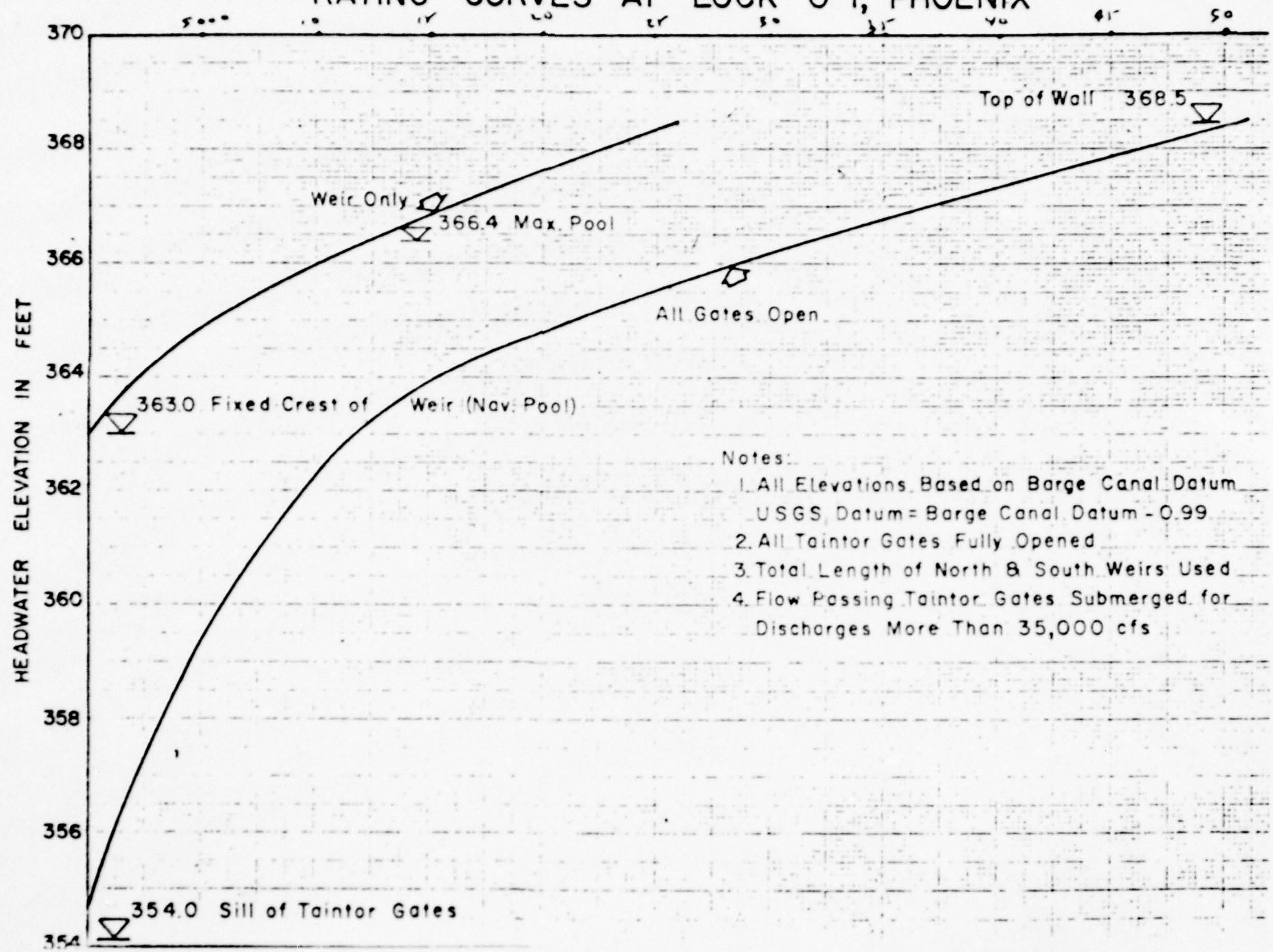
STATION 04237500 SENECA RIVER AT BALDWINSVILLE, N.Y.

TOTAL D.A. = 3130.00 CONTR. D.A. =
GAGE DATUM = 362.60 FT.

WATER YEAR	ANNUAL PEAK DISCH,CFS	DATE	CODES	HIGHEST SINCE	GAGE HEIGHT OF ANNUAL PEAK,FT	CODE	ANNUAL MAX GAGE HT,FT	DATE	CODE
1950	15700	04-01-50	KR		8.50				
1951	11800	02-24-51	HO KR		6.73				
1952	10700	03-14-52	HO KR		5.90				
1953	8800	03-29-53	HO KR		5.25				
1954	9090	05-06-54	HO KR		5.27				
1955	11900	03-18-55	HO KR			NM	6.84	03-23-55	
1956	16700	03-12-56	HO KR		8.84				
1957	7430	01-24-57	HO KR		4.73				
1958	10700	04-24-58	HO KR		5.92				
1959	11500	04-04-59	HO KR		6.43				
1960	17200	04-04-60	HO KR		9.21				
1961	11400	04-29-61	HO KR		6.09				
1962	8190	03-15-62	HO KR		4.96				
1963	10100	03-22-63	HO KR		5.57				
1964	9940	03-18-64	HO KR		5.30				
1965	5940	02-13-65	HO KR		3.93				
1966	8650	03-08-66	HO KR			NM	4.99	03-07-66	
1967	6580	05-16-67	HO KR			NM	4.21	05-15-67	
1968	8090	04-05-68	HO KR				4.84	03-27-68	RW
1969	9440	04-27-69	HO KR				5.42	04-27-69	
1970	10600	04-05-70	HO KR			NM	5.83	04-04-70	
1971	14800	03-19-71	HO KR				7.53	03-19-71	
1972	17200	06-28-72	HO KR			NM	9.21	06-30-72	
1973	12100	04-08-73	HO KR		6.75				
1974	8970	04-05-74	HO KR		5.77				
1975	10500	09-29-75	HO KR		6.62				

