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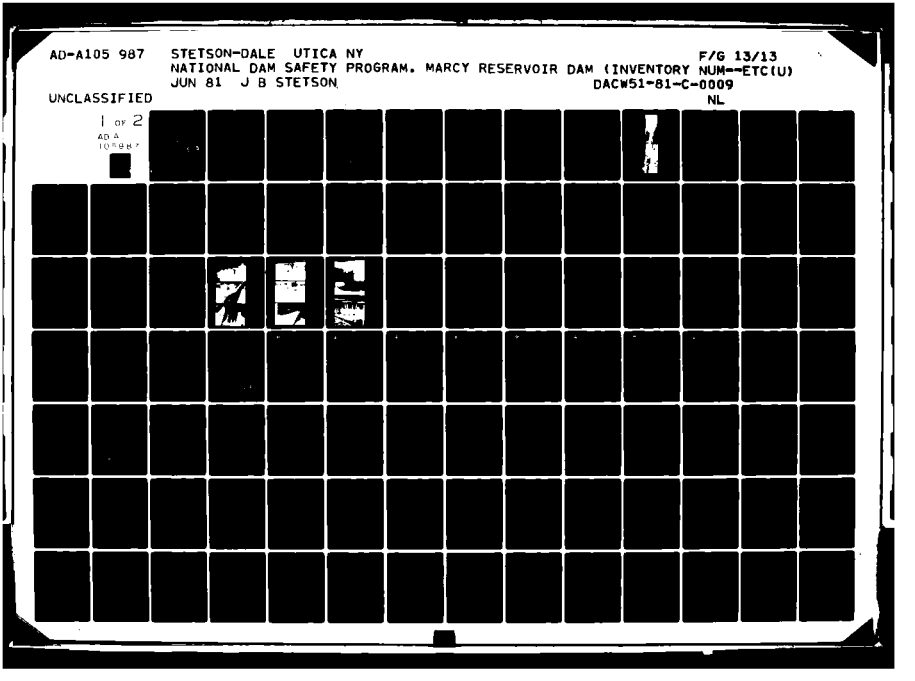

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

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.

The examination of documents and visual inspection of the Marcy Reservoir Dam did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which require further investigation and remedial work.

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The structural stability analysis indicates unsatisfactory stability would result from loadings which could occur under ice loading conditions and the 1/2 PMF and PMF events and marginal stability under normal operating conditions. A structural stability investigation should be commenced within 6 months to determine the characteristics of the uplift forces acting on the dam, the properties of the existing dam and foundation, and the effect of these conditions on the stability of the dam. Remedial work should be undertaken depending on the results of this investigation and completed within two years.

The hydrologic/hydraulic analysis indicates that the spillway will pass only 21% of the Probable Maximum Flood (PMF). The dam will be overtopped by 2.6 feet and 1.3 feet by the PMF and 1/2 PMF respectively. Failure of the dam during the 1/2 PMF event would significantly increase the downstream hazard from that which would exist just prior to failure of the dam. The spillway capacity, therefore, is assessed as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a "seriously inadequate spillway" is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean, however, that based on an initial screening, and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream from the dam.

It is, therefore, recommended that within 6 months of notification to the Owner, a detailed hydrologic/hydraulic investigation of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed and their effect upon the overtopping potential of the dam. The results of these investigations will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to discharge the outflow from at least the 1/2 PMF. In the interim, a detailed emergency action plan must be developed and implemented during periods of unusually heavy precipitation. Also, around-the-clock surveillance of the structure must be provided during these periods.

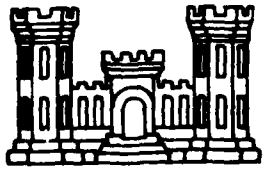
MOHAWK RIVER BASIN

MARCY RESERVOIR DAM

NEW YORK

INVENTORY No. NY 190

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



NEW YORK DISTRICT CORPS OF ENGINEERS

MAY 1981

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 aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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APPENDIX

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Marcy Reservoir Dam I.D. No. NY 190
State Located:	New York
County:	Oneida
Watershed:	Mohawk River Basin
Stream:	Crane Creek
Date of Inspection:	December 4, 1980

ASSESSMENT OF GENERAL CONDITIONS

The examination of documents and visual inspection of the Marcy Reservoir Dam did not reveal conditions which constitute an immediate hazard to human life or property. The dam, however, has a number of problem areas which require further investigation and remedial work.

The structural stability analysis indicates unsatisfactory stability would result from loadings which could occur under ice loading conditions and the 1/2 PMF and PMF events and marginal stability under normal operating conditions. A structural stability investigation should be commenced within 6 months to determine the characteristics of the uplift forces acting on the dam, the properties of the existing dam and foundation, and the effect of these conditions on the stability of the dam. Remedial work should be undertaken depending on the results of this investigation and completed within two years.

The hydrologic/hydraulic analysis indicates that the spillway will pass only 21% of the Probable Maximum Flood (PMF). The dam will be overtopped by 2.6 feet and 1.3 feet by the PMF and 1/2 PMF respectively. Failure of the dam during the 1/2 PMF event would significantly increase the downstream hazard from that which would exist just prior to failure of the dam. The spillway capacity, therefore, is assessed as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a "seriously inadequate spillway" is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean, however, that based on an initial screening, and preliminary computations, there appears to be a serious deficiency in spillway capacity so that if a severe storm were to occur, overtopping and failure of the dam would take place, significantly increasing the hazard to loss of life downstream from the dam.

It is, therefore, recommended that within 6 months of notification to the Owner, a detailed hydrologic/hydraulic investigation of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed and their effect upon the overtopping potential of the dam. The results of these investigations will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to discharge the outflow from at least the 1/2 PMF. In the interim, a detailed emergency action plan must be developed and implemented during periods of unusually heavy precipitation. Also, around-the-clock surveillance of the structure must be provided during these periods.

The following remedial work should be undertaken within 18 months:

1. The minor seepage on the downstream face of the dam at construction joints should be investigated and appropriate remedial measures taken to eliminate this seepage.

2. The severely spalled surfaces of the exposed concrete should be repaired.

3. The hydraulic concrete on the upstream face of the dam should be removed and the surface repaired.

4. The obstructions at the blowoff valve should be removed to provide unrestricted outflow from the impoundment.

5. The gatehouse should be repaired and placed in operating condition and proper security maintained to prevent vandalism.

6. A formalized inspection system should be initiated to develop data on the conditions and maintenance operations at the facility.

7. A flood warning and emergency evacuation system should be implemented to alert the public in the event conditions occur which could result in failure of the dam.

Dale Engineering Company

John B. Stetson, President

Approved By: Col. W. M. Smith, Jr.
Date: New York District Engineer

30 JUN 1981

1. Overview of the Marcy Reservoir Dam

PHASE I INSPECTION REPORT
MARCY RESERVOIR DAM I.D. NO NY 190
MOHAWK RIVER BASIN
ONEIDA COUNTY, NEW YORK

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 U.S. Army Corps of Engineers.

b. Purpose of Inspection

The purpose of this inspection is to evaluate the existing condition of the Marcy Reservoir Dam and appurtenant structures, owned by the New York State Department of Mental Health and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the U.S. Army Corps of Engineers.

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 Marcy Reservoir Dam is a concrete gravity structure approximately 564 feet long with a maximum height of 32 feet. The structure originally served as the water supply source for the Marcy Psychiatric Center. With the construction of a town-wide public water system in the early 1970's, the filtration plant located at the downstream side of the dam was abandoned, and the gates serving that facility were closed. The blowoff valve, which is used to drain the impoundment, is presently in the full open position allowing the impoundment to drain during periods of low runoff. However, because of the limited capacity of this line, the impoundment fills during high runoff conditions. The principal spillway on the dam is located near the east abutment. The spillway consists of two 20 foot wide ogee-shaped spillway sections. During high runoff periods, flow will normally crest the spillway. At present, the facility serves no useful function for the Marcy Psychiatric Center.

b. Location

The Reservoir is located in the Town of Marcy, Oneida County, New York, just north of the hamlet of Marcy, near Route 291.

c. Size Classification

The maximum height of the dam is approximately 32 feet. The volume of the impoundment is approximately 255 acre feet to the top of dam. Therefore, the dam is in the small size classification as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

Residential properties along Route 291 are situated on the bank of Crane Creek, the receiving stream from the impoundment. 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 State of New York, Department of Mental Health:

Contact: Mr. Robert Driscoll, Business Manager
Marcy Psychiatric Center
1213 Court Street
Utica, New York 13502
Telephone: (315) 797-6800

f. Purpose of the Dam

The dam was originally constructed as the water supply for the Marcy Psychiatric Center. This use has been abandoned since 1974.

g. Design and Construction History

The plans for the Marcy Reservoir Dam are dated 1919. Construction is believed to have been completed shortly thereafter. These plans substantially conform to the present configuration of the facility. No information is available regarding the design or construction history of this facility.

h. Normal Operational Procedures

Since its abandonment as a water supply source, the sluice gates controlling flow into the filtration plant have been closed. The blowoff valve which is used to drain the facility remains in a full open position allowing the water level in the impoundment to fluctuate with runoff conditions. The plumbing superintendent at the Marcy Psychiatric Center periodically checks the facility to determine that the blowoff valve is in the full open position. At this time, a cursory inspection of the facility is also conducted.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of Marcy Reservoir Dam is 4.25 square miles.

b. Discharge at Dam Site

No discharge records are available for this site.

Computed Discharges:

Ungated Spillway, top of dam	1,800 cfs
* Gated Drawdown	80 cfs

c. Elevation (feet above MSL)

Top of Dam	591.0
Spillway Crest	585.0
Stream Bed at Centerline of Dam	558±

d. Reservoir

Length of Normal Pool	1,400± feet

e. Storage

Top of Dam	255 acre feet
Spillway Crest	165 acre feet

f. Reservoir Area

Top of Dam	16 acres
Spillway Pool	13 acres

g. Dam

Type - concrete gravity
Length - 564 feet
Height - 32 feet
Freeboard Between Spillway and Top of Dam - 6 feet
Top Width - 7 feet
Side Slopes - upstream, vertical; downstream, 2 vertical vs 1 horizontal
Zoning - N/A
Impervious Core - N/A
Grout Curtain - none

* Discharge through 24 inch blowoff pipe, with valve fully open and reservoir level at spillway crest.

h. Spillway

Type - Ogee crest
Length - 2 @ 20 feet = 40 feet
Crest Elevation - 585
Gates - none - 18 inch flashboards on westerly spillway section
U/S Channel - impoundment
D/S Channel - rock channel

i. Regulating Outlets

Blowoff - 24 inch cast iron with 24 inch gate valve.

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

Geologically, Marcy Reservoir Dam is located in the Mohawk section of the Appalachian Plateaus Province which is part of the Appalachian Highlands, the major physiographic division. Bedrock beneath the dam and at both abutments is the upper part of the Utica Shale of Middle Ordovician age. The formation consists of black, fissile to massive, carbonaceous argillaceous shales with intercalated layers of calcareous shales in places. The rock weathers easily and has a tendency to slump on moderate to steep slopes.

b. Subsurface Investigations

The borings used for the original design of the dam are included on Sheet 3 of the drawings included in Appendix G. These plans indicate that the dam is founded on bedrock throughout its length.

2.2 DESIGN RECORDS

No reports were available from the original design of the dam.

2.3 CONSTRUCTION RECORDS

No information was available concerning the original construction.

2.4 OPERATIONAL RECORDS

There are no operational records available for this dam.

2.5 EVALUATION OF DATA

The data presented in this report was obtained from the Marcy Psychiatric Center and from the files of the New York State Department of Environmental Conservation, Dam Safety Section. The information available appears to be reliable and adequate for a Phase I inspection report.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

The Marcy Reservoir Dam was inspected on December 4, 1980. The Dale Engineering Company Inspection Team was accompanied on the inspection by Walter Farmer, Head Stationary Engineer for the Marcy Psychiatric Center. During the inspection, the weather was fair with a light snow covering on the ground. The water elevation in the impoundment was approximately 585.1, just cresting the spillway.

b. Dam

Although the ground surface was partially obscured by a light snow cover, the conditions did not preclude an inspection of the ground surfaces at the toe of the dam. A close examination of the surfaces downstream from the dam at the toe and at both abutments showed no indication of seepage or leakage. Concrete surfaces were heavily spalled on all exposed faces. The most severe deterioration existed on vertical joints on the downstream face and on the walkway crossing the spillway. Minor wetness detected on the downstream face of the dam could be the result of slight seepage through the vertical joints of the structure. The upstream face of the dam had been surfaced with hydraulically placed concrete sometime during the life of the structure. These surfaces have separated from the underlying concrete so that no protection is offered. Despite the poor condition of the surface concrete, there was no evidence of settlement or misalignment of the concrete structure that would indicate structural instability.

c. Spillway

The ogee shaped spillway located near the east abutment of the dam was partially obscured by flow over the spillway. However, surface deterioration was evident through the flow. The walkway across the crest of the spillway was severely deteriorated with reinforcing bars exposed near the edges. The handrail across the walkway was damaged and would constitute a hazard to persons using this walkway. The concrete at the base of the spillway training walls was severely eroded. At the time of the inspection, flashboards were in place on the westerly spillway section. These flashboards were severely deteriorated with numerous holes and missing sections.

d. Reservoir Area

The slopes of the reservoir are relatively steep and show no signs of recent erosion. No areas of slope instability are known to exist in the reservoir area.

e. Appurtenant Structures

The gatehouse near the west abutment of the dam has been damaged by vandals. The wooden gates controlling flow from the impoundment to the filtration plant appear to be in place as evidenced by the sections of chain extending into the gate pits. The operating mechanisms used to remove the gate is severely deteriorated and inoperative for all practical purposes. The blowoff from the impoundment is in the full open position. However, the volume of flow from the 24 inch pipe indicates some blockage exists in this line restricting the quantity of flow.

3.2 EVALUATION

The visual inspection revealed that the dam shows no signs of structural instability and no evidence of misalignment or settlement were detected in the field. Only minor seepage was detected on the downstream face of the concrete gravity dam. No seepage or wetness was detected at the ground surface near the downstream toe or at the abutments. The structure has been unmaintained for many years and is suffering the effects of age.

These specific items should be addressed by the Owner:

1. Spalling of concrete surfaces is prevalent throughout the structure. The hydraulic concrete surface on the upstream face of the dam is deteriorated and is peeling away from the dam. These concrete surfaces of the structure should be repaired to prevent further deterioration which could ultimately result in structural damage to the facility.

2. The blowoff valve is partially obstructed and flow from the impoundment is restricted. The obstructions should be removed from the blowoff line and steps should be taken to maintain full flow through the line.

3. The gatehouse is severely deteriorated and the gates are inoperative for all practical purposes. The gatehouse should be repaired and security maintained to prevent vandalism.

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

Since its abandonment as a source of water for the Marcy Psychiatric Center, the facility has fallen into a state of disrepair. Infrequent visits are made to the facility to check the opening of the blowoff valve and to provide a cursory inspection of the general condition of the dam. The dam at present provides no useful function for the Marcy Psychiatric Center.

4.2 MAINTENANCE OF THE DAM

Maintenance and operation of the dam is controlled by the Marcy Psychiatric Center. Conditions at the site indicate that the facility is poorly maintained. No formalized inspection is in effect at the facility.

4.3 MAINTENANCE OF OPERATING FACILITY

The valve controlling the blowoff from the impoundment is inspected at infrequent intervals to determine that flow from the impoundment is maintained.

4.4 DESCRIPTION OF WARNING SYSTEM

No warning system is in effect at present.

4.5 EVALUATION

In general, the dam is poorly maintained and inspected infrequently by the plumbing superintendent at the Marcy Psychiatric Center. Since the dam is in the high hazard classification, a warning system should be implemented to alert the public should conditions occur which could result in failure of the dam. A formal inspection procedure should be implemented and records maintained so that changing conditions can be readily identified.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The Marcy Reservoir Dam is located in the Town of Marcy, northeast of the Marcy Psychiatric Center. The dam has a drainage area of 4.25 square miles, which is characterized by moderately steep to steeply sloping hills. The watershed is essentially undeveloped. The reservoir has a surface area of approximately 13 acres and outlets into Crane Creek, which flows southerly underneath the Conrail Railroad embankment and then to Route 291.

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. This has been assessed through the evaluation of the Probable Maximum Flood (PMF) for the watershed and the subsequent routing of the flood through the reservoir and 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 of run-off of a specific location that is considered reasonably possible for a particular drainage area.

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. In the event that the dam could not pass 1/2 the Probable Maximum Flood without overtopping, additional analyses are to be performed on potential dam failures if the dam is designated as a High Hazard Classification. This process was done with the concept that, if the dam was unable to satisfy this criteria, further refined hydrologic investigations would be required.

The U.S. Army Corps of Engineers' Hydrologic Engineering Center's Computer Program HEC-1 DB using the Modified Puls Method of flood routing was used to evaluate the dam, spillway capacity, and downstream hazard.

Unit hydrographs were defined by Snyder coefficients, C_t and C_p. Snyder's C_t was estimated to be 2.0 for the drainage area and C_p was estimated to be 0.625. The drainage area was divided into sub-areas to model the variability in hydrologic characteristics within the drainage basin.

Run-off, routing and flood hydrograph combining was then performed to obtain the flow into the reservoir. In this analysis, the reservoir pool was assumed to be at the spillway crest elevation at the start of the storm and outflow through the low level outlet was assumed to be zero.

The Probable Maximum Precipitation (PMP) was 19.4 inches according to Hydrometeorological Report (HMR #33) for a 24-hour duration storm, 200 square mile basin, while loss rates were set at 1.0 inches initial

abstraction and 0.1 inch/hour continuous loss rate. The loss rate function yielded 83 percent run-off from the PMF. The peak for the PMF inflow hydrograph was 8,653 cfs and the 1/2 PMF inflow peak was 4,323 cfs. The relatively small storage capacity of the reservoir above the spillway only reduced these peak flows to 8,638 cfs for the PMF and 4,318 cfs for the 1/2 PMF flow.

5.3 SPILLWAY CAPACITY

The spillway is an ogee shaped weir with a net length of 40 feet and a discharge capacity at the top of dam elevation of 1,800 cfs.

SPILLWAY CAPACITY

Flood	Peak Discharge	Capacity as % of Flood Discharge
PMF	8,638 cfs	21%
1/2 PMF	4,318 cfs	42%

5.4 RESERVOIR CAPACITY

The reservoir storage capacity was obtained from the plans included in Appendix G and USGS mapping. The resulting estimates of the reservoir storage capacity are shown below:

Top of Dam	255 Acre Feet
Spillway Crest	165 Acre Feet

5.5 FLOODS OF RECORD

There is no information on water levels at the dam site.

5.6 OVERTOPPING POTENTIAL

The HEC-1 DB analysis indicates that the dam will be overtopped as follows:

Flood	Maximum Depth Over Dam
PMF	2.6 Feet
1/2 PMF	1.3 Feet

A dam break analysis was performed to determine the significance of various dam failures on the downstream hazard. This analysis was performed with the 1/2 PMF assuming the dam to fail at the maximum elevation resulting from the 1/2 PMF. The railroad embankment approximately 400 feet downstream of the dam would restrict flow for intermediate flows. However, the hydrologic/hydraulic analysis indicates that this embankment would be overtopped by flows greater than 36% of the PMF. The 1/2 PMF will overtop the embankment by about 1 foot and the PMF by 2.1 feet. Such overflows will cause failure of most earthen embankments. Therefore, the dam break analysis was performed assuming that the railroad embankment was no longer in existence at the time of the dam failure. The flood elevations, due to various dam failures and the flood elevations that would exist just before the corresponding dam break induced flood wave, are

shown below. These flood elevations are compared where the creek crosses Route 291, which is the area of the downstream hazard.

	Flood Elevations @ Route 291	
	Just Prior to Dam Break	Due to Dam Break
Failure Time = 0.2 hrs.	522.4	526.5
Failure Time = 0.3 hrs.	522.4	526.5
Failure Time = 0.5 hrs.	522.4	526.0

The above elevations were estimated from USGS quad sheets. These elevations are not exact and their significance is in the difference between the elevations for the flood levels with and without the dam failure. The worst of these three cases indicates that the flood depth would increase from 7.4 feet to 11.5 feet due to a dam failure. The homes in this area are located about 8 feet above the stream level. Therefore, this flood depth increase of 4 feet indicates that the downstream hazard would be significantly increased by a dam failure under this condition.

5.7 EVALUATION

The hydrologic/hydraulic analysis establishes the spillway capacity as 21% of the Probable Maximum Flood (PMF). The dam will be overtopped by 2.6 feet by the PMF and 1.3 feet under the 1/2 PMF. The stability analysis indicates unsatisfactory stability for the dam under the 1/2 PMF loading condition and the dam break analysis indicates that failure of the dam under the 1/2 PMF will increase the downstream flood levels on the order of 4 feet. Therefore, the spillway is assessed as seriously inadequate according to the Corps of Engineers' screening criteria.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

This dam is a concrete gravity structure consisting of non-overflow and overflow sections. The structure extends across the valley in a northwesterly direction from the left abutment. The ogee spillway section is located in the left portion of the dam and is flanked on either side by non-overflow sections. A concrete walkway extends across the spillway connecting the adjacent non-overflow sections at the top of dam elevation. The concrete spillway apron and training walls extend about 40 feet downstream. For some 70 feet downstream of the spillway apron, the outside bank of the receiving stream is riprapped.

The dam was inspected under conditions where the reservoir level was slightly above the spillway crest, with some water discharging over the spillway. The majority of the reservoir was covered with ice except for a narrow strip next to the dam in the spillway area. However, the entire crest and downstream face were visible. The field observations indicate the dam retains structural stability, but surface deterioration was evident. There is a general surface deterioration of the non-overflow sections with many areas of spalling 1 to 3 inches deep, with the worst areas on the order of 6 inches deep. The most severely spalled areas generally occur along joints. Many areas of small amounts of calcium deposits were present on the downstream face. Some wet areas were also present in the downstream face of the non-overflow section. The origin of this slight wetness was difficult to ascertain, although one area did appear to be flowing slightly upon close examination. No indications of seepage beyond the toe of the dam or around the abutments was noted. The upstream face appears to have received a shotcrete layer some time in the not too recent past. This shotcrete layer has delaminated from the original dam face in many areas.

The walkway over the spillway has experienced significant spalling of the concrete, resulting in exposure of some of the reinforcing. This loss of section has resulted in some portions of the railing no longer being attached to the walkway. The center pier of the spillway, which supports the walkway, has also experienced significant spalling of the concrete. At the time of the inspection, flashboards were in place in the northwesterly spillway section. These flashboards were in poor condition, as evidenced by broken sections of the boards. The surface of the training walls along the sides of the spillway apron were deteriorated with significant scouring evident in the area of the interface of the training walls and apron slab.

b. Design and Construction Data

No information regarding the structural stability of the structure was located. Drawings included in Appendix G substantially conform to the present facility. The plans indicate that the structure is 564 feet long consisting of a 112 feet long left non-overflow section; a 41.5 feet long spillway section, and a 410.5 feet long right non-overflow section. The entire base and abutments are shown as being keyed into rock.

The non-overflow sections have a crest width of 7 feet. This dam width is constant from the crest elevation of 591 down to elevation 585 at which point the downstream face slopes at a 1:2 (horizontal to vertical) batter to elevation 565, where the slope changes to 6.5:10. Below elevation 565, an earthen berm is constructed against the downstream face. The upstream faces of both the non-overflow and spillway sections are vertical. The crest width of the spillway is curved in an ogee shape, but the width is 7 feet and the downstream face slopes to conform to the configuration of the non-overflow section. The downstream face slopes at 1:2 from the tangent of the ogee curve to elevation 565, where the surface curves to transition between the downstream face and the spillway apron.

The only available construction drawings for the facility, which are included in Appendix G, are dated July 1919.

c. Operating Records

There are no available operating records for the facility.

d. Post Construction Changes

There are no available documents or indications of significant post construction changes. It does appear that the upstream face of the dam has been overlaid with a shotcrete layer.

e. Seismic Stability

No known faults exist in the immediate vicinity of the dam. A major fault line is present five miles north of the dam and trends to the northeast. A lineament is located about three-quarters of a mile south of the dam and trends to the northeast. Bedding dips 4° to 5° to the southwest. Joints are close to vertical and strikes are N20E, N60E, N25W and E-W. The area is located within Zone 2 of the Seismic Probability Map. Earthquakes recorded in the area are tabulated below:

Date	Intensity Modified Mercalli	Location Relative to Dam
1840	V-VI	19 miles SE
1930	II	4 miles S

6.2 STRUCTURAL STABILITY ANALYSIS

Design drawings available for review show the plan alignment and cross-sections for the dam, but do not include specific engineering information on the properties of the dam and foundation materials, nor stability analysis. As a part of the present study, stability evaluations have been performed for the spillway section. Actual properties of the dam's construction materials and foundation were not determined as part of this study. Where information on properties was necessary for computations, but lacking, assumptions felt to be practical were made. The stability computations assumed a structural cross-section based on dimensions

indicated by the plans included in this report. It should be considered that, in areas where deterioration has occurred, section dimensions would be less than indicated by the plans with some adverse effect on the structural strength expected. The analysis also assumed the dam section to be monolithic, possessing necessary internal resistance to shear and bending occuring as a result of loading.

The result of the stability computations indicate satisfactory stability for the analyzed spillway section against sliding effects for all studied loading conditions. The studied loading conditions include: (1) normal operation (reservoir at spillway crest, no ice), (2) reservoir pool at the spillway crest with ice effects, (3) reservoir elevation at the 1/2 PMF level, (4) reservoir elevation at the PMF level, and (5) reservoir pool at the spillway crest with seismic effects.

The analysis of stability against overturning indicates satisfactory stability under seismic loading, but only marginal stability under normal operating conditions. Unsatisfactory stability was indicated for ice loading, 1/2 PMF, and PMF loading conditions, according to the Recommended Guidelines for Safety Inspection of Dams (i.e., the resultant of the forces acting on the dam is located outside the middle third of the base, resulting in tensile stresses developing in the dam section, a condition which is structurally undesirable).

The stability computations are presented in Appendix E and the results of these computations are summarized in the table on the next page.

The lateral water pressures used in the 1/2 PMF and PMF conditions were computed from the water surface elevations calculated in the hydrologic/hydraulic analysis. It should be noted that the railroad embankment just downstream of the dam would act as a flow restriction for intermediate flows causing the tailwater to backup onto the downstream face of the dam. This condition of a high tailwater would tend to increase the stability of the structure due to the resulting resistance to overturning. However, this railroad embankment will be overtopped by flows greater than 36% of the PMF, leading to severe erosion and probable failure of the embankment. Therefore, the tailwater elevations for the 1/2 PMF and PMF conditions were computed assuming the railroad embankment would no longer be in existence at the time of the peak discharges from these storms.

Critical to the analysis and resulting indication of stability are the items of uplift water pressure acting on the base of the dam and the relative permeability of the site's foundation material. For the "normal operation conditions" case, the analysis uplift force was based on a full headwater hydrostatic pressure acting on the dam's upstream corner and the normal tailwater hydrostatic pressure (essentially zero for the analyzed section) acting on the dam's downstream corner. Uplift pressures were assumed to vary linearly between the dam's upstream and downstream corners, and to act upon 100 percent of the dam base. The resulting uplift force represents a condition that is significant to indications of instability. Uplift as computed for the normal operating condition was also assigned to the flood conditions studied, assuming that uplift pressures would not increase significantly over a relatively short flood stage period because of expected low foundation rock permeability.

RESULTS OF STABILITY COMPUTATIONS

	Loading Condition	Factor of Safety* Overturning	Factor of Safety* Sliding**	Location of Resultant Passing through Base***
(1)	Water level at spillway elevation, uplift on base (no ice)	1.55	6.4	0.337b
(2)	Water level at spillway elevation, uplift on base plus 7.5 kips per lineal foot ice load	1.15	5.1	0.12b
(3)	Water levels against upstream face and downstream face based on 1/2 PMF elevations, uplift same as Case 1	1.15	4.3	0.13b
(4)	Water level against upstream face and downstream face based on PMF elevations, uplift same as Case 1	1.10	4.1	0.09b
(5)	Water level at spillway elevation, uplift on base, seismic effects applicable to Zone 2	1.35	5.5	0.26b

* These factors of safety indicate the ratio of moments resisting overturning to those moments causing overturning, and the ratio of forces resisting sliding to those causing sliding. Upstream and downstream water levels were obtained from HEC-1DB analysis.

** As determined applying the shear-friction method.

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

The discussed analysis applies to a dam in structurally good condition. Although the field observations indicate the structure retains structural stability, significant deterioration of the concrete surfaces was noted. In addition, the stability computations indicate marginal stability against overturning for normal operating conditions and unsatisfactory stability for normal pool with ice, 1/2 PMF and PMF loading conditions. Therefore, further investigations are recommended. Evaluation of existing structural conditions should be based upon inspection of the dam and abutments with the reservoir drawn down to allow inspection of the upstream portion of the structure and foundation. The observed condition of the dam structure and rock foundation can serve as the basis for planning and conducting necessary tests for determining physical properties important to the dam's stability. Because of the effect on stability, methods to evaluate the presence and magnitude of the uplift acting on the dam should be undertaken. Stability analyses based upon actually existing conditions should be completed and recommendations to improve the stability should be developed if necessary. Meanwhile, maintenance and repair should be planned for deteriorated areas to ensure that the presently existing stability is retained.

The entire structure, as well as areas beyond the toe of the structure, should be regularly inspected as part of a formalized inspection program to detect deficiencies. Any deficiencies and the remedial measures undertaken to correct these deficiencies should be well documented to provide historical background on which future evaluations may be based.

SECTION 7: ASSESSMENT/REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Safety

The Phase I Inspection of the Marcy Reservoir Dam did not indicate conditions which would constitute an immediate hazard to life or property.

The stability analysis indicates unsatisfactory stability during loadings which could occur during ice loading conditions and during the 1/2 PMF and PMF events.

The hydrologic/hydraulic analysis indicates that the spillway will pass only 21% of the PMF. The dam will be overtopped by 2.6 feet and 1.3 feet by the PMF and 1/2 PMF respectively. Failure of the dam during the 1/2 PMF event would significantly increase the downstream hazard from that which would exist just prior to failure of the dam. The spillway capacity, therefore, is assessed as seriously inadequate.

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

1. Minor seepage was detected on the downstream face of the dam at vertical construction joints.

2. Severe spalling of the exposed concrete exists generally throughout the structure. Deterioration is especially severe at the walkway across the spillway, at vertical construction joints, and at the base of the spillway training walls.

3. The hydraulic concrete on the upstream face of the dam is peeling away from the dam surface.

4. The blowoff valve which is maintained in the full open position is partially obstructed, thereby restricting outflow from the impoundment.

5. The gatehouse is severely deteriorated and the gates are inoperative for all practical purposes.

6. The structure has been poorly maintained and no formalized inspection program is presently in effect.

7. No warning system is presently in effect to alert the public should conditions occur which could result in failure of the dam.

b. Adequacy of Information

The information available is adequate for this Phase I investigation.

c. Urgency

The Owner should immediately implement a program of surveillance during heavy rainfall conditions. Within three months a flood warning and emergency evacuation plan should be implemented. The remaining items set forth in the safety assessment should be addressed by the Owner and appropriate improvements and repairs should be performed within 18 months of this notification. The recommended investigations should begin within six months.

d. Need for Additional Investigation

Further investigations relative to the stability of the structure should be performed to determine appropriate measures necessary to provide stability under all conditions. A detailed hydrologic/hydraulic investigation should be undertaken to determine the measures necessary to provide adequate spillway capacity.

7.2 RECOMMENDED MEASURES

The following is a list of recommended measures to be undertaken to insure safety of the facility:

1. A structural stability investigation should be performed to determine the characteristics of the uplift forces acting on the dam, the properties of the existing dam and foundation, and the effect of these conditions on the stability of the dam. Remedial work should be undertaken depending on the results of this investigation.

2. A detailed hydrologic/hydraulic analysis to more accurately determine site specific characteristics of the watershed should be undertaken to determine the necessary measures to provide adequate spillway capacity. The remedial work necessary to provide this capacity should be undertaken depending on the results of this investigation.

3. The minor seepage on the downstream face of the dam at construction joints should be investigated and appropriate remedial measures taken to eliminate this seepage.

4. The severely spalled surfaces of the exposed concrete should be repaired.

5. The hydraulic concrete on the upstream face of the dam should be removed and the surface repaired.

6. The obstructions at the blowoff valve should be removed to provide unrestricted outflow from the impoundment.

7. The gatehouse should be repaired and placed in operating condition and proper security maintained to prevent vandalism.

8. A formalized inspection system should be initiated to develop data on the conditions and maintenance operations at the facility.

9. A flood warning and emergency evacuation system should be implemented to alert the public in the event conditions occur which could result in failure of the dam.

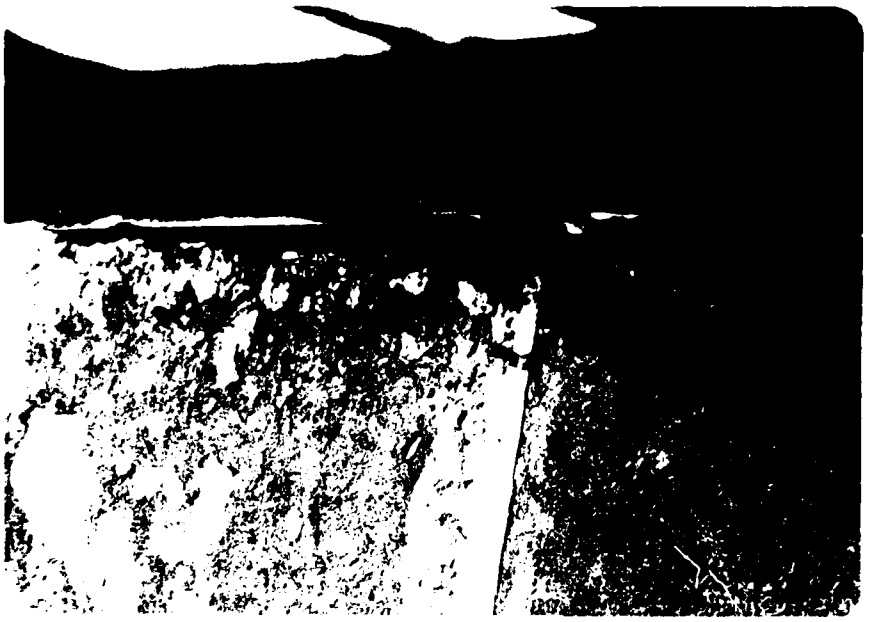
APPENDIX A

PHOTOGRAPHS

2. Spillway as viewed from downstream.

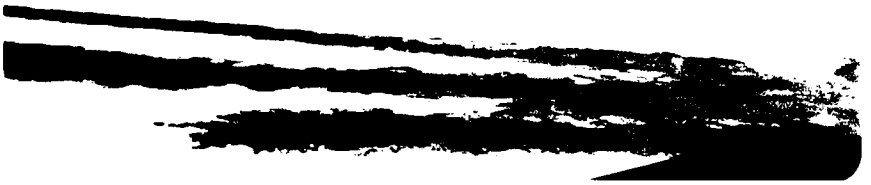
3. Spillway as viewed from top of walkway. Note deteriorated concrete and restricted flow from 24" reservoir drain.

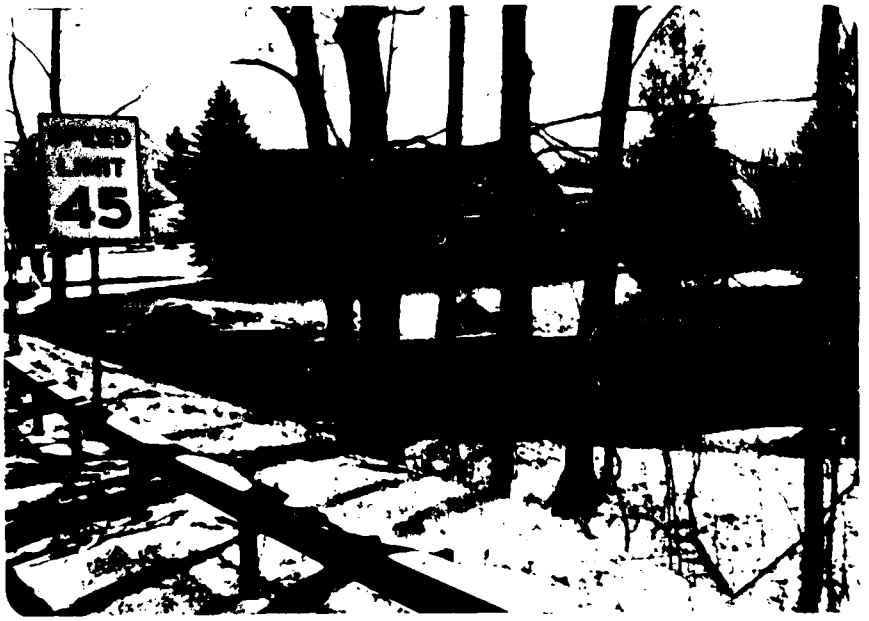
4. Close up of deteriorated walkway. Note exposed reinforcing.



