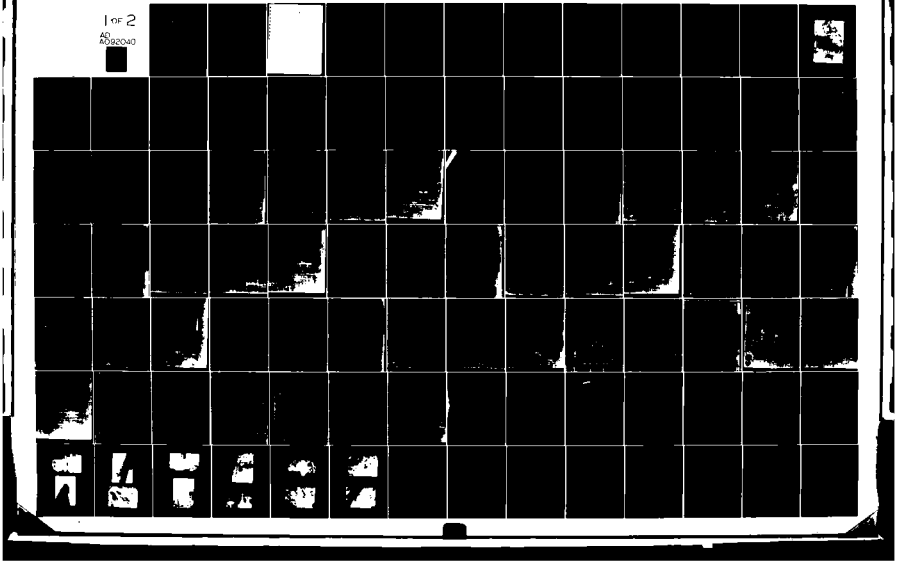
AD-A092 040 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. HARLEM VALLEY RESERVOIR (INVENTORY--ETC(U)
SEP 80 E O'BRIEN DACW51-79-C-0001
UNCLASSIFIED NL

1 OF 2
AD
AD92040



SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A092040
	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report Harlem Valley Reservoir Housatonic River Basin, Dutchess County, New York Inventory No. 273	5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Eugene O'Brien	8. CONTRACT OR GRANT NUMBER(s) DACW-51-79-C-0001
9. PERFORMING ORGANIZATION NAME AND ADDRESS Tippetts-Abbett-McCarthy-Stratton 655 Third Avenue New York, New York 10017	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS New York State Department of Environmental Conservation 50 Wolf Road Albany, NY 12233	12. REPORT DATE 30 September 1980
	13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza New York District, CofE New York, NY 10287	15. SECURITY CLASS. (of this report) UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

LEVEL II

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; Distribution unlimited.

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

...ICABLE...
...NED A
...PAGES WHICH DO NOT

DTIC
NOV 25 1980

18. SUPPLEMENTARY NOTES

original contains color plates: All DTIC reproductions will be in black and white

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

Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Harlem Valley Reservoir
Dutchess County

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 the available documents and visual inspection of the Harlem Valley Reservoir Dam did not reveal conditions which constitute a hazard to human life or property.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

393970 DW

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the spillway can pass the PMF flood using only 80% of its capacity. In addition, the stability of the dam is adequate against overturning and sliding.

The following remedial and maintenance actions should be completed within one year:

1. Monitor the seepage on the abutments near the toe of the dam at biweekly intervals with the aid of weirs. In addition, determine the source of the seepage.

2. Clear abutments immediately downstream of the dam of trees and brush.

3. Clean out and maintain clean the seepage collector channel upstream of the valve house on the left abutment.

4. Trim trees and remove brush from tailrace channel of the spillway.

5. Repair deteriorated concrete surfaces on overflow section training walls and caulk joints where the overflow section meets the wall.

6. Repair jammed screen on the intake for the water supply main.

7. Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of all reservoir gates and valves. Document this information for future reference. Also develop an emergency action plan.

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

HOUSATONIC RIVER BASIN

HARLEM VALLEY RESERVOIR

DUTCHESS COUNTY, NEW YORK
INVENTORY NO. N.Y. 273

PHASE I INSPECTION REPORT, NATIONAL DAM SAFETY PROGRAM

NEW YORK DISTRICT CORPS OF ENGINEERS

AUGUST 1980

PREFACE

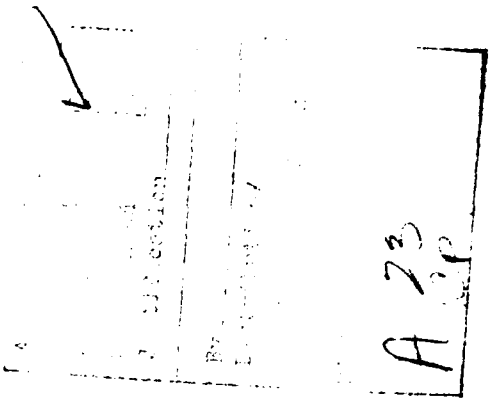
This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C., 20314. The purpose of a Phase I Investigation is to identify expeditiously 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 investigations, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

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

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

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

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
HARLEM VALLEY RESERVOIR DAM
I.D. NO. N.Y. 273
D.E.C. NO. 677
HOUSATONIC RIVER BASIN
DUTCHESS COUNTY, NEW YORK



CONTENTS

APPENDICES

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
HARLEM VALLEY RESERVOIR DAM
I.D. NO. N.Y. 273
D.E.C. NO. 677
HOUSATONIC RIVER BASIN
DUTCHESS COUNTY, NEW YORK

Name of Dam:	Harlem Valley Reservoir (I.D. No. N. Y. 273)
State Located:	New York
County Located:	Dutchess
Stream:	Tributary of Swamp River
Basin:	Housatonic
Date of Inspection:	June 12, 1980

ASSESSMENT

Examination of the available documents and visual inspection of the Harlem Valley Reservoir Dam did not reveal conditions which constitute a hazard to human life or property.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the spillway can pass the PMF flood using only 80% of its capacity. In addition, the stability of the dam is adequate against overturning and sliding.

The following remedial and maintenance actions should be completed within one year:

1. Monitor the seepage on the abutments near the toe of the dam at biweekly intervals with the aid of weirs. In addition, determine the source of the seepage.

2. Clear abutments immediately downstream of the dam of trees and brush.

3. Clean out and maintain clean the seepage collector channel upstream of the valve house on the left abutment.

4. Trim trees and remove brush from tailrace channel of the spillway.

5. Repair deteriorated concrete surfaces on overflow section training walls and caulk joints where the overflow section meets the wall.

6. Repair jammed screen on the intake for the water supply main.

7. Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of all reservoir gates and valves. Document this information for future reference. Also develop an emergency action plan.

Eugene O'Brien

Eugene O'Brien, P.E.
New York No. 29823

Approved by:

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

Date: 30 Sep 80

1. OVERVIEW OF DAM.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
HARLEM VALLEY RESERVOIR DAM
I.D. NO. N.Y. 273
D.E.C. NO. 677
HOUSATONIC RIVER BASIN
DUTCHESS COUNTY, NEW YORK

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the State of New York, Department of Environmental Conservation by letter dated 7 January 1980, in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367, 8 August 1972.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions 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 THE PROJECT

a. Description of the Dam and Appurtenant Structures

The Harlem Valley Reservoir Dam is composed of an approximately 320 foot long concrete gravity dam that includes a centrally located 30 foot wide overflow section serving as a spillway. The crest of the dam is 5 feet wide and its maximum height above river level is 59 feet. The upstream slope of the dam is vertical and the downstream slope varies from vertical nearest the top to 10V on 5H below Elevation 776, to 10V on 6½H below Elevation 756, to 10V on 8H below Elevation 736.

The spillway, which is uncontrolled, has an ogee shaped crest which is about 6 feet below the crest of the dam. There are two 12-inch diameter water supply mains and one 24-inch diameter "blowoff" reservoir drain. Each of the 12-inch diameter water supply mains has a low and high level intake. The intakes for the reservoir drain and the water supply mains are controlled by slide gates on the upstream side of the dam, which are manually controlled within an intake tower located just to the left of the spillway. In addition, the mains and drain can be controlled by a valve located in a valve house at the toe of the dam and just to the left of the spillway outlet channel.

b. Location

Harlem Valley Reservoir Dam is located on a tributary of the Swamp River on the grounds of the Harlem Valley State Hospital near Wingdale, New York. The dam is about one mile east of the intersection of Routes 22 and 55.

c. Size Classification

The dam is 59 feet high and has a reservoir with a maximum storage capacity of 222 acre-feet and therefore is classified as an intermediate dam (height greater than 45 feet).

d. Hazard Classification

The dam is in the "high" hazard potential category because of its close proximity (0.5 mile) to the Harlem Valley State Hospital buildings.

e. Ownership

Harlem Valley Reservoir is owned by New York State Harlem Valley Hospital. The person to contact is Mr. James Billings - Harlem Valley Psychiatric Hospital, Wingdale, New York, 12594, Tel. (914) 832-6611.

f. Purpose of Dam

The dam impounds a pumped storage reservoir used as water supply for the Harlem Valley State Hospital.

g. Design and Construction History

The dam was designed and constructed in 1918 by New York State. The downstream face of the dam and the spillway crest area were treated with pneumatically applied concrete in 1956. Repairs were also carried out on the downstream valve house and the dam in 1970.

h. Normal Operating Procedure

The reservoir is normally kept with the water level at El 776 (spillway crest elevation) by pumping water from the Swamp River. Water is continuously released through one or both of the 12-inch water supply mains to a filter plant used to supply the hospital facility. Average daily usage is 275,000 gallons per day. The 24-inch reservoir drain is opened and cleaned out annually. Complete operation records of inflow and outflow are kept at the filter plant office. Mr. Bill Conklin is the person to contact.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi.)	0.45
b. Discharge at Dam Site (CFS)	
Ungated Spillway at Maximum Pool	1900
Maximum Capacity 12-inch Water Supply Mains	50
Maximum Capacity Reservoir Drain	100
Total Discharge Maximum Pool	2050

c. Elevation (feet above MSL USGS Datum)

Top of Dam	782
Maximum Design Pool	782
Spillway Crest	776
Invert-Water Supply Outlet Intake 1	750
" " " " " 2	750
" " " " " 3	735
" " " " " 4	735
Invert-Reservoir Drain	729

d. Reservoir

Length of Normal Pool (feet)	550
Surface Area of Maximum Pool, Acres	16.4
Surface Area of Normal Pool, Acres	7.4

e. Storage (acre-feet)

Reservoir at Spillway Crest	155
Reservoir at Maximum Pool	222

f. Dam

Type	Concrete gravity
Length (feet)	320
Upstream Slope	Vertical
Downstream Slope	Varies - Vertical to 10V:8H
Crest Elevation (MSL)	782
Crest Width (feet)	5
Grout Curtain	None (according to drawings)

g. Spillway

Type	Ogee - Section of Dam
Length (feet)	30
Crest Elevation (MSL)	776
Upstream Channel	None
Downstream Channel	20 feet wide -

h. Reservoir Drain and Pipelines

Upstream - An intake tower is located immediately adjacent and to the left of the spillway. There are four intakes at two levels serving two water supply mains (one intake at each level per water supply main). An additional intake serves the 24-inch diameter reservoir drain.

Downstream - The outlet for the 24-inch diameter reservoir drain discharges into the spillway channel after passing through a valve house at the toe of the dam. The control for the drain is located in the valve house. The two 12-inch diameter water supply pipes are also controlled in this valve house and they continue downstream to the filtration plant.

SECTION 2 - ENGINEERING DATA

2.1 GEOLOGY

The records of the owner contain no data on site geology. However, there is data available in the literature on the general geology of the area. The Harlem Valley Reservoir is located in the eastern portion of the New England Upland physiographic province of New York State. The durable metamorphic rocks in the region are reflected in the landforms of significant topographic relief. The rocks at the reservoir site are Precambrian and/or Lower Paleozoic biotite quartz gneiss of the Waramaug Formation.

2.2 SUBSURFACE INVESTIGATIONS

A limited amount of subsurface investigations were carried out prior to construction of the dam. Nine wash borings were carried out and the logs are shown in Appendix A. In addition, it is known that surficial soils in the vicinity of the Harlem Valley Reservoir are of the Charlton-Hollis-Woodbridge Association. These deep (Charlton and Woodbridge) and shallow (Hollis) soils are associated in hilly areas. The materials are developed on glacial till derived from schist and gneiss.

2.3 DAM AND APPURTENANT STRUCTURES

There is a complete set of contract drawings for the dam and appurtenant structures available in the records of the owner. A selection of these are included in Appendix A. In addition, drawings showing the repair work carried out in 1956 and 1970 are available and are included in Appendix A.

2.4 CONSTRUCTION RECORDS

No information has been located with regard to the original and subsequent construction of the dam.

2.5 OPERATION RECORDS

There are complete operation records available for at least the last 20 years. Records of inflow, outflow and maintenance are kept on a daily basis for the reservoir. Periodic maintenance is done for the dam and appurtenant structures by the owner.

2.6 EVALUATION OF DATA

There is sufficient data available to support a Phase I evaluation of the dam.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

The visual inspection of the Harlem Valley Reservoir was made on June 12, 1980. The weather was fair and the temperature was 65-70°F. The reservoir was at about spillway crest (El. 776).

b. Main Dam and Appurtenant Structures

The main dam shows no signs of major distress or structural problems. The vertical and horizontal alignment of the crest appears to be unchanged. There are no major cracks in the concrete or joints on the dam or spillway sections. However, the following adverse conditions were noted:

1. There is minor seepage ($\sim$ 3 gpm) in both abutments, just downstream of the dam. There is no indication of fines being washed from the abutments.

2. There is spalling of the concrete at almost all joints on the downstream face of the dam.

3. The abutments immediately downstream of the dam are heavily overgrown and obscure slope and seepage conditions.

4. The pneumatically applied concrete is only in fair condition in spots near the base of the dam.

5. The channels constructed to route seepage near the valve house are clogged. As a result, the water from seepage collects just upstream of the valve house, saturating the ground and flooding the bottom level of the valve house.

6. Concrete surfaces at the junction of the overflow section training wall and the overflow section are deteriorated due to ice damage.

c. Spillway and Tailrace

The crest of the spillway, which was repaired with pneumatically applied concrete, appears to be in generally good condition. The downstream face, however, was also covered with pneumatically applied concrete and is not in good condition. The condition of the spillway face becomes increasingly worse lower on the spillway. In the uppermost sections the pneumatically applied concrete is bubbled and uneven. Lower down it becomes spalled and irregular with sections missing and some minor seepage emanating from beneath it. Near the base the pneumatically applied concrete is gone altogether and the face of the spillway is wet.

The tailrace channel of the spillway is heavily overgrown and choked with fallen trees and brush.

d. Reservoir Drain and Pipelines

The upstream regulating gates of the water supply mains and the reservoir drain are in good operating condition with the exception of a "jammed" screen on one of the intakes for the water supply main. This however does not effect the opening and closing of the gates. The downstream valves are also in good operating condition.

e. Reservoir Area

There are neither slides, rockfalls, sloughing or other signs of instability in the vicinity of the dam. There are no objectionable amounts of floating debris in the reservoir.

3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the investigations reveal several deficiencies which should be corrected before further deterioration results in a hazardous condition. The deficiencies and recommended measures to improve these in the order of importance are as follows:

1. Monitor the seepage on the abutments near the toe of the dam at biweekly intervals with the aid of weirs. In addition, determine the source of the seepage.

2. Clear abutments immediately downstream of the dam of trees and brush.

3. Clean out and maintain clean the seepage collector channel upstream of the valve house on the left abutment.

4. Trim the trees and remove the brush from tailrace channel of the spillway.

5. Repair the jammed screen on the intake for the water supply main.

6. Repair deteriorated concrete surfaces on overflow section training walls and caulk joints where the overflow section meets the wall.

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The Harlem Valley Reservoir is used continuously to supply water to the Harlem Valley State Hospital. Water is released continuously from the reservoir through one or two 12-inch diameter water supply mains. The reservoir is maintained at spillway crest level by continuous pumping from the Swamp River. In addition, the 24-inch diameter reservoir drain is operated periodically to flush out sediment. Both the water supply and reservoir drain are controlled upstream from an intake tower with slide gates and a manual hoist, downstream control is by valves located in a valve house at the toe of the dam. Slide gates are operated at various times, but on no set schedule. The spillway is uncontrolled. Complete inflow and outflow operating records are available in the filtration plant near the dam.

4.2 MAINTENANCE OF THE DAM

There is no regular maintenance schedule for the dam. The dam is continuously 'looked at' by the maintenance staff of the Hospital.

4.3 WARNING SYSTEM IN EFFECT

There are no warning systems in effect or in preparation.

4.4 EVALUATION

The overall maintenance of the Harlem Valley Reservoir is considered inadequate in the following areas:

1. Collector channels for seepage on the left abutment downstream of the dam are clogged causing seepage to enter the valve house.

2. Control of trees and vegetation on the abutments immediately downstream of the dam and in the spillway tailrace channel.

3. No formal operation and maintenance manuals exist for the project.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Harlem Valley Reservoir Dam is located south of Dover Plains in Dutchess County, New York, Hydrologic Unit Code 01100005. The watershed contributing to the reservoir is 0.45 square miles (285.7 acres) and consists mainly of undeveloped wooded mountain slopes with a relatively large area of swamp indicated on the USGS Dover Plains quadrangle. There are no defined water courses in the basin and the surface runoff stored by the reservoir is supplemented by water pumped from downstream of the dam. Slopes in the watershed range between 5 and 10 percent with elevations rising from a lake level of 776 to peaks above 920.

5.2 ANALYSIS CRITERIA

The analysis of the Harlem Valley Reservoir Dam was performed using the U. S. Army Corps of Engineers HEC-1 computer program (Ref. 1). Because of the small drainage area size, it was assumed that the basin runoff equals the excess rainfall. The Probable Maximum Precipitation (PMF) obtained from Hydrometeorological Report No. 51 (Ref. 4) was distributed over a 24 hour period and converted to runoff. It was estimated that there would be a constant rainfall loss of 0.1 inch per hour over the land area. No losses were calculated for rain falling directly on the water surface.

5.3 SPILLWAY CAPACITY

The principal spillway of Harlem Valley Reservoir Dam is centrally located on the dam, 30.0 feet in length with its ogee crest at El 776 MSL. The computed discharge with water surface at El 782 (top of dam) is 1900 cfs.

5.4 RESERVOIR CAPACITY

The normal capacity of the Harlem Valley Reservoir is reported to be 155 acre-feet. Surcharge storage between El 776 (spillway crest elevation) and the top of the dam, El 782, is 67 acre-feet, which is equivalent to 2.8 inches of runoff over the entire drainage basin. Maximum or total capacity of the reservoir is 222 acre-feet.

5.5 FLOODS OF RECORD

There are no available records of the floods or maximum reservoir elevations resulting from floods.

5.6 OVERTOPPING POTENTIAL

The potential of the dam being overtopped was investigated on the basis of the spillway capacity and the available surcharge

storage to meet the computed design flood inflows. The inflow peak of the Probable Maximum Flood (PMF), computed by converting rainfall excess to runoff was 1972 cfs. The PMF hydrograph routed through the reservoir resulted in a peak outflow of 1549 cfs, and a corresponding reservoir surface elevation of 781.1 which does not overtop the dam. One-half the PMF raised the reservoir surface to 779.2 MSL with a peak outflow of 720 cfs.

5.7 EVALUATION

The computed PMF outflow is approximately 77% of the spillway capacity, and the spillway is, therefore, assessed as adequate.

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

Visual observations did not indicate existing problems with the structure of the dam. The seepage observed in the abutments of the dam is not considered to represent an unstable or otherwise dangerous condition at the present time.

b. Design and Construction Data

The original preconstruction design computations regarding the structural stability of the dam are not available. There are contract drawings showing the design and details of the structure in Appendix A.

c. Stability Analysis

A structural stability analysis of spillway section of the structure was performed using design sections shown in the contract drawings. The following table shows the loading cases considered and the results of the analysis. Detailed analysis is shown in Appendix E.

Loading Condition	Overturning	Sliding Factor of Safety (See Appendix E)
I) Normal Loading Condition: Reservoir Level at Spillway Crest; no ice load	Within Middle Third	2.55
II) Normal Loading Condition: Reservoir Level at Spillway Crest; with ice load (5 kips)	Within Middle Third	2.43
III) Unusual Loading Condition: One-half PMF Reservoir Level at El 779.1, water flowing 3.1 ft over spillway	Within Middle Half	2.26
IV) Extreme Loading Condition: PMF Reservoir Level at El 781.1, water flowing 5.1 ft over spillway	Within Middle Half	2.08
V) Unusual Loading Condition: Earthquake Reservoir Level at Spillway Crest, 0.05g earthquake force	Within Middle Half	2.0

On the basis of stability analysis performed during the investigation, the structural stability of the overflow section of the dam against overturning was determined to be adequate for all cases. The structural stability of the dam against sliding was determined to be adequate for all cases.

d. Operating Records

Operation records which are available for the project did not indicate any operational problems, which would affect the stability of the dam.

e. Post-Construction Changes

Two post-construction changes have been carried out both of which only indirectly effect the stability of the dam. Pneumatically applied concreting was carried out in 1956 for the purpose of reducing seepage on the dam. This appears to have been moderately successful; however, the concrete has since deteriorated and is now in only fair condition. The second post-construction change was the construction of concrete seepage collectors on the left abutment near the toe of the dam. Neither of these changes have an effect on the stability of the dam.

f. Seismic Stability

The dam is located in Zone 2; therefore, a stability analysis was carried out using a normal reservoir loading (water level at spillway crest) and a 0.05g earthquake factor. The results of the analysis showed the dam to be safe under both overturning and sliding.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of available documents and the visual inspection of the Harlem Valley Reservoir Dam and appurtenant structures did not reveal any conditions which constitute a hazard to human life or property. The dam is not considered to be unsafe.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the spillway can pass the PMF flood using only 80% of its capacity. The dam has an adequate factor of safety against overturning and sliding for all loading conditions.

b. Adequacy of Information

The information and data available were adequate for performance of this investigation.

c. Need for Additional Investigations

No additional investigations are required.

d. Urgency

The recommended measures as described below must be completed within one year from notification.

7.2 RECOMMENDED MEASURES

1. Monitor the seepage on the abutments near the toe of the dam at biweekly intervals with the aid of weirs. In addition, determine the source of the seepage.

2. Clear abutments immediately downstream of the dam of trees and brush.

3. Clean out and maintain clean the seepage collector channel upstream of the valve house on the left abutment.

4. Trim trees and remove brush from tailrace channel of the spillway.

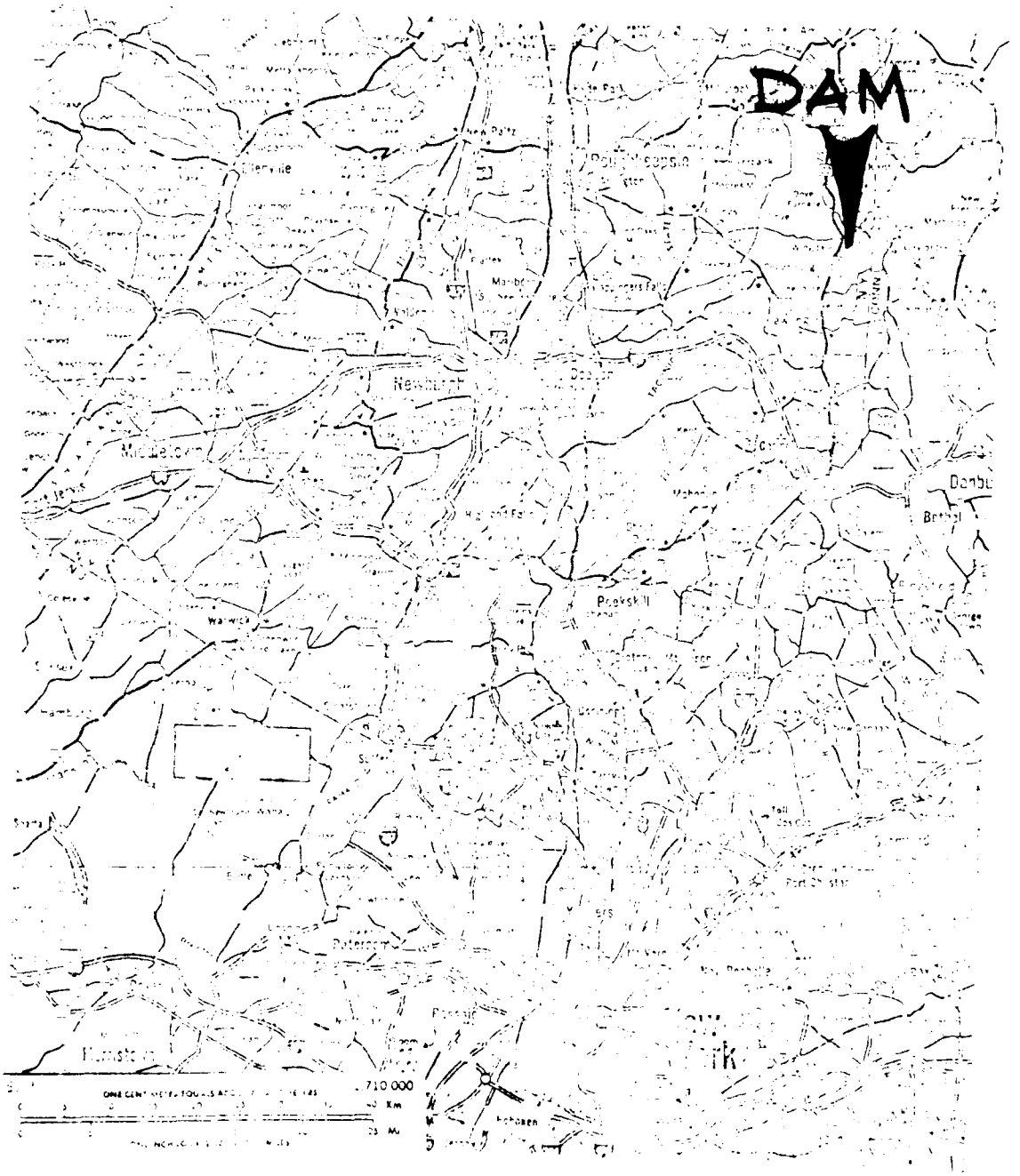
5. Repair jammed screen on the intake for the water supply main.

6. Repair deteriorated concrete surfaces on overflow section training walls and caulk joints where the overflow section meets the wall.

7. Provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of all reservoir gates and valves. Document this information for future reference. Also develop an emergency action plan.