HYDRAULICS

RATING CURVES AT LOCK O-1, PHOENIX



12-7

RATING CURVES AT LOCK O-1, PHOENIX

OVERFLOW THROUGH DRUM GATE

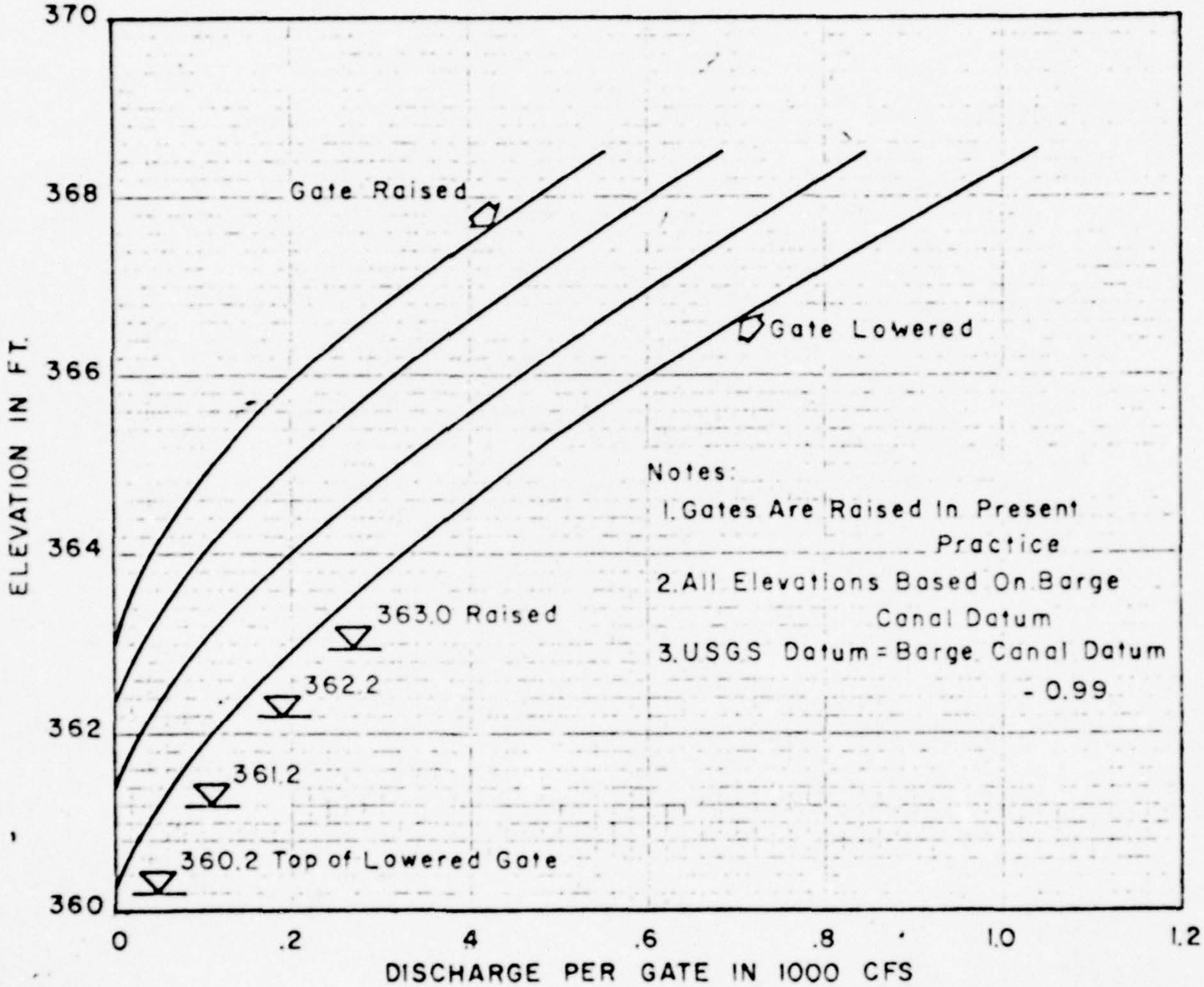
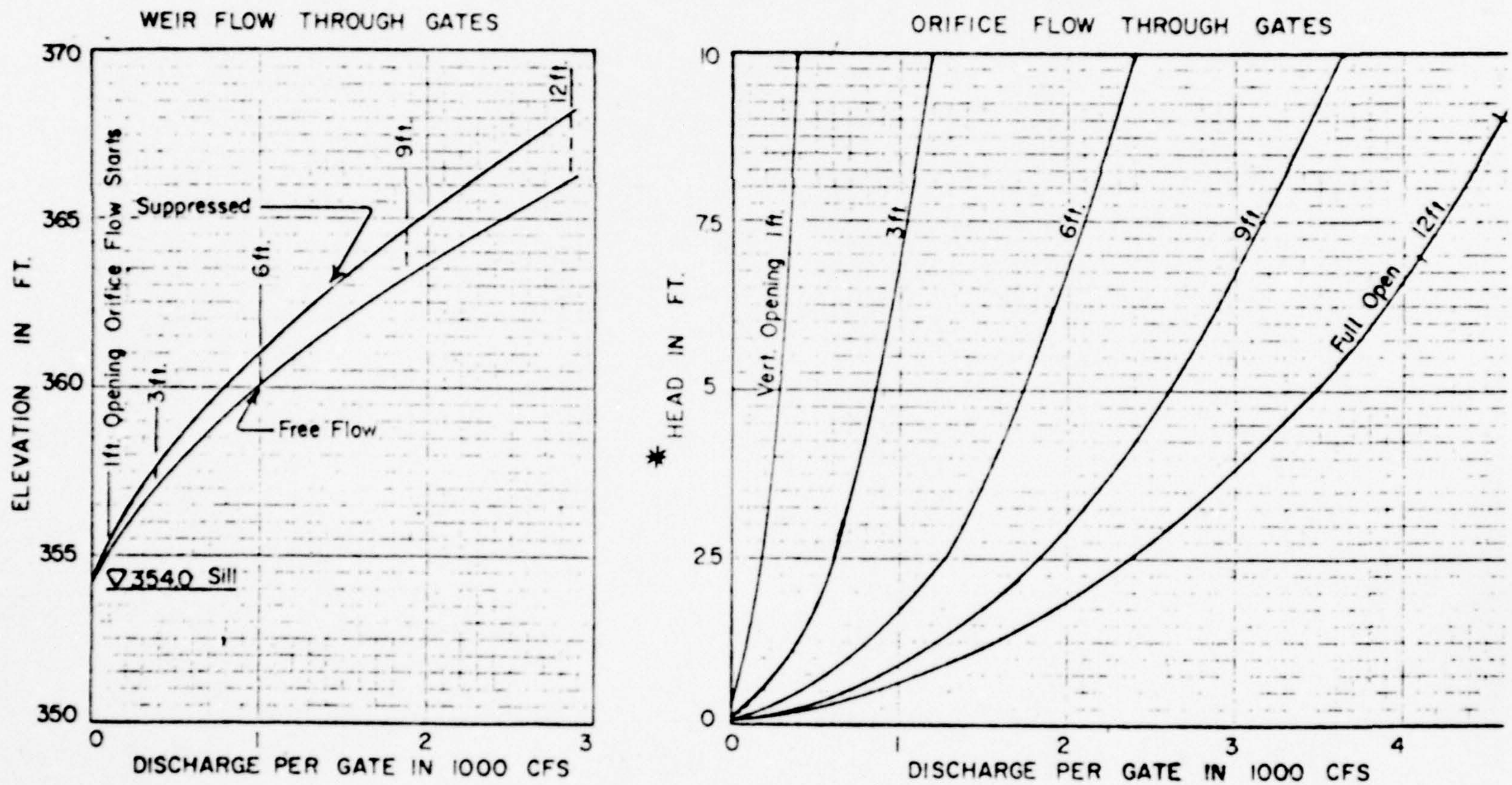