8. Close up of [illegible] shotcrete.

9. View of reservoir area from dam crest.





10. Downstream hazard area. Receiving stream in foreground

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam MARCY RESERVOIR DAM

Fed. I.D. # NY 190 DEC Dam No. ———

River Basin MOHAWK RIVER

Location: Town MARCY County ONEIDA.

Stream Name CRANE CREEK

Tributary of MOHAWK RIVER

Latitude (N) 43-10.1 Longitude (W) 75-17.3

Type of Dam GRAVITY (CONCRETE)

Hazard Category HIGH

Date(s) of Inspection DECEMBER 4, 1980

Weather Conditions FAIR (LIGHT SNOW COVER)

Reservoir Level at Time of Inspection SPILLWAY LEVEL

b. Inspection Personnel F.W. BYSZEWSKI, B. COLWELL, J.A. GOMEZ, H. MUSKATT - DALE ENGINEERING COMPANY W. FARMER - MARCY PSYCHIATRIC CENTER

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

MR. ROBERT DRISCOLL

BUSINESS MANAGER TELEPHONE 315-797-6800

MARCY PSYCHIATRIC CENTER

1213 COURT ST.

UTICA N.Y. 13502

d. History:

Date Constructed ABOUT 1920 Date(s) Reconstructed ———

Designer THE DEPARTMENT OF THE STATE ENGINEER AND SURVEYOR

Constructed By UNKNOWN.

Owner DEPARTMENT OF MENTAL HEALTH (NEW YORK STATE)

2) Embankment

a. Characteristics

(1) Embankment Material N/A

(2) Cutoff Type N/A

(3) Impervious Core N/A

(4) Internal Drainage System N/A

(5) Miscellaneous N/A.

b. Crest

(1) Vertical Alignment N/A

(2) Horizontal Alignment N/A

(3) Surface Cracks N/A

(4) Miscellaneous N/A

c. Upstream Slope

(1) Slope (Estimate) (V:H) N/A

(2) Undesirable Growth or Debris, Animal Burrows N/A

(3) Sloughing, Subsidence or Depressions N/A

(4) Slope Protection N/A

(5) Surface Cracks or Movement at Toe N/A

d. Downstream Slope

(1) Slope (Estimate - V:H) N/A

(2) Undesirable Growth or Debris, Animal Burrows N/A

(3) Sloughing, Subsidence or Depressions N/A

(4) Surface Cracks or Movement at Toe N/A

(5) Seepage N/A

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

(7) Condition Around Outlet Structure N/A

(8) Seepage Beyond Toe None observed

e. Abutments - Embankment Contact

N/A

(1) Erosion at Contact N/A

(2) Seepage Along Contact N/A

3) Drainage System

a. Description of System N/A

b. Condition of System N/A

c. Discharge from Drainage System N/A

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) None

5) Reservoir

a. Slopes STEEP SLOPES NO EVIDENCE OF RECENT EROSION

b. Sedimentation NONE OBSERVED. SOME SEDIMENTATION REPUTEDLY EXISTS.

c. Unusual Conditions Which Affect Dam NONE.

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) RESIDENTIAL PROPERTY ON BANK OF STREAM

b. Seepage, Unusual Growth NONE

c. Evidence of Movement Beyond Toe of Dam NONE

d. Condition of Downstream Channel GOOD, NO SIGN OF RECENT EROSION

7) Spillway(s) (Including Discharge Conveyance Channel)

EMERGENCY SPILLWAY WAS DISCHARGING MINOR FLOW AT TIME OF INSPECTION.

a. General SURFACE OF CONCRETE IN POOR CONDITION, SEVERE SURFACE SPALLING AND DETERIORATION. NO MISALIGNMENT OR STRUCTURAL CRACKING OBSERVED. DETERIORATION AT BASE OF SPILLWAY TRAINING WALL

b. Condition of Service Spillway SEE ABOVE NO SEPARATE SERVICE SPILLWAY

c. Condition of Auxiliary Spillway SEE A above

d. Condition of Discharge Conveyance Channel GOOD CONDITION
ROCK CHANNEL, NO SIGNS OF RECENT EROSION.

8) Reservoir Drain/Outlet

Type: Pipe ✓ Conduit _____ Other _____

Material: Concrete _____ Metal ✓ Other _____

Size: 24" Length 35ft±

Invert Elevations: Entrance 560.0 Exit 554±

Physical Condition (Describe): Unobservable ✓

Material: CAST IRON PIPE w/ 24" GATE VALVE & 24" WOODEN SLUICE GATE AT ENTRANCE

Joints: _____ Alignment _____

Structural Integrity: UNOBSERVABLE

Hydraulic Capability: VALVE WAS FULLY OPEN, WOODEN SLUICE GATE REMOVED. QUANTITY OF FLOW INDICATES SUBSTANTIAL RESTRICTION

Means of Control: Gate ✓ Valve ✓ Uncontrolled _____

Operation: Operable ✓ Inoperable _____ Other _____

Present Condition (Describe): GATE VALVE FULL OPEN, OPERABLE
POSSIBLY OBSTRUCTED. WOODEN SLUICE GATE HAS BEEN REMOVED. LYING ON GROUND AT TOE OF DAM.

9) Structural

a. Concrete Surfaces SEVERE SURFACE SPALLING & DETERIORATION SHOT CRETE SURFACE ON UPSTREAM FACE HAS SEPARATED FROM ORIGINAL SURFACE.

b. Structural Cracking

c. Movement - Horizontal & Vertical Alignment (Settlement) NO VERTICAL OR HORIZONTAL MISALIGNMENT OBSERVED.

d. Junctions with Abutments or Embankments GOOD - NO SEEPAGE OBSERVED.

e. Drains - Foundation, Joint, Face NONE

f. Water Passages, Conduits, Sluices GATES TO ABANDONED WATER TREATMENT PLANT ARE CLOSED. NO ATTEMPT TO OPERATE

g. Seepage or Leakage Wet AREAS on Downstream Face WHICH APPEARED TO BE FLOWING SLIGHTLY, UPON CLOSE EXAMINATION.

h. Joints - Construction, etc. SEVERELY DETERIORATED AT SURFACE, NO LEAKAGE SEE PHOTOS.

i. Foundation NO FOUNDATION PROBLEMS OBSERVED. PLANS INDICATE DAM ON ROCK FOUNDATION.

j. Abutments NO SEEPAGE OR EROSION

k. Control Gates NONE

l. Approach & Outlet Channels APPROACH CHANNEL IS THE IMPOUNDMENT. OUTLET CHANNEL IN ROCK NO SIGNS OF RECENT EROSION.

m. Energy Dissipators (Plunge Pool, etc.) NONE

n. Intake Structures GATE HOUSE SEVERELY DETERIORATED. GATE LIFT CHAINS ARE HANGING DOWN INTO ICE COVERED PIT. GATES REPUTEDLY WERE IN PLACE.

o. Stability NO SIGNS OF INSTABILITY NOTED IN THE FIELD.

p. Miscellaneous WALKWAY OVER SPILLWAY IS SEVERELY DETERIORATED. REINFORCING BARS ARE EXPOSED HAND RAIL IS UNSAFE.

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)

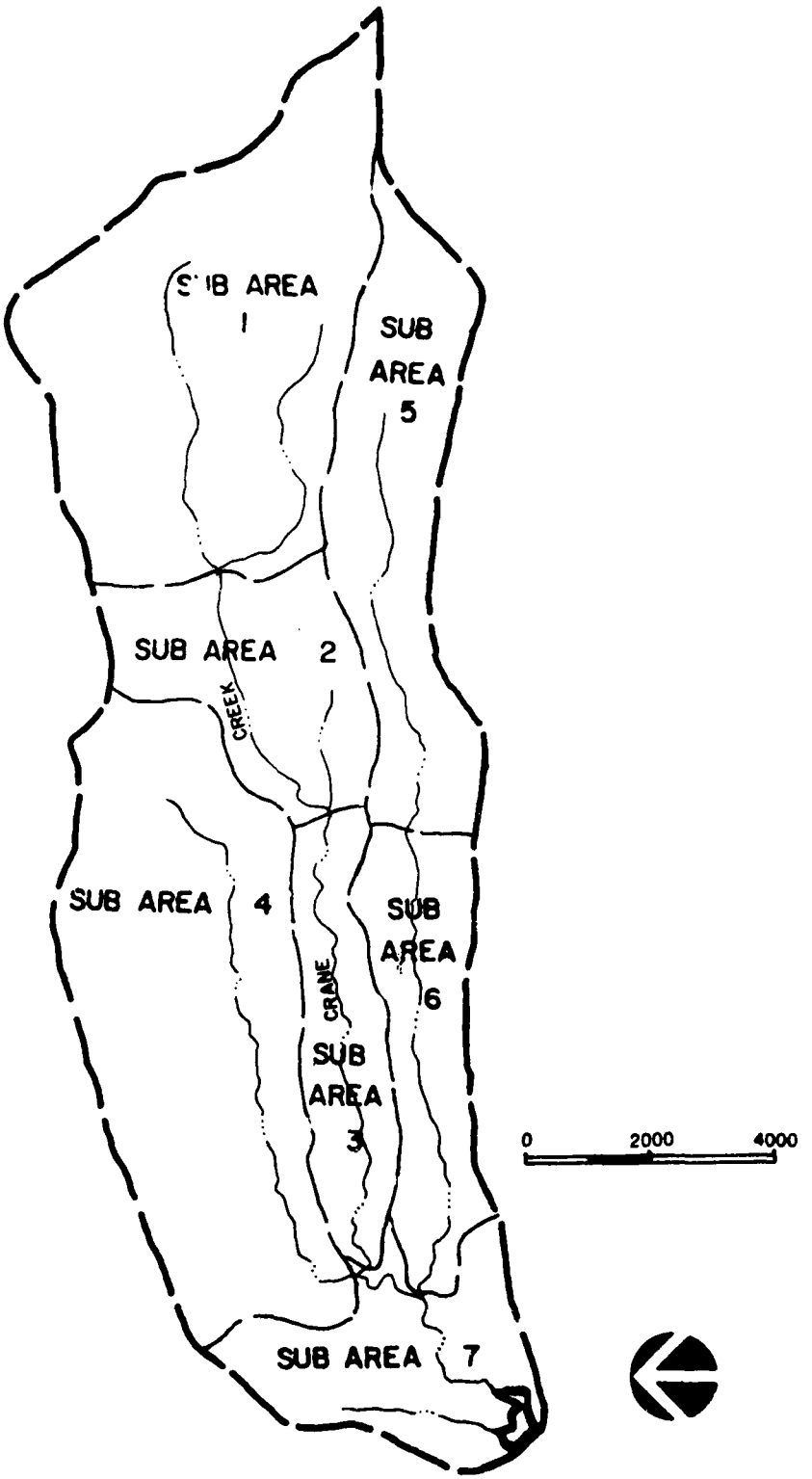
a. Description and Condition GATEHOUSE IS SEVERELY DETERIORATED, WINDOWS OUT,

11) Operation Procedures (Lake Level Regulation):

BLOW OFF VALVE IS IN FULL OPEN POSITON. IMPOUNDMENT LEVEL FLUCTUATES WITH RUNOFF CONDITIONS. BLOW OFF IS PARTIALLY OBSTRUCTED

APPENDIX C

HYDROLOGIC/HYDRAULIC, ENGINEERING DATA AND COMPUTATIONS



LEGEND

WATERSHED AREA

SUB AREA

DRAINAGE BASIN

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DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE

SUBJECT Mapp Reservoir PROJECT NO 2552

Subarea Hydrologic Parameters DRAWN BY JAG

Subarea	Area	C_f	L	L_{CA}	$t_l = C_t (L \cdot L_{CA})^{0.3}$
1	1.108 mi²	2.0	1.78	0.83 mi	2.25 hr
2	0.416	2.0	1.03	0.51	1.65
3	0.302	2.0	1.38	0.70	1.98
4	1.091	2.0	2.0	0.95	2.42
5	0.573	2.0	1.91	0.98	2.41
6	0.359	2.0	1.42	0.75	2.04
7	0.402	2.0	0.98	0.40	1.51

$\Sigma = 4.25 m^2$

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PROJECT NAME N.Y.S. Dam Inspections 1981 DATE 12-17-80

SUBJECT Marcy Reservoir ID# 190 PROJECT NO. 2520

Depth-Area-Duration DRAWN BY JAG

PMP from HMR #33
for Lat. ~ 43°10' Long. ~ 75°18'
Index Rainfall = 19.4" for 200 mi², 24 hr
Zone 1

Duration	% Index*	Depth
6 hrs.	111	21.5"
12 hrs.	123	23.9
24 hrs	133	25.8
48 hrs	142	27.5

* Adjusted for site area, Drainage Area = 4.25 mi²
(which is less than the lower limit of the areal adjustment graph, 10 mi². Therefore these values are adjusted for this lower limit)

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PROJECT NAME N.Y.S. Dam Inspections 1981 DATE

SUBJECT [illegible] Reservoir PROJECT NO [illegible]

Spillway Rating DRAWN BY [illegible]

Length = 40'

Design Head Assumed = 6' = H_d based on [illegible] [illegible]

Q = CLH^{3/2} [illegible] Fig. [illegible] [illegible] Hydraulics by [illegible]

$h/H_d = \frac{8}{6} > 1.33$ C_d = 4.03

$L_e = L_c - KNH_e$ K from Fig. 14-11 Type 1 - Chow

Elev.	H_e	H_e/H_d	C/C_d	C	L_e	Q (cfs)
585	0					
585.25	0.25'	0.04	0.72	2.9		15
585.5	0.5	0.08	0.73	2.94		42
585.75	0.75	0.125	0.76	3.06		80
586	1.0	0.167	0.78	3.14	39.95	125
586.5	1.5	0.20	0.81	3.26	39.93	239
587	2.0	0.33	0.84	3.39	39.92	383
587.5	2.5	0.42	0.87	3.51	39.91	554
588	3.0	0.5	0.9	3.63	39.91	753
588.5	3.5	0.58	0.92	3.71	39.9	970
589	4.0	0.67	0.94	3.79	39.88	1210
589.5	4.5	0.75	0.96	3.87	39.87	1475

Above Elev. 591 Discharge is the sum of the pressure flow under the [illegible] $Q = 2/3 \sqrt{2g}\, CL\,(H_1^{3/2} - H_2^{3/2})$, C from Fig. 257 Design of Small Dams and weir flow [illegible] [illegible] [illegible] [illegible] [illegible] considered separately.

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DESIGN BRIEF

PROJECT NAME N. Y. S. Dam Inspections 1981 DATE

SUBJECT Diana Reservoir PROJECT NO.

Spillway Rating (B.T.O.) DRAWN BY

For Flow over walkway $Q = CLH^{3/2}$ $C = 3.65$

H = Elev − 591 L = 41.5'

Elev.	H_1	H_2	d/H_1	C	Q_p	Q_w	Q_{tot}
591	6'	1.33	0.78	0.64	1800	--	1800
592	7	2.33	0.67	0.647	2072	110	2180
593	8	3.33	0.58	0.658	2330	310	2640

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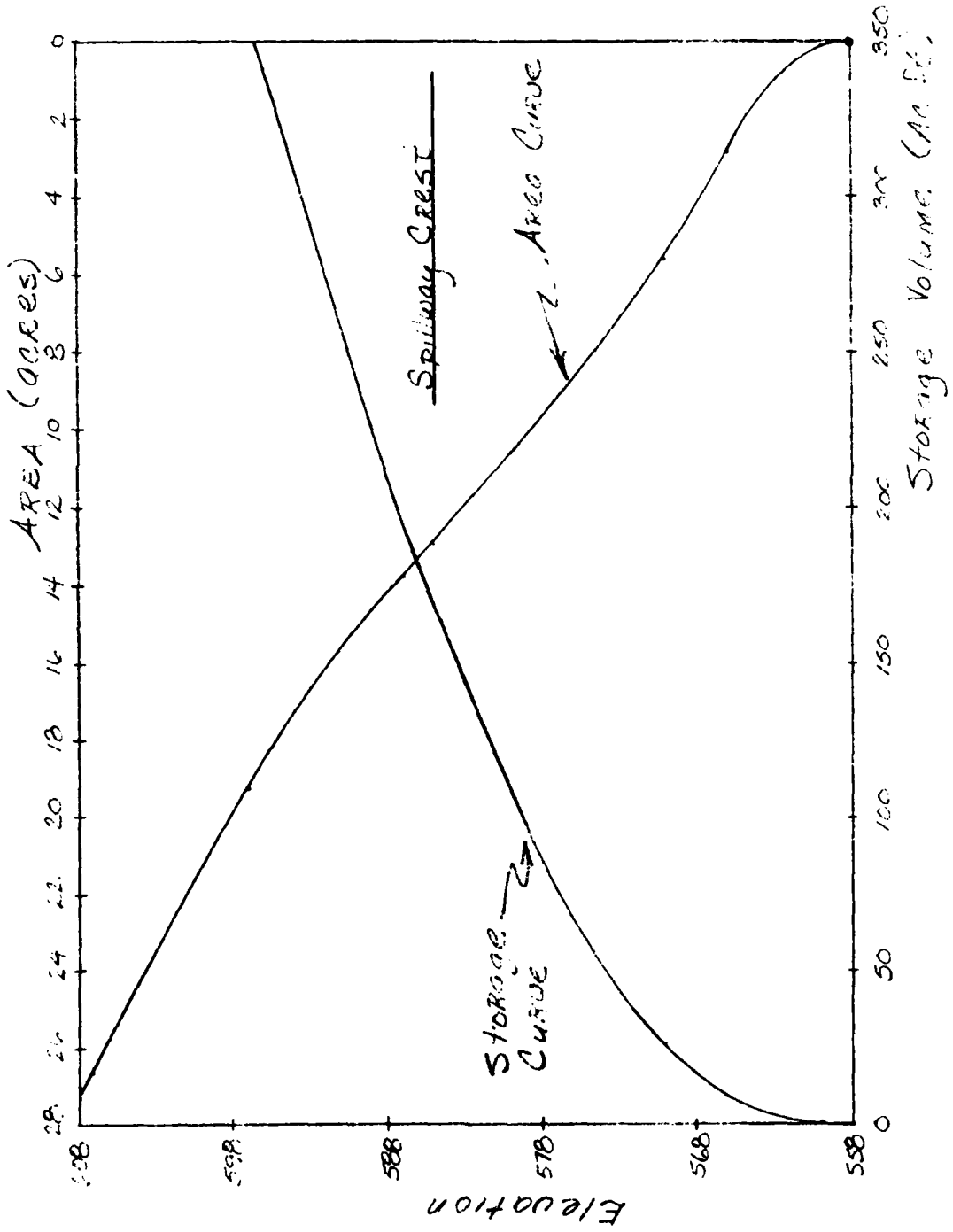
DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 198_ DATE

SUBJECT Diana Reservoir PROJECT NO

Area Capacity Curve DRAWN BY JAG



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PROJECT NAME N.Y.S. Dam Inspections - 1981 DATE

SUBJECT Mateo Reservoir PROJECT NO 25[illegible]

Research Dam Discharge Rating DRAWN BY JAG

24" "Blow off" Pipe @ invert elev. 559

Length ~41', with a 45° bend and a gate valve.

for $H > 1.5D$ will act as an orifice

$Q = CA\sqrt{2gH}$

head loss due to bend and valve

$h = \frac{k v^2}{2g}$

$k = 0.42$ - bend
$k_v = 0.19$ - gate valve
} Table 8.3 "Fluid Mechanics with Engineering Applications" Daugherty & Franzini 6th ed.

or equivalent Pipe length

$L_D = 15$ - bend

$= 7$ - gate valve

Equivalent total length $= 41' + (15+7)2' = 85'$

$C = 0.645$ Table 4.1 "Handbook of Hydraulics" - King & Brater

$H = 585 - 559 = 26'$ (Spillway @ elev. 585)

$Q = 83$ cfs

Working with head loss method

$V = 26.4$ fps

$h_f = (0.42 + 0.19)\frac{(26.4\,\text{fps})^2}{(32.2\,\text{ft/sec}^2)2} = 6.6'$

$C = 0.73$ $H = 26' - 6.6' = 19.4'$

$Q = .73(3.14\,\text{ft}^2)\sqrt{64.4(19.4')} = 81$ cfs (almost)

Capacity with pool at spillway level

$Q = 80+$ cfs

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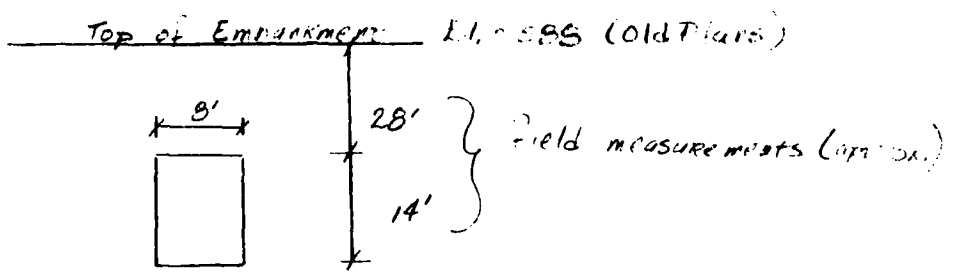
DESIGN BRIEF

PROJECT NAME W.S. Dam Inspection DATE

SUBJECT Yuba Reservoir PROJECT NO

Railroad Culvert Capacity DRAWN BY TAJ



Elev.	H	H/D	Q/w	Q (cfs)
546	0			0
549	3'	0.21	11	88
552	6	0.43	38	304
555	9	0.64	70	560
558	12	0.86	105	840
561	15	1.07	145	1160
564	18	1.29	192	1536
567	21	1.5	235	1800
570	24	1.7	250	2000
573	27	1.93	275	2200
576	30	2.14	300	2400
579	33	2.36	325	2600
582	36	2.57	350	2800
585	39	2.79	370	2960
588	42	3	385	3080
589	43	3.07	397	3175 + 1325* = 4500
590	44	3.14	402	3215 + 5250 = 8465
591	45	3.21	405	3240 + 9660 = 12,900
592	46	3.29	408	3265 + 14840 = 18,100

* Includes weir flow over embankment

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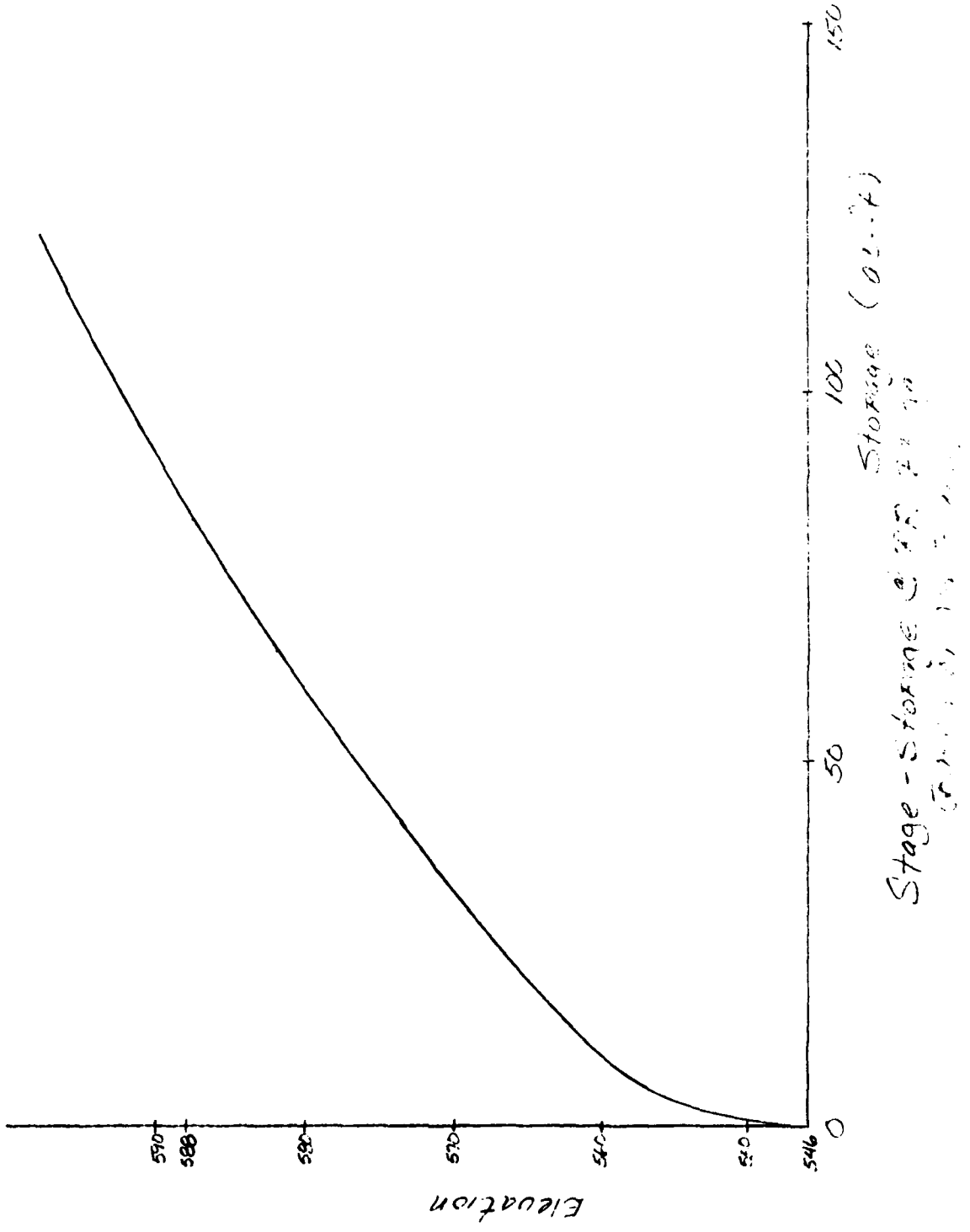
DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE

SUBJECT Dam 4 Reservoir PROJECT NO

Stage-Storage Curve DRAWN BY JH



Marcy Reservoir Dam
NY 190

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	591	16	255
2) Design High Water (Max. Design Pool)	N/A	—	—
3) Auxiliary Spillway Crest	N/A	—	—
4) Pool Level with Flashboards 18" flashboards	586.5	13.6	190
5) Service Spillway Crest	585	13	165

DISCHARGES

	Volume (cfs)
1) Average Daily	N/A
2) Spillway @ Maximum High Water (Top of Dam)	1800
3) Spillway @ Design High Water	N/A
4) Spillway @ Auxiliary Spillway Crest Elevation	N/A
5) Low Level Outlet w/ water level at top of dam	92
6) Total (of all facilities) @ Maximum High Water	1890
7) Maximum Known Flood	unknown
8) At Time of Inspection	~5 over spillway plus flow through blowoff

CREST: ELEVATION: 591 @ Top

Type: Concrete

Width: 7' Length: 112' left non-overflow section
411 Right non-overflow sect.

Spillover As described above

Location

SPILLWAY:

PRINCIPAL		EMERGENCY
N/A	Elevation	585
	Type	Ogee
	Width	2 @ 20' = 40'
	Type of Control	
	Uncontrolled	✓
	Controlled:	
	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	Concrete
	Anticipated Length of operating service	N/A
	Chute Length	N/A
	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	28' ±

HYDROMETEROLOGICAL GAGES:

Type : None at present

Location: _____

Records:

Date - _____

Max. Reading - _____ _____

FLOOD WATER CONTROL SYSTEM:

Warning System: None at present

_____

Method of Controlled Releases (mechanisms):

Blow off pipe can act as
Reservoir drain

DRAINAGE AREA: 4.25 SQ. MI.

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Undeveloped - much of it is forested

Terrain - Relief: Moderately steep to steep

Surface - Soil: Not Known

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

Not Known

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

Unknown

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

None Known

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

Location: N/A

Elevation:

Reservoir:

Length @ Maximum Pool 0.35± (Miles)

Length of Shoreline (@ Spillway Crest) 0.60± (Miles)

```
(0077)  M      1       1   0.357       0    4.25       0       0       0       1       0
(0078)  P      0    19.4     111     123     133     142       0       0       0       0
(0079)  T                                                    1.0     0.1       0       0
(0080)  W   2.14   0.625       0       0       0       0       0       0       0       0
(0081)  X   -2.0   -0.10     1.0       0       0       0       0       0       0       0
(0082)  K      3     600       0       0       0       0       1       0       0       0
(0083)  K1         COMBINE 3 HYDROGRAPHS @ 600  5+6+3=3
(0084)  K      1     701       0       0       0       0       1       0       0       0
(0085)  K1         ROUTE TO RESERVOIR
(0086)  Y      0       0       0       1       1       0       0       0       0       0
(0087)  Y1     1       0       0       0       0       0      -1       0       0       0
(0088)  Y6 0.063   0.035   0.063    1000    1025    2100  -.0095       0       0       0
(0089)  Y7   150    1025     153    1025     169    1033     166    1000     181    1000
(0090)  Y7   187    1003     197    1005     250    1025       0       0       0       0
(0091)  K      0     701       0       0       0       0       1       0       0       0
(0092)  K1         RUNOFF SUBAREA 7
(0093)  M      1       1   0.412       0    4.25       0       0       0       1       0
(0094)  P      0    19.4     111     123     133     142       0       0       0       0
(0095)  T      0       0       0       0       0       0     1.0     0.1       0    0.05
(0096)  W   1.51   0.625       0       0       0       0       0       0       0       0
(0097)  X   -2.0   -0.10     1.0       0       0       0       0       0       0       0
(0098)  K      2     701       0       0       0       0       1       0       0       0
(0099)  K1         COMBINE 2 HYDROGRAPHS - TOTAL RESERVOIR INFLOW
(0100)  K      1     700       0       0       0       0       1       0       0       0
(0101)  K1         ROUTE THRU RESERVOIR AND OVER SPILLWAY
(0102)  Y      0       0       0       1       1       0       0       0       0       0
(0103)  Y1     1       0       0       0       0       0    -585      -1       0       0
(0104)  Y4 585.0  585.25   585.5  585.75   586.0   586.5   587.0   587.5   588.0   588.5
(0105)  Y4 589.0   589.5   591.0   592.0   593.0       0       0       0       0       0
(0106)  Y5     0      15      42      80     125     240     365     555     755     970
(0107)  Y5  1210    1475    1800    2180    2640       0       0       0       0       0
(0108)  $S     0     0.1       9      26      58     110     165     178     192     206
(0109)  $S   221     237     255     293     358
(0110)  $E   558     560     566     570     575     580     585     586     587     588
(0111)  $E   589     590     591     593     597
(0112)  $$   585       0       0       0       0       0       0       0       0       0
(0113)  $D   591    2.65     1.5     522       0       0       0       0       0       0
(0114)  K      1     800       0       0       0       0       1
```

```
(0001)  A1         MARCY RESERVOIR   FILE IS ABWZ
(0002)  A2         HEC-1DB   (SNYDER PARAMETERS)
(0003)  A3         PMF - DAM OVERTOPPING ANALYSIS
(0004)  B     300        0       15        0        0        0        0        0        4        0
(0005)  B1      5        0        0        0        0        0        0        0        0        0
(0006)  J       1        7        1        0        0        0        0        0        0        0
(0007)  J1    0.2      0.3      0.4      0.5      0.6      0.8      1.0        0        0        0
(0008)  K       0      100        0        0        0        0        1        0        0        0
(0009)  K1         RUNOFF SUBAREA 1
(0010)  M       1        1    1.106        0     4.25        0        0        0        1        0
(0011)  P       0     19.4      111      123      133      142        0        0        0        0
(0012)  T       0        0        0        0        0        0      1.0      0.1        0        0
(0013)  W    2.25    0.625        0        0        0        0        0        0        0        0
(0014)  X    -2.0    -0.10      1.6        0        0        0        0        0        0        0
(0015)  K       1      200        0        0        0        0        1        0        0        0
(0016)  K1         ROUTE SUBAREA 2
(0017)  Y       0        0        0        1        1        0        0        0        0        0
(0018)  Y1      1        0        0        0        0        0       -1        0        0        0
(0019)  Y6  0.060    0.035    0.060     1000     1025     4490    0.034        0        0        0
(0020)  Y7    100     1025      150     1004      160     1002      164     1000      174     1000
(0021)  Y7    176     1002      168     1004      240     1025        0        0        0        0
(0022)  K       0      200        0        0        0        0        1        0        0        0
(0023)  K1         RUNOFF SUBAREA 2
(0024)  M       1        1    0.416        0     4.25        0        0        0        1        0
(0025)  P       0     19.4      111      123      133      142        0        0        0        0
(0026)  T       0        0        0        0        0        0      1.0      0.1        0        0
(0027)  W    1.65    0.625        0        0        0        0        0        0        0        0
(0028)  X    -2.0    -0.10      1.6        0        0        0        0        0        0        0
(0029)  K       2      200        0        0        0        0        1        0        0        0
(0030)  K1         COMBINE 2 HYDROGRAPHS 1+2=2
(0031)  K       1      300        0        0        0        0        1        0        0        0
(0032)  K1         ROUTE TO SUBAREA 3
(0033)  Y       0        0        0        1        1        0        0        0        0        0
(0034)  Y1      1        0        0        0        0        0       -1        0        0        0
(0035)  Y6  0.060    0.035    0.060     1000     1025     7300    0.024        0        0        0
(0036)  Y7    100     1025      150     1005      160     1003      166     1000      181     1000
(0037)  Y7    187     1005      197     1005      252     1025        0        0        0        0
(0038)  K       0      300        0        0        0        0        1        0        0        0
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```
(0039)   K1        RUNOFF SUBAREA 5
(0040)   M      1        1   0.352        0     4.25        0        0        0        1        0
(0041)   P      0     19.4      111      123      133      142        0        0        0        0
(0042)   T      0        0        0        0        0        0      1.0      0.1        0        0
(0043)   W   1.98    0.625        0        0        0        0        0        0        0        0
(0044)   X   -2.0    -0.10      1.6        0        0        0        0        0        0        0
(0045)   K      0      400        0        0        0        0        1        0        0        0
(0046)   K1        RUNOFF SUBAREA 4
(0047)   M      1        1   1.091        0     4.25        0        0        0        1        0
(0048)   P      0     19.4      111      123      133      142        0        0        0        0
(0049)   T      0        0        0        0        0        0      1.0      0.1        0        0
(0050)   W   2.42    0.625        0        0        0        0        0        0        0        0
(0051)   X   -2.0    -0.10      1.6        0        0        0        0        0        0        0
(0052)   K      3      300        0        0        0        0        1        0        0        0
(0053)   K1        COMBINE 3 HYDROGRAPHS 2+3+4=3
(0054)   K      1      600        0        0        0        0        1        0        0        0
(0055)   K1        ROUTE TO SUBAREA 6 OUTLET
(0056)   Y      0        0        0        1        1        0        0        0        0        0
(0057)   Y1     1        0        0        0        0        0       -1        0        0        0
(0058)   Y6 0.060    0.035    0.060     1000     1025     1420    0.014        0        0        0
(0059)   Y7   100     1025      150     1005      160     1003      166     1000      161     1000
(0060)   Y7   187     1003      197     1005      250     1025        0        0        0        0
(0061)   K      2      500        0        0        0        0        1        0        0        0
(0062)   K1        RUNOFF SUBAREA 5
(0063)   M      1        1   0.575        0     4.25        0        0        0        1        0
(0064)   P      0     19.4      111      123      133      142        0        0        0        0
(0065)   T      0        0        0        0        0        0      1.0      0.1        0        0
(0066)   W   2.41    0.625        0        0        0        0        0        0        0        0
(0067)   X   -2.0    -0.10      1.6        0        0        0        0        0        0        0
(0068)   K      1      600        0        0        0        0        1        0        0        0
(0069)   K1        ROUTE TO SUBAREA 6
(0070)   Y      0        0        0        1        1        0        0        0        0        0
(0071)   Y1     1        0        0        0        0        0       -1        0        0        0
(0072)   Y6 0.060    0.035    0.060     1000     1025     7500    0.030        0        0        0
(0073)   Y7   100     1025      150     1004      160     1002      164     1000      174     1000
(0074)   Y7   178     1002      188     1004      240     1025        0        0        0        0
(0075)   K      4      600        0        0        0        0        1        0        0        0
(0076)   K1        RUNOFF SUBAREA 6
```

```
(0115)   K1      ROUTE THRU RR BRIDGE
(0116)   Y       0       0       0       1       1
(0117)   Y1      1       0       0       0       0       0       -1
(0118)   Y2      0       0.3     1.1     2.7     5.7     10.7    16.6    24      31      39
(0119)   Y2      47.5    .58     65      73      83      88      90      93.5    97.5
(0120)   Y3      0       88      305     560     840     1160    1535    1800    2000    2200
(0121)   Y3      2400    2600    2800    2960    3080    4500    8465    12900   18100
(0122)   Y4      546     549     552     555     558     561     564     567     573     573
(0123)   Y4      576     579     582     585     588     589     590     591     592
(0124)   Y5      0       88      305     560     840     1160    1535    1800    2000    2200
(0125)   Y5      2400    2600    2800    2960    3080    4500    8465    12900   18100
(0126)   K       1       99      0       0       0       0       1
(0127)   K1      ROUTE TO ROUTE 12C (DOWNSTREAM HAZARD)
(0128)   Y       0       0       0       1       1
(0129)   Y1      1       0       0       0       0       0       -1
(0130)   Y6      0.080   0.055   0.085   515     540     1330    0.014
(0131)   Y7      183     545     195     530     352     519     364     515     376     515
(0132)   Y7      388     519     600     530     1000    540
(0133)   K       99      0       0       0       0       0       0       0       0       0
(0134)   A
(0135)   A
(0136)   A
(0137)   A
(0138)   A
```

