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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.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property.

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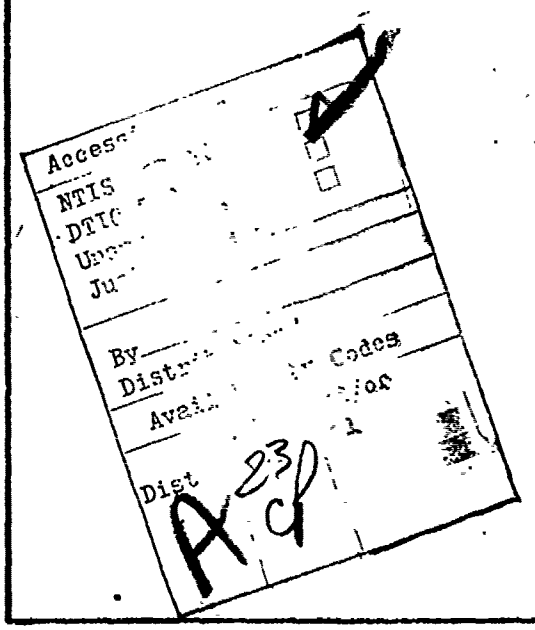
Several deficiencies were noted and these should be corrected within 6 months of the date of the final approval of this report. Among the other actions which should be taken are repairing concrete on the post supporting the northern slide gate, filling the small scoured areas behind the sheet pile wall and monitoring the leakage through the masonry wall. In addition, a detailed emergency operation-action plan and warning system should be developed.

The spillways do not have sufficient capacity to discharge the peak outflow from one-half the Probable Maximum Flood (PMF). For this storm event and lesser events, high discharges will cause damage in the channel downstream of the dam. However, dam failure would not significantly increase the hazard to loss of life downstream from that which would exist just prior to an overtopping-induced failure. Therefore, the spillway is assessed as inadequate.



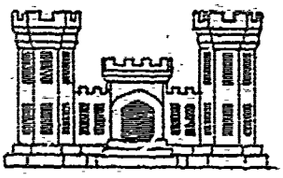
OSWEGO RIVER BASIN

KEUKA LAKE OUTLET DAM

YATES COUNTY, NEW YORK

INVENTORY NO. N.Y. 390

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



NEW YORK DISTRICT CORPS OF ENGINEERS

AUGUST 1980

CONTRACT NO. DACW-51-79-C0001

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

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

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

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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(6) PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
KEUKA LAKE OUTLET DAM (Inventory Number)
~~I.D. NO.~~ NY 390
OSWEGO RIVER BASIN
YATES COUNTY, NEW YORK
Phase I Inspection Report

TABLE OF CONTENTS

(10) George Hall

DACW51-77-C-0004

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Keuka Lake Outlet Dam (I.D. No. NY 390)
State Located:	New York
County Located:	Yates
Watershed:	Oswego River Basin
Date of Inspection:	May 8, 1980

ASSESSMENT

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life or property.

Several deficiencies were noted and these should be corrected within 6 months of the date of the final approval of this report. Among the other actions which should be taken are repairing concrete on the post supporting the northern slide gate, filling the small scoured areas behind the sheet pile wall and monitoring the leakage through the masonry wall. In addition, a detailed emergency operation-action plan and warning system should be developed.

The spillways do not have sufficient capacity to discharge the peak outflow from one-half the Probable Maximum Flood (PMF). For this storm event and lesser events, high discharges will cause damage in the channel downstream of the dam. However, dam failure would not significantly increase the hazard to loss of life downstream from that which would exist just prior to an overtopping-induced failure. Therefore, the spillway is assessed as inadequate.

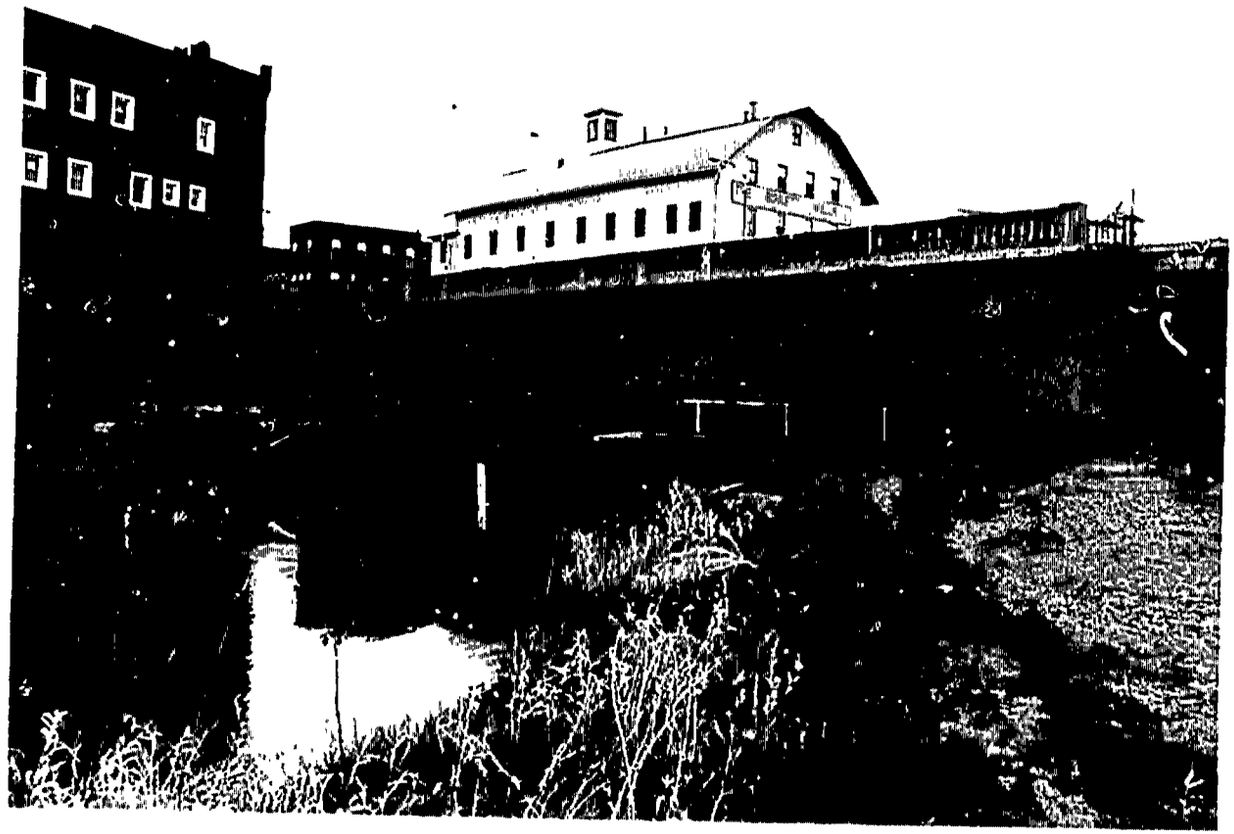
George Koch

George Koch
Chief, Dam Safety Section
New York State Department
of Environmental Conservation
NY License No. 45937

Approved By:

Col. W. M. Smith Jr.
New York District Engineer

Date: 30 Sep 80



OVERVIEW
KEUKA LAKE OUTLET DAM
I.D. NO. NY 390

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
KEUKA LAKE OUTLET DAM
I.D. NO. NY 390
#538-613
OSWEGO RIVER BASIN
YATES COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

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

b. Purpose of Inspection
This inspection was conducted to evaluate the existing condition of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property and to recommend remedial measures where required

1.2 DESCRIPTION OF PROJECT

a. Description of Dam
The Keuka Lake Outlet Dam is a concrete, masonry and earth structure with gated spillways at either end of the structure and an auxiliary spillway in the center.

The dam is approximately 100 feet long and a maximum of 10.5 feet high. At the south end of the structure there are two Rodney Hunt sluice gates 54 inches by 54 inches. The invert of the orifice for these gates is low enough to permit them to be used to partially drain the reservoir. The control mechanism for these gates is located on the top of the dam. Steel sheet pile walls form the entrance channel to this spillway. There is a vertical slide gate controlling flow through an opening which is 4 feet wide by 5.4 feet high on the northern end of the dam. This gate is referred to on the plans as the Birkett Gate. In the center of the dam there is an auxiliary spillway which is 50.8 feet wide. This spillway consists of an earth fill on the upstream slope and a vertical masonry wall with a concrete cap forming the crest.

b. Location
The dam is located in the Village of Penn Yan on the Keuka Lake Outlet. New York State Route 14A (which is also Main Street in the village) is immediately downstream of the dam.

c. Size Classification
The dam is 10.5 feet high and has a maximum storage capacity of 200,750 acre-feet. Therefore, the dam is in the large size category as defined by the "Recommended Guidelines for Safety Inspection of Dams."

d. Hazard Classification

The dam is classified as a "high" hazard structure, due to the presence of 6 homes, a sewage treatment plant, an industrial plant and several local roads located downstream of the dam.

e. Ownership

The dam is owned by the Village of Penn Yan. Mr. Wesley Ryder is the Utilities Manager for the village. He may be contacted at the village offices at 2 Maiden Lane, Penn Yan. The phone number for the offices is (315)536-3374.

f. Purpose of Dam

The dam is used to regulate the level of Keuka Lake. The gates are operated in a manner to provide some flood control regulation.

g. Design and Construction History

Records indicate that this dam was constructed in or about 1880 by the State for use as a canal lock. In 1900, it was renovated and converted to a power dam. New York State Electric and Gas Corporation controlled the dam until 1962, when it was turned over to the Village. The gates on the south end of the dam, were replaced in 1966. Owen C. Hoban, consulting engineer, designed the reconstruction of this portion of the dam. At that time, the two Rodney Hunt Gates currently in existence were installed.

h. Normal Operational Procedures

The water surface in Keuka Lake is maintained according to an established plan. The graph which details the suggested lake level for each month of the year has been included in Appendix C. The water level is changed through the operation of the two Rodney Hunt Gates at the southern end of the dam. The Village of Penn Yan is responsible for the operation of the gates.

1.3 PERTINENT DATA

a. Drainage Area (square miles) 182

b. Discharge at Dam

	COMPUTED DISCHARGE (cfs)			
STAGE	RODNEY HUNT (GATES-2)*	BIRKETT GATE*	CENTER MASONRY SPILLWAY	TOTAL
708.43	-			-
709	10.8	-		10.8
714	328	12.4		452
716.04	524	193	-	717
718.75	646	227	715	1588

* Gates Fully Open

c. Elevations (USGS Datum)

Top of Dam	718.75
Auxiliary Spillway Crest	716.04
Normal Pool	712-714
Sill of Birkett (Northern) Gate	709.0
Sill of Rodney Hunt (Southern) Gate	708.43

d. Reservoir-Surface Area

	(sq. miles)
Normal Pool	18.3

e. Storage Capacity

	(Acre-Feet)
Top-of-Dam	200,750
Auxiliary Spillway Crest	166,000
Sill of Birkett Gate	86,500
Sill of Rodney Hunt Gate	80,500

f. Dam

Type: Earth fill upstream slope, masonry and concrete dam

Dam length(ft):	100
Crest Width(ft):	5

g. Service Spillways

Northern End-Birkett Gate

Type: Single slide gate with an opening 4 feet wide by 5.4 feet high

Invert Elev. 709.0

Southern End - Twin Gates

Type: Two Rodney Hunt gates; each opening 4.5 feet by 4.5 feet
Control mechanism located above gates.

Invert Elev. 708.43

h. Auxiliary Spillway

Weir in center of dam with earth fill on upstream slope and vertical masonry wall with concrete cap forming crest.

Length(ft): 50.8

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. Geology

The Keuka Lake Outlet Dam is located in the glaciated Alleghany plateau physiographic province of New York State. The rock in this area consists of limestones, dolomites, shales and sandstones from the Devonian era. The rock lies almost horizontal although there is some sagging in the middle of the Finger Lakes district. Severe trenching or dissection by streams and glacial erosion has carved the upland into very rugged terrain. A review of the "Brittle Structures Map of the State of New York" indicated that there are no faults in the immediate vicinity of the dam.

The surficial soils are the result of glaciations during the Cenozoic Era, the last of which was the Wisconsin glaciation.

b. Subsurface Investigations

No records of any subsurface investigations made in the vicinity of this structure could be located.

2.2 DESIGN RECORDS

No records concerning the original design of this dam were available. Plans prepared in 1955 by Owen C. Hoban, consulting engineer, for the reconstruction of the southern end of the dam and the installation of the Rodney Hunt gates were available. Copies of these plans have been included in Appendix E.

2.3 CONSTRUCTION RECORDS

There were no construction records available.

2.4 EVALUATION OF DATA

The data presented in this report was obtained from the Department of Environmental Conservation files, from Wesley Ryder, utilities manager for the Village of Penn Yan, and from measurements made during the site inspection. While the data available concerning the central and northern end of the dam was somewhat limited, overall the information appeared to be adequate and reliable for Phase I inspection purposes.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

Visual inspection of the Keuka Lake Outlet Dam was conducted on May 8, 1980. The weather was overcast and the temperature was around 50 degrees. At the time of the inspection, the lake level was at elevation 714.

b. Dam

No serious deficiencies were noted on this structure. The embankment portion forming the upstream slope was in satisfactory condition. The masonry and concrete wall which formed the crest of the auxiliary spillway was also in satisfactory condition. An inspection report from 1977 (a copy of which has been included in Appendix D) indicated that there was a small amount of leakage exiting from the base of the masonry wall. This area could not be observed at the time of this inspection due to the tailwater level. Mr. Ryder, the village Utilities Manager, indicated that this leakage has been occuring for a number of years, with no noticeable increase in quantity.

c. Service Spillways

The two Rodney Hunt gates on the southern end of the dam had been greased recently and were operable. At the time of the inspection, the gates were opened and there was some debris caught in the opening. There was some scour behind the ends of the sheet pile walls on either side of the southern spillway channel.

The slide gate on the northern end was very old but appeared to be operational. The gate control mechanism was supported on four concrete posts at its corners. The concrete on the left front post was deteriorated and partially removed. Further loss of concrete on this post could result in the gate becoming inoperable. The northern bank of the approach channel to this spillway is lined with gabions and riprap. This bank appeared to be in satisfactory condition.

d. Auxiliary Spillway

The auxiliary spillway is formed by the center portion of the dam. It appeared to be in satisfactory condition.

e. Reservoir

There were no indications of soil or channel instability in the immediate vicinity of the dam. The channel which leads from the end of the lake to the dam is relatively narrow and its capacity is further limited by a railroad bridge located approximately 500 feet upstream of the dam. This bridge traps a substantial amount of debris.before it reaches the dam. Some trees and brush line the channel banks in the area between this railroad bridge and the dam. These banks should be cleared to reduce the amount of debris which flows to the dam.

f. Downstream Channel

The Main Street Bridge is located immediately downstream of the dam. Beyond the bridge, there are several mill buildings which are located at the edge of the channel.

3.2 EVALUATION OF OBSERVATIONS

Visual inspection revealed several deficiencies on this structure. The following items were noted:

1. Deterioration and partial removal of concrete on post supporting northern slide gate control mechanism.

2. Minor scour behind the sheet pile walls on either side of the southern spillway channel.

3. Debris accumulated in the vicinity of the northern spillway gates.

4. Trees and brush lining the channel upstream of the dam.

5. A small amount of leakage from the base of the masonry wall (observed during a 1977 inspection).

SECTION 4: OPERATION AND MAINTENANCE PROCEDURE

4.1 PROCEDURES

The water surface in this lake is maintained according to the plan which has been included in Appendix C. The water level is controlled by the operation of the two Rodney Hunt gates. A minimum outflow of approximately 20 cfs is maintained to provide flow in the downstream channel. To permit this minimum flow, the gates are kept open about 6 inches.

4.2 MAINTENANCE OF DAM

Routine maintenance of the dam is performed by the Village of Penn Yan.

4.3 WARNING SYSTEM IN EFFECT

No apparent warning system is present.

4.4 EVALUATION

The operation and maintenance procedures for this dam appear to be satisfactory. A detailed emergency operation action plan and warning system should be developed.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

The delineation of the contributing watershed to this dam is shown on the map titled "Drainage Area Map - Keuka Lake Outlet Dam" (Appendix C). The relationship of the Keuka Lake watershed to the entire Oswego River Basin is indicated on the map (Appendix C) titled "Oswego River Basin - Basin Map." The irregular but somewhat rectangular shaped, north-south oriented watershed of some 182 square miles drains from the surrounding landscape directly into the Y-shaped, 20 mile long Keuka Lake. Numerous short, steep tributaries surrounded the lake with the larger tributaries; i.e., Sugar Creek, Glen Brook, Mitchellsville Creek, Softwater Creek, and Cold Brook which becomes Keuka Inlet, located within the west and southwest portions of the watershed. Keuka Lake itself has a surface area of some 18.3 square miles and a shoreline length of 55 miles. The surrounding terrain rises steeply to the hilltops which are at elevations 400 to 1200 feet above the Lake. Land use within the watershed is predominantly agricultural with large areas devoted to vineyards. Developed areas are located at Penn Yan, Keuka Park, Hammondsport, Branchport, and Pulteney. Additional runoff is diverted at times directly into Keuka Lake at a New York State Electric and Gas Corporation (NYSE&G) power station located at Keuka. This runoff occurs from a 45.5 square mile catchment area surrounding Waneta and Lamoka Lakes which lie within the Susquehanna River Basin. This diversion consists of a diversion canal 9000 feet long plus a 4400 feet long pipeline. The average diversion inflow rate is about 80 cfs or 158 acre-feet per day.

5.2 ANALYSIS CRITERIA

No hydrologic/hydraulic information was available regarding the original design for this dam. The 1960 Corps of Engineers report (Ref. 6) provided information regarding stage-storage data for Keuka Lake, and stage-discharge curves for the existing Birkett gate and the center masonry spillway.. The stage-discharge curve calculated for the newer Rodney Hunt gates assumed fully open gates using both weir and orifice flow conditions for increasing water surface elevations.

The analysis of the spillway capacity of the dam was performed using the Corps of Engineers HEC-1 computer program, Dam Safety version. The computer modeling parameters for the drainage area were selected from the Oswego River Basin study (Ref. 7). The spillway design flood selected was the Probable Maximum Flood (PMF) in accordance with the Recommended Guidelines of the Corps of Engineers. The PMF storm event is that hypothetical flow resulting from the most critical combination of rainfall, minimum soil infiltration loss, and concentration of runoff at a specific location that is considered reasonably possible for a specific watershed.

5.3 SPILLWAY CAPACITY

The two Rodney Hunt gates, each 4.5 feet square, are the primary control structures and were analyzed for both weir and orifice flow conditions in the fully open position. The discharge coefficients, C, for weir and orifice flow respectively were 2.77 and 0.7.

Additional normal discharge capacity at the site is obtained from the Birkett gate which was also analyzed in a similar manner. This gate is normally positioned at a fixed opening; for the analysis, a fully open gate was used. Discharge coefficients of 2.77 and 0.42 respectively were determined using the existing stage-discharge curves. The center, masonry auxiliary spillway's discharge capacity was also obtained from the existing stage-discharge curve, developed using a weir coefficient of 3.1. Although there exists a 13 foot wide railroad underpass 55 feet right of the Rodney Hunt gates, any additional discharge capacity through this area was not considered.

Computed discharges for all site facilities are as follows (all gates fully open):

ELEV. (USGS)		DISCHARGE (cfs)
718.75	Top of Dam	1588
716.04	Auxiliary Spillway Crest	717

The flood analyses performed for this dam considered two conditions: the gates fully closed and fully open. From an initial water surface elevation of 714 (mid-summer stage), the spillways when fully open do not have sufficient capacity for discharging the peak outflow from one-half the PMF. For this storm event, the peak inflow is 51,947 cfs and the peak outflow is 2,884 cfs.

5.4 RESERVOIR CAPACITY

Normal lake levels fluctuate throughout the year between the elevations of 712 and 715. The available storage capacity for these elevations is 35,000 acre-feet which is equivalent to 3.6 inches of direct runoff from the watershed. Storage capacity to elevation 716 adds some 12,000 acre-feet (1.2 inches). Surcharge storage capacity to the top-of-dam elevation of 718.75 adds an additional 34,750 acre-feet (3.58 inches). The total storage capacity of Keuka Lake is 200,750 acre-feet for elevation 718.75. Since the dam is located approximately one mile downstream of the main body of Keuka Lake, stages recorded at the dam do not indicate corresponding lake levels. Gage readings have established the head losses along the outflow channel leading to the dam as being about 0.5 feet.

5.5 FLOODS OF RECORD

The maximum known flood in the watershed occurred on June 24, 1972 when a gage reading of 719.35 was recorded at Hammondsport. The watershed total precipitation during this 5 day event ranged from 8 to 10 inches of rain. In 1872, a higher lake level of 720.09 was recorded but the present structure did not exist as it does today for this storm event.

5.6 OVERTOPPING POTENTIAL

Records indicate that the present dam has been overtopped by approximately 0.5 feet during the maximum flood. No dam failure has been recorded. The analyses indicates the spillways do not have sufficient discharge capacity for one-half the PMF. The computed depth of overtopping is 1.84 feet for

this event. Overtopping would occur for all storm events exceeding 32% of the PMF.

5.7 EVALUATION

The spillway capacity is inadequate for the peak outflow from one-half the PMF. The Corps of Engineers report (Ref. 6) indicates discharges in excess of 500 cfs will cause damage in the channel downstream of the dam. Hence, dam failure would not significantly increase the hazard to loss of life downstream from that which would exist just prior to an overtopping-induced failure. Therefore, the spillway is assessed as inadequate.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual observations of the dam did not reveal any serious deficiencies which would affect the stability of the dam. There was a small amount of scour behind the upstream ends of the sheet piling and one of the concrete posts supporting the gate mechanism at the northern end of the dam was deteriorated. A small amount of leakage exiting at the base of the masonry wall was observed in a prior inspection. With the exception of these deficiencies, the dam appeared to be structurally in good condition

b. Design and Construction Data

Design and construction data was very limited. Plans for the southern portion of the dam which was reconstructed in 1966 were available and have been included in Appendix E. No accurate cross sections of the Birket Gate section or the auxiliary spillway section could be located. Due to this lack of cross sectional data, and due to the unique composition of this structure, no stability analysis was performed. However, there was no evidence of any stability problems on this structure.

SECTION 7: ASSESSMENT/RECOMMENDATION

7.1 ASSESSMENT

a. Safety

The Phase I inspection of the Keuka Lake Outlet Dam did not reveal conditions which constitute a hazard to human life or property. Minor deficiencies such as the deterioration of concrete on the northern slide gate control mechanism and the leakage exiting at the base of the wall could affect the safety of the dam if the conditions worsen.

The spillways, while not having sufficient discharge capacity for passing one-half the PMF, are considered to be inadequate. During periods of unusually heavy precipitation and high runoff occurring over the watershed, continuous surveillance should be provided both at the dam and in the downstream areas to warn residents of high floodwater conditions. Such surveillance procedures and other measures deemed necessary should be developed, documented and placed in readiness for future use as part of a detailed emergency operation-action plan. A warning system should also be developed and implemented; to be used in the event of dam failure.

b. Adequacy of Information

The information available for the preparation of this report was considered to be adequate for Phase I inspection purposes.

c. Urgency

The remedial measures outlined in the following section should be taken within 6 months of the date of final approval of this report.

7.2 RECOMMENDED MEASURES

1. Repair the concrete on the post supporting the northern slide gate control mechanism.

2. Fill the small scoured areas behind the sheet pile walls and protect this area with riprap.

3. Monitor the leakage in the masonry wall and if it becomes worse, take remedial actions.

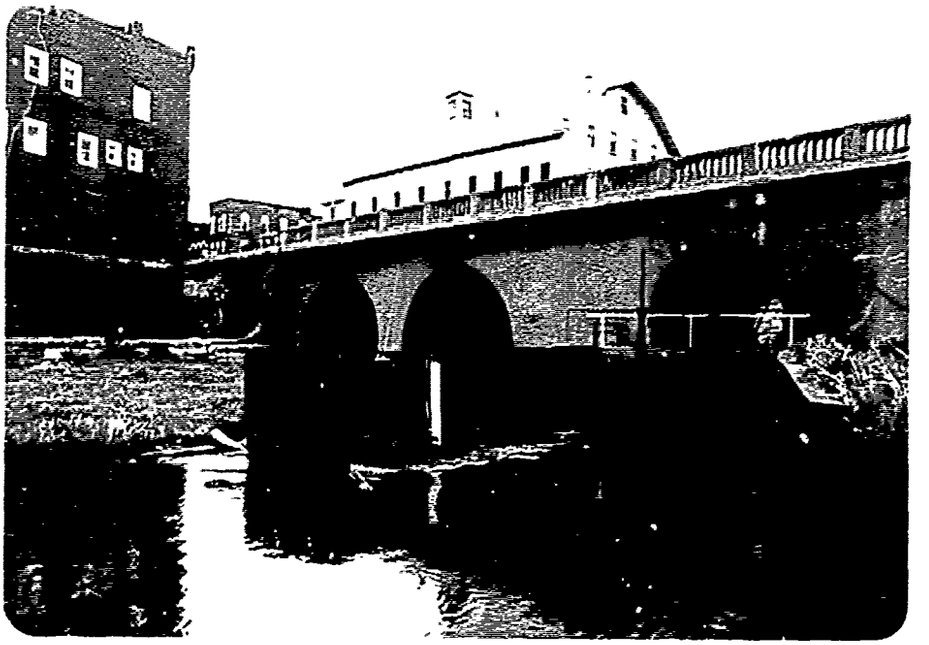
4. Remove the debris which has accumulated in the vicinity of the northern spillway gates.