PLATE V-8(c)

RATING CURVES AT LOCK O-1, PHOENIX



* Unsubmerged: Headwater El - Sill - 1/2 Opening

Submerged: Headwater - Tailwater

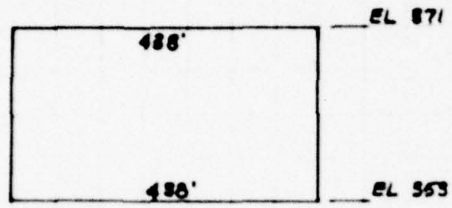
PROJECT NAME NEW YORK STATE DAM INSPECTION DATE 6-25-79

SUBJECT PHOENIX DAM - LOCK #1 PROJECT NO 2305

STAGE - DISCHARGE RELATIONSHIP DRAWN BY JPG & NFD

CONTROL SECTION

ACROSS OLD DAM IMMEDIATELY BELOW SPILLWAY



$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

$A = 7884$

$S = .004$ '/ft

$n = .035$

ELEV	h	1.49/n	A	R	S	Q
353	0	42.57	0	0	.004	0
354	1	↓	438	1	↓	1179
355	2		876	2		3748
356	3		1314	3		7386
357	4		1752	4		11941
358	5		2190	5		17333
359	6		2628	6		23503
360	7		3066	7		30403
361	8		3504	8		37999
362	9		3942	9		46259
363	10		4380	10		55158
364	11		4818	11		64675
365	12		5246	12		74790
366	13		5694	13		85486
367	14		6132	14		96748
368	15		6570	15		108563
369	16		7008	16		120917
370	17		7446	17		133800
371	18		7884	18		147202
372	19		8322	19		161111
373	20	↓	8760	20	↓	175521
374	21	42.57	9190	21	.004	190255

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DESIGN BRIEF

PROJECT NAME New York State Dam Inspection — DATE 6-25-79

SUBJECT Phoenix Dam - Lock #1 — PROJECT NO. 2305

Stage - Discharge Relationship — DRAWN BY JPG & NFD

Free Weir Flow

Spillway = 553' Length

$C_d = 4.03$

$H_d = 2.80'$ (Assumed)

Elev	He	He/Hd	C/Cd	C	$Q = C\,l\,He^{1.5}$
363	0	0	0	0	0
364	1	.36	.86	3.466	1917
365	2	.71	.95	3.828	5987
366	3	1.07	1.01	4.070	11695
367	4	1.43	1.025	4.131	18275
368	5				25541
369	6				33575
370	7				42309
371	8				51691
372	9				61680
373	10				72241
374	11				83343
375	12				94963
376	13				107077
377	14				119666
378	15				132714
379	16				146204
380	17				160123
381	18				174457
382	19				189195
383	20	1.43	1.025	4.131	204330

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PROJECT NAME New York State Dam Inspection DATE 6·25·79

SUBJECT Phoenix Dam - Lock # 1 PROJECT NO. 2305

Stage - Discharge Relationship DRAWN BY JPB/NFD

Free Weir Flow

Tainter Gates (closed)

$l = 190'$ $C = 3.0$

Elev	H	C	l	$Q = ClH^{1.5}$
366	0	3.0	160	0
367	1	↓	↓	480
368	2			1358
369	3			2494
370	4			3840
371	5			5367
372	6			7055
373	7			8890
374	8			10861
375	9			12960
376	10			15179
377	11			17512
378	12			19953
379	13			22499
380	14			25144
381	15			27885
382	16	↓	↓	30720
383	17	3.0	160	33645

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PROJECT NAME New York State Dam Inspection DATE 6-25-79

SUBJECT Phoenix Dam - Lock # 1 PROJECT NO 2305

Stage - Discharge Relationship DRAWN BY JPG & UFD

Submergence Correction

Tainter Gates Only

Elev	d	hd	He	Qdstem	(hd+d)/He	hd/He	%
373	14.5	2.8	10	75000	1.73	.28	3
375	16.5	↓	12		1.61	.23	6
377	18.5	↓	14		1.52	.20	10
379	20.5	↓	16		1.46	.18	11
381	22.5	↓	18		1.41	.16	15
383	24.5	2.8	20		1.37	.14	16

Free Discharge - Q total

Elev	Spillway	Tainter Gates (closed)	Qtotal	Qsubmergence
363	0	0	0	–
365	5987	0	5987	–
367	18275	480	18755	–
369	33575	2494	36069	–
371	51691	5367	57058	–
373	72241	8890	81131	78697
375	94963	12960	107923	101447
377	119666	17512	137178	123460
379	146204	22499	168703	150146
381	174457	27885	202342	171991
383	204330	33645	237975	199899

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PROJECT NAME New York State Dam Inspection DATE 9·25·79

SUBJECT Phoenix Dam - Lock # 1 PROJECT NO 2305

Stage - Discharge Relationship DRAWN BY JPG & NFO

Submerged Flow

Tainter Gates: Trunion Ht = a = 15' $G_o = 12'$
(Fully opened) $R = 20'$ $G_o/R = .6$
$a/R = .75$ $l = 190'$

$$Q = C_s\, l\, h_s \sqrt{2gh}$$

Elev	h_s	$h+h_s$	h	h_s/G_o	C_s	Q
366	12	15	3	1.0	1.0	31691
367	13	16	3	1.08	1.0	34332
368	14	17.5	3.5	1.16	1.0	39936
369	15	18.6	3.6	1.25	1.0	43395
370	16	19.8	3.8	1.33	1.0	47556
371	17	21.0	4	1.42	1.0	51841
372	18	22.0	4	1.50	.90	49402
373	19	23.0	4	1.58	.85	49249
374	20	24.0	4	1.67	.70	42693
375	21	25.3	4.3	1.75	.60	39838

Discharge - Q_{total}

Elev	Spillway	Tainter Gates	Q_{total}
364	1917	0	1917
366	11695	31691	43386
368	25541	39936	65477
370	42309	47556	89865
372	61680	49402	111082
374	83343	42693	126036