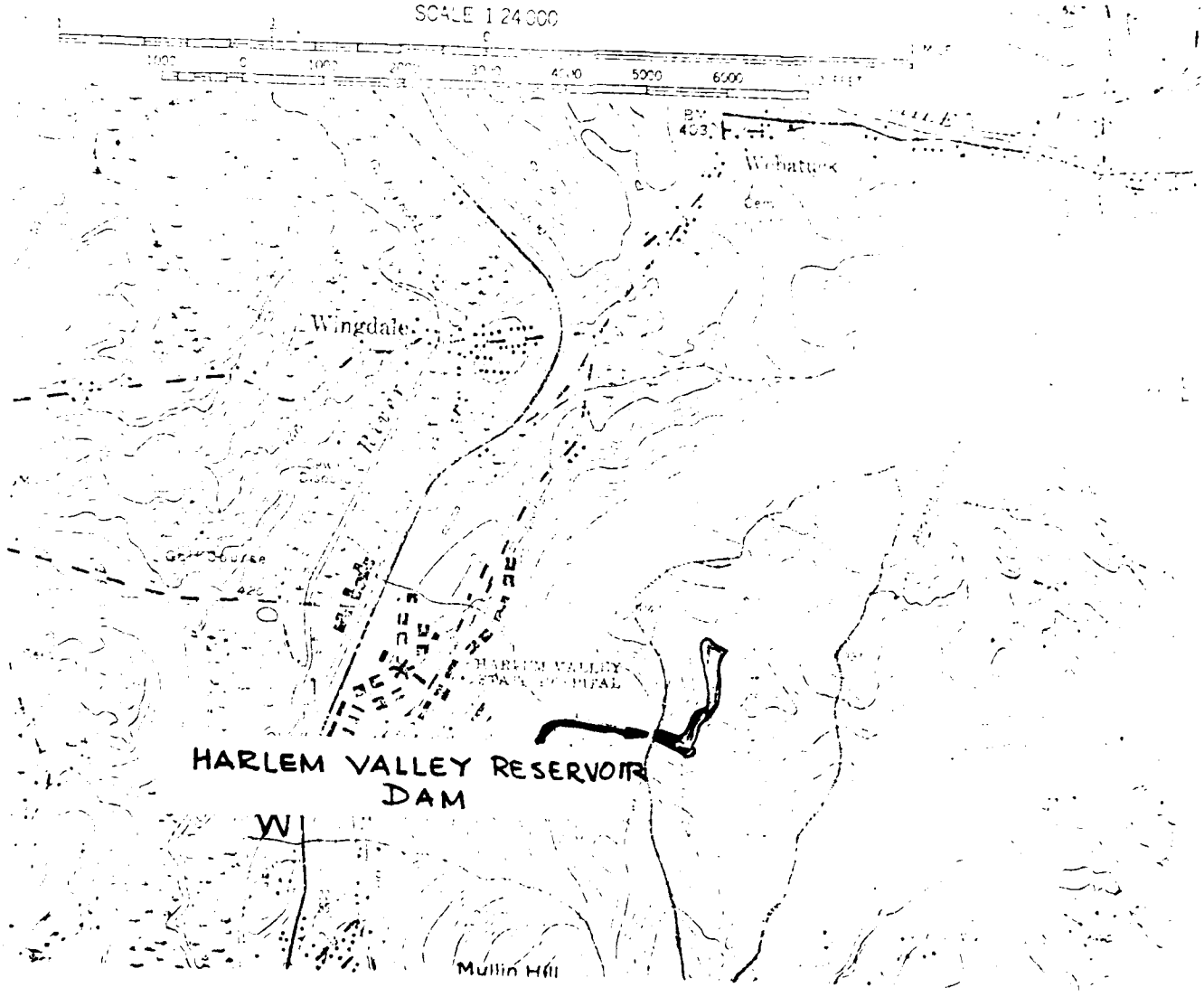
DRAWINGS

APPENDIX A

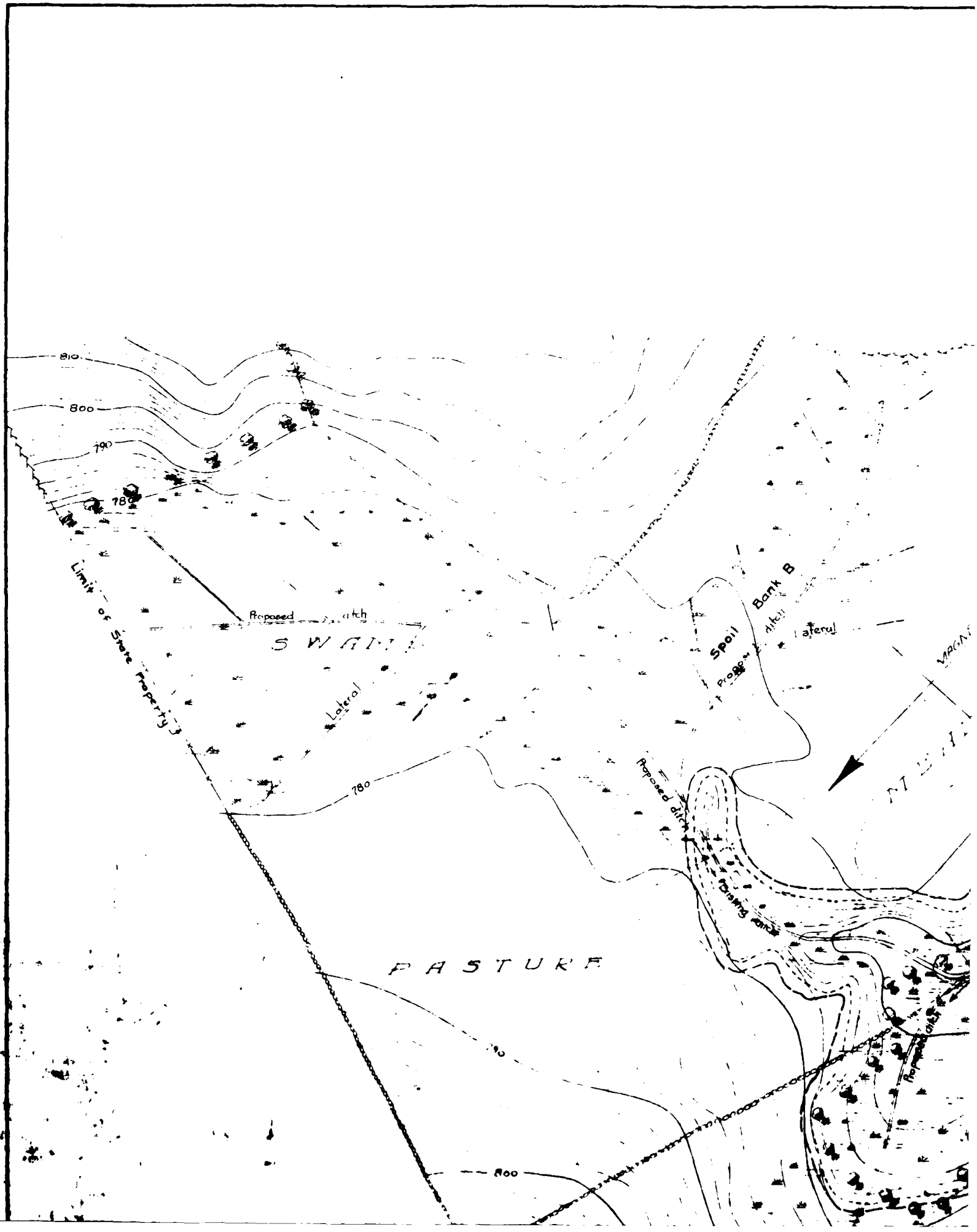


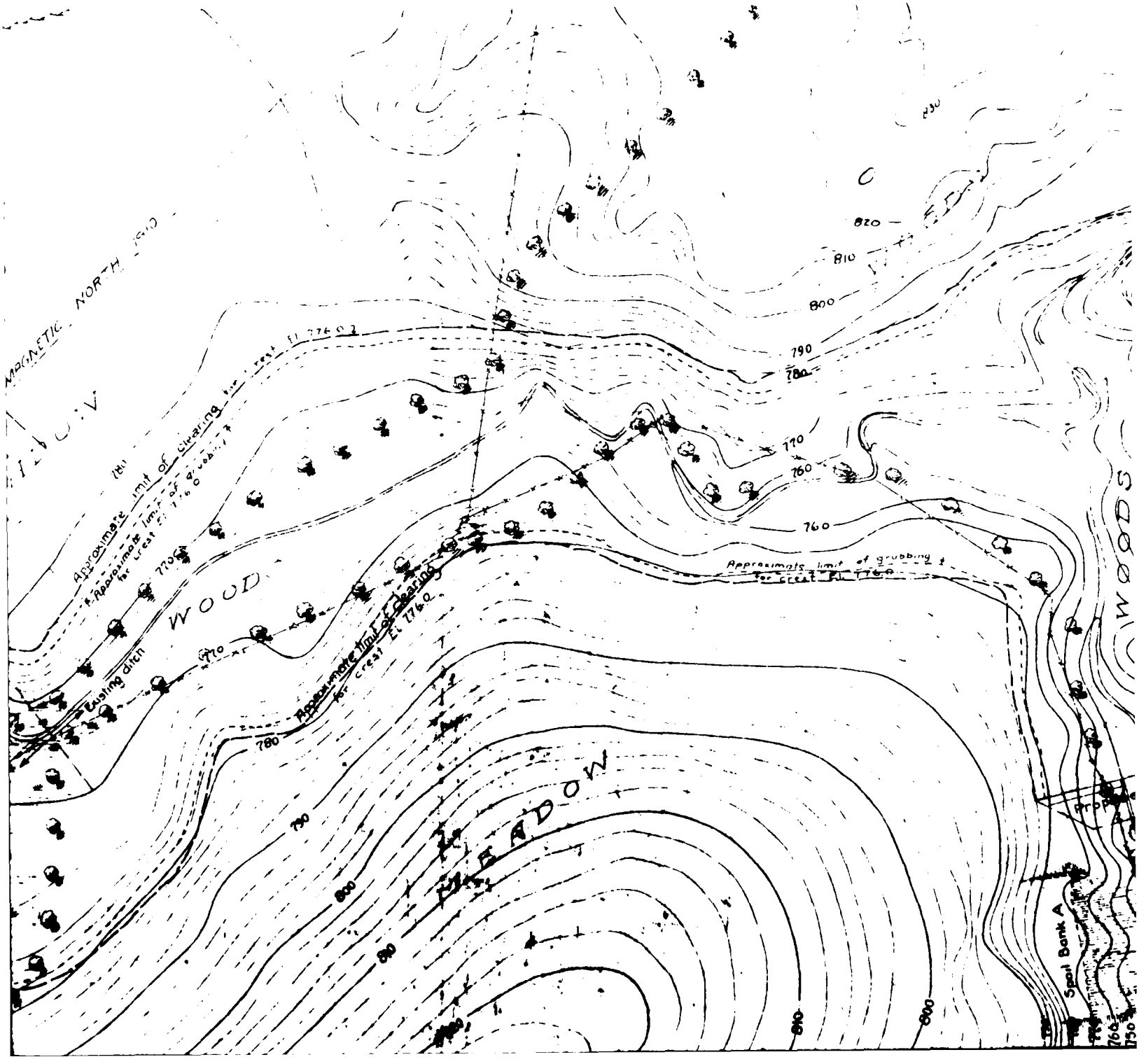
VICINITY MAP
HARLEM VALLEY RESERVOIR DAM

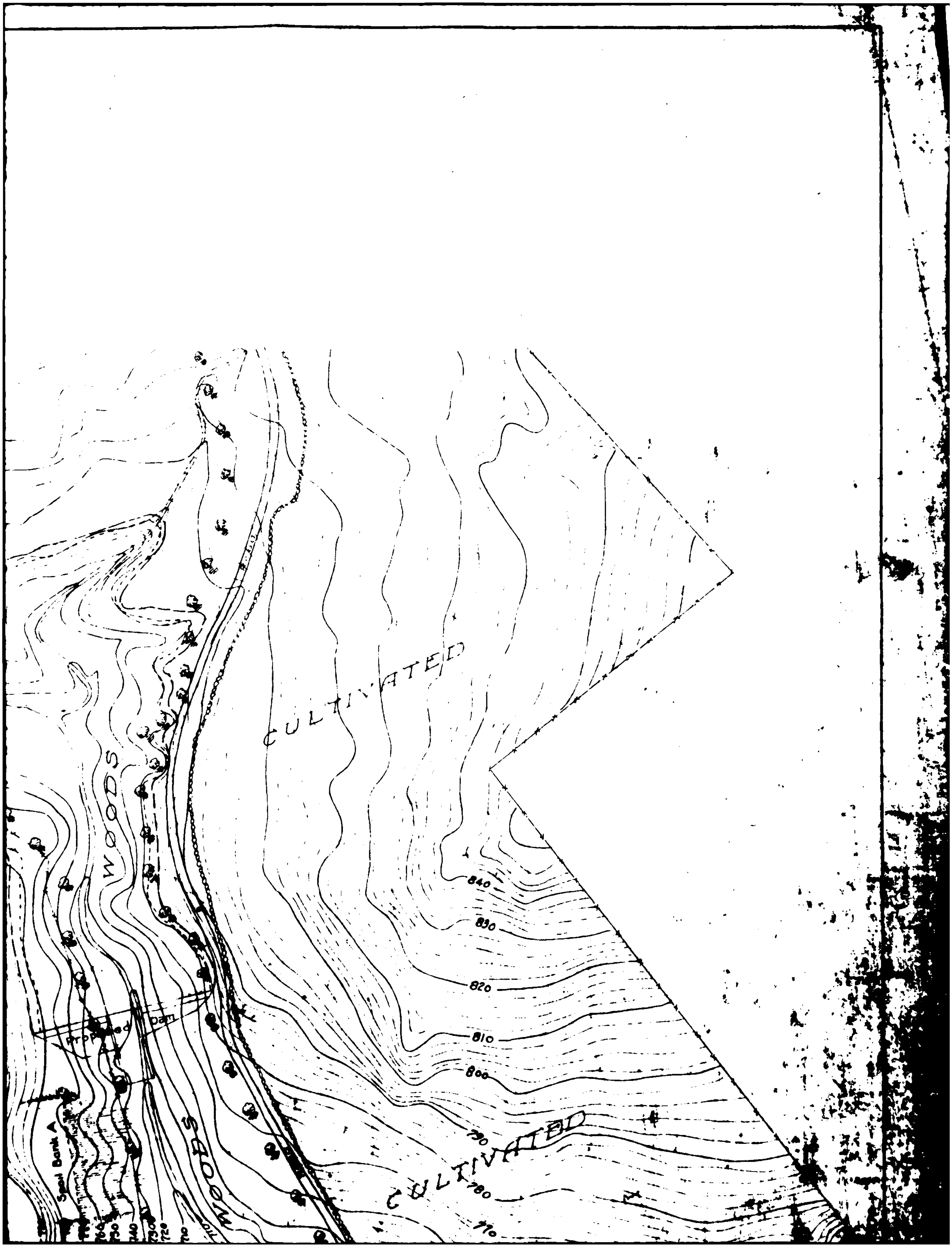
DOVER PLAINS QUAD
New York - New Jersey

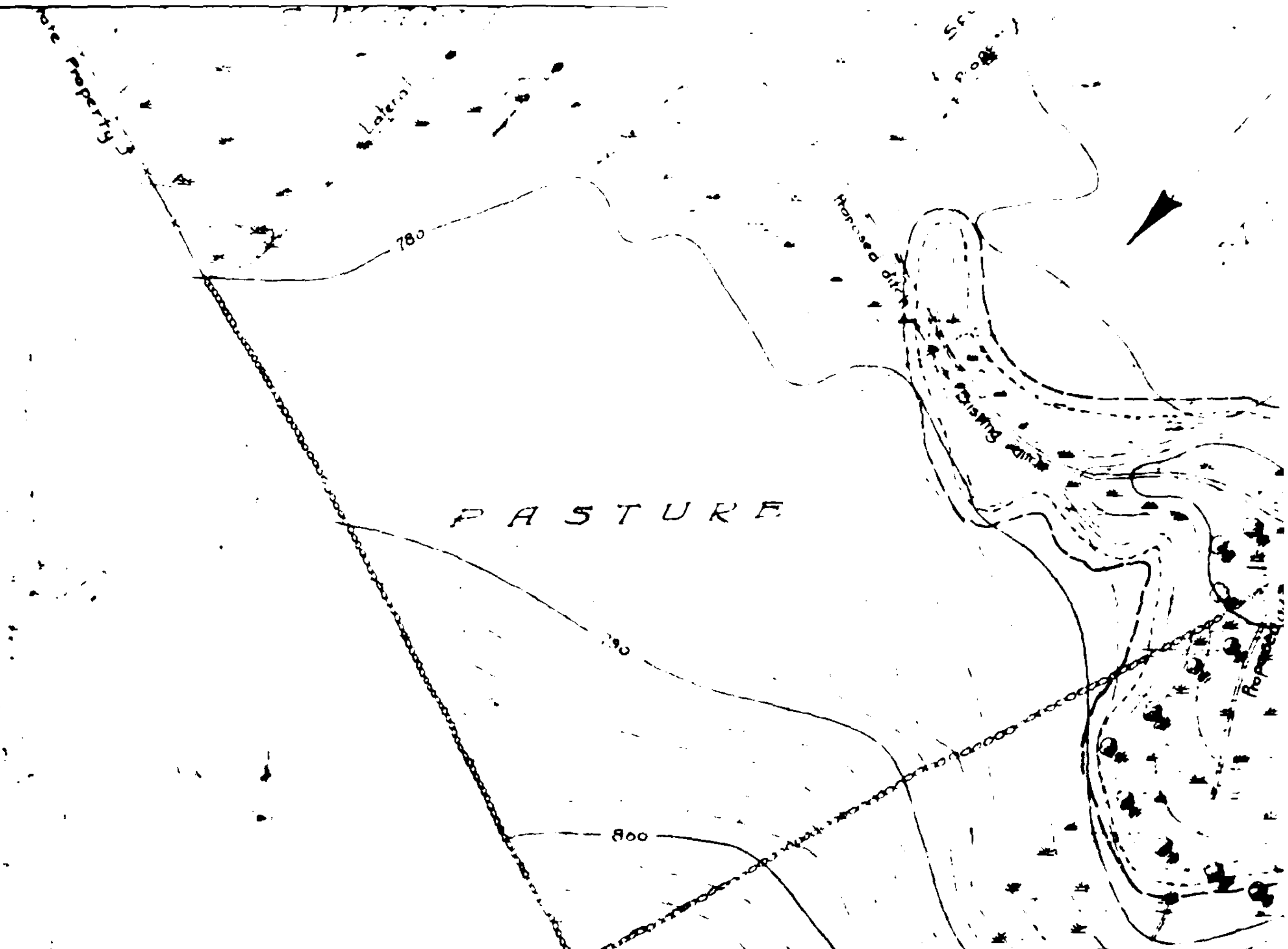


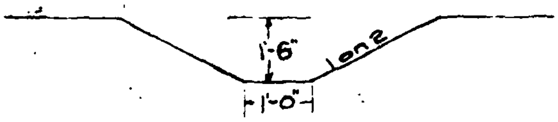
TOPOGRAPHIC MAP
HARLEM VALLEY RESERVOIR DAM


810
800
790
780
Limit of State Property
Proposed ditch
SWAMP
Lateral
Spoil
Bank B
ditch
Lateral
780
Proposed ditch
Existing dam
PASTURE
800
Proposed ditch


MAGNETIC NORTH
WOODS
MEADOW
Approximate limit of clearing for crest El 776.0
Approximate limit of grubbing for crest El 776.0
Existing ditch
Approximate limit of clearing for crest El 776.0
Approximate limit of grubbing for crest El 776.0
Spoil Bank A
820
810
800
790
780
770
760
750
740
730


CULTIVATED
WOODS
840
830
820
810
800
790
780
770
WOODS
CULTIVATED
Spoil Bank A





SECTION OF DITCH AND LATERALS.

Note- The section and location of ditch may be modified to suit conditions as directed by the Engineer. Ditches will be ommitted where swamp is eliminated by filling with spoil

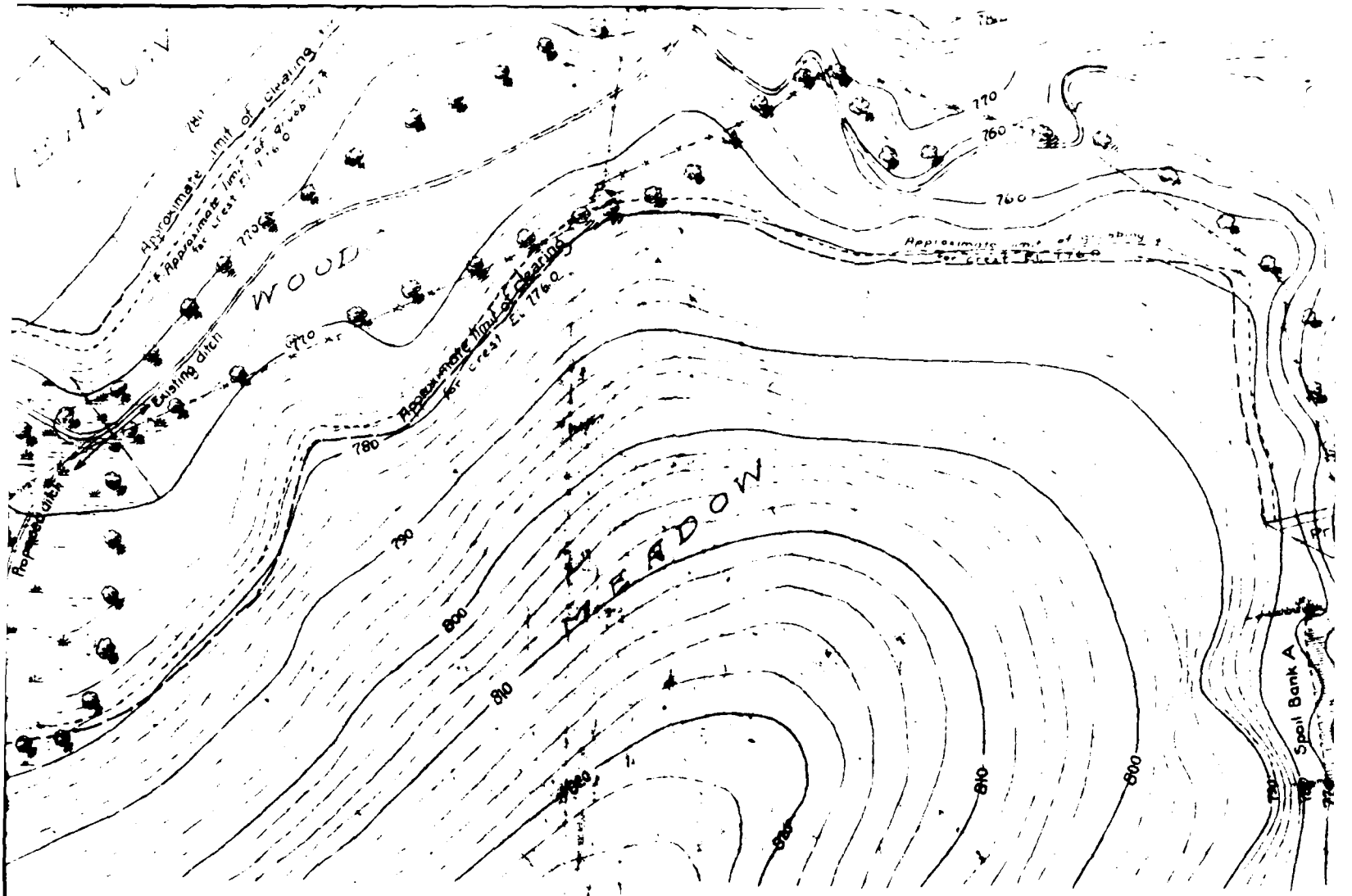
Clearing, grubbing or ditching

General limit of grubbing shall be ten feet hor[illegible] general limit of clearing shall be twentyfive f[illegible] outside future flow line at El 776.0.

NEW YORK STATE DEPARTMENT OF HEAL[illegible]
Albany, N. Y., March [illegible]
[illegible] Water Supply System [illegible]
Prison, [illegible], N. Y. [illegible]
[illegible]

Deputy [illegible]

Traced by H W Benedict, Dec 31, 1917.
1st Check by. [illegible] Jan. 7. 1918
2nd Check by. [illegible] Sept. 10 1918 (Revisions)

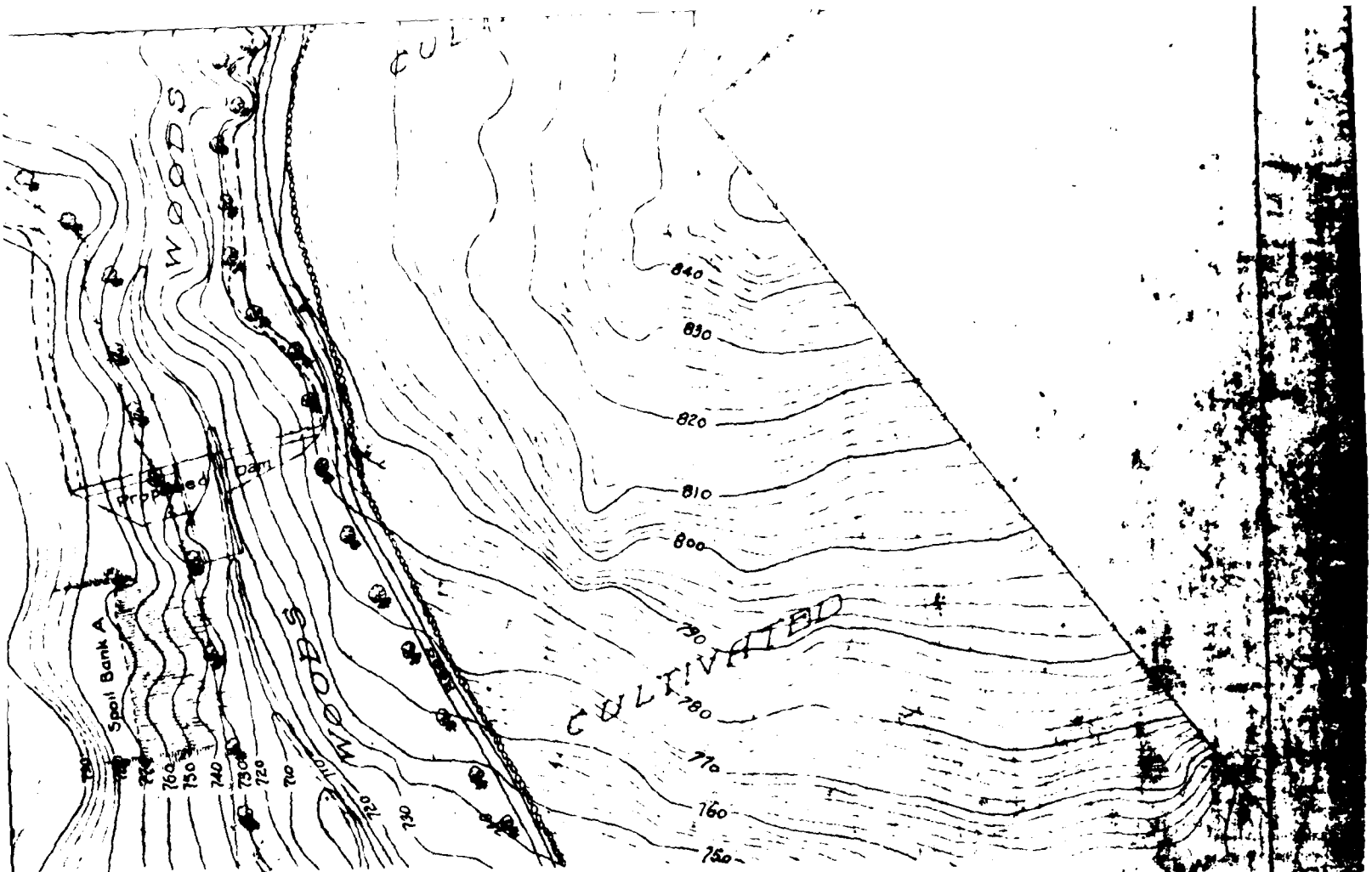


g of reservoir site will not be done under this contract.

horizontally and
e feet horizontally

Spoil bank A is for spoil from excavation for dam. Limits indicated are approximate only. Top El 784.±. Side slopes 2 on 3. Volume 5300± Cu. Yds. Top and sides of spoil bank to be covered with at least 6 inches of top soil obtained by grubbing.

Spoil bank B. Material grubbed is to be spoiled over this swampy swale. Top of spoil is to join adjacent hill sides without abrupt slopes. Spoil is to be graded to provide easy drainage.



NEW YORK STATE DEPARTMENT OF HEALTH

Albany, N. Y., April 9, 1918

amended

Water Supply System for

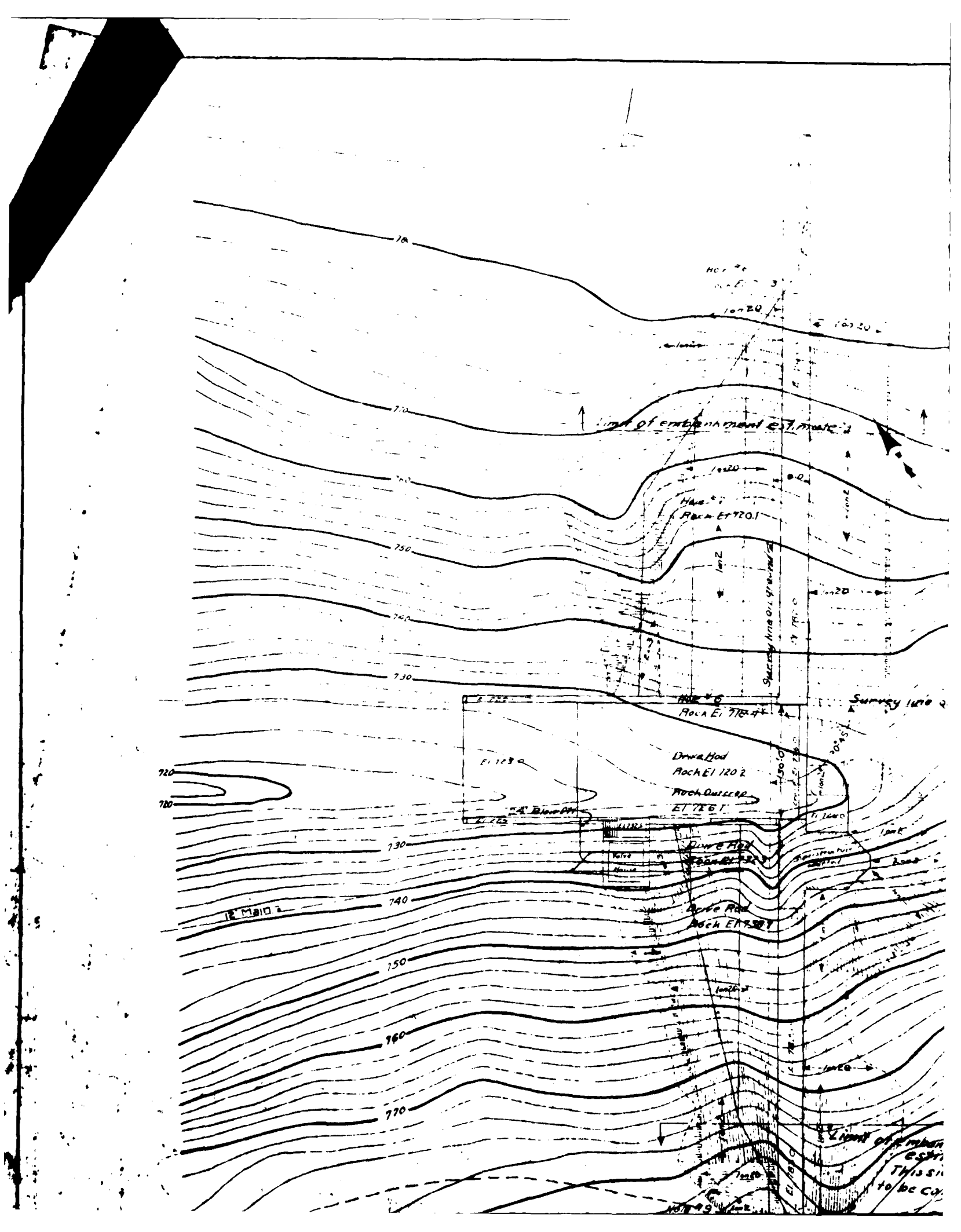
Wingdale Prison, Wingdale, N. Y.

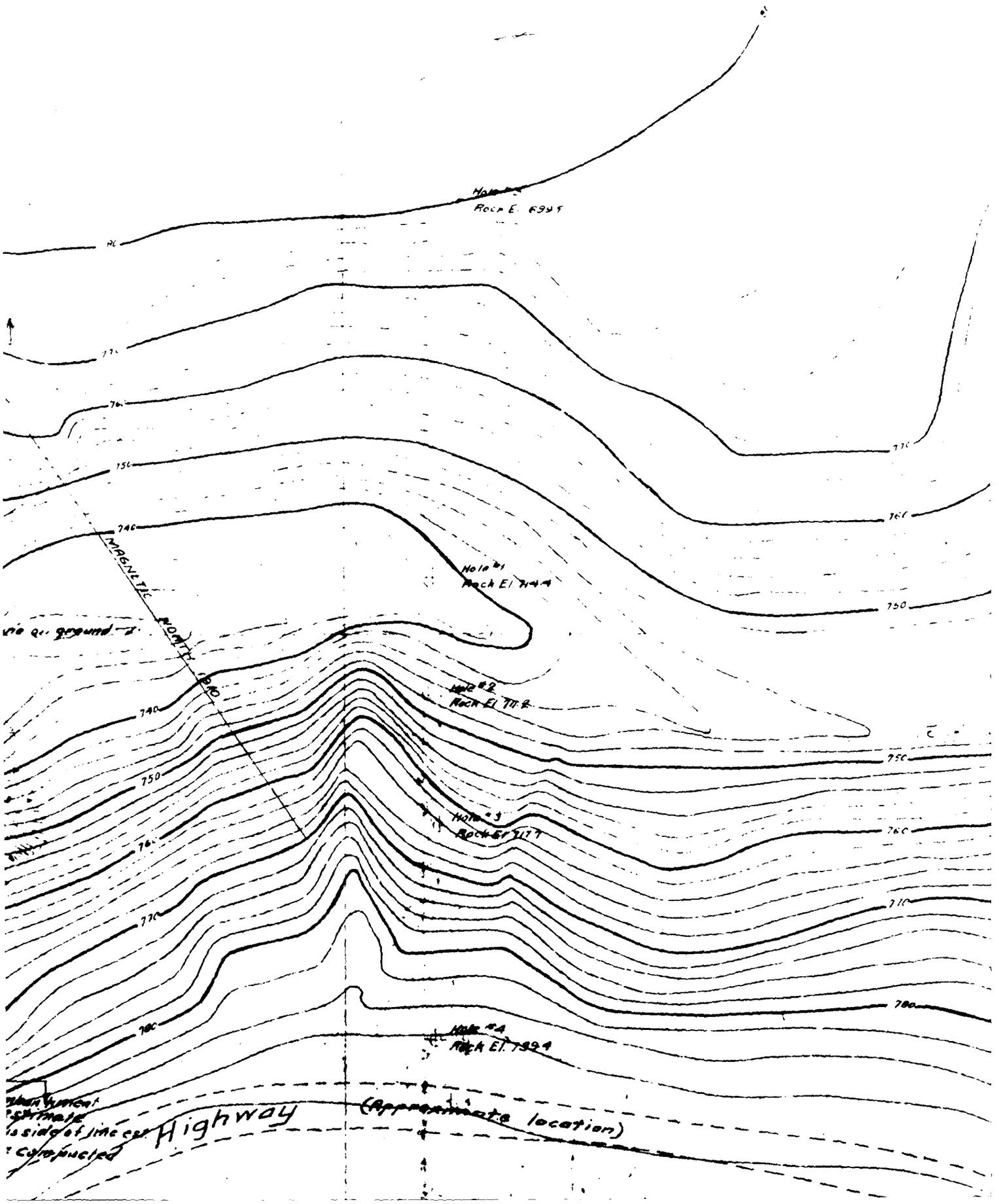
STATE OF NEW YORK

Dam and Water Supply System

Wingdale Prison

GENERAL MAP


Hole #6
Rock El 720.1
Survey Hole #2
Rock El 716.4
Drove Hole
Rock El 120.2
Rock Quarry
El 716.1
Drove Hole
Rock El 732
Drove Hole
Rock El 732
12" Main
Limit of embankment est. made
Survey line
720
730
740
750
760
770
780

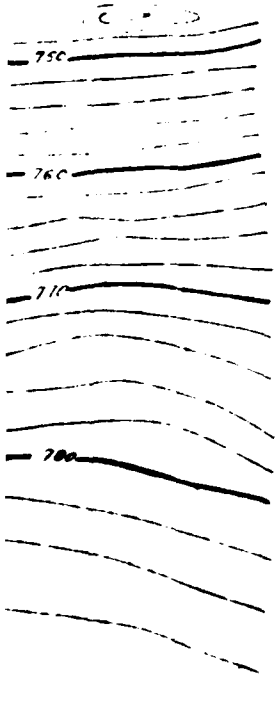

Hole #1
Rock El. 794
Hole #1
Rock El 744
MAGNETIC NORTH
Hole #2
Rock El 778
Hole #3
Rock El 777
Hole #4
Rock El. 794
Highway
(Approximate location)

To give a clear approach to blow-off and lower intakes such excavation shall be made as directed by the engineer

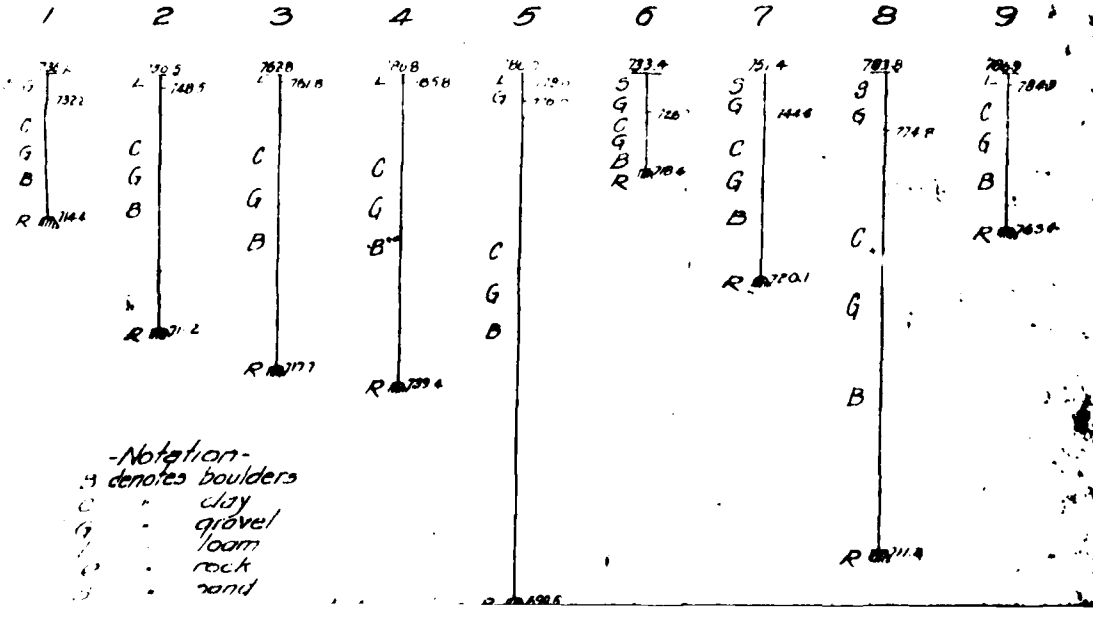
To prevent leakage around ends of corewalls gravel or other porous material within 8 ft of up and down stream faces of corewall shall be removed and replaced below El. 7830 with a backfill of material designated by the engineer. The necessity for and extent of such replacement shall be decided by the engineer.

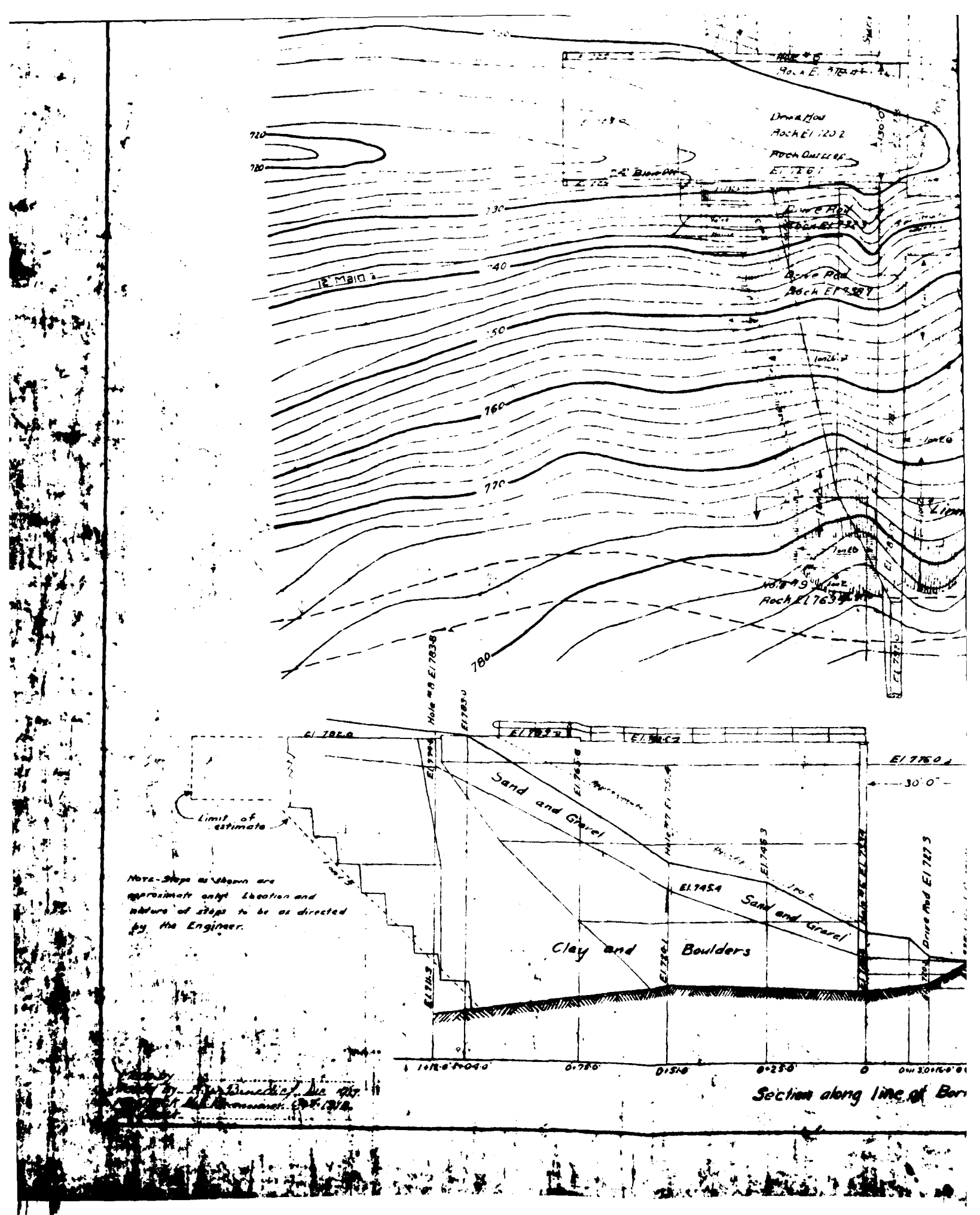
If and to the extent directed by the engineer a dyke of impervious material below El. 7830 shall be constructed beyond the outer ends of the corewalls

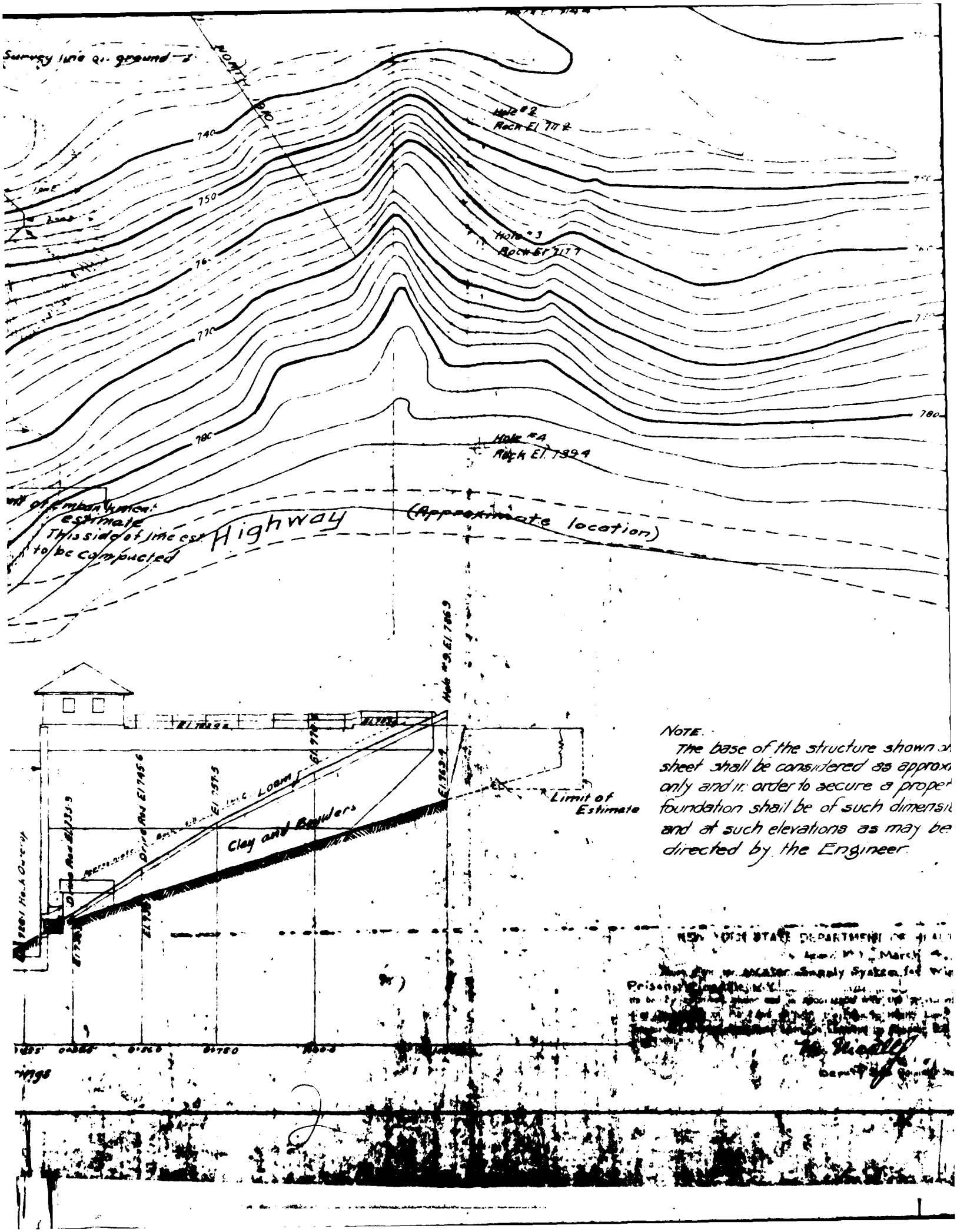
The backfill of foundation pits and the earth backing of dam shall be as directed by the engineer It shall in general be as follows. Backfill against the faces of dam shall show smooth lines and that on the down stream side shall in all cases be equal to or higher than that at the corresponding point on the upstream face The backfill line on face of dam shall be at such height that the top of the earth backing can be carried out at a downward slope of about 5% normal to the upstream face of the dam for at least 20 ft where possible and then sloped downward at 1 on 2 or flatter to the natural surface at or beyond the edge of the excavation pit The purpose of the above is to provide ready surface drainage away from the masonry On the upstream side and in rear of the valve house the backfill shall be sloped up from the intersection of the apron sidewall and the curtain wall at about 2 on 3 until it intersects the 5% slope from the dam. The backfill called for above is indicated with dotted lines on the plan



HOLE NUMBER



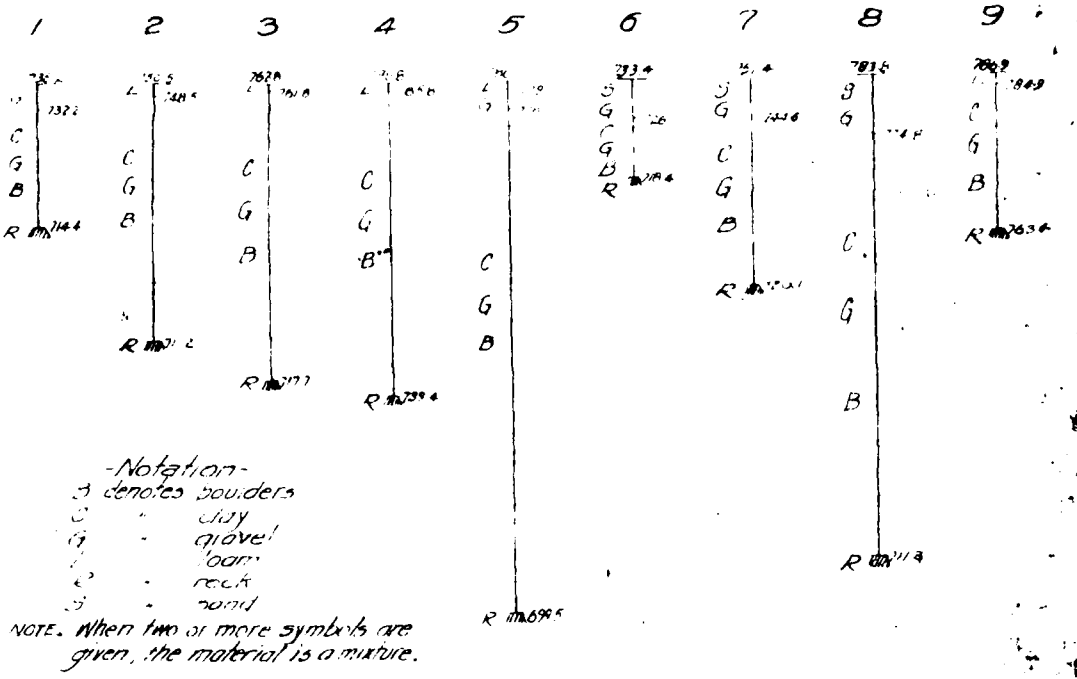

Drive Pad
Rock El 1202
Rock Outcrop
El 1261
12" Main
Drive Pad
Rock El 1389
Hole #9
Rock El 1763
Hole #8 El 1838
El 1785.0
El 1782.0
El 1760.0
30'0"
Limit of estimate
Sand and Gravel
Clay and Boulders
El 1745.4
Sand and Gravel
Drive Pad El 1727.5
Note - Steps as shown are approximate only! Location and nature of steps to be as directed by the Engineer.
Section along line of Bor



NOTE.