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	100
ROUTE HYDROGRAPH TO	200
RUNOFF HYDROGRAPH AT	200
COMBINE 2 HYDROGRAPHS AT	200
ROUTE HYDROGRAPH TO	300
RUNOFF HYDROGRAPH AT	300
RUNOFF HYDROGRAPH AT	400
COMBINE 3 HYDROGRAPHS AT	300
ROUTE HYDROGRAPH TO	600
RUNOFF HYDROGRAPH AT	500
ROUTE HYDROGRAPH TO	600
RUNOFF HYDROGRAPH AT	600
COMBINE 3 HYDROGRAPHS AT	600
ROUTE HYDROGRAPH TO	701
RUNOFF HYDROGRAPH AT	701
COMBINE 2 HYDROGRAPHS AT	701
ROUTE HYDROGRAPH TO	700
ROUTE HYDROGRAPH TO	800
ROUTE HYDROGRAPH TO	900
END OF NETWORK	

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

UN  DATE?THU, MAR 05 1981
    TIME?09:32:53

                    MARCY RESERVOIR  FILE IS ABQZ
                    HEC-1DB  (SNYDER PARAMETERS)
                    PMF - DAM OVERTOPPING ANALYSIS

                              JOB SPECIFICATION
      NQ     NHR     NMIN     IDAY     IHR     IMIN    METRC     IPLT     IPRT    NSTAN
     300       0       15        0       0        0        0        0        4        0
                            JOPER      NWT   LROPT   TRACE
                                5        0       0       0

                         MULTI-PLAN ANALYSES TO BE PERFORMED
                                NPLAN= 1 NRTIO= 7 LRTIO= 1
          RTIOS=   0.20   0.30   0.40   0.50   0.60   0.80   1.00

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

                              SUB-AREA RUNOFF COMPUTATION

          RUNOFF SUBAREA 1
                  ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                    100       0       0       0       0       0       1       0       0

                              HYDROGRAPH DATA
        INYDG     IUNG    TAREA     SNAP    TRSDA    TRSPC    RATIO   ISNOW   ISAME   LOCAL
            1        1     1.11     0.00     4.25     0.00    0.000       0       1       0

                              PRECIP DATA
                 SPFE      PMS       R6      R12      R24      R48      R72      R96
                 0.00    19.40   111.00   123.00   133.00   142.00     0.00     0.00
TRSPC COMPUTED BY THE PROGRAM IS 0.800

                              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     0.10     0.00     0.00

                              UNIT HYDROGRAPH DATA
```

TP= 2.25 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 50 END-OF-PERIOD ORDINATES, LAG= 2.26 HOURS, CP= 0.63 VOL= 1.00

7.	27.	54.	85.	118.	151.	177.	194.	203.	201.
185.	165.	146.	130.	115.	102.	90.	80.	71.	63.
56.	50.	44.	39.	35.	31.	27.	24.	21.	19.
17.	15.	13.	12.	10.	9.	8.	7.	6.	6.
5.	5.	4.	4.	3.	3.	2.	2.	2.	2.

C
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	22.04	18.36	3.68	55198.
										(560.)	(466.)	(93.)	(1563.03)

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

HYDROGRAPH ROUTING

ROUTE SUBAREA 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
200	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
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0600	0.0350	0.0600	1000.0	1025.0	4400.	0.03400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
100.00 1025.00 150.00 1004.00 160.00 1002.00 164.00 1000.00 174.00 1000.00
176.00 1002.00 188.00 1004.00 240.00 1025.00

STORAGE	0.00	1.66	4.18	8.28	13.72	20.01	27.15	35.14	43.98
	64.20	75.59	87.82	100.90	114.84	129.62	145.25	161.73	179.06
OUTFLO	.00	134.45	527.34	1187.31	2212.07	3563.25	5246.98	7275.33	9660.87

	15563.79	19110.27	23073.11	27467.04	32306.62	37606.34	43360.53	49643.35	56408.83
STAGE	1000.00	1001.32	1002.63	1003.95	1005.26	1006.58	1007.89	1009.21	1010.53
	1013.16	1014.47	1015.79	1017.10	1018.42	1019.74	1021.05	1022.37	1023.68
FLOW	0.00	134.45	507.34	1187.31	2212.07	3563.25	5246.98	7275.00	9660.87
	15563.79	19110.27	23073.11	27467.04	32306.62	37606.34	43360.53	49643.35	56408.83

MAXIMUM STAGE IS 1002.4

MAXIMUM STAGE IS 1003.0

MAXIMUM STAGE IS 1003.4

MAXIMUM STAGE IS 1003.8

MAXIMUM STAGE IS 1004.2

MAXIMUM STAGE IS 1004.7

MAXIMUM STAGE IS 1005.3

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

SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
200	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.42	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

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	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.65 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 37 END-OF-PERIOD ORDINATES, LAG= 1.65 HOURS, CP= 0.63 VOL= 1.00

6.	26.	41.	63.	84.	98.	103.	98.	86.	73.
61.	52.	44.	37.	32.	27.	23.	19.	16.	14.
12.	10.	8.	7.	6.	5.	4.	4.	3.	3.
2.	2.	2.	1.	1.	1.	1.			

C						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	22.04	18.36	3.68	21055.
										(560.)	(466.)	(93.)	(596.21)

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

COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS 1+2=2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
200	2	0	0	0	0	1	0	0

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

HYDROGRAPH ROUTING

ROUTE TO SUBAREA 3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
300	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
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0600	0.0350	0.0600	1000.0	1025.0	7300.	0.02400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

150.00 1025.00 150.00 1005.00 160.00 1003.00 166.00 1000.00 181.00 1000.00
187.00 1003.00 197.00 1005.00 250.00 1025.00

STORAGE	0.00	3.89	8.94	15.59	25.06	36.47	49.37	63.76	79.65
	115.92	136.29	158.15	181.51	206.37	232.72	260.56	289.89	320.72
OUTFLOW	0.00	164.09	556.68	1256.73	2294.79	3679.46	5397.54	7455.82	9864.17
	15776.43	19304.31	23229.73	27565.05	32322.67	37514.90	43154.02	49252.20	55821.58
STAGE	1000.00	1001.32	1002.63	1003.95	1005.26	1006.58	1007.89	1009.21	1010.53
	1013.16	1014.47	1015.79	1017.10	1018.42	1019.74	1021.05	1022.37	1023.68
FLOW	0.00	164.09	556.68	1256.73	2294.79	3679.46	5397.54	7455.82	9864.17
	15776.43	19304.31	23229.73	27565.05	32322.67	37514.90	43154.02	49252.20	55821.58

MAXIMUM STAGE IS 1002.8

MAXIMUM STAGE IS 1003.4

MAXIMUM STAGE IS 1004.0

MAXIMUM STAGE IS 1004.4

MAXIMUM STAGE IS 1004.8

MAXIMUM STAGE IS 1005.5

MAXIMUM STAGE IS 1006.1

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
300	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.30	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
2	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.96 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 44 END-OF-PERIOD ORDINATES, LAG= 1.99 HOURS, CP= 0.63 VOL= 1.00

3.	10.	20.	31.	42.	52.	59.	63.	62.	56.
49.	43.	37.	32.	28.	25.	21.	19.	16.	14.
12.	11.	9.	8.	7.	6.	5.	5.	4.	4.
3.	3.	2.	2.	2.	2.	1.	1.	1.	1.
1.	1.	1.	1.						

Q

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
						END-OF-PERIOD FLOW							
									SUM	22.04	18.36	3.68	15132.
										(560.)	(466.)	(93.)	(428.49)

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
400	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.09	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

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	0.10	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 2.42 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 54 END-OF-PERIOD ORDINATES, LAG= 2.40 HOURS, CP= 0.62 VOL= 1.00

6.	22.	44.	70.	98.	126.	151.	170.	181.	186.
182.	166.	148.	133.	119.	106.	95.	85.	76.	68.
61.	55.	49.	44.	39.	35.	31.	28.	25.	23.
20.	18.	16.	14.	13.	12.	10.	9.	8.	7.

7. 6. 5. 5. 4. 4. 3. 3. 3. 2.
2. 2. 2. 2.

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	22.04	18.36	3.68	54164.
										(560.)	(466.)	(93.)	(1533.75)

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COMBINE HYDROGRAPHS

COMBINE 3 HYDROGRAPHS 2+3+4=3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
300	3	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

ROUTE TO SUBAREA 6 OUTLET

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
600	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
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0600	0.0350	0.0600	1000.0	1025.0	1400.	0.01400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 1025.00 150.00 1005.00 160.00 1003.00 166.00 1000.00 181.00 1000.00
187.00 1003.00 197.00 1005.00 250.00 1025.00

STORAGE	0.00	0.75	1.71	2.99	4.81	6.99	9.47	12.23	15.28
	22.23	26.14	30.33	34.81	39.58	44.65	49.97	55.60	61.51

OUTFLOW	0.00	125.32	425.17	959.84	1752.68	2810.23	4122.44	5694.47	7533.88
	12049.45	14743.91	17742.00	21053.16	24686.85	28652.48	32959.43	37616.99	42634.44
STAGE	1000.00	1001.32	1002.63	1003.95	1005.26	1006.58	1007.89	1009.21	1010.53
	1013.16	1014.47	1015.79	1017.10	1018.42	1019.74	1021.05	1022.37	1023.68
FLOW	0.00	125.32	425.17	959.84	1752.68	2810.23	4122.44	5694.47	7533.88
	12049.45	14743.91	17742.00	21053.16	24686.85	28652.48	32959.43	37616.99	42634.44

MAXIMUM STAGE IS 1004.3

MAXIMUM STAGE IS 1005.3

MAXIMUM STAGE IS 1006.0

MAXIMUM STAGE IS 1006.7

MAXIMUM STAGE IS 1007.3

MAXIMUM STAGE IS 1008.4

MAXIMUM STAGE IS 1009.4

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 5

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
500	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.57	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

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	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.41 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.00

UNIT HYDROGRAPH 53 END-OF-PERIOD ORDINATES, LAG= 2.41 HOURS, CP= 0.63 VOL= 1.00

3.	12.	23.	37.	52.	67.	80.	90.	96.	98.
96.	88.	79.	70.	63.	56.	50.	45.	40.	36.
32.	28.	25.	23.	20.	18.	16.	14.	13.	12.
10.	9.	8.	7.	7.	6.	5.	5.	4.	4.
3.	3.	3.	2.	2.	2.	2.	2.	1.	1.
1.	1.	1.							

C MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	22.04	18.36	3.68	28462.
										(560.)	(466.)	(93.)	(805.95)

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HYDROGRAPH ROUTING

ROUTE TO SUBAREA 6

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
600	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
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0600	0.0350	0.0600	1000.0	1025.0	7500.	0.03000

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 1025.00 150.00 1004.00 160.00 1002.00 164.00 1000.00 174.00 1000.00
178.00 1002.00 188.00 1004.00 240.00 1025.00

STORAGE	0.00	2.86	7.12	14.12	23.39	34.11	46.28	59.90	74.96
	139.43	128.84	149.69	172.00	195.74	220.94	247.59	275.68	305.22
OUTFLOW	0.00	126.29	476.56	1115.28	2077.88	3347.09	4928.68	6833.67	9074.81
	14619.64	17950.97	21673.42	25800.79	30346.79	35325.02	40748.92	46631.81	52986.88
STAGE	1000.00	1001.32	1002.63	1003.95	1005.26	1006.58	1007.89	1009.21	1010.53

	1013.16	1014.47	1015.79	1017.10	1018.42	1019.74	1021.05	1022.37	1023.68
FLOW	0.00	126.29	476.56	1115.28	2077.88	3347.09	4928.68	6833.67	9074.81
	14619.64	17950.97	21673.42	25800.79	30346.79	35325.02	40748.92	46631.81	52986.88

MAXIMUM STAGE IS 1001.7

MAXIMUM STAGE IS 1002.1

MAXIMUM STAGE IS 1002.5

MAXIMUM STAGE IS 1002.8

MAXIMUM STAGE IS 1003.0

MAXIMUM STAGE IS 1003.5

MAXIMUM STAGE IS 1004.0

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 6

ISTAQ	ICOPP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
600	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.36	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
2	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.04 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.00

UNIT HYDROGRAPH 44 END-OF-PERIOD ORDINATES, LAG= 2.03 HOURS, CP= 0.63 VOL= 1.00

5.	11.	23.	35.	49.	61.	69.	73.	73.	67.
59.	51.	45.	39.	34.	30.	26.	23.	21.	17.

15.	13.	11.	10.	9.	8.	7.	6.	5.	4.
4.	3.	3.	3.	2.	2.	2.	1.	1.	1.
1.	1.	1.	1.						

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	22.04	18.36	3.68	17987.
										(560.)(	466.)(	93.)(	509.33)

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COMBINE HYDROGRAPHS

COMBINE 3 HYDROGRAPHS @ 600 5+6+3=3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
600	3	0	0	0	0	1	C	0

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HYDROGRAPH ROUTING

ROUTE TO RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
791	1	0	0	0	0	1	C	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
C.C	0.000	C.CO	1	1	0	0	C

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	C	C	0.CCC	0.000	C.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0600	0.0350	0.0600	1000.0	1025.C	2100.	0.C095C

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 1025.00 150.00 1005.00 160.00 1003.00 166.00 1000.00 181.00 1000.00
187.00 1003.00 197.00 1005.00 250.00 1025.00

STORAGE	0.00	1.12	2.57	4.49	7.21	10.49	14.20	18.34	22.91
	33.35	39.21	45.50	52.22	59.37	66.95	74.55	83.39	92.26

OUTFLOW	0.00	103.24	350.24	790.67	1443.78	2314.94	3395.87	4690.85	6206.07
	9925.78	12145.36	14615.05	17342.63	20335.90	23602.61	27150.47	30987.16	35120.30
STAGE	1000.00	1001.32	1002.63	1003.95	1005.26	1006.58	1007.89	1009.21	1010.53
	1013.16	1014.47	1015.79	1017.10	1018.42	1019.74	1021.05	1022.37	1023.68
FLOW	0.00	103.24	350.24	790.67	1443.78	2314.94	3395.87	4690.85	6206.07
	9925.78	12145.36	14615.05	17342.63	20335.90	23602.61	27150.47	30987.16	35120.30

MAXIMUM STAGE IS 1005.4

MAXIMUM STAGE IS 1006.6

MAXIMUM STAGE IS 1007.6

MAXIMUM STAGE IS 1008.4

MAXIMUM STAGE IS 1009.2

MAXIMUM STAGE IS 1010.5

MAXIMUM STAGE IS 1011.7

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 7

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
701	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIC	ISNOW	ISAME	LOCAL
1	1	0.40	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
2	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.51 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.CC QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 33 END-OF-PERIOD ORDINATES, LAG= 1.50 HOURS, CP= 0.63 VOL= 1.CC

7.	25.	49.	76.	97.	108.	108.	96.	80.	66.
55.	46.	38.	32.	26.	22.	18.	15.	13.	10.
9.	7.	6.	5.	4.	3.	3.	2.	2.	2.
1.	1.	1.							

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	22.04	18.54	3.50	20618.
										(560.)	(471.)	(89.)	(583.64)

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COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS - TOTAL RESERVOIR INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
701	2	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

ROUTE THRU RESERVOIR AND OVER SPILLWAY

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
730	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	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-585.	-1

STAGE	585.00	585.25	585.50	585.75	586.00	586.50	587.00	587.50	588.00
	589.00	589.50	591.00	592.00	593.00				
FLOW	0.00	15.00	42.00	80.00	125.00	240.00	385.00	555.00	755.00
	1210.00	1475.00	1800.00	2180.00	2640.00				
CAPACITY=	0.	0.	9.	26.	58.	110.	165.	176.	192.	206.
	221.	237.	255.	293.	358.				
ELEVATION=	558.	560.	566.	570.	575.	580.	585.	586.	587.	588.
	589.	590.	591.	593.	597.				

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
585.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
591.0	2.6	1.5	522.

PEAK OUTFLOW IS 1631. AT TIME 42.50 HOURS

PEAK OUTFLOW IS 2588. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 3452. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 4318. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 5182. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 6908. AT TIME 42.00 HOURS

PEAK OUTFLOW IS 8638. AT TIME 41.75 HOURS

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HYDROGRAPH ROUTING

ROUTE THRU RR BRIDG

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
800	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
1	0	0	0.000	0.000	0.000	-1.	0

STORAGE	0.00	0.30	1.10	2.70	5.70	10.70	16.60	24.00	31.00
	47.50	56.00	65.00	73.00	83.00	86.00	90.00	93.50	
OUTFLOW	0.00	88.00	305.00	560.00	840.00	1160.00	1535.00	1800.00	2000.00
	2400.00	2600.00	2800.00	2960.00	3080.00	4500.00	8465.00	12900.00	
STAGE	546.00	549.00	552.00	555.00	558.00	561.00	564.00	567.00	570.00
	576.00	579.00	582.00	585.00	588.00	589.00	590.00	591.00	
FLOW	0.00	88.00	305.00	560.00	840.00	1160.00	1535.00	1800.00	2000.00
	2400.00	2600.00	2800.00	2960.00	3080.00	4500.00	8465.00	12900.00	

MAXIMUM STAGE IS 564.5

MAXIMUM STAGE IS 577.1

MAXIMUM STAGE IS 588.4

MAXIMUM STAGE IS 589.0

MAXIMUM STAGE IS 589.2

MAXIMUM STAGE IS 589.7

MAXIMUM STAGE IS 590.1

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HYDROGRAPH ROUTING

ROUTE TO ROUTE 120 (DOWNSTREAM HAZARD)

ISTAQ	ICOPP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
900	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
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0800	0.0350	0.0800	515.0	540.0	1300.	0.01400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 540.00 195.00 530.00 352.00 519.00 364.00 515.00 376.00 515.00
388.00 519.00 600.00 530.00 1000.00 540.00

STORAGE	0.00	0.63	1.56	2.81	5.02	8.96	14.64	22.05	31.19
	54.67	69.01	85.24	103.95	125.22	149.04	175.43	204.37	235.87
OUTFLOW	0.00	107.96	394.17	883.75	1776.16	3094.91	4944.92	7419.06	10601.65
	19402.34	25165.81	31658.70	39223.68	48150.93	58520.16	70419.14	83937.88	99166.28
STAGE	515.00	516.32	517.63	518.95	520.26	521.58	522.89	524.21	525.53
	526.16	529.47	530.79	532.11	533.42	534.74	536.05	537.37	538.68

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 FLOW          0.00      107.96      394.17      883.75     1776.18     3094.91     4944.92     7419.06    10601.65
           19402.34    25165.81    31658.70    39223.68    48150.93    58520.16    70419.14    83937.88    99166.28

MAXIMUM STAGE IS      520.0

MAXIMUM STAGE IS      521.0

MAXIMUM STAGE IS      521.9

MAXIMUM STAGE IS      522.5

MAXIMUM STAGE IS      523.0

MAXIMUM STAGE IS      524.0

MAXIMUM STAGE IS      524.7

              **********          **********          **********          **********          **********
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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	RATIOS APPLIED TO FLOWS RATIO 1 0.20	RATIO 2 0.30	RATIO 3 0.40	RATIO 4 0.50	RATIO 5 0.60	RATIO 6 0.80	RATIO 7 1.00
HYDROGRAPH AT	100	1.11	1	450.	674.	899.	1124.	1349.	1798.	2248.
	(	2.87)	(	12.73)(	19.10)(	25.46)(	31.83)(	38.20)(	50.93)(	63.66)(
ROUTED TO	200	1.11	1	450.	675.	900.	1125.	1350.	1801.	2251.
	(	2.87)	(	12.75)(	19.12)(	25.49)(	31.67)(	38.24)(	50.99)(	63.74)(
HYDROGRAPH AT	200	0.42	1	199.	298.	398.	497.	597.	796.	995.
	(	1.08)	(	5.63)(	8.45)(	11.27)(	14.08)(	16.90)(	22.54)(	28.17)(
2 COMBINED	200	1.52	1	632.	949.	1265.	1581.	1899.	2532.	3166.
	(	3.95)	(	17.90)(	26.87)(	35.82)(	44.78)(	53.76)(	71.69)(	89.64)(
ROUTED TO	300	1.52	1	631.	947.	1263.	1579.	1896.	2530.	3163.
	(	3.95)	(	17.87)(	26.82)(	35.76)(	44.71)(	53.70)(	71.64)(	89.56)(
HYDROGRAPH AT	300	0.30	1	131.	197.	262.	328.	393.	525.	656.
	(	0.78)	(	3.71)(	5.57)(	7.43)(	9.28)(	11.14)(	14.85)(	18.57)(
HYDROGRAPH AT	400	1.09	1	426.	639.	852.	1065.	1278.	1704.	2130.
	(	2.83)	(	12.06)(	18.10)(	24.13)(	30.16)(	36.19)(	48.26)(	60.32)(
3 COMBINED	300	2.92	1	1181.	1773.	2364.	2955.	3548.	4731.	5915.
	(	7.55)	(	33.45)(	50.20)(	66.94)(	83.68)(	100.46)(	133.98)(	167.49)(
ROUTED TO	600	2.92	1	1182.	1772.	2364.	2954.	3546.	4728.	5911.
	(	7.55)	(	33.46)(	50.19)(	66.93)(	83.65)(	100.41)(	133.89)(	167.38)(
HYDROGRAPH AT	500	0.57	1	225.	338.	451.	563.	676.	901.	1127.
	(	1.48)	(	6.38)(	9.57)(	12.76)(	15.95)(	19.14)(	25.52)(	31.90)(
ROUTED TO	600	0.57	1	224.	337.	449.	561.	673.	898.	1123.
	(	1.48)	(	6.35)(	9.53)(	12.71)(	15.89)(	19.07)(	25.43)(	31.79)(
HYDROGRAPH AT	600	0.36	1	155.	233.	310.	388.	465.	620.	775.
	(	0.93)	(	4.39)(	6.58)(	8.78)(	10.97)(	13.17)(	17.56)(	21.95)(
5 COMBINED	600	3.85	1	1556.	2333.	3111.	3889.	4668.	6223.	7779.

		(9.97)	(44.05)(	66.07)(	88.09)(	110.14)(	132.19)(	176.20)(	220.27)(
ROUTED TO	701	3.85	1 1557.	2336.	3114.	3893.	4672.	6229.	7787.
		(9.97)	(44.08)(	66.14)(	88.17)(	110.23)(	132.30)(	176.39)(	220.50)(
HYDROGRAPH AT	701	0.40	1 202.	302.	403.	504.	605.	807.	1008.
		(1.04)	(5.71)(	8.56)(	11.42)(	14.27)(	17.13)(	22.84)(	28.55)(
2 COMBINED	701	4.25	1 1726.	2590.	3455.	4323.	5189.	6921.	8653.
		(11.01)	(48.88)(	73.35)(	97.83)(	122.41)(	146.93)(	195.99)(	245.03)(
ROUTED TO	700	4.25	1 1631.	2588.	3452.	4318.	5182.	6908.	8638.
		(11.01)	(46.17)(	73.28)(	97.76)(	122.26)(	146.74)(	195.61)(	244.59)(
ROUTED TO	800	4.25	1 1618.	2473.	3594.	4559.	5321.	7097.	8767.
		(11.01)	(45.80)(	70.03)(	101.76)(	129.11)(	150.68)(	200.97)(	248.26)(
ROUTED TO	900	4.25	1 1617.	2471.	3516.	4353.	5215.	6980.	8686.
		(11.01)	(45.79)(	69.98)(	99.58)(	123.27)(	147.67)(	197.66)(	245.97)(

PLAN 1 STATION 200

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	450.	1002.4	42.00
0.30	675.	1003.0	42.00
0.40	900.	1003.4	42.00
0.50	1125.	1003.8	42.00
0.60	1350.	1004.2	42.00
0.80	1801.	1004.7	42.00
1.00	2251.	1005.3	42.00

PLAN 1 STATION 300

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	631.	1002.8	41.75
0.30	947.	1003.4	41.75
0.40	1263.	1004.0	41.75
0.50	1579.	1004.4	41.75
0.60	1896.	1004.8	41.75
0.80	2530.	1005.5	41.75
1.00	3163.	1006.1	41.75

PLAN 1 STATION 600

	MAXIMUM	MAXIMUM	TIME

RATIO	FLOW,CFS	STAGE,FT	HOURS
0.20	1182.	1004.3	42.00
0.30	1772.	1005.3	42.00
0.40	2364.	1006.0	42.00
0.50	2954.	1006.7	42.00
0.60	3546.	1007.3	42.00
0.80	4728.	1008.4	41.75
1.00	5911.	1009.4	41.75

PLAN 1 STATION 600

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	224.	1001.7	42.25
0.30	337.	1002.1	42.25
0.40	449.	1002.5	42.25
0.50	561.	1002.8	42.25
0.60	673.	1003.0	42.25
0.80	898.	1003.5	42.25
1.00	1123.	1004.0	42.25

PLAN 1 STATION 701

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	1557.	1005.4	42.00
0.30	2336.	1006.6	42.00
0.40	3114.	1007.6	42.00
0.50	3893.	1008.4	42.00
0.60	4672.	1009.2	42.00
0.80	6229.	1010.5	42.00
1.00	7787.	1011.7	42.00

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	565.00	585.00	591.00
STORAGE	165.	165.	255.
OUTFLOW	0.	0.	1800.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	590.22	0.00	241.	1631.	0.00	42.50	0.00
0.30	591.56	0.56	266.	2588.	2.75	42.00	0.00
0.40	591.95	0.95	273.	3452.	4.00	42.00	0.00
0.50	592.28	1.28	279.	4318.	5.00	42.00	0.00
0.60	592.58	1.58	285.	5182.	5.75	42.00	0.00
0.80	593.10	2.10	295.	6908.	7.00	42.00	0.00
1.00	593.58	2.58	302.	8638.	8.00	41.75	0.00

PLAN 1 STATION 800

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	1618.	564.9	42.75
0.30	2473.	577.1	42.50
0.40	3594.	588.4	42.25
0.50	4559.	589.0	41.50
0.60	5321.	589.2	42.00
0.80	7097.	589.7	42.00
1.00	8767.	590.1	42.00

PLAN 1 STATION 900

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	1617.	520.0	42.75
0.30	2471.	521.0	42.50
0.40	3516.	521.9	42.25
0.50	4353.	522.5	42.25
0.60	5215.	523.0	41.75
0.80	6960.	524.0	41.75
1.00	8686.	524.7	41.75

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(0001)   A1        MARCY RESERVOIR   FILE IS ABQZ-1
(0002)   A2        HEC-1DB   (SNYDER PARAMETERS)
(0003)   A3        0.5 PMF - DAMBREAK ANALYSIS
(0004)   B     300        0       10        0        0        0        0        0        4        0
(0005)   B1      0        0        0        0        0        0        0        0        0        0
(0006)   J       3        1        1        0        0        0        0        0        0        0
(0007)   J1    0.5
(0008)   K       0      100        0        0        0        0        1        0        0        0
(0009)   K1        RUNOFF SUBAREA 1
(0010)   M       1        1    1.108        0     4.25        0        0        0        1        0
(0011)   P       0     19.4      111      123      133      142        0        0        0        0
(0012)   T       0        0        0        0        0        0      1.0      0.1        0        0
(0013)   W    2.25    0.625        0        0        0        0        0        0        0        0
(0014)   X    -2.0    -0.10      1.6        0        0        0        0        0        0        0
(0015)   K       1      200        0        0        0        0        1        0        0        0
(0016)   K1        ROUTE SUBAREA 2
(0017)   Y       0        0        0        1        1        0        0        0        0        0
(0018)   Y1      1        0        0        0        0        0       -1        0        0        0
(0019)   Y6  0.060    0.035    0.060     1000     1025     4410    0.034        0        0        0
(0020)   Y7    100     1025      150     1004      160     1002      164     1000      174     1000
(0021)   Y7    175     1002      188     1004      240     1025        0        0        0        0
(0022)   K       0      200        0        0        0        0        1        0        0        0
(0023)   K1        RUNOFF SUBAREA 2
(0024)   M       1        1    0.416        0     4.25        0        0        0        1        0
(0025)   P       0     19.4      111      123      133      142        0        0        0        0
(0026)   T       0        0        0        0        0        0      1.0      0.1        0        0
(0027)   W    1.65    0.625        0        0        0        0        0        0        0        0
(0028)   X    -2.0    -0.10      1.6        0        0        0        0        0        0        0
(0029)   K       2      200        0        0        0        0        1        0        0        0
(0030)   K1        COMBINE 2 HYDROGRAPHS 1+2=2
(0031)   K       1      300        0        0        0        0        1        0        0        0
(0032)   K1        ROUTE TO SUBAREA 3
(0033)   Y       0        0        0        1        1        0        0        0        0        0
(0034)   Y1      1        0        0        0        0        0       -1        0        0        0
(0035)   Y6  0.060    0.035    0.060     1000     1025     7300    0.024        0        0        0
(0036)   Y7    100     1025      150     1005      160     1003      166     1000      171     1000
(0037)   Y7    187     1003      197     1005      250     1025        0        0        0        0
(0038)   K       0      300        0        0        0        0        1        0        0        0
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[illegible]	K1		RUNOFF SUBAREA 3								
[illegible]	M	1	1	0.302	0	4.25	0	0	0	1	
[illegible]	P		19.4	111	123	133	142	0	0		
[illegible]	T		0	0	0	0	0	1.0	0.1	0	0
(0043)	W	1.95	0.625	0	0	0	0	0	0	0	0
(0044)	X	-2.0	-0.10	1.6	0	0	0	0	0	0	0
(0045)	K		400	0	0	0	0	1	0	0	0
(0046)	K1		RUNOFF SUBAREA 4								
(0047)	M	1	1	1.091	0	4.25	0	0	0	1	0
(0048)	P		19.4	111	123	133	142	0	0	0	0
(0049)	T		0	0	0	0	0	1.0	0.1	0	0
(0050)	W	2.42	0.625	0	0	0	0	0	0	0	0
(0051)	X	-2.0	-0.10	1.6	0	0	0	0	0	0	0
(0052)	K	3	300	0	0	0	0	1	0	0	0
(0053)	K1		COMBINE 3 HYDROGRAPHS 2+3+4=3								
(0054)	K	1	600	0	0	0	0	1	0	0	0
(0055)	K1		ROUTE TO SUBAREA 6 OUTLET								
(0056)	Y	0	0	0	1	1	0	0	0	0	0
(0057)	Y1	1	0	0	0	0	0	-1	0	0	0
(0058)	Y6	[illegible]	0.035	0.060	1000	1025	1400	0.014	0	0	0
(0059)	Y7	[illegible]	1025	157	1005	160	1003	166	1000	161	1000
(0060)	Y7	187	1003	197	1005	250	1025	0	0	0	0
(0061)	K	0	500	0	0	0	0	1	0	0	0
(0062)	K1		RUNOFF SUBAREA 5								
(0063)	M	1	1	0.573	0	4.25	0	0	0	1	0
(0064)	P		19.4	111	123	133	142	0	0	0	0
(0065)	T		0	0	0	0	0	1.0	0.1	0	0
(0066)	W	2.41	0.625	0	0	0	0	0	0	0	0
(0067)	X	-2.0	-0.10	1.6	0	0	0	0	0	0	0
(0068)	K	1	600	0	0	0	0	1	0	0	0
(0069)	K1		ROUTE TO SUBAREA 6								
(0070)	Y	0	0	0	1	1	0	0	0	0	0
(0071)	Y1	1	0	0	0	0	0	-1	0	0	0
(0072)	Y6	[illegible]	0.035	[illegible]	1000	1025	750	0.037	0	0	0
(0073)	Y7	[illegible]	1025	150	1004	160	1002	164	1000	174	1000
(0074)	Y7	175	1002	[illegible]	1004	240	1025	0	0	0	0
(0075)	K	0	600	0	0	0	0	1	0	0	0
(0076)	K1		RUNOFF SUBAREA 6								

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(0077)   M      1        1    0.354        0     4.25        0        0        0        1        0
(0078)   P      3     19.4      111      123      133      142        0        0        0        0
(0079)   T      0        0        0        0        0        0     1.0      0.1        0        0
(0080)   W   2.04    0.625        0        0        0        0        0        0        0        0
(0081)   X   -2.0    -0.10      1.6        0        0        0        0        0        0        0
(0082)   K      3      600        .        0        0        0        1        0        0        0
(0083)   K1        COMBINE 3 HYDROGRAPHS @ 600  5+6+3=3
(0084)   K      1      701        0        0        0        0        1        0        0        0
(0085)   K1        ROUTE TO RESERVOIR
(0086)   Y         N        0        0        1        1        2        0        0        0        0
(0087)   Y1     1.0        0        0        0        0        0       -1        0        0        0
(0088)   Y6   0.06        0    0.035    0.060     1000     1025     2100   0.0095        0        0        0
(0089)   Y7     100     1025      150     1005      160     1003      166     1000      181     1000
(0090)   Y7     187     1003      197     1005      250     1025        0        0        0        0
(0091)   K        .      701        0        0        0        0        1        0        0        0
(0092)   K1        RUNOFF SUBAREA 7
(0093)   M      1        1    0.402        0     4.25        0        0        0        1        0
(0094)   P      3     19.4      111      123      133      142        0        0        0        0
(0095)   T      0        0        0        0        0        0     1.0      0.1        0      0.05
(0096)   W   1.51    0.625        0        0        0        0        0        0        0        0
(0097)   X   -2..    -0.10      1.6        0        0        0        0        0        0        0
(0098)   K      2      701        .        0        0        0        1        0        0        0
(0099)   K1        COMBINE 2 HYDROGRAPHS - TOTAL RESERVOIR INFLOW
(0100)   K      1      700        0        0        0        0        1        0        0        0
(0101)   K1        ROUTE THRU RESERVOIR AND OVER SPILLWAY
(0102)   Y         N        0        0        1        1        2        0        0        0        0
(0103)   Y1     1.0        0        0        0        0        0     -585       -1        0        0
(0104)   Y4   585.0    585.25    585.5    585.75    586.0    586.5    587.0    587.5    588.0    588.5
(0105)   Y4   589.0    589.5    591.0    592.0    593.0        0        0        0        0        0
(0106)   Y5        .       15       42       80      125      240      385      555      755      970
(0107)   Y5   1210        1475     1850     2180     2640        0        0        0        0        0
(0108)   $S        3      0.1        9       26       58      110      165      178      192      206
(0109)   $S     221      237      255      293      358
(0110)   $E     556      565      566      570      575      587      585      586      587      588
(0111)   $E     589      592      591      593      597
(0112)   $$     565        0        0        0        0        0        0        0        0        0
(0113)   $D     591     2.65      1.5      522        0        1        0        0        0        0
(0114)   $B      42        7      558      0.2      585   592.27
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(C115)   $B     42        0      558      0.3      585   592.27
(C116)   $B     42        0      558      0.5      585   592.27
(C117)   K       1      800        0        0        0        0        1
(C118)   K1        ROUTE TO RR BRIDGE
(C119)   Y         0        0        0        1        1
(C120)   Y1        1        0        0        0        0        0       -1
(C121)   Y6  0.080    0.035    0.060      546      580      370    0.014
(C122)   Y7    100      580      115      570      130      550      146      546      186      546
(C123)   Y7    202      550      285      554      330      580
(C124)   K       1      900        0        0        0        2        1
(C125)   K1        ROUTE TO ROUTE 12C (DOWNSTREAM HAZARD)
(C126)   Y         0        0        0        1        1
(C127)   Y1        1        0        0        0        0        0       -1
(C128)   Y6  0.080    0.035    0.060      515      540     1300    0.014
(C129)   Y7    100      540      195      530      352      519      364      515      376      515
(C130)   Y7    388      519      600      530     1000      540
(C131)   K      99        0        0        0        0        0        0        0        0        0
(C132)   A
(C133)   A
(C134)   A
(C135)   A
(C136)   A
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PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS
        RUNOFF HYDROGRAPH AT          100
        ROUTE HYDROGRAPH TO           200
        RUNOFF HYDROGRAPH AT          200
        COMBINE  2 HYDROGRAPHS AT     200
        ROUTE HYDROGRAPH TO           300
        RUNOFF HYDROGRAPH AT          300
        RUNOFF HYDROGRAPH AT          400
        COMBINE  3 HYDROGRAPHS AT     300
        ROUTE HYDROGRAPH TO           600
        RUNOFF HYDROGRAPH AT          500
        ROUTE HYDROGRAPH TO           600
        RUNOFF HYDROGRAPH AT          600
        COMBINE  3 HYDROGRAPHS AT     600
        ROUTE HYDROGRAPH TO           701
        RUNOFF HYDROGRAPH AT          701
        COMBINE  2 HYDROGRAPHS AT     701
        ROUTE HYDROGRAPH TO           700
        ROUTE HYDROGRAPH TO           800
        ROUTE HYDROGRAPH TO           900
        END OF NETWORK
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  ******************************
 .JOD HYDROGRAPH PACKAGE (HEC-1)
  4 SAFETY VERSION      JULY 1978
 .AST MODIFICATION  26 FEB 79
 ******************************

 (  DATE?MON, MAR 09 1981
    TIME?16:47:57

                    MARCY RESERVOIR  FILE IS ABQZ-1
                    HEC-1DB  (SNYDER PARAMETERS)
                    0.5 PMF - DAMBREAK ANALYSIS

                                JOB SPECIFICATION
          NQ      NHR     NMIN     IDAY     IHR     IMIN    METRC     IPLT     IPRT    NSTAN
         300       0       10        0       0        0        0        0        4        0
                                   JOPER      NW     LROPT    TRACE
                                       5       0        0        0

                              MULTI-PLAN ANALYSES TO BE PERFORMED
                                  NPLAN= 3 NRTIO= 1 LRTIO= 1
                    RTIOS=    1.50

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

                                SUB-AREA RUNOFF COMPUTATION

                    RUNOFF SUBAREA 1
                            ISTAQ   ICOMP   IECON   ITAPE   JPLT    JPRT    INAME   ISTAGE   IAUTO
                              1.0       0       0       0       0       0       1        0       0

                                HYDROGRAPH DATA
              IHYDG    IUHG    TAREA    SNAP    TRSDA    TRSPC    RATIO   ISNOW   ISAME   LOCAL
                  1       1     1.11    0.00     4.25     0.00    0.000       0       1

                                PRECIP DATA
                        SPFE     PMS      R6      R12      R24      R48      R72      R96
                        0.00   19.40   111.00   123.00   133.00   142.00     0.00     0.00
 PC COMPUTED BY THE PROGRAM IS 0.800

                                LOSS DATA
          LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
              0    0.00    0.00    1.50    0.00    0.00    1.00    1.50    0.10    0.00    0.00

                              UNIT HYDROGRAPH DATA
                          TP=  2.25    CP=0.63    NTA=  0
```

```
                                   RECESSION DATA
                         STRTG=   -2.00    QRCSN=   -0.10    RTIOR= 1.60

         UNIT HYDROGRAPH 74 END-OF-PERIOD ORDINATES, LAG=   2.24 HOURS, CP= 0.63  VOL= 1.00
          4.        15.        32.        50.        71.        93.       116.       139.       161.       178.
        191.       201.       206.       206.       203.       188.       173.       160.       148.       136.
        124.       116.       107.        99.        91.        84.        77.        71.        66.        61.
         56.        52.        48.        44.        41.        37.        35.        32.        29.        27.
         25.        23.        21.        20.        18.        17.        15.        14.        13.        12.
         11.        10.         9.         9.         8.         7.         7.         6.         6.         5.
          5.         5.         4.         4.         4.         3.         3.         3.         3.         2.
          2.         2.         2.         2.

                                     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  22.04  18.36   3.68   77764.
                                                                        ( 560.)( 466.)(  94.)( 2202.03)


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

                                     HYDROGRAPH ROUTING

                ROUTE SUBAREA 2
                         ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                           200       1       0       0       0       0       1       0       0

                                    ALL PLANS HAVE SAME
                                        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
                             1       0       0   0.000   0.000   0.000     -1.       0


NORMAL DEPTH CHANNEL ROUTING
--------------------------

       QN(1)   QN(2)   QN(3)   ELNVT   ELMAX   RLNTH     SEL
      0.0600  0.0350  0.0600  1000.0  1025.0   4400. 0.03400

       CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
        1.00 1025.00  150.00 1004.00  160.00 1002.00  164.00 1000.00  174.00 1000.00
      176.00 1002.00  180.00 1004.00  240.00 1025.00
```

STORAGE	0.00	1.68	4.18	8.28	13.72	20.01	27.15	35.14	43.98
	64.23	75.59	87.82	100.91	114.84	129.62	145.25	161.73	179.06
OUTFLOW	0.00	134.45	507.34	1187.31	2212.07	3563.25	5246.98	7275.00	9660.87
	15563.79	19110.27	23073.11	27467.04	32306.62	37606.34	43380.53	49643.35	56408.83
STAGE	1000.00	1001.32	1002.63	1003.95	1005.26	1006.58	1007.89	1009.21	1010.53
	1013.16	1014.47	1015.79	1017.10	1018.42	1019.74	1021.05	1022.37	1023.68
FLOW	0.00	134.45	507.34	1187.31	2212.07	3563.25	5246.98	7275.00	9660.87
	15563.79	19110.27	23073.11	27467.04	32306.62	37606.34	43380.53	49643.35	56408.83

MAXIMUM STAGE IS 1003.8

MAXIMUM STAGE IS 1003.8

MAXIMUM STAGE IS 1003.8

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
230	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.42	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

RSPC COMPUTED BY THE PROGRAM IS 0.000

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.65 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.00

UNIT HYDROGRAPH 55 END-OF-PERIOD ORDINATES, LAG= 1.65 HOURS, CP= 0.63 VOL= 1.00

5.	12.	24.	38.	54.	69.	84.	94.	101.	104.
102.	95.	85.	76.	69.	62.	55.	50.	44.	40.
36.	32.	29.	26.	23.	21.	19.	17.	15.	13.