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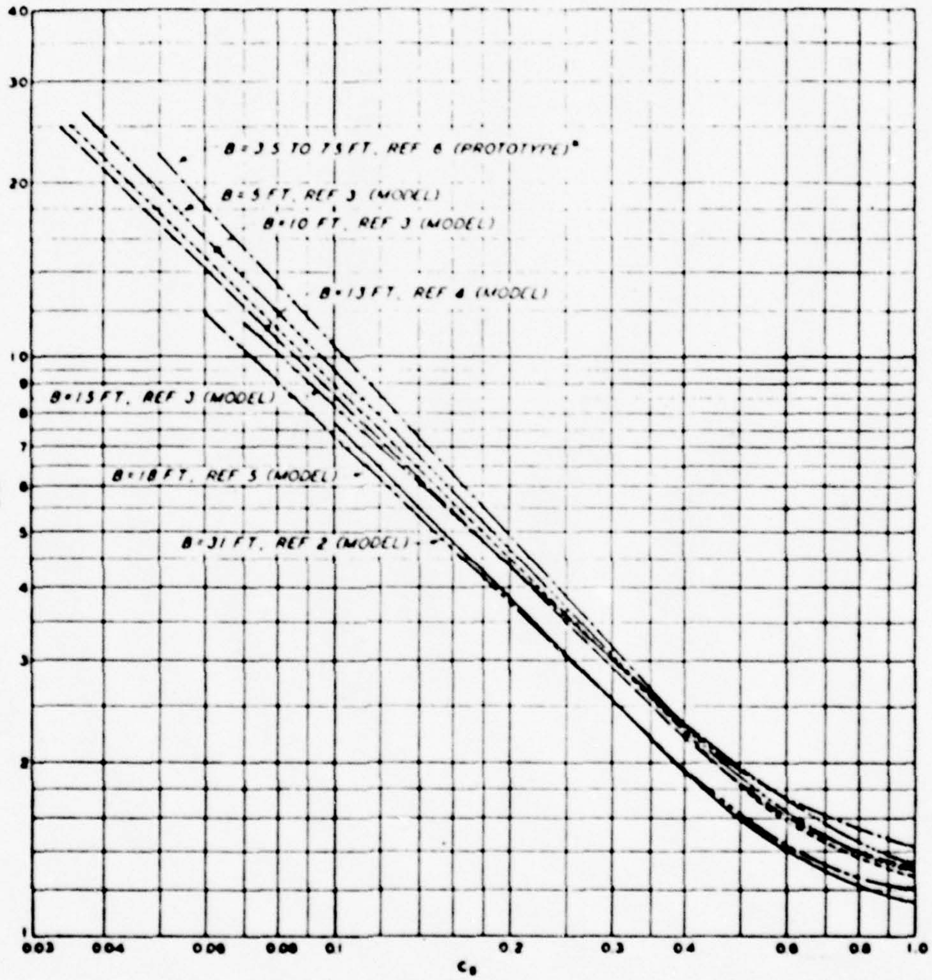
PROJECT NAME: New York Dam Inspection — DATE: 6-25-79

SUBJECT: Phoenix Dam - Lock #1 — PROJECT NO: 2305

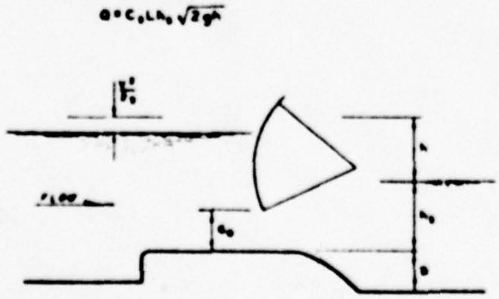
Stage - Discharge Relationship — DRAWN BY: JPG



BASIC EQUATION

$Q = C_s L h_s \sqrt{2gh}$

*MISSISSIPPI RIVER DAMS 2, 5A, AND 26

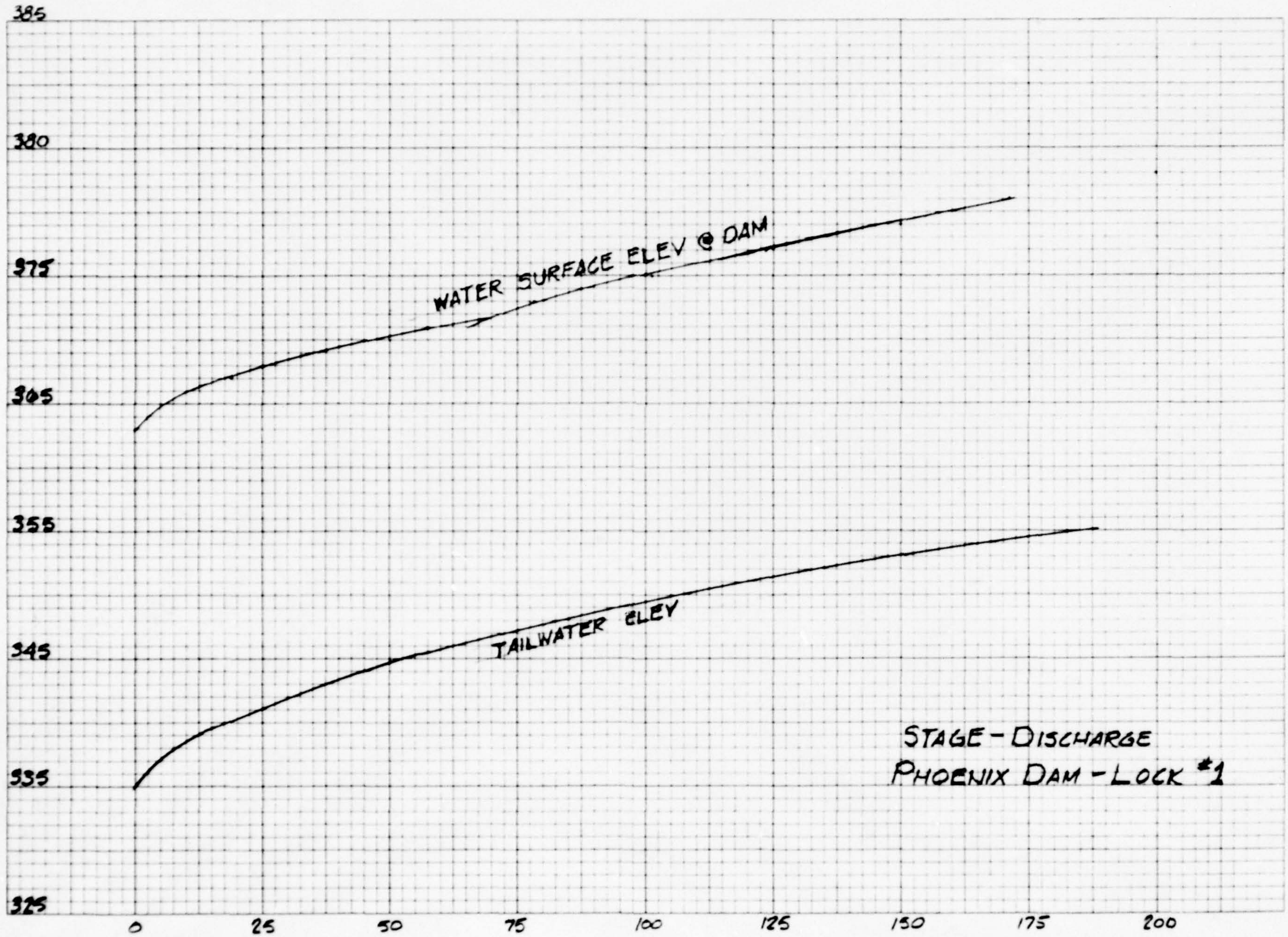


DEFINITION SKETCH

TAINTER GATES IN OPEN CHANNELS

DISCHARGE COEFFICIENT
SUBMERGED FLOW

C-22e


385
380
375
365
355
345
335
325
0
25
50
75
100
125
150
175
200
WATER SURFACE ELEV @ DAM
TAILWATER ELEV
STAGE - DISCHARGE
PHOENIX DAM - LOCK #1