The base of the structure shown on this sheet shall be considered as approximate only and in order to secure a proper foundation shall be of such dimensions and at such elevations as may be directed by the Engineer.

HOLE NUMBER



WASH DRILL BORINGS

NEW YORK STATE DEPARTMENT OF HEALTH

Albany N. Y., Oct. 19, 1916

amended
Plans for the Water Supply System for the ...
Wingdale Prison, Wingdale, N.Y. ...

... hereby approved under and in accordance with the provisions of Section 14 of Chapter 49 of the Laws of 1909, the ... Law, constituting Chapter 45 of the Consolidated Laws, as amended by ... of the Laws of 1913.

... Commissioner of Health

STATE OF NEW YORK

Dam and Water Supply System for

W... Prison

LAYOUT OF DAM

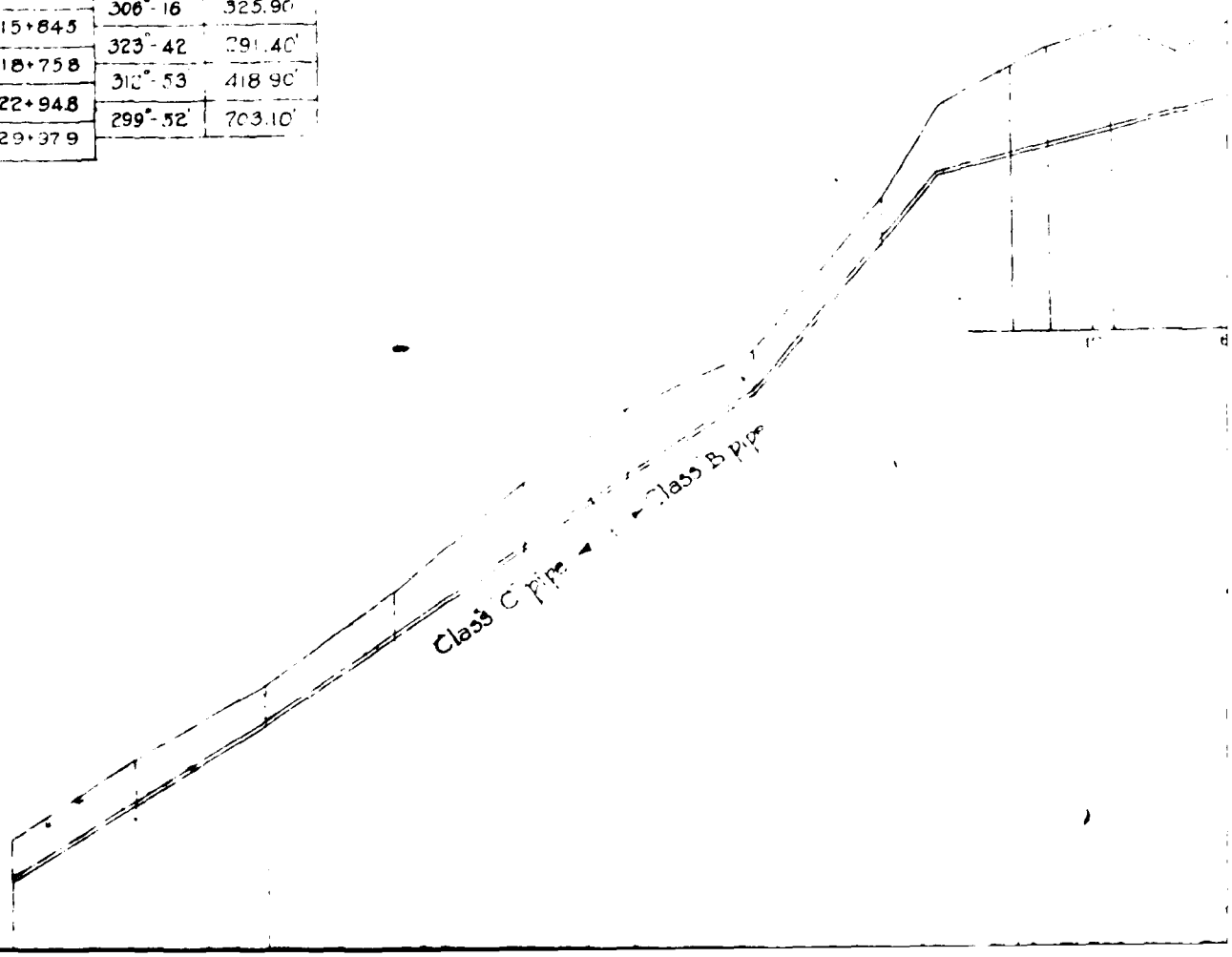
Scale: 1 inch = 20 feet

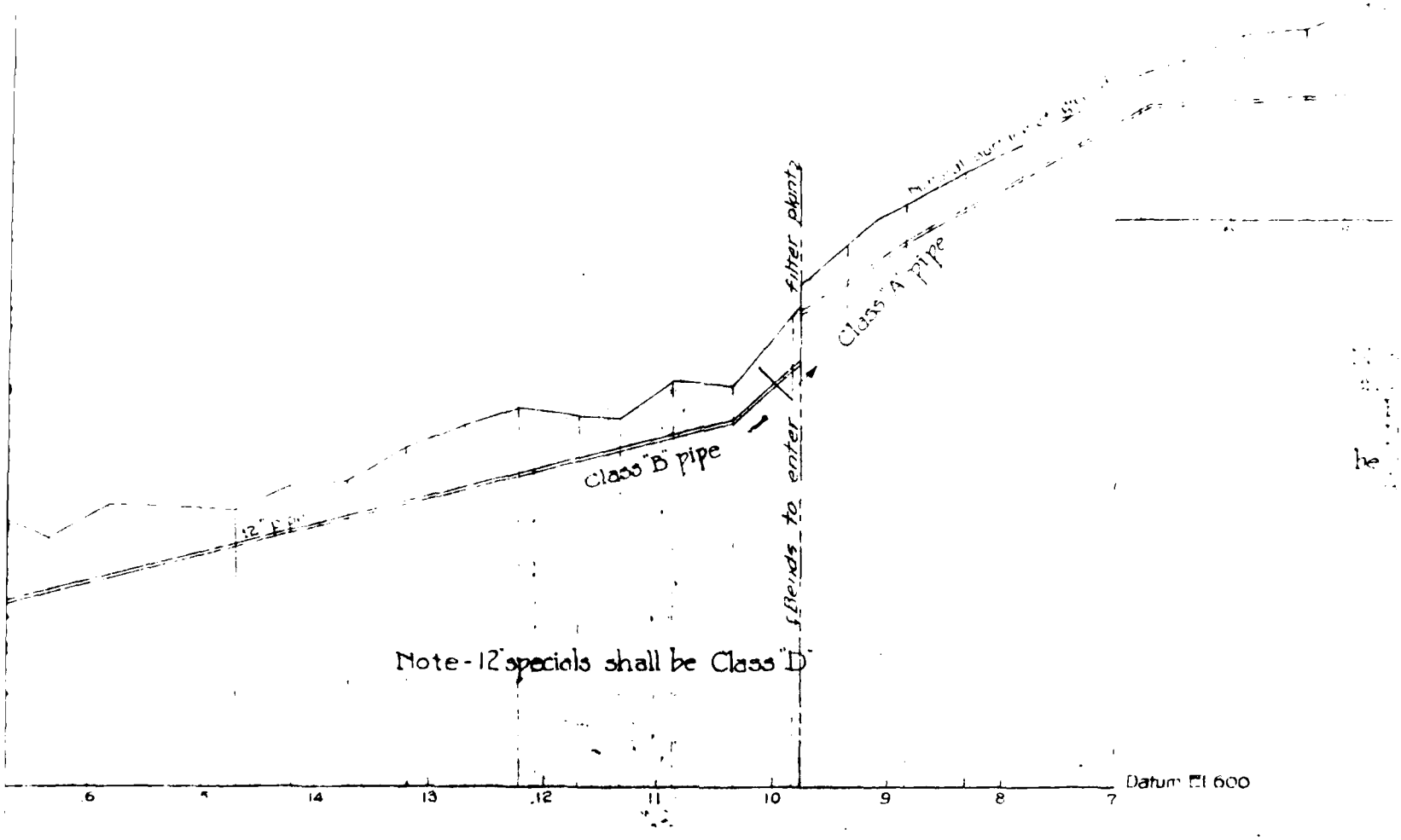
March 2, 1925

...

BASE LINE DATA

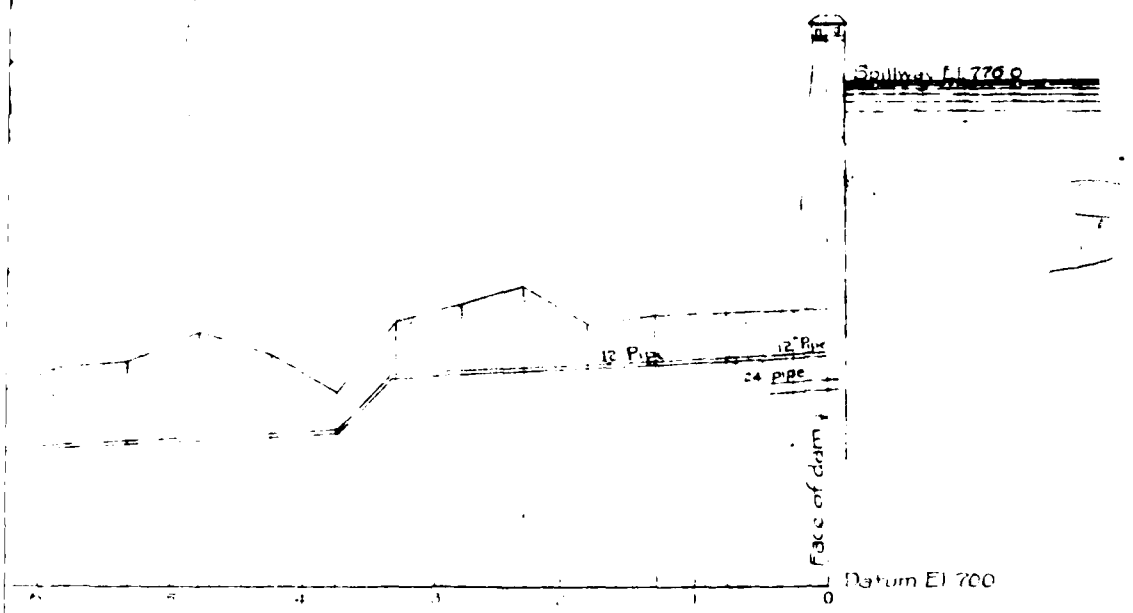
STATION	AZIMUTH	DISTANCE
0+00	274°-31'	109.95
1+10	297°-10'	238.70
3+48.6	288°-37'	193.50'
4+491	296°-23'	172.50
6+219	275°-13'	171.67
7+93.6	273°-16'	465.00
12+586	306°-16'	325.90'
15+845	323°-42'	291.40'
18+758	312°-53'	418.90'
22+948	299°-52'	703.10'
29+379		





PROFILE ON CENTER LINE OF PIPE

SCALES HOR. 1 IN. = 100 FT.
VER. 1 IN. = 20 FT.

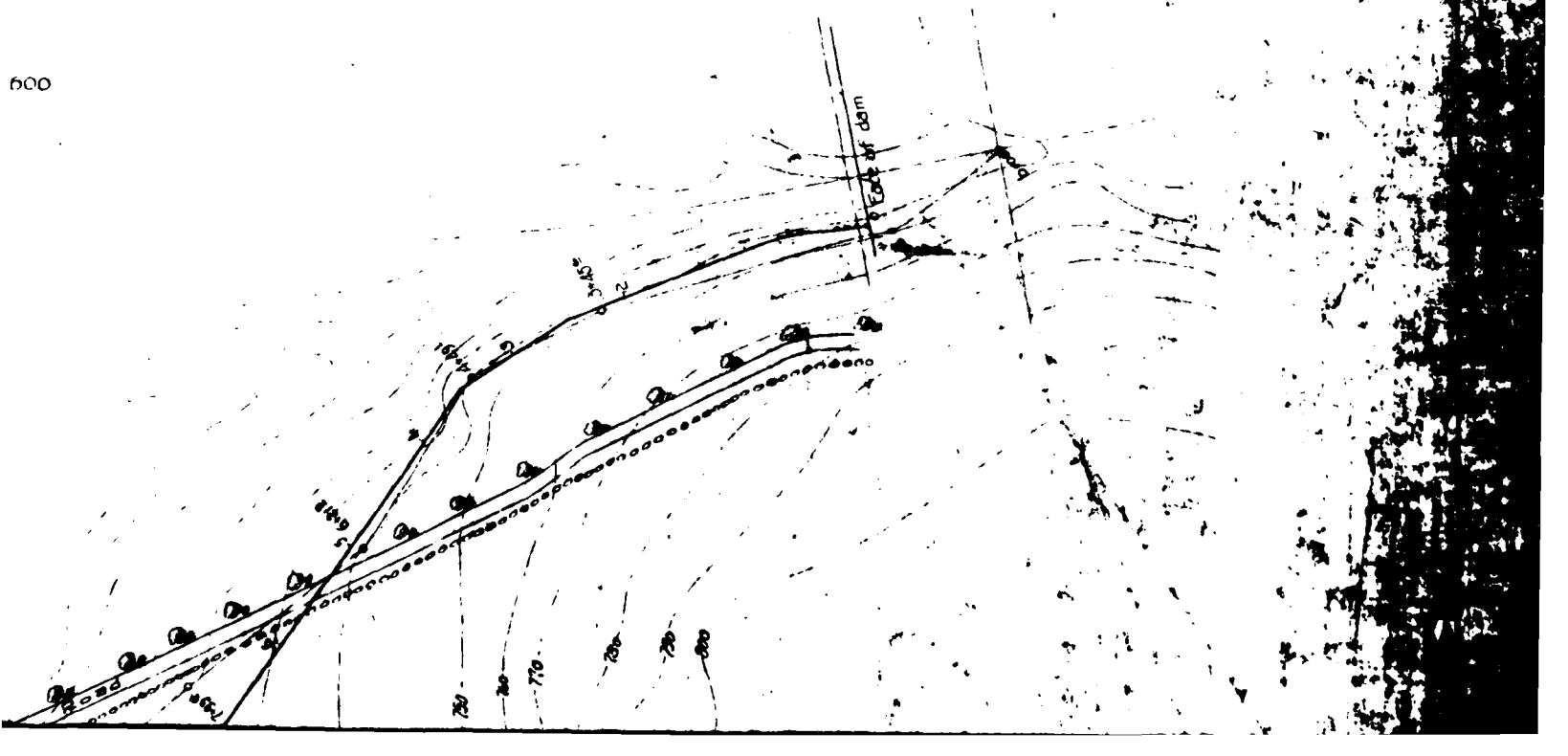


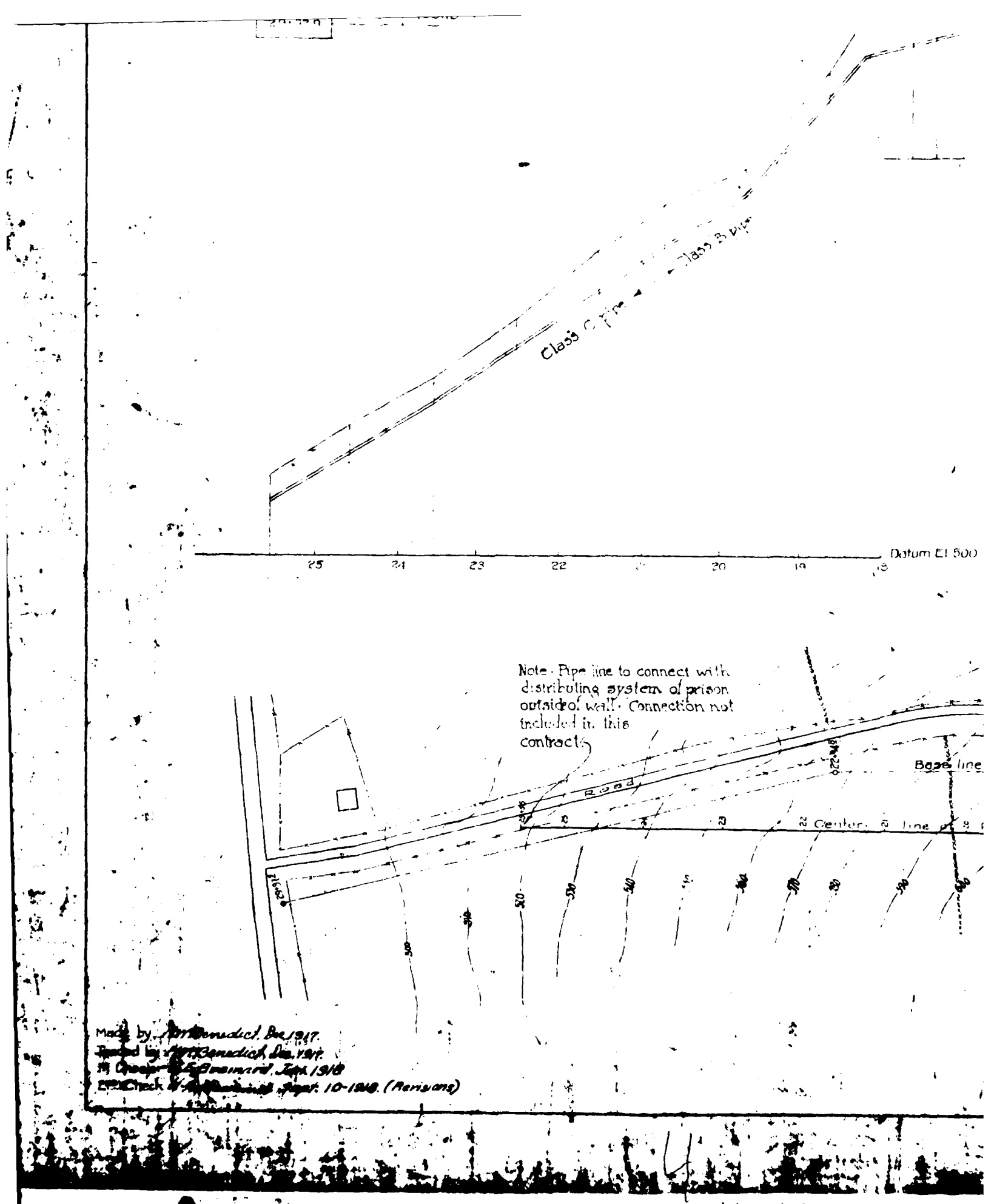
Note - The location of the pipe line as shown is approximate only and may be varied by the Engineer to fit the ground.

Pipe shall have at least five feet of covering.

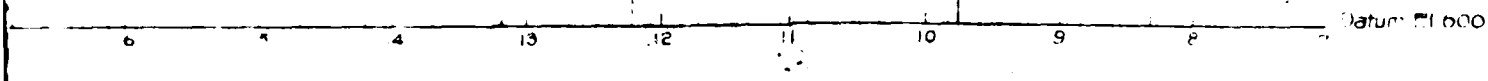
Pipe shall be of the classes shown on the drawing and shall be tested before it is covered (see specifications).

All joints in pipe line are to be leaded



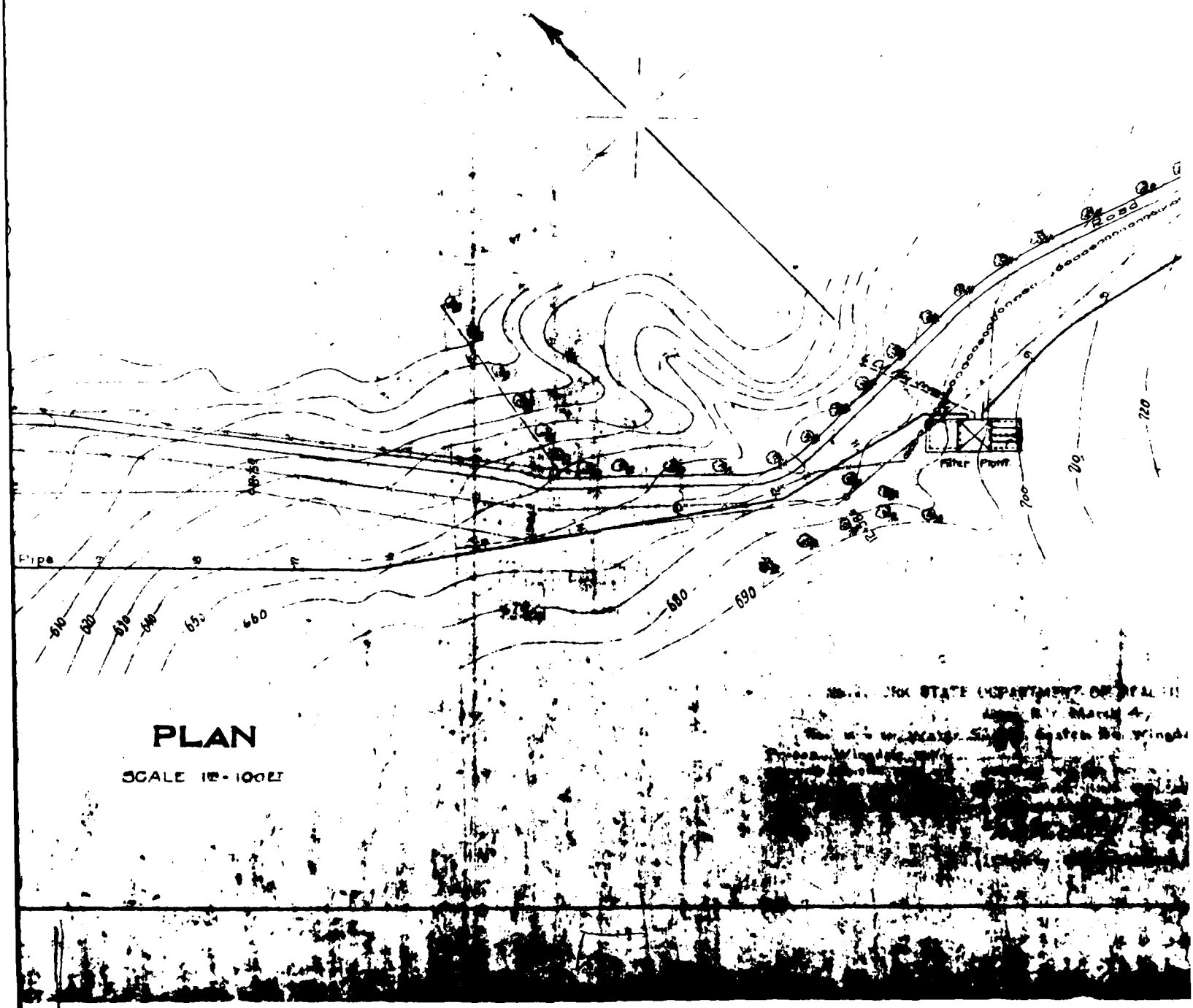

Class B Pipe
Datum El 500
25
24
23
22
20
19
Note - Pipe line to connect with distributing system of prison outside of wall. Connection not included in this contract.
Road
Base line
Center line
Made by
Traced by
Checked by
Report 10-1918 (Revisions)

Note - 12" specials shall be Class D



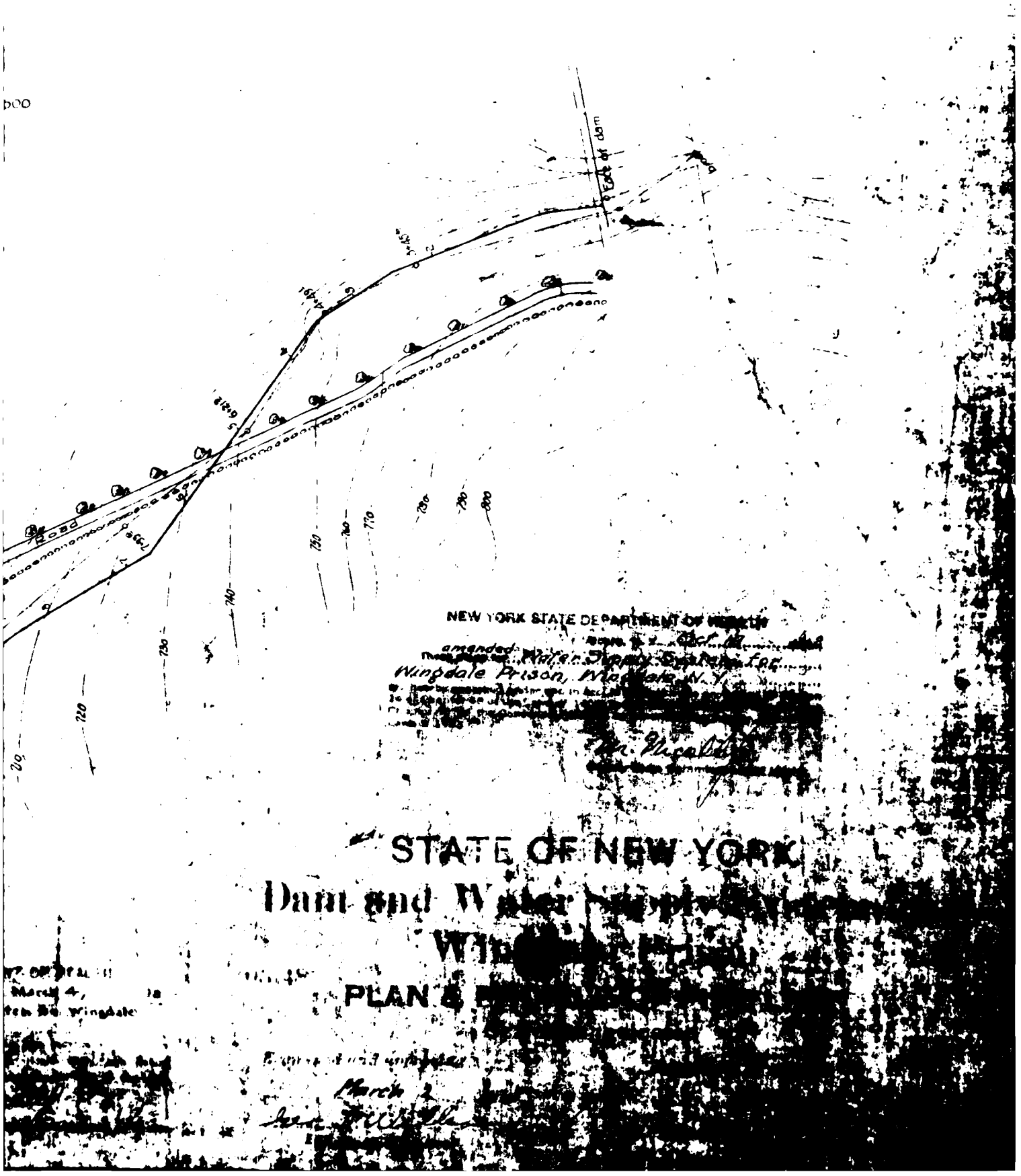
PROFILE ON CENTER LINE OF PIPE

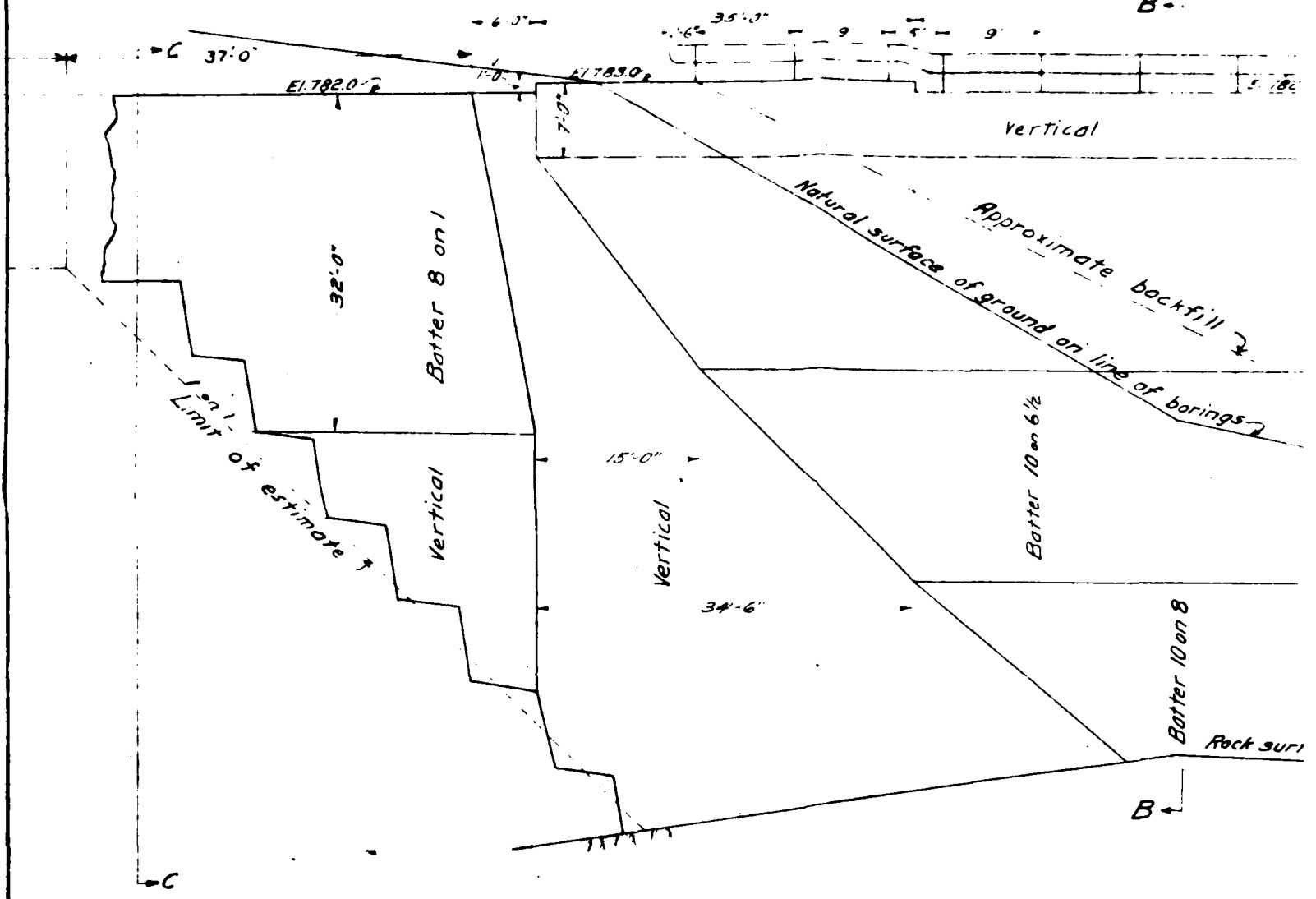
SCALES HOR 1 IN. = 100 FT.
VER 1 IN. = 20 FT.