5. Cut trees and brush which line the channel in the vicinity of the dam.

6. Develop and implement a detailed emergency operation-action plan and warning system.

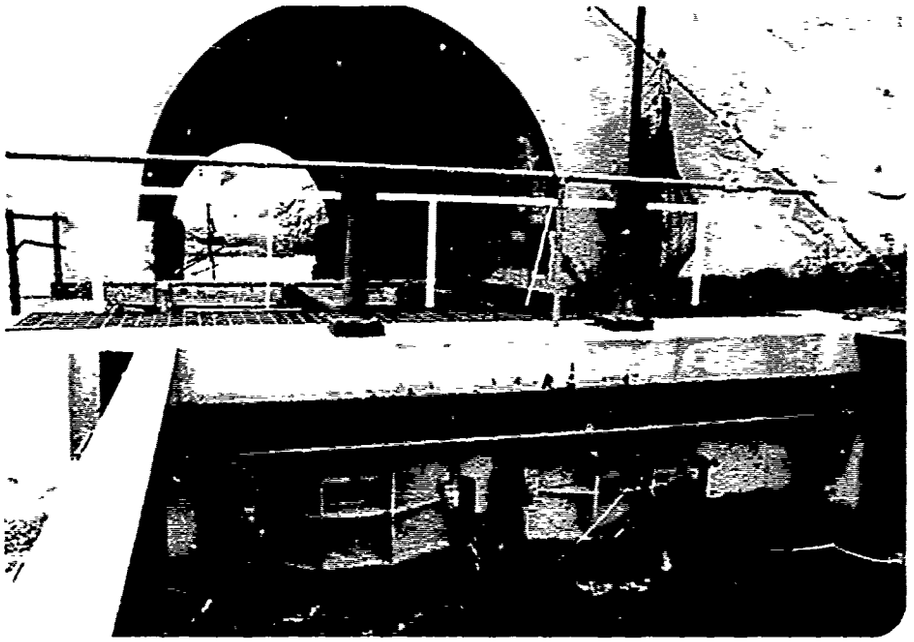
APPENDIX A

PHOTOGRAPHS

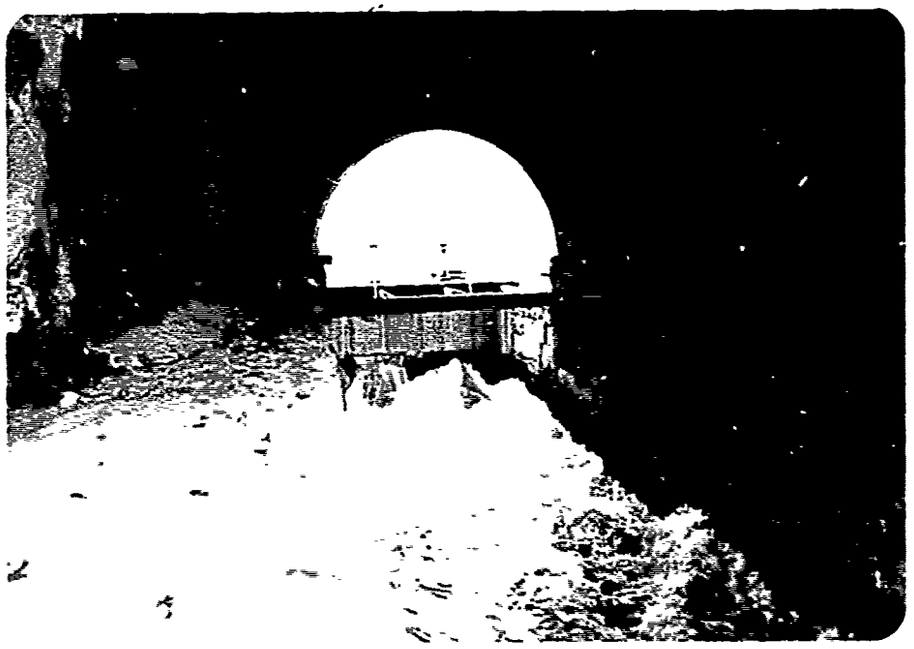


Entrance Channel to Southern Service Spillway
Note Erosion Behind End of Sheet Piling

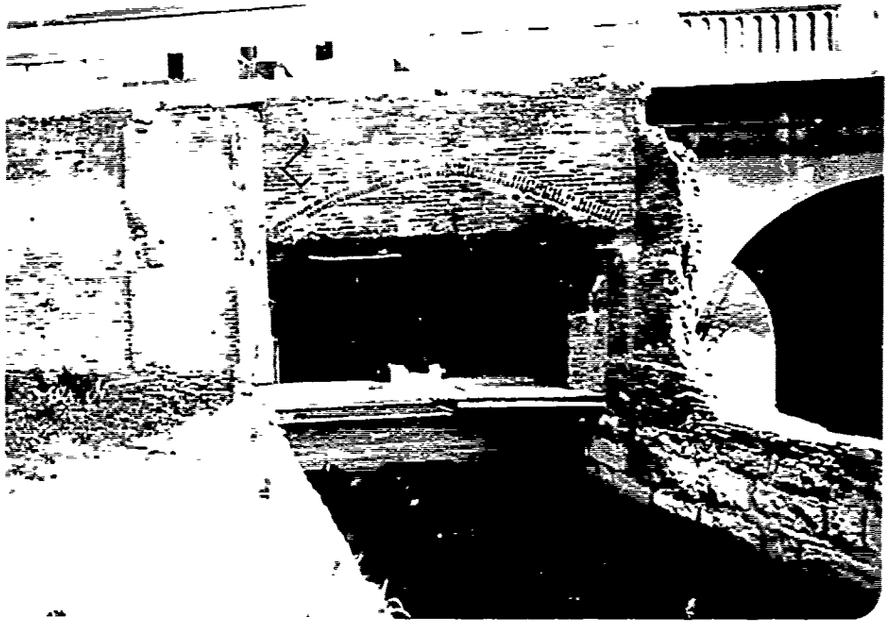
Entrance Channel Looking Upstream-Note trees
Hanging Over Approach Channel



Southern Service Spillway-Rodney Hunt Gates

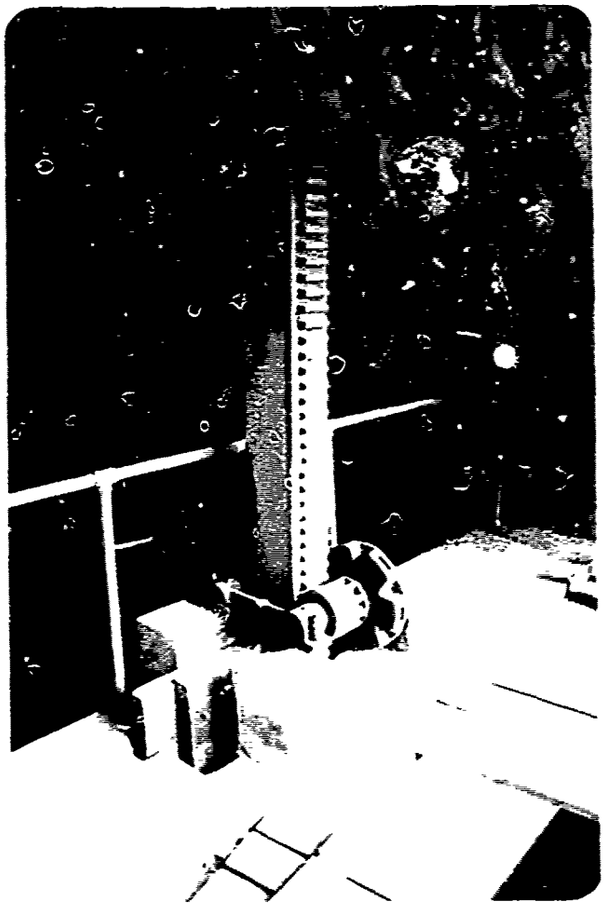


Southern Service Spillway-Looking Upstream

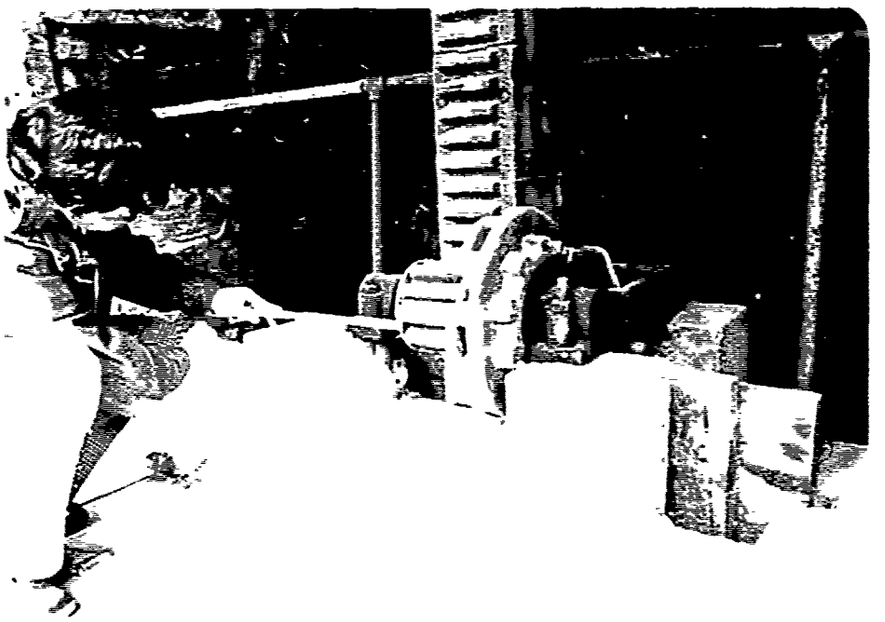


Northern Service Spillway-Birkett Gate

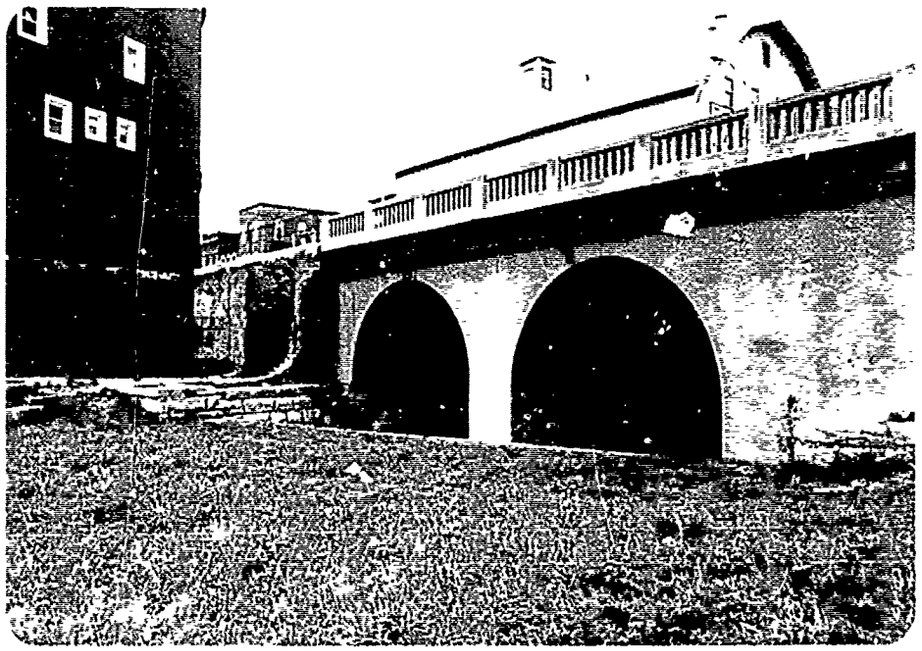
Channel Downstream of Birkett Gate



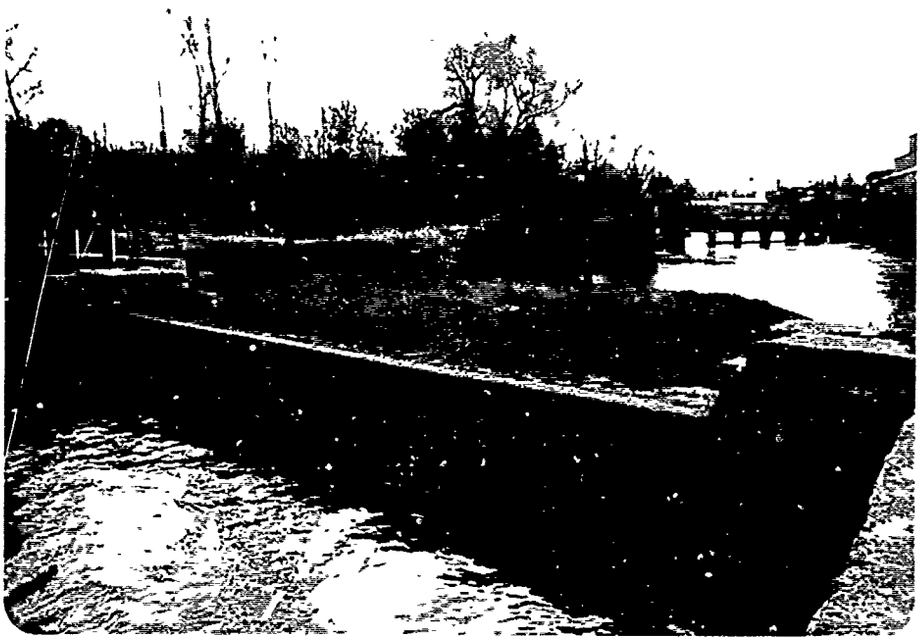
Control Mechanism For Birkett Gate



Deteriorated Concrete on One of Support Posts for Birkett Gate



Auxiliary Spillway Channel with Earth Fill on Upstream Slope



Masonry Wall on Auxiliary Spillway-Slight
Leakage Reported at Base of Wall

Northern Wall of Approach Channel
Note Gabions and Riprap

Railroad Bridge Upstream of Dam which
Restricts Flow

APPENDIX B

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam KEUKA LAKE OUTLET DAM

Fed. I.D. # NY-390 DEC Dam No. 53B-613

River Basin OSWEGO

Location: Town PENN YAN County YATES

Stream Name KEUKA LAKE OUTLET

Tributary of

Latitude (N) 42° 39.6' Longitude (W) 77° 3.2'

Type of Dam CONCRETE, MASONRY & EARTH FILL

Hazard Category C

Date(s) of Inspection 5/8/80

Weather Conditions OVERCAST 50°F

Reservoir Level at Time of Inspection 714

b. Inspection Personnel W. LYNICK R. WARRENDER

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

WESLEY RYDER - UTILITIES MANAGER - VILLAGE OF PENN YAN
315-536-3374

d. History:

Date Constructed 1900 Date(s) Reconstructed 1962

Designer C. HOBAN

Constructed By

Owner VILLAGE OF PENN YAN

2) Embankment

a. Characteristics

(1) Embankment Material EARTH & ROCK FILL

(2) Cutoff Type _____

(3) Impervious Core _____

(4) Internal Drainage System _____

(5) Miscellaneous _____

b. Crest NOT APPLICABLE

(1) Vertical Alignment _____

(2) Horizontal Alignment _____

(3) Surface Cracks _____

(4) Miscellaneous _____

c. Upstream Slope

(1) Slope (Estimate) (V:H) FLAT

(2) Undesirable Growth or Debris, Animal Burrows NONE

(3) Sloughing, Subsidence or Depressions NO

(4) Slope Protection BANK RETAINER STONE WALL AT UPSTREAM TOE

(5) Surface Cracks or Movement at Toe NONE

d. Downstream Slope

(1) Slope (Estimate - V:H) NOT APPLICABLE

(2) Undesirable Growth or Debris, Animal Burrows

(3) Sloughing, Subsidence or Depressions

(4) Surface Cracks or Movement at Toe

(5) Seepage

(6) External Drainage System (Ditches, Trenches; Blanket)

(7) Condition Around Outlet Structure

(8) Seepage Beyond Toe

e. Abutments - Embankment Contact

SATISFACTORY

(1) Erosion at Contact _____

(2) Seepage Along Contact _____

3) Drainage System

a. Description of System NONE

b. Condition of System _____

c. Discharge from Drainage System _____

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

STAFF GAGE ON UPSTREAM SHEET PILE IN FRONT OF B SERVICE SPILLWAY GATES

5) Reservoir

a. Slopes KEUKA LAKE & OUTLET CHANNEL - BRUSH & TREES GROWING ALONG CHANNEL SHOULD BE CUT TO REDUCE DEBRIS PROBLEM

b. Sedimentation

c. Unusual Conditions Which Affect Dam NARROW CHANNEL TO DAM RAILROAD BRIDGE UPSTREAM COLLECTS DEBRIS & PONDS SOME H_2O.

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) 6 HOMES; SEWAGE TREATMENT PLANT; SEVERAL LOCAL ROADS; INDUSTRIAL PLANT JUST BEYOND LEFT ABUTMENT

b. Seepage, Unusual Growth NONE

c. Evidence of Movement Beyond Toe of Dam NO

d. Condition of Downstream Channel SATISFACTORY

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

2 GATES ON ~~EASTERN~~ SOUTHERN END; 1 SLIDE GATE ON NORTHERN END; AUXILIARY CHANNEL IN MIDDLE - GRASS SLOPE CONCRETE OVER MASONRY WALL

a. General

SOUTHERN GATES INSTALLED IN 1966 - 2 ROONEY HUNT GATE VALVES - SOME SCOUR IN BACK OF SHEET PILING ON UPSTREAM END

b. Condition of Service Spillway NORTHERN END GATE - CONCRETE SPALLED AND REMOVED UNDER 1 CORNER OF SUPPORT. FURTHER REMOVAL WOULD MAKE GATE INOPERABLE

SOUTHERN END GATES - LIFT GATE MECHANISM WAS RECENTLY GREASED & IS OPERABLE - SOME DEBRIS CAUGHT IN OPENING

c. Condition of Auxiliary Spillway GOOD

d. Condition of Discharge Conveyance Channel

4 ARCHES UNDER MAIN STREET BRIDGE - COULD LIMIT FLOW SOMEWHAT

8) Reservoir Drain/Outlet NONE - ALTHOUGH SERVICE SPILLWAY CAN BE USED TO LOWER WATER LEVEL

Type: Pipe _____ Conduit _____ Other _____

Material: Concrete _____ Metal _____ Other _____

Size: _____ Length _____

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): Unobservable _____

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve _____ Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): _____

9) Structural

a. Concrete Surfaces BIRKETT GATE - FRONT GATE LIFT SUPPORT BLOCKS CRACKED & BROKEN

RODNEY HUNT GATE - CONCRETE IS GOOD

b. Structural Cracking NONE - MASONRY SURFACES ALL SATISFACTORY

c. Movement - Horizontal & Vertical Alignment (Settlement) OKAY

d. Junctions with Abutments or Embankments. SATISFACTORY

e. Drains - Foundation, Joint, Face NONE

f. Water Passages, Conduits, Sluices SATISFACTORY

g. Seepage or Leakage BACKWATER PREVENTED OBSERVATION

h. Joints - Construction, etc. _____

i. Foundation _____

j. Abutments _____

k. Control Gates GATE IN SATISFACTORY CONDITION EXCEPT CONCRETE DETERIORATED ON ONE POST OF BIRKETT (NORTHERN) GATE

l. Approach & Outlet Channels NORTHERN WALL - GABIONS AND RIP RAP - GOOD CONDITION

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

n. Intake Structures _____

o. Stability APPEARS TO BE SATISFACTORY

p. Miscellaneous _____

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

KEUKA LAKE
NY - 390

AREA-CAPACITY DATA: (USGS)

		Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1)	Top of Dam	718.75		200,750
2)	Design High Water (Max. Design Pool)	N/A		
3)	Auxiliary Spillway Crest	716.04		166,000
4)	Pool Level with Flashboards	N/A		
5)	Service Spillway Crest (INVERTS)	RODNEY HUNT - 708.43		80,500
		BIRKETT - 709		86,500

DISCHARGES

		Volume (cfs)
1)	Average Daily	N/A
2)	Spillways@ Maximum High Water	1588
3)	Spillway @ Design High Water	N/A
4)	Spillways@ Auxiliary Spillway Crest Elevation	717
5)	Low Level Outlet	N/A
6)	Total (of all facilities) @ Maximum High Water	1588
7)	Maximum Known Flood (ELEV. 719.35 ON LAKE ± 718.85 @ DAM)	— 1600 ±
8)	At Time of Inspection [EL = 714.18 ±]	478 ±

CREST: ELEVATION: 718.75

Type: CONCRETE & MASONRY

Width: 5' Length: [illegible]' ±100'

Spillover GATES { BIRKETT / RODNEY HUNT (2) AUXILIARY CHANNEL

Location EACH END CENTER

SPILLWAY:

	SERVICE BIRKETT	SERVICE RODNEY (2) HUNT		AUXILIARY
INVERT)	709	708.43	Elevation	716.04
	GATE	GATE	Type	MASONRY; DROP STRUCTURE
	4'	4.5'	Width	3' [illegible]'
			Type of Control	
	MANUAL HOIST	MANUAL HOIST	Uncontrolled	✓
			Controlled:	
	—	—	Type (Flashboards; gate)	N/A
	1	2	Number	—
	4' x 5.4'	4.5' x 4.5'	Size/Length	50.8'
			Invert Material	MASONRY
			Anticipated Length of operating service	—
	N/A	N/A	Chute Length	N/A
	N/A	N/A	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	-0-

HYDROMETEROLOGICAL GAGES:

Type : USGS RECORDER WATER STAGE - LAKE STAFF @ DAM

Location: HAMMONDSPORT ON SHEET PILE WALL

Records:

Date - 6/24/72 —

Max. Reading - 719.35 —

FLOOD WATER CONTROL SYSTEM:

Warning System: NO

Method of Controlled Releases (mechanisms):

SERVICE SPILLWAYS (BIRKETT GATE & 2 RODNEY HUNT GATES)

DRAINAGE AREA: 182 SQ MILES 116,480 ACRES

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: AGRICULTURAL (VINEYARDS)

Terrain - Relief: MODERATE TO STEEP

Surface - Soil: TILLABLE - SLOW INFILTRATION

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

N/A

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

NO

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

NONE, EXCEPT FOR THOSE STRUCTURES AROUND ENTIRE PERIMETER OF LAKE

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

Location: NO

Elevation:

Reservoir:

Length @ Maximum Pool 20± (Miles)

Length of Shoreline (@ Spillway Crest) 55± (Miles)

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
KEUKA LAKE	1/		
SUBJECT		COMPUTED BY	DATE
WATERSHED PARAMETERS		WCL	6/17/80

DRAINAGE AREA — LAKE SURFACE AREA:

(DA)	(LSA)	
181.44 SQ MI.	18.15 SQ MI. (11620 ACRES) ←	PLANIMETERED
→ 180 SQ MI.	18.3 SQ MI.	USGS GAGE # 04232450 @ HAMMONDSPORT
178.5 SQ MI.	17.5 SQ MI.	CORPS ENGINEERS RPT: KEUKA OUTLET — 6/1960
1966 SQ MI.	18.3 SQ MI.	BULL. 68 - GAZETTEER

PMP - RAINFALL:

HMR # 33
ON ZONE BOUNDARY (1 & 2)

→ 200 SQ MI - 24 HR = 25" (INDEX)

(HRS)	ZONE 1		ZONE 2
		AVE (INS)	
6	76	79 17.4	81
12	90	91 20	91
24	101	101 22.2	101
48	107	110 24.2	112

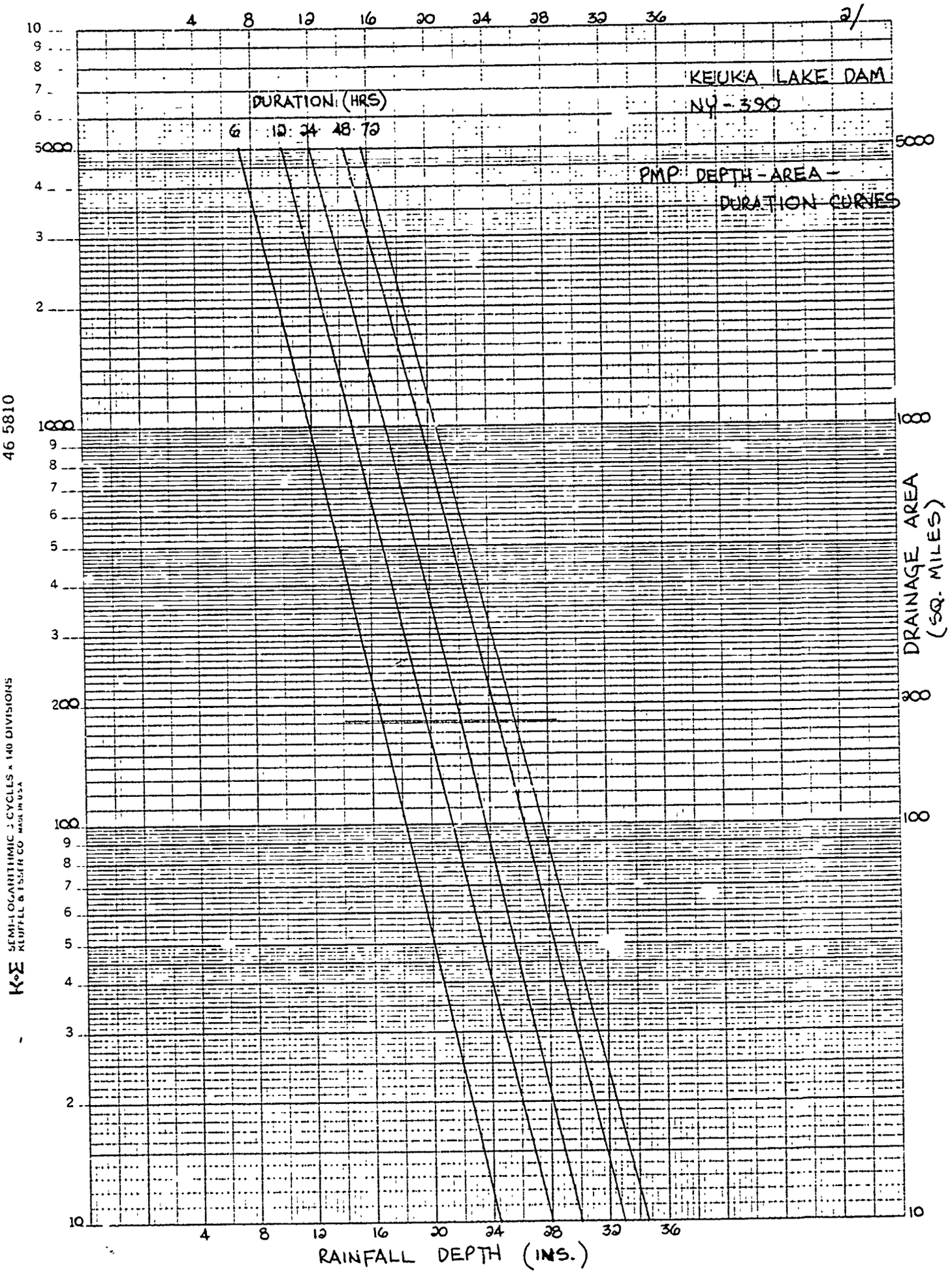
5000	6	7.2
	12	10.1
	24	12.1
	48	14.4
	72	15.6

HMR # 51

AREA (SQ MI)	HRS	DEPTH
10	6	24.5
	12	28
	24	30
	48	33
	72	34.5
200	6	16.5
	12	19.5
	24	22
	48	24.5
	72	25.5
1000	6	12
	12	14.8
	24	17
	48	19.5
	72	20.5

USE # 33

3


KEUKA LAKE DAM
NY-390
PMP DEPTH-AREA-DURATION CURVES
DURATION (HRS)
6
12
24
48
72
2/
DRAINAGE AREA (SQ. MILES)
RAINFALL DEPTH (INS.)
4
8
12
16
20
24
28
32
36
10
100
200
1000
5000
46 5810
K+E SEMI-LOGARITHMIC 2 CYCLES x 140 DIVISIONS
KEUFFEL & ESSER CO MADE IN U.S.A.

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
KEUKA LAKE	3/		
SUBJECT		**COMPUTED BY**	**DATE**
WATERSHED PARAMETERS		WCL	6/18/80

PMP – RAINFALL:

HMR #51 PLOT OF D-A-D:

FOR DA = 182 SQ MI.

DURATION =	6	12	24	48	72
DEPTH (INS) ⟶	16.6	19.7	22	24.6	25.8
(USING INDEX = 24 HR EVENT) %:	75.5	89.5	100	111.8	117.3

SNYDER SYNTHETIC UNIT HYDROGRAPH:

DA = 182 SQ MI.

LONGEST DRAINAGE PATH = L = 29.4 MI.

DIST. TO CENTROID OF DA = L_{CA} = 14.6 MI.