14.	11.	10.	9.	8.	7.	6.	6.	5.	5.
4.	4.	3.	3.	3.	2.	2.	2.	2.	2.
1.	1.	1.	1.	1.					

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	22.04	18.36	3.68	29805.
										(560.)(466.)(94.)(843.98)			

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COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS 1+2=2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
200	2	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

ROUTE TC SUBAREA 3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
300	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME 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
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

GN(1)	GN(2)	GN(3)	ELMVT	ELMAX	RLNTH	SEL
0.040	0.035	0.060	1030.0	1025.0	7300.	0.02400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.0	1025.0	157.0	1025.0	160.0	1023.0	166.0	1025.00	181.00	1030.00
187.0	1030.0	197.0	1025.0	257.0	1025.00				

STORAGE	0.00	3.89	8.94	15.59	25.06	36.47	49.37	63.76	79.65
	115.92	136.29	156.15	181.51	206.37	232.72	260.56	289.89	320.72
OUTFLOW	0.00	164.09	556.68	1256.73	2294.79	3679.46	5397.54	7455.82	9864.17
	15776.43	19304.31	23229.73	27565.05	32322.67	37514.90	43154.02	49252.20	55821.58
STAGE	1000.00	1001.32	1002.63	1003.95	1005.26	1006.58	1007.89	1009.21	1010.53
	1013.16	1014.47	1015.79	1017.10	1018.42	1019.74	1021.05	1022.37	1023.68
FLOW	0.00	164.09	556.68	1256.73	2294.79	3679.46	5397.54	7455.82	9864.17
	15776.43	19304.31	23229.73	27565.05	32322.67	37514.90	43154.02	49252.20	55821.58

MAXIMUM STAGE IS 1004.4

MAXIMUM STAGE IS 1004.4

MAXIMUM STAGE IS 1004.4

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 3

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
300	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.30	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

RSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
1	0.50	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.98 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 66 END-OF-PERIOD ORDINATES, LAG= 1.98 HOURS, CP= 0.63 VOL= 1.00

2.	6.	11.	16.	20.	34.	42.	49.	55.	59.
62.	63.	62.	59.	54.	49.	45.	41.	37.	34.
31.	29.	27.	24.	22.	21.	18.	17.	15.	14.

13.	12.	11.	10.	9.	8.	7.	7.	6.	6.
5.	5.	4.	4.	4.	3.	3.	3.	2.	2.
2.	2.	2.	2.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.				

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	22.04	18.36	3.68	21383.
										(560.)	(466.)	(94.)	(605.50)

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
400	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.09	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.600

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
2	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.42 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 87 END-OF-PERIOD ORDINATES, LAG= 2.41 HOURS, CP= 0.63 VOL= 1.00

5.	13.	26.	42.	59.	78.	97.	117.	136.	153.
167.	177.	185.	189.	189.	184.	175.	161.	149.	139.
129.	119.	111.	103.	95.	88.	82.	76.	71.	66.
61.	56.	52.	49.	45.	42.	39.	36.	33.	31.
29.	27.	25.	23.	21.	20.	18.	17.	16.	15.
14.	13.	12.	11.	10.	9.	9.	8.	8.	7.
7.	6.	6.	5.	5.	4.	4.	4.	4.	3.
3.	3.	3.	2.	2.	2.	2.	2.	2.	2.

END-OF-PERIOD FLO

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	22.04	18.36	3.68	76064.
										(560.)	(466.)	(94.)	(2153.89)

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COMBINE HYDROGRAPHS

COMBINE 3 HYDROGRAPHS 2+3+4=3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
300	3	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

ROUTE TO SUBAREA 6 OUTLET

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
600	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	3	0	0

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

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.060	0.035	0.060	1000.0	1025.0	1400.	0.01400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00 1025.00 150.00 1005.00 160.00 1003.00 166.00 1000.00 181.00 1000.00
187.00 1003.00 197.00 1005.00 250.00 1025.00

STORAGE	0.00	0.75	1.71	2.99	4.61	6.99	9.47	12.23	15.26
	22.23	26.14	30.33	34.81	39.58	44.63	49.97	55.60	61.51
OUTFLOW	0.00	163.32	425.17	959.84	1752.00	2810.23	4122.44	5694.47	7533.86
	12649.45	14743.91	17742.00	21053.14	24666.05	28652.46	32959.43	37614.99	42654.44

STAGE	1000.00	1001.32	1002.63	1003.95	1005.26	1006.58	1007.89	1009.21	1010.53
	1011.16	1014.47	1015.79	1017.10	1018.42	1019.74	1021.05	1022.37	1023.68
FLOW	0.00	125.32	425.17	959.84	1752.66	2810.23	4122.44	5694.47	7533.88
	12049.45	14743.91	17742.00	21053.16	24686.85	28652.48	32959.43	37616.99	42634.44

MAXIMUM STAGE IS 1006.7

MAXIMUM STAGE IS 1006.7

MAXIMUM STAGE IS 1006.7

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA S

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
500	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	3.57	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

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	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.41 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 8- END-OF-PERIOD ORDINATES, LAG= 2.40 HOURS, CP= 0.63 VOL= 1.00

2.	7.	14.	22.	31.	41.	52.	62.	72.	81.
88.	94.	98.	100.	99.	97.	91.	84.	78.	73.
67.	62.	58.	54.	50.	46.	43.	40.	37.	34.
32.	29.	27.	25.	24.	22.	20.	19.	17.	16.
15.	14.	13.	12.	11.	10.	10.	9.	8.	8.
7.	7.	6.	6.	5.	5.	5.	4.	4.	4.
3.	3.	3.	3.	2.	2.	2.	2.	2.	2.
2.	1.	1.	1.	1.	1.	1.	1.	1.	1.

0 MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	END-OF-PERIOD FLOW COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	22.04	18.36	3.68	39956.
										(560.)	(466.)	(94.)	(1131.43)

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HYDROGRAPH ROUTING

ROUTE TO SUBAREA 6

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
600	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME
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
1	0	0	0.000	0.000	0.000	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0600	0.0350	0.0600	1000.0	1025.0	7500.	0.03000

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
100.00 1025.00 150.00 1004.00 160.00 1002.00 164.00 1000.00 174.00 1000.00
178.00 1002.00 188.00 1004.00 240.00 1025.00

STORAGE	0.00	2.86	7.12	14.12	23.39	34.11	46.28	59.90	74.96
	109.43	128.84	149.69	172.00	195.74	220.94	247.59	275.68	305.22
OUTFLOW	0.00	126.29	476.56	1115.28	2077.86	3347.09	4928.68	6833.67	9074.81
	14619.64	17950.97	21673.42	25800.79	30346.79	35325.02	40748.92	46631.81	52986.88
STAGE	1000.00	1001.32	1002.63	1003.95	1005.26	1006.58	1007.89	1009.21	1010.53
	1013.16	1014.47	1015.79	1017.10	1018.42	1019.74	1021.05	1022.37	1023.68
FLOW	0.00	126.29	476.56	1115.28	2077.86	3347.09	4928.68	6833.67	9074.81
	14619.64	17950.97	21673.42	25800.79	30346.79	35325.02	40748.92	46631.81	52986.88

MAXIMUM STAGE IS 1 02[illegible]

MAXIMUM STAGE IS 1002.8

MAXIMUM STAGE IS 1002.8

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 6

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
600	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.36	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.600

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
2	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 2.04 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

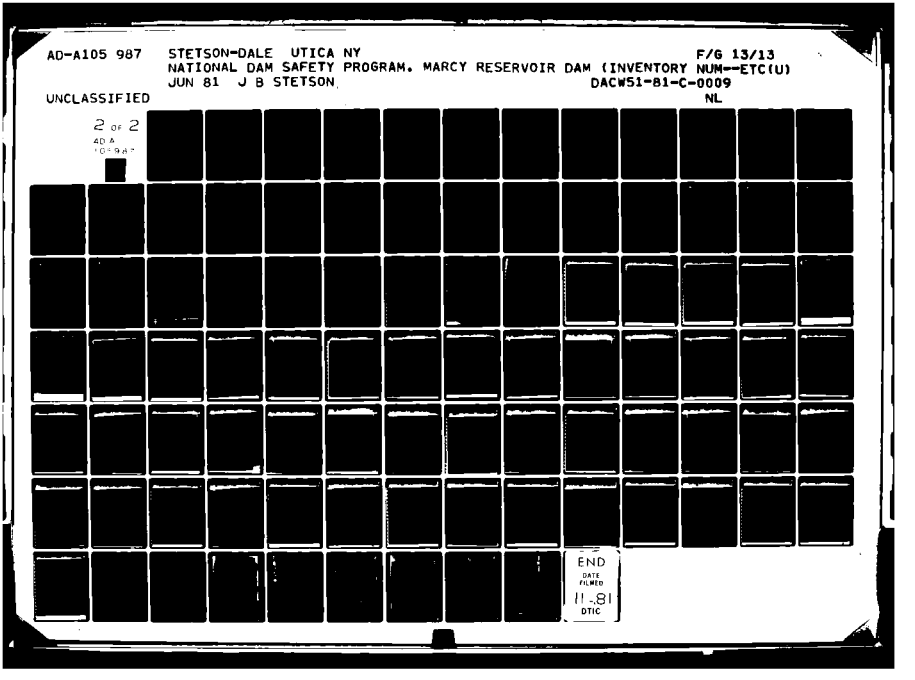
UNIT HYDROGRAPH 67 END-OF-PERIOD ORDINATES, LAG= 2.04 HOURS, CP= 0.63 VOL= 1.00

2.	6.	13.	21.	29.	38.	47.	56.	63.	68.
72.	74.	73.	70.	64.	59.	54.	49.	45.	41.
38.	35.	32.	29.	26.	24.	22.	20.	19.	17.
16.	14.	13.	12.	11.	10.	9.	8.	6.	7.
6.	6.	5.	5.	4.	4.	4.	3.	3.	3.
3.	2.	2.	2.	2.	2.	2.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.			

C

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	22.04	18.36	3.68	25390.
										(560.)(466.)(94.)(718.96)			


AD-A105 987
STETSON-DALE UTICA NY
F/G 13/13
NATIONAL DAM SAFETY PROGRAM. MARCY RESERVOIR DAM (INVENTORY NUM--ETC(U)
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COMBINE HYDROGRAPHS

COMBINE 3 HYDROGRAPHS @ 600 5+6+3=3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
600	3	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

ROUTE TO RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
701	1	0	0	0	0	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.00	-1.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0600	0.0350	0.0600	1000.0	1025.0	2100.	0.00950

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
100.00 1025.00 150.00 1005.00 160.00 1003.00 166.00 1000.00 181.00 1000.00
187.00 1003.00 197.00 1005.00 250.00 1025.00

STORAGE	0.00	1.12	2.57	4.49	7.21	10.49	14.20	18.34	22.91
	33.35	39.21	45.50	52.22	59.37	64.95	74.95	83.39	92.26
OUTFLOW	0.00	103.24	350.24	790.67	1443.78	2314.94	3395.87	4690.85	6206.07
	9925.78	12145.36	14615.05	17342.63	20335.90	23602.61	27150.47	30987.16	35120.30
STAGE	1000.00	1001.32	1002.63	1003.95	1005.26	1006.58	1007.89	1009.21	1010.53
	1011.16	1014.47	1015.79	1017.10	1018.42	1019.74	1021.05	1022.37	1023.68
FLOW	0.00	103.24	350.24	790.67	1443.78	2314.94	3395.87	4690.85	6206.07
	9925.78	12145.36	14615.05	17342.63	20335.90	23602.61	27150.47	30987.16	35120.30

MAXIMUM STAGE IS 1008.4

MAXIMUM STAGE IS 1008.4

MAXIMUM STAGE IS 1008.4

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SUB-AREA RUNOFF COMPUTATION

RUNOFF SUBAREA 7

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
701	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	0.40	0.00	4.25	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	19.40	111.00	123.00	133.00	142.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.800

LOSS DATA

LKOPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
1	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 1.51 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= -2.00 QRCSN= -0.10 RTIOR= 1.60

UNIT HYDROGRAPH 50 END-OF-PERIOD ORDINATES, LAG= 1.50 HOURS, CP= 0.63 VOL= 1.00

4.	15.	30.	47.	65.	83.	97.	106.	111.	109.
101.	89.	79.	70.	62.	55.	49.	43.	39.	34.
30.	27.	24.	21.	19.	17.	15.	13.	12.	10.
9.	8.	7.	6.	6.	5.	4.	4.	3.	3.
3.	2.	2.	2.	2.	2.	1.	1.	1.	1.

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	22.04	18.54	3.50	29219.
										(560.)	(471.)	(89.)	(827.39)

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COMBINE HYDROGRAPHS

COMBINE 2 HYDROGRAPHS - TOTAL RESERVOIR INFLOW

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JFRT	INAME	ISTAGE	IAUTO
701	2	0	0	0	0	1	0	0

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HYDROGRAPH ROUTING

ROUTE THRU RESERVOIR AND OVER SPILLWAY

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JFRT	INAME	ISTAGE	IAUTO
700	1	0	0	3	0	1	0	0

ALL PLANS HAVE SAME 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
1	0	0	0.000	0.000	0.000	-585.	-1

STAGE	585.00	585.25	585.50	585.75	586.00	586.50	587.00	587.50	588.00
	589.00	589.50	591.00	592.00	593.00				
FLOW	0.00	15.00	42.00	80.00	125.00	240.00	385.00	555.00	755.00
	1210.00	1475.00	1800.00	2160.00	2640.00				
CAPACITY=	0.	0.	9.	26.	58.	110.	165.	178.	192.	206.
	221.	237.	255.	293.	358.				
ELEVATION=	584.	586.	586.	590.	595.	582.	585.	586.	587.	588.
	589.	590.	591.	593.	597.				

CREL	SPWID	COGW	EXPW	ELEVL	COQL	CAREA	EXPL
585.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
591.0	2.6	1.5	522.

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
42.	0.00	582.0	0.20	585.00	592.27

BEGIN DAM FAILURE AT 41.67 HOURS

PEAK OUTFLOW IS 1 514. AT TIME 41.87 HOURS

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
42.	0.00	558.00	0.30	585.00	592.27

BEGIN DAM FAILURE AT 41.67 HOURS

PEAK OUTFLOW IS 15560. AT TIME 41.96 HOURS

DAM BREACH DATA

BRWID	Z	ELBM	TFAIL	WSEL	FAILEL
42.	0.00	558.00	0.50	585.00	592.27

BEGIN DAM FAILURE AT 41.67 HOURS

PEAK OUTFLOW IS 12131. AT TIME 42.17 HOURS

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HYDROGRAPH ROUTING

ROUTE TO RR BRIDGE

ISTAQ	ICOPP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
8.0	1	0	0	1	2	1	0	0

ALL PLANS HAVE SAME ROUTING DATA

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

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

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0600	0.0350	0.0600	546.0	580.0	370.	0.01400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00	560.00	115.00	570.00	130.00	550.00	146.00	546.00	180.00	546.00
202.00	550.00	205.00	554.00	330.00	560.00				

STORAGE	0.00	0.72	1.65	2.91	4.74	7.09	9.56	12.10	14.71
	2.12	22.95	25.81	28.75	31.76	34.86	38.05	41.33	44.69

OUTFLOW	0.00	567.12	1943.51	4419.82	8079.71	13129.11	19526.77	27059.96	35656.68
	55655.88	67394.59	79862.17	93241.72	107506.89	122670.22	138740.06	155713.22	173588.03
STAGE	546.00	547.79	549.58	551.37	553.16	554.95	556.74	558.53	560.32
	562.89	565.68	567.47	569.26	571.05	572.84	574.63	576.42	578.21
FLOW	0.00	567.12	1943.51	4419.82	8079.71	13129.11	19526.77	27059.96	35656.68
	55655.88	67394.59	79862.17	93241.72	107506.89	122670.22	138740.06	155713.22	173588.03

AXIMUM STAGE IS 555.6

AXIMUM STAGE IS 555.1

AXIMUM STAGE IS 554.6

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HYDROGRAPH ROUTING

ROUTE TO ROUTE 12C (DOWNSTREAM HAZARD)

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
900	1	0	0	0	2	1	0	0

ALL PLANS HAVE SAME 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
1	0	0	0.000	0.000	0.000	-1.	0

CRMAL DEPTH CHANNEL ROUTING

QR(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0600	0.0350	0.0600	515.0	540.0	1300.	0.01400

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

100.00	540.00	195.00	530.00	352.00	519.00	364.00	515.00	376.00	515.00
388.00	519.00	600.00	530.00	1000.00	540.00				

STORAGE	0.00	0.63	1.56	2.81	5.32	8.96	14.64	22.05	31.19
	54.67	69.01	85.24	103.95	125.22	149.04	175.43	204.37	235.87
OUTFLOW	0.00	167.96	594.17	883.75	1776.19	3094.91	4944.96	7419.36	10601.65
	19422.34	25165.81	31650.79	39225.65	48150.93	58520.16	70419.14	83957.83	99166.26

STAGE	515.00	516.32	517.63	518.95	520.26	521.58	522.89	524.21	525.53
	528.16	529.47	530.79	532.10	533.42	534.74	536.05	537.37	538.68
FLOW	0.00	107.96	394.17	683.75	1776.18	3094.91	4944.92	7419.06	10601.65
	19402.34	25165.81	31658.70	39223.68	48150.93	58520.16	70419.14	83937.88	99166.28

STATION 900, PLAN 1, RTIO 1

OUTFLOW

0.	0.	1.	1.	1.	1.	1.	1.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	2.	3.	4.	4.	6.	7.	8.	10.
11.	13.	14.	16.	18.	21.	22.	24.	25.	26.
27.	27.	27.	27.	27.	26.	26.	25.	24.	23.
22.	21.	21.	20.	19.	18.	17.	16.	15.	15.
14.	14.	13.	13.	12.	12.	11.	11.	10.	10.
10.	9.	9.	8.	8.	8.	8.	7.	7.	7.
7.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	6.	6.	7.	8.	9.	11.
13.	17.	23.	30.	37.	47.	58.	70.	83.	97.
110.	125.	136.	151.	162.	173.	182.	191.	199.	206.
213.	219.	224.	230.	234.	239.	243.	248.	253.	261.
271.	286.	307.	336.	374.	429.	497.	579.	678.	777.
683.	991.	1108.	1229.	1348.	1460.	1531.	1587.	1661.	1747.
1998.	2480.	2899.	3190.	3464.	3713.	3931.	4102.	4224.	4299.
12201.	13636.	5242.	4369.	4102.	3965.	3920.	3664.	3614.	3355.
3269.	3020.	2870.	2596.	2474.	2266.	2135.	1948.	1830.	1660.
1562.	1428.	1346.	1231.	1155.	1061.	996.	918.	861.	798.
751.	700.	656.	614.	579.	544.	513.	482.	457.	433.
411.	389.	372.	347.	332.	318.	302.	289.	275.	263.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	2.	3.
3.	3.	3.	4.	4.	4.	4.	5.	5.	5.
6.	7.	8.	9.	10.	11.	12.	12.	12.	13.
36.	40.	16.	13.	12.	12.	11.	11.	11.	10.
9.	9.	8.	7.	7.	6.	6.	6.	5.	5.
4.	4.	4.	4.	3.	3.	3.	3.	3.	3.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.

STAGE

515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.1	515.1	515.1	515.1	515.1
515.1	515.2	515.2	515.2	515.2	515.3	515.3	515.3	515.3	515.3
515.3	515.3	515.3	515.3	515.3	515.3	515.3	515.3	515.3	515.3
515.3	515.3	515.3	515.2	515.2	515.2	515.2	515.2	515.2	515.2
515.2	515.2	515.2	515.2	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.2	515.2	515.3	515.4	515.5	515.6	515.7	515.9	516.0	516.2
516.3	516.4	516.5	516.5	516.6	516.6	516.7	516.7	516.7	516.8
516.8	516.8	516.9	516.9	516.9	516.9	516.9	517.0	517.0	517.0
517.1	517.1	517.2	517.4	517.5	517.7	517.9	518.1	518.4	518.7
518.9	519.1	519.3	519.5	519.6	519.8	519.9	520.0	520.1	520.2
520.5	521.0	521.4	521.6	521.8	522.0	522.2	522.3	522.4	522.4
520.1	520.5	523.1	522.5	522.3	522.2	522.2	522.0	521.9	521.8
521.7	521.5	521.4	521.1	521.0	520.8	520.6	520.4	520.3	520.1
519.9	519.7	519.6	519.5	519.3	519.2	519.1	519.[illegible]	51[illegible].9	518.7

518.6	518.5	518.3	518.2	518.1	518.0	517.9	517.9	517.8	517.7
517.7	517.6	517.5	517.4	517.3	517.3	517.2	517.1	517.1	517.0

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	13636.	3500.	1107.	535.	160424.
CMS	386.	99.	31.	15.	4543.
INCHES		7.66	9.69	9.75	9.75
MM		194.52	246.22	247.69	247.69
AC-FT		1735.	2197.	2210.	2210.
THOUS CU M		2141.	2709.	2726.	2726.

MAXIMUM STORAGE = 40.

MAXIMUM STAGE IS 526.5

STATION 900, PLAN 2, RTIO 1

OUTFLOW

0.	0.	1.	1.	1.	1.	1.	1.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	2.	3.	4.	4.	6.	7.	8.	10.
11.	13.	14.	16.	18.	21.	22.	24.	25.	26.
27.	27.	27.	27.	27.	26.	26.	25.	24.	23.
22.	21.	21.	20.	19.	18.	17.	16.	15.	15.
14.	14.	13.	13.	12.	12.	11.	11.	10.	10.
10.	9.	9.	8.	8.	8.	8.	7.	7.	7.
7.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	6.	6.	7.	8.	9.	11.
13.	17.	23.	30.	37.	47.	58.	73.	85.	97.
111.	125.	138.	151.	162.	173.	182.	191.	199.	206.
213.	219.	224.	230.	234.	239.	243.	246.	253.	261.
271.	286.	307.	336.	374.	429.	497.	579.	678.	777.
861.	991.	1108.	1229.	1348.	1463.	1561.	1587.	1661.	1747.
1948.	2480.	2699.	3190.	3464.	3713.	3951.	4102.	4224.	4299.
8696.	13472.	8515.	4097.	4255.	3959.	3876.	3720.	3559.	3406.
3224.	3059.	2835.	2626.	2448.	2286.	2116.	1965.	1813.	1676.
1548.	1441.	1335.	1240.	1147.	1068.	995.	922.	858.	801.
749.	702.	657.	616.	578.	545.	512.	483.	457.	433.
411.	390.	372.	347.	332.	316.	302.	289.	279.	263.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	2.	3.
3.	3.	3.	4.	4.	4.	4.	5.	5.	5.
6.	7.	8.	9.	10.	11.	12.	12.	12.	13.
26.	39.	25.	12.	13.	12.	11.	11.	10.	10.
9.	9.	8.	8.	7.	7.	6.	6.	5.	5.
4.	4.	4.	4.	3.	3.	3.	3.	3.	3.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.

STAGE

515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.1	515.1	515.1	515.1	515.1
515.1	515.2	515.2	515.2	515.2	515.3	515.3	515.3	515.3	515.3
515.3	515.3	515.3	515.3	515.3	515.3	515.3	515.3	515.3	515.3
515.3	515.3	515.3	515.2	515.2	515.2	515.2	515.2	515.2	515.2
515.2	515.2	515.2	515.2	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1

515.2	515.2	515.3	515.4	515.5	515.6	515.7	515.9	516.0	516.2
516.3	516.4	516.5	516.5	516.6	516.6	516.7	516.7	516.7	516.8
516.8	516.8	516.9	516.9	516.9	516.9	516.9	517.0	517.0	517.0
517.1	517.1	517.2	517.4	517.5	517.7	517.9	518.1	518.4	518.7
518.9	519.1	519.3	519.5	519.6	519.8	519.9	520.0	520.1	520.2
520.5	521.0	521.4	521.6	521.8	522.0	522.2	522.3	522.4	522.4
524.7	526.5	524.7	522.3	522.4	522.2	522.1	522.0	521.9	521.8
521.7	521.5	521.3	521.1	520.9	520.8	520.6	520.5	520.3	520.1
519.9	519.8	519.6	519.5	519.3	519.2	519.1	519.0	518.9	518.7
518.6	518.5	518.3	518.2	518.1	518.0	517.9	517.9	517.8	517.7
517.7	517.6	517.5	517.4	517.3	517.3	517.2	517.1	517.1	517.0

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	13472.	3484.	1164.	533.	159868.
CMS	381.	99.	31.	15.	4527.
INCHES		7.62	9.66	9.72	9.72
MM		193.66	245.36	246.83	246.83
AC-FT		1728.	2189.	2202.	2202.
THOUS CU M		2131.	2700.	2716.	2716.

MAXIMUM STORAGE = 39.

INUM STAGE IS 526.3

STATION 900, PLAN 3, RTIO 1

OUTFLOW

0.	0.	1.	1.	1.	1.	1.	1.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	2.	3.	4.	4.	6.	7.	8.	10.
11.	13.	14.	16.	18.	21.	22.	24.	25.	26.
27.	27.	27.	27.	27.	26.	26.	25.	24.	23.
22.	21.	21.	20.	19.	18.	17.	16.	15.	15.
14.	14.	13.	13.	12.	12.	11.	11.	10.	10.
10.	9.	9.	8.	8.	8.	8.	7.	7.	7.
7.	6.	6.	6.	6.	6.	6.	6.	6.	6.
6.	5.	5.	5.	5.	5.	5.	5.	5.	5.
5.	5.	5.	5.	6.	6.	7.	8.	9.	11.
13.	17.	23.	30.	37.	47.	56.	70.	83.	97.
11 .	125.	136.	151.	162.	173.	182.	191.	199.	206.
213.	219.	224.	230.	234.	239.	243.	248.	253.	261.
271.	286.	317.	336.	374.	429.	447.	579.	67-.	777.

883.	991.	1108.	1229.	1346.	1460.	1531.	1587.	1661.	1747.
1998.	2480.	2899.	5190.	3464.	3713.	3931.	4102.	4224.	4299.
6063.	9680.	11943.	8251.	4112.	4068.	3860.	3704.	3584.	3380.
3249.	3037.	2855.	2609.	2463.	2276.	2127.	1955.	1823.	1667.
1556.	1434.	1341.	1235.	1151.	1064.	993.	920.	860.	800.
753.	701.	658.	615.	578.	545.	513.	482.	457.	433.
411.	389.	372.	347.	332.	318.	302.	289.	275.	263.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	2.	3.
3.	3.	3.	4.	4.	4.	4.	5.	5.	5.
6.	7.	8.	9.	10.	11.	12.	12.	12.	13.
16.	29.	35.	24.	12.	12.	11.	11.	10.	10.
9.	9.	8.	8.	7.	7.	6.	6.	5.	5.
4.	4.	4.	4.	3.	3.	3.	3.	3.	3.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.

STAGE

515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0	515.0
515.	515.	515.	515.	515.	515.	515.	515.	515.	515.

515.0	515.0	515.0	515.0	515.0	515.1	515.1	515.1	515.1	515.1
515.1	515.2	515.2	515.2	515.2	515.3	515.3	515.3	515.3	515.3
515.3	515.3	515.3	515.3	515.3	515.3	515.3	515.3	515.3	515.3
515.3	515.3	515.3	515.2	515.2	515.2	515.2	515.2	515.2	515.2
515.2	515.2	515.2	515.2	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1	515.1
515.2	515.2	515.3	515.4	515.5	515.6	515.7	515.9	516.0	516.2
516.3	516.4	516.5	516.5	516.6	516.6	516.7	516.7	516.7	516.8
516.8	516.9	516.9	516.9	516.9	516.9	516.9	517.0	517.0	517.0
517.1	517.1	517.2	517.4	517.5	517.7	517.9	518.1	518.4	518.7
518.9	519.1	519.3	519.5	519.6	519.8	519.9	520.0	520.1	520.2
520.5	521.0	521.4	521.6	521.8	522.0	522.2	522.3	522.4	522.4
523.5	525.1	526.0	524.6	522.3	522.3	522.1	522.0	521.9	521.8
521.7	521.5	521.3	521.1	520.9	520.8	520.6	520.4	520.3	520.1
519.9	519.8	519.6	519.5	519.3	519.2	519.1	519.0	518.9	518.7
518.6	518.5	518.3	518.2	518.1	518.0	517.9	517.9	517.8	517.7
517.7	517.6	517.5	517.4	517.3	517.3	517.2	517.1	517.1	517.0

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	11943.	3515.	1111.	537.	163969.
CMS	338.	100.	31.	15.	4558.
INCHES		7.69	9.73	9.76	9.78
MM		195.36	247.06	248.53	248.53
AC-FT		1743.	2204.	2217.	2217.
THOUS CU M		2150.	2719.	2735.	2735.

MAXIMUM STORAGE = 35.

MAXIMUM STAGE IS 526.3

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

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
				0.50
HYDROGRAPH AT	100	1.11	1	1135.
		(2.87)		(32.15)(
			2	1135.
				(32.15)(
			3	1135.
				(32.15)(
ROUTED TO	200	1.11	1	1134.
		(2.87)		(32.10)(
			2	1134.
				(32.10)(
			3	1134.
				(32.10)(
YDROGRAPH AT	2[illegible]	0.42	1	498.
		(1.09)		(14.10)(
			2	498.
				(14.10)(
			3	498.
				(14.10)(
2 COMBINED	2[illegible]	1.52	1	1587.
		(3.95)		(44.95)(
			2	1587.
				(44.95)(
			3	1587.
				(44.95)(
OUTED TO	3[illegible]	1.52	1	1584.
		(3.95)		(44.85)(
			2	1584.
				(44.85)(
			3	1584.
				(44.85)(
YDROGRAPH AT	3[illegible]	0.30	1	329.
		([illegible].78)		(9.32)(
				[illegible]

RATIOS APPLIED TO FLOWS

				(9.32)(
			3	329.
				(9.32)(
YDROGRAPH AT	40[	1.09	1	1075.
	(	2.83)		(30.43)(
			2	1075.
				(30.43)(
			3	1075.
				(30.43)(
3 COMBINED	300	2.92	1	2975.
	(	7.55)		(84.23)(
			2	2975.
				(84.23)(
			3	2975.
				(84.23)(
OUTED T'	6..	2.92	1	2975.
	(	7.55)		(84.24)(
			2	2975.
				(84.24)(
			3	2975.
				(84.24)(
YDROGRAPH AT	5[0	0.57	1	565.
	(	1.46)		(16.01)(
			2	565.
				(16.01)(
			3	565.
				(16.01)(
OUTED T'	6..	0.57	1	563.
	(	1.46)		(15.94)(
			2	563.
				(15.94)(
			3	563.
				(15.94)(
YDROGRAPH AT	600	0.36	1	387.
	(	0.93)		(10.95)(
			2	387.
				(10.95)(
			3	387.
				(10.95)(
3 COMBINED	6..	3.85	1	3913.
	(	9.97)		(110.80)(
			2	3913.
				(110.80)(
			3	3913.