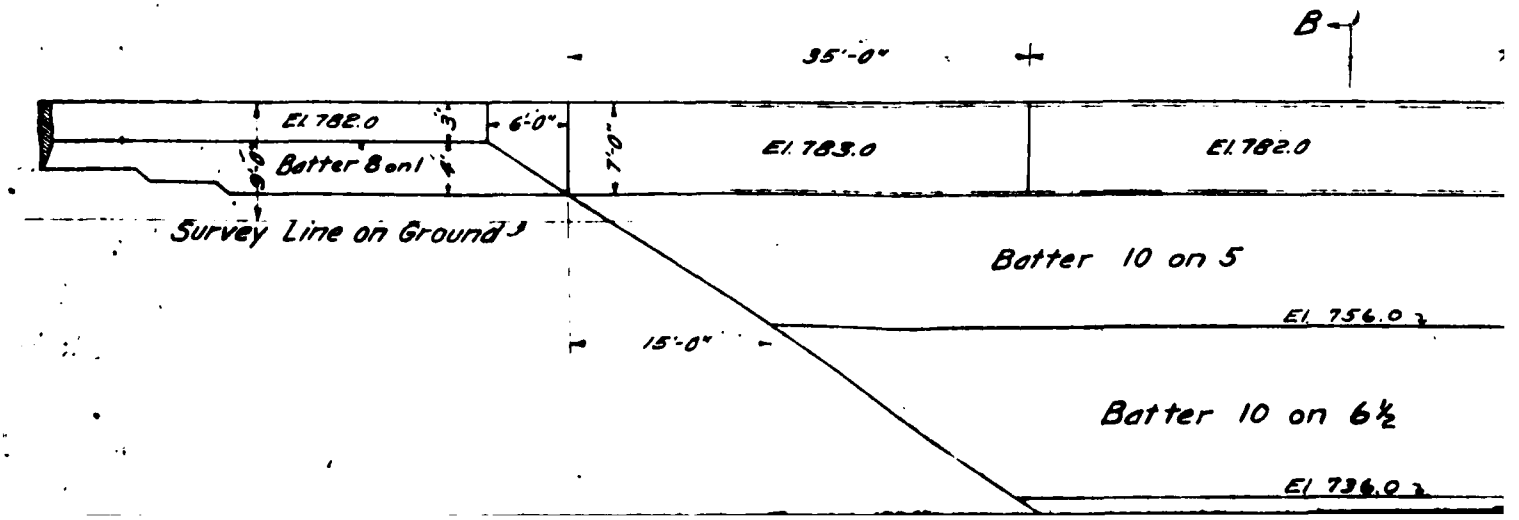
PLAN

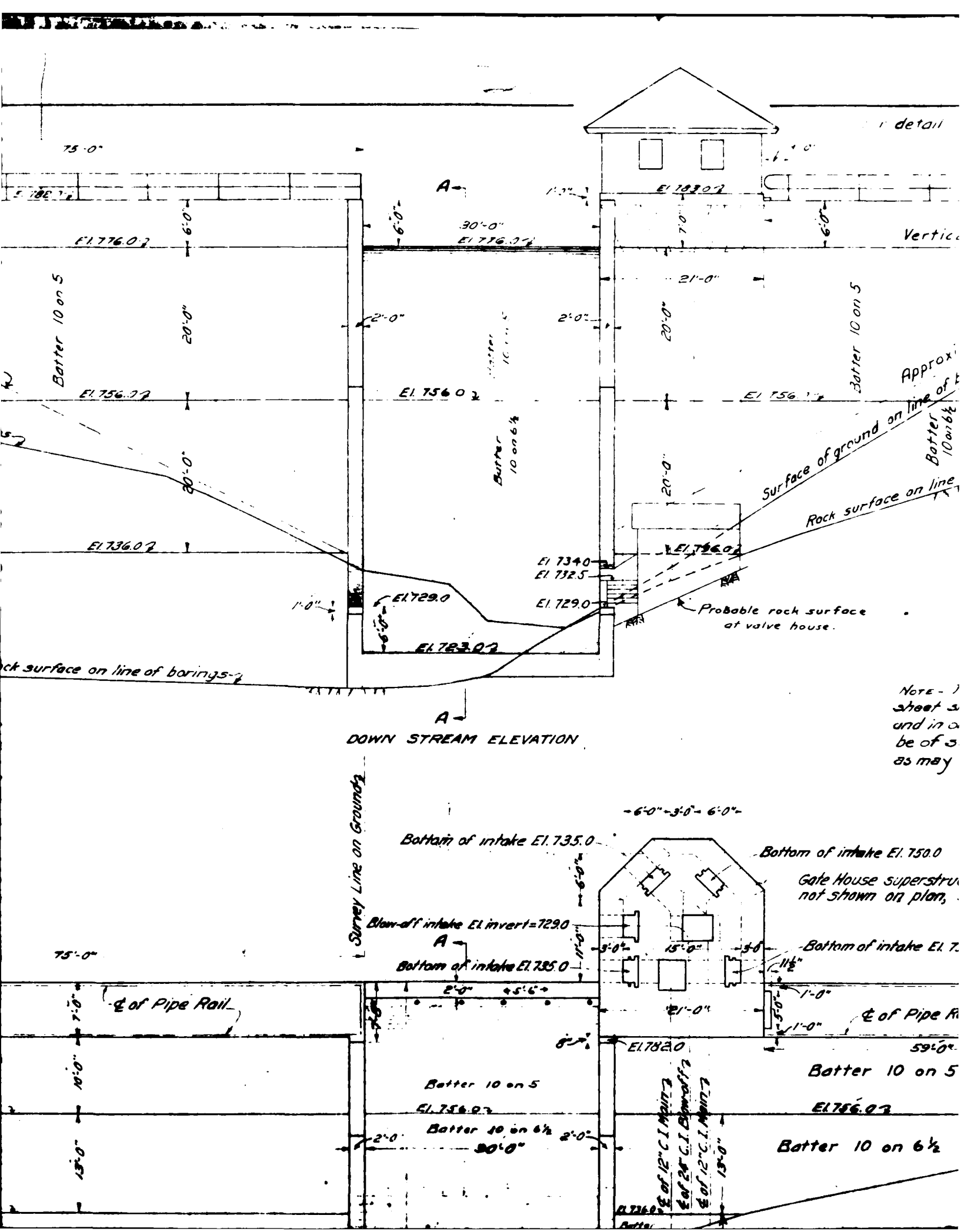
SCALE 1" = 100 FT


NEW YORK STATE DEPARTMENT OF
STATE OF NEW YORK
Dam and W
PLAN &
March 2

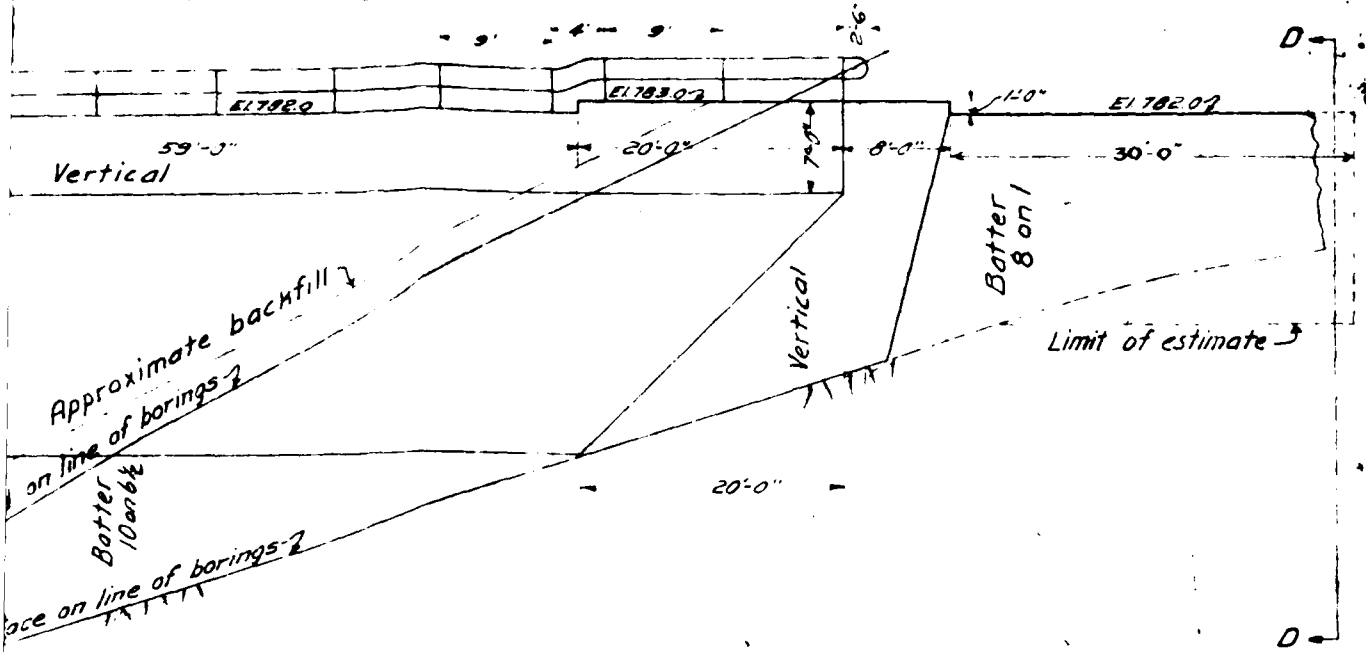


NOTE - Steps as shown are approximate only. Location and nature of steps to be as directed by the Engineer.




75'-0"
A
El. 783.0
6'-0"
30'-0"
El. 776.0
Batter 10 on 5
20'-0"
2'-0"
El. 756.0
Batter 10 on 6½
El. 736.0
El. 734.0
El. 732.5
El. 729.0
1'-0"
Surface of ground on line of borings
Rock surface on line of borings
Probable rock surface at valve house.
DOWN STREAM ELEVATION
Survey Line on Ground
Bottom of intake El. 735.0
Bottom of intake El. 750.0
Blow-off intake El. invert=729.0
Bottom of intake El. 735.0
21'-0"
59'-0"
℄ of Pipe Rail
℄ of 12" C.I. Main
℄ of 12" C.I. Blow-off
Batter 10 on 5
Batter 10 on 6½

detail of pipe railing see sheet No 10



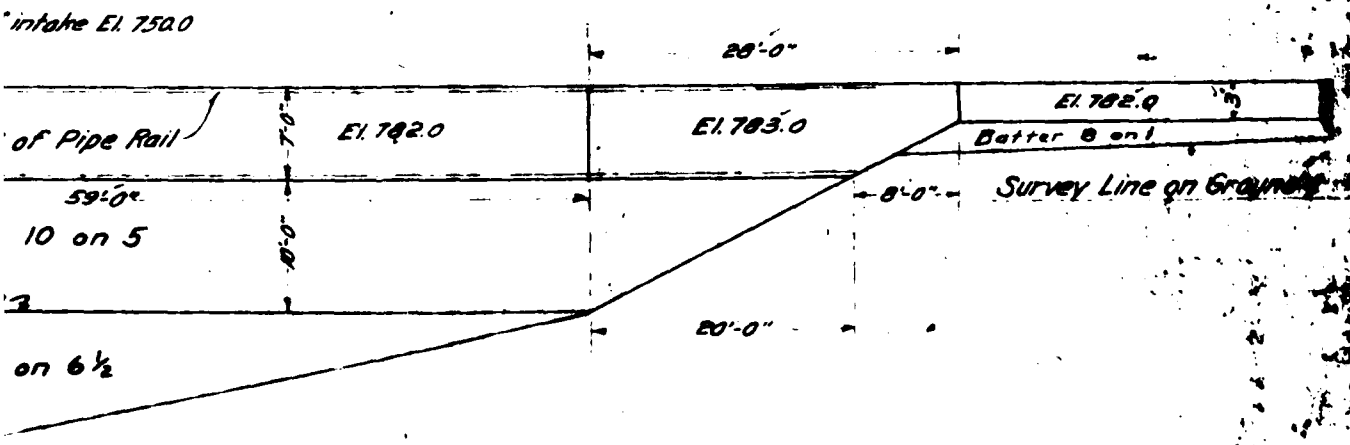
Note - The base of the structure shown on this sheet shall be considered as approximate only and in order to secure a proper foundation, shall be of such dimensions and at such elevations as may be directed by the Engineer.

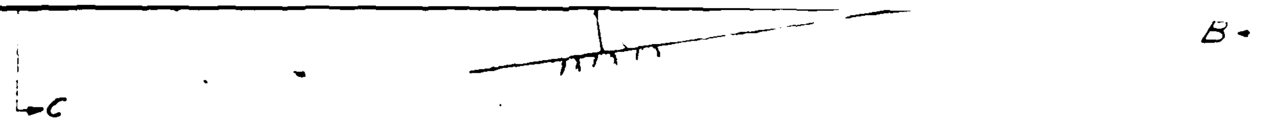
e El. 750.0

superstructure

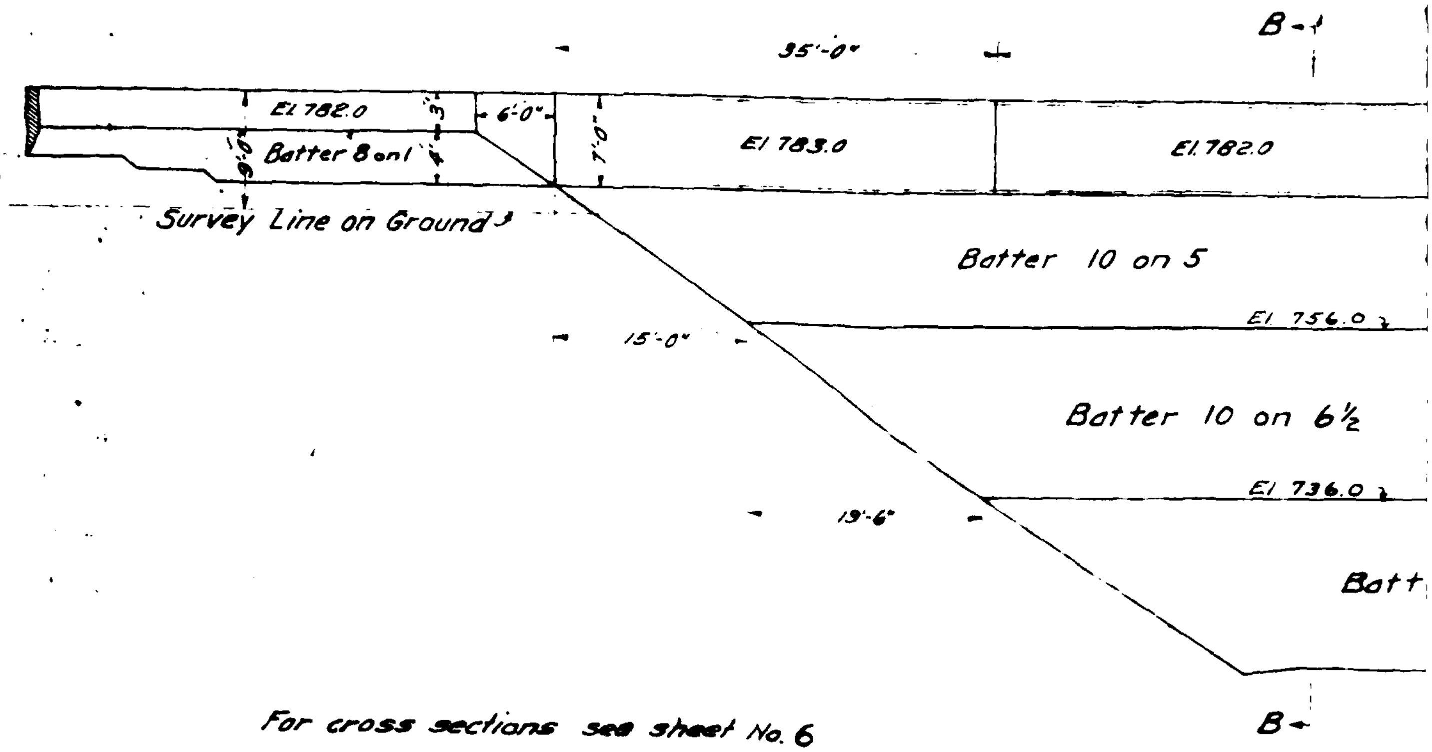
on plan, see sheet No 9.

intake El. 750.0





NOTE - Steps as shown are approximate only. Location and nature of steps to be as directed by the Engineer.

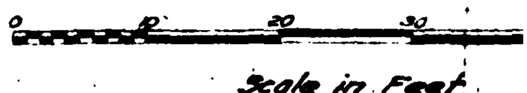


For cross sections see sheet No. 6

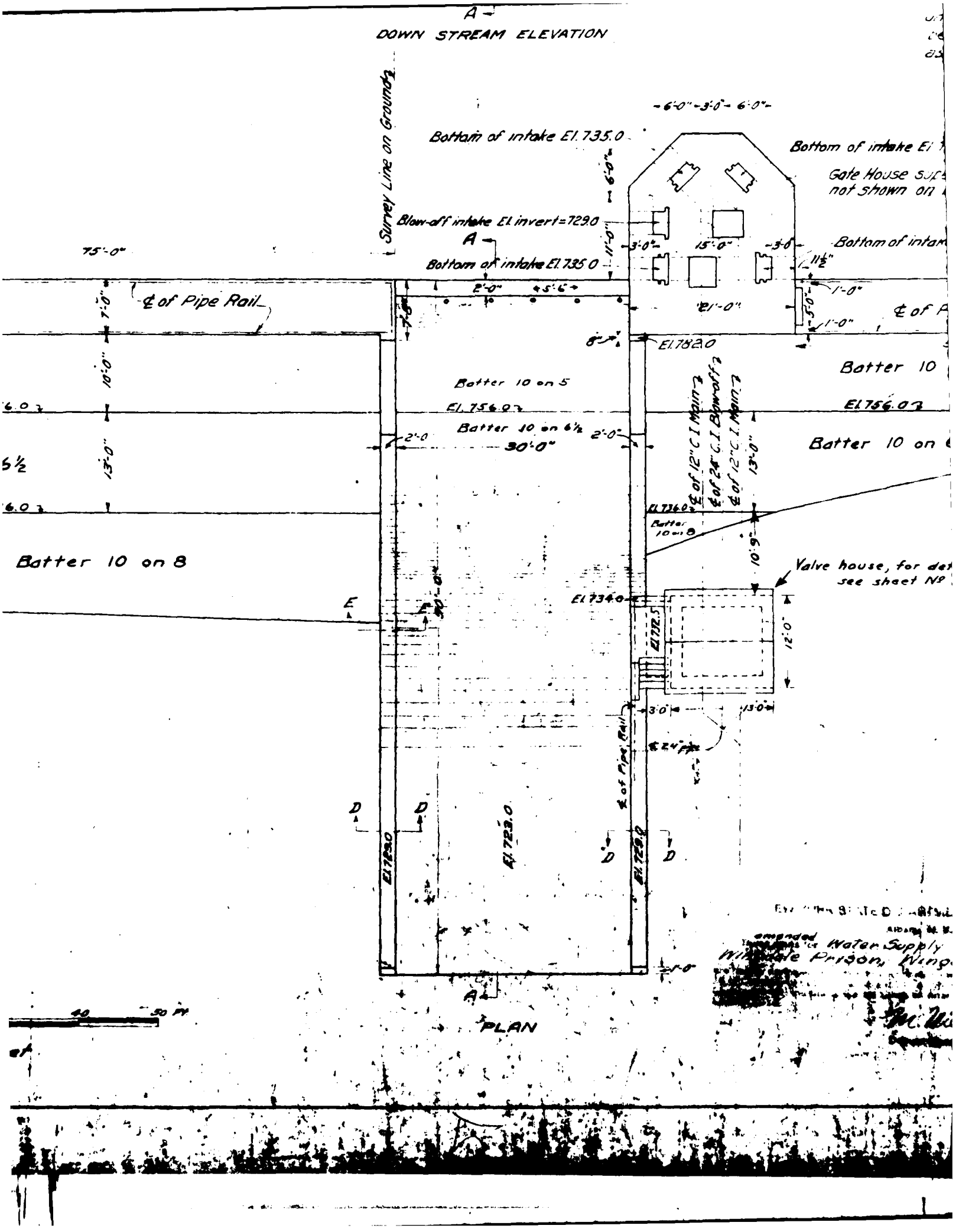
Vertical expansion joints normal to face of dam shall be constructed not over 34 feet apart.

All concrete to be 2nd class except roof of valve house.

A staff gage shall be constructed in the concrete of the gate house substructure from elev. 740 to elev. 780 graduated to tenths of feet and marked at each foot with the elevation. Details of the gage and location will be supplied by the engineer. Cost of gage shall be included in the contract price of 2nd Class Concrete.



Made by [illegible]
Traced by [illegible]
Check H. [illegible] Jan 21 1[illegible]
Chad [illegible]

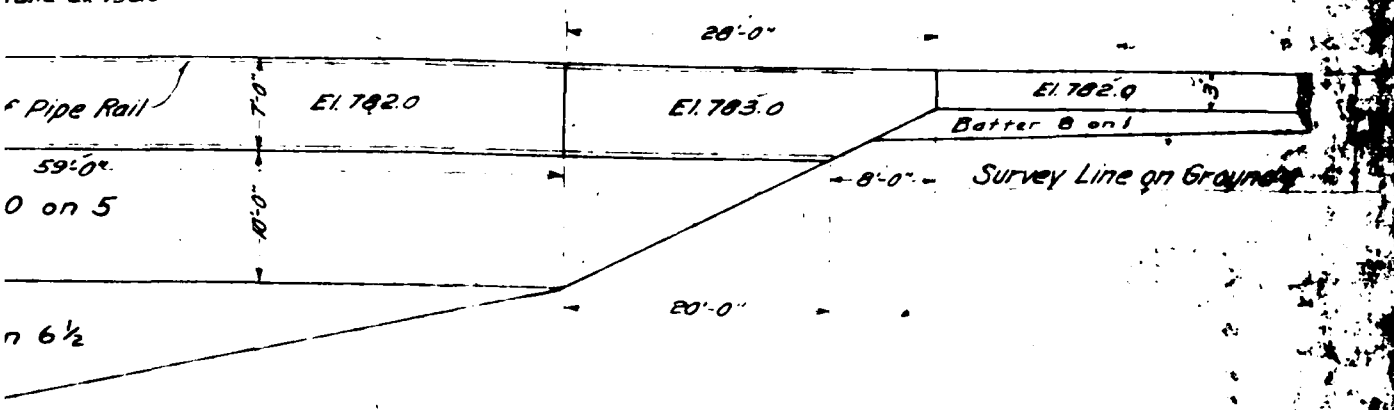

A
DOWN STREAM ELEVATION
Survey Line on Ground
Bottom of intake El. 735.0
Blow-off intake El. invert=729.0
Bottom of intake El. 735.0
Gate House
not shown on
Bottom of intake
75'-0"
℄ of Pipe Rail
Batter 10 on 5
El. 756.0
Batter 10 on 6½
30'-0"
Batter 10 on 8
El. 782.0
Batter 10
Batter 10 on
El. 734.0
Valve house, for det
see sheet No
℄ of Pipe Rail
El. 723.0
El. 729.0
El. 712.5
PLAN
amended
Water Supply
Prison, Wyo

be of such dimensions and of such elevations
as may be directed by the Engineer.

El. 750.0

superstructure
on plan, see sheet No 9.

take El. 750.0



detail
No 11.

March 4, 18

Water Supply System for Wingdale

Prison, Wingdale, N. Y.

M. Nicoll
Deputy

STATE OF NEW YORK

Water Supply System for

Wingdale, N. Y.

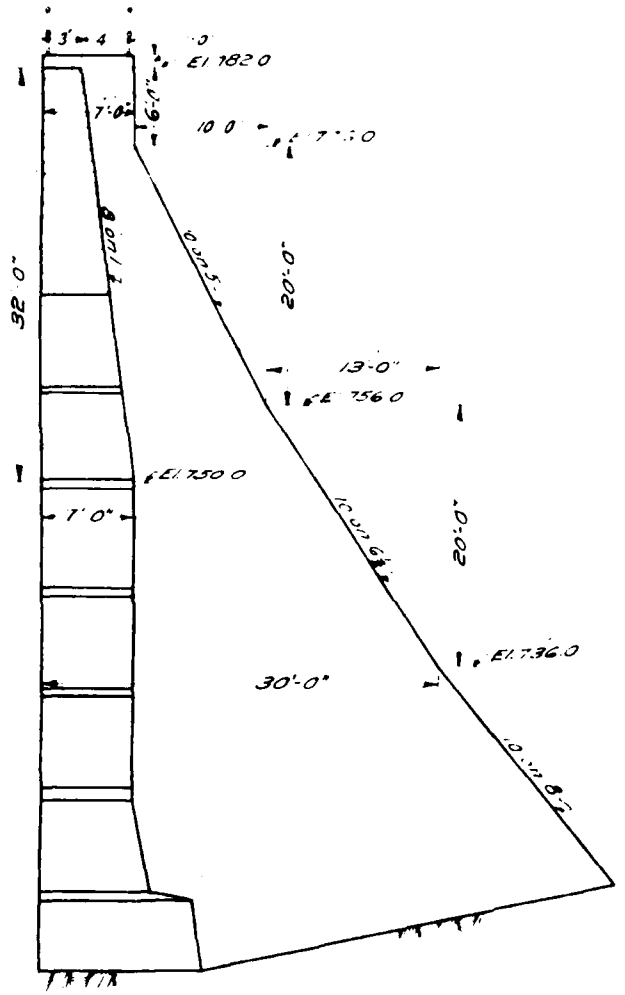
PLAN & ELEVATION OF DAM

Oct 19 18

y System for
ngdale, N. Y.

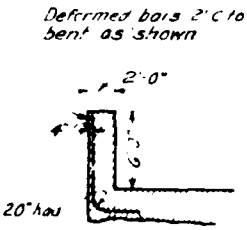
Nicoll

March 2

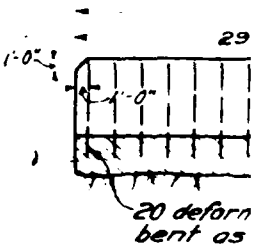


SECTIONAL ELEVATION C-C
Scale 1"=10'

SECTIONAL ELEVATION
Scale 1"=10'

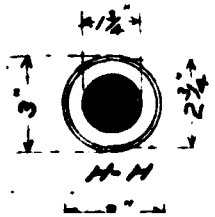


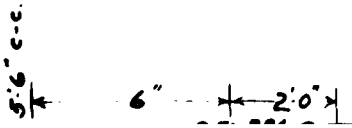
SECTION D-D

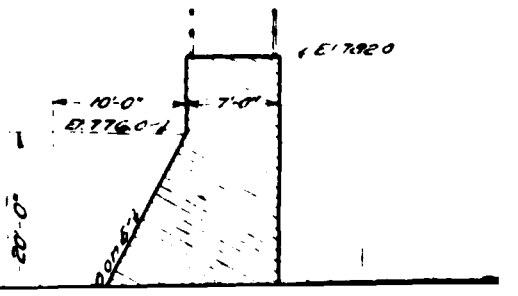


Note:- All reinforcement a
bars 0.56" net sectio

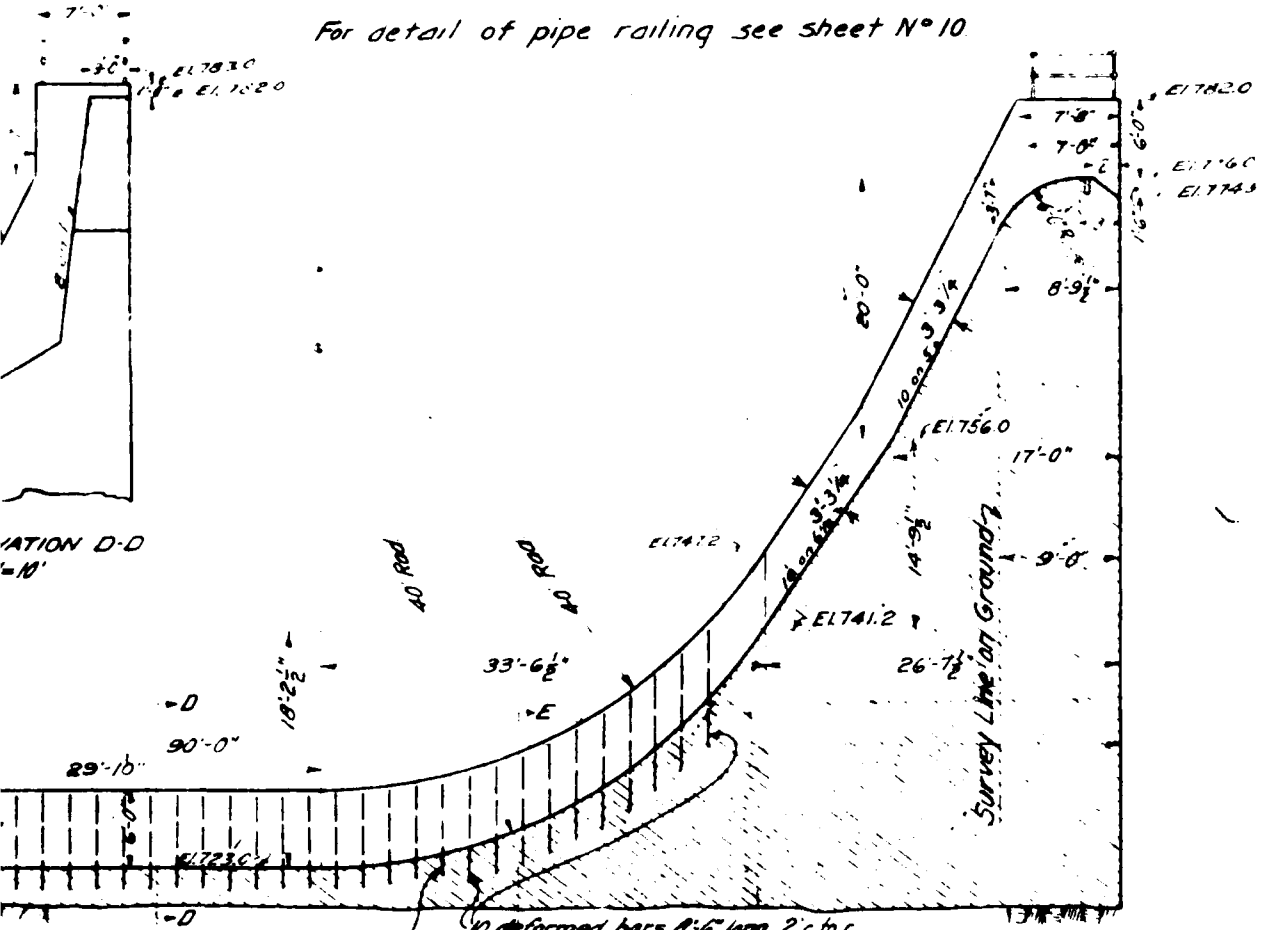
For Plan and Elevation see sheet No 5.
All concrete shall be 2nd class.
For location of sections see Sheet No 5







For detail of pipe railing see sheet N° 10



ATION D-D
=10'

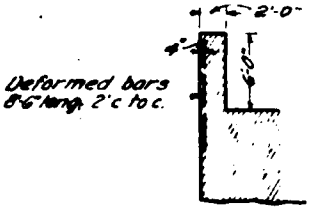
0 deformed bars 10' long 2'c.to c.
ent as shown in section D-D

10 deformed bars 8'-6" long 2'c.to c.

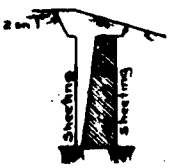
SECTIONAL ELEVATION A-A
Scale 1"=10'

Note:- The apron as shown is typical only, its elevation, and floor thickness shall be as directed by the engineer. The apron shall be lengthened if so directed.

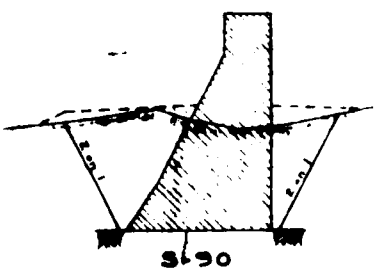
ment deformed
t section



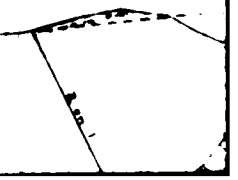
SECTION E-E

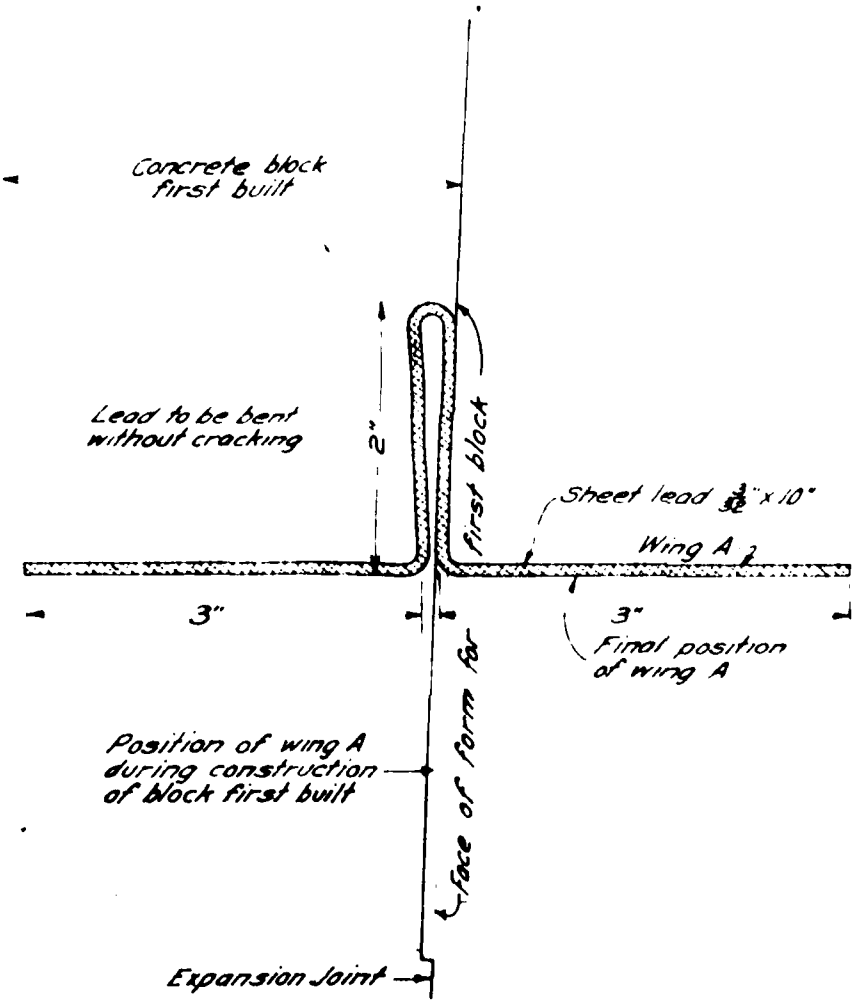


S-188



S-90



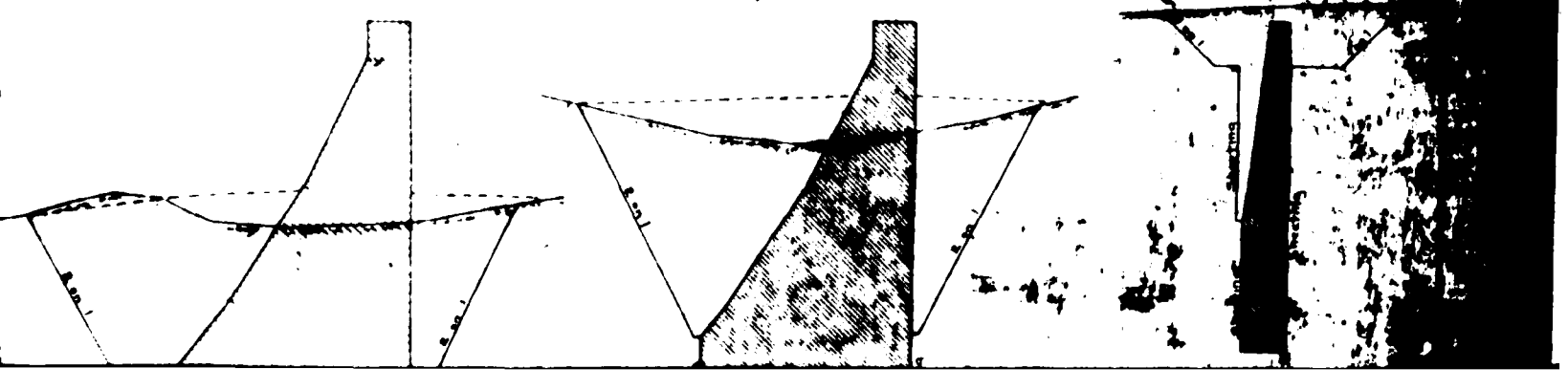


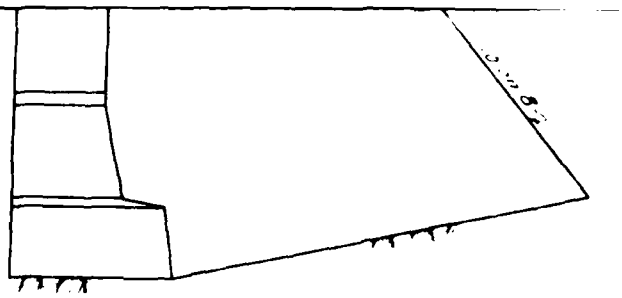
Payment for lead shall be included in contract price for 2nd class concrete.