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DESIGN BRIEF

PROJECT NAME New York State Dam Inspection DATE 6·15·79

SUBJECT Phoenix Dam · Lock #1 PROJECT NO. 2305

Stage - Storage Relationship DRAWN BY JPG

Elev	End Area (acres)	Vol (Acre-Ft)	Storage (Acre-Ft)
352			
354	.0219	1752	1752
356	.0226	1808	3560
358	.0234	1872	5432
360	.0242	1936	7368
362	.0249	1992	9360
364	.0256	2048	11408
366	.0264	2112	13520
368	.0271	2168	15688
370	.0278	2224	17912
372	.0286	2288	20200
374	.0293	2344	22544
376	.0300	2400	24944
378	.0308	2464	27408
380	.0315	2520	29928

APPENDIX D

STABILITY ANALYSIS

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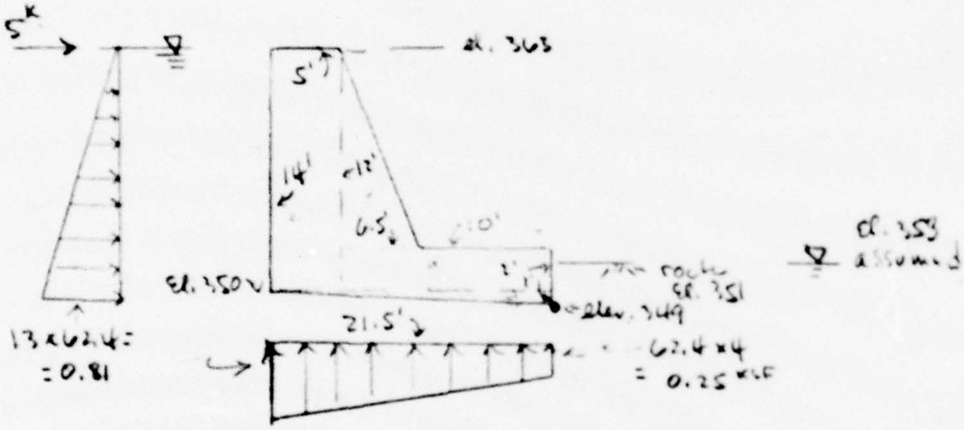
PROJECT NAME: PHOENIX DAM - LOCK #1 DATE:

SUBJECT: STABILITY ANALYSIS - OVERTURNING & SLIDING PROJECT NO:

DRAWN BY:

see attached sheet for dam cross-section

I. WL @ top of dam, ice acting — elev. 363 ups, 353 ds



(i) resisting ovt moment about toe : mass of dam =

$= (2 \times 16.5 \times \frac{16.5}{2} \times .15) + (\frac{1}{2} \times 12 \times 6.5 \times .15)(10 + \frac{2}{3} \times 6.5) + (5 \times 14 \times .15)(16.5 + \frac{5}{2}) +$

$+ (\frac{21.5}{2} \times 1 \times .15)(\frac{21.5}{2}) = 40.8 + 84 + 199.5 + 11.6 = 335.9^{1K}$

(ii) horiz. water pressure behind dam = $(0.81^{ksf} \times \frac{13}{2})(\frac{13}{3} + 1) = 28.1^{1K}$

(iii) uplift on base of dam = $(0.25 \times 21.5 \times \frac{21.5}{2}) + (0.56 \times \frac{21.5}{2} \times \frac{2 \times 21.5}{3}) =$

$= 57.8 + 86.3 = 144^{1K}$

(iv) ice at top of dam = $5^K \times 14' = 70^{1K}$

FS against overturning $= \frac{336^{1K}}{28.1 + 144 + 70} = 1.39$ (5^K ice and uplift act) - o[...]

note: downstream resistance provided by downstream rock and key neglected

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SUBJECT ____ PROJECT NO. ____
____ DRAWN BY ____

FS against overturning $= \frac{336}{28.1 + 144 + (\frac{1}{2} \times 70)} = 1.21$ (7.5k ice, plus uplift, act)

Position of resultant passing through base

let d = distance from toe to position of resultant

$$d = \frac{\Sigma M_{toe}}{\Sigma V} = \frac{336 - 242}{22.2 - 11.4} = \frac{94}{10.8} \quad 8.7'$$

(for uplift, 5k ice acting)

if b = 21.5'

$$d = \frac{8.7}{21.5}(b) = 0.4\,b \quad \text{(within mid-third)}$$

$$d = \frac{336 - 277}{10.8} = \underline{5.46} = \frac{5.46}{21.5}\,b = \underline{0.25\,b} \quad \text{(outside mid-third)}$$

[for uplift 7.5k ice act]

$$FS = \frac{336^k}{47 + 180^k} = 2.65$$ (5k ice acts, no uplift) - ok -

$$= \frac{336}{168} = 2.0$$ (10k ice acts, no uplift) - ok -

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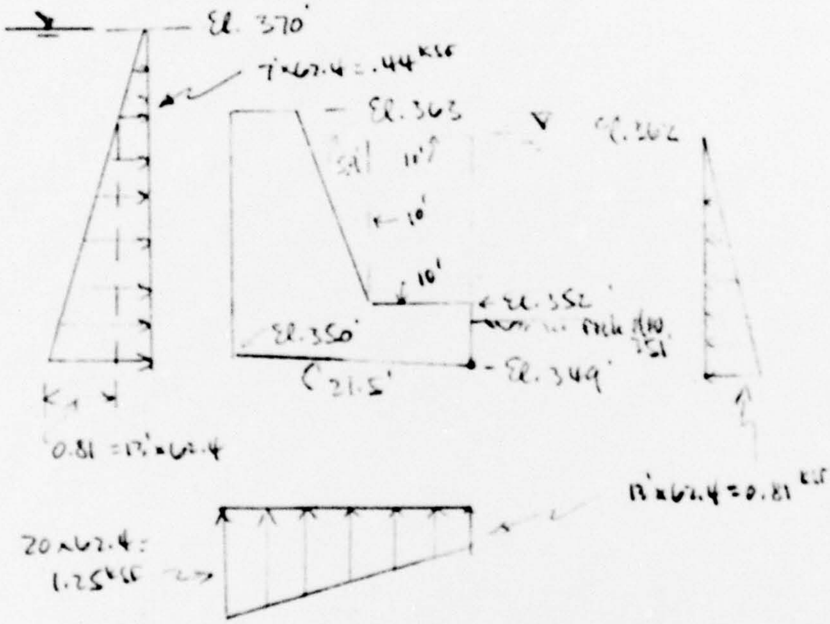
PROJECT NAME ______ DATE ______