(USE) C_t = 2.0 SLOPES (MODERATE TO STEEP)

LAG TIME = $t_p = C_t (L \times L_{CA})^{0.3}$

$t_p = 2 (29.4 \times 14.6)^{0.3}$

t_p = 12.32 HRS

UNIT RAINFALL DURATION = $t_r = \frac{t_p}{5.5}$

t_r = 2.24 HRS

(USE) t_R = 2

ADJUSTED LAG TIME = $T_p = t_p + 0.25(t_R - t_r)$

$T_p = 12.32 + 0.25(2 - 2.24)$

TP = 12.26 HRS

PEAKING COEFF = C_p = 0.625

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
KEUKA LAKE	4/		
SUBJECT		COMPUTED BY	DATE
WATERSHED PARAMETERS		WCL	6/19/80

SOIL INFILTRATION (LOSS RATES):

SOIL NAME: (MAJOR)	SCS SOIL GROUP	LOSS (INS/HR)
E4 - MARDIN	C	0.1
Ew2 (WET) - VOLUSIA	C	0.1
(MINOR)		
Awi1 (WET) - APPLETON	C	0.1
A3 - HONEOYE	B	0.2
DhE (HILLY, STEEP) - LORDSTOWN-MARDIN	C	0.1
H3 - HOWARD	B	0.2

REF: OSWEGO RIVER BASIN - STUDY:

		(INS/HR)	
LOSS RATES	INITIAL =	1.50	BASED UPON MODELING CALIBRATED TO JUNE 1972 EVENT (AGNES)
	CONSTANT =	0.03	

BASE FLOW	STRTQ =	100 cfs	SAME
	QRCSN =	800 cfs	
	RTIOR =	1.6	

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

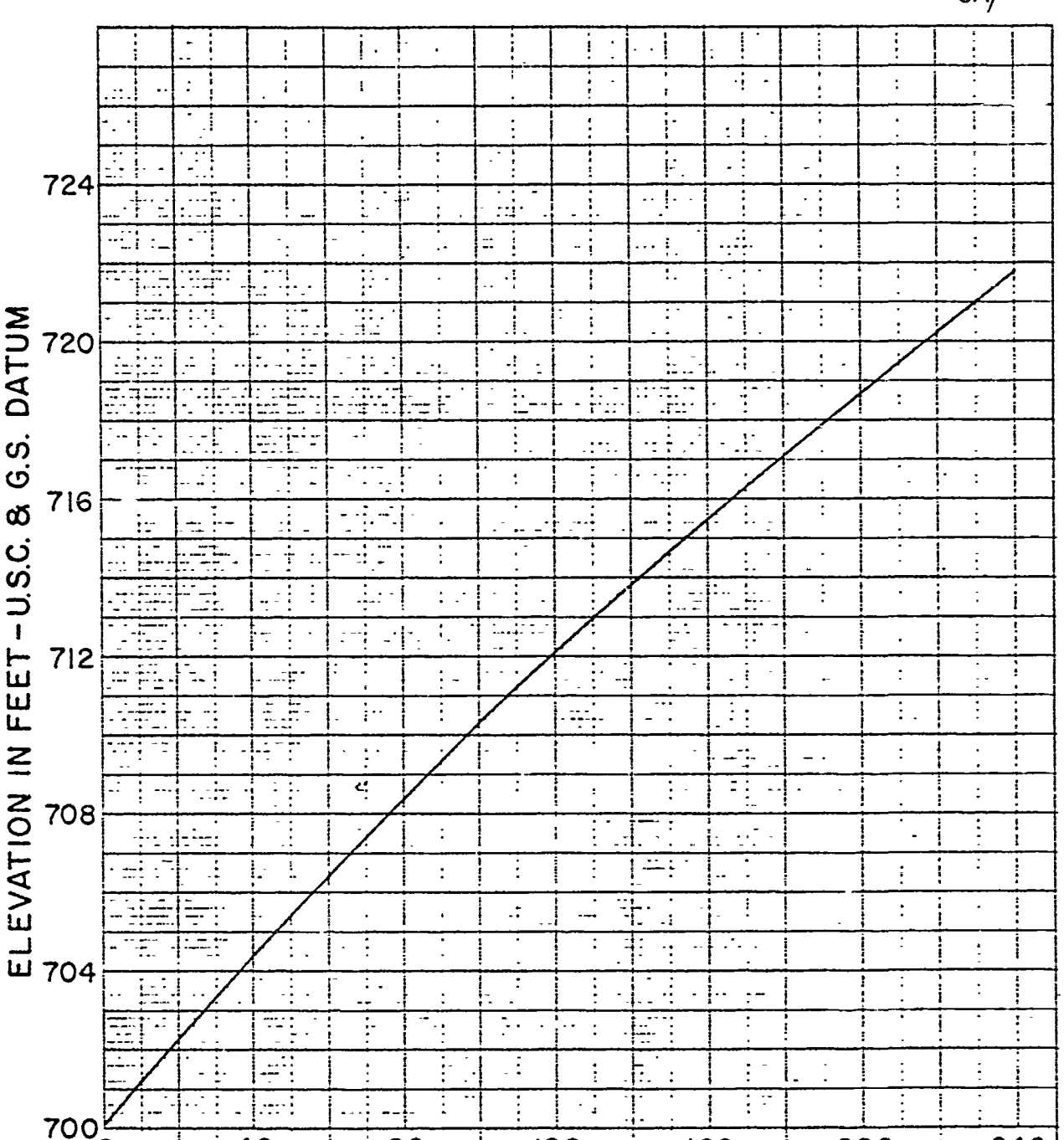
PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
KEUKA LAKE	5/		
SUBJECT		**COMPUTED BY**	**DATE**
STAGE - STORAGE DATA		WCL	6/19/80

CORPS ENGINEERS (6/1960 REPORT)
PLATE I - 11 : KEUKA OUTLET

ELEV.	AC-FT (x 1000)	
721.7	240	
721	230	
720	217	
718	191	
716	166	
714	142	— [USE AS NORMAL POOL]
712	119	
710	97	
708	76	

5A/



OSWEGO RIVER WATERSHED, NEW YORK

KEUKA LAKE OUTLET

PENN YAN, NEW YORK

STORAGE CAPACITY CURVE KEUKA LAKE

U.S. ARMY ENGINEER DISTRICT. BUFFALO

TO ACCOMPANY PROJECT REPORT (PUBLIC LAW 685)

DATED: JUNE 1960

APPENDIX PLATE I-11

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
KEUKA LAKE	6/		
SUBJECT		COMPUTED BY	DATE
MASONRY SPILLWAY (CENTER) - DISCHARGE CAPACITY		WCL	6/20/80

SINGLE SPILLWAY @ 50.8' = CREST LENGTH (FIELD MEASURED)

CORPS ENGINEERS (6/1960 RPT) - KEUKA OUTLET

RATING CURVE USING $Q = CLH^{3/2}$: PLATE I-9

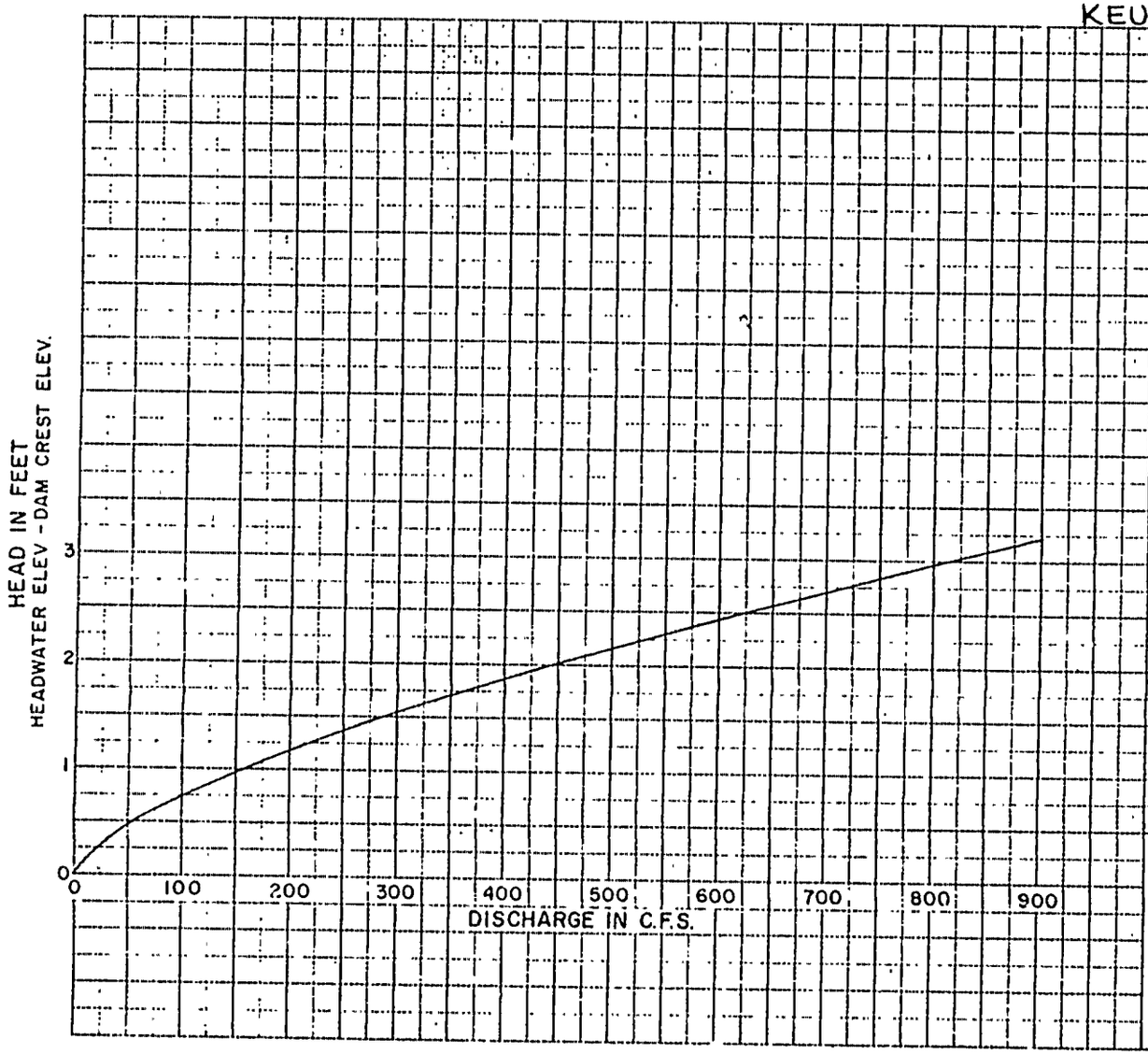
CREST @ 716.04

L = 50.8' C = 3.1

	WATER SURF. ELEV.	H	Q
	716.04 (USE 716)	—	—
	716.5	0.5	55
	717	1	155
	717.5	1.5	285
	718	2	445
	718.5	2.5	620
TOP ABUT —	718.75	2.75	715
	719	3	815

KEUKA LAKE OUTLET DAM

NY-390



NOTES

1. HEADWATER ELEVATION IS GAGE READING MINUS 0.36'
2. DAM CREST ELEVATION 716.04

OSWEGO RIVER WATERSHED, NEW YORK

KEUKA LAKE OUTLET
PENN YAN, NEW YORK

RATING CURVE
MAIN STREET DAM

U.S. ARMY ENGINEER DISTRICT, BUFFALO
TO ACCOMPANY PROJECT REPORT (PUBLIC LAW 685)
DATED: JUNE 1960

APPENDIX PLATE 1-9

6A/

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB: KEUKA LAKE | SHEET NO. 7/ | CHECKED BY | DATE

SUBJECT: RODNEY HUNT SLUICE GATES - DISCHARGE CAPACITY | COMPUTED BY: WCL | DATE: 6/20/80

TWIN 54" x 54" GATES — VARIABLE OPENING:
(4.5' x 4.5')

ORIFICE C ≈ 0.7 AREA = 20.25 SQ FT.
INVERT = 708.43
TOP OPENING = 712.93

WEIR FLOW: $Q = CLH^{3/2}$
ORIFICE FLOW: $Q = CA\sqrt{2gH}$

CONDITION: GATE FULLY OPEN (MAX CAPACITY):

L = 4.5'
C = 2.77 (SIMILAR TO BIRKETT GATE)

	WATER SURF ELEV	H	Q	2Q
INV.	708.43	—	—	—
	709	0.57	5.4	10.8
	710	1.57	24.5'	49
	712	3.57	84	168
TOP	712.93	4.5	119	238
	713	4.57	122	244
	714	5.57	164	328
	714.4	5.97	182	364
	715	6.57	210	420
→	715.62	7.17	239	478

ASSUME SAME ELEV CAUSES ORIFICE FLOW TO OCCUR AT THESE GATES

ORIFICE $H = (H_w - 2.25)$

$Q = (0.7)(20.25)\sqrt{2gH}$

$Q = 113.75\sqrt{H}$

	H_w	H	Q	2Q
	716	7.57	262	524
	716.5	8.07	274	548
	717	8.57	286	572
	717.5	9.07	297	594
	718	9.57	307	614
	718.5	10.07	318	636
TOP ABUT —	718.75	10.32	323	646
	719	10.57	328	656

RODNEY HUNT MACHINE CO.

[redacted]

ESTABLISHED 1840

ORANGE, MASSACHUSETTS, 01364, U.S.A. TELEPHONE 617-544-2811 TWX 617-544-6147

August 18, 1966

State of New York
Conservation Department
Division of Water Resources
Central Regional Office
418 East State Street
Ithaca, New York

Attention: Mr. Frank J. Keller, P.E.
Senior Hydraulic Engineer

Subject: Keuka Lake Outlet Structure
Sluice Gate
Rodney Hunt Shop Order 63076-2

Gentlemen:

We have received your letter of July 11th but because of the preparation for vacations and the vacation we have not been able to answer it until now. We are sorry about this delay and hope that it has not seriously inconvenienced you.

You requested a discharge rating chart for th[redacted]which we furnished on this project through R. E. Clark & Sons. We do not have a rating chart as such on this but our experience and the available literature would seem to indicate that a coefficient of discharge of 0.70 is reasonable for these gates. We have seen figures from 0.65 to 0.75 used and for our calculation purposes, we normally use the 0.70 figure. We believe that a stage-discharge curve based on this coefficient will be accurate enough to allow you to set the opening of the gate accordingly. Finer settings may be determined by experience over the years.

We hope that this information will satisfactorily meet your requirements. If we can assist you further in any way on this, please let us know.

Very truly yours,

RODNEY HUNT COMPANY

R.W. Henderson

R. W. Henderson, Manager
Water Control Equipment Division

RWH/bg

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
KEUKA LAKE	8/		
SUBJECT		COMPUTED BY	DATE
BIRKETT GATE - DISCHARGE CAPACITY		WCL	6/20/80

SINGLE 4' x 5.4' GATE — NORMALLY @ FIXED OPENING:
(48" x 64.8")

ORIFICE AREA = 21.6 SQ FT

INVERT = 709.0
TOP OPENING = 714.4 TOP OF CONC @ GATE = 719.1 (MEASURED) (FIELD)

CORPS ENGINEERS (6/1960 RPT) - KEUKA OUTLET

RATING CURVES FOR WEIR & ORIFICE FLOW: PLATES I-7 & I-8

CONDITION: GATE FULLY OPEN (MAX CAPACITY):

RECALCULATE "C": $C = \frac{Q}{LH^{3/2}}$

L = 4'

	WATER SURF. ELEV.	H	Q		NO TAILWATER C	
INV.	709					
	710	1	11	WEIR FLOW (PLATE I-7)	2.75	
	712	3	58		2.79	
	712.93	3.93	86			
	713	4	89		2.79	
	714	5	124		2.77	
TOP	714.4	5.4	139		2.77	
	715	6	163		2.77	
	715.6	6.6	188		2.77	
	716	7	193	ORIFICE FLOW (PLATE I-8)	0.42	0.537
	716.5	7.5	199			
	717	8	206		0.42	0.516
	717.5	8.5	212			
	718	9	218		0.419	0.501
	718.75	9.75	227			
	719	10	230		0.419	0.491
	718.5	9.5	224			

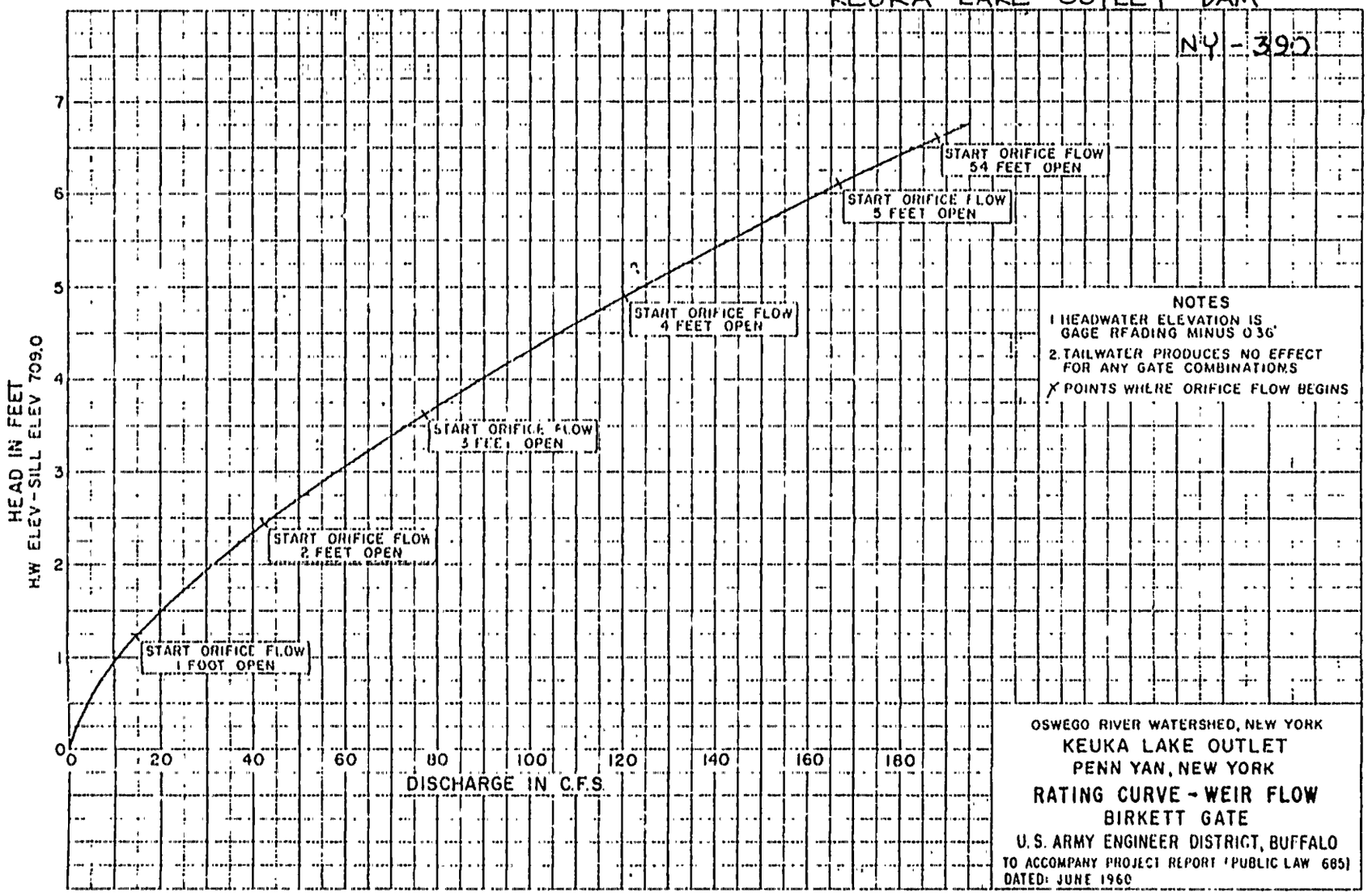
(H TO CENTER OF ORIFICE)

ORIFICE FLOW: $C = \frac{Q}{A\sqrt{2gH}}$

A = 21.6

KEUKA LAKE OUTLET DAM

NY-390



NOTES

1. HEADWATER ELEVATION IS GAGE READING MINUS 0.36'
2. TAILWATER PRODUCES NO EFFECT FOR ANY GATE COMBINATIONS

X POINTS WHERE ORIFICE FLOW BEGINS

OSWEGO RIVER WATERSHED, NEW YORK

KEUKA LAKE OUTLET

PENN YAN, NEW YORK

RATING CURVE - WEIR FLOW

BIRKETT GATE

U.S. ARMY ENGINEER DISTRICT, BUFFALO

TO ACCOMPANY PROJECT REPORT (PUBLIC LAW 685)

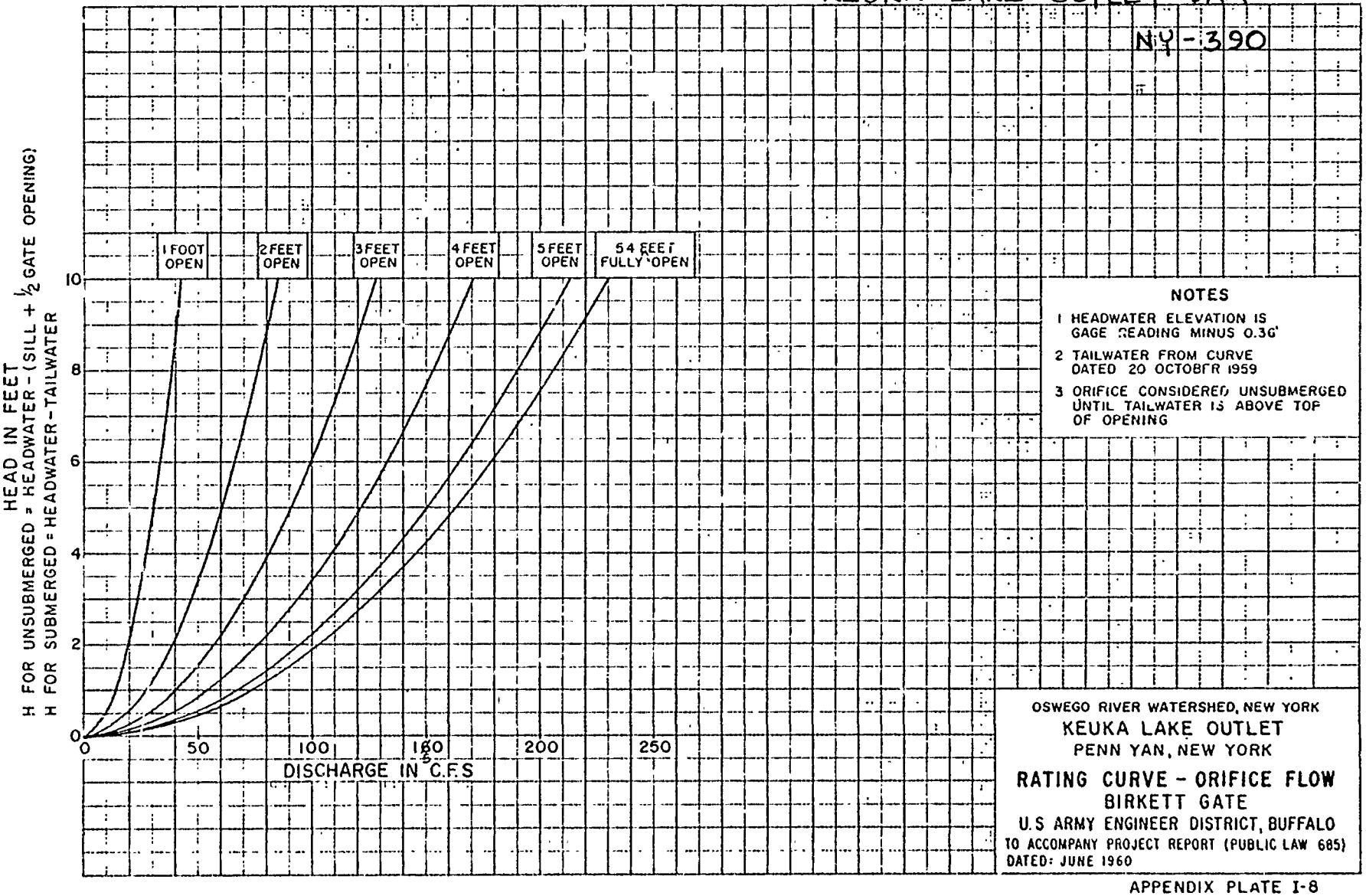
DATED: JUNE 1960

APPENDIX PLATE I-7

8A/

KEUKA LAKE OUTLET DAM

NY-390



NOTES

1 HEADWATER ELEVATION IS GAGE READING MINUS 0.36'

2 TAILWATER FROM CURVE DATED 20 OCTOBER 1959

3 ORIFICE CONSIDERED UNSUBMERGED UNTIL TAILWATER IS ABOVE TOP OF OPENING

OSWEGO RIVER WATERSHED, NEW YORK

KEUKA LAKE OUTLET

PENN YAN, NEW YORK

RATING CURVE - ORIFICE FLOW

BIRKETT GATE

U.S ARMY ENGINEER DISTRICT, BUFFALO

TO ACCOMPANY PROJECT REPORT (PUBLIC LAW 685)

DATED: JUNE 1960

APPENDIX PLATE I-8

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB	SHEET NO.	CHECKED BY	DATE
KEUKA LAKE	9/		
SUBJECT		**COMPUTED BY**	**DATE**
DISCHARGE CAPACITY - NON-OVERFLOW SECTIONS (FLOOD CONDITION)		WCL	6/20/80

RR UNDERPASS - 60' RT OF SPILLWAY:

BROAD-CRESTED WEIR: $Q = CLH^{3/2}$

L = 13' C = 2.63

CREST ELEV = 718.3

ELEV.	H	Q
718.3		
718.5	0.2	3
718.75	0.45	10.3
719	0.7	20

BIRKETT GATE:

PLATFORM (OVERTOP)

$Q = CLH^{3/2}$

C = 3.1

L = 15.8'

CREST = 718.8

Q	H	ELEV.
		718.8
4	0.2	719

MASONRY WALLS BETWEEN GATE & CENTER SPILLWAY

$Q = CLH^{3/2}$

C = 3.1

L = 29.9'

CREST = 718.8

H	Q
0.2	8

RODNEY HUNT GATE:

MASONRY WALLS BETWEEN GATE & CENTER SPILLWAY

$Q = CLH^{3/2}$ C = 3.1 L = 14.5' CREST = 718.8

Q	H	ELEV.
		718.8
4	0.2	719

00-15-1 (3/78)
Formerly GA-17

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

PROJECT GRID

JOB: KEUKA LAKE | SHEET NO. 10/ | CHECKED BY | DATE

SUBJECT: STAGE - DISCHARGE : SUMMARY | COMPUTED BY WCL | DATE 6/23/80

STAGE (ELEV)	CENTER MASONRY SPILLWAY (FULLY-OPEN)	R+L GATES (2) (FULLY-OPEN)	BIRKETT GATE (FULLY-OPEN)	RR UNDERPASS	NON-OVERFLOW SECTIONS(3)	(cfs) TOTAL
708.43	—	—	—	—	—	—
709	—	10.8	—	—	—	10.8
710	—	49	11	—	—	60
711.2	—	168	58	—	—	226
713	—	244	89	—	—	333
USE AS NORMAL POOL 714	—	328	124	—	—	452
715	—	420	163	—	—	583
715.16	—	478	188	—	—	666
716	—	524	193	—	—	717
716.5	55	548	199	—	—	802
717	155	570	204	—	—	933
717.5	285	594	212	—	—	1091
718	445	614	218	—	—	1277
718.5	620	636	224	3	—	1483
718.75	715	646	227	10	—	1598
719	815	656	230	20	16	1737

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  26 FEB 79
  MODIFIED FOR HONEYWELL APR 79
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**********************************
NEW YORK STATE
DEPT OF ENVIRONMENTAL CONSERVATION
FLOOD PROTECTION BUREAU
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  1  A KEUKA LAKE DAM        NY-390
  2  A                       VILLAGE OF PENN YAN          OSWEGO RIVER BASIN
  3  A                                                    YATES COUNTY
  4  B    200       2       0       0       0       0       0       0       0       0
  5  B1     5
  6  J      1       2       1
  7  J1   0.5       1
  8  K      0  SUBBSN                                                1
  9  K1                          INFLOW HYDROGRAPH
 10  M      1       1     182             182                                       1
 11  P      0      22      79      91     101     110
 12  T                                                      1.5    0.03             0.1
 13  W  12.26   0.625                       ^
 14  X    100     800     1.6
 15  K      1     DAM                       2                1
 16  K1                    ROUTED HYDROGRAPH AT DAM = CENTER SPILLWAY AND ALL GATES
 17  Y                                     1       1
 18  Y1     1                                                      -713.99      -1
 19  Y4708.43  713.99     714     715   715.6     716   716.5     717   717.5     718
 20  Y4 718.5  718.75     719
 21  Y5     0       0     452     583     666     717     802     933    1091    1277
 22  Y5  1480    1588    1701
 23  $S 76000   97000  119000  142000  166000  191000  217000  230000  240000
 24  $E   708     710     712     714     716     718     720     721   721.7
 25  $$   714
 26  $D718.75     3.1     1.5    60.2
 27  K     99
 28  A
 29  A
 30  A
 31  A
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FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
MODIFIED FOR HONEYWELL APR 79
****

****
NEW YORK STATE
DEPT OF ENVIRONMENTAL CONSERVATION
FLOOD PROTECTION BUREAU
****

RUN DATE 06/25/80

KEUKA LAKE DAM NY-390
VILLAGE OF PENN YAN

OSWEGO RIVER BASIN
YATES COUNTY
SNYDER UH

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
200	2	0	0	0	0	0	0	0	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 2 LRTIO= 1
RTIOS= 0.50 1.00

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

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	182.00	0.	182.00	0.	0.	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.	22.00	79.00	91.00	101.00	110.00	0.	0.

TRSPC COMPUTED BY THE PROGRAM IS 0.880

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.	0.	1.00	0.	0.	1.00	1.50	0.03	0.	0.10

UNIT HYDROGRAPH DATA
TP= 12.26 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= 100.00 QRCSN= 800.00 RTIOR= 1.60
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 7.00 AND R= 5.50 INTERVALS

UNIT HYDROGRAPH 33 END-OF-PERIOD ORDINATES, LAG= 12.14 HOURS, CP= 0.63 VOL= 1.00

373.	1367.	2706.	4149.	5352.	6028.	6082.	5443.	4535.	3779.
3149.	2624.	2186.	1822.	1518.	1265.	1054.	878.	732.	610.
508.	423.	353.	294.	245.	204.	170.	142.	118.	98.
82.	68.	57.							

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	2.00	1	0.02	0.00	0.02	96.	1.09	10.00	101	0.	0.	0.	80.
1.01	4.00	2	0.02	0.00	0.02	95.	1.09	12.00	102	0.	0.	0.	76.