DETAIL OF LEAD WATER STOP

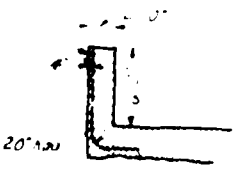
Scale – Full Size

To be used in all concrete expansion joints where a head of water is to be retained





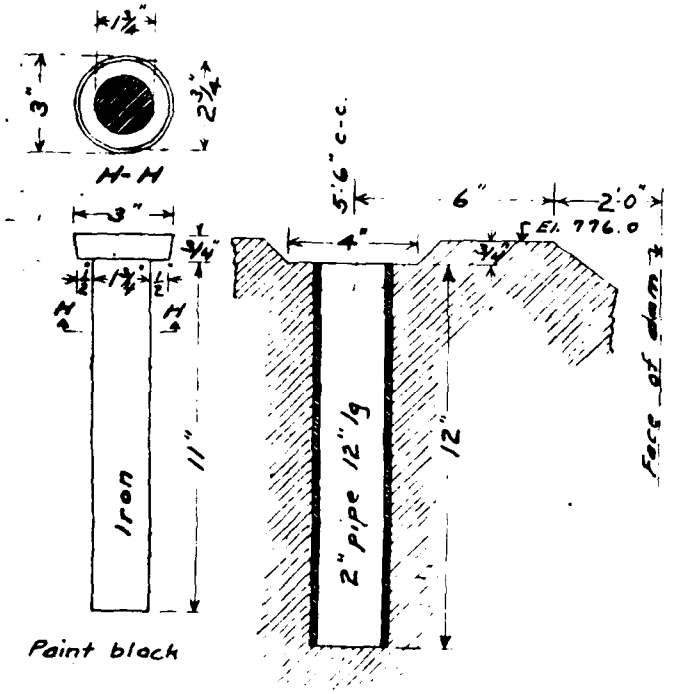
SECTIONAL ELEVATION C-C
Scale 1"=10'



SECTION D-D

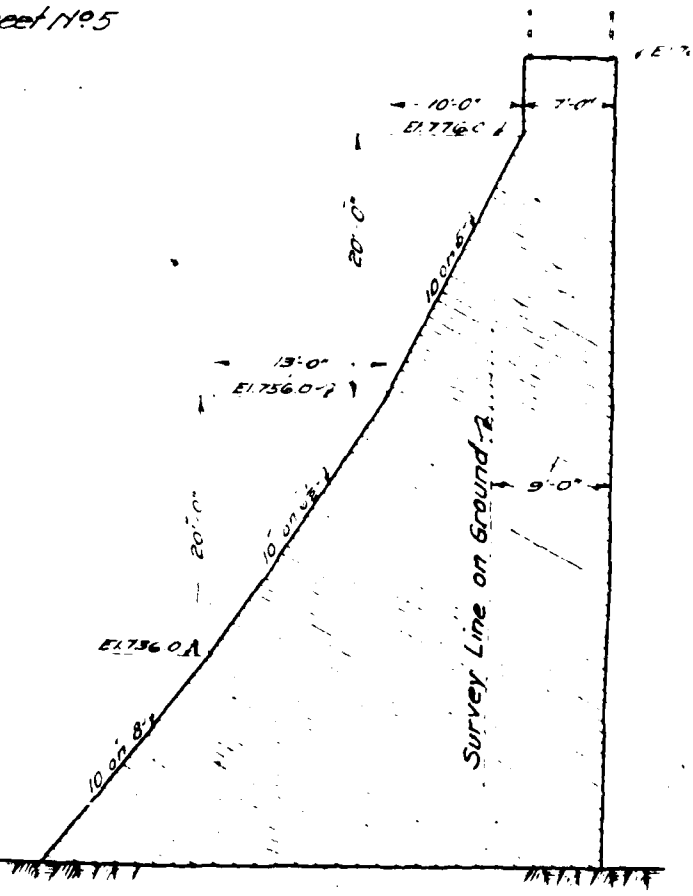
Note:- All reinforced
bars .456" ne

For Plan and Elevation see sheet No 5.
All concrete shall be 2nd class.
For location of sections see sheet No 5



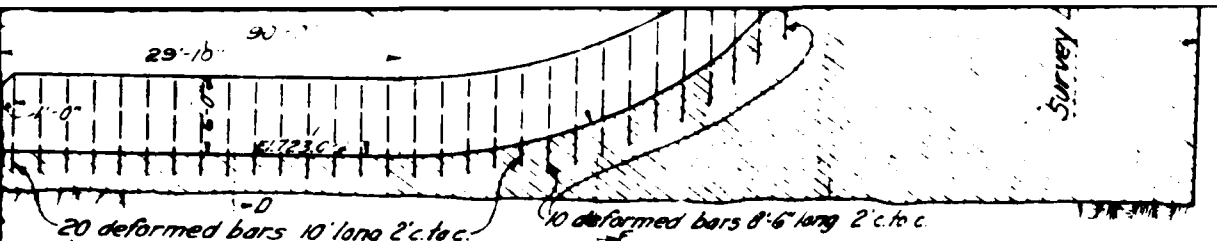
DETAIL OF
FLASH BOARD SOCKET & FILLER
SCALE 3 ins. 1 ft

6 sets required.



SECTIONAL ELEVATION B-B
Scale 1"=10'

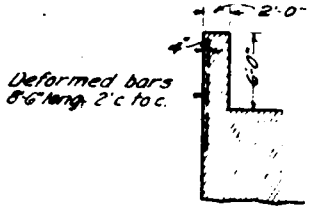
Made By S.E. Gibson Dec. 1917
Traced By C.T. Mishkern
1st Check H.C. Brainard Jan 21, 1918
2nd Check



SECTIONAL ELEVATION A-A
Scale 1"=10'

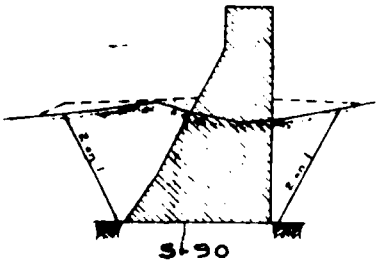
Note:- The apron as shown is typical only, its elevation, and floor thickness shall be as directed by the engineer. The apron shall be lengthened if so directed.

forcement deformed
6" net section

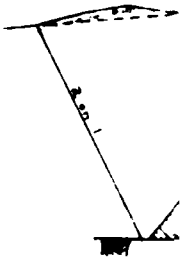


SECTION E-E

S-188



S-90

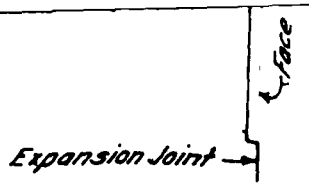


Note:- To secure a bond and prevent sliding of the dam the rock surface under the dam shall be roughened to an extent and in a manner satisfactory to the engineer.

The base of the structure, shown on this sheet shall be considered as approximate only and in order to secure a proper foundation shall be of such dimensions and at such elevations as may be directed by the Engineer

ALTH
March 4, 1910
Water Supply System for Wingdale Prison, Wingdale, N.Y.
W. Nicoll
Deputy Engr.

Oct 19 B
amended Water Supply System for Wingdale Prison, Wingdale, N.Y.
W. Nicoll

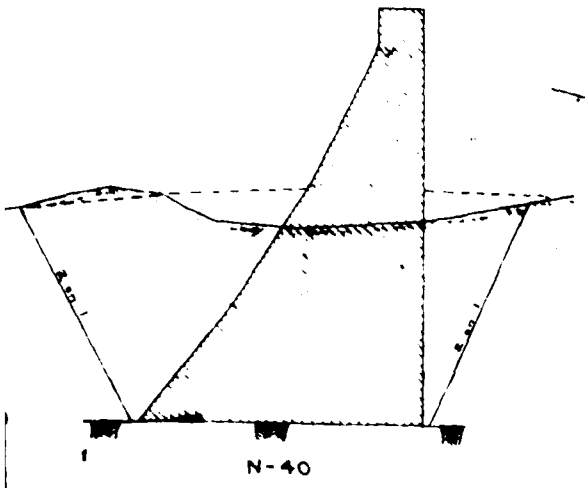


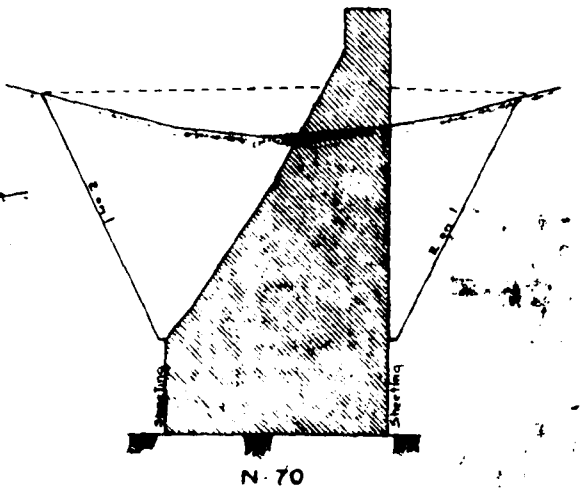
Payment for lead shall be included in contract price for 2nd class concrete.

DETAIL OF LEAD WATER STOP

Scale = Full Size

To be used in all concrete expansion joints where a head of water is to be retained





TYPICAL SECTIONS OF DAM SHOWING

BASIS OF EXCAVATION ESTIMATE

Scale: 1 in. = 20 feet

STATE OF NEW YORK

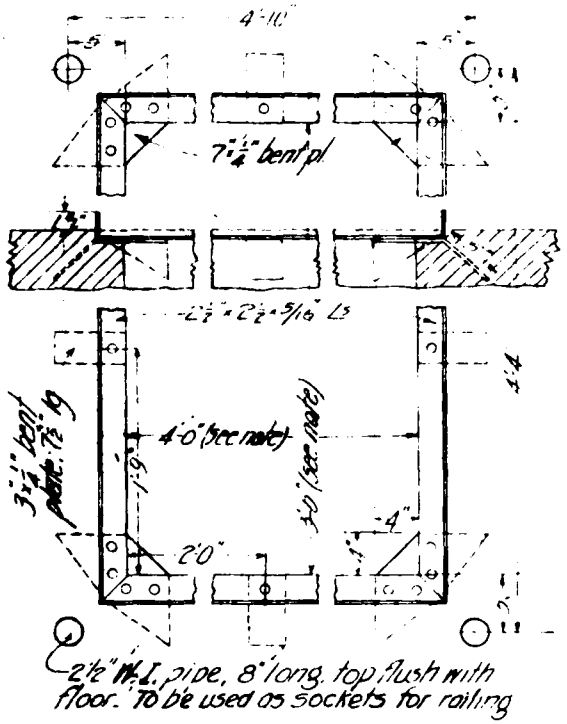
[illegible] Water Supply System for

Wingdale Prison

CROSS SECTIONS & DETAILS OF DAM

Scales as indicated

March 2 [illegible]

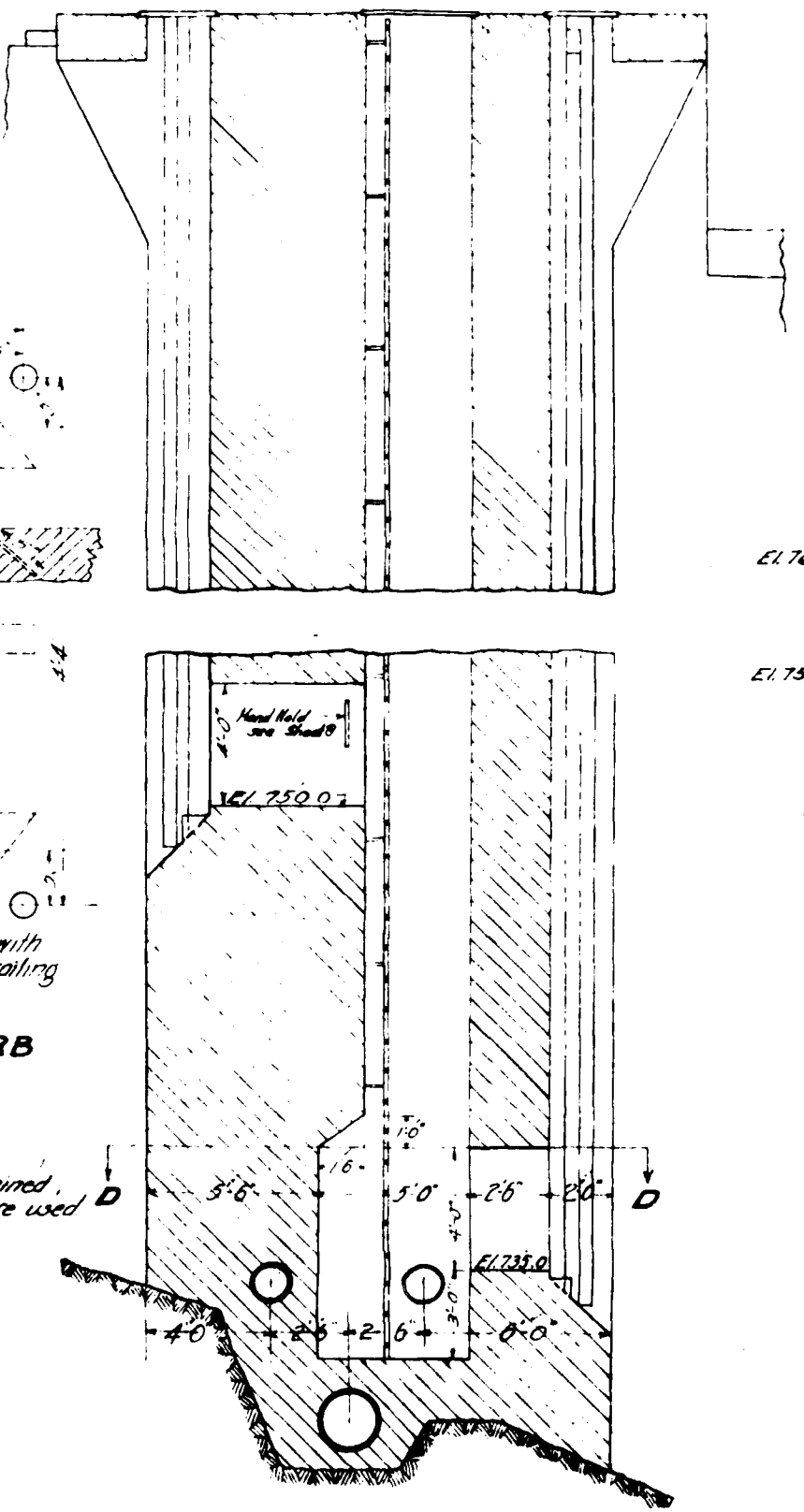


DETAIL OF WELL CURB
2-SETS REQUIRED.

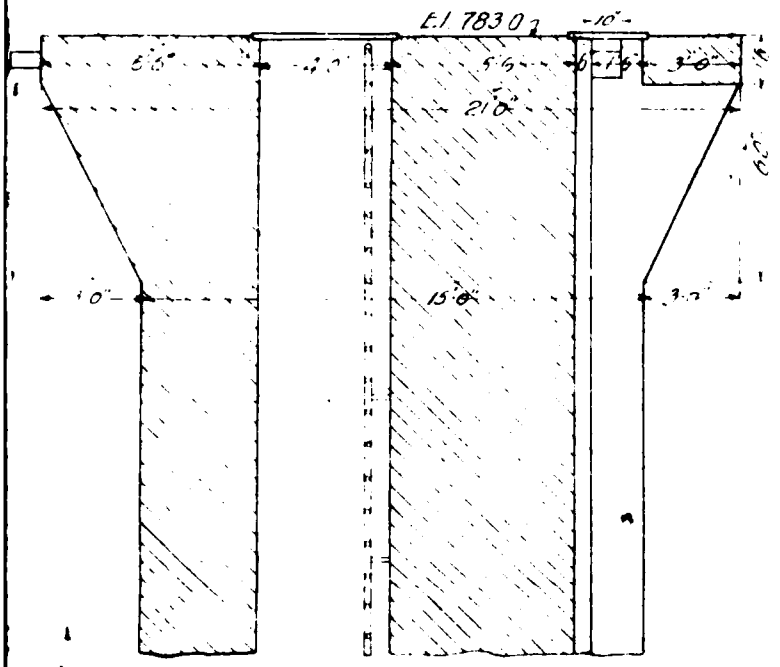
SCALE 1½" = 1'

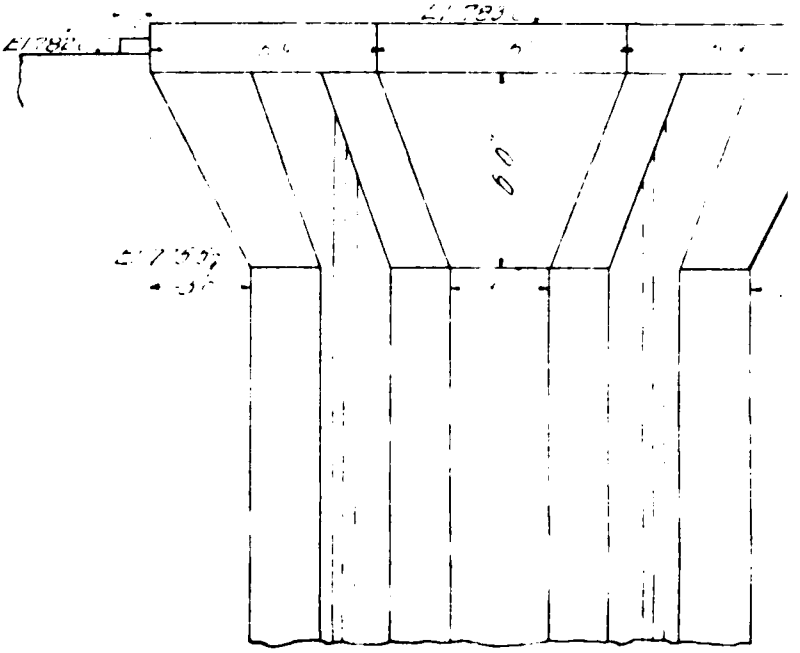
NOTE: These dimensions to be maintained, if angles of a different size are used

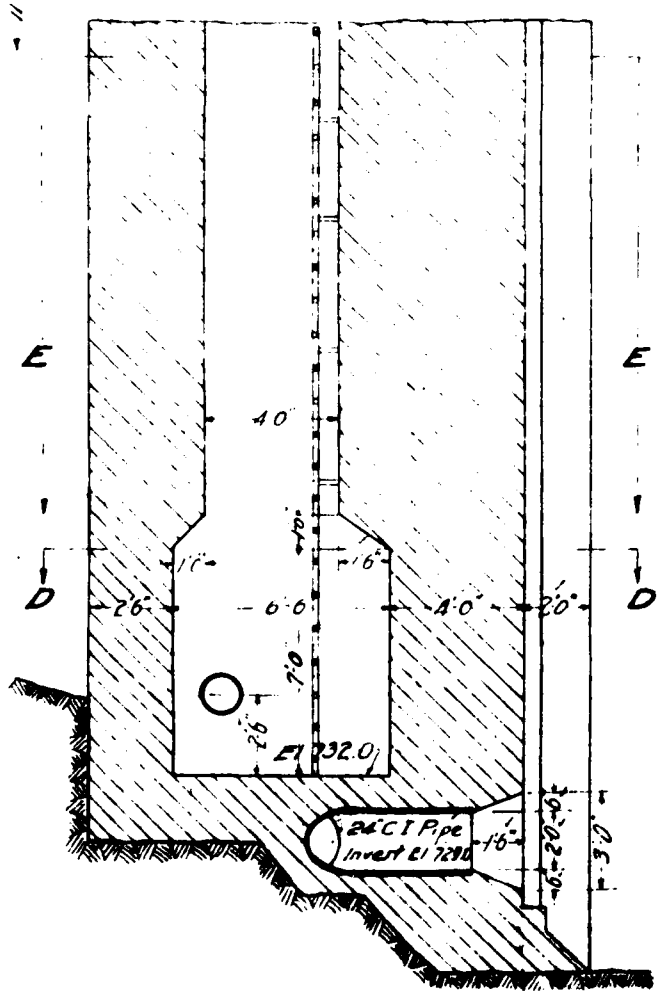
For detail of Gate Recess Curb see sheet No. 8.



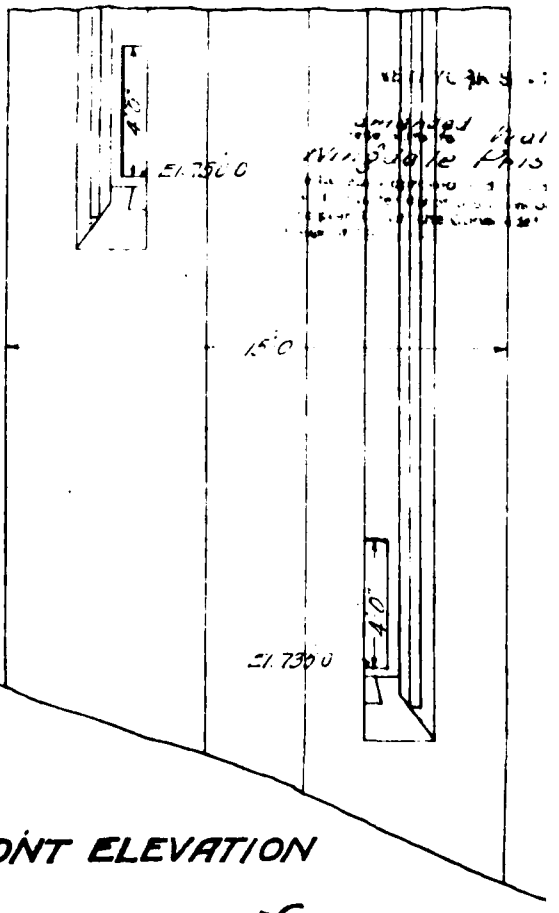
SECTIONAL ELEVATION B-B



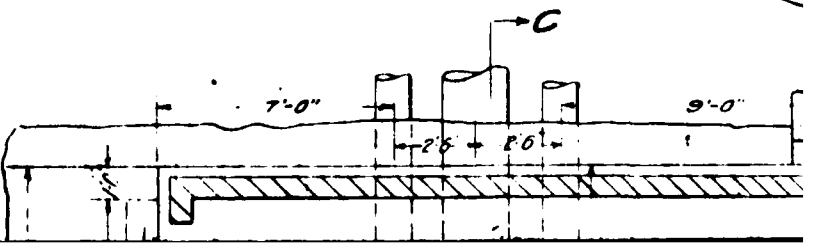


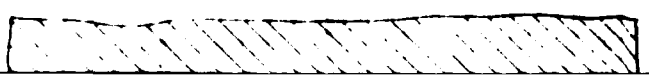


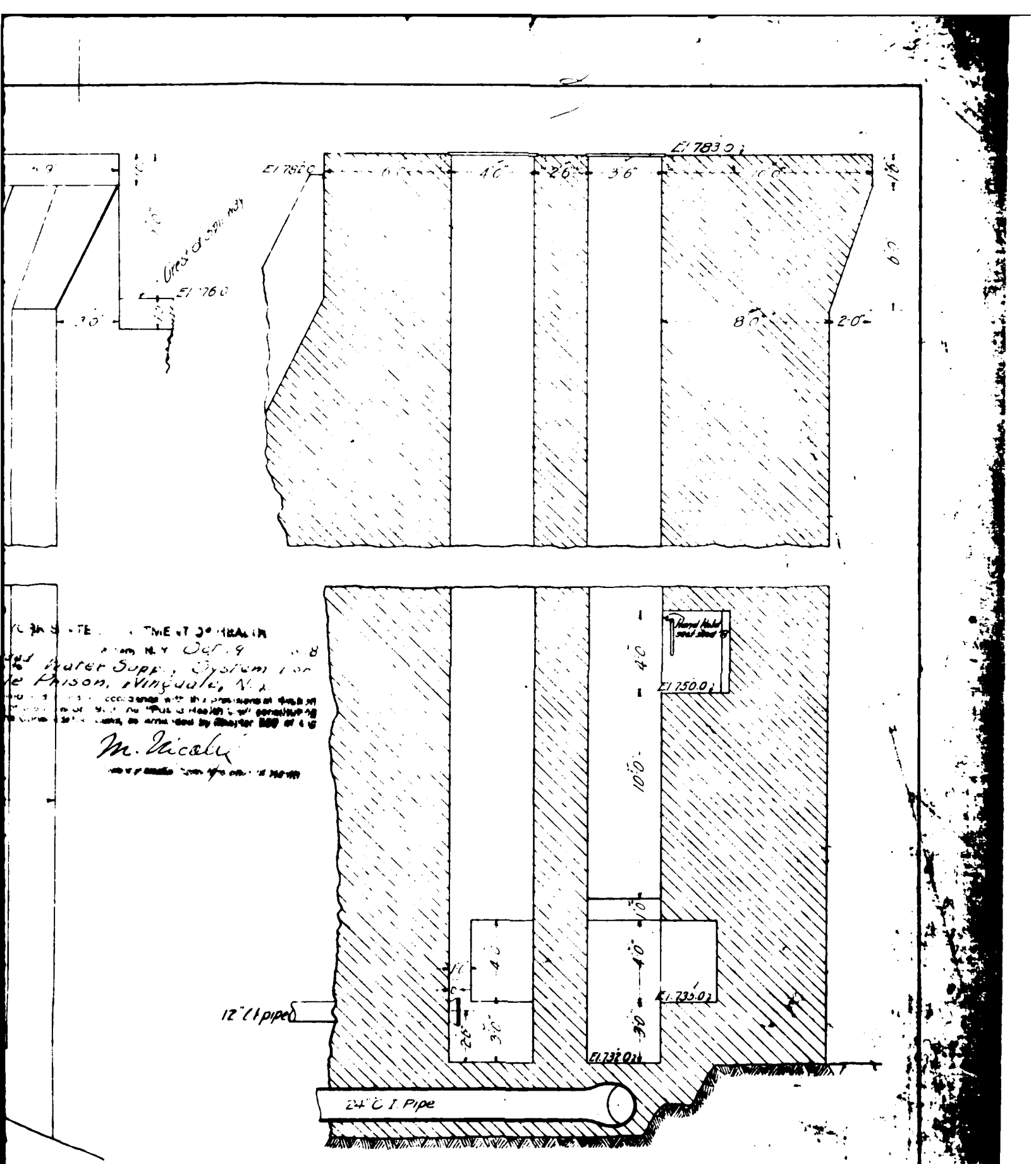
SECTIONAL ELEVATION A-A



FRONT ELEVATION







SECTIONAL ELEVATION C-C

For embedded metal see sheet No 8.
All concrete shown on this sheet shall be [illegible] class.
The base of the structure shown on this plan shall

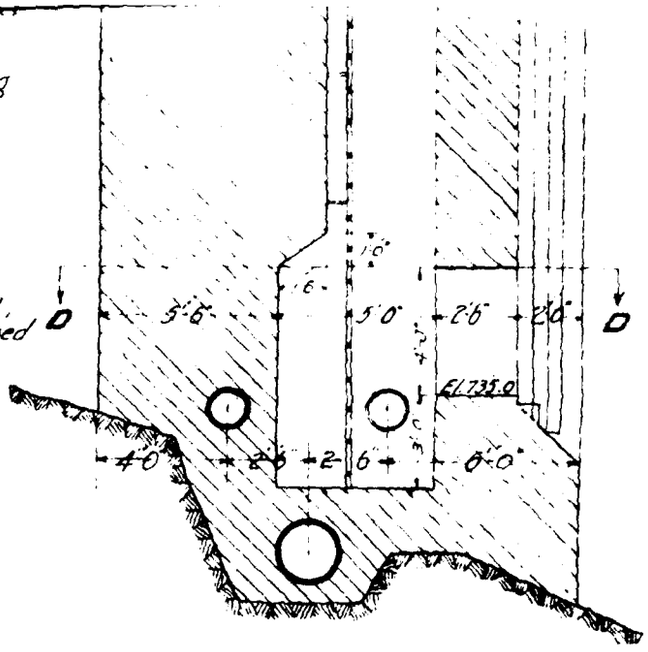
2½ W.I. pipe, 8' long, top flush with floor. To be used as sockets for railing

DETAIL OF WELL CURB
2-SETS REQUIRED.

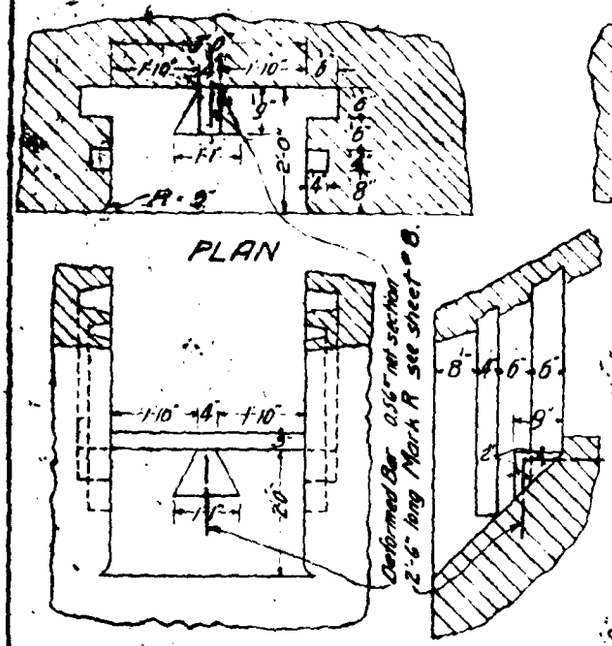
SCALE 1" = 1'

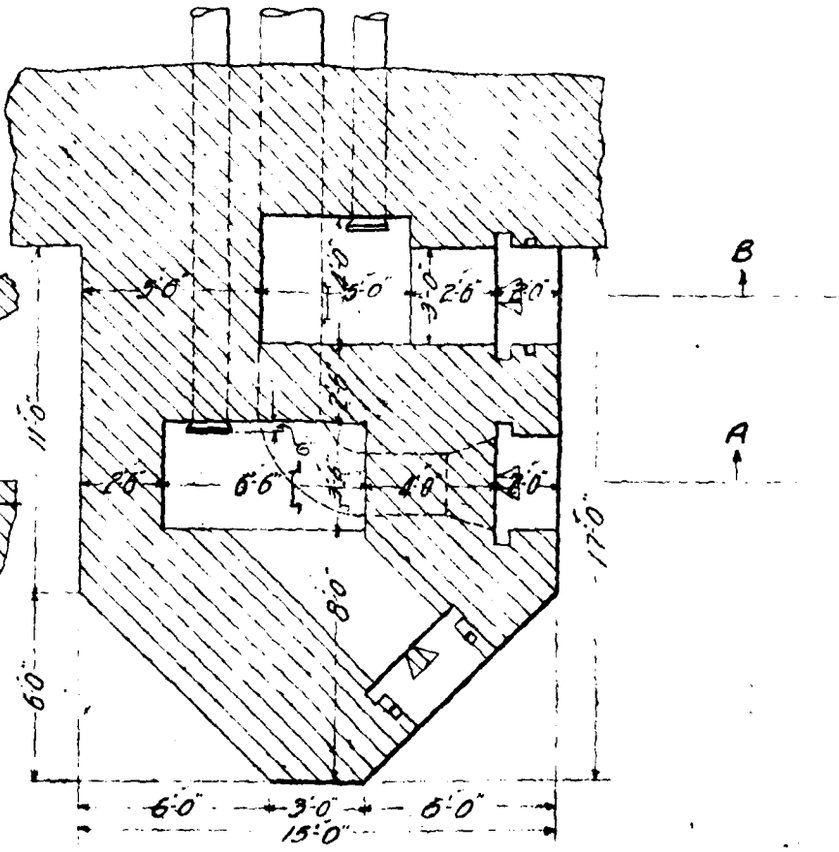
Note: These dimensions to be maintained, if angles of a different size are used

For detail of Gate Recess Curb see sheet No. 8.



SECTIONAL ELEVATION B-B



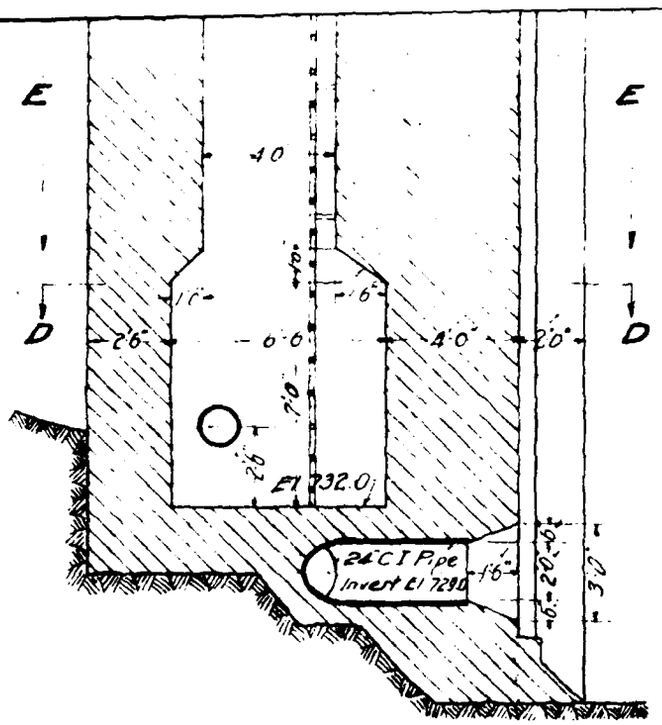


DETAIL OF RECESS FOR GATE AND SCREEN
SCALE ½" = 1'

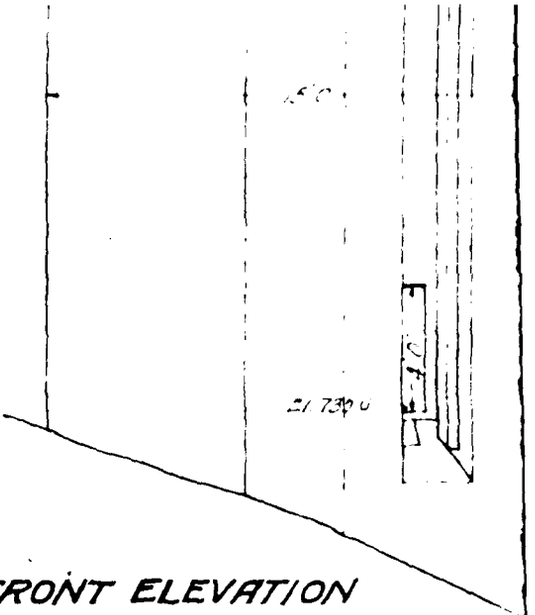
D-D

SECTIONAL PLAN BELOW EL. 739.0

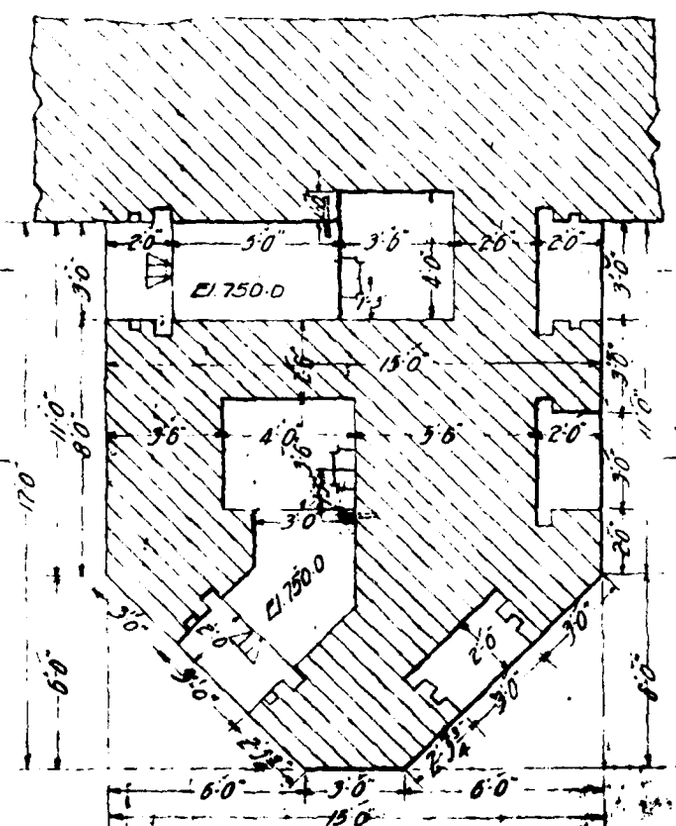
MADE BY G.E.S. Dec. 1917
TRACED BY M.E.S. Dec. 1917
CHECKED H.A.B. Jan 21-1918
CHECKED M.E.S. Feb. 19-1918 (Revisions)



SECTIONAL ELEVATION A-A

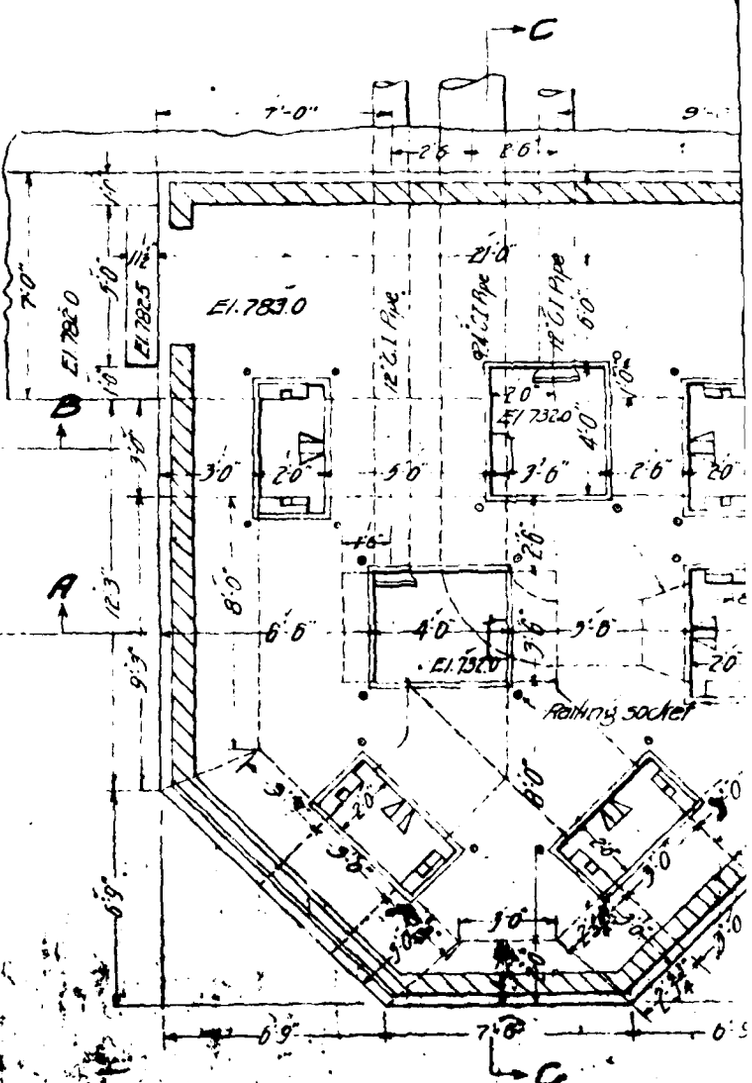


FRONT ELEVATION



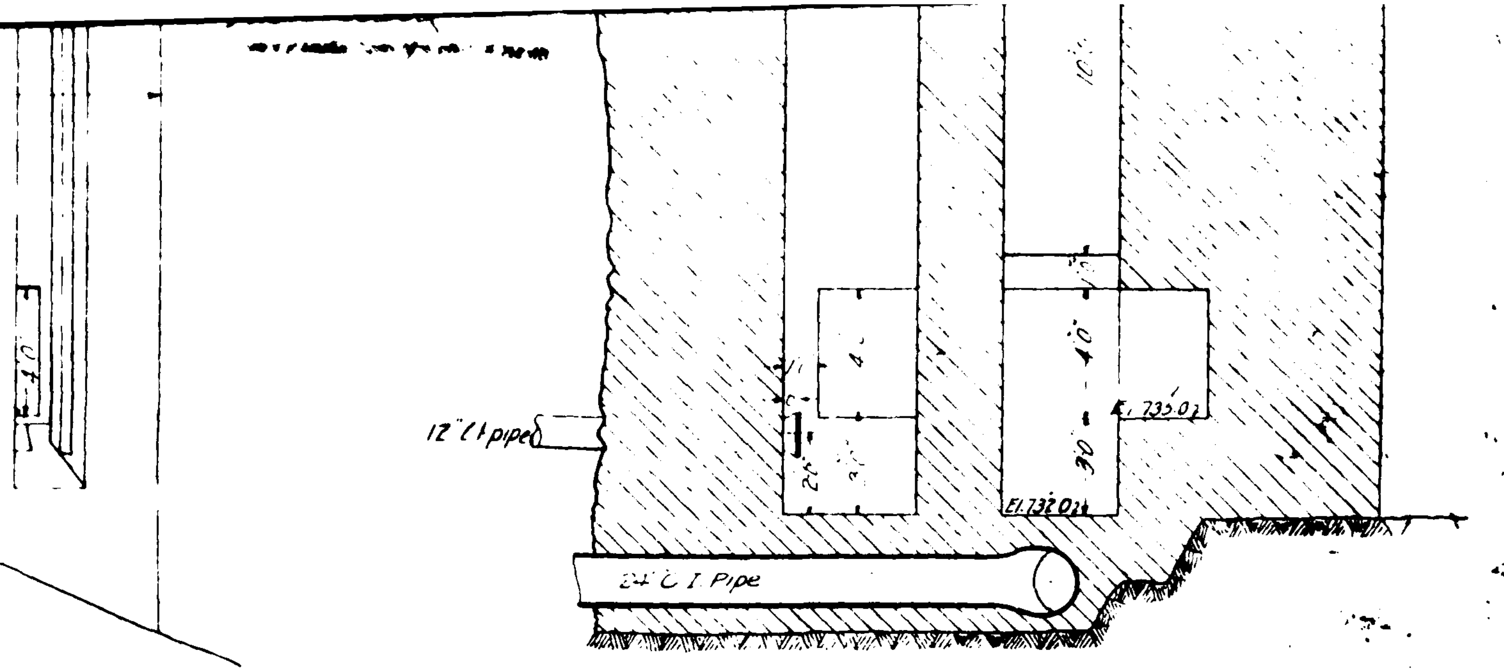
E-E

SECTIONAL PLAN EL. 754 TO EL. 740

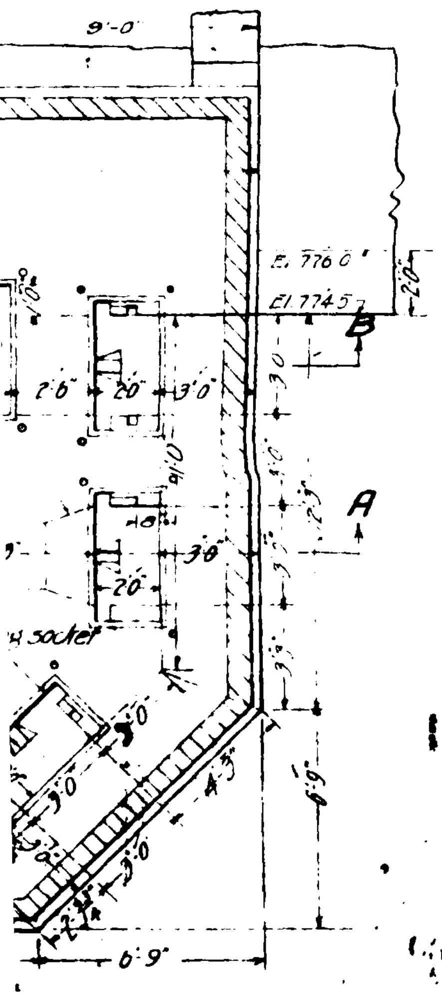


PLAN AT EL. 783.0

Details of gate house superstruc



SECTIONAL ELEVATION C-C



For embedded metal see sheet Nº 8.
All concrete shown on this sheet shall be 2nd class.