SUBJECT ______ PROJECT NO. ______

______ DRAWN BY ______

II. WL @ ½ PMF levels [upst elev 370'. d's elev 362]



(i) resisting ovt moment about toe $= 336^{k} + \left[\left(10 \times 10 \times 62.4 \times \frac{10}{2}\right) + \left(\frac{10 \times 5.9}{2} \times 62.4\right)\left(\frac{5.9}{3} + 10\right) + \left(0.81 \times \frac{13}{2} \times \frac{13}{3}\right)\right] = 336 + 31.2 + 22 + 22 = 412$

(ii) ovt due to horiz. water pressure behind dam:

$= (0.44 \times 13)\left(\frac{13}{2} + 1\right) + \left(0.81 \times \frac{13}{2}\right)\left(\frac{13}{3} + 1\right) = 71^{k}$

(iii) uplift on base of dam $= \left(0.81 \times 21.5 \times \frac{21.5}{2}\right) + \left(.44 \times \frac{21.5}{2} \times \frac{2 \times 21.5}{3}\right) = 255^{k}$

FS against overturning $= \dfrac{412^{k}}{255 + 71^{k}} = 1.26 \pm$

(full uplift acting)

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PROJECT NAME ______ DATE ______

SUBJECT ______ PROJECT NO. ______

DRAWN BY ______

Position of resultant passing through base,

$$d = \frac{\Sigma M}{\Sigma V} = \frac{412 - 326}{22.2 - \left(\frac{1.25+0.81}{2}\right)(21.5) + \left(\frac{15.1+10}{2}\right)(10 \times 62.4)}$$

$$= \frac{86^{k}}{8.05^{k}} = 10.6'$$

if $b = 21.5'$, $d = (10.6/21.5)(b) = 0.5\ (b)$

with full PMF uplift acting

if uplift acting is as for normal WL (extra uplift does not have time to develop)

$$FS = \frac{412^{k}}{71^{k} + 144^{k}} = 1.92$$ against overturning

Position of resultant passing through base

$$d = \frac{\Sigma M}{\Sigma V} = \frac{412 - 215}{22.2 - 11.4 + 8.1} = 10.4 = \underline{0.48\ (b)}$$

within middle third

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PROJECT NAME ____ DATE ____

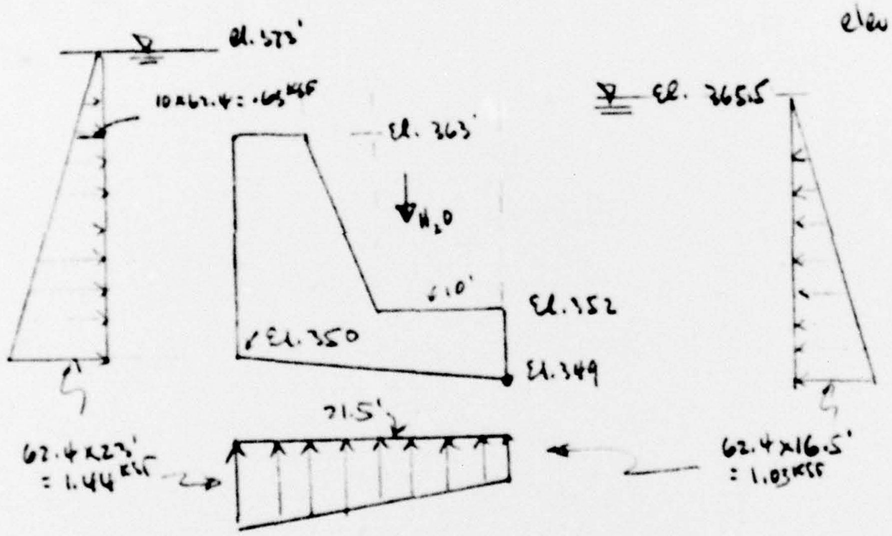
SUBJECT ____ PROJECT NO. ____

DRAWN BY ____

III. WL @ PMF elevations upstream and downstream

elev. upstream = 373', 10' above spillway

elev. downstream = 365.5



(i) resisting out moment = mass of dam + upstream water on top of dam + lat. p

$= 336^{1K} + \left[\left(13.5' \times 10' \times 62.4 \times \frac{10}{2}\right) + \left(\frac{1}{2} \times 6.5 \times 13.5 \times 62.4\right)\left(10 + \frac{1}{3} \times 6.5\right)\right] + \left(1.03 \times \frac{16.5}{2} \times \frac{16.5}{2}\right.$

$= 336^{1K} + 42 + 33.3 + 46.7 = 458^{1K}$

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DESIGN BRIEF

PROJECT NAME ______ DATE ______

SUBJECT ______ PROJECT NO. ______

______ DRAWN BY ______

(ii) moment causing overturning : upst. water press + uplift =

$= 28.1 + (.624)(13)(\frac{13}{2}+1) + \left[(1.03 \times 21.5 \times \frac{21.5}{2}) + (0.41 \times \frac{21.5}{2} \times \frac{2 \times 21.5}{3}) \right] =$

$= 28.1 + 60.8 + 238 + 63.2 = 390^{1k}$

FS against overturning =

$= \frac{458^{1k}}{390^{1k}} = 1.17 \pm$ (uplift acting) -o

$= \frac{458}{89} = 5.2 \pm$ (no uplift) -

note: downstream resistance provided by downstream rock and key neglecte

Position of resultant passing through base

$d = \frac{\Sigma M}{\Sigma V} = \frac{458 - 390}{22.2 + (\frac{16.5+10}{2})(13.5 \times 62.4) - (\frac{1.44+1.03}{2})(21.5)}$

$= \frac{68^{1k}}{22.2 + 11.1 - 26.6} = \frac{68}{6.7} = 10.14'$

with uplift

if $b = 21.5'$, $d = (10.14/21.5)\,b = 0.47\,(b)$ (inside mid

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PROJECT NAME ____ DATE ____

SUBJECT ____ PROJECT NO. ____

DRAWN BY ____

if uplift acting is as for normal WL (extra uplift does not have time to develop)

$$\text{FS against o/t} = \frac{458^{k}}{89 + 144^{k}} = \underline{1.97}$$

$$\text{Position of resultant passing through base, } d = \frac{458 - 233}{22.2 - 11.4 + 11.1} = \underline{10.3'}$$

21.8

in terms of b, $d = \frac{10.3}{21.5} = \underline{0.48\ b}$ (within mid third

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PROJECT NAME ______ DATE ______
SUBJECT ______ PROJECT NO. ______
______ DRAWN BY ______

SLIDING

I. WL @ normal pool elevation

(i) weight of dam $= (2 \times 16.5 \times .15) + (\frac{1}{2} \times 12 \times 6.5 \times .15) + (5 \times 14 \times .15) +$
$+ (\frac{21.5}{2} \times 1 \times .15) = 5 + 5.8 + 9.8 + 1.6 = 22.2^{k}$