1.01	6.00	3	0.02	0.00	0.02	97.	1.09	14.00	103	0.	0.	0.	75.
1.01	8.00	4	0.07	0.01	0.06	104.	1.09	16.00	104	0.	0.	0.	69.
1.01	10.00	5	0.07	0.01	0.06	119.	1.09	18.00	105	0.	0.	0.	66.
1.01	12.00	6	0.07	0.01	0.06	142.	1.09	20.00	106	0.	0.	0.	63.
1.01	14.00	7	0.35	0.04	0.32	182.	1.09	22.00	107	0.	0.	0.	60.
1.01	16.00	8	0.72	0.07	0.65	269.	1.10	0.	108	0.	0.	0.	57.
1.01	18.00	9	0.29	0.13	0.16	452.	1.10	2.00	109	0.	0.	0.	55.
1.01	20.00	10	0.03	0.00	0.03	734.	1.10	4.00	110	0.	0.	0.	52.
1.01	22.00	11	0.03	0.00	0.03	1049.	1.10	6.00	111	0.	0.	0.	50.
1.02	0.	12	0.03	0.00	0.03	1336.	1.10	8.00	112	0.	0.	0.	48.
1.02	2.00	13	0.26	0.20	0.05	1608.	1.10	10.00	113	0.	0.	0.	45.
1.02	4.00	14	0.26	0.20	0.05	1947.	1.10	12.00	114	0.	0.	0.	43.
1.02	6.00	15	0.26	0.20	0.05	2422.	1.10	14.00	115	0.	0.	0.	41.
1.02	8.00	16	0.77	0.72	0.05	3279.	1.10	16.00	116	0.	0.	0.	39.
1.02	10.00	17	0.77	0.72	0.05	4873.	1.10	18.00	117	0.	0.	0.	38.
1.02	12.00	18	0.77	0.72	0.05	7324.	1.10	20.00	118	0.	0.	0.	36.
1.02	14.00	19	3.98	3.92	0.05	11754.	1.10	22.00	119	0.	0.	0.	34.
1.02	16.00	20	8.11	8.06	0.05	21424.	1.11	0.	120	0.	0.	0.	33.
1.02	18.00	21	3.21	3.16	0.05	37846.	1.11	2.00	121	0.	0.	0.	31.
1.02	20.00	22	0.39	0.33	0.05	58391.	1.11	4.00	122	0.	0.	0.	30.
1.02	22.00	23	0.39	0.33	0.05	78940.	1.11	6.00	123	0.	0.	0.	28.
1.03	0.	24	0.39	0.33	0.05	95214.	1.11	8.00	124	0.	0.	0.	27.
1.03	2.00	25	0.	0.	0.	103893.	1.11	10.00	125	0.	0.	0.	26.
1.03	4.00	26	0.	0.	0.	103319.	1.11	12.00	126	0.	0.	0.	25.
1.03	6.00	27	0.	0.	0.	94251.	1.11	14.00	127	0.	0.	0.	24.
1.03	8.00	28	0.	0.	0.	81231.	1.11	16.00	128	0.	0.	0.	22.
1.03	10.00	29	0.	0.	0.	68689.	1.11	18.00	129	0.	0.	0.	21.
1.03	12.00	30	0.	0.	0.	57715.	1.11	20.00	130	0.	0.	0.	20.
1.03	14.00	31	0.	0.	0.	48218.	1.11	22.00	131	0.	0.	0.	19.
1.03	16.00	32	0.	0.	0.	40179.	1.12	0.	132	0.	0.	0.	19.
1.03	18.00	33	0.	0.	0.	33481.	1.12	2.00	133	0.	0.	0.	18.
1.03	20.00	34	0.	0.	0.	27900.	1.12	4.00	134	0.	0.	0.	17.
1.03	22.00	35	0.	0.	0.	23249.	1.12	6.00	135	0.	0.	0.	16.
1.04	0.	36	0.	0.	0.	19374.	1.12	8.00	136	0.	0.	0.	15.
1.04	2.00	37	0.	0.	0.	16145.	1.12	10.00	137	0.	0.	0.	15.
1.04	4.00	38	0.	0.	0.	13454.	1.12	12.00	138	0.	0.	0.	14.
1.04	6.00	39	0.	0.	0.	11212.	1.12	14.00	139	0.	0.	0.	13.
1.04	8.00	40	0.	0.	0.	9342.	1.12	16.00	140	0.	0.	0.	13.
1.04	10.00	41	0.	0.	0.	7783.	1.12	18.00	141	0.	0.	0.	12.
1.04	12.00	42	0.	0.	0.	6480.	1.12	20.00	142	0.	0.	0.	12.
1.04	14.00	43	0.	0.	0.	5401.	1.12	22.00	143	0.	0.	0.	11.
1.04	16.00	44	0.	0.	0.	4502.	1.13	0.	144	0.	0.	0.	11.
1.04	18.00	45	0.	0.	0.	3752.	1.13	2.00	145	0.	0.	0.	10.
1.04	20.00	46	0.	0.	0.	3118.	1.13	4.00	146	0.	0.	0.	10.
1.04	22.00	47	0.	0.	0.	2590.	1.13	6.00	147	0.	0.	0.	9.
1.05	0.	48	0.	0.	0.	2150.	1.13	8.00	148	0.	0.	0.	9.
1.05	2.00	49	0.	0.	0.	1758.	1.13	10.00	149	0.	0.	0.	8.
1.05	4.00	50	0.	0.	0.	1432.	1.13	12.00	150	0.	0.	0.	8.
1.05	6.00	51	0.	0.	0.	1160.	1.13	14.00	151	0.	0.	0.	8.
1.05	8.00	52	0.	0.	0.	798.	1.13	16.00	152	0.	0.	0.	7.
1.05	10.00	53	0.	0.	0.	762.	1.13	18.00	153	0.	0.	0.	7.
1.05	12.00	54	0.	0.	0.	727.	1.13	20.00	154	0.	0.	0.	7.
1.05	14.00	55	0.	0.	0.	693.	1.13	22.00	155	0.	0.	0.	6.
1.05	16.00	56	0.	0.	0.	661.	1.14	0.	156	0.	0.	0.	6.
1.05	18.00	57	0.	0.	0.	631.	1.14	2.00	157	0.	0.	0.	6.
1.05	20.00	58	0.	0.	0.	602.	1.14	4.00	158	0.	0.	0.	5.
1.05	22.00	59	0.	0.	0.	574.	1.14	6.00	159	0.	0.	0.	5.
1.06	0.	60	0.	0.	0.	548.	1.14	8.00	160	0.	0.	0.	5.
1.06	2.00	61	0.	0.	0.	523.	1.14	10.00	161	0.	0.	0.	5.
1.06	4.00	62	0.	0.	0.	499.	1.14	12.00	162	0.	0.	0.	5.
1.06	6.00	63	0.	0.	0.	476.	1.14	14.00	163	0.	0.	0.	4.
1.06	8.00	64	0.	0.	0.	454.	1.14	16.00	164	0.	0.	0.	4.
1.06	10.00	65	0.	0.	0.	433.	1.14	18.00	165	0.	0.	0.	4.
1.06	12.00	66	0.	0.	0.	413.	1.14	20.00	166	0.	0.	0.	4.
1.06	14.00	67	0.	0.	0.	394.	1.14	22.00	167	0.	0.	0.	4.
1.06	16.00	68	0.	0.	0.	376.	1.15	0.	168	0.	0.	0.	3.

1.06	18.00	69	0.	0.	0.	359.	1.15	2.00	169	0.	0.	0.	3.
1.06	20.00	70	0.	0.	0.	343.	1.15	4.00	170	0.	0.	0.	3.
1.06	22.00	71	0.	0.	0.	327.	1.15	6.00	171	0.	0.	0.	3.
1.07	0.	72	0.	0.	0.	312.	1.15	8.00	172	0.	0.	0.	3.
1.07	2.00	73	0.	0.	0.	297.	1.15	10.00	173	0.	0.	0.	3.
1.07	4.00	74	0.	0.	0.	284.	1.15	12.00	174	0.	0.	0.	3.
1.07	6.00	75	0.	0.	0.	271.	1.15	14.00	175	0.	0.	0.	2.
1.07	8.00	76	0.	0.	0.	258.	1.15	16.00	176	0.	0.	0.	2.
1.07	10.00	77	0.	0.	0.	247.	1.15	18.00	177	0.	0.	0.	2.
1.07	12.00	78	0.	0.	0.	235.	1.15	20.00	178	0.	0.	0.	2.
1.07	14.00	79	0.	0.	0.	224.	1.15	22.00	179	0.	0.	0.	2.
1.07	16.00	80	0.	0.	0.	214.	1.16	0.	180	0.	0.	0.	2.
1.07	18.00	81	0.	0.	0.	204.	1.16	2.00	181	0.	0.	0.	2.
1.07	20.00	82	0.	0.	0.	195.	1.16	4.00	182	0.	0.	0.	2.
1.07	22.00	83	0.	0.	0.	186.	1.16	6.00	183	0.	0.	0.	2.
1.08	0.	84	0.	0.	0.	177.	1.16	8.00	184	0.	0.	0.	2.
1.08	2.00	85	0.	0.	0.	169.	1.16	10.00	185	0.	0.	0.	2.
1.08	4.00	86	0.	0.	0.	161.	1.16	12.00	186	0.	0.	0.	1.
1.08	6.00	87	0.	0.	0.	154.	1.16	14.00	187	0.	0.	0.	1.
1.08	8.00	88	0.	0.	0.	147.	1.16	16.00	188	0.	0.	0.	1.
1.08	10.00	89	0.	0.	0.	140.	1.16	18.00	189	0.	0.	0.	1.
1.08	12.00	90	0.	0.	0.	134.	1.16	20.00	190	0.	0.	0.	1.
1.08	14.00	91	0.	0.	0.	128.	1.16	22.00	191	0.	0.	0.	1.
1.08	16.00	92	0.	0.	0.	122.	1.17	0.	192	0.	0.	0.	1.
1.08	18.00	93	0.	0.	0.	116.	1.17	2.00	193	0.	0.	0.	1.
1.08	20.00	94	0.	0.	0.	111.	1.17	4.00	194	0.	0.	0.	1.
1.08	22.00	95	0.	0.	0.	106.	1.17	6.00	195	0.	0.	0.	1.
1.09	0.	96	0.	0.	0.	101.	1.17	8.00	196	0.	0.	0.	1.
1.09	2.00	97	0.	0.	0.	96.	1.17	10.00	197	0.	0.	0.	1.
1.09	4.00	98	0.	0.	0.	92.	1.17	12.00	198	0.	0.	0.	1.
1.09	6.00	99	0.	0.	0.	88.	1.17	14.00	199	0.	0.	0.	1.
1.09	8.00	100	0.	0.	0.	84.	1.17	16.00	200	0.	0.	0.	1.
									SUM	21.30	19.19	2.12	1138842.
										(541.)	(487.)	(54.)	(32248.41)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	103893.	100648.	72142.	30904.	1138800.
CMS	2942.	2850.	2043.	875.	32247.
INCHES		5.14	14.75	18.95	19.40
MM		130.67	374.63	481.44	492.81
AC-FT		49908.	143092.	183889.	188231.
THOUS CU M		61561.	176501.	226823.	232180.

HYDROGRAPH AT STASUBBSN FOR PLAN 1, RTIO 1

48.	48.	49.	52.	60.	71.	91.	134.	226.	367.
524.	668.	804.	974.	1211.	1640.	2436.	3662.	5877.	10712.
18923.	29195.	39470.	47607.	51947.	51660.	47126.	40616.	34344.	28857.
24109.	20090.	16740.	13950.	11625.	9687.	8072.	6727.	5606.	4671.
3891.	3240.	2701.	2251.	1876.	1559.	1295.	1075.	879.	716.
580.	399.	381.	363.	347.	331.	316.	301.	287.	274.
261.	249.	238.	227.	217.	207.	197.	188.	180.	171.
163.	156.	149.	142.	135.	129.	123.	118.	112.	107.
102.	97.	93.	89.	85.	81.	77.	73.	70.	67.
64.	61.	58.	55.	53.	50.	48.	46.	44.	42.
40.	38.	36.	35.	33.	32.	30.	29.	27.	26.
25.	24.	23.	22.	21.	20.	19.	18.	17.	16.
16.	15.	14.	14.	13.	12.	12.	11.	11.	10.
10.	9.	9.	8.	8.	8.	7.	7.	7.	6.
6.	6.	6.	5.	5.	5.	5.	4.	4.	4.
4.	4.	3.	3.	3.	3.	3.	3.	3.	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.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	51947.	50324.	36071.	15452.	569400.
CMS	1471.	1425.	1021.	438.	16124.
INCHES		2.57	7.37	9.48	9.70
MM		65.33	187.31	240.72	246.41
AC-FT		24954.	71546.	91944.	94116.
THOUS CU M		30780.	88250.	113412.	116090.

HYDROGRAPH AT STASUBBSN FOR PLAN 1, RTIO 2

96.	95.	97.	104.	119.	142.	182.	269.	452.	734.
1049.	1336.	1608.	1947.	2422.	3279.	4873.	7324.	11754.	21424.
37846.	58391.	78940.	95214.	103893.	103319.	94251.	81231.	68689.	57715.
48218.	40179.	33481.	27900.	23249.	19374.	16145.	13454.	11212.	9342.
7783.	6480.	5401.	4502.	3752.	3118.	2590.	2150.	1758.	1432.
1160.	798.	762.	727.	693.	661.	631.	602.	574.	548.
523.	499.	476.	454.	433.	413.	394.	376.	359.	343.
327.	312.	297.	284.	271.	258.	247.	235.	224.	214.
204.	195.	186.	177.	169.	161.	154.	147.	140.	134.
128.	122.	116.	111.	106.	101.	96.	92.	88.	84.
80.	76.	73.	69.	66.	63.	60.	57.	55.	52.
50.	48.	45.	43.	41.	39.	38.	36.	34.	33.
31.	30.	28.	27.	26.	25.	24.	22.	21.	20.
19.	19.	18.	17.	16.	15.	15.	14.	13.	13.
12.	12.	11.	11.	10.	10.	9.	9.	8.	8.
8.	7.	7.	7.	6.	6.	6.	5.	5.	5.
5.	5.	4.	4.	4.	4.	4.	3.	3.	3.
3.	3.	3.	3.	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.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	103893.	100648.	72142.	30904.	1138800.
CMS	2942.	2850.	2043.	875.	32247.
INCHES		5.14	14.75	18.95	19.40
MM		130.67	374.63	481.44	492.81
AC-FT		49908.	143092.	183889.	188231.
THOUS CU M		61561.	176501.	226823.	232180.

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

HYDROGRAPH ROUTING

ROUTED HYDROGRAPH AT DAM - CENTER SPILLWAY AND ALL GATES

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

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.	0.	0.	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.	0.	0.	-714.	-1

STAGE	708.43	713.99	714.00	715.00	715.60	716.00	716.50	717.00	717.50	718.00
	718.50	718.75	719.00							
FLOW	0.	0.	452.00	583.00	666.00	717.00	802.00	933.00	1091.00	1277.00
	1480.00	1588.00	1701.00							
CAPACITY=	76000.	97000.	119000.	142000.	166000.	191000.	217000.	230000.	240000.	
ELEVATION=	708.	710.	712.	714.	716.	718.	720	721.	722	

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
714.0	0.	0.	0.	0.	0.	0.	0.

DAM DATA

TOPEL	COQD	EXPD	DAMWID
718.8	3.1	1.5	60.

STATION DAM, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

22.	34.	40.	45.	50.	57.	68.	88.	130.	206.
315.	452.	453.	453.	454.	456.	459.	464.	471.	486.
511.	554.	617.	696.	800.	984.	1203.	1419.	1616.	1839.
2047.	2228.	2381.	2507.	2609.	2691.	2754.	2802.	2837.	2861.
2876.	2883.	2884.	2880.	2871.	2859.	2844.	2827.	2808.	2787.
2765.	2741.	2717.	2693.	2670.	2646.	2623.	2599.	2576.	2553.
2531.	2508.	2486.	2464.	2442.	2420.	2399.	2378.	2357.	2336.
2315.	2295.	2275.	2255.	2235.	2216.	2196.	2177.	2159.	2140.
2122.	2103.	2086.	2068.	2050.	2033.	2016.	1999.	1983.	1966.
1950.	1934.	1918.	1903.	1887.	1872.	1857.	1843.	1828.	1814.
1800.	1786.	1773.	1759.	1746.	1733.	1720.	1708.	1695.	1683.
1671.	1659.	1648.	1637.	1626.	1615.	1605.	1595.	1586.	1577.
1569.	1560.	1552.	1543.	1535.	1526.	1518.	1510.	1502.	1494.
1485.	1477.	1470.	1462.	1455.	1447.	1440.	1433.	1425.	1418.
1411.	1404.	1396.	1389.	1382.	1375.	1368.	1361.	1354.	1347.
1340.	1333.	1326.	1319.	1313.	1306.	1299.	1293.	1286.	1279.
1273.	1267.	1261.	1254.	1248.	1242.	1236.	1230.	1224.	1218.
1212.	1206.	1200.	1194.	1188.	1183.	1177.	1171.	1165.	1160.
1154.	1148.	1143.	1137.	1131.	1126.	1120.	1115.	1109.	1104.
1099.	1093.	1088.	1084.	1079.	1075.	1070.	1066.	1061.	1057.

STORAGE

141891.	141894.	141895.	141896.	141898.	141899.	141902.	141907.	141918.	141937.
141965.	142000.	142047.	142119.	142225.	142385.	142646.	143074.	143785.	145077.
147444.	151333.	156911.	163999.	172103.	180518.	188500.	195535.	201479.	206417.
210473.	213773.	216436.	218568.	220258.	221581.	222597.	223360.	223912.	224289.
224522.	224635.	224649.	224582.	224449.	224260.	224025.	223753.	223449.	223119.
222768.	222395.	222009.	221623.	221239.	220856.	220475.	220094.	219715.	219338.
218962.	218588.	218216.	217845.	217476.	217109.	216744.	216382.	216021.	215662.
215305.	214951.	214598.	214248.	213900.	213554.	213210.	212868.	212529.	212192.
211857.	211524.	211194.	210866.	210540.	210216.	209894.	209575.	209258.	208943.
208630.	208319.	208011.	207704.	207400.	207098.	206798.	206499.	206204.	205910.
205618.	205328.	205040.	204754.	204470.	204188.	203907.	203629.	203352.	203078.
202805.	202533.	202264.	201996.	201730.	201465.	201202.	200941.	200681.	200422.
200165.	199909.	199654.	199401.	199148.	198897.	198648.	198399.	198152.	197907.
197662.	197419.	197177.	196936.	196696.	196457.	196220.	195984.	195749.	195515.
195282.	195051.	194820.	194591.	194363.	194136.	193910.	193685.	193461.	193239.
193017.	192797.	192578.	192360.	192143.	191927.	191712.	191498.	191286.	191074.
190864.	190654.	190446.	190239.	190033.	189828.	189623.	189420.	189218.	189017.
188816.	188617.	188418.	188221.	188024.	187829.	187634.	187440.	187248.	187056.
186865.	186675.	186486.	186298.	186110.	185924.	185739.	185554.	185370.	185188.
185006.	184825.	184645.	184465.	184287.	184109.	183932.	183755.	183579.	183404.

STAGE

714.0	714.0	714.0	714.0	714.0	714.0	714.0	714.0	714.0	714.0
714.0	714.0	714.0	714.0	714.0	714.0	714.1	714.1	714.1	714.3
714.5	714.8	715.2	715.8	716.5	717.2	717.8	718.3	718.8	719.2
719.5	719.8	720.0	720.1	720.3	720.4	720.4	720.5	720.5	720.6
720.6	720.6	720.6	720.6	720.6	720.6	720.5	720.5	720.5	720.5
720.4	720.4	720.4	720.4	720.3	720.3	720.3	720.2	720.2	720.2
720.2	720.1	720.1	720.1	720.0	720.0	720.0	720.0	719.9	719.9
719.9	719.8	719.8	719.8	719.8	719.7	719.7	719.7	719.7	719.6
719.6	719.6	719.6	719.5	719.5	719.5	719.5	719.4	719.4	719.4

719.1	719.1	719.1	719.1	719.0	719.0	719.0	719.0	719.0	718.9
718.9	718.9	718.9	718.8	718.8	718.8	718.8	718.8	718.7	718.7
718.7	718.7	718.7	718.6	718.6	718.6	718.6	718.6	718.6	718.5
718.5	718.5	718.5	718.5	718.4	718.4	718.4	718.4	718.4	718.3
718.3	718.3	718.3	718.3	718.3	718.2	718.2	718.2	718.2	718.2
718.2	718.1	718.1	718.1	718.1	718.1	718.1	718.0	718.0	718.0
718.0	718.0	718.0	717.9	717.9	717.9	717.9	717.9	717.9	717.8
717.8	717.8	717.8	717.8	717.8	717.7	717.7	717.7	717.7	717.7
717.7	717.7	717.6	717.6	717.6	717.6	717.6	717.6	717.5	717.5
717.5	717.5	717.5	717.5	717.5	717.4	717.4	717.4	717.4	717.4

PEAK OUTFLOW IS 2884. AT TIME 86.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2884.	2882.	2852.	2671.	318232.
CMS	82.	82.	81.	76.	9011.
INCHES		0.15	0.58	1.6[illegible]	5.42
MM		3.74	14.81	41.61	137.71
AC-FT		1429.	5657.	15895.	52600.
THOUS CU M		1763.	6978.	19606.	64881.

OVN

STATION DAM, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

44.	68.	81.	90.	100.	114.	136.	177.	260.	416.
453.	454.	456.	458.	461.	466.	472.	482.	499.	528.
580.	670.	814.	1159.	1691.	2596.	3600.	4517.	5339.	6046.
6640.	7128.	7521.	7832.	8073.	8254.	8385.	8474.	8527.	8551.
8551.	8532.	8496.	8447.	8387.	8319.	8244.	8163.	8079.	7990.
7899.	7806.	7711.	7618.	7525.	7434.	7344.	7255.	7167.	7081.
6995.	6911.	6827.	6745.	6664.	6584.	6505.	6427.	6350.	6274.
6199.	6126.	6053.	5981.	5910.	5841.	5772.	5704.	5637.	5571.
5506.	5442.	5379.	5317.	5255.	5195.	5135.	5076.	5018.	4961.
4904.	4849.	4794.	4740.	4687.	4634.	4583.	4532.	4481.	4432.
4383.	4335.	4287.	4240.	4194.	4148.	4102.	4059.	4016.	3973.
3930.	3888.	3847.	3806.	3766.	3727.	3688.	3649.	3611.	3574.
3537.	3501.	3465.	3430.	3395.	3360.	3326.	3293.	3260.	3227.
3192.	3157.	3123.	3090.	3057.	3024.	2992.	2961.	2930.	2899.
2869.	2839.	2809.	2780.	2752.	2724.	2696.	2669.	2642.	2615.
2589.	2563.	2538.	2513.	2488.	2464.	2440.	2416.	2393.	2370.
2347.	2325.	2303.	2281.	2260.	2239.	2218.	2198.	2178.	2158.
2138.	2119.	2100.	2081.	2063.	2045.	2027.	2009.	1992.	1975.
1958.	1941.	1925.	1909.	1893.	1878.	1862.	1847.	1832.	1818.
1803.	1789.	1775.	1761.	1748.	1734.	1721.	1709.	1696.	1684.

STORAGE

141[illegible].	141902.	141906.	141908.	141910.	141914.	141920.	141930.	141951.	141991.
142066.	142189.	142357.	142575.	142860.	143255.	143851.	144780.	146276.	148933.
153740.	161590.	172817.	187047.	203266.	220037.	235853.	249685.	261260.	270766.
278472.	284640.	289517.	293321.	296233.	298407.	299967.	301020.	301653.	301941.
301942.	301709.	301284.	300702.	299993.	299180.	298283.	297319.	296300.	295236.
294137.	293000.	291847.	290703.	289569.	288445.	287330.	286225.	285131.	284046.
282971.	281906.	280852.	279807.	278772.	277747.	276732.	275727.	274732.	273747.
272771.	271805.	270849.	269903.	268966.	268039.	267121.	266212.	265313.	264423.
263542.	262670.	261807.	260953.	260108.	259272.	258444.	257626.	256815.	256013.
255219.	254434.	253657.	252887.	252126.	251373.	250628.	249890.	249160.	248437.
247723.	247015.	246315.	245622.	244936.	244257.	243585.	242920.	242262.	241611.
240966.	240328.	239696.	239071.	238452.	237840.	237233.	236633.	236039.	235450.
234868.	234291.	233720.	233155.	232595.	232041.	231493.	230949.	230411.	229880.
229357.	228839.	228326.	227819.	227316.	226819.	226326.	225839.	225356.	224878.
224405.	223937.	223473.	223014.	222559.	222109.	221663.	221222.	220785.	220352.
219924.	219499.	219079.	218663.	218251.	217843.	217438.	217038.	216641.	216249.
215860.	215474.	215093.	214714.	214340.	213969.	213601.	213237.	212876.	212518.
212163.	211812.	211464.	211118.	210776.	210437.	210101.	209768.	209437.	209110.
208785.	208463.	208144.	207827.	207513.	207202.	206893.	206587.	206283.	205981.
20568[illegible].	205386.	205091.	204799.	204509.	204222.	203936.	203653.	203372.	203093.

STAGE

714.0	714.0	714.0	714.0	714.0	714.0	714.0	714.0	714.0	714.0
714.0	714.0	714.0	714.0	714.1	714.1	714.2	714.3	714.4	714.6
715.0	715.6	716.5	717.7	718.9	720.2	721.4	722.4	723.2	723.9
724.4	724.8	725.2	725.4	725.6	725.8	725.9	726.0	726.0	726.0
726.0	726.0	726.0	725.9	725.9	725.8	725.8	725.7	725.6	725.6
725.5	725.4	725.3	725.2	725.2	725.1	725.0	724.9	724.9	724.8
724.7	724.6	724.6	724.5	724.4	724.3	724.3	724.2	724.1	724.1
724.0	723.9	723.9	723.8	723.7	723.7	723.6	723.5	723.5	723.4
723.3	723.3	723.2	723.2	723.1	723.0	723.0	722.9	722.9	722.8
722.8	722.7	722.7	722.6	722.5	722.5	722.4	722.4	722.3	722.3
722.2	722.2	722.1	722.1	722.0	722.0	722.0	721.9	721.9	721.8

721.0	720.9	720.9	720.8	720.8	720.8	720.7	720.7	720.6	720.6
720.6	720.5	720.5	720.5	720.4	720.4	720.4	720.3	720.3	720.3
720.2	720.2	720.2	720.1	720.1	720.1	720.0	720.0	720.0	719.9
719.9	719.9	719.9	719.8	719.8	719.8	719.7	719.7	719.7	719.7
719.6	719.6	719.6	719.5	719.5	719.5	719.5	719.4	719.4	719.4
719.4	719.3	719.3	719.3	719.3	719.2	719.2	719.2	719.2	719.2
719.1	719.1	719.1	719.1	719.0	719.0	719.0	719.0	719.0	718.9

PEAK OUTFLOW IS 8551. AT TIME 82.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8551.	8544.	8427.	7725.	768743.
CMS	242.	242.	239.	219.	21768.
INCHES		0.44	1.72	4.74	13.10
MM		11.09	43.76	120.34	332.67
AC-FT		4237.	16714.	45965.	127065.
THOUS CU M		5226.	20617.	56698.	156732.

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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE 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	RATIO 2
				0.50	1.00
HYDROGRAPH AT	SUBBSN	182.00	1	51947.	103893.
	(	0.00)	(	1470.97)(	2941.93)(
ROUTED TO	DAM	182.00	1	2884.	8551.
	(	0.00)	(	81.67)(	242.15)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	713.99	714.00	718.75
STORAGE	141885.	142000.	200750.
OUTFLOW	0.	452.	1588.

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	720.59	1.84	224649.	2884.	180.00	86.00	0.
1.00	726.04	7.29	301942.	8551.	352.00	82.00	0.