The base of the structure shown on this plan shall be considered as approximate only and in order to secure a proper foundation shall be of such dimensions and at such elevations as may be directed by the engineer.

March 4, 8.
Water Supply System for Wingdale Prison, Wingdale, N.Y.

M. Nicoll
Deputy

STATE OF NEW YORK

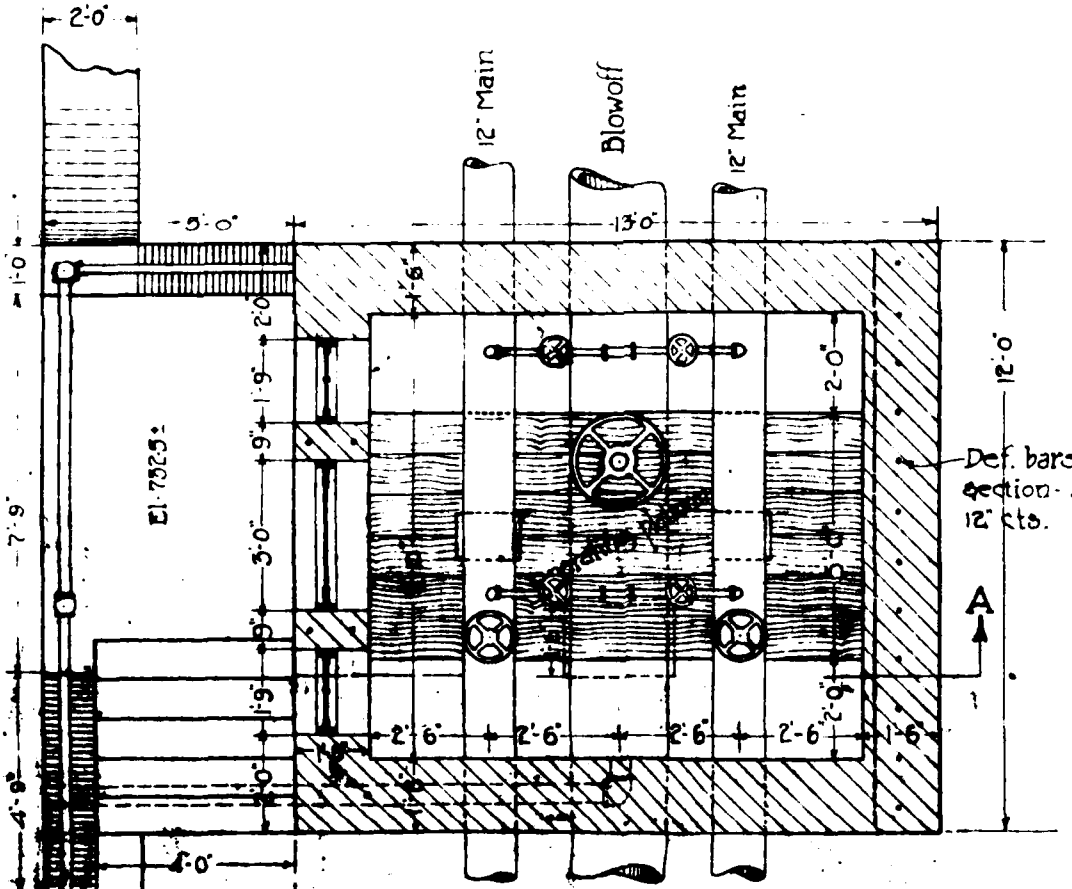
Dam and Water Supply System for Wingdale Prison

GATE HOUSE SUBSTRUCTURE

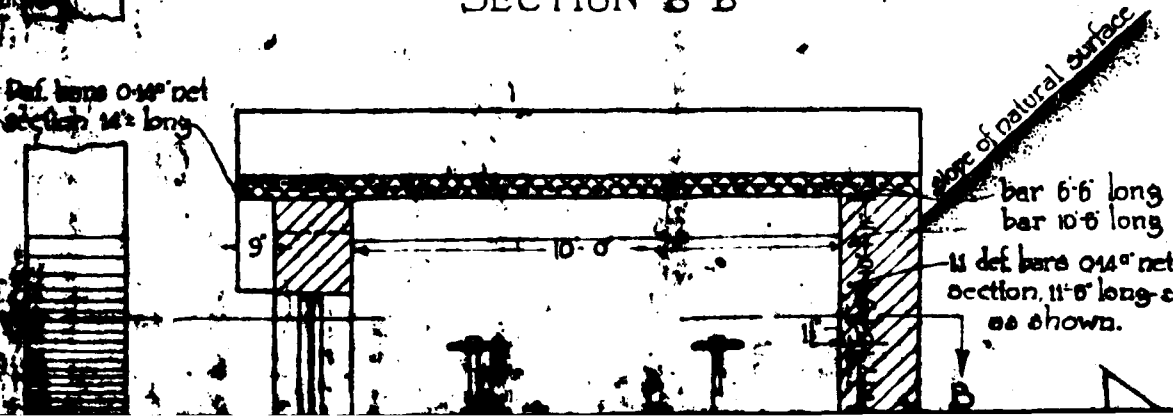
March 2 8.

3.0

superstructure see sheet Nº 9.

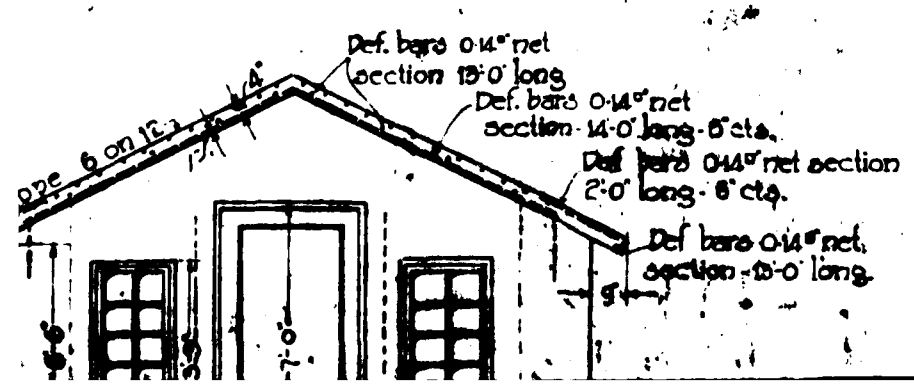


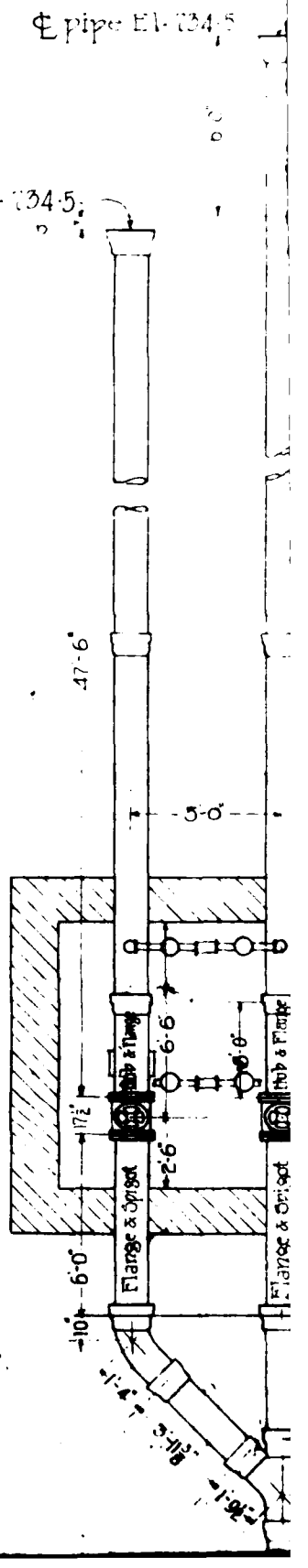
SECTION B-B

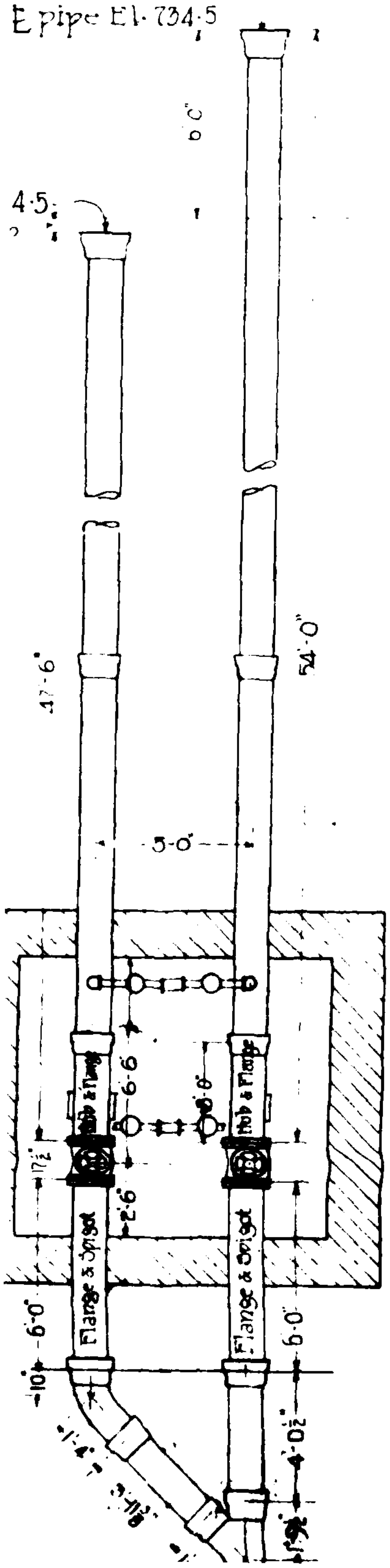


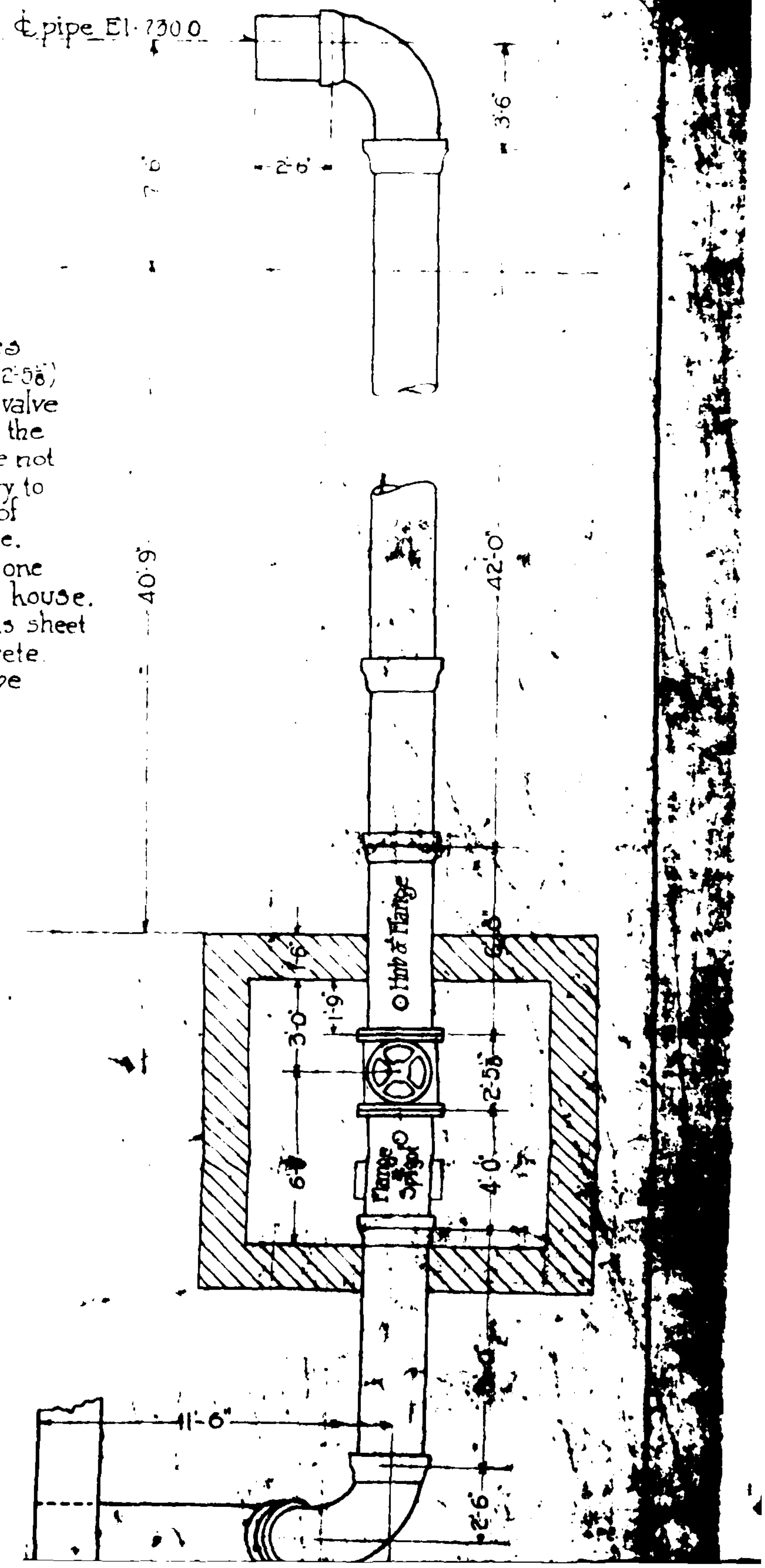
NOTE
The
ered as a
foundation
as may be
One
Two
Water
shall be
Floor
removable
All cast
Class "B"

: base of the structure shown on this sheet shall be consid-
is approximate only and in order to secure a proper
ion shall be of such dimensions and at such elevations
be directed by the Engineer.
: heavy wood door required for masonry opening of 3'-7".
fixed windows required for masonry opening of 1'-9" × 3'-9".
terproofing compound satisfactory to the Engineer
e mixed with concrete used in roof.
oor of operating platform shall be so constructed as to be
able in order to give access to pipes and valves.
cast iron pipe shown on this sheet shall be Class "A", 24" specials
5" and 12" specials Class "D".





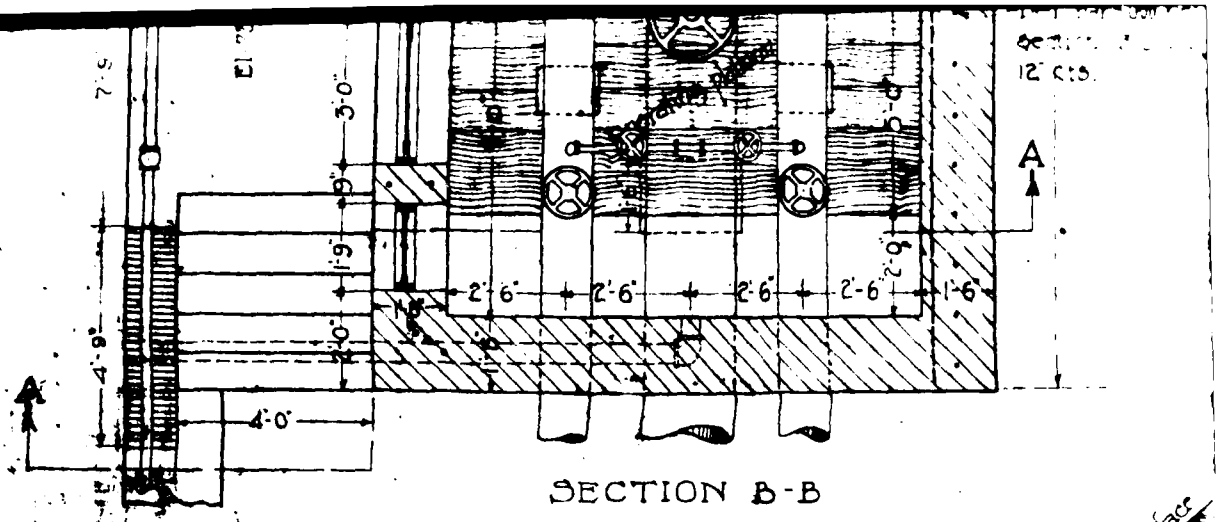




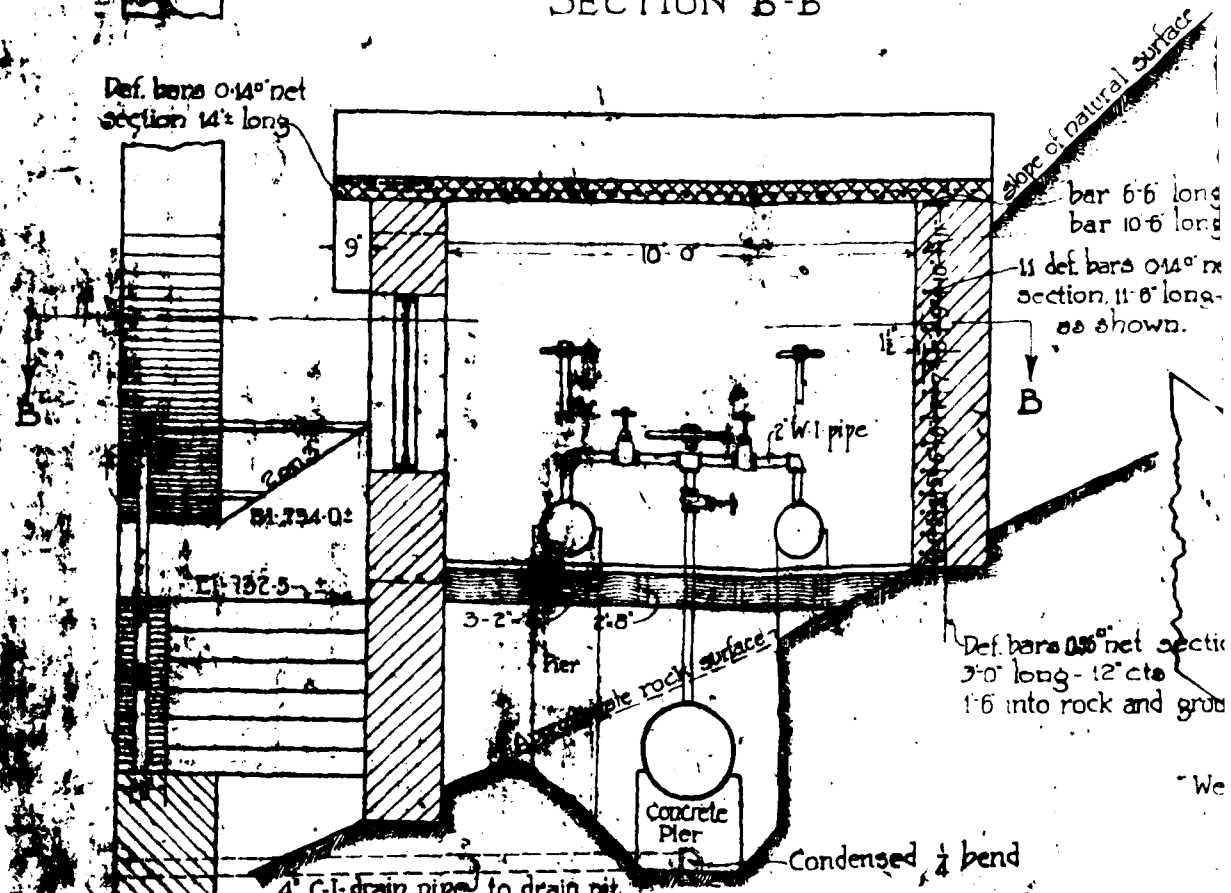
NOTE — Dimensions of valves between flange faces (17½ and 2-5⅝) were taken from a standard valve catalog. If the dimensions of the valves used on the work are not the same, it will be necessary to modify the relation of center of valves to walls of valve house.

Lay pipes to a grade of one per cent from dam to valve house.

All masonry shown on this sheet shall be second class concrete, excepting roof, which shall be reinforced concrete.



SECTION B-B



SECTION A-A

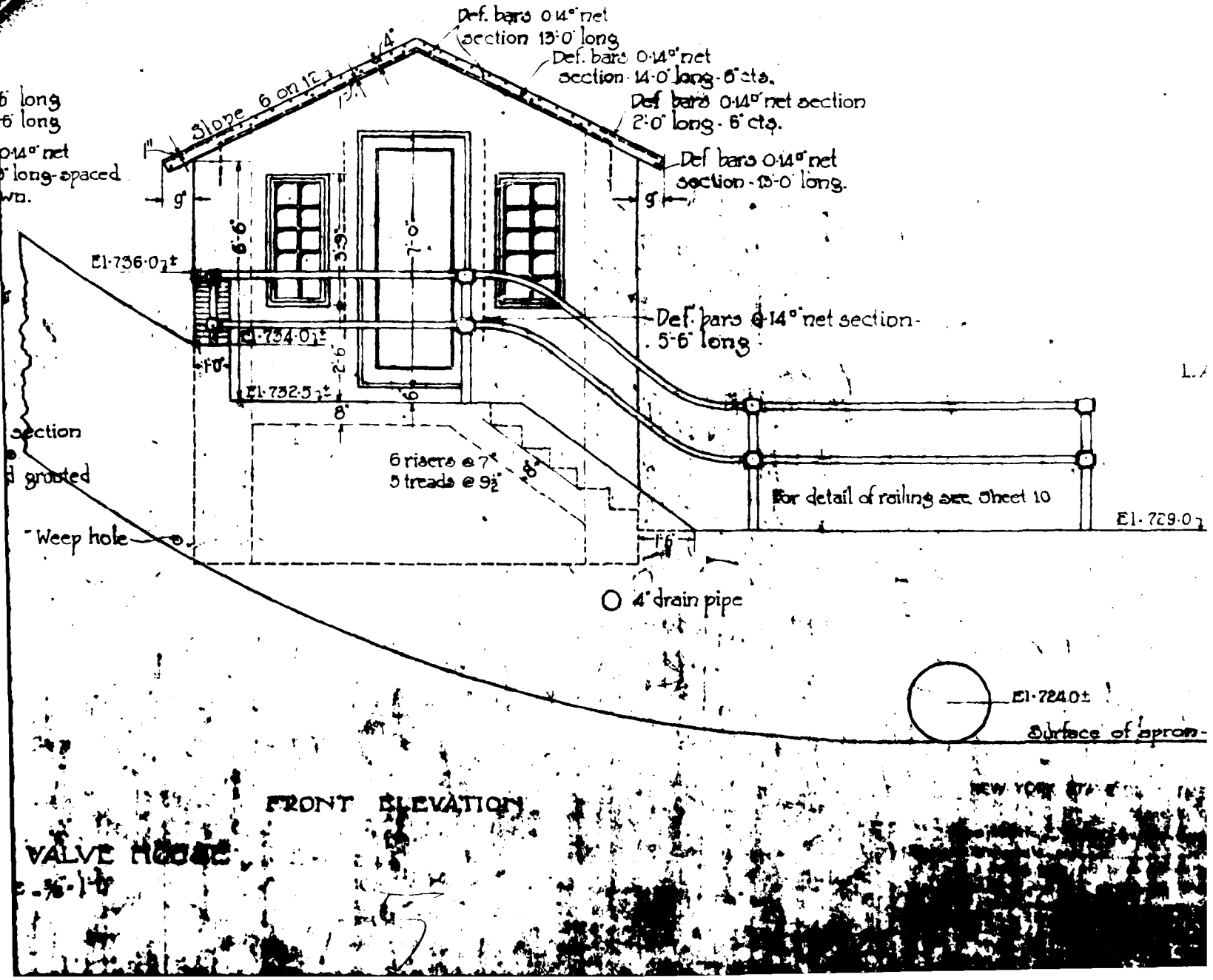
DETAILS OF WA

SCALE -

waterproofing compound satisfactory to the Engineer shall be mixed with concrete used in roof.

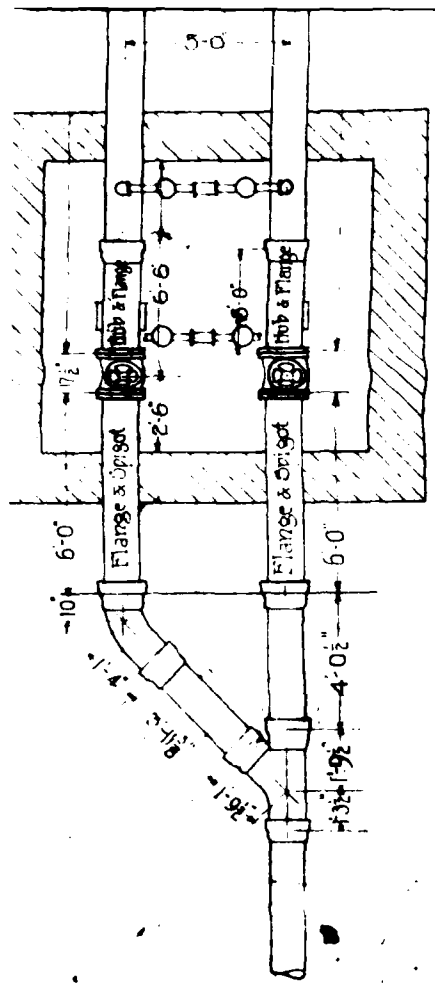
Floor of operating platform shall be so constructed as to be removable in order to give access to pipes and valves.

All cast iron pipe shown on this sheet shall be Class "A", 24" specials Class "B" and 12" specials Class "D".

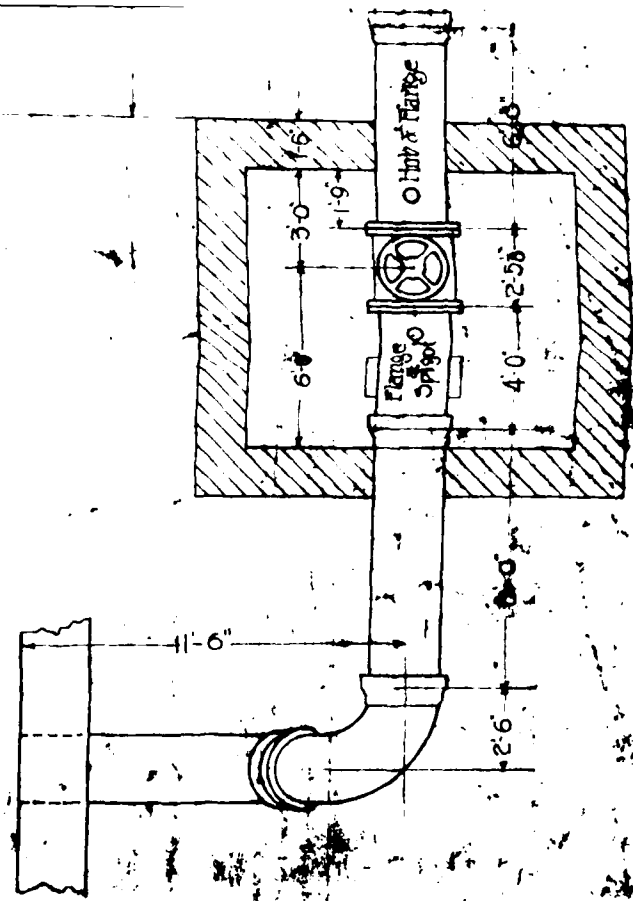


FRONT ELEVATION

VALVE HOUSE



LAYOUT OF 12" PIPE



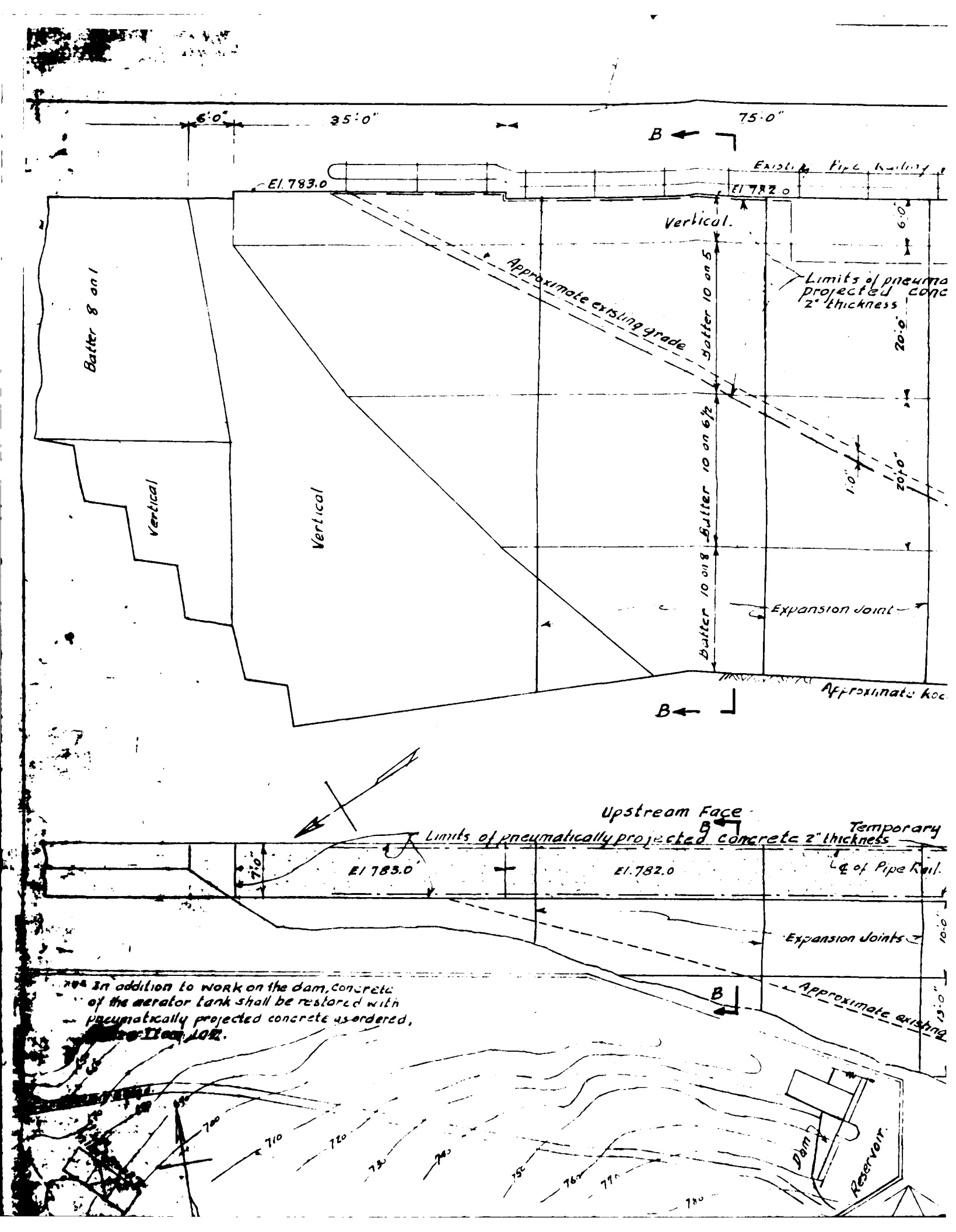
LAYOUT OF 24" PIPE

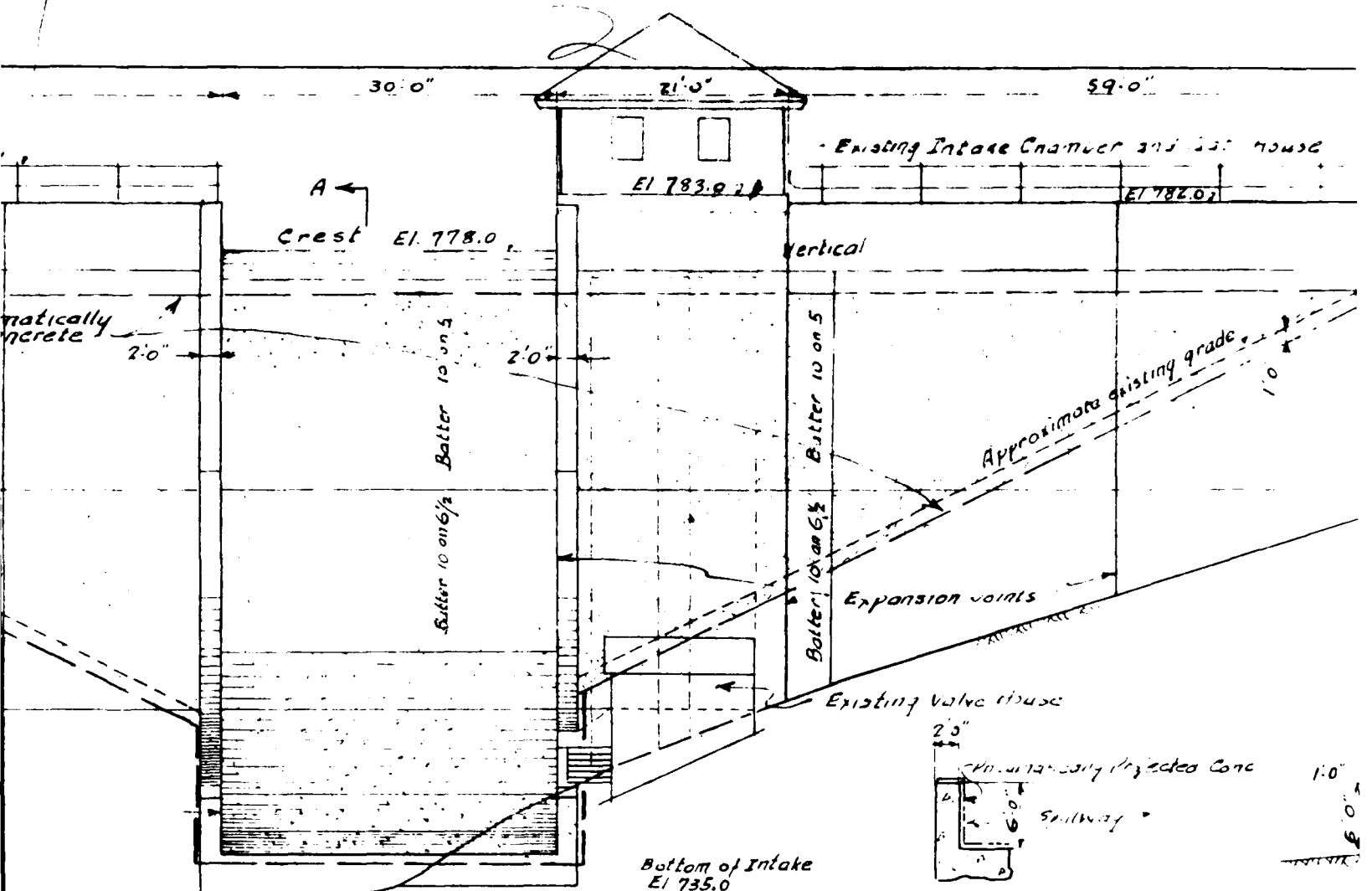
SCALE 1"-1-0"