				(110.60)(
ROUTED TO	701	3.85	1	3912.
		(9.97)		(110.76)(
			2	3912.
				(110.76)(
			3	3912.
				(110.76)(
HYDROGRAPH AT	701	0.40	1	507.
		(1.04)		(14.35)(
			2	507.
				(14.35)(
			3	507.
				(14.35)(
2 COMBINED	701	4.25	1	4338.
		(11.01)		(122.85)(
			2	4338.
				(122.85)(
			3	4338.
				(122.85)(
ROUTED TO	700	4.25	1	16263.
		(11.01)		(460.51)(
			2	13275.
				(375.90)(
			3	12131.
				(343.50)(
ROUTED TO	600	4.25	1	15516.
		(11.01)		(439.36)(
			2	13522.
				(382.91)(
			3	12090.
				(342.35)(
ROUTED TO	900	4.25	1	13636.
		(11.01)		(386.13)(
			2	13472.
				(381.48)(
			3	11943.
				(338.19)(

PLAN 1 STATION 200

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.50	1134.	1013.8	41.83

PLAN 2 STATION 200

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	1134.	1003.8	41.83

PLAN 3 STATION 200

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	1134.	1003.8	41.83

PLAN 1 STATION 300

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	1584.	1004.4	41.67

PLAN 2 STATION 300

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	1584.	1004.4	41.67

PLAN 3 STATION 300

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	1584.	1004.4	41.67

PLAN 1 STATION 600

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	2975.	1006.7	41.83

PLAN 2 STATION 600

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	2975.	1006.7	41.83

PLAN 3 STATION 600

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	2975.	1006.7	41.83

PLAN 1 STATION 600

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	563.	1002.8	42.17

PLAN 2 STATION 600

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	563.	1002.8	42.17

PLAN 3 STATION 600

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	563.	1002.8	42.17

PLAN 1 STATION 701

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	3912.	1008.4	41.83

PLAN 2 STATION 701

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	3912.	1008.4	41.83

PLAN 3 STATION 701

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	3912.	1008.4	41.83

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	585.00	585.00	591.00
STORAGE	165.	165.	255.
OUTFLOW	0.	0.	1800.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	592.26	1.28	279.	18318.	1.77	41.87	41.67

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	585.00	585.00	591.00
STORAGE	165.	165.	255.
OUTFLOW	0.	0.	1800.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	592.28	1.28	279.	15583.	1.80	41.96	41.67

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	585.00	585.00	591.00
STORAGE	165.	165.	255.
OUTFLOW	0.	0.	1800.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.50	592.28	1.28	279.	12131.	1.85	42.17	41.67

PLAN 1 STATION 800

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	15516.	555.6	41.83

PLAN 2 STATION 800

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS

0.50	13522.	555.1	42.00

PLAN 3 STATION 850

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	12090.	554.6	42.17

PLAN 1 STATION 920

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	13636.	526.5	42.00

PLAN 2 STATION 920

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	13472.	526.5	42.00

PLAN 3 STATION 920

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.50	11943.	526.0	42.17

APPENDIX D

REFERENCES

APPENDIX D

REFERENCES

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APPENDIX E

STABILITY ANALYSIS

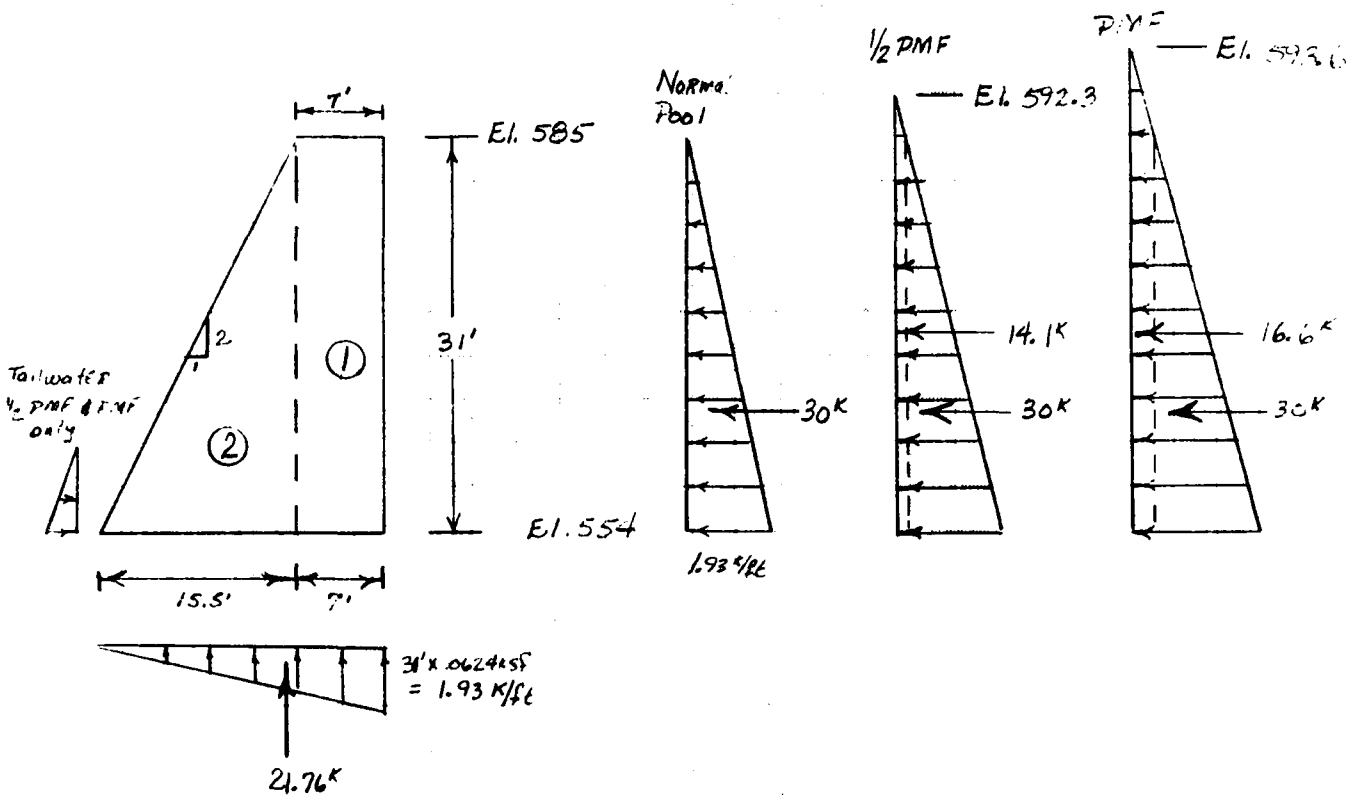
STETSON • DALE BANKERS TRUST BUILDING UTICA • NEW YORK • 13501
TEL 315-797-5800

DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE

SUBJECT Dam Inspections Tom PROJECT NO 2511

Stability DRAWN BY TAJ



Wt. of Dam

① 7' x 31' x 1' x 0.15 Kcf = 32.55K

② ½ x 15.5' x 31' x 1' x 0.15 Kcf = 36.04K

Σ = 68.59K

Resisting Moment due to wt. of Dam

M_R = 32.55K (15.5' + 7'/2) + 36.04K (2/3 * 15.5')

= 618.5 K-K + 372.4 K-K

= 991 K-K

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DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections - 1981 DATE

SUBJECT Maxey Reservoir Dam PROJECT NO.

Spillway DRAWN BY

Uplift Pressure

$$\text{Uplift} = 31'(0.0624^{\#}/\text{ft}^3)\left(\tfrac{22.5'}{2}\right) = 21.76^{k}$$

$$\text{Overturning Moment} = 21.76^{k}\left(\tfrac{2}{3} * 22.5'\right) = 326.4^{ft\text{-}k}$$

Case I – Normal Pool (@ Spillway Elev.)

i) Overturning

Overturning Moment due to upstream water = $30^{k}\left(31\tfrac{1}{3}\right) = 310^{ft\text{-}k}$

Total Overturning Moment = $310^{ft\text{-}k} + 326.4^{ft\text{-}k} = 636^{ft\text{-}k}$

$$F.S. = \frac{M_R}{M_O} = \frac{991^{ft\text{-}k}}{636^{ft\text{-}k}} = 1.56$$

Position of Resultant

$$d = \frac{\Sigma M}{\Sigma V} = \frac{(991 - 636)^{ft\text{-}k}}{(68.59^{k} - 21.76^{k})} = \frac{355^{ft\text{-}k}}{46.83^{k}} = 7.58'$$

$$= \frac{7.58'}{22.5'} = 0.346 \quad \text{Just inside middle } 1/3 \text{ O.K.}$$

ii) Sliding

$$F.S. = \frac{\mu N + CA}{\text{driving force}}$$

$$N = \Sigma V = 68.59^{k} - 21.76^{k} = 46.83^{k}$$

$$F.S. = \frac{0.65(46.83^{k}) + (0.05\text{ksf})(144^{\#}/\text{ft}^3)(1')(22.5')}{30^{k}} = \frac{30.4 + 162}{30}$$

$$F.S. = 6.4 \quad \text{O.K.}$$

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DESIGN BRIEF

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE

SUBJECT Niagara Mohawk Dam PROJECT NO

Stability DRAWN BY

II. Normal Pool with Ice

Ice Force 7.5 K/Ft of dam @ elev. 585

$M_{IO_{ICE}} = 7.5^K (31') = 232.5^{1-K}$

i) Overturning

$$F.S. = \frac{991^{1-K}}{636 + 232} = 1.14$$

Position of Resultant

$$d = \frac{(555-232)^{1-K}}{46.83^K} = 2.6' = 0.12b < 1/3 b \quad N.G.$$

ii) Sliding

$$F.S. = \frac{192.5^K}{30^K + 7.5^K} = 5.12$$

III. 1/2 PMF (Assuming Uplift same as Case I)

Tailwater Elev. = 556.5

T.W. Force = $0.0624\ ksf\ (2.5')^2\ 1/2 = 0.195^K$

$M_{R_{T.W.}} = 0.195^K\ (1/3 * 2.5') = 0.16^{1-K}$ (negligible)

i) Overturning

$$F.S. = \frac{991^{1-K}}{636 + 14.1^K\left(\frac{31'}{2}\right)} = \frac{991^{1-K}}{855^{1-K}} = 1.16$$

Position of Resultant

$$d = \frac{(991 - 855)^{1-K}}{46.83^K} = 2.9' = 0.13\ b < 1/3\ b \quad N.G.$$

ii) Sliding

$$F.S. = \frac{192}{30 + 14.1} = 4.35$$

Case IV PMF (Assuming uplift same as Case II)

Tailwater Elev. = 558.5
T.W. Force = $0.0624 \times 4.5' \times (4.5')^2 \times 1/2 = 0.63^K$
$M_{R_{TW}} = 0.63^K \times (1/3 \times 4.5') = 0.95^{1-K}$

i) Overturning

$$F.S. = \frac{991 + 1}{636 + 166(3\frac{1}{2})} = \frac{992^{1-K}}{893^{1-K}} = 1.11$$

Position of Resultant

$$d = \frac{(992 - 893)^{1-K}}{46.83^K} = 2.11' = 0.09\,b < 1/3\,b \quad N.G.$$

ii) Sliding

$$F.S. = \frac{192^K + .63^K}{30 + 16.6} = 4.14$$

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

PROJECT NAME N.Y.S. Dam Inspections 1981 DATE

SUBJECT [illegible] Reservoir Dam PROJECT NO

Stability DRAWN BY

Case V – Seismic Load (Zone 2, Horiz. [illegible] 0.05, vert [illegible])

a) Add'l overturning moment due to [illegible] gravity loads

$0.05\{32.55^k \times 31/2 + 36.04^k \times 31/3\} + 0.025\{32.55^k \times (7/2 + 15.5') + 36.04^k \times [illegible]\}$

$0.05\{504.5 + 372.4\} + 0.025\{618.45 + 372.4\}$

$43.85^{1-k} + 24.77^{1-k} = 68.6^{1-k}$

Effective Σ vertical loads $= 46.83^k - 0.025(68.5^k) = 45.11^k$

b) Add'l moment due to hydrodynamic effect [illegible] reservoir (Ref. "Design of Small Dams")

$P_e = C\lambda wh = 0.73(0.05)(0.0625 [illegible])(27)(1') = 0.0615 K/ft$

$V_e = 0.726\ P_e y = 0.726(0.0615^k/ft)(27') = 1.205^k$

$M_e = V_e\bar{y} = 1.205^k(0.4118 \times 27' + 4') = 18.2^{1-k}$

i) Overturning

$$F.S. = \frac{991^{1-k}}{636^{1-k} + 68.6^{1-k} + 18.2^{1-k}} = \frac{991}{723} = 1.37$$

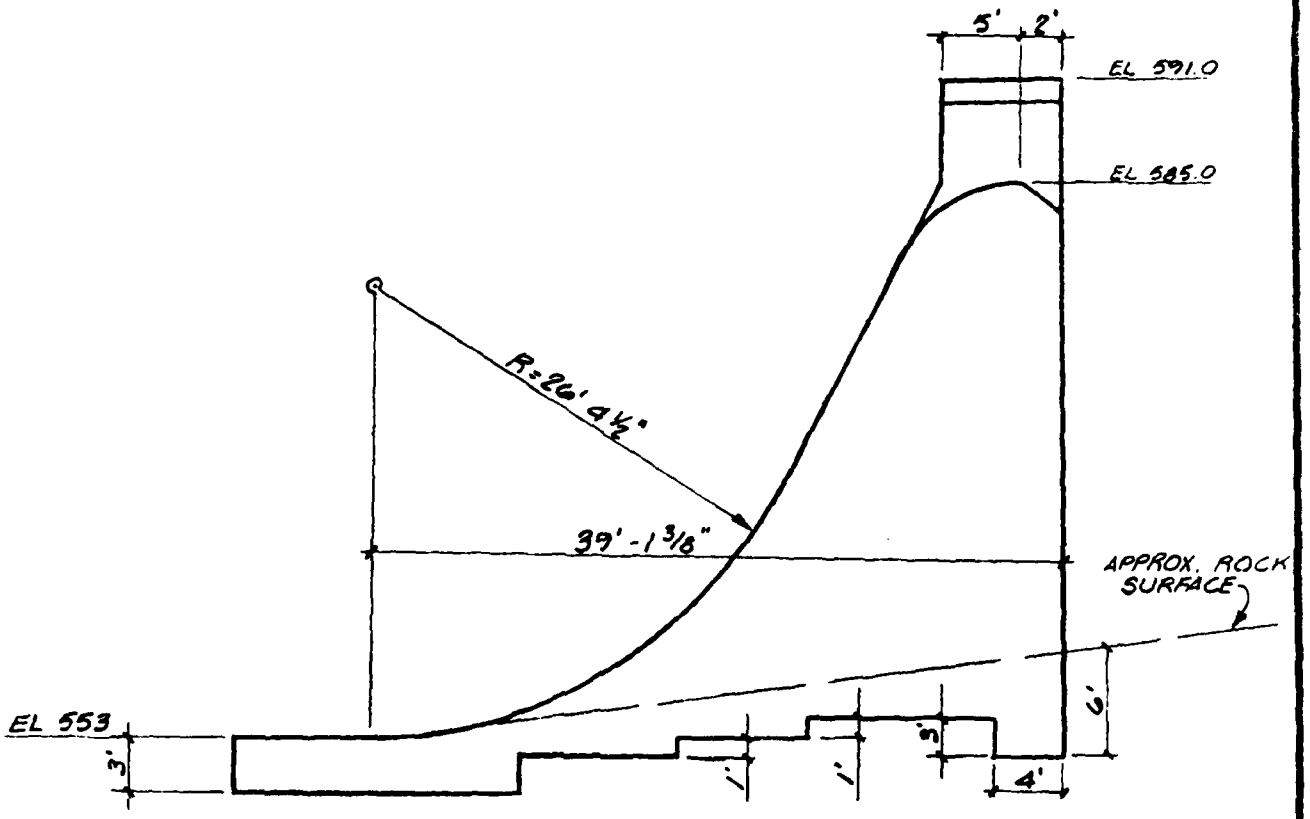
Position of Resultant

$$d = \frac{(991 - 723)^{1-k}}{45.11^k} = 5.94' = \frac{5.94'}{22.5'}b = 0.26\,b$$ within [illegible] O.K.

ii) Sliding

$$F.S. = \frac{0.65(45.11^k) + 162^k}{30^k + 1.205^k + 0.05(68.59^k)} = \frac{191.3}{34.63^k}$$

F.S. = 5.5



TYPICAL SECTION

MARCY DAM

STETSON • DALE

DATE	DRAWN
JOB	APP'D

APPENDIX F

PREVIOUS INSPECTION REPORTS/AVAILABLE DOCUMENTS

DEC DAM INSPECTION REPORT

RB	CTY	YR. AP.	DAM NO.	INS. DATE	USE	TYPE
03	33	19	000846	110172	003	4

AS BUILT INSPECTION

- [1] Location of Spillway and outlet
- [1] Elevations
- [1] Size of Spillway and outlet
- [1] Geometry of Non-overflow section

[1] GENERAL CONDITION OF NON-OVERFLOW SECTION

- [2] Settlement
- [2] Cracks
- [1] Deflections
- [2] Joints
- [2] Surface of Concrete
- [2] Leakage
- [2] Undermining
- [1] Settlement of Embankment
- [2] Crest of Dam
- [2] Downstream Slope
- [1] Upstream Slope
- [2] Toe of Slope

[1] GENERAL CONDITION OF SPILLWAY AND OUTLET WORKS

- [2] Auxiliary Spillway
- [2] Service or Concrete Spillway
- [2] Stilling Basin
- [2] Joints
- [2] Surface of Concrete
- [2] Spillway Toe
- [2] Mechanical Equipment
- [4] Plunge Pool
- [2] Drain

- [2] Maintenance
- [B] Hazard Class
- [3] Evaluation
- [-4] Inspector

COMMENTS:

CONCRETE CAP COMING OFF UPSTREAM NON-OVER FLOW SECTION ENTIRE STRUCTURE NEEDS NEW CAP

Adequate - No apparent repairs needed or minor repairs which can be covered by periodic maintenance.
2. Inadequate - Items in need of major repair.

For boxes listed conditions listed under spillway and outlet works.
1. Satisfactory.
2. Can be covered by periodic maintenance.
3. Unsatisfactory - Above and beyond normal maintenance.
4. Dam does not contain this feature.

Maintenance

1. Evidence of periodic maintenance being performed.
2. No evidence of periodic maintenance.
3. No longer a dam or dam no longer in use.

8.) Hazard Classification Downstream

2. (B) Damage to private and/or public property.
3. (C) Loss of life and/or property.

Evaluation - Based on Judgment and Classification in Box Nos.

Evaluation for Unsafe Dam

1. Unsafe - Repairable.
2. Unsafe - Not Repairable.
3. Insufficient evidence to declare unsafe.

River Basins	Counties	
(1) LOWER HUDSON	1 Albany – 2	36 Orange – 26
(2) UPPER HUDSON	2 Allegany – 3-1	37 Orleans – 3
(3) MOHAWK	3 Bronx	38 Oswego – 3
(4) LAKE CHAMPLAIN	4 Broome – 27	39 Otsego – 2
(5) DELAWARE	5 Cattaraugus	40 Putnam
(6) SUSQUEHANNA	6 Cayuga	41 Queens
(7) CHEMUNG	7 Chautauqua – 2	42 Rensselaer
(8) OSWEGO	8 Chemung	43 Richmond
(9) GENESEE	9 Chenango – 32	44 Rockland
(10) ALLEGHENY	10 Clinton	45 St. Lawrence
(11) LAKE ERIE	11 Columbia	46 Saratoga
(12) WESTERN LAKE ONTARIO	12 Cortland	47 Schenectady
(13) CENTRAL LAKE ONTARIO	13 Delaware	48 Schoharie
(14) EASTERN LAKE ONTARIO	14 Dutchess	49 Schuyler
(15) SALMON RIVER	15 Erie	50 Seneca
(16) BLACK RIVER	16 Essex	51 Steuben
(17) WEST ST. LAWRENCE	17 Franklin	52 Suffolk
(18) EAST ST. LAWRENCE	18 Fulton	53 Sullivan
(19) RACQUETTE RIVER	19 Genesee	54 Tioga
(20) ST. REGIS RIVER	20 Greene	55 Tompkins
(21) HOUSATONIC	21 Hamilton	56 Ulster
(22) LONG ISLAND	22 Herkimer – 3	57 Warren
(23) OSWEGATCHIE	23 Jefferson – 30	58 Washington – 27
	24 Kings	59 Wayne
	25 Lewis – 30	60 Westchester – 25
	26 Livingston	61 Wyoming
	27 Madison	62 Yates
	28 Monroe	
	29 Montgomery	
	30 Nassau	
	31 New York	
	32 Niagara	
	33 Oneida	
	34 Onondaga – 39	
	35 Ontario	

Revised 7/1/71

River Basin - Nos. 1-23 on Compilation Sheets
County - Nos. 1-62 Alphabetically
Year Approved -
Inspection Date - Month, Day, Year
5. Apparent Use -
   1. Fish & Wildlife Management
   2. Recreation
   3. Water Supply
   4. Power
   5. Farm
   6. No Apparent Use
6. Type -
   1. Earth with Aux. Service Spillway
   2. Earth with Single Conc. Spillway
   3. Earth with Single non-conc. Spillway
   4. Concrete
   5. Other
7. As-Built Inspection - Built substantially according to approved plans and specifications

Location of Spillway and Outlet Works

1. Appears to meet originally approved plans and specifications
2. Not built according to plans and specifications but location appears to be detrimental to structure.
3. Not built according to plans and specifications but location does not appear to be detrimental to structure.

Elevations

1. Generally in accordance to approved plans and specifications as determined from visual inspection and use of hand level.
2. Not built according to plans and specifications and elevation changes appear to be detrimental to structure.
3. Not built according to plans and specifications but elevation changes do not appear to be detrimental to structure.

Size of Spillway and Outlet Works

1. Appears to meet originally approved plans and specifications as determined by field measurements using tape measure.
2. Not built according to plans and specifications and changes appear detrimental to structure.
3. Not built according to plans and specifications but changes do not appear detrimental to structure.

Geometry of Non-overflow Structures

1. Generally in accordance to originally approved plans and specifications as determined from visual inspection and use of hand level and tape measure.
2. Not built according to plans and specifications and changes appear detrimental to structure.
3. Not built according to plans and specifications but changes do not appear detrimental to structure.

General Conditions of Non-Overflow Section

1. Adequate - No apparent repairs needed or minor repairs which can be covered by periodic maintenance.
2. Inadequate - Items in need of major repair.

(a) For boxes listed on condition under non-overflow section.
1. Satisfactory.
2. Can be covered by periodic maintenance.
3. Unsatisfactory - Above and beyond normal maintenance.

4-19-19-3000
(10-15000)
Acc. 106

SUBJECT Marcy Creek at Marcy FILE NO. Dm 846M
Utica State Hospital Water Supply Dam ACC. NO. 3589
Concrete gravity freeboard and overfall dam SHEET 1
COMPUTER [illegible] Oct. 5, 1920 CHECKED BY App. Serial No. (None filed) 19
MADE IN CONNECTION WITH oral instruction of Division Engineer
REFERENCE as noted below CONT'D FROM ACC.

Papers:

1. Portfolio containing six prints of plans our Acc. 10,814 to 10,8[illegible] received from State Engineer;

2. Specifications in printed form as received from State Engineer;

[illegible]
(See over [illegible] omitted)

Site:

See plans for site [illegible] immediately above the railroad embankment on Marcy Creek at Hamlet of Marcy, Oneida County, N.Y.

Foundation — rock

[illegible]

[illegible] the erection of a gravity [illegible] [illegible] and freeboard section [illegible] State Hospital at Marcy, N.Y.

CONT'D ON ACC.

September 21, 1920.

Subject: Construction of Dam on Marcy Creek, at Marcy, N. Y.

Department of State Engineer and Surveyor,

Albany, N. Y.

Gentlemen:

It is our understanding that your Department has prepared plans and specifications for the construction of a dam for the Utica State Asylum, which is to be located on a stream known as Marcy Creek, near the Hamlet of Marcy, Oneida County, N. Y.

To complete our records relating to dams outside of the State Canal System, we ask that you furnish this Commission prints of the plans for such dam, and a copy of the specifications to be followed during the construction of same.

Very truly yours,

GEO. D. PRATT, Commissioner,

By

Division Engineer.

JWH-B.
S

MIDDLE DIVISION

STATE OF NEW YORK

1919

SPECIFICATIONS FOR THE CONSTRUCTION OF A DAM, GATE HOUSE, RESERVOIR AND APPURTENANCES FOR THE MARCY DIVISION OF THE UTICA STATE HOSPITAL AT MARCY, NEW YORK

Chapter 238, Laws of 1917
Chapter 177, Laws of 1919, Part 3

GENERAL DESCRIPTION

The work to be done under these specifications and this contract shall consist in:

(a) Building the dam and gate house complete with gates, crane, valves, pipe and appurtenances necessary to operate the same.

(b) Clearing and grubbing the reservoir site.

The drawings which accompany these specifications and which form a part thereof consist of 6 sheets numbered 1 to 6 inclusive.

GENERAL REQUIREMENTS

1 Plans and Specifications

The specifications and the accompanying plans are part of the contract, and are intended to require and include all work and material necessary or proper for the work contemplated. Work shown on the plans and not mentioned in the specifications or vice versa shall be done as though shown by both. In case the Contractor considers that the specifications and plans are not sufficiently clear or complete, he shall requisition and the State Engineer will provide such supplementary plans and specifications as he may deem necessary. In case of any discrepancy or ambiguity in the plans, specifications or maps, or between them, the matter must be immediately submitted to the State Engineer who shall adjust the same, and his decisions in relation thereto shall be final and conclusive.

1a Inspection and Measurements

The State Hospital Commission will appoint and direct an Inspector who shall see that the provisions of the plans and specifications are fulfilled. The measurements, inspections and estimates during the progress of the work shall be made by the State Engineer or his duly authorized representatives hereinafter referred to as "the Engineer." The work shall be executed to the satisfaction of both the Engineer and the Inspector and in conformity with their instructions and in such order and sequence as they shall approve or direct provided, however, that all the requirements of the contract shall be fulfilled. The Contractor shall furnish every needful facility to the Engineer and Inspector for the inspection of all materials and work under this contract and all material which may be rejected by them shall at once be removed from the vicinity and replaced by material of approved quality.

1b Specification of Patented Articles

The mention of apparatus, articles, or materials by name, and such specific description of same as is referred to herein, is intended to convey to the contractor's understanding the degree of excellence required. Articles or materials which will conform substantially to the standard of excellence established and furnish an article of equivalent merit, strength, durability and appearance to perform the required functions is deemed to be eligible for offer. The State Engineer shall be the sole judge of the qualifications of the offerings and will determine all questions regarding the conformance of any offer with the specifications.

2 Blueprints

The State Engineer will upon request furnish the Contractor with not more than six complete sets of blueprints of the contract drawings free of charge. Additional sets may be obtained from the State Engineer upon payment of 15 cents per sheet.

3 Cleaning up Site

All rubbish, refuse, unused materials, temporary buildings and tools shall be removed from the site upon completion of the work. All ditches, pits and other excavations made by the Contractor for his own convenience in prosecuting the work shall be filled up, and all embankments, temporary spoil banks and similar deposits shall be removed prior to the completion of the contract and in such a manner and to such an extent as the Engineer and Inspector may direct. This work shall be done at the Contractor's expense.

4 Liability for Accidents

The Contractor hereby assumes all risks and liabilities for accidents or damages that may accrue to persons or property or to the work included in this contract during its prosecution. The work herein contracted for, so far as may be required, shall be conducted so as to facilitate and not to incommode the prosecution of contracts for work which may adjoin this contract. Public or private roadways shall not be obstructed by excavation or otherwise, except when approved in writing by the Engineer and Inspector.

5 Plant

The successful bidder shall satisfy the State Hospital Commission before the contract is awarded to him, that he has, or will promptly provide suitable and proper men, and all tools and machinery necessary for each of the different kinds of work.

7 Contractor's Force

The Contractor shall give his constant personal attention to the work while it is in progress or he shall place it in charge of a competent and steady foreman who shall have authority to act for the Contractor, and who shall be acceptable to the State Engineer and the State Hospital Commission. The Contractor shall at all times employ a sufficient number of workmen for the proper performance of the several works and he shall prosecute the same to full completion in the manner and time stipulated and specified. Any overseer or workman whom the Engineer or Inspector may deem incompetent or unfit for duty shall be at once discharged. The work under this contract shall be performed by the Contractor and by workmen under his immediate superintendence, and not by a sub-contractor except with the previous consent in writing of the State Engineer.

8 Investigation of Conditions

The Contractor must satisfy himself regarding conditions governing all the works to be done as to its nature and extent and the labor and materials needed, it being understood that, while the quantities exhibited have been prepared with care, the Contractor assumes all responsibility and must satisfy himself as to their accuracy.

9 Excess Work

When it appears from the monthly estimates of the Engineer or otherwise that the total cost of the work will exceed the amount originally shown on the bidding sheet, the State Hospital Commission may expressly enjoin the Contractor from proceeding with the excess work and may cause it to be performed under a special agreement with such Contractor at the same or at a less rate than contained in the original contract, or the State Hospital Commission may by contract with other parties or by its own forces cause such excess work to be completed. The Contractor shall not be paid any additional price for work done under any item of the contract because the quantity of work performed under such item is less than the quantity shown on the bidding sheet exhibited at the letting of the contract.

9a Commencement of Work

Ordering and preparing material must begin within ten days after signing the contract and actual operations on the site must begin promptly when required by the State Engineer. The Contractor shall notify the State Engineer one week in advance of actual operations.

9b Completion of Work

The whole work shall be completed within 12 months after the date of this contract.

9c Completion of Work by the State Hospital Commission

If in the judgment of the State Engineer the work is not being progressed in a manner that will insure the completion within the specified period or is not being performed according to its terms, he may at any time suspend or stop the work and the State Hospital Commission may complete the same either with its own forces or by re-letting the work remaining to be done and in such cases any excess in the cost of completing the contract beyond the prices for which the same was originally awarded shall be charged to and paid by the Contractor.

9d Final Acceptance of Work

The final acceptance of the work contracted for shall be jointly vested in the State Engineer and Surveyor and the State Hospital Commission. When the Contractor considers that he has fully completed his work he shall report the fact in writing to the Division Engineer, whose duty it shall be to promptly inspect the work and report his conclusions to the State Engineer and Surveyor. When the State Engineer and the State Hospital Commission shall conclude that the terms of the contract have been fully complied with, a written notification of acceptance will be issued to the Contractor. Until such notification is issued and until a settlement of the final account is made, the Contractor shall remain fully bound by all the conditions of the contract.

10 8-hour Labor

The laws provide that no laborer, workman or mechanic in the employ of the Contractor or of any sub-contractor, or any other person doing or contracting to do the whole or any part of the work contemplated by this contract shall be permitted or required to work more than eight hours in any one calendar day except in case of extraordinary emergency caused by fire, flood or danger

to life or property. The laws further provide that each such laborer, workman or mechanic employed by such Contractor, sub-contractor or other person on, about or upon such work shall receive not less than the prevailing rate of wages for a day's work in the same trade or occupation in the locality within the State where such labor is performed. It is further provided that such contract shall be void and of no effect unless the person or corporation making or performing the same shall comply with the provisions of the "Labor Law."

CLEARING

11 **Definition**

Preparatory to beginning construction the site of the proposed work shall be cleared.

The item of clearing shall include the removal or destruction, as required by the Engineer, of all trees, bushes, timbers, and decayed or growing organic matter above the surface of the ground within a line 25 feet horizontally outside the future edge (i.e. after completion of the necessary grubbing) of the reservoir water surface when level with the crest of the dam (i.e. El. 585.0); and also upon the site of proposed structures and such other adjacent areas as may be directed by the Engineer.

12 **Fences to be Removed**

All fences within the area of the work are to be removed and disposed of by the Contractor. The material therein shall become his property and the cost of its removal shall be included in the contract price for clearing.

13 **Payment**

Clearing will be paid for at the contract price therefor.

GRUBBING

14 **Definition**

Grubbing will be required over the reservoir basin inside a line 10 feet horizontally outside the future edge (i.e. after the completion of the necessary grubbing) of the reservoir water surface when level with the crest of the dam (i.e. El. 585.0), and where shown on the plans, and shall include the removal of organic matter below the surface of the ground, and its disposal outside the area draining into the reservoir as directed by the Engineer.

15 **Payment**

Grubbing will be paid for as excavation by measurement of the quantity removed as determined from cross-sections. If the excavated space has to be refilled with lining, puddle or other special material, payment therefor will be made at the contract price for said special material.

COFFER-DAMS, PUMPING, BAILING AND DRAINING

16 **General**

Suitable coffer-dams shall be built where needed so that the masonry work may be done in the dry.

Coffer-dams, pumping, bailing and draining shall include the furnishing, construction, maintenance and removal of coffer-dams, and similar work wherever such may be required to enable the construction to be carried out in a proper and satisfactory manner; the excavation, maintenance, and, when so directed by the Engineer, the refilling of all ditches; the furnishing and operation of pumps and appliances; and the providing of all material, labor, etc., required to prevent interference with the work by water, ice or snow, irrespective of any depth to which the excavation may be ordered to be carried. Special care shall be taken to thoroughly drain the foundations of all structures.

Damage of any kind resulting from faulty construction of a coffer-dam, from failure to keep a coffer-dam in good condition, or from insufficient pumping facilities or similar lack of proper conduct of the work shall be made good by the Contractor at his expense. When a coffer-dam is no longer required, it shall be removed unless otherwise permitted by the Engineer and the material disposed of in the spoil bank or banks shown on the plans or permitted for use by the Engineer.

16a **Payment**

Coffer-dams, pumping, bailing and draining will be paid for at the contract price therefor. Payment in the monthly estimates will be begun for the item of coffer-dams, pumping, bailing and draining after concreting has commenced and the proportion paid shall correspond approximately to the total percentage of the permanent work done within a coffer-dam, less the usual ten per cent retained.

EXCAVATION

18 **Definition**

Excavation shall consist of the loosening, loading, transporting and depositing of all material, whether wet or dry, of every name and nature necessary to be removed, for the purpose of forming ditches, pits for structures, for obtaining material from borrow pits, or for any other purpose necessary to complete the work under contract, except as noted in paragraphs 16 and 16a.

20. **Disposal of Material**

Material for embankments shall be deposited at the place where it is to be used, and surplus material shall be deposited in the place where it is to be spoiled. After the spoil bank has been roughly brought to the dimensions and form required by the Engineer, its surface shall be leveled and trimmed to even and continuous planes as shown on the plans or directed by the Engineer. No compensation for the grading of spoil banks will be paid, it being understood that the cost thereof is included in the price paid for excavation. Where spoil banks are re-excavated for any purpose, the remaining portions of the banks must be trimmed up and left in a condition satisfactory to the Engineer.

The location of embankments, spoil banks and all places of deposit determined upon will be shown as nearly as possible on the plans for the work, and the land necessary therefor will be furnished by the State free of charge to the Contractor.

21 **Lines and Grades**

Excavation shall be made only to such lines and grades as are shown on the plans, as hereinafter specified, or as may be fixed, in accordance with the plans and specifications, from time to time, by the Engineer. Where structures occur, the lines and grades shown on the plans shall be considered as approximate only and they will be fixed in writing by the State Engineer as circumstances require, to give a satisfactory structure. No structure shall be commenced without the Engineer's approval. If, during the progress of the excavation for any structure, or protection work, it appears that the sides will cave or slide in a manner that will necessitate excavation outside of the limits shown on the plans, the Engineer may direct that the excavation be stopped until such time as the Contractor is ready to put in the foundation or a part of the foundation of the structure, and that the final excavation be made in such lengths only as can be immediately completed and built up to the caving line. All material, the removal of which is necessiated by the Contractor's negligence or delay in prosecution of work, shall be removed and disposed of at his expense. Slides, rain or seepage wash, caves, etc., not due to the Contractor's negligence or delay in prosecution of the work, occurring at any time prior to the completion of the contract, shall be removed by the Contractor, if so directed by the Engineer. The removal and dumping of the material will be paid for at the contract price for excavation. All finished surfaces shall conform closely to the lines fixed and shall be dressed true and smooth.

If it appears during the progress of the work that flatter slopes than those shown on the drawing for the sides of excavations will be advisable, the State Engineer may direct in writing that the material be excavated to an amount sufficient to secure stability.

21a **Leaks and Springs**

Where leaks or springs are found which in the opinion of the Engineer might affect the safety of any of the permanent work, he may direct special provisions to be taken, such as grouting through pipes, etc. Grout so used shall consist of pure cement, and will be paid for as second-class concrete, and where practicable all material and all labor used in closing or deflecting such leaks and springs will be paid for at the contract prices for excavation.

21b
Drainage

Where drains, ditches or natural watercourses intersect the excavation, or the location for borrow pits or spoil banks, suitable provisions shall be made by the Contractor for maintaining the existing drainage and for the unobstructed flow of water. Where such provision is only required for temporary use, payment therefor shall be included in the provisions for coffer-dams, pumping, bailing and draining (Pars. 16 and 16a of these specifications) and all injury, wash or erosion, resulting from neglect of proper arrangements shall be remedied by the Contractor without cost to the State.

22
Borrow Pits

Material to be borrowed shall be taken from borrow pits shown upon the plans or designated by the Engineer in the nearest available location and if sufficient suitable material is not found in them it shall be taken from the nearest available location selected by the Engineer. The material taken therefrom, except the material for filling coffer-dams, shall be classed as excavation, and all the specifications for that item as hereinbefore made shall prevail. Borrow pits shall be cut to the form prescribed, and shall be drained if required by the Engineer; payment for such draining being included in the contract price for coffer-dams, pumping, bailing and draining.

22a
Test Pits

Test pits shall be excavated or test holes drilled, as may be directed, wherever necessary to a sufficient depth to ascertain the quality of the underlying material.

These test pits or holes will be paid for as excavation.

23
Explosives Not to be Used

No explosives shall be used in excavating for the dam or any of its appurtenances.

24
Payment

The volume of all excavated material for which the Contractor will be paid shall be that occupied by it before its removal; the maximum limits of such volume shall not exceed those defined upon the plan or fixed by the Engineer, as specified in paragraph 21. The volume shall be determined by measurements taken before and after its removal.

Excavation will be paid for only once. All cost of rehandling material must be included in the contract price for the original excavation.

The excavation of material from within the excavation lines, used for backing or filling coffer-dams for temporary embankments, and similar purposes, or placed in temporary spoil banks, and whose subsequent removal by the Contractor will be necessary in order to comply with the provisions and intent of the plans and specifications, will not be paid for until such material has been removed and disposed of in accordance with the terms of the contract.