#1

12

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****************************                                                   ****************************
FLOOD HYDROGRAPH PACKAGE   (HEC-1)                                             NEW YORK STATE
DAM SAFETY VERSION      JULY 1978                                              DEPT OF ENVIRONMENTAL CONSERVATION
 LAST MODIFICATION  26 FEB 79                                                  FLOOD PROTECTION BUREAU
  MODIFIED FOR HONEYWELL  APR 79
****************************                                                   ****************************
    1              A KEUKA LAKE DAM        NY-390                        OSWEGO RIVER BASIN
    2              A                       VILLAGE OF PENN YAN           YATES COUNTY
    3              A                                                     SNYDER UH
    4              B    200        2        0        0        0        0        0        0        0        0
    5              B1     5

    6              J      1        2        1

    7              J1   0.5        1

    8              K      0   SUBBSN                                              1

    9              K1                      INFLOW HYDROGRAPH

   10              M      1        1      182               182                                     1

   11              P      0       22       79       91      101      110

   12              T                                                          1.5     0.03                0.1

   13              W  12.26    0.625

   14              .    100      800      1.6

   15                    1      DAM                           2                 1

   16              K1                      ROUTED HYDROGRAPH AT DAM - CENTER SPILLWAY ONLY

   17              Y                                          1

   18              Y1     1                                                      -714       -1

   19              Y4   714      716    716.5      717    717.5      718    718.5   718.75      719

   20              Y5     0        0       55      155      285      445      620      715      815

   21              $S 76000    97000   119000   142000   166000   191000   217000   230000   240000

   22              $E   708      710      712      714      716      718      720      721    721.7

   23              $$   716

   24              $D718.75      3.1      1.5     60.2

   25              K     99

   26              A

   27              A

   28              A

   29              A

   30              A
```

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 .50	 RATIO 2 1.00
HYDROGRAPH AT	SUBBSN	162.00 (0.00)	1	51947. (1470.97)	103893. (2941.93)
ROUTED TO	DAM	162.00 (0.00)	1	2147. (60.81)	7033. (216.30)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	714.00	716.00	718.75
STORAGE	142000.	166000.	200750.
OUTFLOW	0.	0.	715.

CENTER SPILLWAY ONLY

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	720.82	2.13	223444.	2147.	320.00	98.00	0.
1.00	720.33	1.58	206104.	1638.	252.00	92.00	0.

#4

15

```
*********************************                                       ********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)                                        NEW YORK STATE
DAM SAFETY VERSION      JULY 1978                                       DEPT OF ENVIRONMENTAL CONSERVATION
  LAST MODIFICATION  26 FEB 79                                          FLOOD PROTECTION BUREAU
  MODIFIED FOR HONEYWELL APR 79
*********************************                                       ********************************