NEW YORK STATE DEPARTMENT OF PUBLIC WORKS

amended

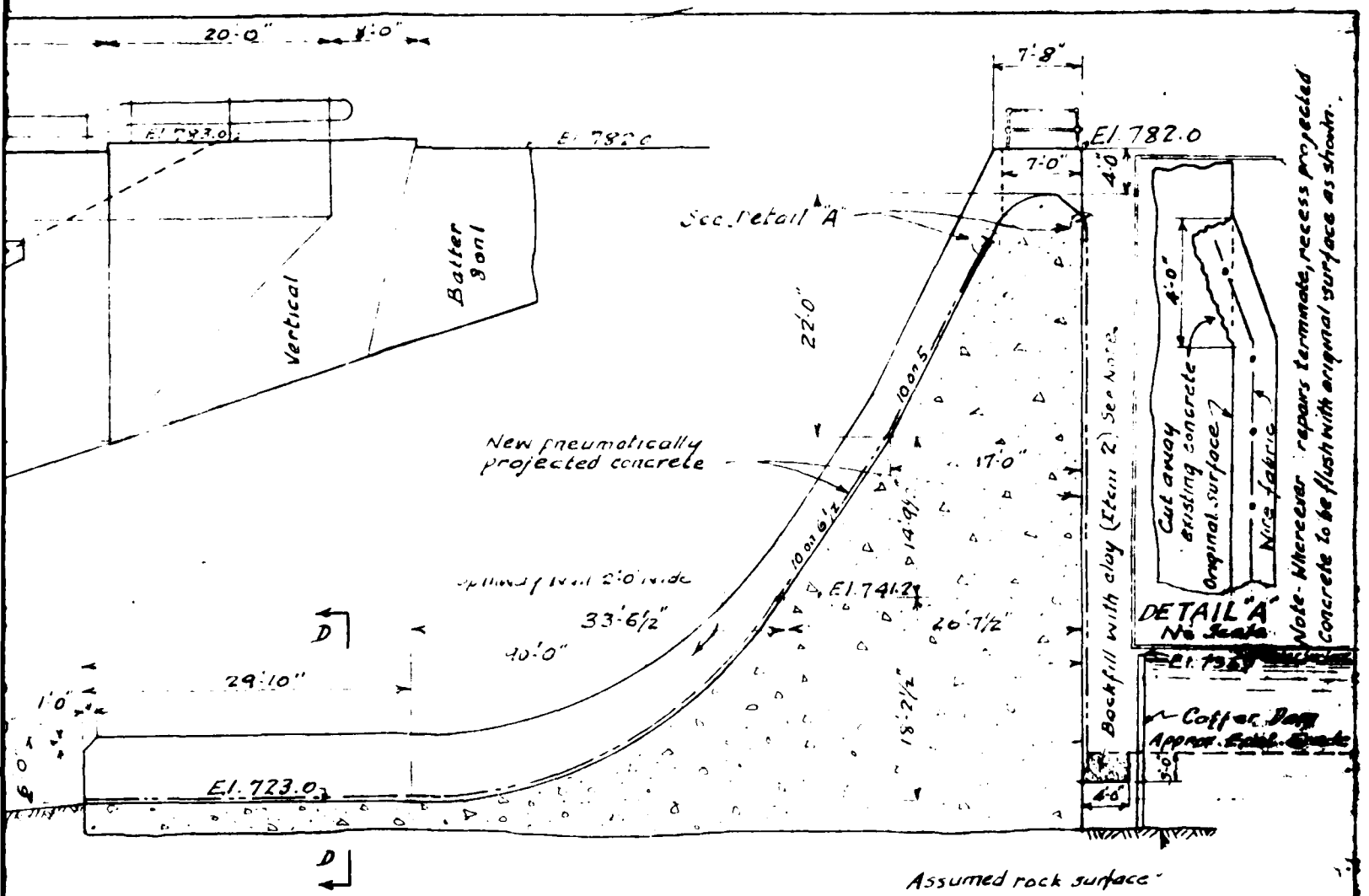
Dam and


6'-0"
35'-0"
75'-0"
B
Existing Pipe Railing
El. 783.0
El. 782.0
Vertical.
6'-0"
Batter 8 on 1
Approximate existing grade
Batter 10 on 5
Limits of pneumatically projected concrete 2" thickness
20'-0"
Vertical
Vertical
Batter 10 on 6½
1'-0"
20'-0"
Batter 10 on 8
Expansion Joint
Approximate rock
B
Upstream Face
B
Temporary
Limits of pneumatically projected concrete 2" thickness
7'-0"
El. 783.0
El. 782.0
℄ of Pipe Rail.
Expansion Joints
10'-0"
Approximate existing
B
13'-0"
In addition to work on the dam, concrete of the aerator tank shall be restored with pneumatically projected concrete as ordered, [illegible] Dec. 10th.
700
710
720
730
740
750
760
770
780
Dam
Reservoir

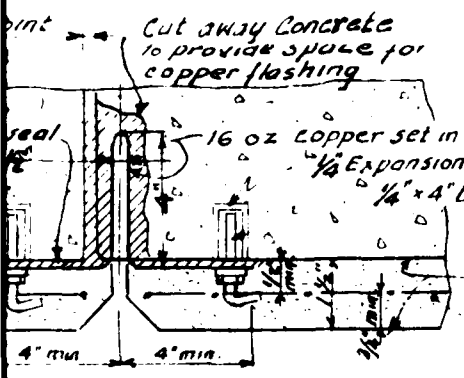


NOTE

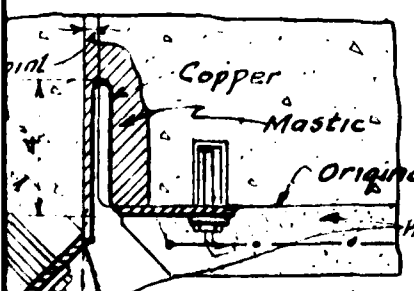
Limits of application of pneumatically projected concrete as shown are approximate only. Actual limits shall be as determined by the Engineer in the field.



SECTION A-A



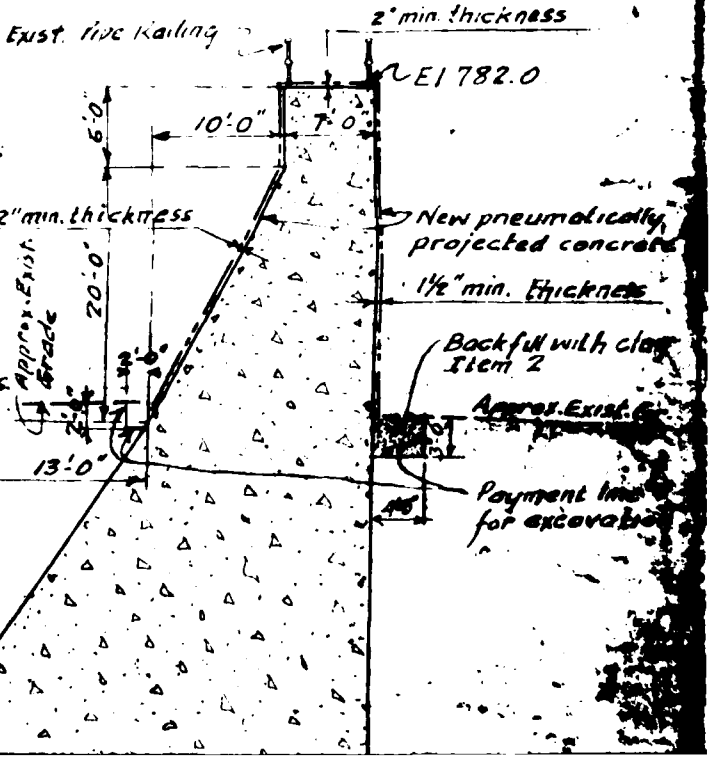
PLAN
STRAIGHT JOINT

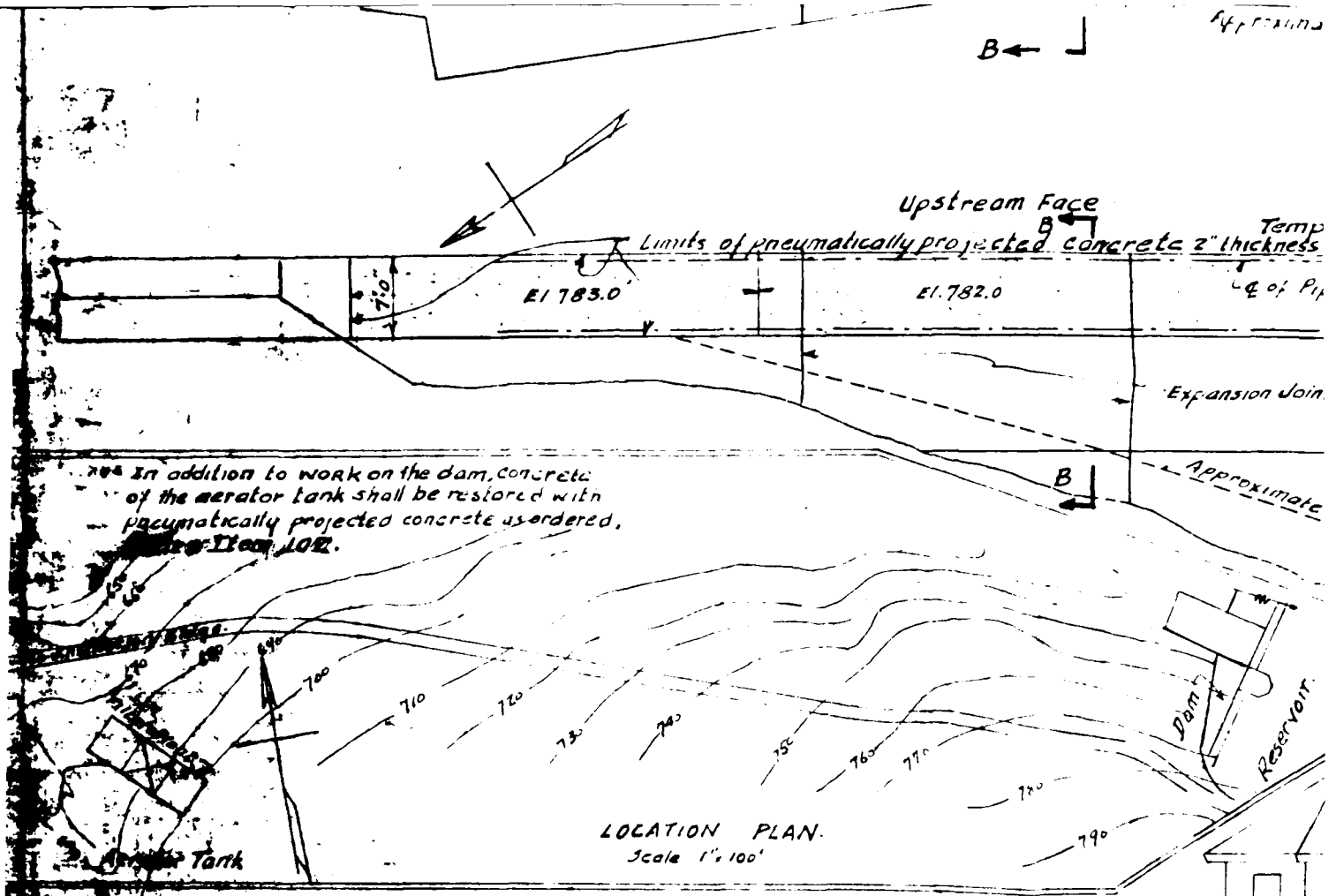


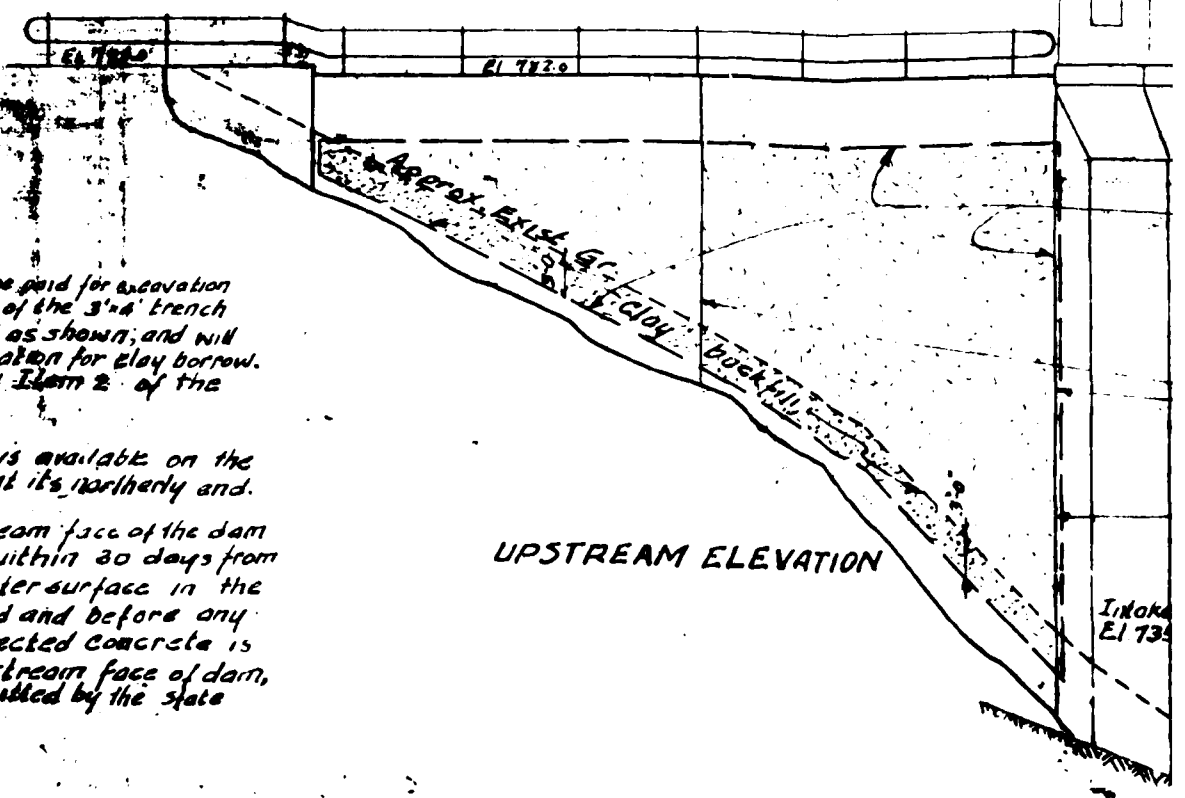
See notes on straight joint

PLAN
AT CORNER JOINTS

Note - Method for sealing vertical expansion joints is suggested for the guidance of the Contractor and the Engineer, but other methods may be submitted by the Contractor for approval by State Architect.





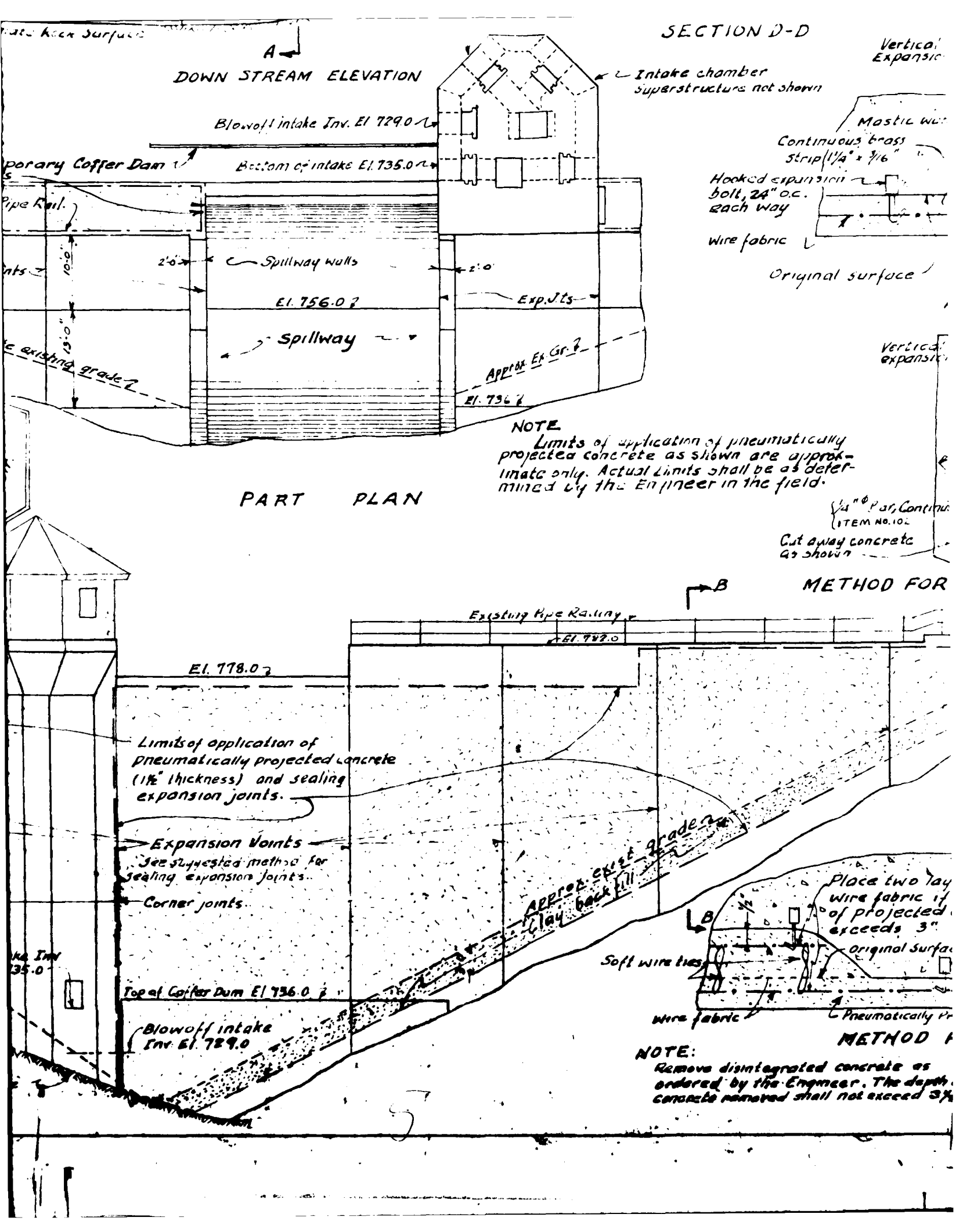


NOTE:

The Contractor will be paid for excavation within the payment lines of the 3'x4' trench and the core trench as shown, and will also be paid for excavation for clay borrow. See Section 2.18 of Item 2 of the Specifications.

Clay for backfill is available on the Institution property at its northerly end.

Work on the upstream face of the dam shall be completed within 30 days from the time that the water surface in the reservoir is lowered and before any pneumatically projected concrete is placed on the downstream face of dam, unless otherwise permitted by the State Architect.


SECTION D-D
A
DOWN STREAM ELEVATION
Intake chamber superstructure not shown
Blowoff intake Inv. El 729.0
Bottom of intake El. 735.0
Pipe Rail.
Spillway walls
El. 756.0
Exp. Jts
Spillway
Approx Ex Gr.
El. 736
NOTE
Limits of application of pneumatically projected concrete as shown are approximate only. Actual limits shall be as determined by the Engineer in the field.
PART PLAN
B
Existing Pipe Railing
El. 778.0
Limits of application of pneumatically projected concrete (1½" thickness) and sealing expansion joints.
Expansion Joints
See suggested method for sealing expansion joints.
Corner joints.
Approx. exist. grade
Lay back fill
Top of Cofferdam El 736.0
Blowoff intake Inv. El. 729.0
Soft wire ties
Wire fabric
Original Surface
METHOD
NOTE:
Remove disintegrated concrete as ordered by the Engineer. The depth
Mastic
Continuous brass strip (1¼" x 3/16"
Hooked expansion bolt, 24" o.c. each way
Wire fabric
Original surface
Cut away concrete as shown
ITEM NO. 102

HARLEM VALLEY STATE HOSPITAL

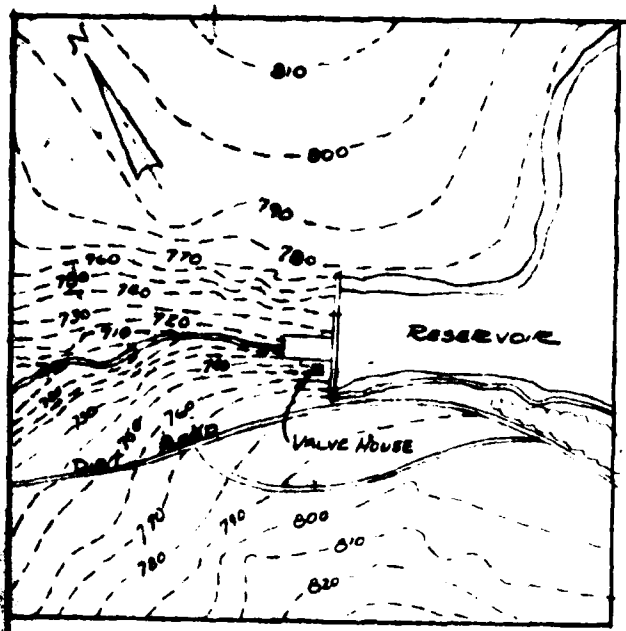
WINGDALE — NEW YORK.

Drawn By J.P.C.	GENERAL ENGINEERING	Project No. 13[illegible]
Checked By M.J.F.T.	IMPROVEMENT TO WATER SUPPLY	Spec. No. 13[illegible]GE
Traced By J.P.C.	REPAIRS TO DAM.	Scale [illegible]
Tr'ing Ch'kd By M.J.F.T.	PLAN, SECTIONS AND DETAILS	Date Aug. 15, 195[illegible]
Field Check By Letter F.P.S.A.D. G.G.S. 9-7-58	STATE OF NEW YORK DEPARTMENT OF PUBLIC WORKS DIVISION OF ARCHITECTURE. C.W. LARSON, STATE ARCHITECT	Drwg. No. 56/5017
Approved By J.C.B.		

Approved By Letter #30477 P.F.O. to D.W.L.

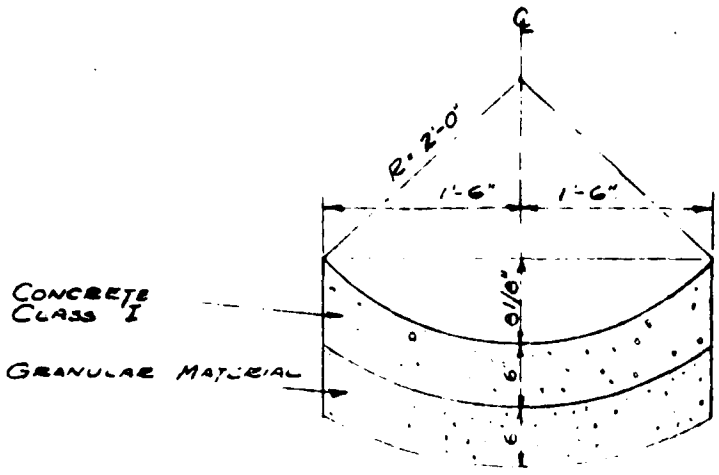
Dated October 29, 1958

16



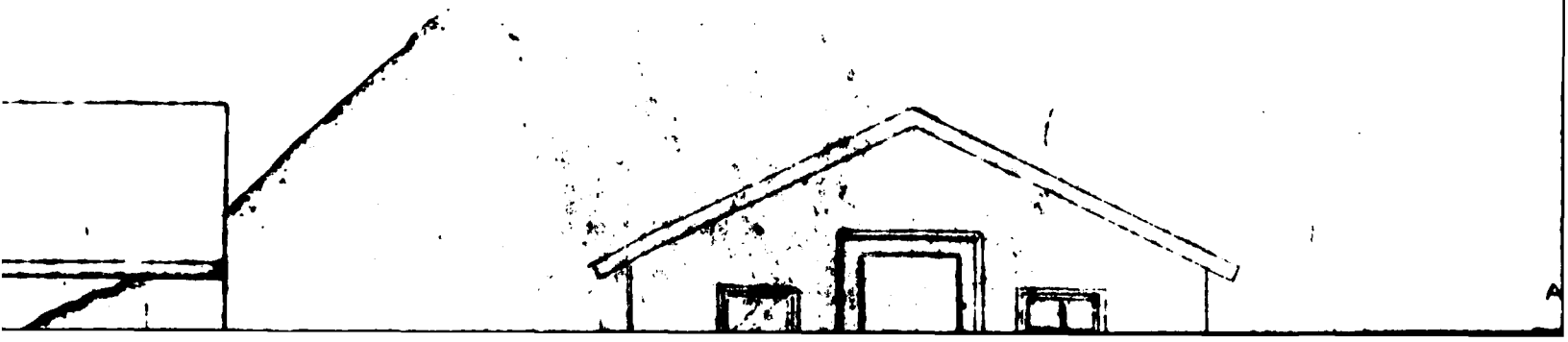
PLOT PLAN
SCALE 1"=100'

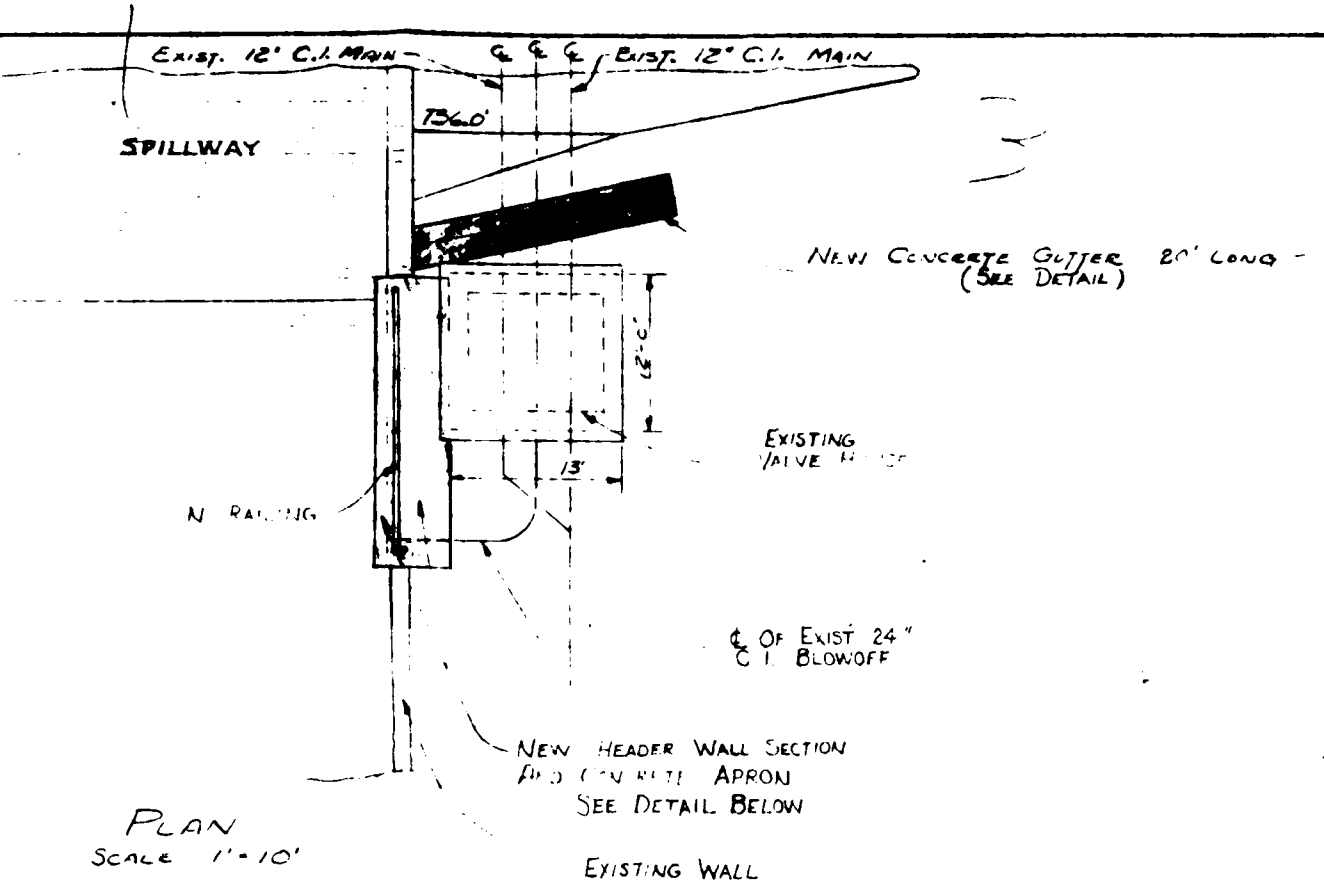
EX. VALVE HOUSE



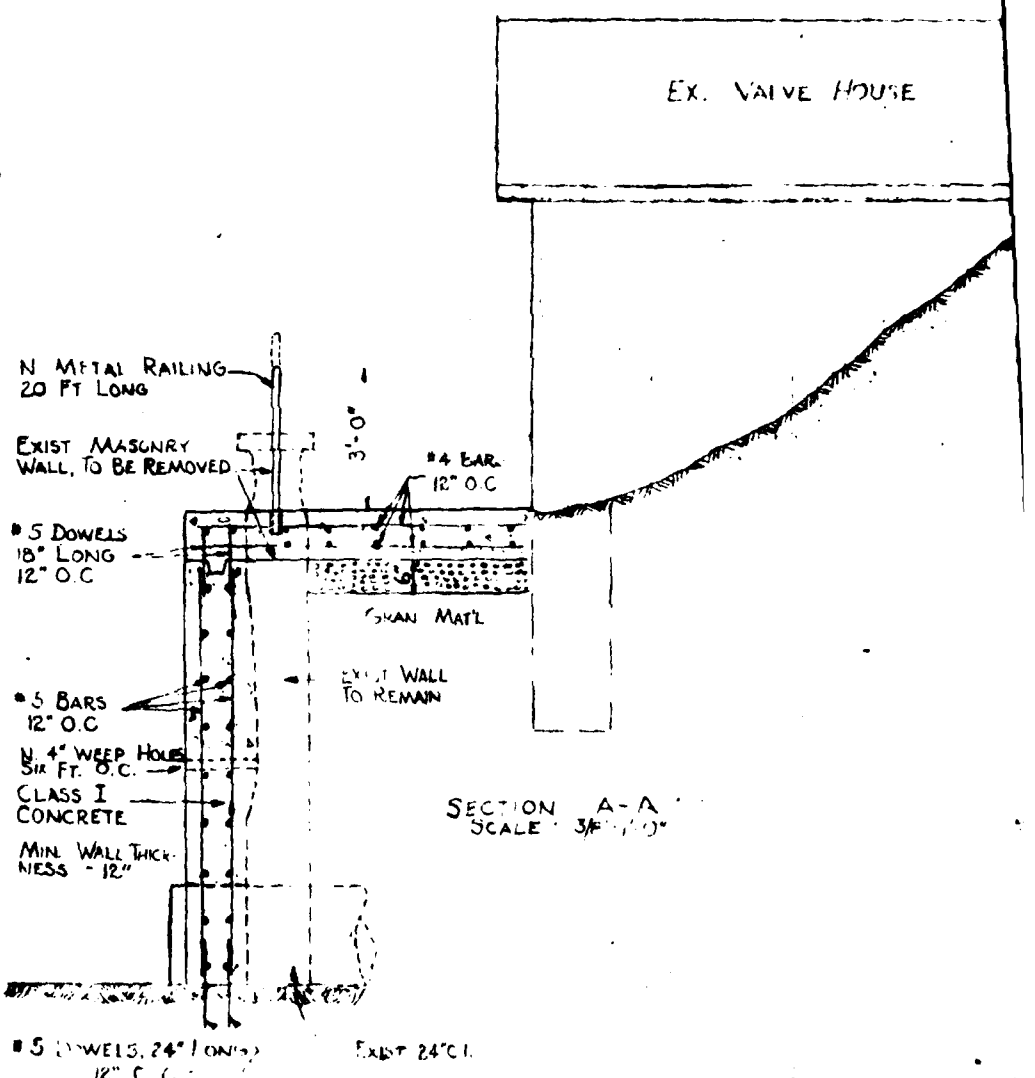
CONCRETE GUTTER DETAIL

NO SCALE

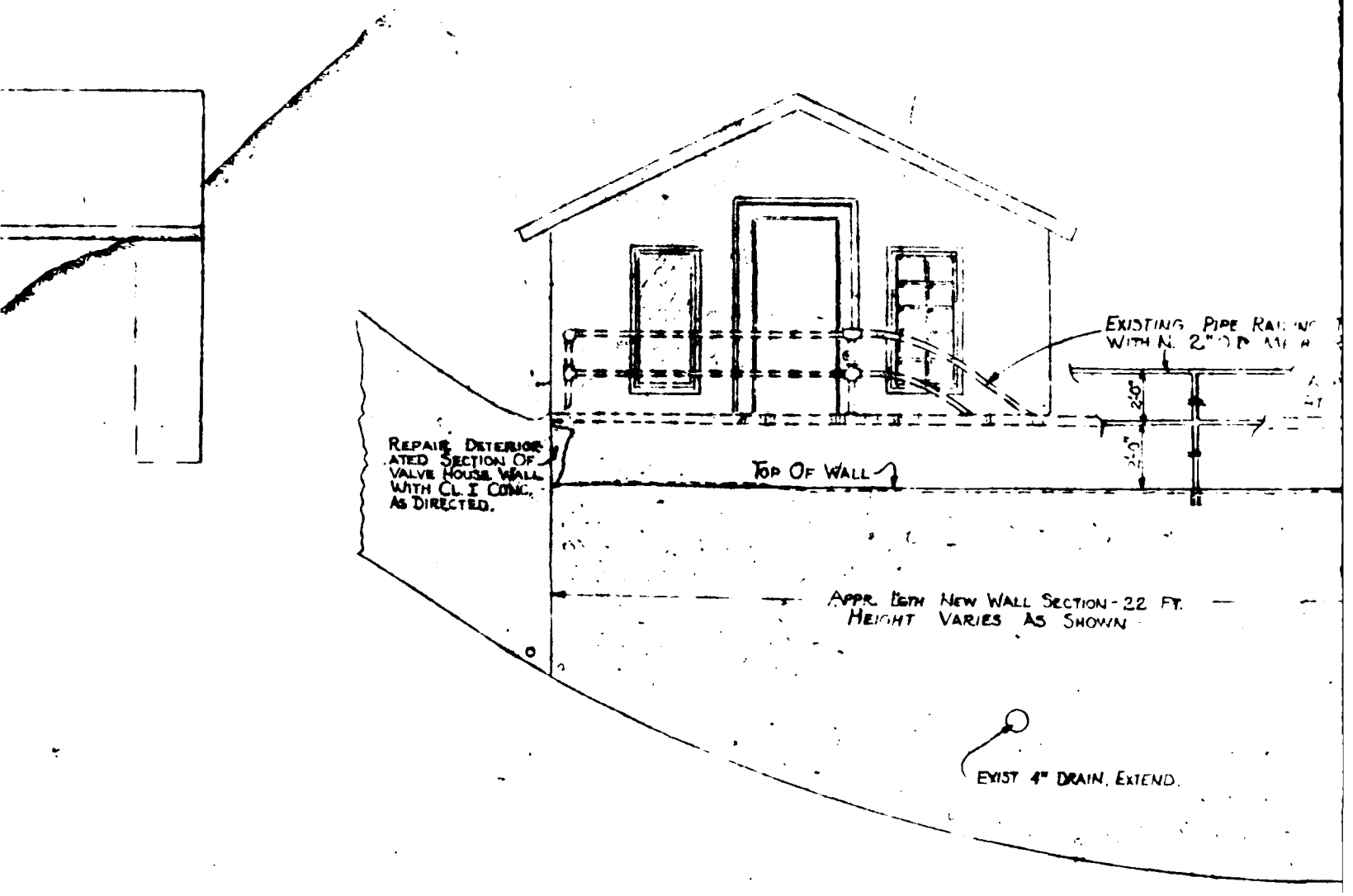




PLAN
SCALE 1"=10'