Any excavation below or beyond the lines shown on the plans, which may be required by the State Engineer, will be paid for at the contract price for excavation, which price shall also include payment for disposition of the material in the spoil banks.

Payment for excavation will be made in the monthly estimates according to the particular character of the material actually excavated and the value of the work done in effecting such excavation, which value will be determined by the Engineer, who will establish unit rates for the removal of rock, earth, etc., the same to be in amount such that the total cost of the item of excavation on the completion of the contract shall not exceed the contract price for this item of work. The balance, if any, of the item or contract price for excavation will be included in the final estimate and paid if and when the contract is completed according to its terms, but not otherwise.

EMBANKMENT AND BACKFILL

29a
Materials

The material used in embankment or backfill shall be satisfactory to the Engineer and of a nature that will under proper manipulation compact into a solid, impervious and permanent embankment. It shall be free from perishable material and from other material liable to become unstable when saturated with water after having been compacted. All stones of such size as

interfere with proper compacting shall be removed from the work. Stones permitted to remain shall be separated from each other by earth, and in no case shall stones, gravel or any porous material be allowed to collect in nests or layers.

No frozen material shall be used in the construction of embankments, and no material used in embankment or backfill shall be placed on beds that are frozen.

29b Material, — Where Obtainable

Whenever material of suitable quality for constructing embankments or backfill is found in the places where excavation is required by the plans, such material shall be used for constructing the embankments or backfill.

If the Contractor wastes any of this material or uses it for coffer-dams, temporary embankments, or any other purposes and it becomes necessary in consequence to borrow material in order to complete the work according to the plans, the borrowed material shall be furnished and deposited at the Contractor's expense.

When sufficient suitable material for embankment or backfill is not obtainable from the excavation, the deficiency shall be supplied by the Contractor, from borrow pits located and appropriated by the State for free use by said Contractor. (See specifications for borrow pits under excavation.)

30 Backfill

Spoil material where deposited by spreading in layers behind and around walls or other structures, or over pipes, is termed backfill.

Backfill shall be free from perishable matter, frozen material or from other material liable to become unstable when saturated with water. Backfill shall not be placed on beds that are frozen.

All of the provisions of Paragraph 29b, "Material.— Where Obtainable," shall apply to backfill.

Backfill may be deposited by any means that will give satisfactory results, and shall, if required, be spread in horizontal layers not exceeding 15 inches in thickness but need not be compacted.

Payment for backfill is included in the contract price for excavation.

30a Drainage

Where drains, ditches or natural water courses intersect embankments, backfills or the locations for borrow pits or spoil banks, suitable provision shall be made by the Contractor for maintaining the existing drainage and for the unobstructed flow of water. Where such provision is only required for temporary work or is required only for the convenience of the Contractor, payment therefor shall be included in the provisions for coffer-dams, pumping, bailing and draining. Pars. 16 and 16a of these Specifications), and all injury, wash or erosion, resulting from neglect of proper arrangements shall be remedied by the Contractor without cost to the State. Suitable ditches for carrying off seepage or surface water shall also be provided wherever required or directed. All cost of the ditches shall be paid for at the contract price for excavation except as specified in the preceding sentences and subject, where necessary, to those clauses of the contract governing alterations.

30b Cut-off Trenches

In case the condition of the natural soil is judged to require, for the safety of any embankment, cut-off trenches of location or dimensions other than shown on the plans, such trenches shall be excavated and backfilled with satisfactory material. The locations and dimensions of such trenches shall be as prescribed by the Engineer. All cost of the trenches and backfilling shall be paid for at the corresponding contract prices for excavation, subject, where necessary, to those clauses of the contract governing alterations.

31 Finishing, Soiling and Seeding

All surfaces of embankment and backfill shall be brought to the prescribed lines and grades and finished in a neat and workmanlike manner and kept in this condition until the completion of the contract. All such surfaces not protected by riprap or other special covering shall be covered to a thickness of four inches with the best of available soil, suitable to sustain vegetation, taken from the excavation or borrow pits where such are used, upon which will be sown and raked in, suitable grass seed. If required by the Contractor, laying sod or turf four inches thick, prop-

erly placed in contact, will be accepted in lieu of the soiling and seeding. The soil may preferably be placed as the work progresses and will be included as part of it. There shall not be less than two and one-half bushels of first-class seed to the acre of surface, and the seed shall be mixed by a reputable seedsman of New York State, of such grasses and in such proportions as will produce a compact, deep-rooted, lasting turf. Gullies and washes shall be reseeded and returfed as directed.

Payment for this soiling and seeding will be included in the contract price for excavation.

SAWED LUMBER

40 **Quality**

All lumber shall be sound, well manufactured, full to size and saw butted, and shall be free from defects tending to impair strength and durability.

The kinds of lumber shall be as ordered or shown on the plans.

40a **Douglas Fir**

Dimension lumber shall be of a selected grade, subject to a close special inspection in "Number One Common Grade," the specifications for which are as follows: To be cut from good, sound, live, close-grained yellow or red fir; to be free from wane edges, cut true to sizes ordered, free from splits, shakes and other defects, except pitch seams four to six inches in length, and sound live knots not more than two inches in diameter, and shall not show a sap angle on more than one edge of the stick.

40b **Yellow Pine**

All yellow pine shall be of the long leaf variety and the inspection shall be "Standard," "Merchantable" or "Prime" as defined by the "Interstate Rules for 1905" for the classification and inspection of yellow pine lumber.

40c **White Pine Norway Pine**

All white and Norway pine lumber shall be of a quality acceptable under the grade of "No. 1 Joists, Scantling and Timber" as described in the "Rules for the Grading of Pine and Hemlock Lumber" adopted by the Northern Pine Manufacturers' Association, April 15, 1906.

40d **Spruce Lumber**

All spruce lumber shall be of a quality acceptable under the grade of "No. 1 Dimensions," as defined in the "Rules for the Grading of Pine and Hemlock Lumber" adopted by the Northern Pine Manufacturers' Association, April 15, 1906.

40e **Oak and other Hardwoods**

All oak and other hardwood lumber shall be of a quality acceptable under the grade of "Firsts," "Seconds" or "No. 1 Common" as defined in "Rules for the Measurement and Inspection of Hardwood Lumber" issued by the National Hardwood Lumber Association, to take effect August 1, 1908.

41 **Payment**

Payment for sawed lumber will be included in the contract prices of the items in which it is used, which prices shall include the cost of furnishing and placing all metal fastenings unless otherwise specified.

WROUGHT IRON PIPE RAILING

69a **Wrought Iron Pipe Railing**

Wrought iron pipe railing, of standard quality wrought iron pipe with malleable iron railing fittings and threaded connections, shall be constructed and secured as shown on the plans.

All the parts thereof shall be painted as specified under "Painting."

Payment for wrought iron pipe railing will be made by the linear foot of completed railing in place including all posts and settings. Measurement will be made from end to end of the completed railing.

Payment for removable wrought iron chain railing around wells, gate recesses and ladder opening will be made at the contract price per linear foot for Wrought Iron Pipe Railing and shall include the furnishing and setting of all sockets, snaps, etc.

CEMENT

GENERAL CONDITIONS

70 Inspection

All cement shall be subject to *rigid inspection* and to prescribed tests made at the cement testing laboratories of the State Engineer.

71 Requirements, etc.

All cement used in the work shall be *true Portland* cement, of well known brands which have been in successful use on large engineering works in America for not less than 2 years, and which are manufactured at works which have been in successful operation for at least 1 year.

72 Weight

Cement barrels shall contain three hundred and seventy-six pounds of cement. Each sack of cement shall contain ninety-four pounds net.

73 Storing

Provisions shall be made by the Contractor for storing cement in a dry place and delivery shall not be made until the State Engineer has been notified to inspect the cement and to take samples, for which all *facilities* shall be offered by the Contractor. The Contractor shall replace at his own cost any cement which may be damaged while stored.

74 Samples

Samples will be taken by the *Engineer*, at once on delivery, from at least every tenth barrel or from the equivalent of the tenth barrel when packed in sacks, and will be numbered consecutively throughout the progress of the work; each sample will be sufficient to fill a three-inch cubical box, and each lot of samples will be forwarded by express to Albany for separate tests.

Not more than two hundred barrels shall be covered by one set of tests.

74a Samples Taken at Cement Mill

When desired by the Contractor, cement will be sampled at the cement mill by the Cement Inspector representing the State Engineer. Samples will be taken from the conveyor or bin in such a manner as to obtain a sample for each 100 barrels or fraction thereof of cement. Each sample will be kept separate and all will be sent to the cement testing laboratory at Albany. The requirements, tests and methods of procedure will be the same as described in Articles 75 to 85 inclusive.

No cement shall be removed from any bin containing tested cement until the results of the tests have been received. If the samples have failed to pass the required tests, the cement shall not be used on any state contract. If the *cement* is accepted all shipments will be made under the direction of the Cement Inspector and only while he is present. The bin shall at all times be locked and sealed and not opened until the Cement Inspector shall so direct.

75 Tests

The tests will be: 1st, for fineness; 2d, for constancy of volume; 3d, for time of initial set; 4th, for tensile strength; 5th for composition, by chemical tests; 6th, for specific gravity.

76 Results

The average result of the separate samples shall be the test for tensile strength of any lot. The samples of each lot shall be required to show uniform results in tests. Marked deviations from such results may be considered cause for *rejection, even through* test requirements may be otherwise fulfilled.

The results of the tests may be expected in twelve days after shipment of samples.

Cement not satisfactory to the State Engineer in the seven-day tests will be held awaiting the result of the twenty-eight day tests before acceptance or rejection.

77 Rejected Cement

Any cement which has been rejected by this department, because of failure to stand the required tests, shall be immediately removed at the expense of the Contractor.

The acceptance or rejection will be based on the following requirements:

PORTLAND CEMENT

78 **Definition**

Portland cement is the product obtained by finely pulverizing clinker produced by calcining to incipient fusion an intimate and properly proportioned mixture of argillaceous and calcareous materials with no additions subsequent to calcination excepting water and calcined or uncalcined gypsum.

I. Chemical Properties

79 **Chemical Limits**

The following limits shall not be exceeded:

Loss on ignition, per cent	4.00
Insoluble residue, per cent	0.85
Sulfuric anhydride (SO_3), per cent	2.00
Magnesia (MgO), per cent	5.00

II. Physical Properties

80 **Specific Gravity**

The specific gravity of cement shall be not less than 3.10 (3.07 for white Portland cement). Should the test of cement as received fall below this requirement a second test may be made upon an ignited sample. The specific gravity test will not be made unless specifically ordered.

81 **Fineness**

The residue on a standard No. 200 sieve shall not exceed 22 per cent by weight.

82 **Soundness**

A pat of neat cement shall remain firm and hard, and show no signs of distortion, cracking, checking, or disintegration in the steam test for soundness.

83 **Time of Setting**

The cement shall not develop initial set in less than 45 minutes when the Vicat needle is used or 60 minutes when the Gillmore needle is used. Final set shall be attained within 10 hours.

84 **Tensile Strength**

The average tensile strength in pounds per square inch of not less than three standard motar briquettes composed of one part cement and three parts standard sand, by weight, shall be equal to or higher than the following:

Age at test, days	Storage of briquettes	Tensile strength, lb. per sq. in
7	1 day in moist air, 6 days in water	200
28	1 day in moist air, 27 days in water	300

The average tensile strength of standard mortar at 28 days shall be higher than the strength at 7 days.

85 **Sand for Tests**

The sand used in the tests shall be standard Ottawa sand and shall pass a sieve of 400 meshes per square inch and shall stop on a sieve of 900 meshes per square inch.

CONCRETE

93 **Application**

Concrete, of the class specified, shall be used in such places, of such forms, and of such dimensions as may be shown on the plans.

94 **Embedded Steel or Iron**

When the conditions make it desirable to embed steel or iron in concrete, it shall be placed as shown on the plans or as directed by the Engineer.

96 **Second-class Concrete**

Second-class concrete shall be made of one part of Portland cement, two and one-half parts clean sand and five parts of crushed stone or gravel all measured in loose bulk.

98 **Crushed Stone**

Stone for concrete shall be of an approved kind and quality of rock and shall be free from dirt from being crushed from soil, mud or dust. Soft stone shall not be used in making concrete. Crushed stone for second-class concrete shall be of hard, durable stone, satisfactory to the Engineer, of fragments that will pass through a two and one-half inch circular hole, and that will not pass through a one-eighth inch circular hole.

99 **Voids**

Before beginning construction, the Engineer in local charge shall determine the voids in the crushed stone or gravel which is to form the aggregate of the concrete.

The amount of mortar which is to form the matrix of the concrete may be varied slightly if necessary, in order that it shall exceed the natural voids of the total mass of the loose aggregate by 20 per cent. This amount shall be used until a change in the character of the aggregate shall require a slight variation in the amount of mortar.

The cement shall be measured by the bulk occupied when poured out of its bag or barrel. No artificial increasing of the bulk will be allowed.

100 **Sand**

All sand shall be composed of grains varying in size from fine to coarse, not exceeding one-quarter of an inch in size; it shall be clean, sharp, and shall be screened and washed if required.

Sand which contains not more than 5 per cent of its volume of silt or loam need not be washed, provided that the silt and loam are finely divided and that the total amount of silt or loam in the aggregate of sand and gravel or sand and broken stone does not exceed 6 per cent of the volume of these materials when mixed together in the proportions to be used for the concrete. Sand which contains not more than 10 per cent of its volume of gravel need not have the gravel removed, provided the amount of broken stone or gravel for the concrete be reduced by an amount similar to that contained in the sand.

101 **Gravel**

Gravel for second-class concrete shall be composed of hard, durable stone, and shall be clean. It shall be in fragments that will pass through a two and one-half inch circular hole, and that will not pass through a one-eighth inch circular hole. Gravel mixed with mud, clay, dirt or quicksand shall be washed.

101-a **Samples**

All sand, gravel and broken stone to be used in concrete shall be first approved by the State Engineer, and for this purpose samples therof shall be selected in the presence of the Engineer and shall be forwarded by the Contractor, free of charge, to the office of the Division Engineer of the division in which this contract is located. An additional sample of sand shall be similarly forwarded to the testing laboratory in Albany.

Additional samples, containing not less than one-cubic foot each, shall also be selected in the presence of the Engineer and shall be forwarded by the Contractor, free of charge, to the office of the Engineer on the contract, and all sand, gravel and broken stone which falls below the quality of the approved samples shall be rejected.

102 **Machine Mixing**

Machine mixing will be required in all cases where the quantity of concrete to be made at one locality exceeds two hundred cubic yards. Only approved machines requiring the exact measuring of the ingredients of each batch of concrete shall be used. Mixing shall continue until every face of every particle of stone or gravel is completely coated with mortar. No continuous mixer in whose operation the proportions of the ingredients of the concrete depend upon the shovelers shall be used. In all machine mixing the batches of concrete shall be proportioned to the size of the mixer to produce the best results.

Hand mixing shall be done upon proper platforms, in a manner satisfactory to the Engineer, and after the materials are wet the work shall proceed rapidly until the concrete is in place, and is so thoroughly manipulated that water flushes to the surface, and all the interstices between the stones are entirely filled with mortar.

103 **Hand Mixing**

All mortar and concrete shall be used while fresh and before the initial set has begun. Any mortar or concrete in which the initial set has begun shall be removed from the mixing boards or receptacle and not used in the work. No retempering of mortar or concrete will be allowed.

104 **Fresh Mortar and Concrete**

The quantity of water to be used in making concrete will be determined by the Engineer, but in general a wet mixture shall be used as tending to produce a uniform, dense and impervious concrete. The amount of water used shall be such that little or no free water collects on the surface. Concrete upon which concrete is to be deposited shall have the upper surface removed with picks or chisels and shall be thoroughly scrubbed with wire brooms and water from a hose under sufficient pressure to thoroughly remove all laitance, loose and foreign material. This work shall be done immediately before depositing new concrete.

105 **Wet or Dry Concrete**

When required by the Engineer, concrete shall be deposited in layers averaging not more than six inches in thickness before compacting. In order to bond the successive courses, horizontal keys running lengthwise of the wall, at least twelve inches deep, of a total width of at least one-fourth of the width of the joint, shall be formed at the top of the upper layer of each day's work and at such other levels as work is interrupted until the concrete has taken its initial set.

Whenever concreting is suspended on any section for more than one hour, all edges which will be exposed in the finished work shall be brought to a level and be struck off with a straight edge and a trowle.

No concrete shall be slid down a chute or thrown to the place where it is to be laid, except by special permission of the Engineer.

106 **Depositing**

In any given layer the separate batches shall follow each other so closely that each one shall be placed and compacted before the preceding one had set, so that there shall be no line of separation between the batches.

After the concrete has begun to set, it shall not be walked upon in less than twelve hours.

107 **Separate Batches**

The operation of compacting the concrete shall be conducted so as to form a compact, dense, impervious artificial stone which shall show a smooth face when the forms are removed. The weight of rammers, if used, shall be satisfactory to the Engineer.

108 **Compacting**

Any monolith, the concrete of which is found porous, has been plastered or is otherwise defective, shall be removed and replaced in whole or in part, as directed by the Engineer, and entirely at the Contractor's expense.

109 **Porous Concrete**

The Contractor shall construct suitable forms, the cost of which shall be included in the contract price per cubic yard for the concrete, the interior shape and dimensions of which shall be such that the finished concrete shall be of the form and dimensions shown on the plans. Lumber for lagging for faces shall be not less than two inches in thickness before being dressed, except where used for curved or special surfaces. Especial attention must be paid to bracing, and where the forms appear to be insufficiently braced, or unsatisfactorily built, either before or during concreting, the Engineer shall order work to be stopped until the defects have been corrected to his satisfaction. All forms shall be set and maintained true to the lines designated until the concrete is sufficiently hardened. All forms shall be satisfactory to the Engineer, and shall remain in place as long as he deems necessary. The interior surfaces of the forms, which come in contact with surfaces of the concrete which will be exposed in the finished work, shall be of lumber dressed on both faces and both edges and having watertight joints, and shall be so constructed as to leave all such exposed surfaces of the concrete with a smooth, even finish.

110 **Forms**

111 **Facing**

No piece of stone shall be left within one inch of any face. A broad-tined fork or other implement, if approved, being thrust between the form and the concrete to pry the fragments of stone back from the face.

All finished and unfinished work shall be thoroughly washed down at least twice daily for ten days.

Whenever concreting is suspended in an uncompleted section and the forms used are to be moved before concreting is to be continued in that section, all edges which will be exposed in the finished work shall be struck off as specified in Article 106 and shall then be protected by embedding dressed timbers along the lagging so as to prevent the concrete from becoming disfigured while shifting the forms or from other causes. Such timbers shall be not less than three inches thick and ten inches wide and shall be fastened with bolts placed not more than three feet apart and set into the concrete not less than one foot. The timbers and bolts must be placed to the satisfaction of the Engineer, and the timbers shall not be removed until so directed by him. All cost of providing and handling the timbers and bolts shall be included in the contract price for second-class concrete.

112 **Large Stones in Concrete**

Solid pieces of rock, exclusive of slate, shale or other rock unsuitable for use as concrete aggregate, containing more than one cubic foot may be embedded in a large mass of concrete. Each stone before being bedded or placed shall be thoroughly washed and scrubbed, if necessary, to free it from all dirt. Stones bedded in concrete shall be at least six inches apart at all points, and no stones shall be placed within one foot of any face of the concrete or of any embedded metal, unless they are placed cornerwise and so that no part of the stone will be within six inches of the face or of the embedded metal. Stones shall be worked down into the concrete by bars so as to exclude the air from any pockets in the lower surface of the stone.

No bowlders or fragments of rock shall be placed in any wall where the width is less than twice the transverse dimension of the rock as placed in the wall.

113 **Sections**

All concrete walls and structures shall be built in alternate sections approximately thirty-four feet long, unless otherwise shown on the plans. Dams shall be built with sheet lead, joints as shown on the plans.

In case additional joints are required by the Engineer, such additional joints shall be made by the Contractor without extra compensation.

113a **Weep Holes**

The Contractor shall construct weep holes, four inches in diameter, in the apron side walls at such points as are required by the Engineer. Selected stones shall be placed by hand at the inner end of the holes to assist drainage in escaping and to prevent the outflow of earth. The cost of all labor and materials required to construct and protect these weep holes will be included in the contract price for second-class concrete.

114 **Protection**

Whenever directed by the Engineer, newly-laid masonry shall be protected to prevent freezing and the protection shall be in all respects satisfactory to him.

Whenever necessary, the Engineer may withhold permission to lay concrete during freezing weather until the work is protected by housing or until the ingredients entering into the composition of the concrete shall be heated, so that when the concrete is mixed and ready to be deposited it shall have a temperature of not less than 75 degrees Fahrenheit. In warm weather, concrete shall be covered with canvas or otherwise protected from the sun and kept wet until thoroughly set.

The Contractor shall be responsible for all damage to concrete by freezing, and any concrete so damaged shall be cut out and replaced at the Contractor's expense, as directed by and to the satisfaction of the Engineer.

The new concrete shall be thoroughly bonded or doweled into the existing sound concrete.

All damage to or disfigurement of masonry of any kind, occurring prior to the final acceptance of the work, shall be remedied by the Contractor at his own expense and to the satisfaction of the Engineer. The Contractor shall place and maintain sufficient protection at all points where the masonry is exposed to damage or disfigurement from lines, derricks, etc., and the cost thereof shall be covered in the general contract prices.

The top surfaces that will be exposed in the finished work shall be formed immediately after the underlying course is completed and before this course takes its initial set. The top surface shall be formed by cutting off the excess with a straight edge and shall then be rubbed smooth and hard with a wooden float by skilled men. As soon as the forms are removed, all exposed faces shall be finished by being rubbed smooth with a float and water. No plastering of any surface will be allowed, the required finish being obtained by rubbing down the irregularities of the face. The facing and coping shall show a smooth, dense surface, without pits, irregularities, blow holes or bubbles.

115 **Surface Finish**

The top course of concrete shall be not less than four feet in thickness unless otherwise shown on the plans.

All edges which will be exposed in the finished structure shall be rounded. A radius of one inch shall be used unless otherwise designated on the plans.

The edges of joints between sections, in exposed surfaces of walls, shall be beveled one-half of an inch.

Where coping edges or surfaces are wavy or uneven, they shall be chipped or rubbed and faced to even lines by the Contractor, at his expense, if so directed by the Engineer.

Concrete shall not be laid in water nor exposed to the action of water before setting, except with special permission of the Engineer, and then in such manner as he may approve.

116 **Concrete Under Water**

Where concrete is to rest on any excavated surface other than rock, special care shall be taken not to disturb the bottom of the excavation, and the final removal of material to grade shall not be made until just before the concrete is laid.

116a **Excavation for Foundations**

The excavation lines and bases of structures shown on the plans shall be considered as only approximate and they may be ordered in writing by the State Engineer to be placed at any elevation or of any dimensions that will give a satisfactory foundation. Any additional concrete that may be required in writing by the State Engineer, below or beyond the lines shown on the plans, will be paid for at the contract price.

No structure shall be commenced without the Engineer's approval.

All rock or hardpan foundation surfaces shall be freed from loose pieces, cut to firm surfaces and cleaned to the satisfaction of the Engineer, before laying concrete. All seams shall be cleaned out and filled with concrete or mortar and payment for such cleaning out and filling shall be made at the contract price for second-class concrete.

Concrete will be paid for at the contract price per cubic yard for second-class concrete, payment being made for the actual quantity in the finished structure, as called for by the plans or ordered in writing by the State Engineer.

117 **Payment**

No payment will be made for any concrete outside of these limits nor for any concrete whose placing is rendered necessary owing to lack of proper care during excavation.

Payment for all labor and materials required to build concrete structures, as specified in the foregoing paragraphs, shall be included in the contract prices for concrete.

In estimating concrete, no deductions will be made for pipes under twelve inches in size.

METAL REINFORCEMENT

Unless otherwise designated upon the plans, all metal reinforcement shall be of medium steel and shall consist of approved "deformed" bars or rods which shall have an elastic limit of not less than 30,000 pounds per square inch nor more than 40,000 pounds per square inch and an elongation of not less than 22 per cent in a length of 8 inches.

117b **Reinforcement**

All metal reinforcement shall be open-hearth steel, shall be uniform in quality and shall endure bending 180 degrees, when cold, around a circle whose diameter is equal to the diameter or thickness of the test piece without fracture on the outside of the bent portion.

All steel or iron for metal reinforcement shall, when embedded, be free from mill scale, grease, injurious rust, dirt or other foreign substance.

All metal reinforcement shall be securely held in place so that it will be in the prescribed position after the concrete has been thoroughly compacted.

117i **Payment** Metal reinforcement shall be used where shown on the plans or ordered by the Engineer and payment therefor will be made at the contract price per pound for the actual quantity of metal reinforcement in the finished structure.

CAST IRON PIPE AND SPECIALS

204 **Definition** In the following specifications straight sections will be termed pipe, and branches, bends, reducers, etc., will be called specials.

205 **General** Cast iron pipe and specials shall be made with hub and spigot unless otherwise specified and shown on the plans, and shall accurately conform in shape and dimensions to the adopted standard approved by the Engineer. The pipe shall be straight and shall be true circles in section with their inner and outer surfaces concentric and shall be of the specified dimensions in internal diameter from end to end. The straight pipe shall be practically twelve feet in length exclusive of the sockets.

206 **Casting** All straight pipe shall be cast in dry sand moulds in a vertical position, the hub end downward.

207 **Coating** All pipes and special castings shall be thoroughly cleaned and subjected to a careful hammer inspection and then coated inside and out with coal tar pitch varnish.

The varnish shall be made from coal tar to which sufficient linseed oil shall be added to make a smooth coating, tough and tenacious when cold and not brittle or with any tendency to scale off. The coating shall be applied by dipping the casting in the varnish. The casting shall be heated to a temperature of 300° Fahr. immediately before it is dipped and shall possess not less than this temperature at the time it is coated. The varnish shall be heated to a temperature of 300° Fahr. and shall be maintained at this temperature during the time the casting is immersed.

208 **Quality** All pipes and special castings shall be smooth, free from lumps, scale blisters, sand holes, cracks or other imperfections and no plugging or filling will be allowed.

209 **Weight** No special castings shall be accepted the weight of which is less than the standard weight by more than ten per cent and no excess above the standard weight of more than ten per cent shall be paid for.

No payment will be made for more than five per cent excess of weight above the specific standards for pipe less than twelve inches or more than four per cent excess of weight above the specific standards for pipe twelve or more inches in diameter.

All pipes shall be rejected which fall five per cent below the specific standard weight for pipes less than twelve inches or more than four per cent below the specific standard for pipe twelve inches or more in diameter.

210 **Payment** Cast iron pipe and specials will be paid for at the contract price for the actual number of tons laid in the work and will include the furnishing, delivering, handling, laying, leading and calking.

211 Laying

Iron pipe with hub and spigot or flanges where shown on plans shall be laid to the lines and grade shown on the plans or given by the Engineer. Excavation under and around joints shall be of sufficient depth and width to readily allow the careful leading and calking of the joints.

212 Joints

Joints shall be formed as follows:

A sufficient amount of jute or oakum shall be calked into the hub of the pipe to prevent the jointing material from entering the pipe; the remainder of the joint space shall be filled with molten lead at one pouring and the lead thoroughly calked into the joint with proper tools to the satisfaction of the Engineer.

213 Testing

Before the joints are covered they shall be tested, when required by the Engineer, by hydrostatic pressure equal to one and one-half times the pressure which the pipe will be subjected to in service.

No joint shall leak when subjected to the pressure of the required test for a period of thirty minutes.

The Contractor shall furnish all of the apparatus and appliances for making the tests at his own expense and all tests shall be made under the direction of the Engineer and to his satisfaction.

SPECIFICATIONS FOR STRUCTURAL STEEL, ETC.

GENERAL

300 Workmanship

All workmanship shall be in every particular of the best in use at the present time. In any case of doubt as to the quality of work required by these specifications that interpretation shall be given which shall secure the best class of work.

Lack of facilities shall not be considered as sufficient excuse for poor or inferior workmanship.

301 Methods

All methods used during manufacture shall be satisfactory to the Engineer.

302 Finish

All portions of the work exposed to view shall be neatly finished and all idle corners of plates or shapes shall be neatly chamfered. The several pieces which form a built member shall be straight and fit closely together and when completed each member shall be without perceptible wind and free from kinks, twists, bends or open joints. No straightening of any description shall be permitted after a member is riveted up. (316)

308 Welding of Steel

The welding of any steel member shall not be permitted.

309 Fillets

No sharp or unfilleted angles or corners shall be allowed in any piece of metal.

316 Straightening

All structural steel shall be made straight and true before any laying out or other shop work is done thereon, and when necessary shall be straightened again before assembling: straightening shall not be done by hammering; mill straightening shall not be considered sufficient. (302)

320 Handling Materials

In handling materials and finished members care shall be taken to prevent injury of any kind or unnecessary exposure to the elements. Any pieces injured in any manner prior to the final acceptance of the work shall be repaired or replaced, as may be directed by the Engineer, by the Contractor at his own expense. (321)

Any material received at the shop shall be promptly protected from rust by storage under cover.

321 Storing Materials

Before and during erection all materials shall be stored well above the ground on skids and shall be kept clean. They shall be so stored and handled as not to interfere with the work of other contractors. (320).

DRAWINGS

321 Contract Drawing

The drawings which accompany these specifications, hereafter designated as the "contract drawings," are not intended to be "shop" or "working" drawings.

325 Shop Drawings Required

The Contractor shall make, as soon as possible after the contract is signed, complete and accurate shop drawings of all structural steel, machinery, and other details, and the connections thereof to the masonry.

Any details not sufficiently shown on the contract drawings will be furnished to the Contractor by the Engineer upon request.

The estimated weight of each shipping unit shall be clearly indicated on the shop drawings on which this unit is detailed.

326 Disagreement of Scale Dimensions

In case of disagreement on any drawing between scale dimensions and figures the figures shall be followed.

327 Size of Shop Drawings

Shop drawings shall be neatly drawn on tracing cloth of the best quality, approved by the Engineer cut to a standard size of 24 x 36 inches and arranged in general to conform to our contract drawings. The margin line shall be drawn 1 inch from the top, bottom and right hand edges and 2 inches from the left hand edge to permit binding. The working space on these drawings will therefore be 22 x 33 inches. A space 3 x 11 inches, the 11-inch dimension being parallel to the length of the sheet, shall be reserved in the lower right hand corner for title and approval signatures. The sheets shall be arranged so that as far as possible the notes will appear above each other near the right hand edge of the sheet.

These drawings shall be arranged in systematic order and numbered consecutively in the lower right hand corner similar to the contract drawings.

328 Errors on Contract Drawings

The Contractor shall carefully verify and shall become responsible for the correctness of all other than the principal controlling dimensions shown on the contract drawings, and shall call the attention of the Engineer to any errors or discrepancies that he may discover therein. He shall have no claim for damages which may result from following an error in any other than the principal controlling dimensions on these drawings.

329 Approval of Shop Drawings

When the shop drawings prepared by the Contractor, as above specified, are completed, duplicate blueprints shall be submitted to the Engineer, who will indicate thereon such corrections as may be necessary to secure the completion of the contract in accordance with the intent of the contract drawings and specifications. One set of blueprints, with desired corrections indicated in colored crayon thereon, will be returned to the Contractor. When the revision has been completed to the satisfaction of the Engineer he shall approve the shop drawings and will return them to the Contractor who shall carry out the construction in strict accordance therewith and who shall make no further changes therein except upon written instructions from the Engineer. The approval above referred to shall not, however, be held in any case to relieve the Contractor from the responsibility for errors that may exist in the shop drawings.

330 Commencement of Shop Work

No shop work shall be done until after the shop drawings have been approved.

331 Ordering of Materials

The Contractor shall bear all costs or damages which may result from the ordering of any materials prior to the approval of the shop drawings. (366, 367)

The Engineer shall be allowed, for the examination of a shop drawing or set of shop drawings, ten days, or one and one-half days for each drawings in a set, whichever period is the greater. If shop drawings are detained for examination for a longer period than above stated, the Contractor shall be granted an equivalent extension of time.

332 Detention of Drawings

After the completion of the contract and before the final estimate is paid, the Contractor shall deliver to the Engineer all approved tracings which shall thereafter remain the property of the State of New York.

333 Disposal of Tracings

The Contractor shall, when required, promptly furnish the Engineer with six complete sets of blueprints on cloth of the approved shop drawings without charge therefor. He shall also promptly furnish at cost any blueprints that may be required in excess of six complete sets. All blueprints shall be clear and distinct.

334 Blueprints

The cost of all drawings and of six complete sets of blueprints on cloth, as above specified, shall be included in the contract prices for the various items which appear upon the quantity sheet.

335 Cost of Shop Drawings, etc.

INSPECTION

All raw and finished materials and all workmanship thereon shall at all times and at all stages of the work or manufacture be subject to the inspection and acceptance or rejection of the Engineer, who shall at all times while the work or manufacture is in progress have free access to all parts of the furnaces, mills, foundries or shops in which the work, or any part thereof, is in progress.

336 All Material Subject to Inspection

The Contractor shall also notify the Engineer sufficiently in advance as to when the materials will be ready for inspection at the mills or foundries. No materials or finished members will be accepted which have not been fully passed upon by the Engineer and stamped by him with his private stamp.

339 Engineer to be Notified

The acceptance at any time of any materials or work shall not be a bar to its future rejection if subsequently found to be defective or inferior in quality or uniformity to the material specified, and any material accepted at the mills which under the punches, shears, etc., shows hard spots, brittleness, laminations, piping, cracks, lack of uniformity in quality or other defects, shall be rejected and replaced by satisfactory material solely at the expense of the Contractor.

340 Rejection of Accepted Material

The Contractor shall freely furnish all necessary testing machines of approved capacity and design, all test pieces and all other desired facilities for inspecting and testing raw material, ingots and finished material at the furnaces, mills and foundries and shall facilitate the examination of workmanship in the shops and during erection. In order that the inspection may be thoroughly made the Contractor shall move and turn over all pieces of material and all finished members as the Engineer may direct.

341 Facilities to be Furnished

MATERIALS.

Unless otherwise shown or specified upon the contract drawings, all parts of the structure shall be built of the materials specified in the following paragraphs:

Structural shapes and plates shall be rolled from medium, acid or basic, open-hearth steel.

342 Structural Shapes and Plates

374 **Rivets and Bolts**

Rivets shall be made from rivet steel and bolts from soft steel, both grades to be made by the open-hearth process.

375a **Steel**

Steel shall be subject only to surface inspection and cold bending tests. Test pieces cut from finished materials shall endure bending cold, one hundred and eighty degrees around a circle whose diameter is equal to the thickness of the test piece, without signs of cracking. One bending test shall be made upon at least one piece taken at random from every ten pieces of any particular size of plate, angle or other shape in stock. Full sized rivets shall endure bending flat upon themselves without signs of cracking.

WROUGHT IRON

393 **Process of Manufacture**

Wrought iron shall be tough, fibrous and uniform in quality and shall be manufactured by approved methods. Steel scrap shall not be used in its manufacture. Finished material shall be clean, smooth, true to shape, of workmanlike finish and free from defects.

394 **Tensile Tests**

Test pieces cut from finished material shall show an ultimate tensile strength of not less than 48,000 pounds per square inch, an elastic limit of not less than 25,000 pounds per square inch and an elongation of not less than twenty per cent in eight inches.

395 **Bending Tests**

Wrought iron test pieces cut from finished material when cold or when heated to a bright, cherry-red, shall endure bending 180 degrees around a circle whose diameter is equal to twice the thickness of the test piece without signs of cracking. Test pieces when nicked and broken shall show a fracture not less than ninety per cent fibrous, free from coarse, crystalline spots.

396 **Red Shortness**

Wrought iron when welded shall not show signs of red shortness.

PAYMENT FOR METAL WORK

484 **Basis of Payments**

Payment for the various classes of metal work will be made at the contract prices of the items under which the various metals are classified, which contract prices shall include the cost of all labor and materials required to furnish and erect in place all such metal work called for by the plans and specifications, unless otherwise provided for.

With the three exceptions noted below, payment will be made for the actual weight of metal, painted one coat, as determined at the shop before shipment.

485 **Exception 1**

Payment will not be made for weight in excess of one hundred and two per cent of the total estimated weight of the structural steel or in excess of one hundred and five per cent of the total estimated weight of the iron and steel castings and metal reinforcement required for the entire work. in each case the estimated weight shall be computed from the approved shop drawings.

486 **Exception 2**

Payment will not be made for the weight of the field coats of paint, the cost of which shall be included in the contract price of the material painted.

488 **Estimated Weights**

In calculating weights, the weight of one cubic foot of rolled or cast steel shall be taken at four hundred and ninety pounds, the weight of one cubic foot of wrought iron shall be taken at four hundred and eighty pounds and the weight of one cubic foot of cast iron shall be taken at four hundred and fifty pounds.

489 **Weighing**

All weighing will be done by the Engineer. The Contractor shall do the required handling of the material and shall furnish scales which shall be satisfactory to the Engineer, who may at any time require the Contractor to test the scales at his own expense.