A KEUKA LAKE DAM       NY-390                              OSWEGO RIVER BASIN
A                      VILLAGE OF PENN YAN                 YATES COUNTY
A                                                          SNYDER JH
B     200       2       0       0       0       0       0       0       0       0
B1      5
J       1       7       1
J1    0.3    0.31    0.32    0.33    0.34    0.35     0.5
K       0  SUBBSN                                       1
K1                     INFLOW HYDROGRAPH
M       1       1     182             182                               1
P       0      22      79      91     101     110
T                                                     1.5    0.03            0.1
W   12.26   0.625
X     100     800     1.6
K       1     DAM                                       1
K1                     ROUTED HYDROGRAPH AT DAM - CENTER SPILLWAY ONLY
Y                               1       1
Y1      1                                         -713.99      -1
Y4713.99      716   716.5     717   717.5     718   718.5  718.75     719
Y5      0       0      55     155     285     445     620     715     815
$S  76000   97000  119000  142000  166000  191000  217000  230000  240000
$E    708     710     712     714     716     718     720     721   721.7
$$    716
$D718.75      3.1     1.5    60.2
K      99
A
A
A
A
A
```

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FORMULTIPLE 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 0.30	RATIO 2 0.31	RATIO 3 0.32	RATIO 4 0.33	RATIO 5 0.34	RATIO 6 0.35	RATIO 7 0.50
HYDROGRAPH AT	SUBBSN	182.00	1	31168.	32207.	33246.	34285.	35324.	36363.	51947.
		(5541.69)		(882.58)(	912.00)(	941.42)(	970.84)(	1000.26)(	1029.68)(	1470.97)(
ROUTED TO	DAM	182.00	1	572.	618.	667.	717.	778.	845.	2141.
		(5541.69)		(16.19)(	17.49)(	18.89)(	20.30)(	22.02)(	23.92)(	60.64)(

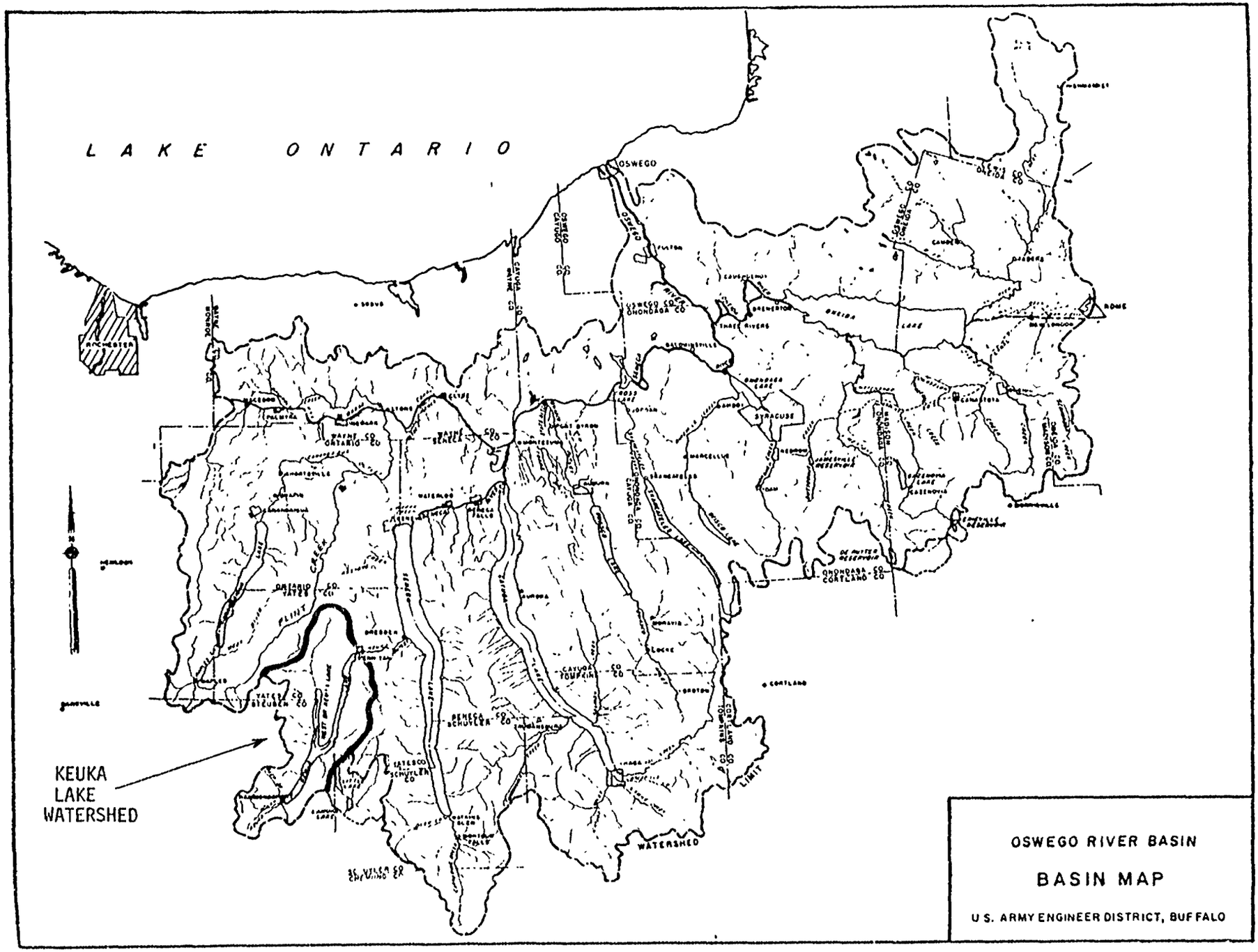
SUMMARY OF DAM SAFETY ANALYSIS

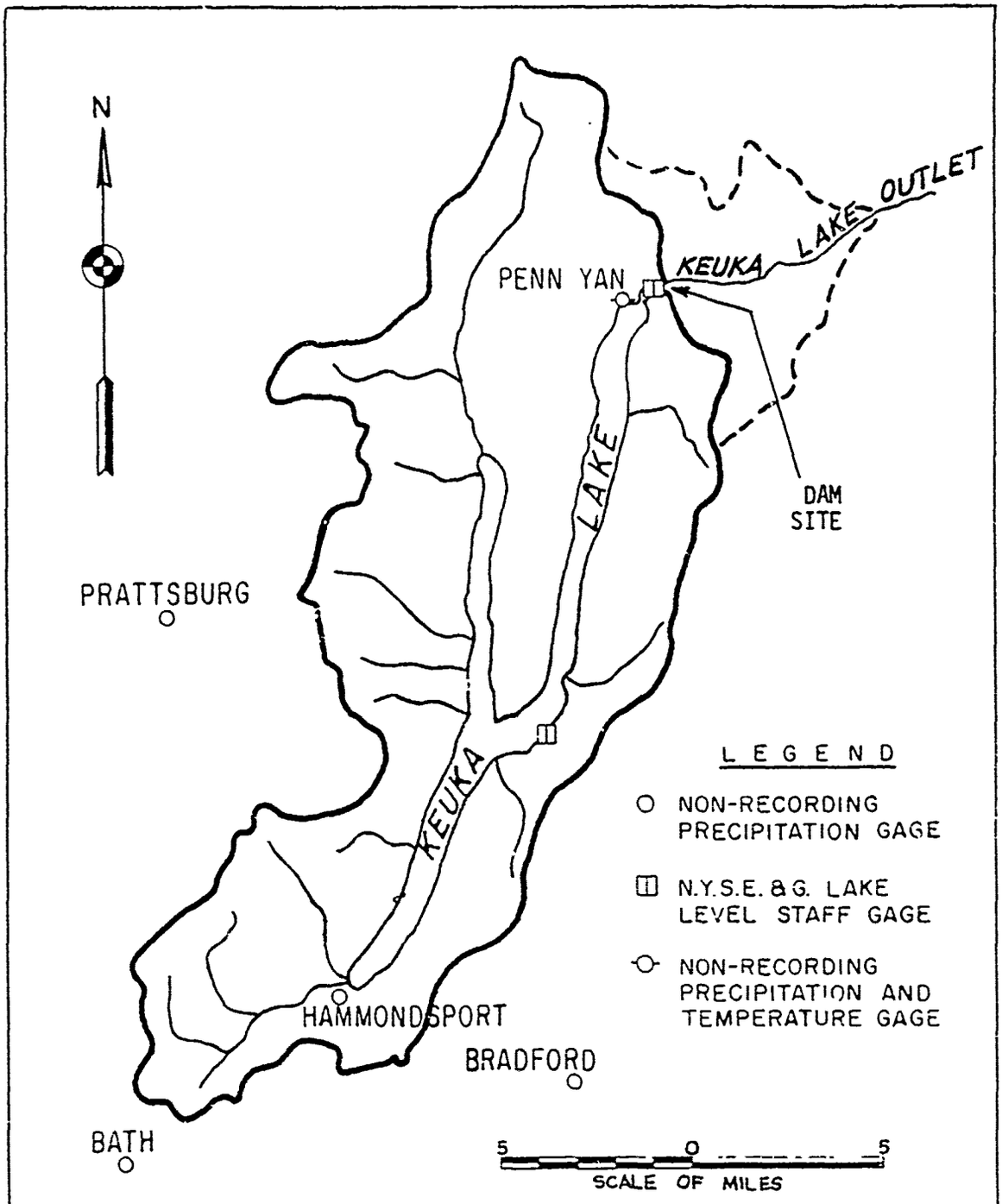
PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	713.99	716.00	718.75
STORAGE	141885.	166000.	200750.
OUTFLOW	0.	0.	715.

[CENTER SPILLWAY ONLY

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
0.30	718.36	0.	195710.	572.	0.	98.00	0.
0.31	718.49	0.	197411.	618.	0.	96.00	0.
0.32	718.62	0.	199111.	667.	0.	96.00	0.
0.33	718.75	0.00	200809.	717.	10.00	96.00	0.
0.34	718.88	0.13	202488.	778.	60.00	96.00	0.
0.35	719.01	0.26	204156.	843.	92.00	94.00	0.
0.50	720.87	2.12	228347.	2141.	320.00	88.00	0.


LAKE ONTARIO
OSWEGO
SYRACUSE
ROME
CORTLAND
KEUKA
LAKE
WATERSHED
OSWEGO RIVER BASIN
BASIN MAP
U.S. ARMY ENGINEER DISTRICT, BUFFALO



OSWEGO RIVER WATERSHED, NEW YORK

KEUKA LAKE OUTLET

PENN YAN, NEW YORK

DRAINAGE AREA MAP
KEUKA LAKE OUTLET DAM

04232450 KEUKA INLET (KEUKA LAKE) AT HAMMONDSPORT, NY
(Formerly published as Keuka Lake at Hammondsport)

LOCATION.--Lat 42°24'22", long 77°13'08", Steuben County, Hydrologic Unit 04140201, on left bank of Keuka Inlet at end of Liberty Street extension at Hammondsport, and 300 ft (91 m) upstream from mouth.

DRAINAGE AREA.--Keuka Inlet 25.0 mi² (64.8 km²); Keuka Lake at mouth 182 mi² (471 km²).

PERIOD OF RECORD.--August 1960 to current year.

REVISED RECORDS.--WSP 2112: Drainage area. WRD NY 1974: 1973.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to October 1, 1975, at datum 710.00 ft (216.408 m) higher.

REMARKS.--Lake regulated by village of Penn Yan; prior to July 1962, by New York State Electric and Gas Corp. Area of water surface, 18.3 mi² (47.4 km²). During each year, a large part of flow from 45.5 mi² (118 km²) of drainage area of Mud Creek (Susquehanna River basin) is diverted into Keuka Lake for power development. For table of diversion, see station 01528700.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 719.35 ft (219.258 m) June 24, 1972; minimum daily, 711.40 ft (216.835 m) Feb. 2, 3, 1961.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 715.15 ft (217.978 m) March 11; minimum, 712.65 ft (217.216 m) Feb. 18.

ELEVATION, IN FEET NGVD, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	713.08	713.18	713.21	712.86	713.51	712.87	714.50	714.24	714.42	714.40	714.55	713.77
2	713.11	713.15	713.19	713.26	713.40	712.90	714.48	714.20	714.42	714.40	714.61	713.76
3	713.07	713.15	713.16	713.33	713.25	712.98	714.50	714.14	714.42	714.41	714.65	713.82
4	713.06	713.15	713.16	713.34	713.20	713.16	714.44	714.10	714.41	714.40	714.58	713.82
5	713.07	713.14	713.16	713.35	713.15	713.53	714.47	714.06	714.41	714.39	714.49	713.81
6	713.03	713.15	713.13	713.36	713.10	714.69	714.41	714.02	714.42	714.36	714.45	714.13
7	713.03	713.17	713.10	713.35	713.10	714.92	714.42	713.98	714.41	714.35	714.32	714.23
8	713.03	713.17	713.09	713.38	713.10	715.02	714.40	713.97	714.42	714.34	714.25	714.18
9	713.01	713.16	713.15	713.35	713.10	715.04	714.48	713.97	714.49	714.32	714.19	714.09
10	712.98	713.18	713.13	713.37	713.05	715.08	714.57	713.98	714.49	714.31	714.10	714.00
11	712.99	713.19	713.10	713.30	713.00	715.10	714.67	714.00	714.51	714.30	714.07	713.95
12	712.99	713.22	713.07	713.20	712.90	715.07	714.75	714.00	714.53	714.32	713.99	713.88
13	713.07	713.19	713.03	713.10	712.85	715.03	714.78	714.01	714.50	714.32	713.91	713.79
14	713.19	713.18	713.00	713.05	712.85	715.02	714.79	714.02	714.48	714.32	713.86	713.79
15	713.20	713.20	712.97	713.00	712.80	715.01	714.80	714.03	714.46	714.33	713.85	713.84
16	713.21	713.21	712.95	713.00	712.75	714.97	714.80	714.05	714.45	714.39	713.85	713.78
17	713.19	713.20	712.93	713.00	712.70	714.92	714.79	714.07	714.45	714.41	713.80	713.72
18	713.16	713.23	712.93	713.00	712.65	714.89	714.78	714.08	714.45	714.40	713.80	713.65
19	713.17	713.24	712.90	713.05	712.70	714.85	714.75	714.07	714.43	714.38	713.80	713.62
20	713.18	713.26	712.87	713.05	712.75	714.80	714.71	714.07	714.40	714.37	713.79	713.52
21	713.16	713.26	712.88	713.10	712.80	714.77	714.68	714.08	714.35	714.36	713.79	713.47
22	713.16	713.25	712.95	713.20	712.90	714.74	714.65	714.11	714.36	714.34	713.77	713.46