(ii) horiz. water pressure upstream $= (0.81 \times \frac{13}{2}) = 5.3^{k}$

(iii) uplift on base of dam $= (\frac{0.81 + 0.25}{2}^{ksf})(21.5') = 11.4^{k}$

FS against sliding (friction-shear method, using 50 psi bond-shear between dam concrete and bedrock, $\mu = 0.65$)

$$FS = \frac{\mu N + \text{bond/shear}}{\text{upstream water press.} + \text{ice}} = \frac{(0.65)(22.2 - 11.4) + (.05 \times 144 \times 21.5)}{5.3 + 7.5}$$

$$= \frac{7 + 155}{10.3 \;\; 17.8} = 12.6 \pm$$ (uplift and 5^k ice act) - ok

$= 10.6 \pm$ (uplift and 10^k ice act) ok

FS against sliding (friction only, no shear-bond on base)

$= \frac{7}{10.3} = 0.7 \pm$ (uplift and 5^k ice act) - ok

FS against sliding $= \frac{(0.65 \times 22.2)}{10.3} = 1.4$ (no uplift, 5^k ice acts) - ok

II. WL @ PMF elevations

(i) wt. of dam = 22.2^k

(ii) downstream H_2O above dam section = $(13.5 \times 10 \times 62.4) + (\frac{1}{2} \times 6.5 \times 13.5 \times$
$= 8.4^k + 2.7^k = 11.1^k$

(iii) downstream horiz. water pressure = $(1.03 \times 16.5 \times \frac{1}{2}) = 8.5^k$

(iv) upstream water pressure = $\left(\frac{0.63 + 1.44}{2}\right)(13') = 13.5^k$

(v) uplift pressure on base of dam = $\left(\frac{1.44 + 1.0}{2}\right)(21.5') = 26.2^k$

(vi) normal WL uplift = 11.4^k

FS against sliding (friction-shear method, using 50 psi bond shear between dam and bedrock, $\mu = 0.65$)

$$FS = \frac{(0.65)(22.2 + 11.1 + 11.4) + (.05 \times 144 \times 21.5) + 8.5}{13.5^k} = 13 \pm$$ (normal WL uplift acting)

[note: assume bond between concrete and bedrock resists net uplift on dam base]

$$FS = \frac{(0.65)(22.2 + 11.1) + 8.5}{13.5} = 2.3 \pm$$ (no uplift, no bond between dam and rock)

note: sliding analysis have neglected resistance provided by downstream rock and key

III WL @ ½ PMF elevations

(i) wt. of dam = 22.2^k

(ii) ds H_2O above dam section = $\left(\frac{15.9+10}{2}\right)(10 \times 62.4) = 8.0^k$

(iii) ds horiz. water pressure = $\left(0.81^{ksf} \times \frac{13}{2}\right) = 5.3^k$

(iv) upst. horiz. water pressure = $\left(\frac{.44+1.25}{2}\right)(13') = 11^k$

(v) full uplift ——

(vi) normal WL uplift = 11.4^k

$$FS = \frac{(0.65)(22.2+8.0-11.4) + (.05 \times 144 \times 11.5)\,15.3}{(11)} = \frac{172}{11} = 17\pm$$

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DESIGN BRIEF

PROJECT NAME ______ DATE ______

SUBJECT ______ PROJECT NO. ______

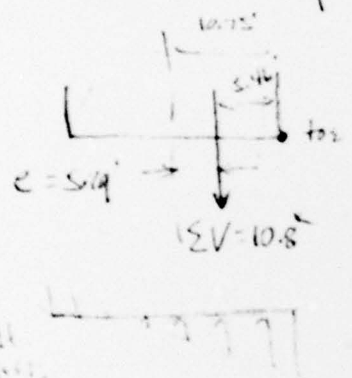
______ DRAWN BY ______

Estimating foundation contact stresses at toe and heel

I_{x-x} (moment of inertia) for one foot wide section of base

$= \frac{1}{12} bh^3 = \frac{1}{12}(1)(21.5')^3 = 828\ ft^4$

(a) WL @ top of dam, 7.5^k ice force acting



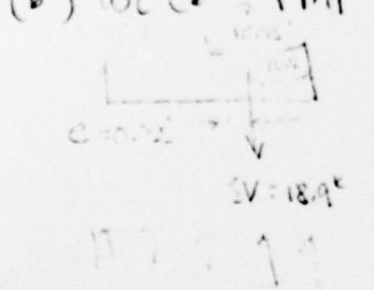
$\sigma_{toe} = \frac{V}{A} + \frac{Mc}{I}$

$= \frac{10.8^k}{(21.5\times1')} + \frac{(10.8^k \times 5.19')(\frac{21.5'}{2})}{(828\ ft^4)} = 0.50 + 0.74$

$= 0.50 + 0.74 = +1.24$ ksf (compression)

$\sigma_{heel} = \frac{V}{A} - \frac{Mc}{I} = 0.50 - 0.74 = -0.24$ ksf (theoretical tension)

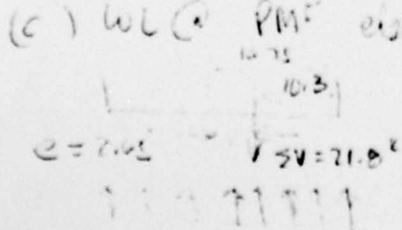
(b) WL @ ½ PMF elevations



$\sigma_{toe} = \frac{18.9}{21.5} + \frac{(18.9\times0.35)(10.75)}{828} = 0.88 + 0.09 = 0.97$ ksf (comp)