PAINTING

490 **Brand**

All paint used shall be satisfactory to the Engineer and, unless otherwise specified, shall be of the best grade made by some established manufacturer whose products have been successfully used for a number of years upon many large and well known public works. Such paint, except for red and white lead priming coats shall be brought to the work, mixed ready for use, in unbroken packages having the maker's brand, which shall be approved by the Engineer before the packages are opened.

491 **Stirring**

When the original packages are opened, the paint shall be thoroughly stirred until it is of a uniform consistency from top to bottom, and it shall thereafter be stirred sufficiently often to maintain such uniform consistency. If the paint after stirring is too thick to spread well, the matter shall be brought to the attention of the Engineer.

492 **Adulterants Forbidden**

No thinners or adulterants of any kind shall be used without the premission of the Engineer.

493 **Red Lead**

Red lead shall be used for the shop coat on metal and it shall be thoroughly mixed immediately before using in the proportion of twenty-five pounds of pure dry red lead to one gallon of pure raw linseed oil and one-eighth pint of pure japan, free from benzine. No red lead paint shall be used that has been mixed for more than six hours. An approved pure red lead in paste form mixed with the proper quantity of pure raw linseed oil and pure turpentine japan drier may be used.

494 **Original Packages**

All lead, oil and japan shall be brought to the shop in their original packages.

495 **Analysis**

All paints shall be subject to analysis whenever the Engineer may so require.

496 **Shop Coat**

All steel and iron, including the railings, cast iron pipe, chains and excepting surfaces which are to be permanently in contact with motar or concrete, shall be thoroughly cleaned by effective methods from mill scale, rust, grease or dirt, and covered at the shops with one coat of red lead paint while clean and before any rust shall have formed. The paint shall be thoroughly applied to the metal. Painting shall be done under cover in stormy weather, and if the Engineer shall so require, the material painted shall remain under cover until the paint is dry; no painting shall be done when the metal is wet. No work shall be shipped until the paint has dried.

497 **Surfaces in Contact**

All surfaces coming in contact shall be painted on each surface, as above specified, before being riveted together.

500 **Machine Finished Surfaces**

All machine finished surfaces shall be thoroughly cleaned and heavily coated as soon as finished with a mixture of pure white lead and tallow.

500½ **Priming Woodowrk**

All woodwork upon which painting is called for on the plans or directed by the Engineer, shall receive a priming coat of either white lead and pure raw, linseed oil mixed, or of prepared paint reduced by the addition of pure, raw linseed oil, both as directed by the Engineer. All knots and blemishes shall be shellaced before priming. After priming all nail or other holes and cracks shall be carefully filled with putty. Door and window frames and other mill work shall either be primed at the mill or as soon as received at the work and before erection.

501 **Recesses**

All recesses which will retain water, or through which water can enter, shall be filled with paint skins or waterproof cement to the satisfaction of the Engineer before the field painting is begun.

502 **Field Coats**

After erection, all metal work, exposed to the air, or wood work upon which painting is called for or directed by the Engineer shall have two additional coats of paint, thoroughly and evenly applied. The third coat shall not be applied until the second is dry, and at least forty-eight hours shall elapse between the application of any two coats. Before the field painting is begun, the structure shall be thoroughly cleaned from rust, snow, ice, dirt, etc., and retouched where the shop coat is rubbed off. No painting shall be done in unsuitable weather or when the metal or wood is wet.

502½ **Gate House Floor**

The concrete floor of the gate house shall be painted with "B. P. S. cement floor coating" made by the Patterson-Sargent Co. or the equivalent. It shall be applied as recommended by the manufacturer and in a manner satisfactory to the Engineer. The painting of the concrete floor shall not be commenced until all other work shall have been completed, unless otherwise permitted by the Engineer. Before painting is begun, all cracks, holes, crevices, etc. shall be filled with cement and allowed to become dry and hard. The floor shall be free from oil or grease, dry and clean.

503 **Colors**

Colors shall be as specified in the painting schedule.

504 **Neat Appearance**

The finished structure shall present a neat and satisfactory appearance.

505 **Experienced Workmen**

Painting shall be done by competent workmen.

506 **Brushes**

All painting shall be done with stiff brushes of approved form and no spraying shall be permitted. All coats shall be well brushed out.

507 **Use of Swabs**

Cloths and swabs shall be used for painting surfaces not accessible to the paint brush.

507½ **Chains**

Stop gate and rack chains shall be dipped after testing. Guard and railing chains shall be painted.

508 **Payment**

Payment for all labor and materials needed to properly paint all work as specified in the preceding paragraphs or called for on the plans will be included in the contract price of the material painted.

The various items to be painted and the treatment of each shall be as follows:
Cast iron pipe black (Paragraph 207).
Pipe railing — black paint.
Window sash and door — French gray paint.
Clapboards — French gray.
Trim — white lead.
Crane and superstructure — French gray paint.
Chain — Black dipped (See Wrought Iron Chain).
Floor plates — Black paint.
Racks and stop gates — Black paint.
Valves — Black paint.
Blow off valve chamber cover — French gray.

508j
Painting
Schedule

COVER FOR BLOWOFF CHAMBER

The blowoff valve chamber shall be covered with two inch plank. Joints shall be T. & G and painted with one thick coat of white lead. Planks shall be supported by 2 x 8 beams. A 24-inch square opening in the center shall be covered with a water proof hinged scuttle and provided with a brass padlock.

The entire cover shall be readily removable. Payment for cover shall be made at the contract price for Valve Well Cover. This Contract price shall include all hardware and painting.

WROUGHT IRON CHAIN

Chains for stop gates shall be one half inch hand made wrought iron chains having a proof load of 8,000 lbs. After being tested to the full proof load in the presence of the Engineer, the chain shall be heated to a temperature of 300 degrees Fahrenheit and dipped for at least five minutes in coal tar varnish. The varnish shall be maintained at a temperature of 300 degrees Fahrenheit while the chain is immersed. The chain shall be withdrawn, drained and quickly redipped so that any portions not covered by the first immersion will be covered.

These specifications apply also to $\frac{1}{4}$ inch chain except that the proof test for $\frac{1}{4}$ inch chain shall be 1,500 pounds.

Payment for wrought iron chain, together with the necessary grab hooks, shackles, anchors, rings etc., will be made at the contract price per pound for wrought iron chain.

The above specified dipping shall be included in this contract price.

STOP GATES AND RACKS

Each opening to wells in gate house shall be equipped with a rack and a stop gate. These shall be interchangeable. One extra rack complete with chain for lower culvert shall be furnished. The blowoff pipe shall be furnished with stop gate only, the rack being omitted.

The finished bearing surface of the concrete around gates shall be a plane and stop gates shall have a tight fit over each opening. The copper screen on the upstream face of racks shall be set entirely within the outer edge of the frame of the rack and shall be securely attached thereto, after the painting of the rack has been completed. The method of attaching shall be such as to reduce to a minimum any injury to the screen fastenings while rack is being raised or lowered.

Raw edges of screen or ends of wire liable to produce injuries while handling shall not be left.

The method of fastening shall be satisfactory to the Engineer. The cost of all labor and material required in furnishing and attaching screens shall be included in the contract price for copper rack screen. Payment shall be made for the actual number of square feet of copper rack screen actually placed on the racks. If in the opinion of the Engineer the specified screen can not be procured, an equivalent screen may, subject to the approval of the the Engineer, be substituted therefor.

508½
Painting Schedule

The various items to be painted and the treatment of each shall be as follows:
Cast iron pipe black (Paragraph 207).
Pipe railing — black paint.
Window sash and door — French gray paint.
Clapboards — French gray.
Trim — white lead.
Crane and superstructure — French gray paint.
Chain — Black dipped (See Wrought Iron Chain).
Floor plates — Black paint.
Racks and stop gates — Black paint.
Valves — Black paint.
Blow off valve chamber cover — French gray.

COVER FOR BLOWOFF CHAMBER

The blowoff valve chamber shall be covered with two inch plank. Joints shall be T. & G. and painted with one thick coat of white lead. Planks shall be supported by 2 x 8 beams. A 24-inch square opening in the center shall be covered with a water proof hinged scuttle and provided with a brass padlock.

The entire cover shall be readily removable. Payment for cover shall be made at the contract price for Valve Well Cover. This Contract price shall include all hardware and painting.

WROUGHT IRON CHAIN

Chains for stop gates shall be one half inch hand made wrought iron chains having a proof load of 8,000 lbs. After being tested to the full proof load in the presence of the Engineer, the chain shall be heated to a temperature of 300 degrees Fahrenheit and dipped for at least five minutes in coal tar varnish. The varnish shall be maintained at a temperature of 300 degrees Fahrenheit while the chain is immersed. The chain shall be withdrawn, drained and quickly redipped so that any portions not covered by the first immersion will be covered.

These specifications apply also to ¼ inch chain except that the proof test for ¼ inch chain shall be 1,500 pounds.

Payment for wrought iron chain, together with the necessary grab hooks, shackles, anchors, rings etc., will be made at the contract price per pound for wrought iron chain.

The above specified dipping shall be included in this contract price.

STOP GATES AND RACKS

Each opening to wells in gate house shall be equipped with a rack and a stop gate. These shall be interchangeable. One extra rack complete with chain for lower culvert shall be furnished. The blowoff pipe shall be furnished with stop gate only, the rack being omitted.

The finished bearing surface of the concrete around gates shall be a plane and stop gates shall have a tight fit over each opening. The copper screen on the upstream face of racks shall be set entirely within the outer edge of the frame of the rack and shall be securely attached thereto, after the painting of the rack has been completed. The method of attaching shall be such as to reduce to a minimum any injury to the screen fastenings while rack is being raised or lowered.

Raw edges of screen or ends of wire liable to produce injuries while handling shall not be left.

The method of fastening shall be satisfactory to the Engineer. The cost of all labor and material required in furnishing and attaching screens shall be included in the contract price for copper rack screen. Payment shall be made for the actual number of square feet of copper rack screen actually placed on the racks. If in the opinion of the Engineer the specified screen can not be procured; an equivalent screen may, subject to the approval of the the Engineer, be substituted therefor.

The gates are to be raised and lowered by half inch wrought iron chains securely attached thereto and the upper ends of the chains are to be fastened to anchors embedded in the concrete. Both upper and lower connections shall be such as to permit ready removal and interchangeability of chains. The chains are to be operated by a hand crane and the upper ends of chains must terminate in a ring suitable for shackle connections in wall or hook connection to crane.

Payment for the stop gates and racks will be made at the contract price per pound for structural steel. Payment for the oak strips on the stop gates will be made at the contract price per gate for stop gate seals.

GLASS

Windows shall be glazed with double thick, "A" quality of cylinder glass measuring not more than eight lights to the inch in thickness and weighing approximately 21 oz. to the square foot. Lights of glass which show objectionable waves or defects will be rejected and they shall be replaced by glass satisfactory to the Engineer.

Glass shall be bedded in putty and shall be secured by glazier points.

ROOFING

Shingles shall be laid directly on shiplap. Cedar shingles of the best obtainable quality shall be furnished and laid four inches to the weather.

Shingle nails shall be galvanized and of such a length that the points will not pass through the under side of sheathing.

Ridge rolls shall be of No. 24 gage galvanized iron and shall be soldered at joints.

Payment for roofing shall be included in the contract lump sum price for Gate House.

MILL WORK

All lumber used in mill work shall be thoroughly seasoned, free from shakes, sap, loose knots, knot holes, wanes and all other defects impairing its strength, durability or appearance. All finished work shall be smooth and shall show no tool marks.

All work shall be done by skilled mechanics in the best and most workmanlike manner. The exposed surfaces of trim, door, sash, etc., shall be sand papered smooth, ready to receive paint. Nails shall be set for putty stopping.

Appropriate hardware (hinges, locks, knobs, sash fasteners, padlock, etc.) of plain substantial type satisfactory to the Engineer, shall be furnished and installed. Lock for door shall be of the type commonly known as Yale Lock and be furnished with two keys. Padlock for scuttle over blowoff valve shall be brass and of the six lever type. Sash, door and frames shall be of approved construction and of clear, kiln dried lumber, and shall be primed on all sides at the time of making.

Sash shall be $1\frac{1}{4}$ inches thick and shall be hung complete with weights, safety chain and fasteners.

Door shall be full $1\frac{1}{8}$ inches thick with moulded panels.

Clapboards shall be cut true at joints and fit snugly at ends.

PAYMENT FOR GATE HOUSE

Payment for all anchor bolts, lumber, trim, sash, door, ship lap, clapboards, shingles, paper, hardware and other materials and all painting and labor necessary to construct the gate house will be included in the contract price for the gate house.

Payment for the gate house will be made at the contract price for the gate house, per lump sum.

VALVES

Valves shall have iron body, bronze or brass mounted and be of the parallel seat, double gate type, with outside rising stem operated by hand wheels except blowoff valve which shall be fitted with a five foot removable key. Connections shall be as indicated on the plans. Valves shall be standard, designed for the proper head and purpose and made by some well established manufacturer satisfactory to the Engineer.

Payment for valves shall be made at the contract lump sum price for valves of the various sizes called for.

Three inch valves shall be provided with stems from valve to elevation 590.5 and terminating in a hand wheel. These stems shall have bearings securely fastened to the walls of the wells at proper intervals.

Payment for the stems and wheels shall be included in the contract price for three inch valves.

SANITARY

The location of bunk houses, kitchens, mess shacks, buildings or tents for like purposes on the site of, or on ground tributary to the future reservoir is prohibited. The Contractor shall provide for the use of workmen and others employed on the contract an adequate number of properly located, enclosed and sanitarily constructed fly proof privies and maintain same in a sanitary manner, all as directed by the Engineer.

Upon the completion of the work or the earlier abandonment of the privy or when so directed by the Engineer, the entire contents of the vault, together with as much of the side wall and bottom as directed shall be removed, treated and disposed of as directed by the Engineer, and the vault refilled with earth.

The Contractor shall be responsible for the observance by his employees, either direct or through sub-contractors, of all sanitary regulations promulgated by the Engineer, and the Contractor shall immediately discharge any employee failing to observe same if so directed by the Engineer and that employee shall not be re-employed without the consent of the Engineer.

CRANE

Gates and racks in gate house will be operated by a traveling hand crane fitted with Yale Triplex block hoist or equivalent, of 12 feet lift. Crane, chain and other parts shall be safely capable of moving and raising a four ton load, and shall be so arranged as to lift and move gates and screens to any part of the gate house floor.

The Contractor shall submit detailed design of crane, including substructure, to the Engineer for his approval. Crane will be similar to that made by the Brown Hoisting Machinery Company and shown in their Catalog D 1914, Page 45.

From the plans it will be seen that the substructure shall be placed close to the inside walls of the gate house in order to secure maximum amount of space in which to store gates and racks not in use.

The crane shall be tested as to its operation by raising and lowering racks and gates and interchanging the same. These tests shall be made as directed by and to the satisfaction of the Engineer. Any defects developed by the tests shall be rectified by the Contractor without cost to the State. The cost of these tests shall be included in the contract price of the apparatus tested.

The crane shall be considered to include all parts of hoist supported by or rolling on the parallel tracks forming the upper part of the substructure.

Payment for crane will be made at the contract price for crane.

CRANE SUBSTRUCTURE

The crane substructure or supporting frame for parallel tracks on which the crane travels shall be fabricated from rolled shapes. The design may be varied to suit the type of crane selected. Complete shop drawings of substructure shall be submitted by the Contractor. (See Paragraph 325.)

Payment for the crane substructure, including the parallel tracks will be made at the contract price per pound for structural steel.

OFFICE

Unless otherwise directed the Contractor shall provide at the site of the work for the use of the Engineer in a location approved by him, a suitable weatherproof office with wooden floor, of approved design, not less than 12 feet wide, 16 feet long and 8 feet high at the eaves, with door and lock and two glazed windows.

Payment for materials and construction of office complete will be made at the contract price for field office.

STATE OF NEW YORK

PRELIMINARY ESTIMATE OF QUANTITIES AND COST

Description: For the construction of a dam, gate house, reservoir and appurtenances for the Marcy Division of the Utica State Hospital at Marcy, New York.

Chapter 238, Laws of 1917.

Chapter 177, Laws of 1919, Part 3.

ALBANY, JULY 12, 1919.

Item No.	% of Rounding	Quantities	ITEMS	PRICE		AMOUNT	
				Dolls.	Cts.	Dolls.	Cts.
1	.....	1	Lump Sum Clearing.....Per Lump Sum	600	00	600	00
2	.....	30,000	Cu. Yds. Grubbing.....Per Cu. Yd.	1	00	30,000	00
3	10	8,100	Cu. Yds. Excavation.....Per Cu. Yd.	1	75	14,175	00
4	10	11,500	Cu. Yds. Second-class Concrete.....Per Cu. Yd.	11	00	126,500	00
5	5	9,000	Lbs. Structural Steel.....Per Lb.	0	12	1,080	00
6	10	900	Lbs. W. I. Chain.....Per Lb.	0	40	360	00
7	5	2,200	Lbs. Metal Reinforcement.....Per Lb.	0	08	176	00
8	5	650	Lin. Ft. W. I. Pipe Railing.....Per Lin. Ft.	2	00	1,300	00
9	10	9	Tons Furnishing and Laying C. I. Pipe and Specials.....Per Ton	80	00	720	00
10	.....	1	Each 24-inch Valve.....Per Each	250	00	250	00
11	.....	2	Each 3-inch Valve.....Per Each	12	00	24	00
12	.....	1	Each 2-inch Valve.....Per Each	8	00	8	00
13	5	80	Sq. Ft. Copper Rack Screen.....Per Sq. Ft.	0	50	40	00
14	.....	1	Lump Sum Gate House Superstructure.Per Lump Sum	800	00	800	00
15	*	1	Lump Sum Field Office.....Per Lump Sum	300	00	300	00
16	.....	1	Lump Sum Crane and Hoist.....Per Lump Sum	550	00	550	00
17	.....	1	Lump Sum Valve Well Cover.....Per Lump Sum	15	00	15	00
18	.....	1	Lump Sum Coffer-dams, Pumping, Bailing and Draining.....Per Lump Sum	300	00	300	00
19	.....	5	Lump Sum Gate Seals.....Per Gate	6	00	30	00
						177,228	00

* Contingent item.

STATE OF NEW YORK

QUANTITIES EXHIBITED AND PROPOSITIONS RECEIVED

AT THE OFFICE OF THE

STATE HOSPITAL COMMISSION

Description: For the construction of a dam, gate house, reservoir and appurtenances for the Marcy Division of the Utica State Hospital at Marcy, New York.

Chapter 238, Laws of 1917.

Chapter 177, Laws of 1919, Part 3. ALBANY,.....1919.

Item No.	% of Rounding	Quantities	ITEMS	PRICE		AMOUNT	
				Dolls.	Cts	Dolls.	Cts
1	.....	1	Lump Sum Clearing.....Per Lump Sum				
2	.....	30,000	Cu. Yds. Grubbing.....Per Cu. Yd.				
3	10	8,100	Cu. Yds. Excavation.....Per Cu. Yd.				
4	10	11,500	Cu. Yds. Second-class Concrete.....Per Cu. Yd.				
5	5	9,000	Lbs. Structural Steel.....Per Lb.				
6	10	900	Lbs. W. I. Chain.....Per Lb.				
7	5	2,200	Lbs. Metal Reinforcement.....Per Lb.				
8	5	650	Lin. Ft. W. I. Pipe Railing.....Per. Lin. Ft.				
9	10	9	Tons Furnishing and Laying C. I. Pipe and Specials.....Per Ton				
10	.....	1	Each 24-inch Valve.....Per Each				
11	.....	2	Each 3-inch Valve.....Per Each				
12	.....	1	Each 2-inch Valve.....Per Each				
13	5	80	Sq. Ft. Copper Rack Screen.....Per Sq. Ft				
14	.....	1	Lump Sum Gate House Superstructure Per Lump Sum				
15	*	1	Lump Sum Field Office.....Per Lump Sum				
16	.....	1	Lump Sum Crane and Hoist.....Per Lump Sum				
17	.....	1	Lump Sum Valve Well Cover.....Per Lump Sum				
18	.....	1	Lump Sum Coffer-dams, Pumping, Bailing and Draining.....Per Lump Sum				
19	.....	5	Lump Sum Gate Seals.....Per Gate				

* Contingent item.

The undersigned, resident ..... County of ..... hereby propose ..... to the State Hospital Commission of the State of New York, to construct and to finish, in accordance with the plans and specifications prepared therefor by the State Engineer and Surveyor, and this day exhibited to the undersigned by the State Hospital Commission, all of the work therein described for the prices above named, said prices to be in full compensation for all work, labor and material required to complete the said work according to the meaning and intent of said plans, specifications and contract, and on the acceptance of this proposal for said work do ..... hereby bind ..... to enter into contract with the said State Hospital Commission at such time and place as shall be required by them and to give the required bond and surety to perform said work for the consideration above named.

Marcy Division

Accompanying this proposal is a draft or certified check for $ ....., being 10 per cent of the amount of the proposal. This money shall become the property of the State of New York if in case this proposal shall be accepted by the State through the State Hospital Commission, the undersigned shall fail to execute a contract and furnish the surety required by the law within the time fixed; otherwise the said money is to be returned to the undersigned.

...1919.

Dated at ..... the ..... day of ....., 191....

AMOUNT	
Dolls.	Cts

..... { P. O. Address ..... County of .....

..... { P. O. Address ..... County of .....

CONTRACT

STATE OF NEW YORK

DEPARTMENT STATE HOSPITAL COMMISSION

Made between.....

.....

hereinafter referred to as the "Contractor," and the People of State of New York, hereinafter referred to as the "State," this.....day of.....

191..., by which the Contractor covenants and agrees to furnish all work, labor and services and material of every kind, and to do and perform each and every act and thing necessary or proper for the construction of a dam, gate house, reservoir and appurtenances for the Marcy Division of the Utica State Hospital at Marcy, N. Y., in accordance with the plans and specifications for said work hereto annexed and forming a part hereof, and to fully complete said improvement in accordance with the true intent and meaning of said plans and specifications without any further, other or different expense whatsoever to the State, than the consideration hereinafter provided to be paid therefor by the State.

1. It being understood and agreed that the Contractor shall make said improvements and conduct the work in compliance with all laws of the State of New York and the ordinances of any city, village or town and the lawful directions of the officers, agents or representatives of the State or of said city, village or town.

2. The Contractor further stipulates and agrees pursuant to Section 3, Article II, of the Labor Law, that no laborer, workman or mechanic in the employ of the Contractor, sub-contractor or other person doing or contracting to do the whole or a part of the work contemplated by this contract, shall be permitted or required to work more than eight hours in any one calendar day, except in case of extraordinary emergency caused by fire, flood or danger to life or property.

3. The Contractor further stipulates and agrees that the wages to be paid for a legal day's work as hereinbefore defined, to all classes of such laborers, workmen or mechanics employed by him or by any sub-contractor or other person on, about or upon said work or upon any material to be used upon or in connection therewith shall not be less than the prevailing rate of wages for a day's work in the same trade or occupation in the locality within the State where such public work on, about or in connection with which such labor is performed in its final or completed form is to be situated, erected or used; and that each such laborer, workman or mechanic shall be paid such wages herein provided for. The Contractor further agrees that this contract shall at the option of the State be void and of no effect unless said Contractor, sub-contractor and each and every person who may have any part on the Contractor's behalf in performing the same shall comply with the provisions of this paragraph.

4. The Contractor further agrees that in the construction of said work only citizens and such persons as shall have duly declared their intention to become citizens of the United States shall be employed; and in all cases where laborers are employed on such public works preference shall be given to citizens of the State of New York. The Contractor further agrees that this contract shall, at the option of the State, be void if the provisions of this section are not complied with.

5. The Contractor further agrees that he will not assign, transfer, convey, sublet, or otherwise dispose of this contract or of his right, title or interest therein or his power to execute the same without the consent in writing of the State Hospital Commission, or any moneys which are to become due, or payable to him because thereof, to any person, company or corporation, without the previous consent in writing of the State Hospital Commission, and that until such consent in writing shall have been given, no claim or demand shall exist to any of the moneys to be paid by the State on account of the provisions of this contract in favor of any person, association or corporation except the said Contractor.

6. It is mutually agreed that the State reserves the right until the final completion and acceptance of the work, to make such additions to or deductions from such work or changes in the plans and specifications covering the work, as may be necessary, and the contract shall not be invalidated thereby; and the Contractor shall do and complete the work in accordance with such additions to or deductions from or changes in the plans and specifications, and no claim shall be made by the Contractor for any loss of profits because of any such change or by reason of any variation between the quantities of the approximate estimate and the quantities of the work as done; and that the amount of payment for such work shall be based upon item prices specified in this contract, if there be such; but, if such additions, deductions or changes shall require the furnishing of items of labor or materials or both other than those for which prices are fixed, the Contractor shall nevertheless perform the work and furnish the materials, when properly ordered so to do, and the compensation therefor shall be determined by the contract price of similar items, if there be any such, so far as may be, and if there be no item prices of a similar nature, then compensation shall be fixed by mutual agreement based on the market prices so far as such prices may be made applicable thereto.

7. It is mutually agreed that no alteration shall be made in any such map, plan or specification or in the plan of any work under this contract during its progress, except with the consent and approval of the State Hospital Commission and the State Engineer, nor unless a description of such alteration and such approval be in writing and signed by the parties making the same and a copy thereof filed in the office of the State Engineer and the State Hospital Commission.

8. It is mutually agreed that no change of plans or specifications which will increase the expense of said work or create any claim against the State for damage arising therefrom, shall be made unless a written statement, setting forth the object of the change, its character, amount and the expense thereof, is submitted to the State Hospital Commission and the State Engineer, and their assent thereto is obtained.

9. It is further mutually agreed that no extra work shall be certified for payment or paid for unless said work is done pursuant to written order of the State Engineer and State Hospital Commission.

10. The Contractor agrees that he has satisfied himself by his own investigation and research regarding all the conditions affecting the work to be done and labor and material needed, and that his conclusion to execute this contract is based on such investigation and research, and not on the estimate of the quantities or other information prepared by the State Engineer, and that he shall make no claim against the State because any of the estimates, tests or representations of any kind affecting the work made by any officer or agent of the State, may prove to be in any respect erroneous.

11. It is further mutually agreed that if, in the judgment of the State Hospital Commission the work is not being performed according to the contract or for the best interests of the State, the State Hospital Commission shall have power to suspend or stop the work under this contract while it is in progress and complete the same in such manner as will accord with the contract specifications and be for the best interests of the State; or at the option of the State Hospital Commission that the contract may be cancelled and the work readvertised and relet, and in such cases that any excess in the cost of completing the contract beyond the price for which the work was originally awarded shall be charged to and paid by the Contractor.

12. It is mutually agreed that the right is reserved to the State Hospital Commission to suspend or cancel this contract, as above provided, and to continue the work in part or entirety, to protect the work accomplished, to salvage the plant and material, to complete the contract or readvertise and relet the same.

13. The Contractor further promises and agrees that all tools, machinery, appliances and materials of every kind which shall be necessary and proper for use upon said work and used or delivered for use upon the same, shall at all times be owned by the Contractor free and clear from all liens or encumbrances of any kind or nature whatsoever, and that if the State by its officers or agents or any of them shall, in the exercise of the rights hereinbefore reserved, assume the execution of this contract or any part thereof or to perform the said work or any part thereof, that the State may take possession of and use for that purpose all of said tools, machinery, appliances and materials, or such thereof as may be necessary, without let or hindrance by the Contractor, or by the Contractor's agents, servants or assistants, and that the State shall have the sole and exclusive right to the possession and use of such tools, machinery, appliances and materials as may be necessary for said purposes, and the value of the use thereof, which shall be determined by the State Hospital Commission, shall be applied upon the cost of completing the contract and credited to the Contractor; and the State shall not be liable for any depreciation, loss or damages to said tools, machinery, appliances and materials during said use by the State, unless caused by its negligence.

14. In case of any discrepancy or ambiguity in the plans, specifications or maps, or between them the matter must be immediately submitted to the State Engineer, who shall adjust the same and his decisions in relation thereto shall be final and conclusive upon the parties.

15. The Contractor shall, immediately after the execution of this contract, begin the necessary preparations to do the work, and promises and agrees that the work shall be fully completed on or before the.....day of....., 193..

The Contractor agrees to notify the State Hospital Commission and the State Engineer one week in advance of actual operations. In the event that the State shall not have fully acquired possession of the lands, structures or waters within the contract site, when said Contractor is ready to begin actual operations, the time for the completion of this contract shall be deemed extended for a period equal to the time of the actual delay caused thereby.

16. The parties mutually agree that time is of the essence of this contract and that the damages to the State for failure of the Contractor to have fully completed the work on or before the date last mentioned, shall be twenty dollars per day for each day after the said date that shall elapse before the work shall be fully completed, which amount shall in no event be considered as a penalty, or otherwise than the liquidated and adjusted damages of the State because of said delay and which damages the Contractor shall promptly pay, and which damages the State Hospital Commission may retain from any moneys which otherwise shall be payable to the Contractor; and in the event that the moneys payable as aforesaid are not sufficient to fully compensate the State because of such delay, then the Contractor promises and agrees to pay the balance of said damages to the State promptly upon demand by the State Hospital Commission.

18. All measurements, inspections and estimates shall be made by the State Engineer and the engineers appointed by him, during the progress of the work, and all work shall be executed to the satisfaction of the State Hospital Commission and the State Engineer and Surveyor and in conformity with the instructions of the former. The Contractor agrees that all work or material which may be rejected by the State Engineer or the State Hospital Commission or their representatives shall at once be removed from the site of the work by the Contractor at his own expense and replaced by satisfactory work or material. The Contractor shall at all times employ a sufficient number of competent workmen and provide sufficient and proper materials to ensure the completion of the work within the time stipulated. Any foreman or workman who may be in the employ of the Contractor, and whom the State Engineer or the State Hospital Commission deem incompetent or unfit, shall, at the direction of the State Engineer or the State Hospital Commission be immediately dismissed from the work.

19. The Contractor shall maintain an office upon the work or so close thereto as to be conveniently accessible, and it is agreed that any written direction or request of the State Hospital Commission delivered to a person in charge of said office, or, in the event of the absence of any such person from the office, left therein in a conspicuous place, or affixed to the door thereof, shall have the same force and effect as if communicated to the Contractor personally.

20. The Contractor agrees to employ an English-speaking foreman with each separate number of persons who may be employed on said work and that instructions and directions concerning the work given such foreman by the State Hospital Commission or his representative shall have the same force and effect as if personally communicated to the Contractor.

21. It is further agreed that, so long as any lawful or proper direction concerning the work or material, given by the State Hospital Commission or its representative shall remain uncomplied with, the Contractor shall not be entitled to have any estimate made for the purpose of payment.

22. The Contractor agrees to indemnify the State and save it harmless from all costs, damages or expenses of any kind by reason of any claim or claims which may be made that injury to person or property shall have resulted from any wrong, negligence or want of care or skill on the part of the Contractor, his agents or servants, or either of them, in the execution of the contract, or anything in any way connected therewith or incidental thereto, including any claim of other contractors that the work or anything appertaining thereto has been so managed or conducted as to impede, wrong or injure them.

23. The Contractor further agrees that all damages of whatever nature resulting from the work or resulting to the work during its progress, from whatever cause, shall be borne and sustained by the Contractor; that all work shall be solely at the Contractor's risk until it has been finally inspected and accepted by the State Engineer and State Hospital Commission. It is, however, distinctly understood and agreed that the inclusion of any work or material in any said estimates or any payment which may be made on account thereof, or the approval of said work by the State Engineer and State Hospital Commission, or all of said acts shall not operate as an unqualified acceptance of the same or a waiver of any deficiency in material or workmanship which may be discovered within one year after such approval by the State Engineer and State Hospital Commission, it being understood and agreed that any such deficiency or defect so discovered may be remedied by the State Engineer under the direction of the State Hospital Commission, and proper workmanship and material used to put the work in the condition required by this contract according to the plans and specifications and any changes therein made as herebefore set forth. That the expense thereof may be audited by the State Engineer and the State Hospital Commission and that the amount as fixed by said audit shall be final and conclusive upon the parties, and that thereupon the Contractor will immediately pay the amount as thus fixed, to the State.

24. The Contractor agrees to save harmless the State, its officers, agents and employees from and against all demands of whatsoever kind for or on account of the use of any patented plan, design, suggestion, invention, article or appliance that has been or may be adopted, used or included in the work mentioned in this contract.

25. The Contractor agrees that no public or private road that crosses or intersects the line of said work shall be obstructed, nor shall any crops of any kind or nature, or any dwelling house or other building within the site be disturbed, except with the written consent of the State Engineer, and then only in such manner and for such time as may be specified in said written consent.

26. It is mutually agreed that all timber, stone, iron, steel or other materials in existing artificial structures within the site, excepting such as can be made use of by the Contractor in connection with the work on this contract, and excepting also such as are conveyed to the Contractor by this contract for a consideration, as well as all materials of value which may be found in natural deposit in the excavation to be made by said work, are and shall remain the property of the State, that all such materials not so used shall be removed by the Contractor at his own expense to such place within a reasonable distance as the State Engineer and Surveyor or the State Hospital Commission may designate, and shall be there neatly piled and stored under their direction at the

Contractor's expense. In case there are buildings or structures upon the site of this work, the Contractor shall have no right to rent or lease the same or permit any part thereof to be occupied or to be used, except by the Contractor and for the purpose of doing the work or storing material required by the specifications, and then only on written permission of the State Hospital Commission.

26½. In the case of any building or buildings which, under the terms of this contract, are to be removed by the Contractor and become his property upon removal, the Contractor shall not gain title to any fixture or fixtures, machinery or any other appurtenance which may be determined as fairly removable therefrom; the appropriation by the State covering merely lands, buildings and other structures; all removable appurtenances remaining the property of the owner from whom the lands and buildings have been or shall be appropriated.

27. The State reserves the right to deliver to the Contractor for use in said work, stone, gravel, sand or other material which may be found outside of the site of said work, or which may be the property of the State in or upon lands appropriated but not in the path of excavation, for which material the Contractor shall be charged, in payment for the work contemplated by this contract, the prices to be specified in the quantity sheet to form a part of his bid, or at prices to be agreed upon.

28. In consideration of the covenant and agreements of the Contractor, herein contained, and in the event of their being fully kept and performed, the State agrees to pay the Contractor the following prices, viz.:

29. The State Engineer shall, between the first and fifteenth days of each month, make and file with the State Hospital Commission an estimate of the amount, character and quality of the work done and of material which has been actually put in place in accordance with the terms and conditions of this contract, during the preceding month, and compute the value thereof. The State Hospital Commission will, within fifteen days thereafter, at its office in the city of Albany, N. Y., pay to the Contractor the money which shall have been properly appropriated for that purpose, a sum not to exceed ninety per cent of the value of the work performed and material furnished as so certified by the Engineer — retaining not less than ten per cent thereof until the contract shall have been completed and approved by the State Engineer and the State Hospital Commission.

WITNESS our hands and seals the day and year first above written.

.....(Seal)

.....(Seal)

.....(Seal)

.....(Seal)

State Hospital Commission.

(Acknowledgment by Contractor, if an individual.)

STATE OF NEW YORK, }
COUNTY OF..... } ss.:

On this.....day of....., 191....., before me personally appeared.....

to me known to be the person described in, and who executed the foregoing instrument, and he duly acknowledged that he executed the same.

.....

Notary Public.....County.

(County Clerk's certificate to be attached.)

(Acknowledgment by Contractor, if a corporation.)

STATE OF NEW YORK, }
COUNTY OF..... } ss.:

On this.....day of....., 191....., before me personally came.....

to me known, who being by me duly sworn, did depose and say that he resides in.....

.....; that he is the.....

of the.....

the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by authority of the Board of Directors of said corporation, and that he signed his name thereto by like authority.

.....

Notary Public.....County.

(County Clerk's certificate to be attached.)

(Acknowledgment by Contractor, if a corporation; when two officials execute.)

STATE OF NEW YORK, } ss.:
COUNTY OF..... }

On this.....day of....., 191..... before me personally came.....
to me known, who being by me duly sworn, did depose and say that he resides in.....
.....
that he is the.....of the.....
.....the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by authority of the board of directors of said corporation, and that he signed his name thereto by like authority. And the said.....further says that he is acquainted with ..... and knows him to be the.....of said corporation; that the signature of the said ....., subscribed to the said instrument, is in the genuine handwriting of the said ....., and was subscribed by like authority of the said board of directors and in the presence of him the said.....

.....

Notary Public.....County.

(Acknowledgment by Contractor, if a firm or copartnership.)

STATE OF NEW YORK, } ss.:
COUNTY OF..... }

On this.....day of....., 191....., before me, the subscriber, personally appeared.....
to me known and known to me to be the individual who executed the foregoing instrument as a member of the co-partnership of.....
who, being by me duly sworn, did depose and say, that he resides in.....
that he is a member of the above-named co-partnership which is composed of himself and.....
.....who are all the persons interested therein; that he executed the foregoing instrument on behalf of the said co-partnership and as a member thereof; that he was authorized to execute the same; and he acknowledged to me that he executed the same on behalf of the said co-partnership for the purposes therein stated.

.....

(County Clerk's certificate to be attached.) Notary Public.....County.

FAITHFUL PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS

That we.....

Contractor..... and.....

.....