23	713.17	713.23	712.84	713.30	713.00	714.71	714.61	714.10	714.40	714.34	713.74	713.38
24	713.17	713.25	712.81	713.37	712.92	714.69	714.56	714.16	714.38	714.39	713.74	713.31
25	713.15	713.26	712.90	713.29	712.36	714.70	714.50	714.23	714.37	714.40	713.75	713.29
26	713.15	713.26	712.88	713.47	712.85	714.68	714.45	714.24	714.33	714.40	713.75	713.28
27	713.20	713.25	712.85	713.51	712.86	714.64	714.42	714.26	714.29	714.42	713.81	713.28
28	713.19	713.27	712.83	713.53	712.86	714.58	714.39	714.29	714.33	714.40	713.81	713.31
29	713.20	713.26	712.80	713.52	---	714.55	714.35	714.32	714.34	714.41	713.79	713.35
30	713.18	713.24	712.76	713.52	---	714.55	714.29	714.37	714.35	714.39	713.80	713.36
31	713.16	---	712.74	713.51	---	714.53	---	714.40	---	714.39	713.80	---
MEAN	713.12	713.21	712.98	713.26	712.96	714.55	714.57	714.12	714.42	714.37	714.01	713.69
MAX	713.21	713.27	713.21	713.53	713.51	715.10	714.80	714.40	714.53	714.42	714.65	714.23
MIN	712.98	713.14	712.74	712.86	712.65	712.87	714.29	713.97	714.29	714.30	713.74	713.28

CAL YR 1978 MEAN 714.04 MAX 716.26 MIN 712.74
WTR YR 1979 MEAN 713.78 MAX 715.10 MIN 712.65

01528700 DIVERSION FROM WANETA LAKE TO KEUKA LAKE AT KEUKA, NY

LOCATION.--Lat 42°29'06", long 77°06'39", Steuben County, Hydrologic Unit 02050105, at entrance to conduit on Diversion Canal, 0.8 mi (1.3 km) east of Keuka, and 1.0 mi (1.6 km) north of Wayne.

DRAINAGE AREA.--45.5 mi^2 (118 km^2).

PERIOD OF RECORD.--October 1966 to current year.

GAGE.--Daily power generation records.

REMARKS.--Records for January 1951 to September 1966 on file. Sketch indicates diversion from Lamoka-Waneta Lakes (Susquehanna River Basin) to Keuka Lake (Oswego River Basin).

COOPERATION.--Records furnished by New York State Electric and Gas Corp.

AVERAGE DISCHARGE.--13 years, 24.0 ft^3/s (0.680 m^3/s).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 73 ft^3/s (2.07 m^3/s) June 23, 1972; no flow for many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 66 ft^3/s (1.87 m^3/s) Oct. 11, 12; no flow many days.

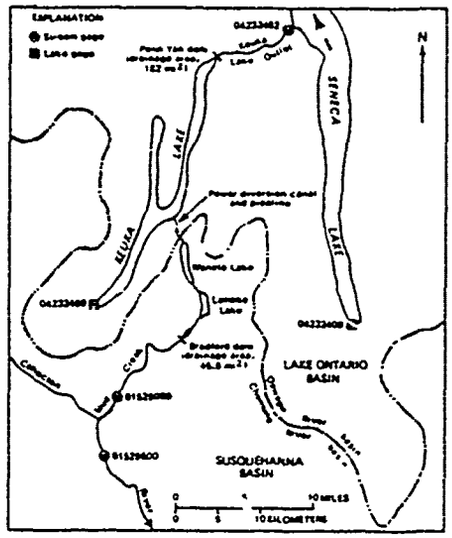


Figure 8.--Gaging stations and transbasin diversion, Cohocton River-Keuka Lake area.

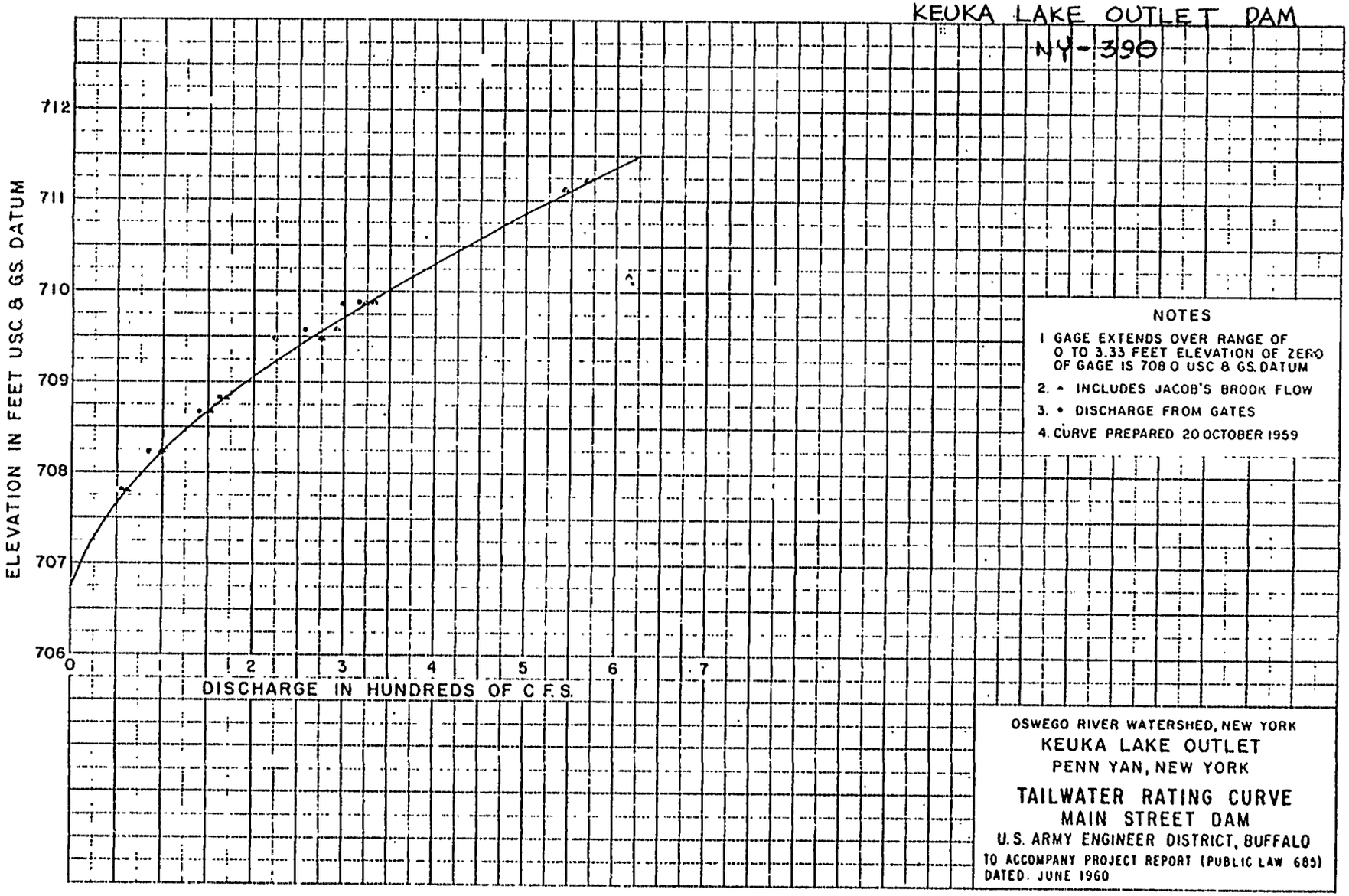
DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1978 TO SEPTEMBER 1979
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	31	.00	.00	.00	.00	.00	26	.00	.00	.00
2	.00	.00	31	23	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	31	48	.00	.00	.00	.00	.00	32	.00	.00
4	.00	.00	31	55	.00	.00	.00	.00	.00	36	.00	.00
5	.00	.00	.00	55	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	32	20	55	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	55	33	55	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	55	33	23	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	55	32	.00	.00	.00	.00	5.2	.00	.00	.00	.00
10	33	55	.00	.00	.00	.00	.00	14	.00	.00	.00	.00
11	66	55	19	.00	.00	.00	.00	8.0	.00	.00	.00	.00
12	66	55	33	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	51	55	33	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	46	48	33	.00	.00	.00	.00	24	.00	.00	.00	.00
15	46	42	34	.00	.00	.00	.00	49	.00	.00	.00	.00
16	27	42	34	.00	.00	.00	.00	55	.00	.00	.00	.00
17	.00	37	34	.00	.00	.00	.00	55	.00	15	.00	.00
18	.00	37	34	.00	.00	.00	.00	35	.00	.00	.00	.00
19	.00	37	34	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	35	33	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	35	33	.00	.00	.00	.00	31	.00	.00	.00	.00
22	.00	16	34	.00	.00	.00	.00	55	.00	.00	.00	.00
23	.00	.00	34	.00	.00	.00	.00	55	.00	.00	.00	.00
24	.00	.00	34	.00	.00	.00	.00	55	.00	.00	.00	.00
25	.00	.00	34	.00	.00	.00	.00	28	.00	.00	.00	.00
26	.00	.00	34	.00	.00	.00	.00	.00	.00	.00	.00	32
27	.00	18	34	.00	.00	.00	.00	.00	.00	.00	.00	49
28	.00	34	34	.00	.00	.00	.00	.00	.00	.00	.00	55
29	.00	34	34	.00	---	.00	.00	24	.00	.00	.00	55
30	.00	34	34	.00	---	.00	.00	42	.00	.00	.00	55
31	.00	---	34	.00	---	.00	---	42	---	.00	.00	---
TOTAL	335.00	866.00	936.00	314.00	.00	.00	.00	577.20	26.00	83.00	.00	246.00
MEAN	10.8	28.9	30.2	10.1	.000	.000	.00	18.6	.87	2.68	.000	8.20
MAX	66	55	34	55	.00	.00	.00	55	26	36	.00	55
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

CAL YR 1978 TOTAL 10772.00 MEAN 29.5 MAX 68 MIN .00
WTR YR 1979 TOTAL 3383.20 MEAN 9.27 MAX 66 MIN .00

KEUKA LAKE OUTLET DAM

NY-390



NOTES

1. GAGE EXTENDS OVER RANGE OF 0 TO 3.33 FEET ELEVATION OF ZERO OF GAGE IS 708.0 USC & GS. DATUM
2. ▲ INCLUDES JACOB'S BROOK FLOW
3. • DISCHARGE FROM GATES
4. CURVE PREPARED 20 OCTOBER 1959

OSWEGO RIVER WATERSHED, NEW YORK

KEUKA LAKE OUTLET

PENN YAN, NEW YORK

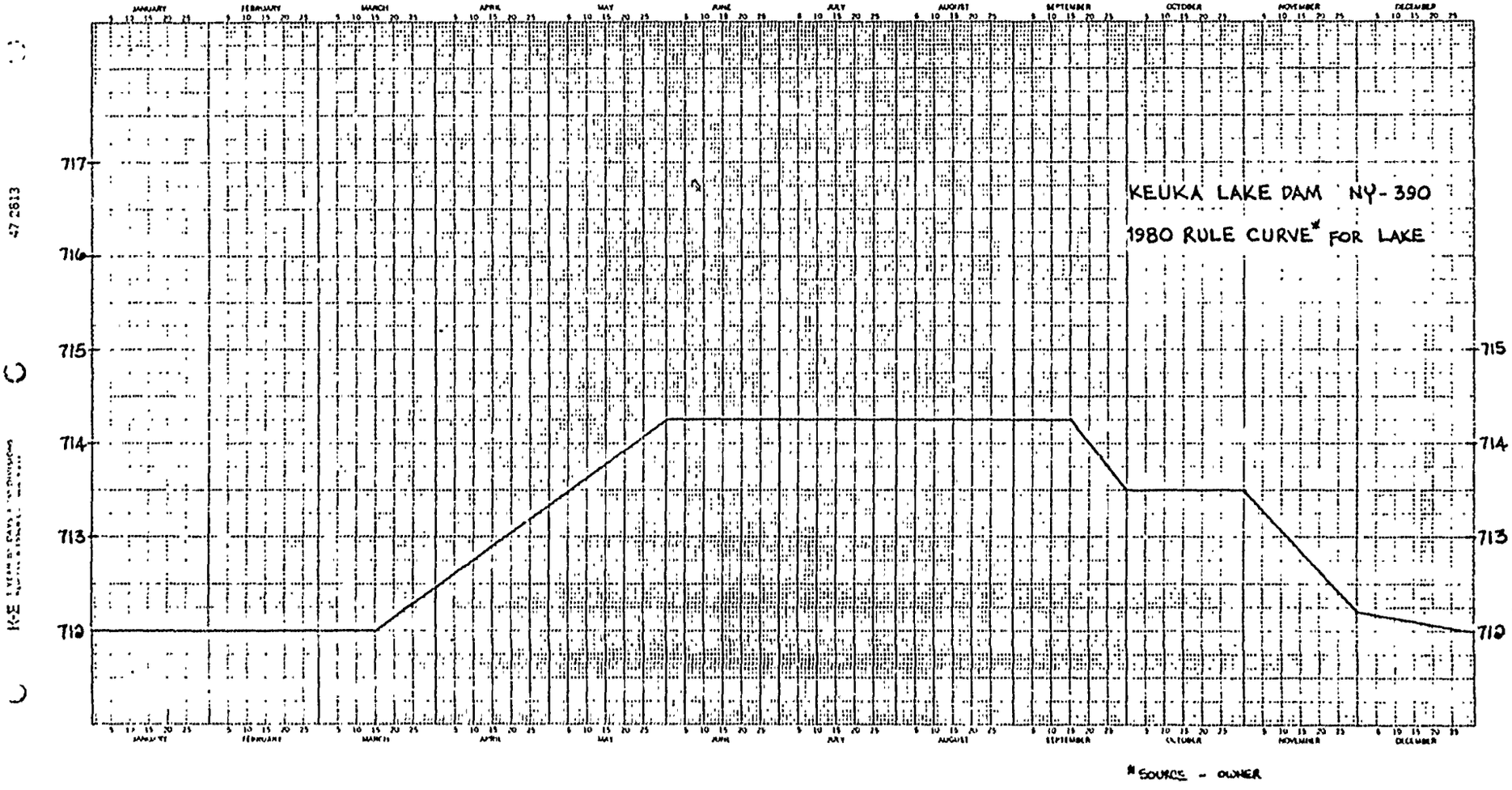
TAILWATER RATING CURVE

MAIN STREET DAM

U.S. ARMY ENGINEER DISTRICT, BUFFALO

TO ACCOMPANY PROJECT REPORT (PUBLIC LAW 685) DATED. JUNE 1960

APPENDIX PLATE I-4


KEUKA LAKE DAM NY-390
1980 RULE CURVE* FOR LAKE
717
716
715
714
713
712
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
*SOURCE - OWNER

KEUKA LAKE DAM
NY-390

#53B-613 OSWEGO

This afternoon the new dam gates were put into operation. These new gates are located in a brick and steel wall across the south channel. [redacted] Each gate opening is 54" wide and 54" high over which is fitted a cast iron gate lifted by a worm gear and cap screw mechanism. Thus these gates can be opened from the bottom any desired amount up to the top of the opening. The capacity for flow is exactly the same as for the old gates and is based upon the height setting of each gate and the pressure created by the lake level. For the present each gate is about 12" open which will permit moderate flow. Very soon they will be opened fully to permit maximum runoff during the spring rise period. At the same time, the gate in the north channel which is now restricted in flow by the conduit under the construction work access will be fully opened too.