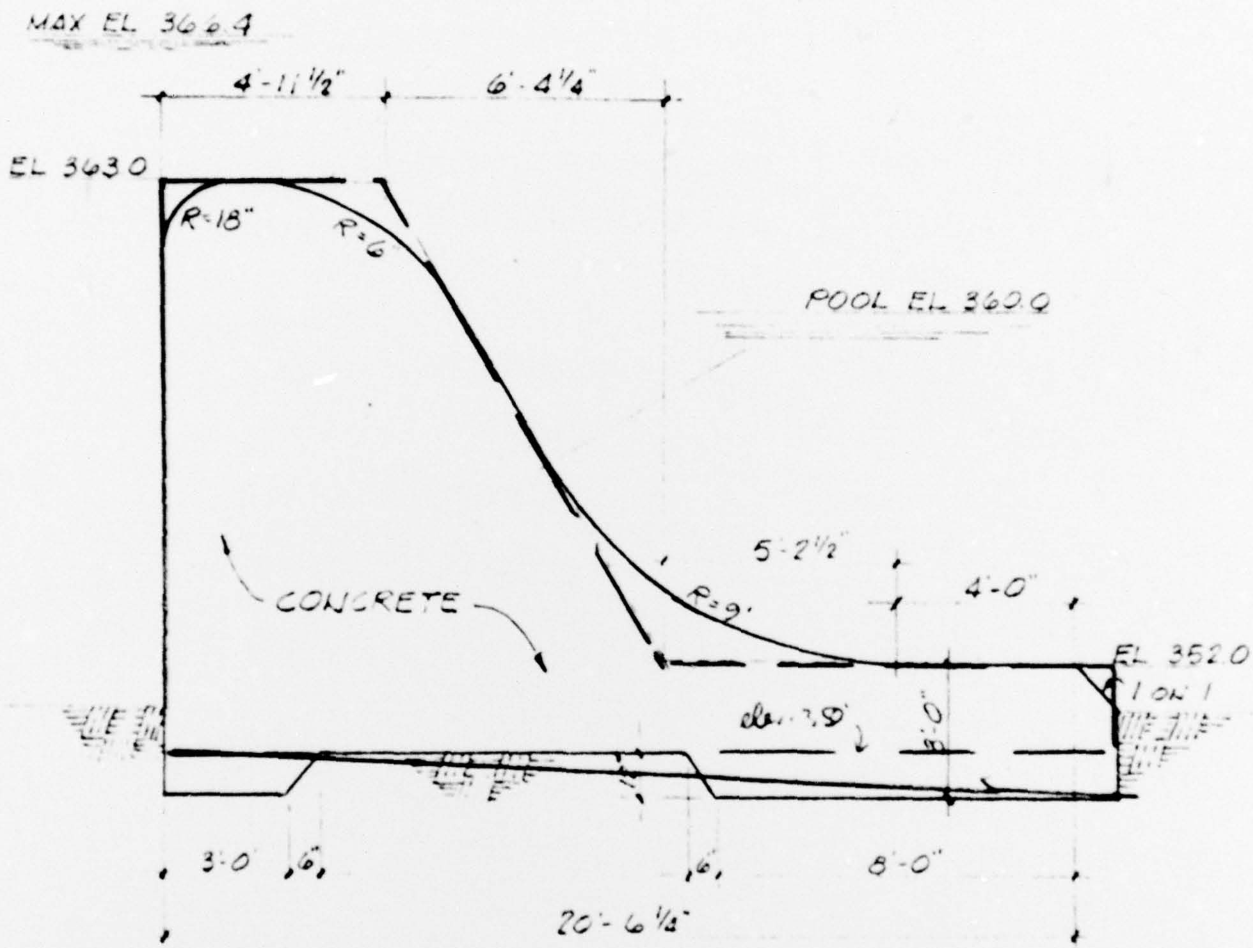
$\sigma_{heel} = 0.88 - 0.09 = 0.79$ ksf (comp)

(c) WL @ PMF elevations



$\sigma_{toe} = \frac{21.8}{21.5} + \frac{(21.8\times.45)(10.75)}{828} = 1.01 + 0.13 = 1.14$ ksf (comp)

$\sigma_{heel} = 1.01 - 0.13 = 0.88$ ksf (comp)



TYPICAL FOR NORTH & SOUTH DAM

PHOENIX DAM-LOCK № 1

SCALE 1/4" = 1'-0"

STETSON · DALE	DATE 6·22·79	DRAWN JPG	STRUCTURAL ANALYSIS
	JOB 2305	APP'D	

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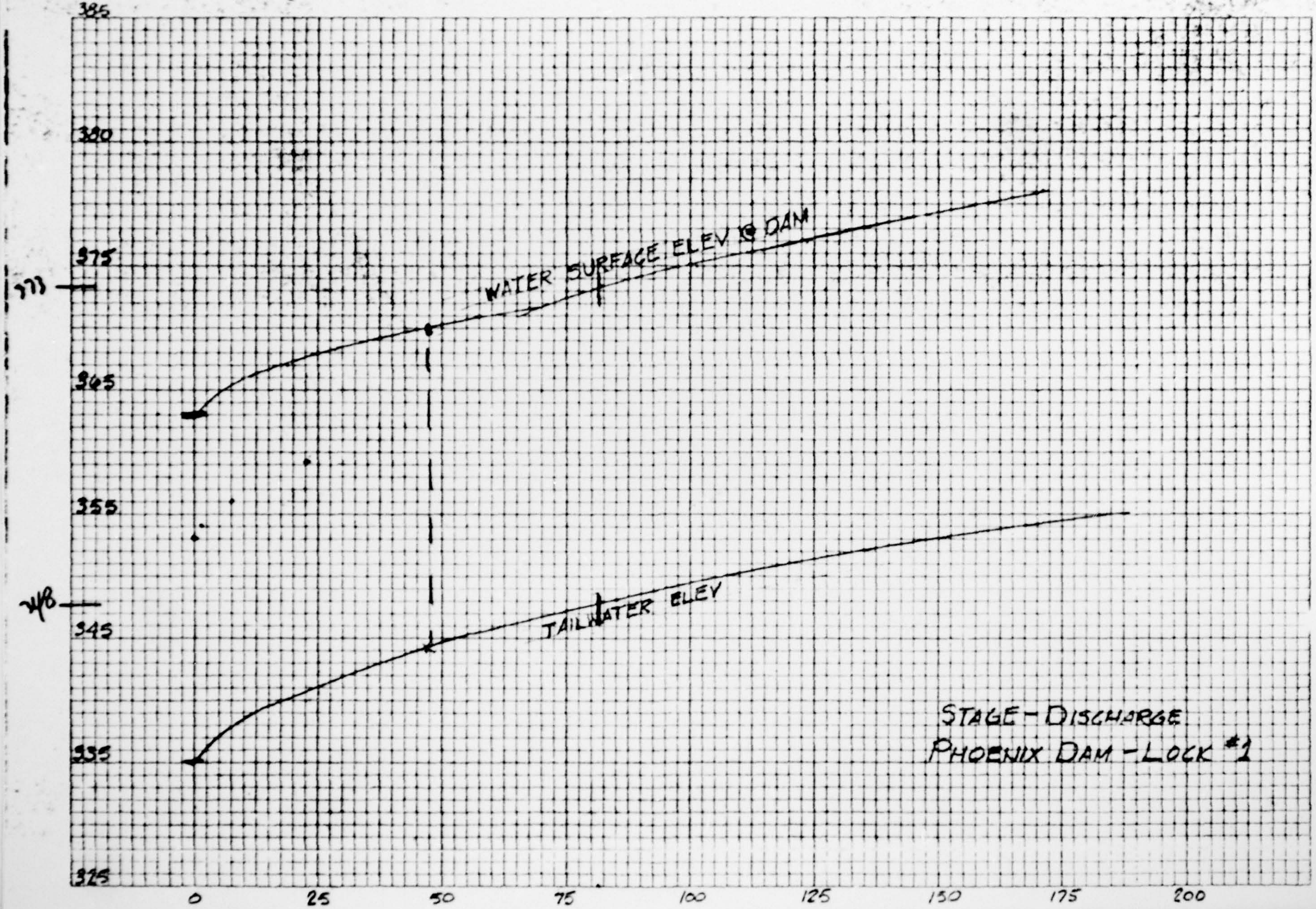

APPENDIX E

REFERENCES

APPENDIX

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