..... surety are held and jointly and severally firmly bound unto THE PEOPLE OF THE STATE OF NEW YORK in the sum of

.....dollars

($.....) lawful money of the United States, to be paid to the said, the People of the State of New York or to their certain attorney or attorneys or assigns, for which payment, well and truly to be made, we bind ourselves, our successors, heirs, executors, administrators and assigns, jointly and severally, firmly by these presents.

SEALED with our seals. Dated this.....day of.....

in the year of our Lord one thousand nine hundred and.....

WHEREAS the above bounden Contractor has covenanted and agreed to furnish all work, labor and services and material of every kind, and to do and perform each and every act and thing necessary and proper for the construction of a dam, gate house, reservoir and appurtenances for the Marcy Division of the Utica State Hospital at Marcy, N. Y. in accordance with the plans and specifications for said work adopted by the State Hospital Commission of the State of New York, or in accordance with said plans and specifications as the same may be altered by the proper officers or agents of the State of New York from time to time.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the said Contractor....., *his, its, their* successors, executors, administrators, or assigns, or either of them shall faithfully and completely perform said contract, then this obligation to be void, otherwise to remain in full force and effect. The said surety hereby stipulates and agrees that no change, extension, alteration or revision of the terms of said contract or of the plans and specifications accompanying the same shall in any way affect *his, their, its* obligation on this bond.

.....(Seal)

.....(Seal)

.....(Seal)

FAITHFUL PERFORMANCE BOND

(Acknowledgment by principal, if an individual.)

STATE OF NEW YORK,
COUNTY OF.....} ss.:

On this.....day of....., 191....., before me personally came.....
to me known to be the person..... described in and who executed the foregoing instrument and ....he.... acknowledged that ....he.... executed the same.

.....

Notary Public.....County.

(County Clerk's certificate to be attached.)

(Acknowledgment by principal, if a corporation.)

STATE OF NEW YORK,
COUNTY OF.....} ss.:

On this.....day of....., 191....., before me personally came.....

to me known, who being by me duly sworn, did depose and say that he resides in.....

.....

that he is the.....of the.....

.....the corporation described in and which executed the foregoing instrument; that ....he.... knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by authority of the board of directors of said corporation, and that ....he.... signed his name thereto by like authority.

.....

Notary Public.....County.

(County Clerk's certificate to be attached.)

FAITHFUL PERFORMANCE BOND

(Acknowledgment by principal, if a corporation: when two officials execute.)

STATE OF NEW YORK, }
} ss.:
COUNTY OF..... }

On this.....day of....., 191....., before me personally came.....
to me known, who being by me duly sworn, did depose and say that he resides in.....
.....
that he is the.....of the.....
.....the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by authority of the board of directors of said corporation, and that he signed his name thereto by like authority. And the said.....further says that he is acquainted with .....and knows him to be the.....of said corporation; that the signature of the said .....subscribed to the said instrument, is in the genuine handwriting of the said....., and was subscribed by like authority of the said board of directors and in the presence of him the said.....

.....

Notary Public.....County.

(Acknowledgment by principal, if a firm or co-partnership.)

STATE OF NEW YORK, }
} ss.:
COUNTY OF..... }

On this.....day of....., 191....., before me, the subscriber, personally appeared.....
to me known and known to me to be the individual who executed the foregoing instrument as a member of the co-partnership of.....
who, being by me duly sworn, did depose and say, that he resides in.....
that he is a member of the above-named co-partnership which is composed of himself and.....
.....who are all the persons interested therein; that he executed the foregoing instrument on behalf of the said co-partnership and as a member thereof; that he was authorized to execute the same; and he acknowledged to me that he executed the same on behalf of the said co-partnership for the purposes therein stated.

.....

Notary Public.....County.

(County Clerk's certificate to be attached.)

FAITHFUL PERFORMANCE BOND

(Acknowledgment by Surety Company.)

STATE OF NEW YORK,
COUNTY OF.....} ss.:

On this.....day of....., 191....., before me personally came.....

to me known, who being by me duly sworn, did depose and say that he resides in.....

.....; that he is the.....

of the.....the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by authority of the board of directors of said corporation, and that he signed his name thereto by like authority.

.....

Notary Public.....County.

(County Clerk's certificate to be attached.)

LABOR BOND

KNOW ALL MEN BY THESE PRESENTS

That we.....

Contractor..... and.....

.....

.....sureties are held and jointly and severally firmly bound unto THE PEOPLE OF THE STATE OF NEW YORK in the sum of

.....dollars ($.....)

to be paid to the said People, their *certain attorney*, agent or assigns, for which payment, well and truly to be made, we jointly and severally bind ourselves and each of our successors, heirs, executors, administrators and assigns, firmly by these presents.

Sealed with our seals. Dated this.....day of.....

one thousand nine hundred and.....

WHEREAS the said Contractor has entered into a contract with the People of the State of New York whereby *it, he, they, have, has* covenanted and agreed to furnish all labor and services of every kind and to do and perform each and every act and thing necessary and proper for the construction of a dam, gate house, reservoir and appurtenances for the Marcy Division of the Utica State Hospital at Marcy, N. Y., in accordance with the plans and specifications for said work adopted by the State Hospital Commission of the State of New York or as the same may be changed or altered from time to time by its duly authorized agents or officers.

THE CONDITION of this obligation is such that if said Contractor, *his, its, or their* successors, executors, administrators or assigns, will well and truly pay in full at least once each month all laborers who may be employed on the work specified in such contract, then this obligation shall be void, but shall otherwise remain in full force and effect.

.....(Seal)

.....(Seal)

.....(Seal)

LABOR BOND

(Acknowledgment by principal, if an individual.)

STATE OF NEW YORK, }
COUNTY OF..... } ss.:

On this.....day of..... 191....., before me personally came.....

to me known to be the person ... described in and who executed the foregoing instrument and ....he.... acknowledged that ....he.... executed the same.

.....

Notary Public.....County.

(County Clerk's certificate to be attached.)

(Acknowledgment by principal, if a corporation.)

STATE OF NEW YORK, }
COUNTY OF..... } ss.:

On this.....day of ....., 191....., before me personally came.....

to me known, who being by me duly sworn, did depose and say that he resides in.....

.....

that he is the.....of the.....

.....the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by authority of the board of directors of said corporation, and that he signed his name thereto by like authority.

.....

Notary Public.....County.

(County Clerk's certificate to be attached.)

LABOR BOND

(Acknowledgment by principal, if a corporation; when two officials execute.)

STATE OF NEW YORK, } ss.:
COUNTY OF..... }

On this.....day of....., 191....., before me personally came.....
to me known, who being by me duly sworn, did depose and say that he resides in.....
.....
that he is the.....of the.....
.....the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by authority of the board of directors of said corporation, and that he signed his name thereto by like authority. And the said.....further says that he is acquainted with .....and knows him to be the.....of said corporation; that the signature of the said .....subscribed to the said instrument, is in the genuine handwriting of the said....., and was subscribed by like authority of the said board of directors and in the presence of him the said.....

.....

Notary Public.....County.

(Acknowledgment by principal, if a firm or co-partnership.)

STATE OF NEW YORK, } ss.:
COUNTY OF..... }

On this.....day of....., 191....., before me, the subscriber, personally appeared.....
to me known and known to me to be the individual who executed the foregoing instrument as a member of the co-partnership of.....
who, being by me duly sworn, did depose and say, that he resides in.....
that he is a member of the above-named co-partnership which is composed of himself and .....who are all the persons interested therein; that he executed the foregoing instrument on behalf of the said co-partnership and as a member thereof; that he was authorized to execute the same; and he acknowledged to me that he executed the same on behalf of the said co-partnership for the purposes therein stated.

.....

Notary Public.....County.

(County Clerk's certificate to be attached.)

LABOR BOND

(Acknowledgment by Surety Company.)

STATE OF NEW YORK,
COUNTY OF.....
} ss.:

On this.....day of....., 191....., before me personally came.....

to me known, who being by me duly sworn, did depose and say that he resides in.....

.....; that he is the.....

of the.....the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by authority of the board of directors of said corporation, and that he signed his name thereto by like authority.

.....

Notary Public.....County.

(County Clerk's certificate to be attached.)

LABOR BOND

STATE OF NEW YORK, }
} ss.:
COUNTY OF..... }

.....of.....

and.....of.....

in the County of.....sureties in the within bond, being duly and severally sworn each for himself saith, that he is a freeholder of said County, and is worth the sum set opposite his name, and upwards, over and above all debts and liabilities entered into or incurred, to wit:

.....thousand dollars;

.....thousand dollars;

.....thousand dollars;

.....thousand dollars;

Subscribed and sworn to before me, by the several persons named in preceding affidavit, this.....day of _____ 191....

_____

_____

_____

_____

_____

(County Clerk's certificate to be attached.)

The foregoing contract and bonds are hereby approved as to form and execution.

....., 191.....

.....

Attorney-General.

The foregoing bond is hereby approved as to character and sufficiency.

....., 191.....

.....

State Hospital Commission.

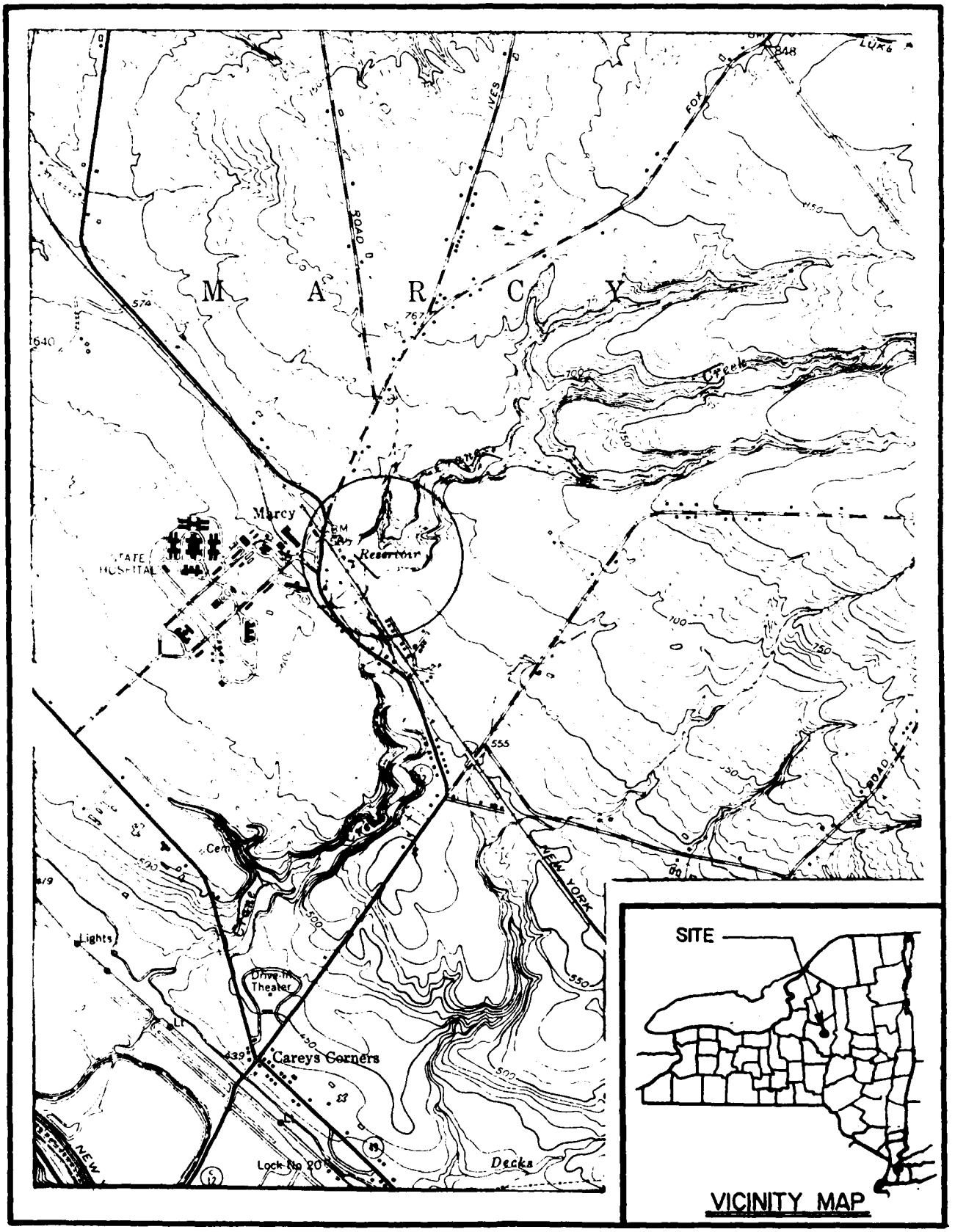
Pursuant to the provisions of Chapter 342, Laws of 1913, I hereby approve the foregoing contract.

.....

Comptroller.

APPENDIX G

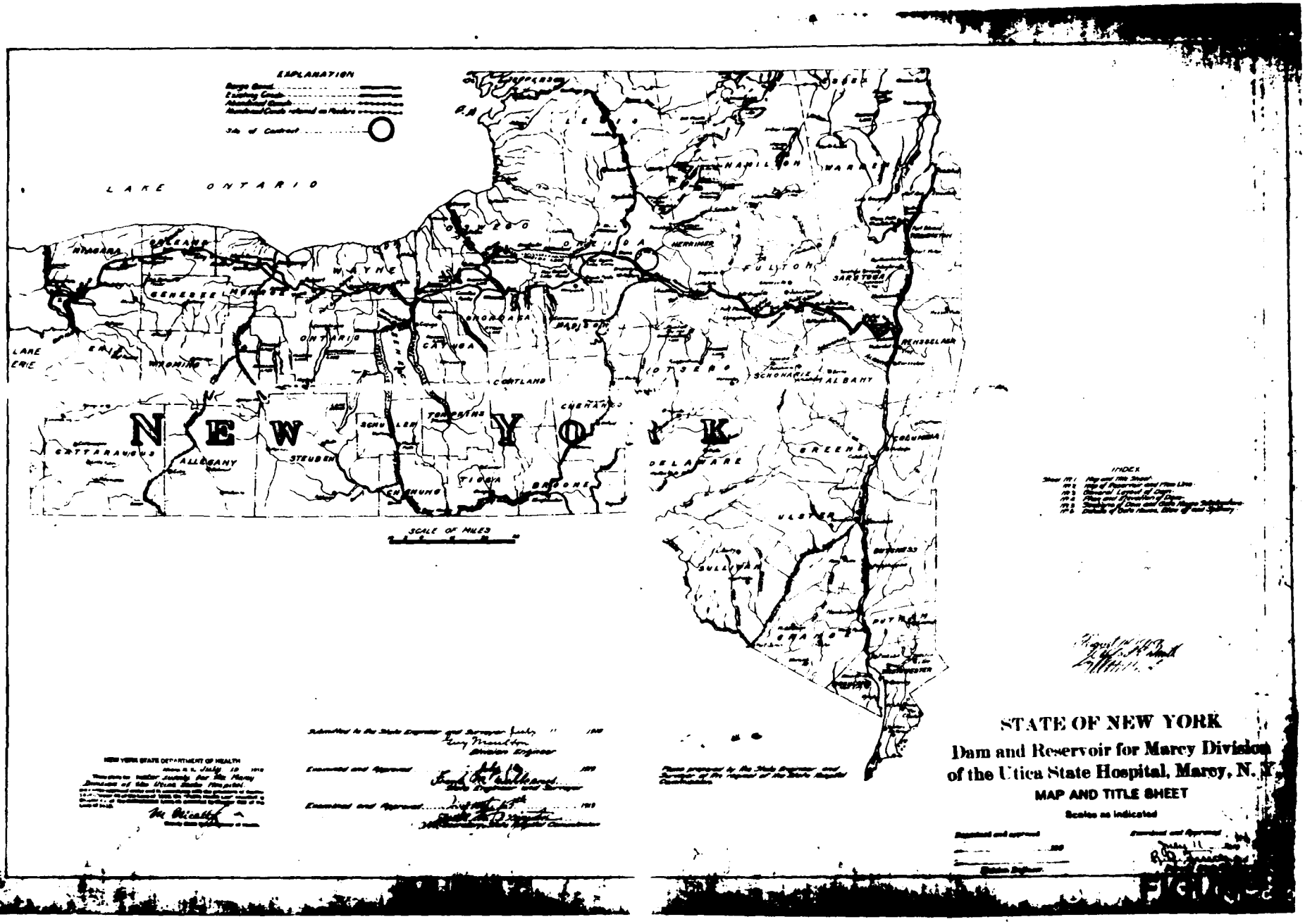
DRAWINGS



LOCATION PLAN

SCALE 1:2000

FIGURE 1


EXPLANATION
LAKE ONTARIO
LAKE ERIE
NEW YORK
SCALE OF MILES
INDEX
STATE OF NEW YORK
Dam and Reservoir for Marcy Division
of the Utica State Hospital, Marcy, N. Y.
MAP AND TITLE SHEET
Scales as indicated

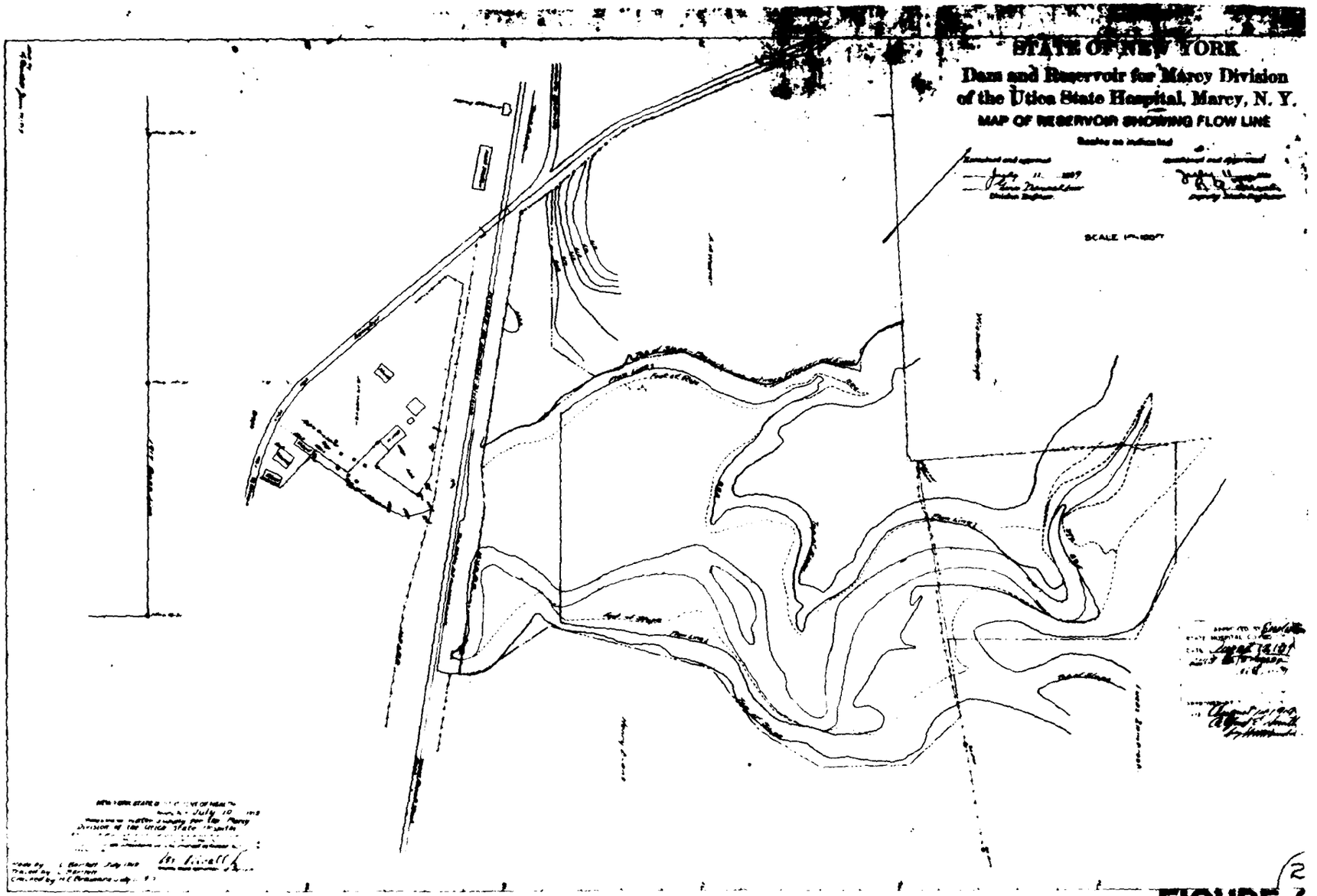

STATE OF NEW YORK
Dam and Reservoir for Marcy Division
of the Utica State Hospital, Marcy, N. Y.
MAP OF RESERVOIR SHOWING FLOW LINE

FIGURE 2

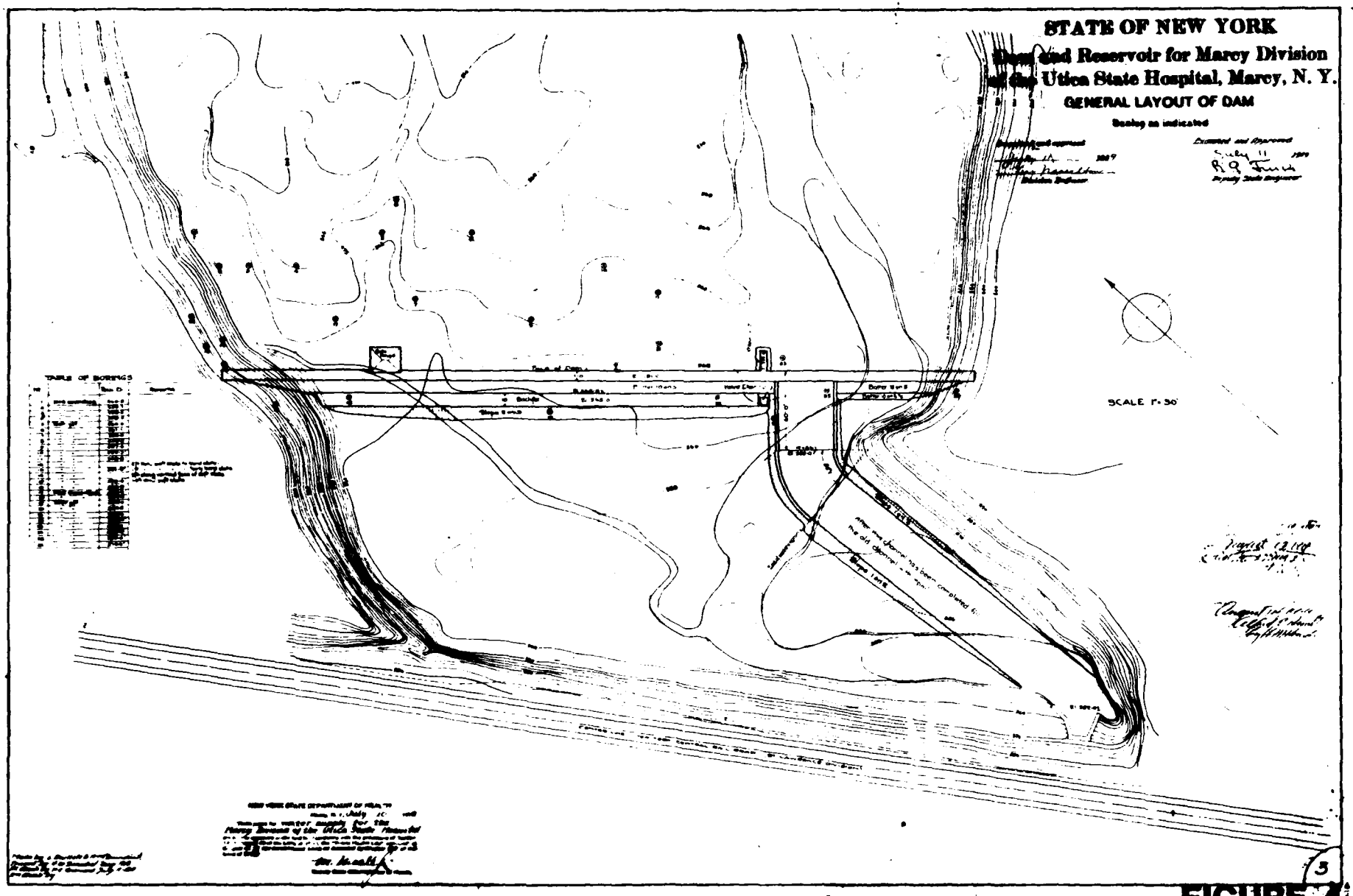

STATE OF NEW YORK
Dam and Reservoir for Marcy Division
of the Utica State Hospital, Marcy, N. Y.
GENERAL LAYOUT OF DAM
SCALE 1"=50'

FIGURE 4

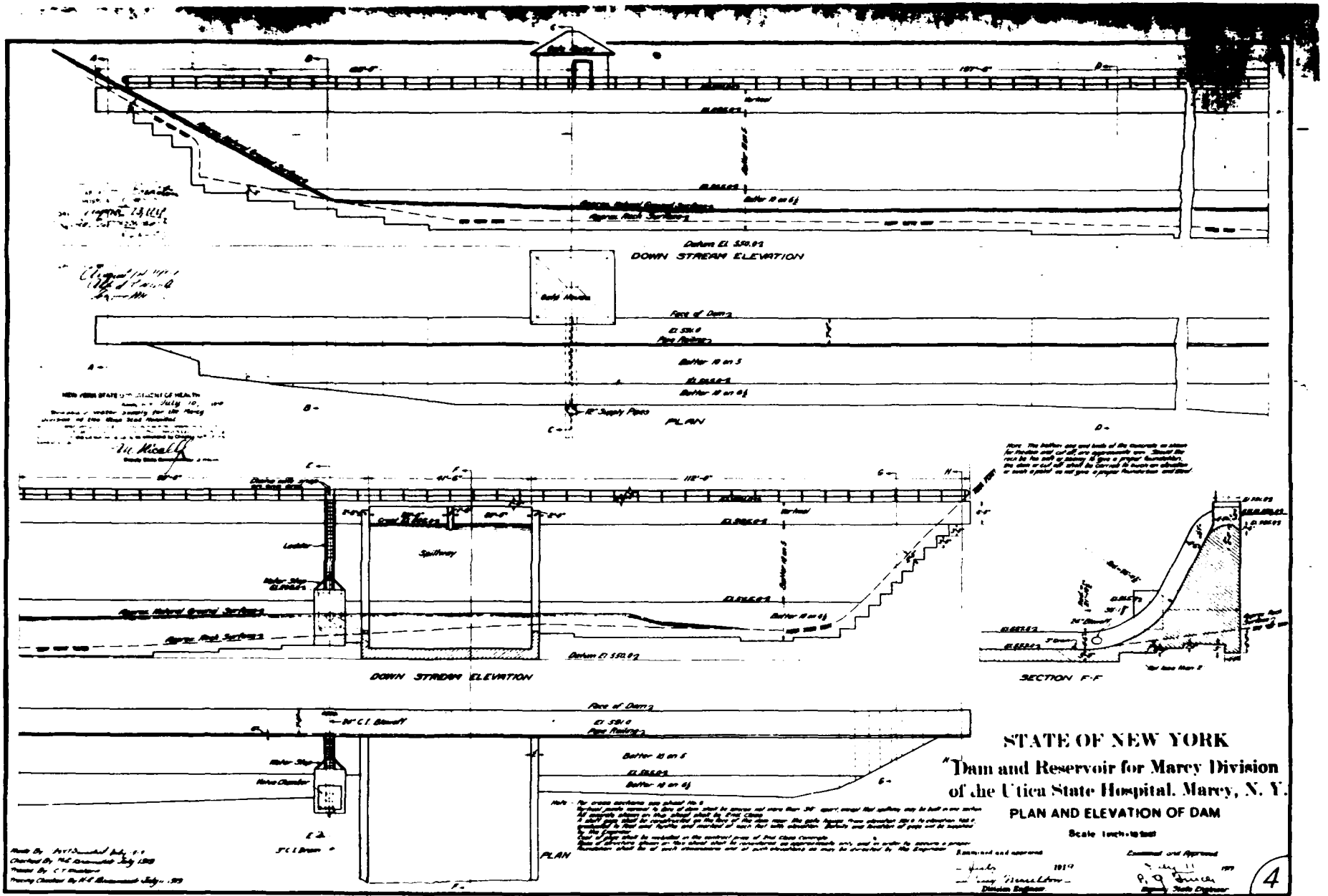
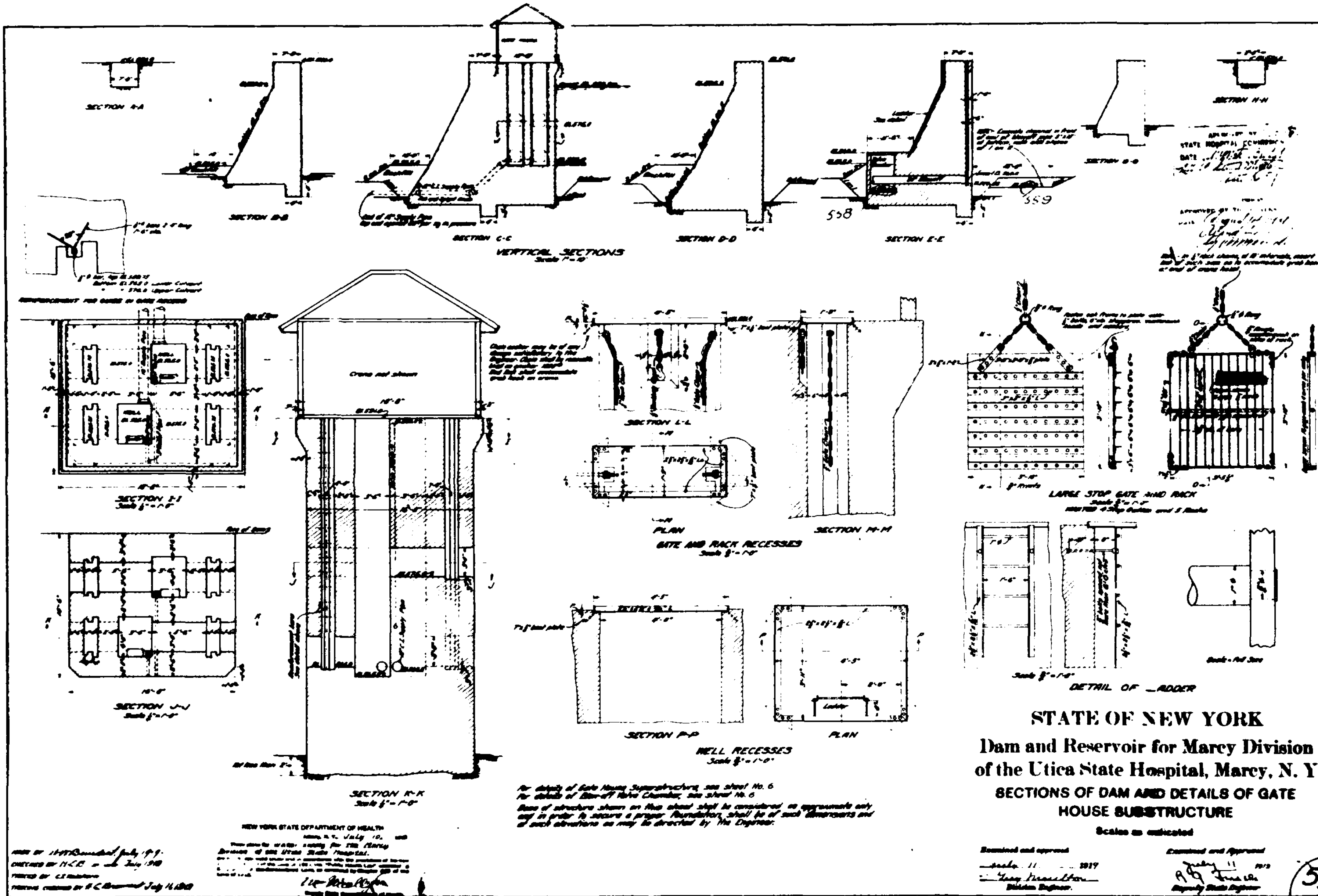

DOWN STREAM ELEVATION
PLAN
DOWN STREAM ELEVATION
SECTION F-F
PLAN
STATE OF NEW YORK
"Dam and Reservoir for Marcy Division
of the Utica State Hospital, Marcy, N. Y.
PLAN AND ELEVATION OF DAM
4

FIGURE 5



STATE OF NEW YORK

Dam and Reservoir for Marcy Division of the Utica State Hospital, Marcy, N. Y.

SECTIONS OF DAM AND DETAILS OF GATE HOUSE SUBSTRUCTURE

Scales as indicated

FIGURE 5

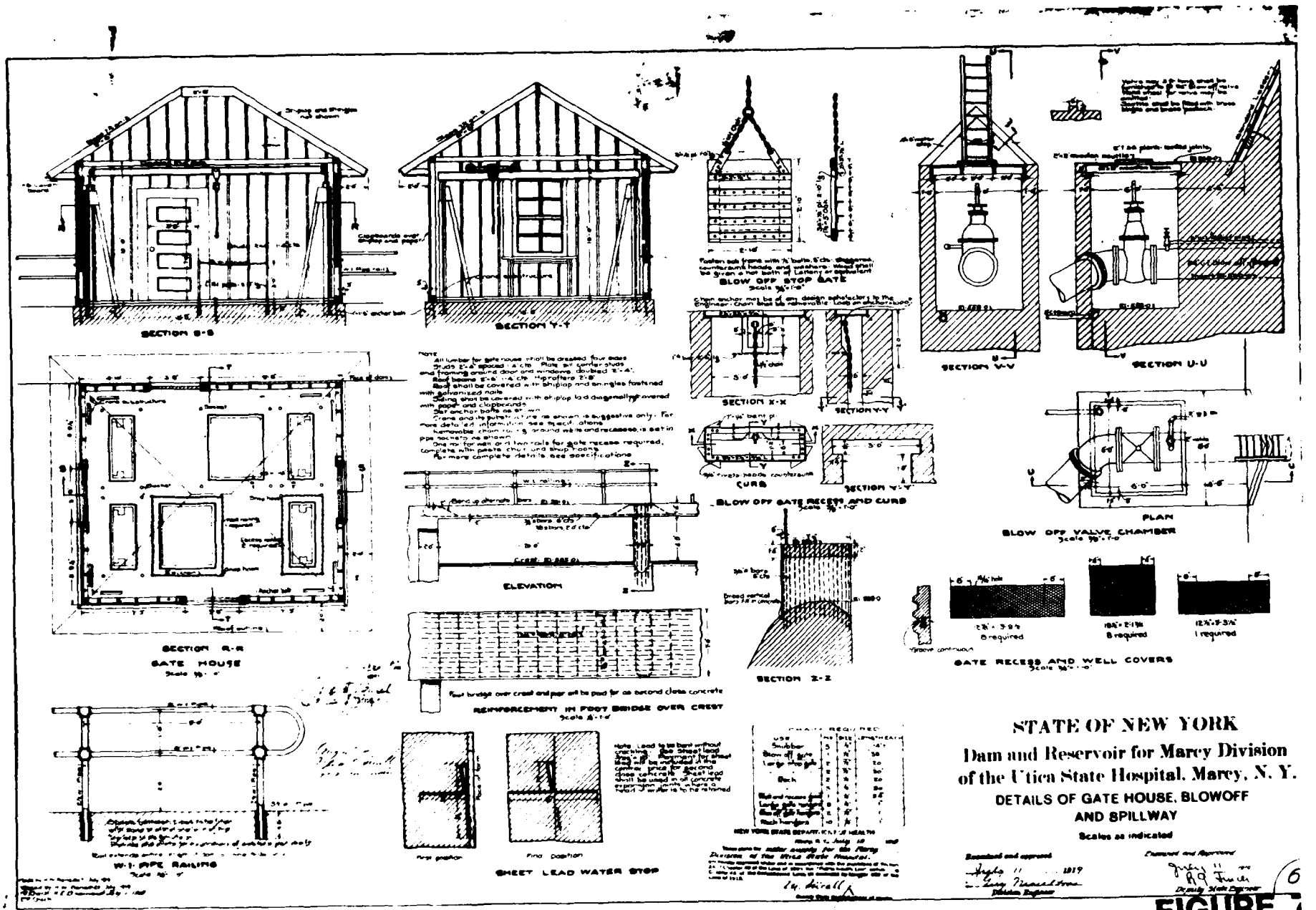

SECTION B-B
SECTION Y-Y
BLOW OFF STOP GATE
SECTION V-V
SECTION U-U
SECTION X-X
SECTION Y-Y
CURB
SECTION Y-Y
BLOW OFF GATE RECESS AND CURB
PLAN
BLOW OFF VALVE CHAMBER
SECTION R-R
GATE HOUSE
ELEVATION
SECTION Z-Z
GATE RECESS AND WELL COVERS
REINFORCEMENT IN FOOT BRIDGE OVER CREST
W.I. PIPE RAILING
SHEET LEAD WATER STOP
STATE OF NEW YORK
Dam and Reservoir for Marcy Division
of the Utica State Hospital, Marcy, N. Y.
DETAILS OF GATE HOUSE, BLOWOFF
AND SPILLWAY
Scales as indicated

FIGURE 7