In summary, the gates in the north and south channel are now both in good condition and will be operated to minimize spring fillup. The target level for June 1st is slightly above 714.0 to be maintained as nearly as possible thereafter until mid-September.

March 2nd, 1966
JTAndrews/hst

APPENDIX D
REFERENCES

APPENDIX D

REFERENCES

1) M.G. Cline and R.L. Marshall, General Soil Map of New York State, Cornell University Agriculture Experiment Station, March 1977.

2) P. Greeson and F. Robison, Characteristics of New York Lakes-Gazetteer, Part 1, Bulletin 68, US Geological Survey, 1970.

Y.W. Isachsen and W.G. McKendree, Brittle Structures Map of New York State, New York State Museum, 1977.

4) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.

5) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

U.S. Army; Corps of Engineers; Buffalo District:

6) Keuka outlet at Penn Yan, New York, Detailed Project Report for Flood Control, June 1960.

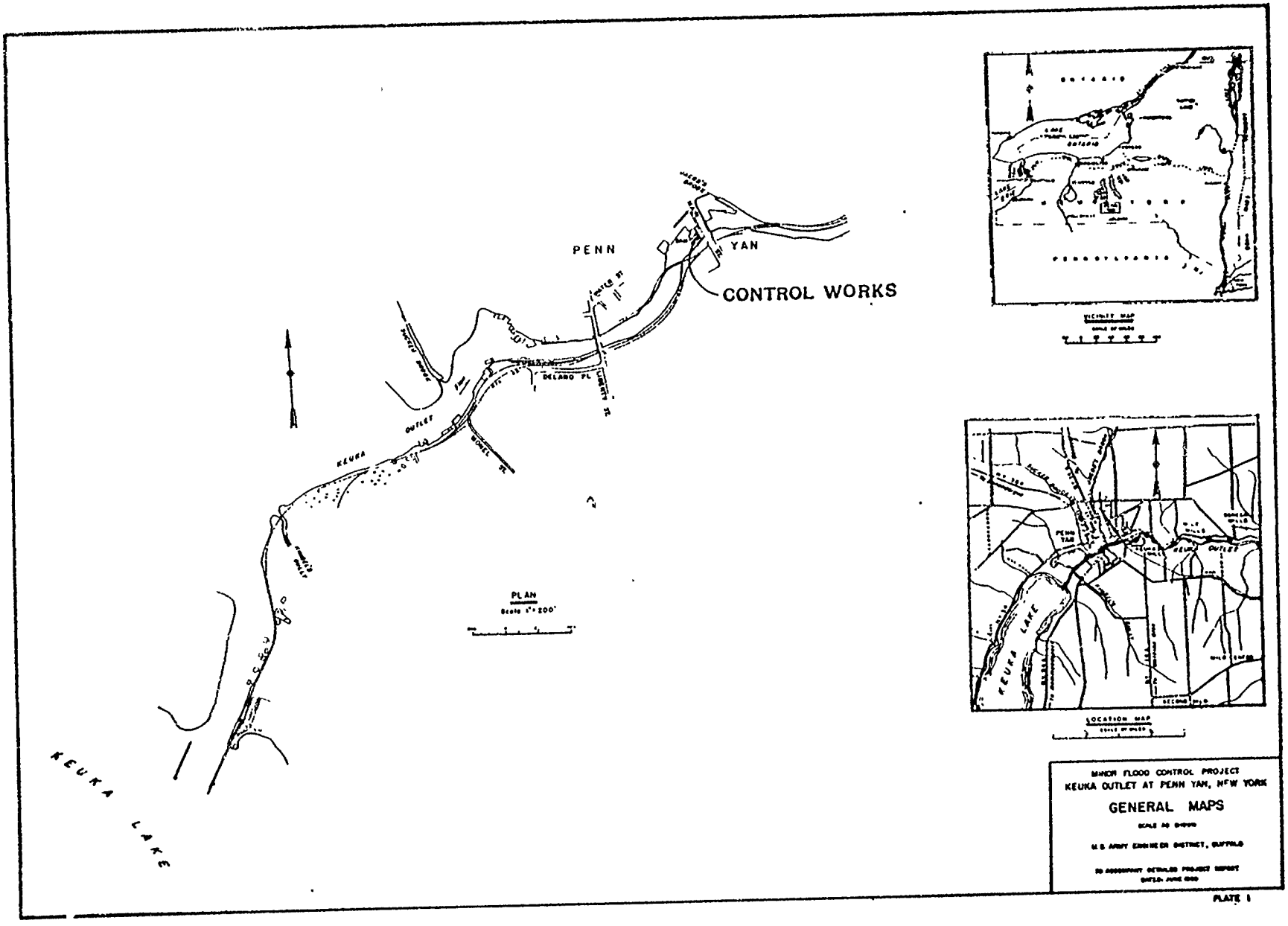
7) Oswego River Basin, Water Resources Management Study, Preliminary Feasibility Report Appendices, May 1978.

8) U.S. Department of Commerce; Weather Bureau; Hydrometeorological Report No. 33: Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 square miles and durations of 6, 12, 24, and 48 hours; April 1956.

9) U.S. Department of Commerce; NOAA: Hydrometeorological Report No. 51: Probable Maximum Precipitation Estimates, United States East of the 105th Meridian; June 1978.

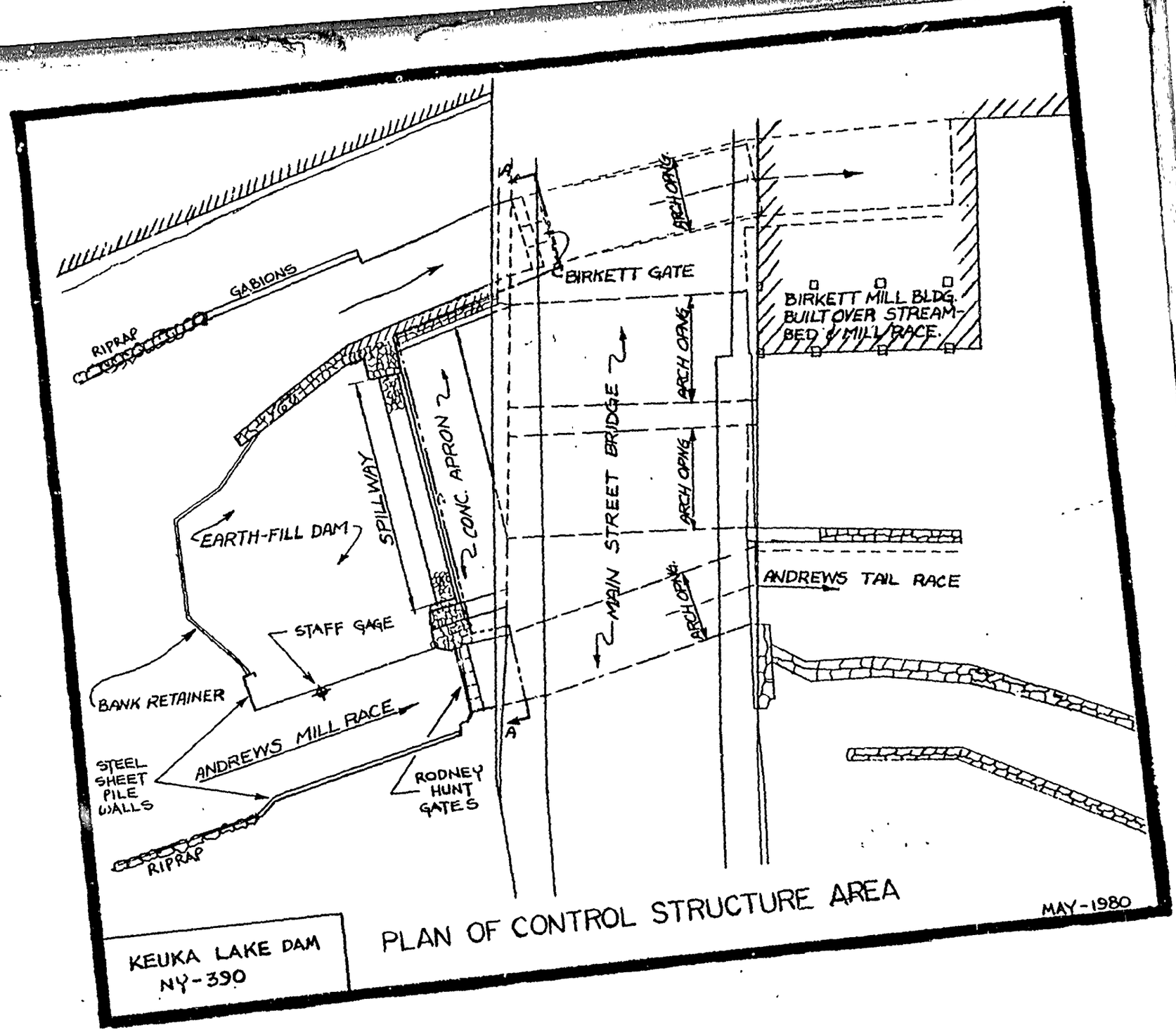
10) U.S. Geological Survey; Water Resources Data for New York - Water Year 1979, Water Data Report NY-79-1, Volume 1, May 1980.

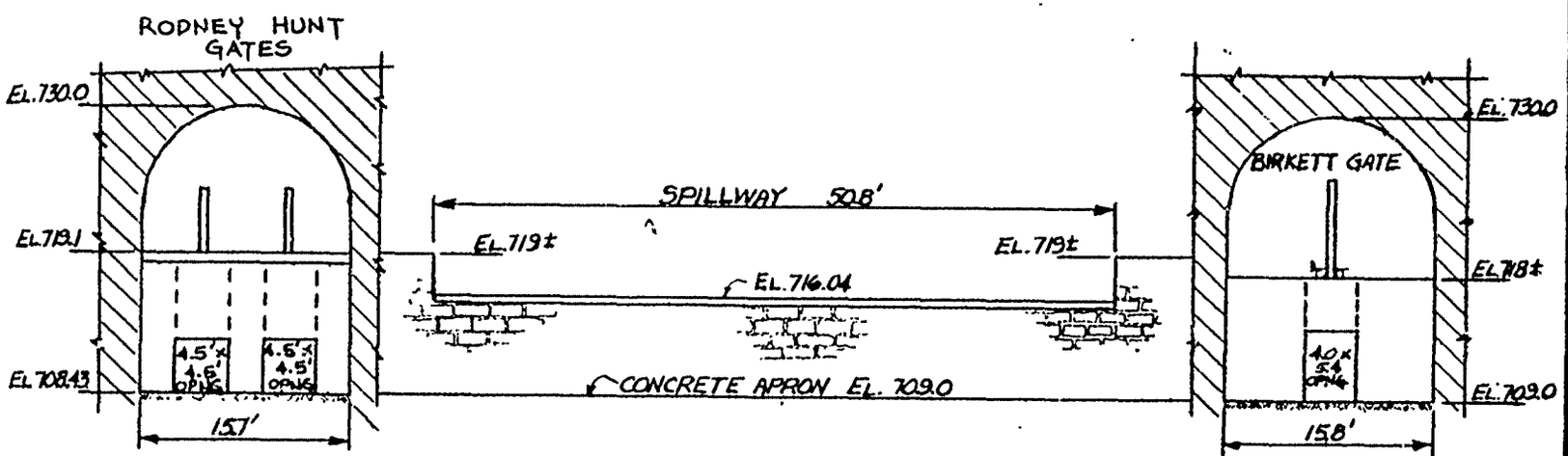
APPENDIX E
DRAWINGS



KEUKA LAKE OUTLET
DAM

NY - 390


GABIONS
RIPRAP
BIRKETT GATE
ARCH OPNG.
BIRKETT MILL BLDG. BUILT OVER STREAM-BED & MILL RACE.
ARCH OPNG.
SPILLWAY
CONC. APRON
MAIN STREET BRIDGE
ARCH OPNG.
EARTH-FILL DAM
ANDREWS TAIL RACE
ARCH OPNG.
STAFF GAGE
BANK RETAINER
ANDREWS MILL RACE
STEEL SHEET PILE WALLS
RODNEY HUNT GATES
RIPRAP
A
A
KEUKA LAKE DAM
NY-390
PLAN OF CONTROL STRUCTURE AREA
MAY-1980

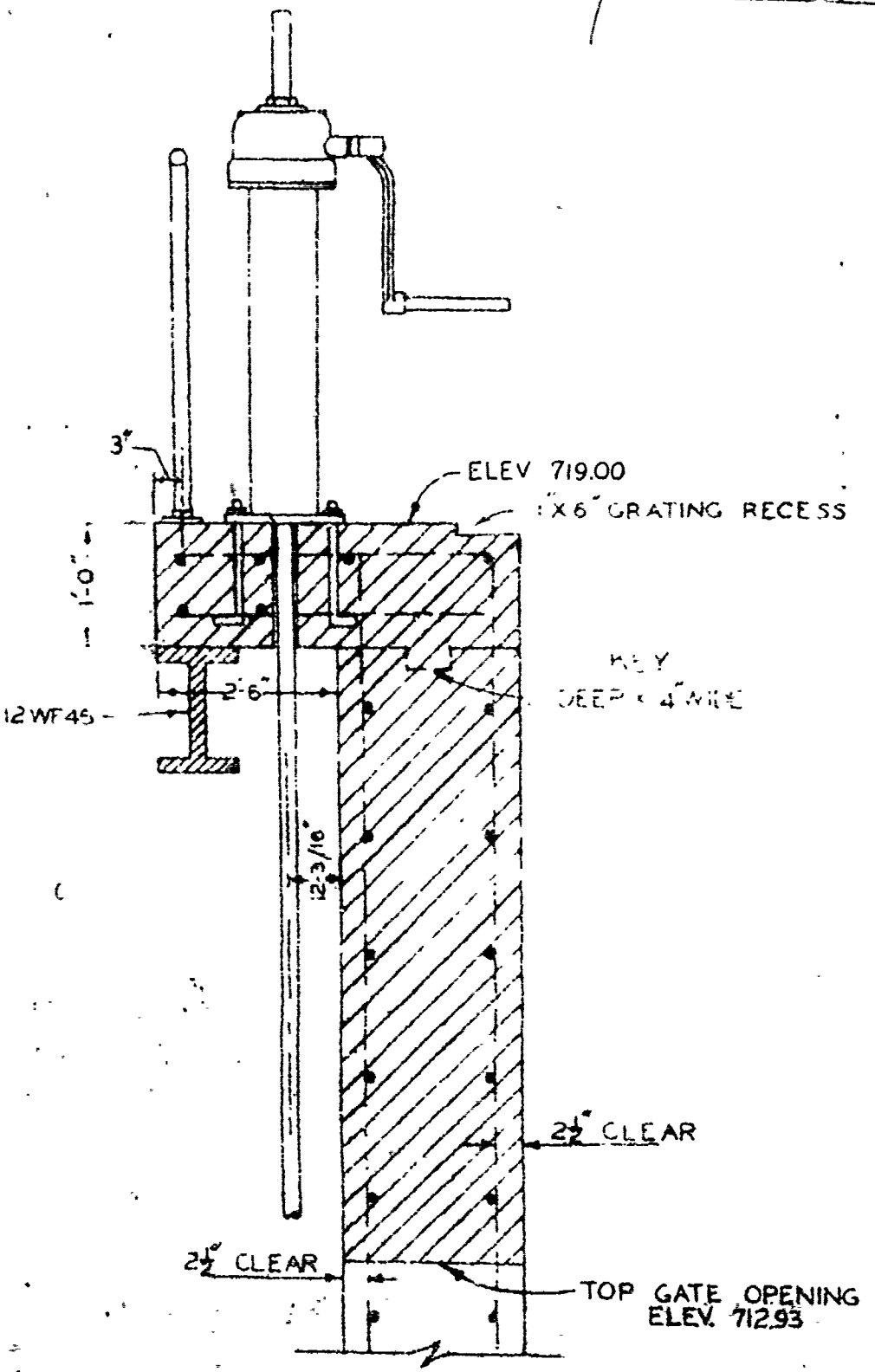


SECTION A-A

KEUKA LAKE DAM
NY-390

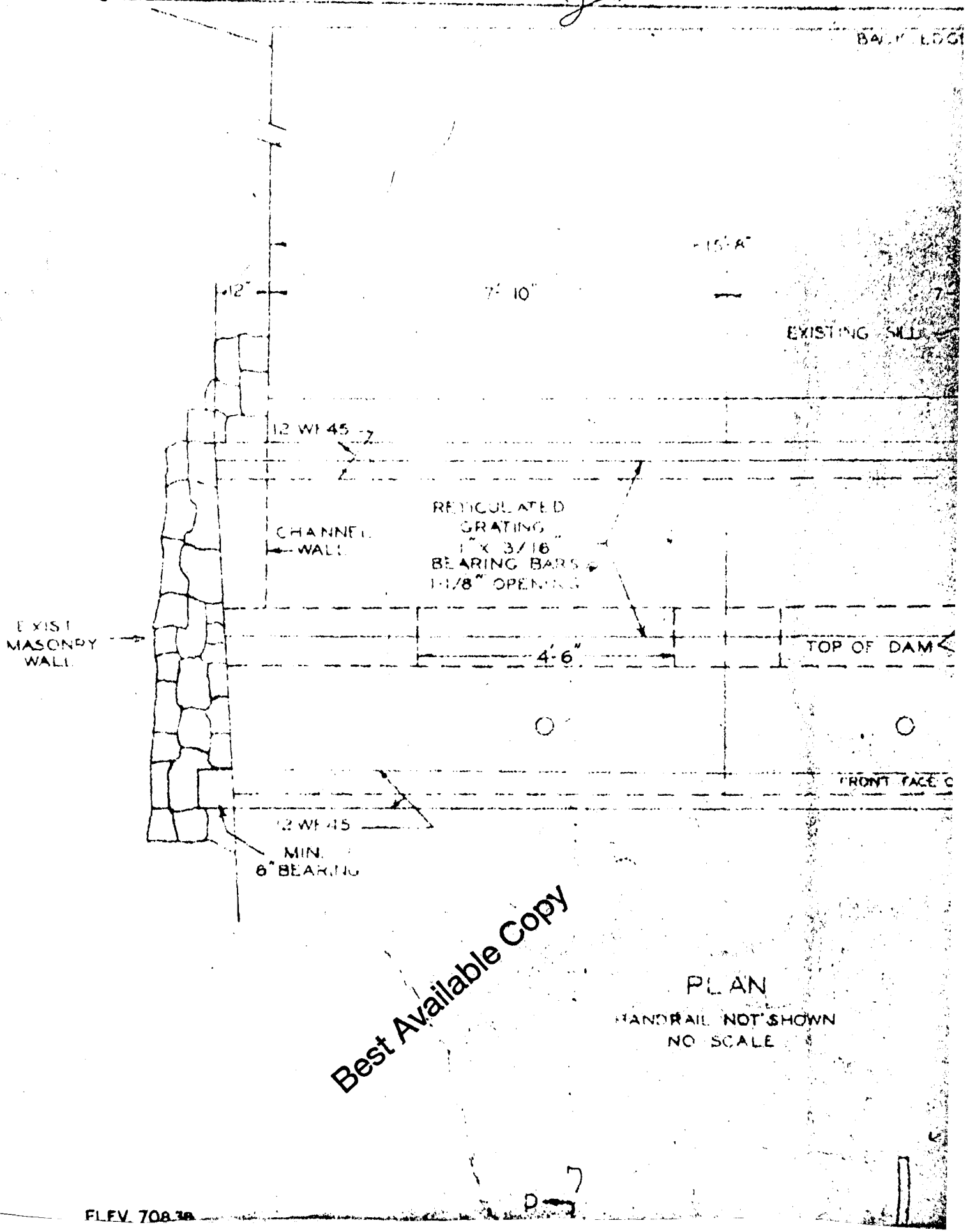
KEUKA LAKE OUTLET
PENN YAN, NEW YORK
MAIN STREET DAM AND
CONTROL GATES

MAY - 1980



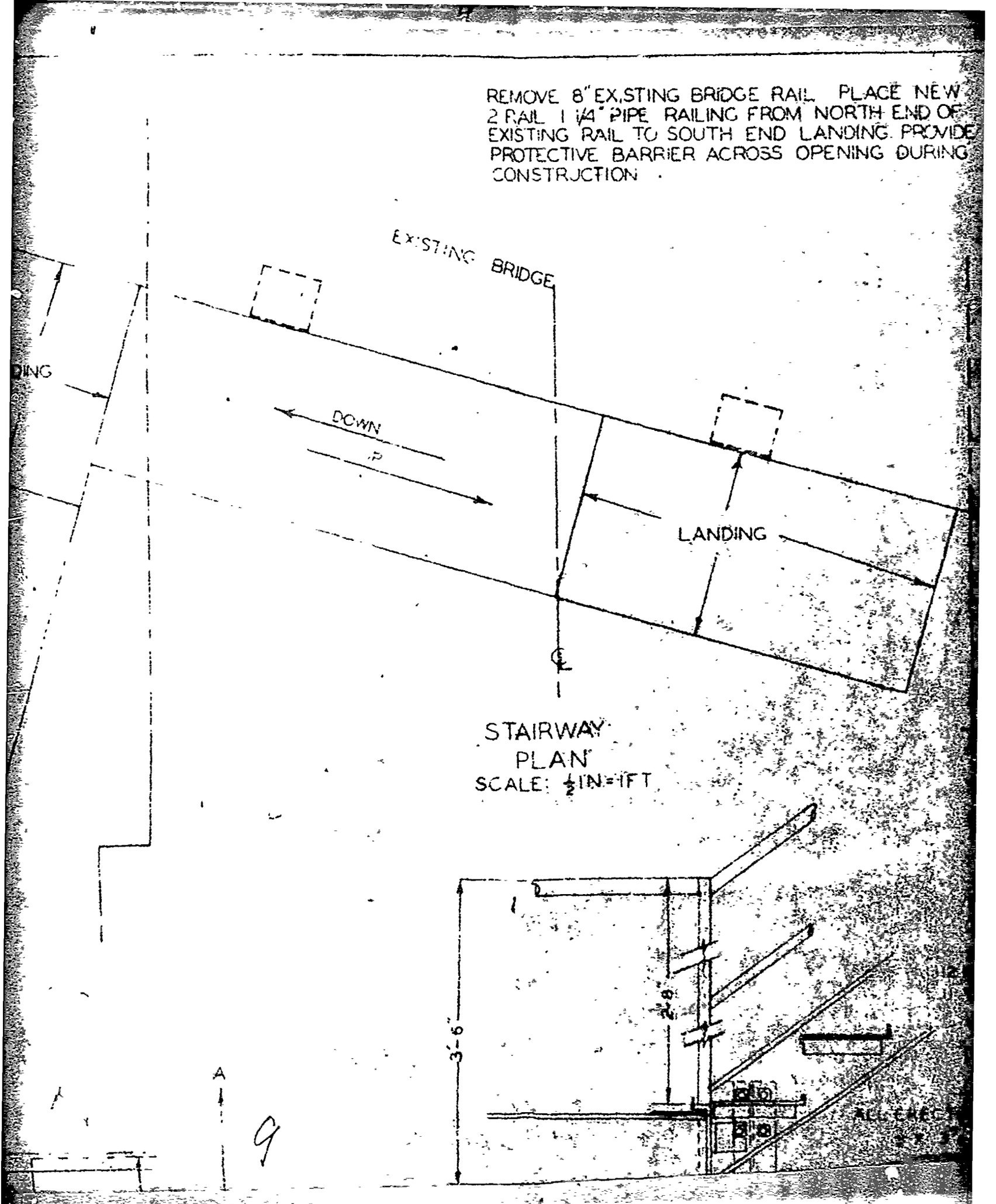
WALL SECTION
NO SCALE

COPPER WATER STOP



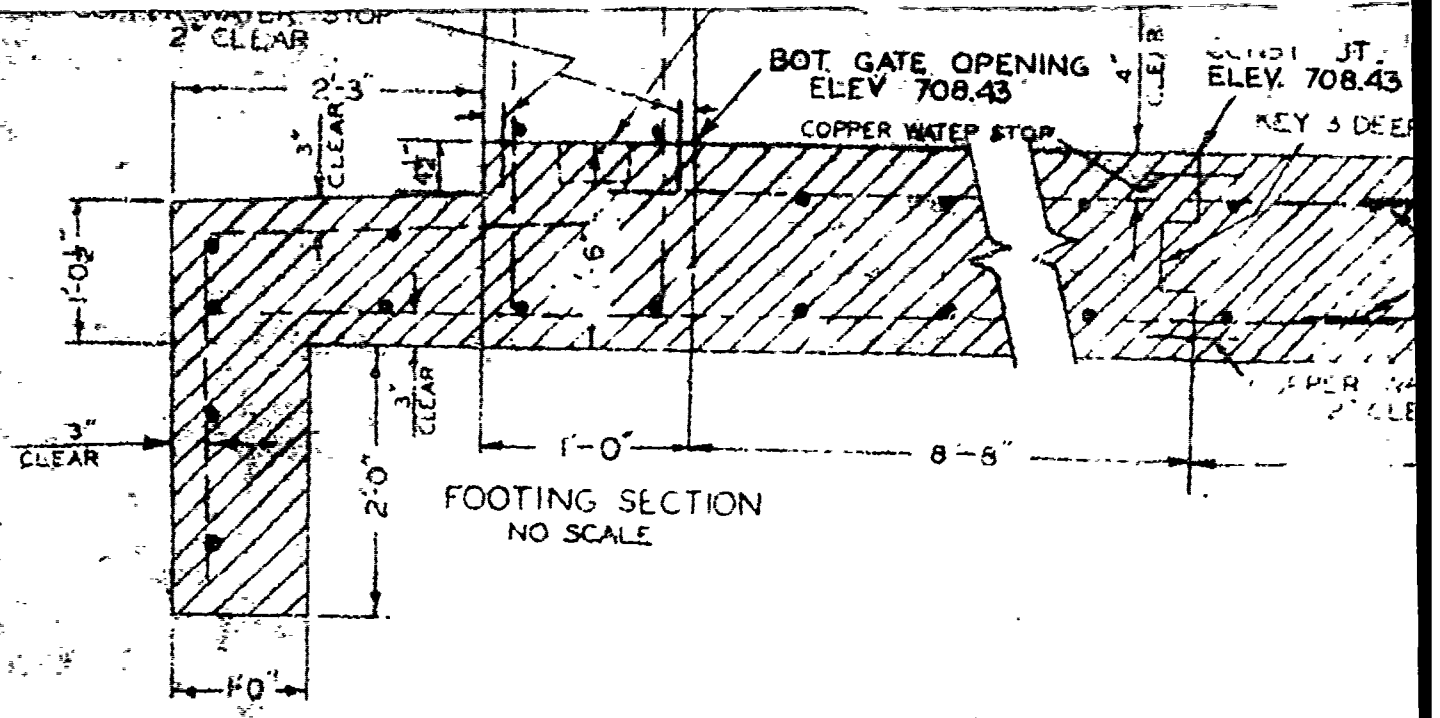
EXIST BRIDGE
7'-8"
2'-4"
CHANNEL WALL
DAM
EAST MASONRY WALL
MIN 6" BEARING
LANDING
4'-1
5"
A
B
6"

REMOVE 8" EXISTING BRIDGE RAIL. PLACE NEW 2 RAIL 1 1/4" PIPE RAILING FROM NORTH END OF EXISTING RAIL TO SOUTH END LANDING. PROVIDE PROTECTIVE BARRIER ACROSS OPENING DURING CONSTRUCTION.



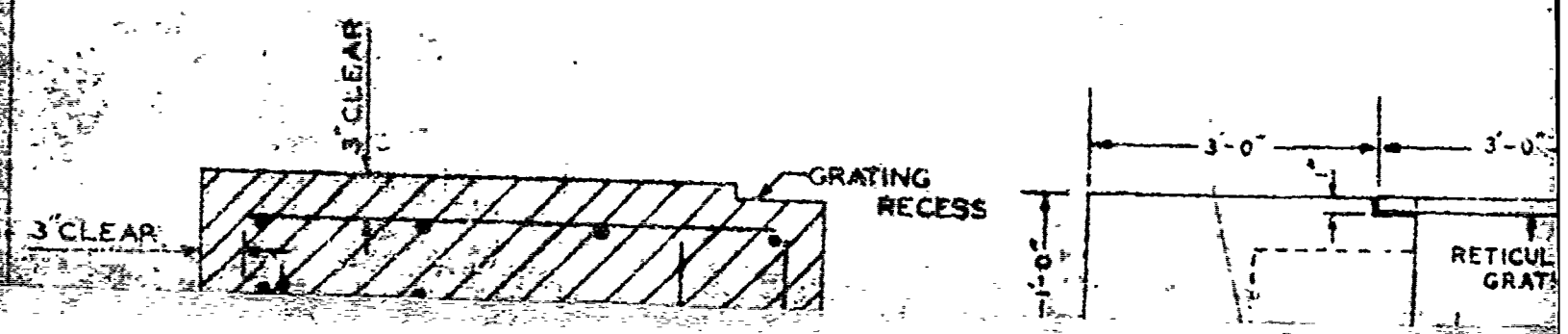
STAIRWAY PLAN
SCALE: 1/2 IN = 1 FT

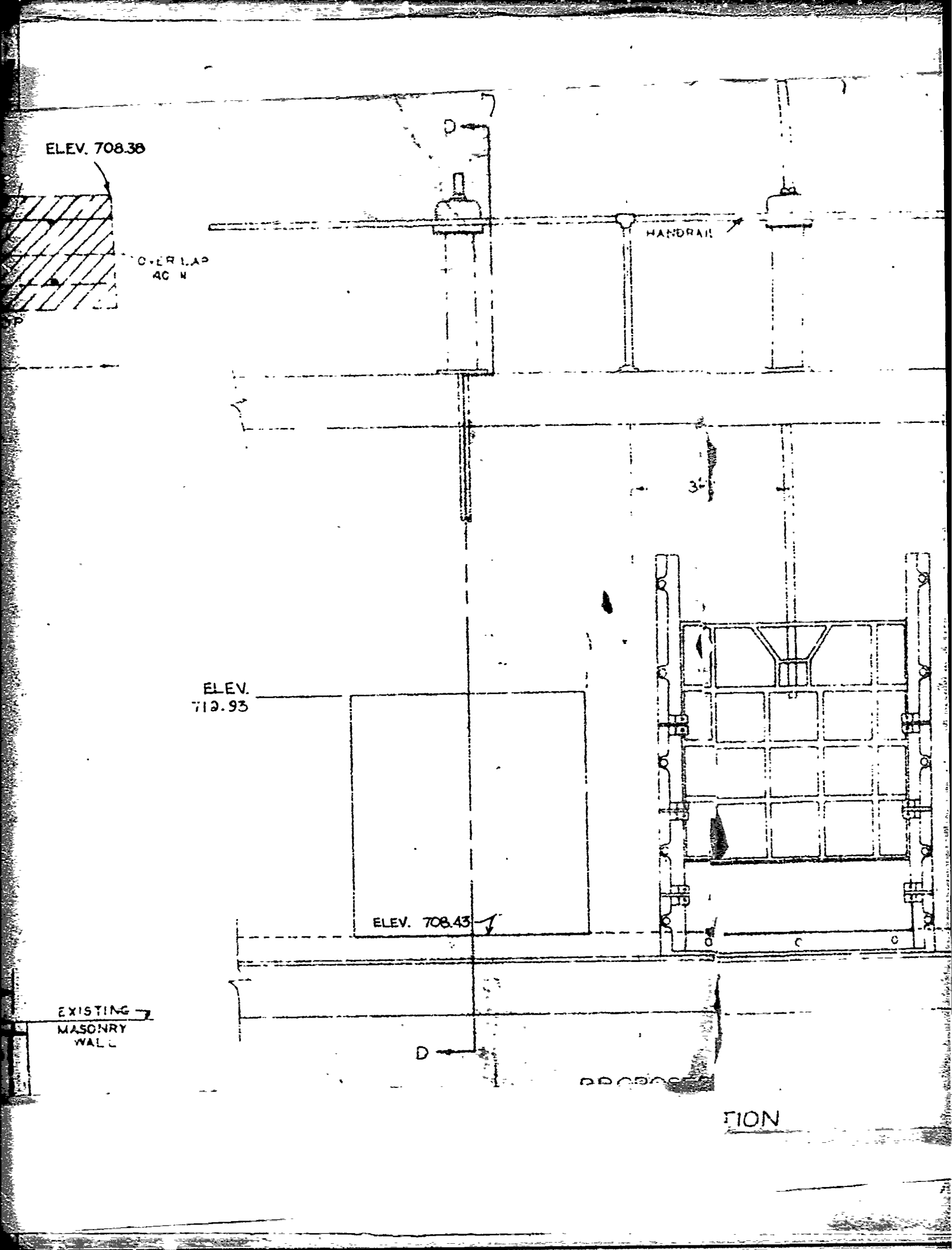
6

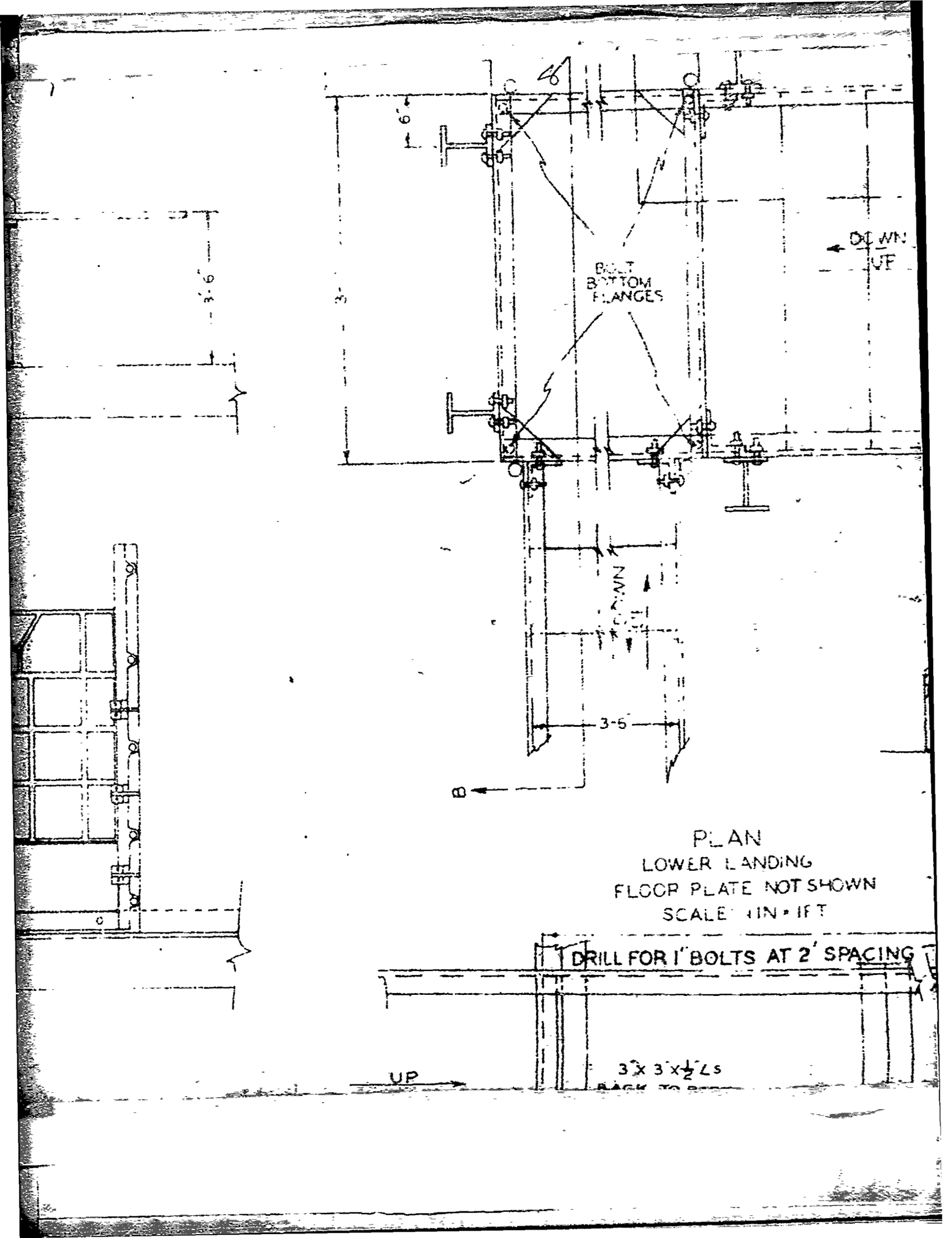


SECTION D-D

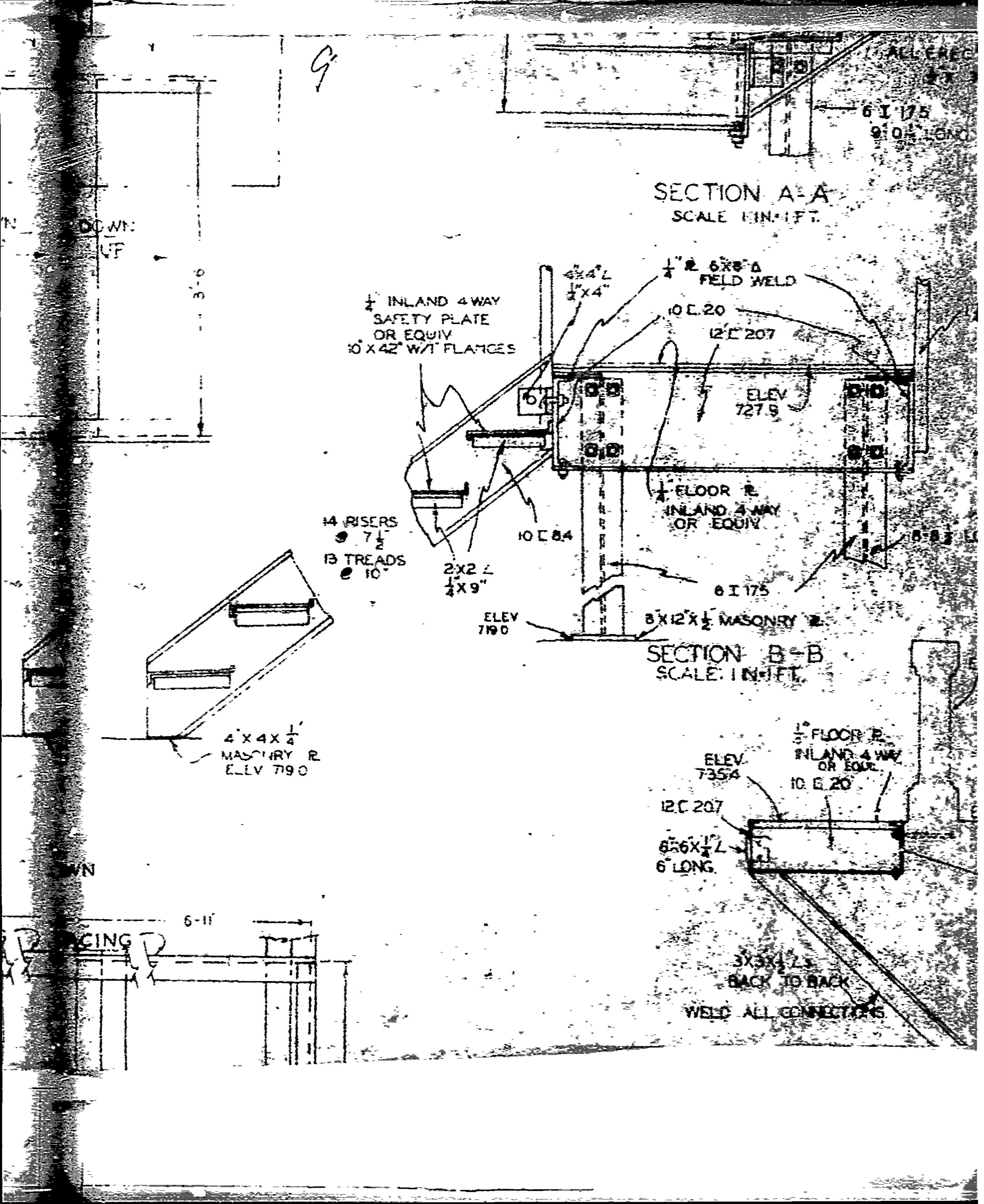
ALL REINFORCING BARS ARE NO. 4 ON 12 IN. CENTERS
SEE SPECIFICATIONS FOR REINFORCING BAR SCHEDULE



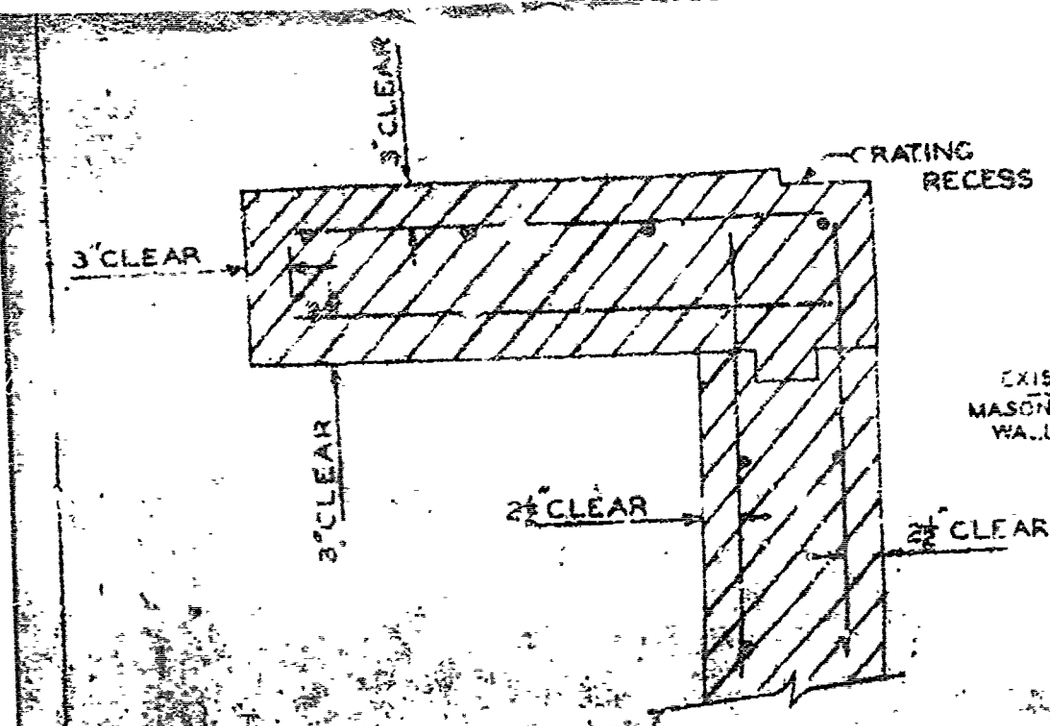

ELEV. 708.38
HANDRAIL
ELEV. 712.93
ELEV. 708.43
EXISTING MASONRY WALL
D
C
C
C



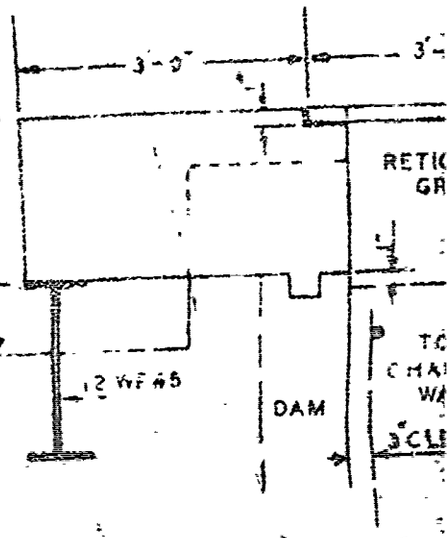
PLAN
LOWER LANDING
FLOOR PLATE NOT SHOWN
SCALE 1IN = 1FT



SECTION A-A
SCALE 1 IN.=1 FT.
6 I 17.5
$\frac{1}{4}$" R 6X8" Δ FIELD WELD
4"X4" L $\frac{1}{2}$"X4"
$\frac{1}{4}$" INLAND 4 WAY SAFETY PLATE OR EQUIV 10 X 42" W/1" FLANGES
10 C 20
12 C 20.7
ELEV 727.9
$\frac{1}{4}$" FLOOR R INLAND 4 WAY OR EQUIV
14 RISERS @ 7$\frac{1}{2}$"
13 TREADS @ 10"
10 C 8.4
2X2 L $\frac{1}{4}$X9"
6 I 17.5
ELEV 719.0
8"X12"X$\frac{1}{2}$" MASONRY R
SECTION B-B
SCALE 1 IN.=1 FT.
4"X4X$\frac{1}{4}$" MASONRY R ELEV 719.0
$\frac{1}{4}$" FLOOR R INLAND 4 WAY OR EQUIV
ELEV 735.4
10 C 20
12 C 20.7
6X6X$\frac{1}{4}$" L 6" LONG
3X3X$\frac{1}{4}$" L's BACK TO BACK
WELD ALL CONNECTIONS
DOWN
UP
3'-6"
6'-11"

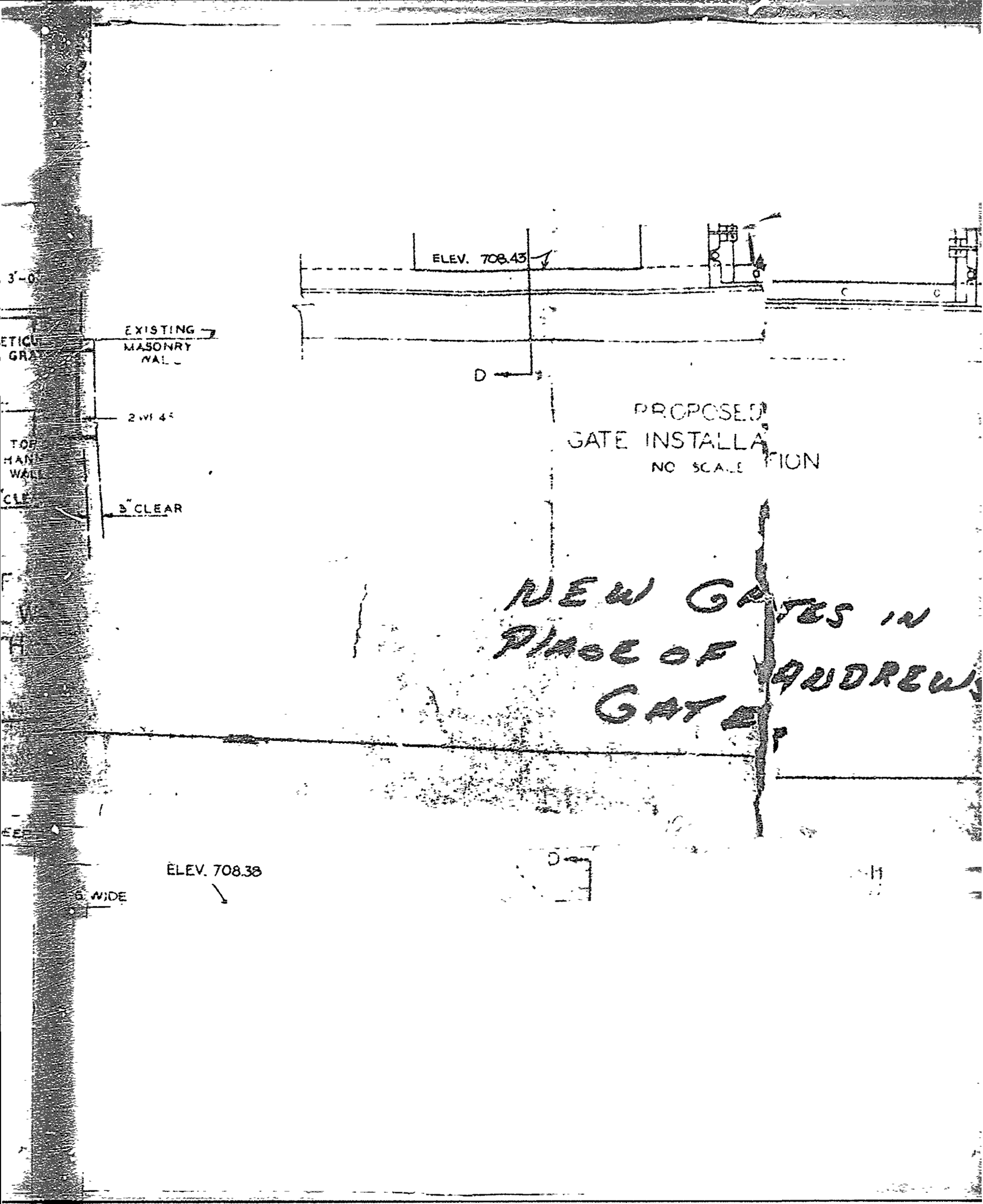


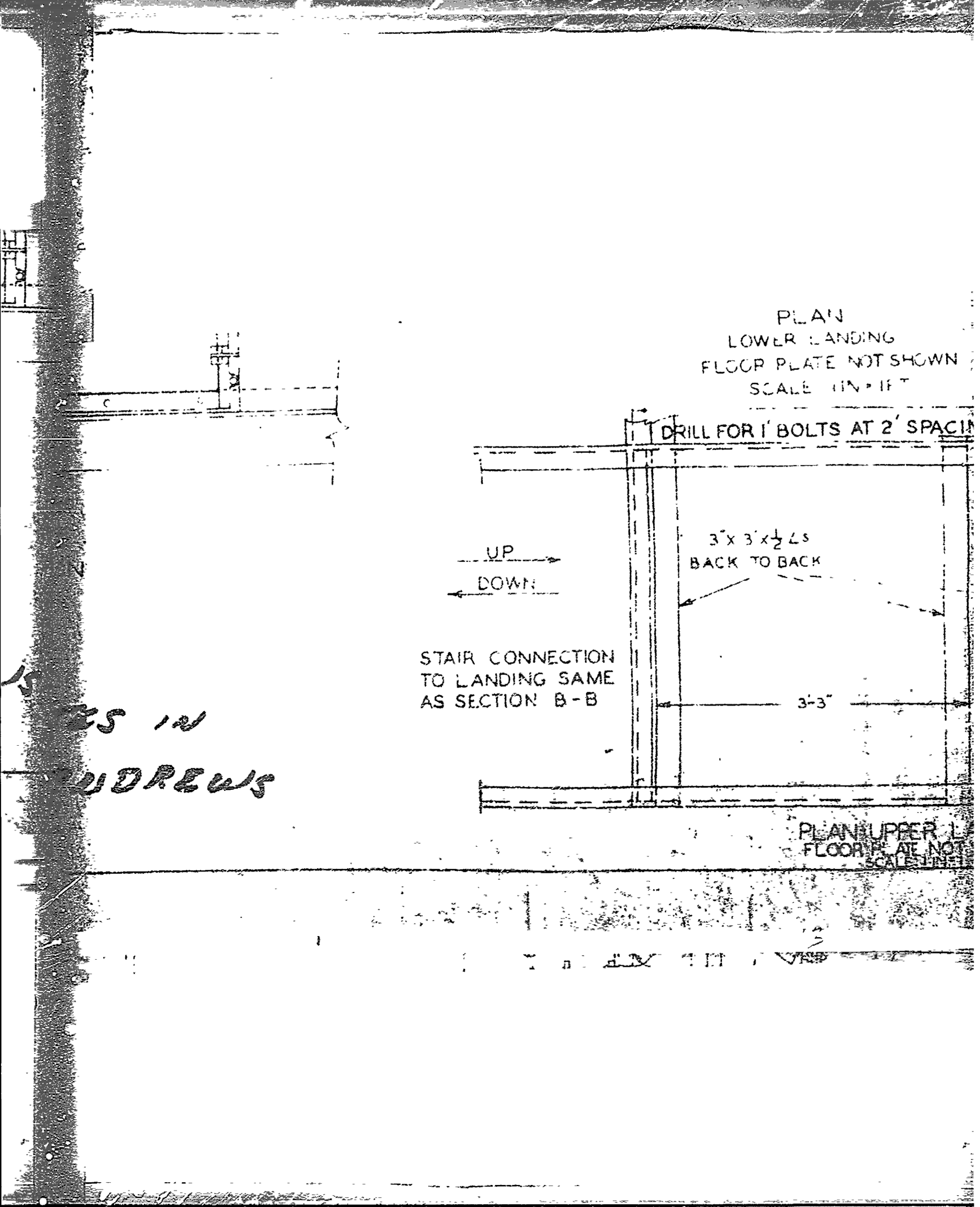
REINFORCING PLAN
SCALE: 1/2" = 1'-0"

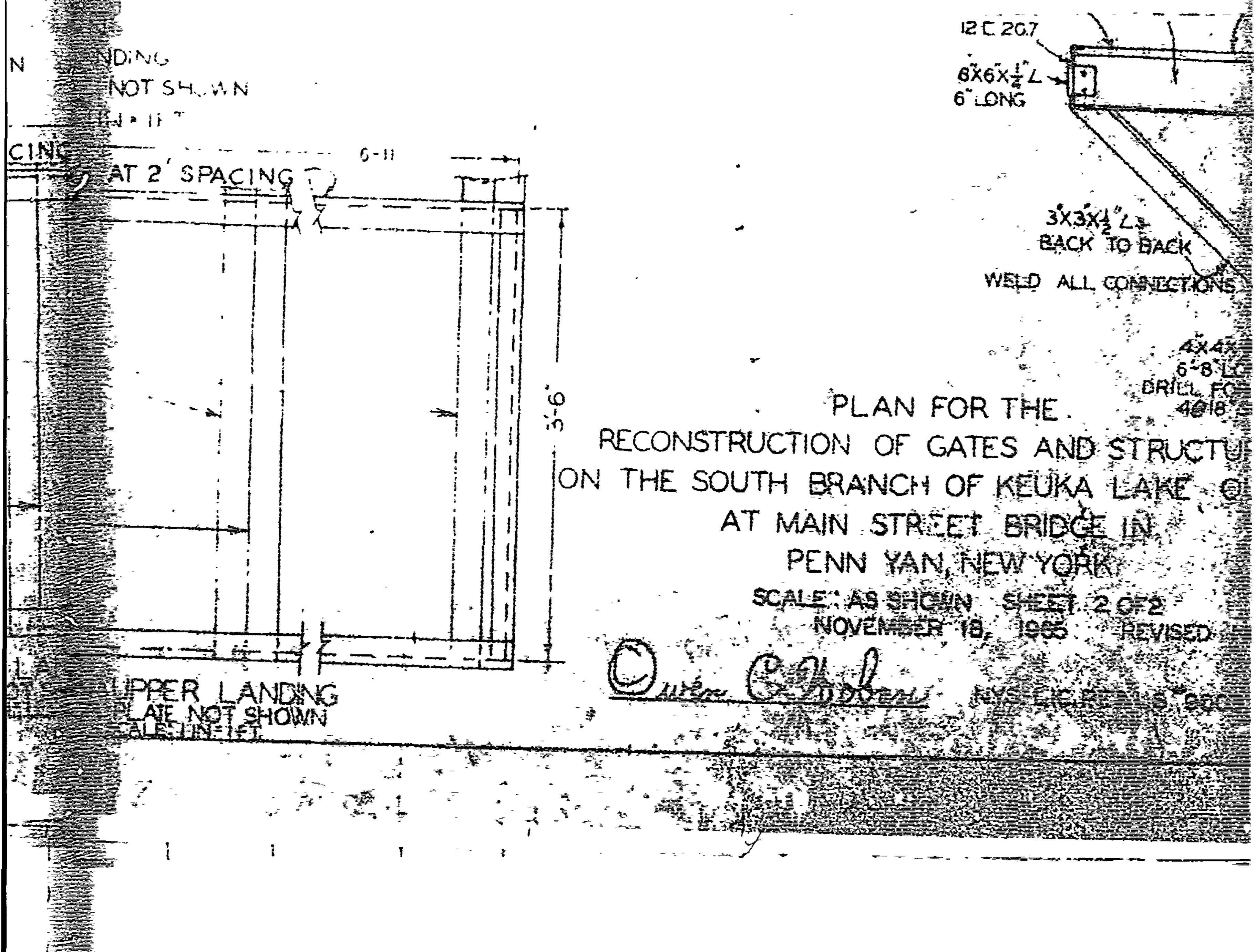


SECTION OF
NORTH CHANNEL
FACING NORTH
NO SCALE

COPPER WATER STOP
KEY 3 DEE

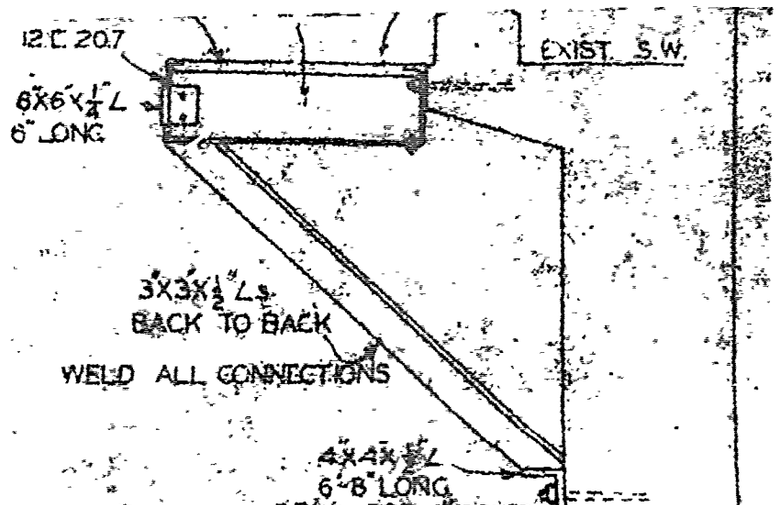

ELEV. 708.43
EXISTING
MASONRY
D
PROPOSED
GATE INSTALLATION
NO SCALE
3" CLEAR
NEW GATES IN
PLACE OF
GATE
ELEV. 708.38
D


PLAN
LOWER LANDING
FLOOR PLATE NOT SHOWN
DRILL FOR 1" BOLTS AT 2" SPACI
3"X 3"X½ L's
BACK TO BACK
UP
DOWN
STAIR CONNECTION
TO LANDING SAME
AS SECTION B-B
3'-3"
PLAN UPPER L
FLOOR PLATE NOT



PLAN FOR THE
RECONSTRUCTION OF GATES AND STRUCTU
ON THE SOUTH BRANCH OF KEUKA LAKE, O
AT MAIN STREET BRIDGE IN
PENN YAN, NEW YORK
SCALE: AS SHOWN SHEET 2 OF 2
NOVEMBER 18, 1965 REVISED

NYS. C.E., P.E., L.S.

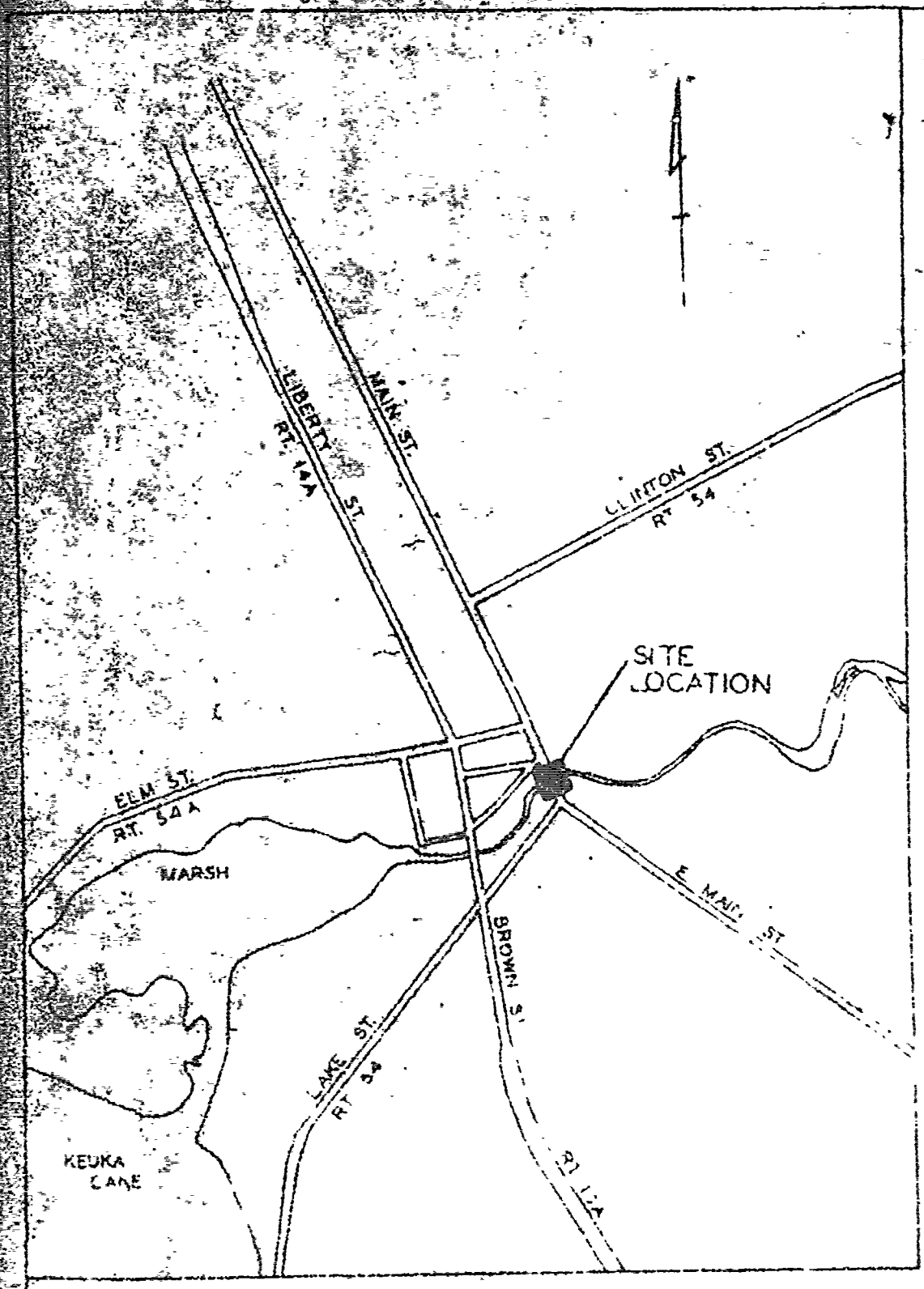


PLAN FOR THE
TION OF GATES AND STRUCTURES
I BRANCH OF KEUKA LAKE OUTLET
MAIN STREET BRIDGE IN
PENN YAN, NEW YORK

SCALE: AS SHOWN SHEET 2 OF 2
NOVEMBER 18, 1965 REVISED NOV. 22, 1965

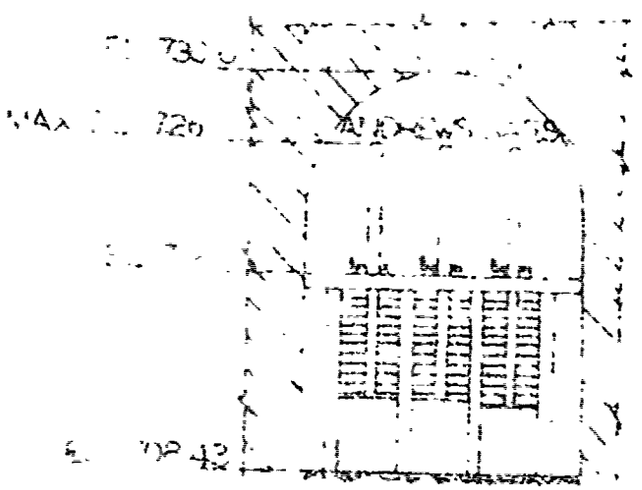
NYS. LIC. RE. L.S. 6900

NO. 390
OSWEGO

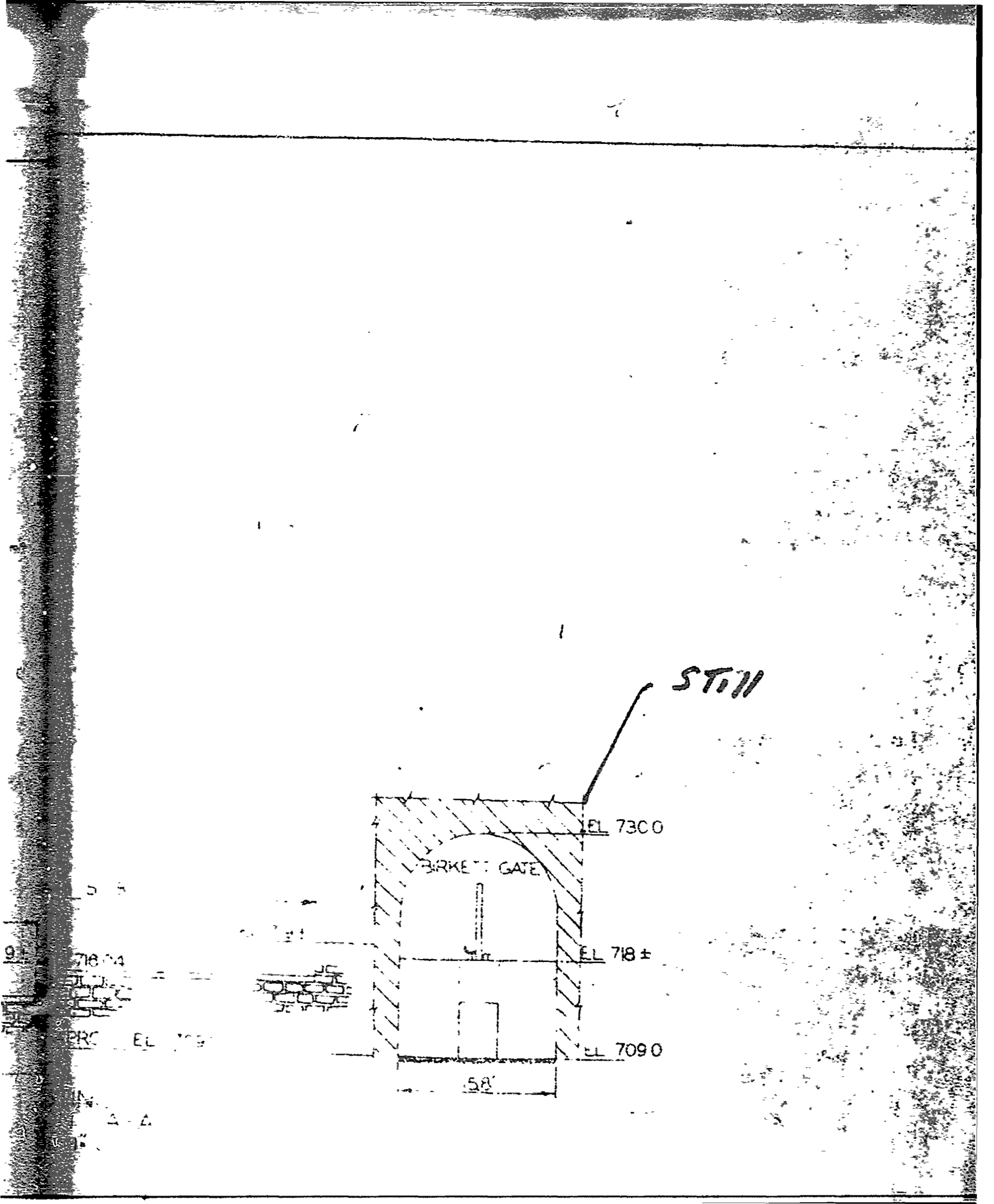


LOCATION PLAN

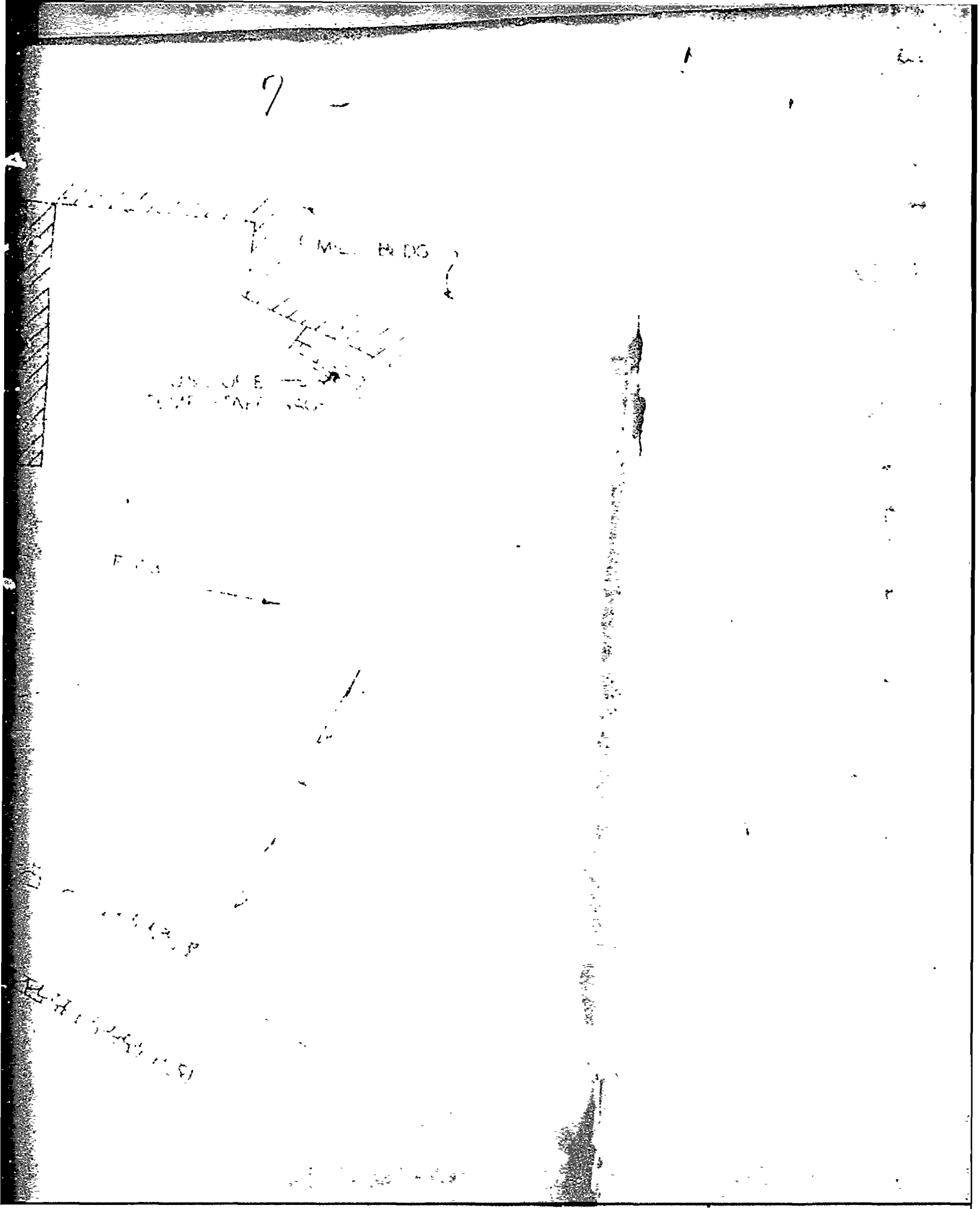
TW-3

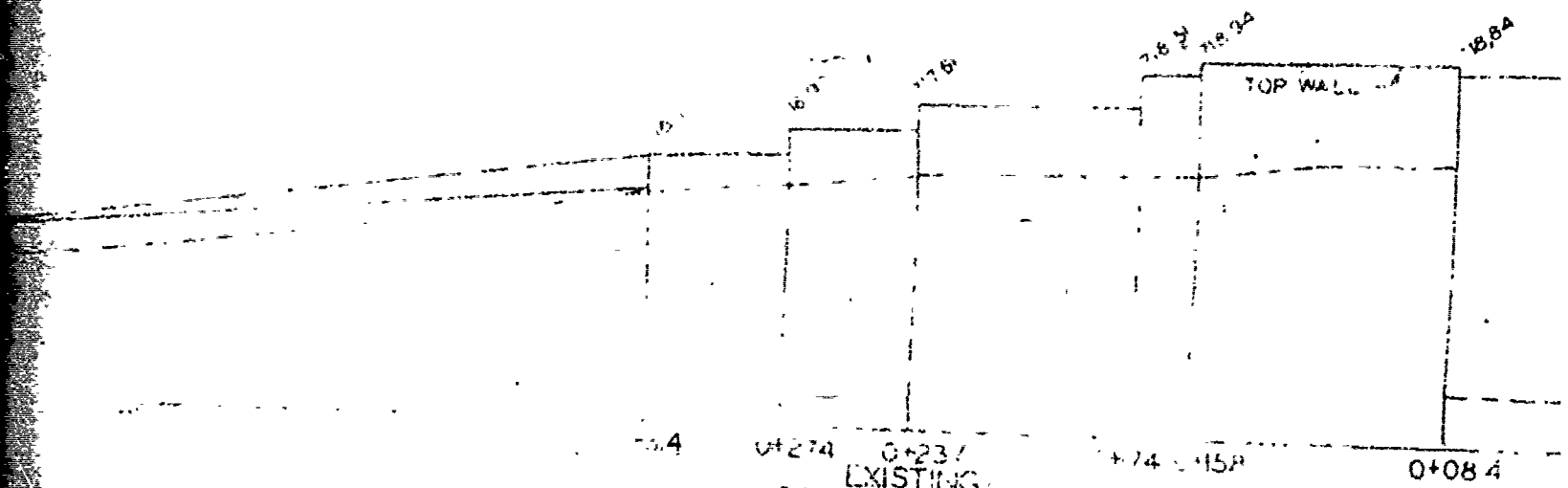


SECTION A—A

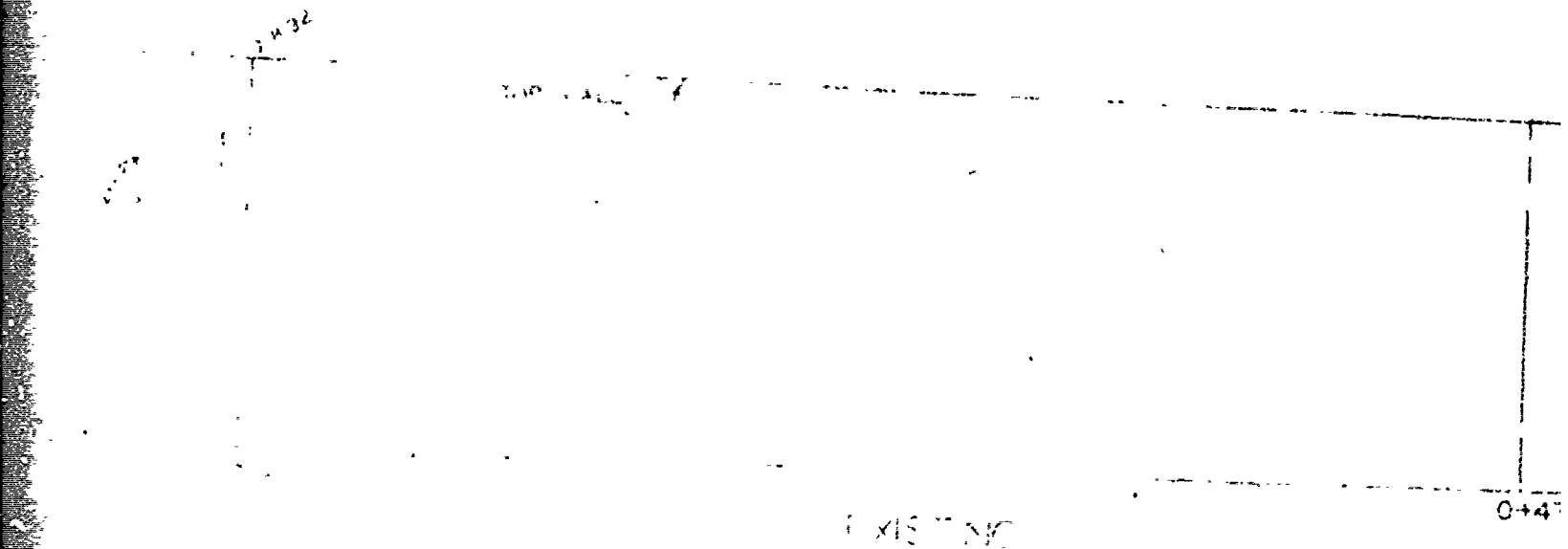

STILL
EL 730 0
BIRKETT GATE
EL 718 ±
EL 709 0
58'

BRICK
OVER
BASKET MI
EARTH-FIL



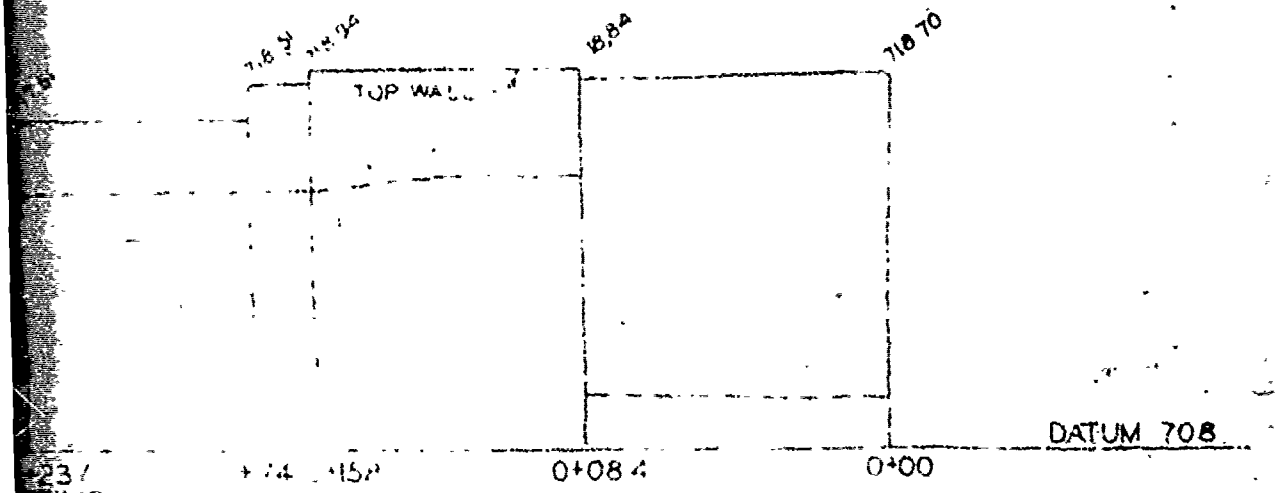


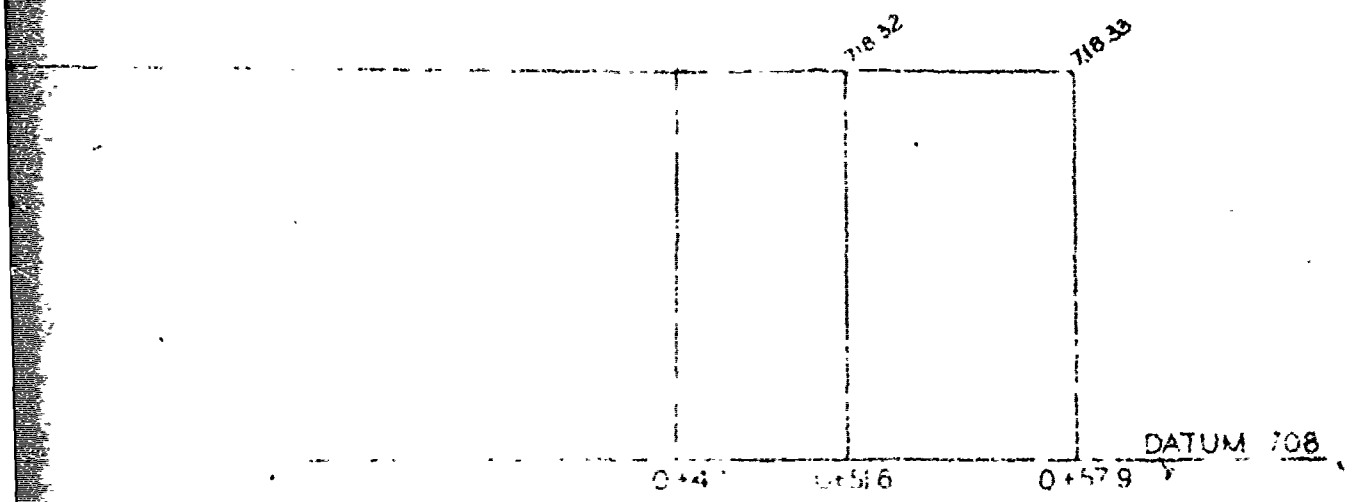
EXISTING
SECTION B-B
SCALE 1"=5'

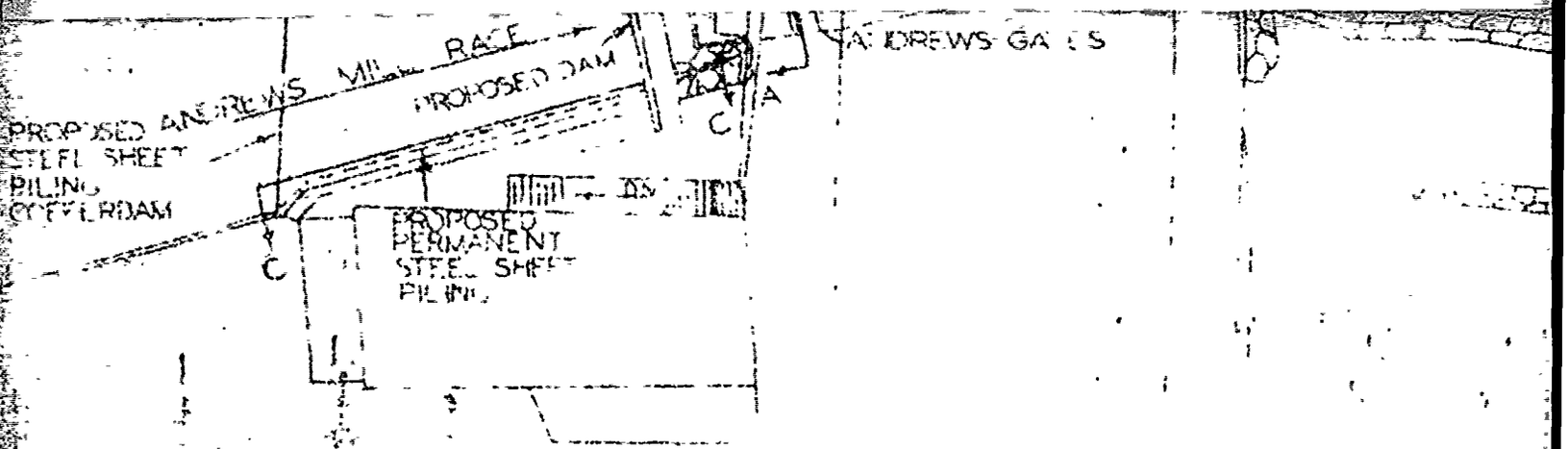


EXISTING
SECTION C-C
SCALE 1"=5'

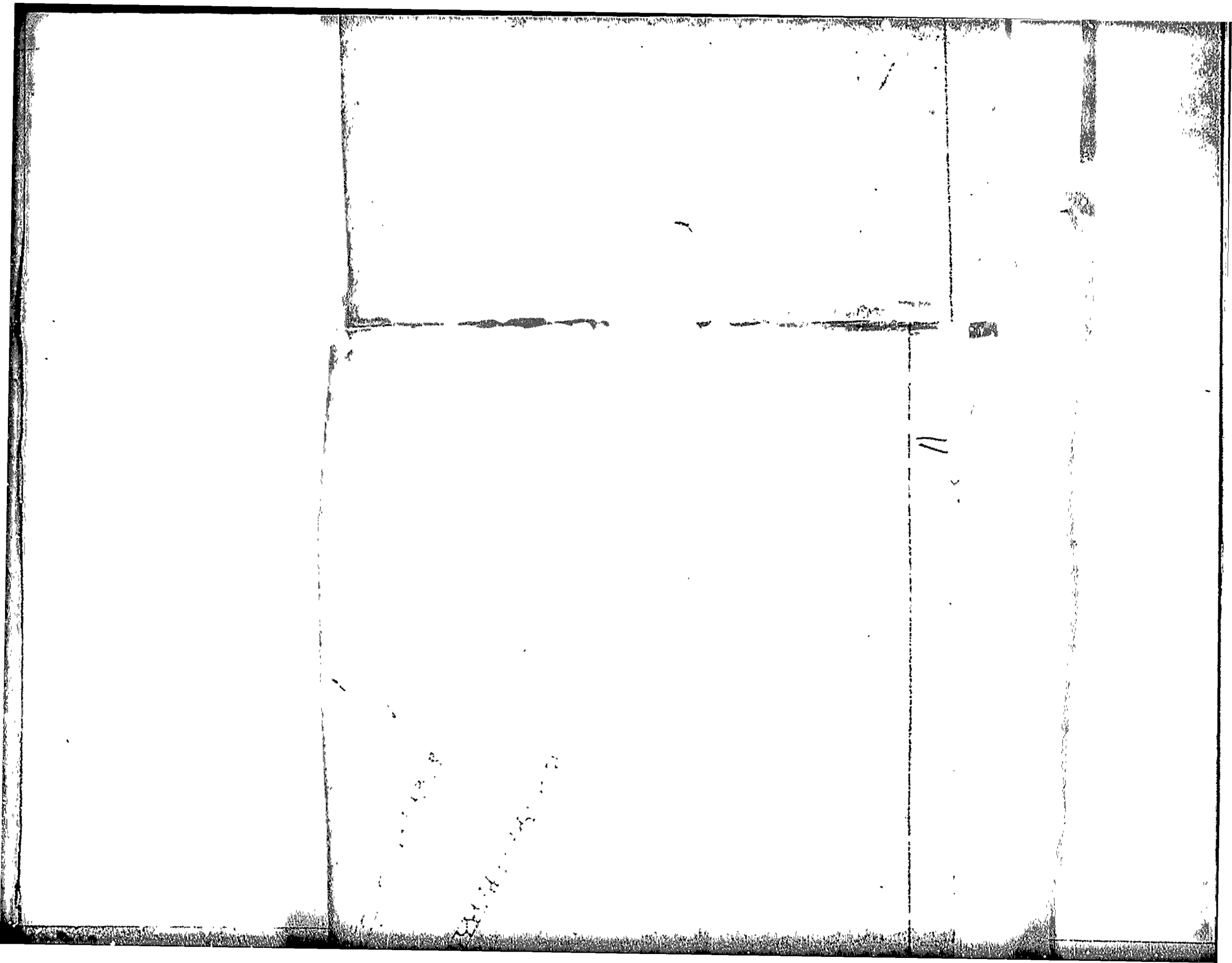
9



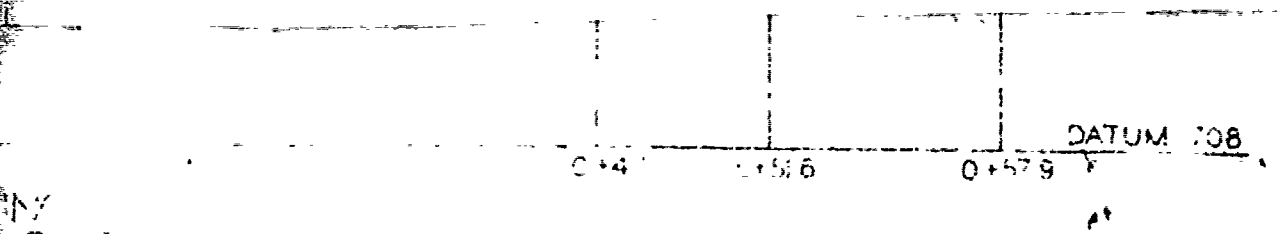



MILL RACE
PROPOSED DAM
ANDREWS GATES
PROPOSED ANDREWS
STEEL SHEET
PILING
COFFERDAM
PROPOSED
PERMANENT
STEEL SHEET
PILING
C
A

PLAN
SCALE



17



PLAN FOR THE RECONSTRUCTION OF GATES AND STRUCTURES ON THE SOUTH BRANCH OF KEUKA LAKE OUTLET AT MAIN STREET BRIDGE IN PENN YAN, NEW YORK

SCALE AS SHOWN— SHEET 1 OF 2

NOVEMBER 18, 1965 REVISED NOV. 22, 1965

Owen C. Hoban N.Y.S LIC. P.E. & L.S. 9603

NY-390

OSWEGO

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