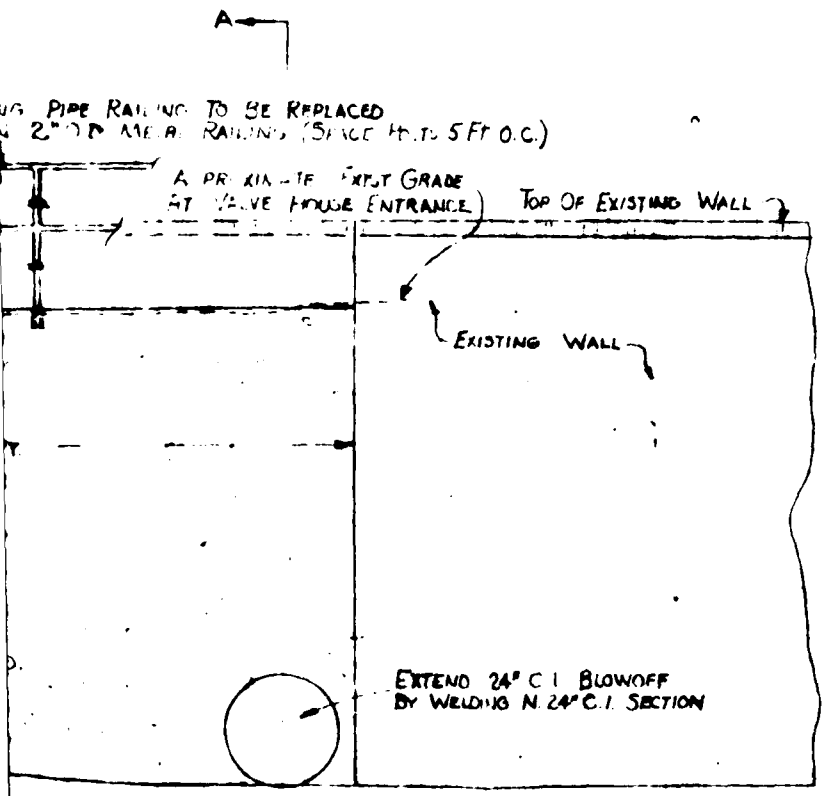


SECTION A-A
SCALE: 3/4"=1'-0"



ELEVATION SCALE: 3/8" = 1'-

5



HARLEM VALLEY STATE HOSPITAL

WINGDALE NEW YORK

REPAIR DAM AND VALVE HOUSE AND APPURTENANT WORK

GENERAL ENGINEERING

PLOT PLAN, SECTIONS AND DETAILS

STATE OF NEW YORK EXECUTIVE DEPARTMENT
OFFICE OF GENERAL SERVICES
BUILDING DESIGN AND CONSTRUCTION
C V R SCHUYLER COMMISSIONER
CHARLES S KAWECKI STATE ARCHITECT

DRAWN BY	DATE	SCALE	APPROVED BY
		AS SHOWN	
TRACED BY	CHECKED BY	STRUCTURAL CHECK	FIELD CHECK

APPROVED BY _____

DATED _____ LETTER NO _____

PROJECT NO	DRAWING NO
23439	70/5040
SPECIFICATION NO	
SF 23439 GE	

PHOTOGRAPHS

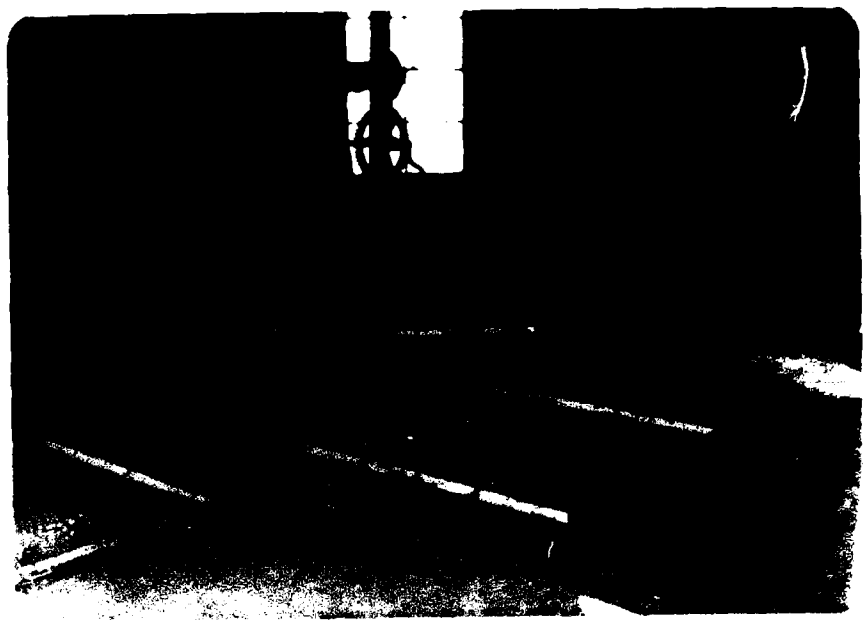
APPENDIX B

2. UPSTREAM VIEW OF DAM AND GATE HOUSE.

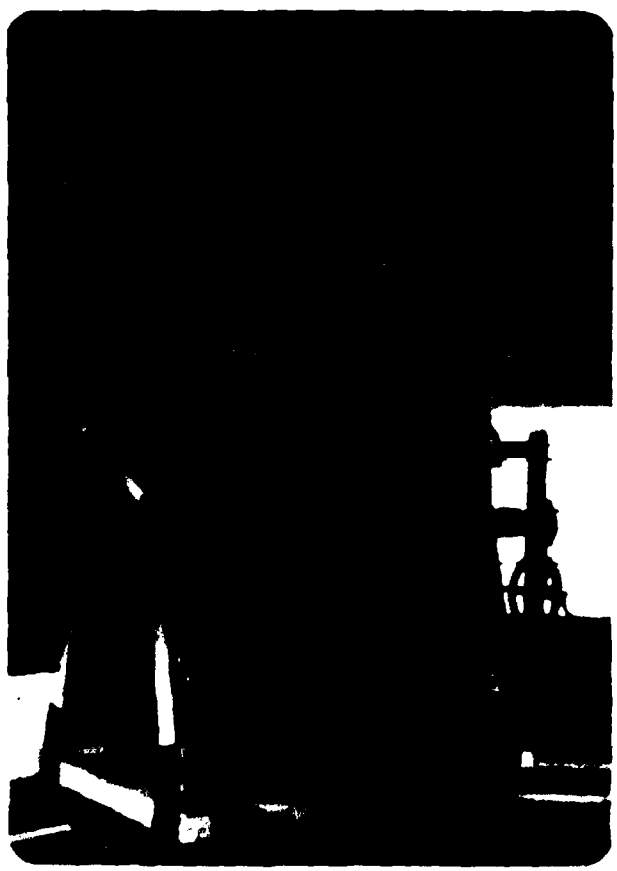
VIEW OF CREST OF SPILLWAY AND RIGHT ABUTMENT OF DAM.

4. DOWNSTREAM FACE OF SPILLWAY.
NOTE: MINOR SEEPAGE.

5. VIEW OF DOWNSTREAM FACE OF DAM
LEFT WING AND SPILLWAY.

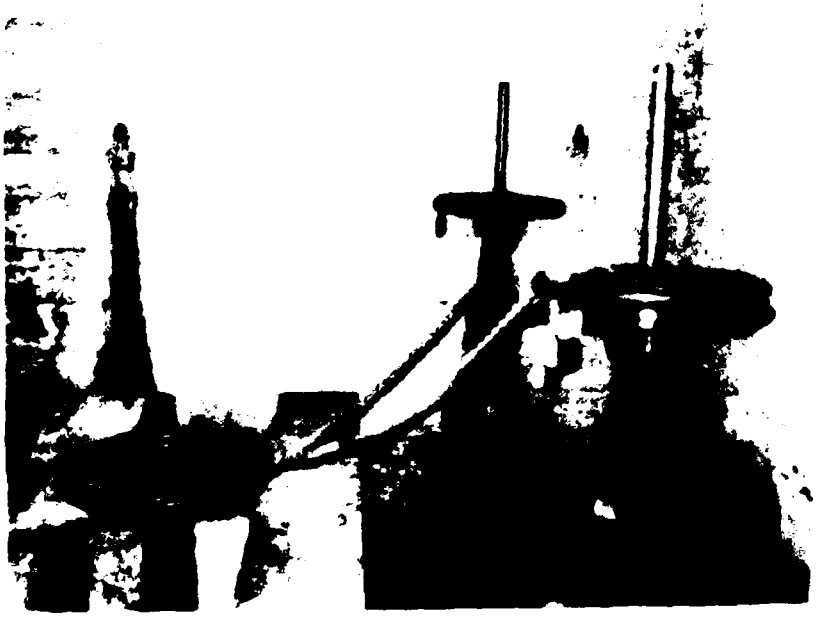


6. VIEW OF INTERIOR OF GATE HOUSE.



7. VIEW OF MANUAL HOIST FOR GATES.

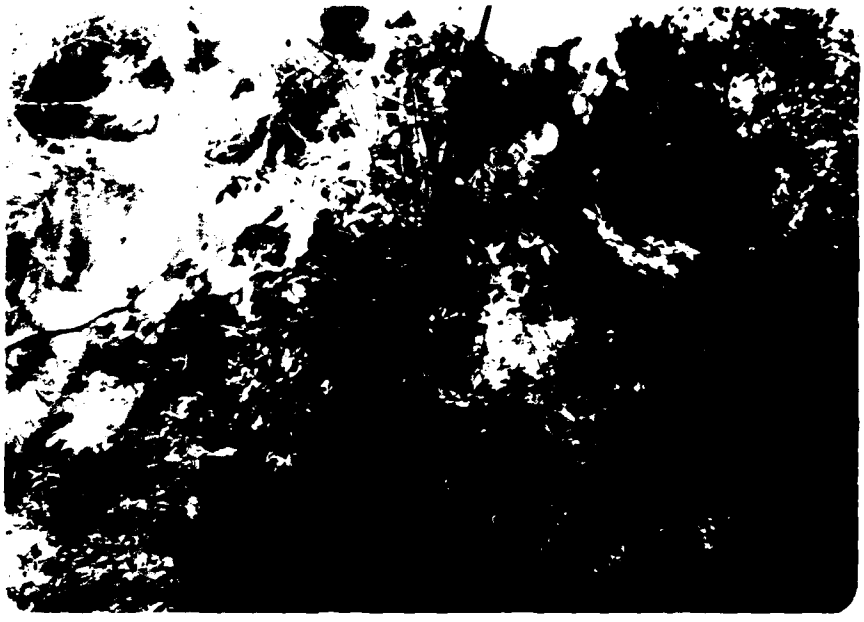
8. VIEW OF LOWER DOWNSTREAM FACE, SPILLWAY TAILRACE TRAINING WALL AND VALVE HOUSE.



9. VIEW OF DOWNSTREAM CONTROL VALVES.

10. VIEW OF DOWNSTREAM SPILLWAY TAILRACE AND 24-INCH RESERVOIR DRAIN OUTLET.

11. VIEW OF SPILLWAY CHANNEL LOOKING DOWNSTREAM.



12. DOWNSTREAM TOE OF DAM ON LEFT ABUTMENT. NOTE: SPALLED CONCRETE SURFACE,OVERGROWN WET ABUTMENT.

13. CLOSE UP VIEW OF DOWNSTREAM FACE OF SPILLWAY. NOTE: BROKEN AND MISSING PNEUMATICALLY APPLIED CONCRETE.

VISUAL INSPECTION CHECKLIST

APPENDIX C

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Harlem Valley Reservoir

Fed. I.D. # NY 273 DEC Dam No. 677

River Basin Housatonic

Location: Town Wingdale County Dutchess

Stream Name None

Tributary of Swamp River

Latitude (N) 41°33' Longitude (W) 73°33'

Type of Dam Concrete Gravity

Hazard Category High

Date(s) of Inspection June 12, 1980

Weather Conditions FAIR - 65° TO 70°

Reservoir Level at Time of Inspection 3 inches below spillway crest

b. Inspection Personnel Harvey S. Feldman -

Joseph J Ferri JR.

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

MR James Billings - Harlem Valley Psychiatric Hos. Wingdale N.Y. 12594

MR George Acker - " " " " " " "

(914) 832-6611

d. History:

Date Constructed 1918 Date(s) Reconstructed

Designer New York State

Constructed By New York State

Owner New York State - Harlem Valley State Hosp.

) Embankment — Section Not Applicable - Concrete Dam

a. Characteristics

(1) Embankment Material N/A

(2) Cutoff Type N/A

(3) Impervious Core N/A

(4) Internal Drainage System N/A

(5) Miscellaneous N/A

b. Crest

(1) Vertical Alignment N/A

(2) Horizontal Alignment N/A

(3) Surface Cracks N/A

(4) Miscellaneous N/A

c. Upstream Slope

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

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

(3) Sloughing, Subsidence or Depressions N/A

(4) Slope Protection _____

_____

_____

(5) Surface Cracks or Movement at Toe _____

_____

d. Downstream Slope 1)?

(1) Slope (Estimate - V:H) _____

(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

_____

_____

(1) Erosion at Contact _____

(2) Seepage Along Contact _____

3) Drainage System

a. Description of System None existing

b. Condition of System _____

c. Discharge from Drainage System _____

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, etc.) None installed

5) Reservoir

a. Slopes Vary - 1V to 1H to 2V:1H. Generally Stable

b. Sedimentation little apparent

c. Unusual Conditions Which Affect Dam None

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) High - Hospital Complex located ± ½ mile Downstream

b. Seepage, Unusual Growth Seepage midway up slope near toe of Dam on Both abutments, Abutments overgrown.

c. Evidence of Movement Beyond Toe of Dam None

d. Condition of Downstream Channel Clogged with brush and other growth

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

Ogee shaped Crest - centrally located in Dam

a. General Spillway was gunited about 15 years ago as part of seepage treatment for dam.

b. Condition of Service Spillway Crest - generally good - Some peeling of gunite. Downstream face in poor condition due to "bubbling" and peeling of gunite - small amounts of seepage from under gunite.

c. Condition of Auxiliary Spillway - None exists

d. Condition of Discharge Conveyance Channel Steep sided channel. Slopes appear to be stable. Channel is overgrown and filled with brush and vegetation.

) Reservoir Drain/Outlet

Type: Pipe ✓ Conduit _____ Other _____

Material: Concrete _____ Metal ✓ Other _____

Size: 24 inches Length 30.5 feet

Invert Elevations: Entrance 729 Exit 723

Physical Condition (Describe): Unobservable (partially

Material: Steel is sound where visible

Joints: good Alignment good

Structural Integrity: good

Hydraulic Capability: good

Means of Control: Gate ✓ Valve _____ Uncontrolled _____.

Operation: Operable ✓ Inoperable _____ Other _____

Present Condition (Describe): good - gate is operated annually +. Clear silt from opening

)) Structural

a. Concrete Surfaces Concrete Surfaces were gunited in 1965. The gunite is in satisfactory condition on the upstream face of the dam but is bubbling and peeling over the entire spillway surface and lower downstream face of the dam

b. Structural Cracking None apparent

c. Movement - Horizontal & Vertical Alignment (Settlement) None Apparent

d. Junctions with Abutments or Embankments Appear to be good Some seepage exist about midway down on each slope. Both dry up in dry weather

e. Drains - Foundation, Joint, Face - None in service

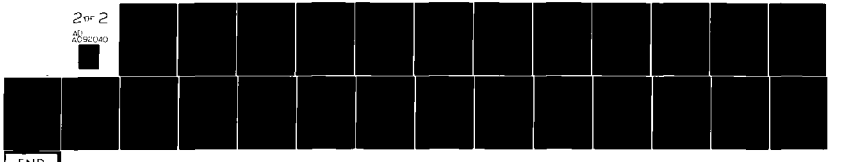
f. Water Passages, Conduits, Sluices - One built to take seepage on left abutment to tailrace is clogged with debris.

g. Seepage or Leakage Some seepage through peeled gunite lower down on dam surface, especially on left abutment - Considerable seepage from under peeled gunite on lower half of spillway

AD-A092 040 NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. HARLEM VALLEY RESERVOIR (INVENTORY--ETC(U)
SEP 80 E O'BRIEN DACW51-79-C-0001

UNCLASSIFIED NL

2 OF 2
AD
A092040



END
DATE FILMED
1-81
DTIC

h. Joints - Construction, etc. Minor spalling of concrete on all construction joints of downstream face and Dam crest.

i. Foundation Not visible - but from channel outcrops it appears to be micaceous shist.

j. Abutments Rock covered with overburden and vegetation - Left abutment soft below spillway

k. Control Gates Appear to be in good working order. One has jammed screen, but gate remains operable

l. Approach & Outlet Channels Approach channel not visible. Outlet channel - Rock base, steep sides. Clogged with vegetation

m. Energy Dissipators (Plunge Pool, etc.) None exist.

n. Intake Structures Good condition - well maintained. Used continuously and Regularly. Exists as it appears on drawings.

o. Stability Appears Stable - No evidence of movement or deformation

p. Miscellaneous None

HYDROLOGIC DATA AND COMPUTATIONS

APPENDIX D

TAMS

Job No. 1551-06 Sheet 1 of 4

Project HARLEM VALLEY DAM PHASE 1 INSPECTION Date JUNE 17 198[illegible]

Subject Hydrologic / Hydraulic Computations By DLC

Inflow Hydrograph Ch'k. by

Rainfall converted to runoff due to small basin size.

HR	Percent	Acc. Rainfall	Incr Rain	Run off		
				Land	Reservoir	Total
1	.45	.1	0.1	0	0.74	0.74
2	.89	.2	0.1	0	0.74	0.74
3	1.34	.3	0.1	0	0.74	0.74
4	1.70	.401	0.101	.28	0.75	1.03
5	2.24	.502	0.101	.28	0.75	1.03
6	2.68	.600	0.098	0	0.73	0.73
7	4.74	1.062	0.46	100.0	3.40	103.4
8	6.26	1.402	0.34	66.8	2.52	69.3
9	8.05	1.803	0.401	83.8	2.97	86.8
10	9.84	2.204	0.401	83.8	2.97	86.8
11	11.63	2.605	0.401	83.8	2.97	86.8
12	13.42	3.006	0.401	83.8	2.97	86.8
13	21.65	4.850	1.844	485.	13.6	499.
14	31.50	7.056	2.206	586.	16.3	602.
15	43.80	9.812	2.756	739.	20.4	759.
16	75.12	16.827	7.015	1920.	51.9	1972.
17	86.67	19.414	2.587	692.	19.1	711.
18	95.70	21.437	2.023	535.	15.	550.
19	96.42	21.598	0.161	17.	1.2	18.2
20	97.14	21.759	0.161	17.	1.2	18.2
21	97.85	21.918	0.159	16.	1.2	17.2
22	98.57	22.080	0.162	17.	1.2	18.2
23	99.28	22.239	0.159	16.	1.2	17.2
24	100.00	22.400	0.161	17.	1.2	18.2

24 HR 10 SQMILE PMP ~ 28 ins.

less 20% (Hop Brook factor) 22.4"

Assume 0.1 in/hr loss on land area.

Land Area = 278.3

Lake Area = 7.4 acres.

TAMS

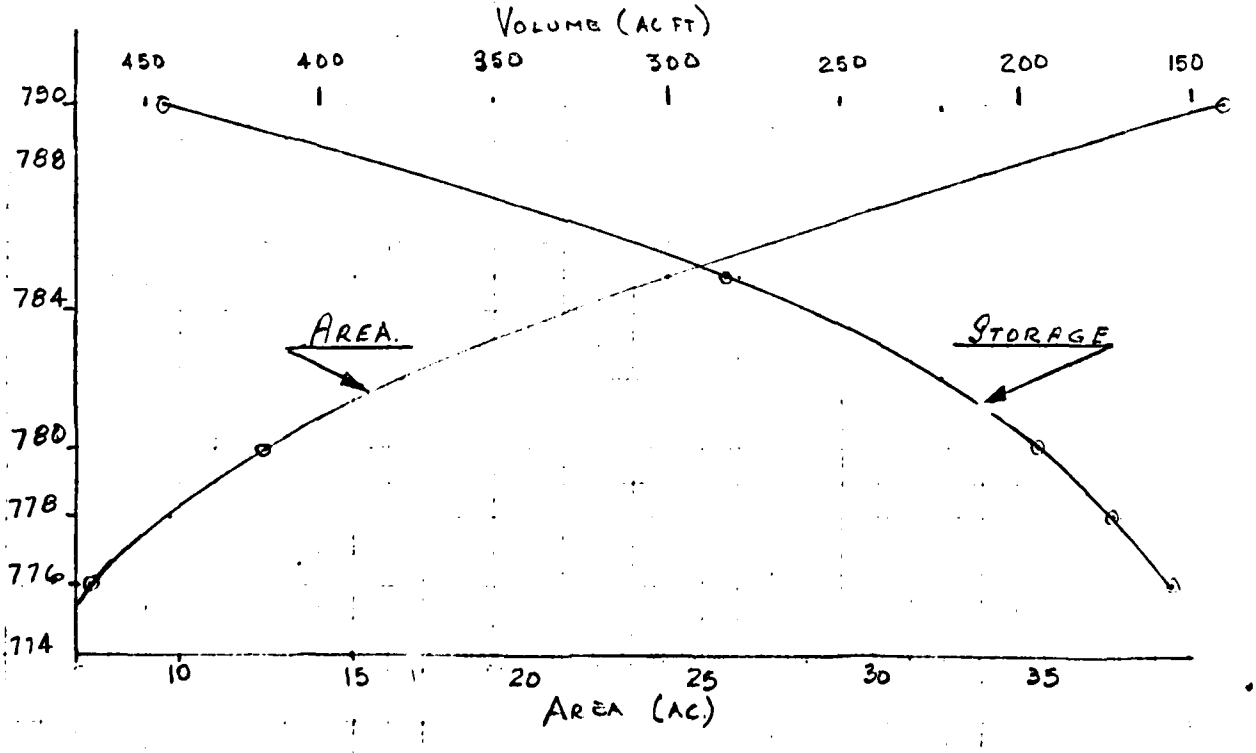
Job No. 1551-06 Sheet 2 of 4

Project HARLEM VALLEY DAM. PHASE 1 Date JUNE 27, 1980

Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS. By DLC

Ch'k. by

EL	AREA	ΔH	MEAN AREA	Δ VOLUME (AC FT)	STORAGE (AC FT)
776	7.4				155
		2	8.6	17.2	
778	9.8				172.2
		2	10.95	21.9	
780	12.1				194.1
		5	18.05	90.25	
785	24.0				284.35
		5	31.95	159.75	
790	39.9				444.1



TAMS

Job No. 1551-06 Sheet 3 of 4

Project HARLEM VALLEY DAM PHASE 1 INSPECTION Date JUNE 26 1980

Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS By D.L.C.

Ch'k. by

SPILLWAY CREST EL 776.0 $H_d \sim 4.0'$

" LENGTH 30.0'

EL	H_e/H_d	C	Q	STORAGE
776	0		0	155
778	.5	3.66	310	172
780	1.0	4.03	970	194
*782	1.5	4.30	1900	222
785		~4.3	3480	284
790		~4.3	6760	444

FLOW OVER DAM

EL 782 C = 2.67 L = 189

TAMS

Job No. 1551-06 Sheet 4 of 4

Project HARLEM VALLEY DAM INSPECTION Date JUNE 27, 1980

Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS. By D.L.C

D/S VALLEY CROSS SECTION Ch'k. by

STATION 1000	DISTANCE	ELEVATION
SLOPE 0.11	7800	700
	7920	650
	7940	640
	7995	625
	8005	625
	8010	630
	8080	640
	8150	650
	8420	700

HARLEM VALLEY DAM DUTCHESS COUNTY NY
PHASE 1 DAM SAFETY INSPECTION
JUNE 1980

JOB SPECIFICATION

NS	NMR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
3	1	0	0	0	0	0	0	0	0

JOPER	NAT	LROPT	TRACE
5	0	0	0

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

RTIOS= 1.00 .50

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

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH /PMF/

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

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
-1	0	.45	0.00	.45	0.00	0.000	0	0	0

INPUT HYDROGRAPH

1.	1.	1.	1.	1.	1.	103.	69.	87.	87.
27.	27.	499.	602.	759.	1972.	711.	550.	18.	18.
17.	18.	17.	18.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1972.	810.	239.	191.	5724.
CMS	56.	23.	7.	5.	162.
INCHES		16.75	19.72	19.72	19.72
MM		425.42	500.94	500.94	500.94
AC-FT		402.	473.	473.	473.
THOUS CU M		496.	584.	584.	584.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

1.	1.	1.	1.	1.	1.	103.	69.	87.	87.
27.	27.	499.	602.	759.	1972.	711.	550.	18.	18.
17.	18.	17.	18.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1972.	810.	239.	191.	5724.
CMS	56.	23.	7.	5.	162.

MM	425.42	500.94	500.94		500.94
	72.	473.	47		73.
THOUS CU M	494.	584.	584.		584.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

0.	0.	0.	1.	1.	0.	52.	35.	43.	43.	
43.	43.	290.	334.	390.	986.	356.	275.	9.	9.	
9.	9.	9.	9.	0.	0.	0.	0.	0.	0.	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	965.	405.	119.	95.	2862.
CMS	28.	11.	3.	3.	81.
INCHES		4.37	9.46	9.46	9.86
MM		212.71	250.47	250.47	250.47
AC-FT		201.	237.	237.	237.
THOUS CU M		248.	292.	292.	292.

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

HYDROGRAPH ROUTING

RESERVOIR ROUTING

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

ROUTING DATA

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

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	155.	-1

ELEV=	776.00	778.00	780.00	782.00	785.00	790.00
FLO=	0.00	310.00	970.00	1900.00	3420.00	6760.00
CAPACITY=	155.	172.	194.	222.	254.	444.
ELEVATION=	776.	778.	780.	782.	785.	790.

CREL	SPWID	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
776.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
782.0	2.7	1.5	180.

STATION 10, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

1.	1.	1.	1.	1.	1.	45.	80.	78.	86.	
97.	87.	264.	569.	693.	1459.	1323.	541.	269.	53.	
23.	19.	18.	18.	10.	1.	0.	0.	0.	0.	

STORAGE

155.	155.	155.	155.	155.	155.	157.	159.	159.	160.
160.	160.	159.	161.	185.	209.	205.	190.	170.	158.

	776.0	776.0	776.0	776.0	776.0	776.0	776.3	776.5	776.5	776.6
	776.6	776.6	777.7	778.8	779.2	779.1	778.8	778.7	777.7	776.3
	776.1	776.1	776.1	776.1	776.1	776.0	776.0	776.0	776.0	776.0

PEAK OUTFLOW IS 1459. AT TIME 14.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1459.	505.	236.	191.	5725.
CMS	41.	14.	7.	5.	162.
INCHES		16.71	19.72	19.72	19.72
MM		424.59	500.84	500.84	500.84
AC-FT		473.	473.	473.	473.
THOUS CU M		584.	583.	584.	584.

STATION 10, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

				OUTFLOW					
0.	0.	0.	0.	1.	0.	22.	40.	39.	43.
47.	43.	132.	255.	334.	720.	665.	285.	162.	91.
12.	9.	9.	9.	5.	1.	0.	0.	0.	0.
				STORAGE					
155.	155.	155.	155.	155.	155.	156.	157.	157.	157.
157.	157.	162.	169.	173.	174.	174.	171.	164.	157.
156.	156.	155.	155.	155.	155.	155.	155.	155.	155.
				STAGE					
776.3	776.3	776.9	777.4	778.1	779.2	779.1	778.8	777.8	776.2
776.1	776.1	776.1	776.1	776.0	776.0	776.0	776.0	776.0	776.0

PEAK OUTFLOW IS 720. AT TIME 16.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	720.	401.	119.	95.	2862.
CMS	20.	11.	3.	3.	81.
INCHES		9.29	9.96	9.96	9.96
MM		210.58	250.42	250.49	250.49
AC-FT		199.	236.	237.	237.
THOUS CU M		245.	292.	292.	292.

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

HYDROGRAPH ROUTING

CHANNEL ROUTING BELOW DAM STN 10+00

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

ROUTING DATA

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

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELEVT	ELMAX	RLNTH	SEL
.0400	.0300	.0400	625.0	700.0	1000.	.11000

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

7[illegible] 625.00 7920.00 650.00 7940.00 640.00 7995.00 625.00 8005.00 625.00
8010.00 [illegible] 8160.00 640.00 8170.00 650.00

STORAGE	0.00	1.74	5.73	13.45	24.98	39.92	58.08	78.94	100.78	123.49
	147.05	171.47	196.74	222.88	249.88	277.73	306.44	336.01	366.44	397.73
OUTFLOW	0.00	2206.25	10604.67	29533.17	64522.12	122506.21	201195.54	309350.34	443649.64	599859.37
	777494.81	976266.02	1196009.43	1436648.88	1698171.34	1980610.93	2284037.93	2608550.82	2954270.57	3321336.19
STAGE	625.00	625.25	626.00	626.84	628.79	634.74	640.68	652.63	656.58	660.53
	664.47	668.42	672.37	676.32	680.26	684.21	688.16	692.11	696.05	700.00
FLOW	0.00	2206.25	10604.67	29533.17	64522.12	122506.21	201195.54	309350.34	443649.64	599859.37
	777494.81	976266.02	1196009.43	1436648.88	1698171.34	1980610.93	2284037.93	2608550.82	2954270.57	3321336.19

STATION 100, PLAN 1, RTIO 1

OUTFLOW

1.	0.	1.	0.	2.	0.	44.	80.	79.	85.
87.	86.	241.	565.	693.	1444.	1339.	540.	275.	51.
25.	15.	20.	15.	13.	0.	2.	0.	0	0.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STAGE

625.0	625.0	625.0	625.0	625.0	625.0	625.1	625.1	625.1	625.1
625.2	625.1	625.5	626.0	626.2	627.5	627.3	625.0	625.5	625.1
625.0	625.0	625.0	625.0	625.0	625.0	625.0	625.0	625.0	625.0

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1444.	509.	230.	191.	5726.
CMS	41.	23.	7.	5	162.
INCHES		14.71	19.72	19.[illegible]	19.77
MM		494.35	500.88	501.07	501.07
AC-FT		401.	473.	473.	473.
THOUS CU M		494.	583.	584.	584.

MAXIMUM STORAGE = 1.

MAXIMUM STAGE IS 627.5

STATION 100, PLAN 1, RTIO 2

OUTFLOW

1.	0.	1.	0.	1.	0.	22.	40.	39.	43.

	12.	0.	9.	0.	0.	1.	0.	0.	0.	0.

STOR

	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.
	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STAGE

625.0	625.0	625.0	625.0	625.0	625.0	625.0	625.1	625.1	625.1
625.1	625.1	625.2	625.4	625.6	626.2	626.2	625.5	625.3	625.1
625.0	625.0	625.0	625.0	625.0	625.0	625.0	625.0	625.0	625.0

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	714.	401.	119.	95.	2962.
CMS	20.	11.	3.	3.	81.
INCHES		8.29	9.86	9.86	9.86
MM		210.55	250.42	250.49	250.49
AC-FT		199.	236.	237.	237.
THOUS CU M		245.	292.	292.	292.

MAXIMUM STORAGE = 1.

MAXIMUM STAGE IS 626.2

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

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

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2	RATIOS APPLIED TO FLOWS
				1.00	.50	
HYDROGRAPH AT	1	.45	1	1972.	986.	
		(1.17)		(55.84)(	27.92)(	
ROUTED TO	1J	.45	1	1459.	729.	
		(1.17)		(41.30)(	20.39)(	
ROUTED TO	1PC	.45	1	1444.	714.	
		(1.17)		(40.90)(	20.21)(	

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	776.00	776.00	782.00
STORAGE	155.	155.	222.
OUTFLOW	0.	0.	1000.

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
1.00	781.05	0.00	209.	1459.	0.00	16.00	0.00
.50	778.24	0.00	186.	720.	0.00	16.00	0.00

PLAN 1 STATION 100

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	1444.	627.5	16.00
.50	714.	626.2	16.00

STABILITY ANALYSIS

APPENDIX E

TAMS

Job No. 1781-66 Sheet 1 of _____

Project NYS Dam Inv. - Harlem Valley Reservoir Date 8-15-80

Subject Stability Analysis By JJF

Ch'k. by _____

Assumptions

1) The Unit weight of Concrete is assumed to be 150 lbs/cuft

2) Ice load of 5000 lbs/ft² acting about 1ft from the top of the dam (C.O.E. Criteria)

3) Angle of Internal Resistance of foundation rock is assumed to be 45°

4) Dam Site is in Seismic Zone 2.

Loading Conditions

1) Case I - Normal Loading; Lake level at Spillway Crest EL. 776. No Ice load.

2) Case II - Normal Loading: Lake level at Spillway Crest - EL. 776, with ice load.

3) Case III - Unusual Loading - Lake level at ½ PMF

4) Case IV - Extreme Loading - Lake level at PMF

5) Case V - Unusual Loading - Lake level at Spillway Crest and earthquake force at 0.05g.

Stability Criteria

a) Overturning - Resultant force shall fall within the middle third of the base for cases I and II. The resultant force shall fall within the middle ½ of the base for cases III, IV, V.

b) Sliding - For case I and II, Friction factor of safety against sliding is to be 1.5. For case III and IV friction factor of safety against Sliding is to be 1.25. For Case IV friction factor of Safety is to be 1.1

TAMS

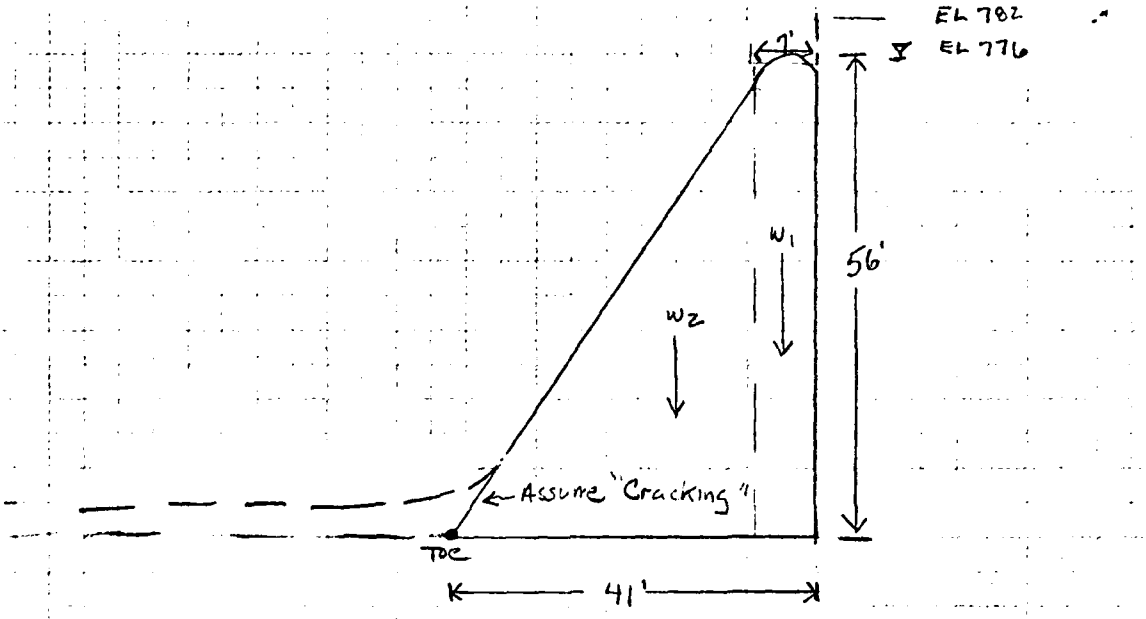
Job No. 1551-06 Sheet 2 of _____

Project NYS Dam Encp. Harlem Valley Reservoir Date 8-15-80

Subject Stability Analysis - overFlow Section By JJF

Ch'k. by _____

Dead Load



ΣMs about Toe

		k	×	MA	=	Me
$W_1 = 54' \times 7' (0.150)$	=	56.7	×	37.5	=	2126.25
$W_2 = 52' \times 34' (0.150)$	=	265.2	×	22.6	=	5993.52

$\Sigma F_V = 321.9$ $\Sigma M_R = 8119.77$

$$\bar{x} = \frac{8119.77}{321.9} = 25.22$$

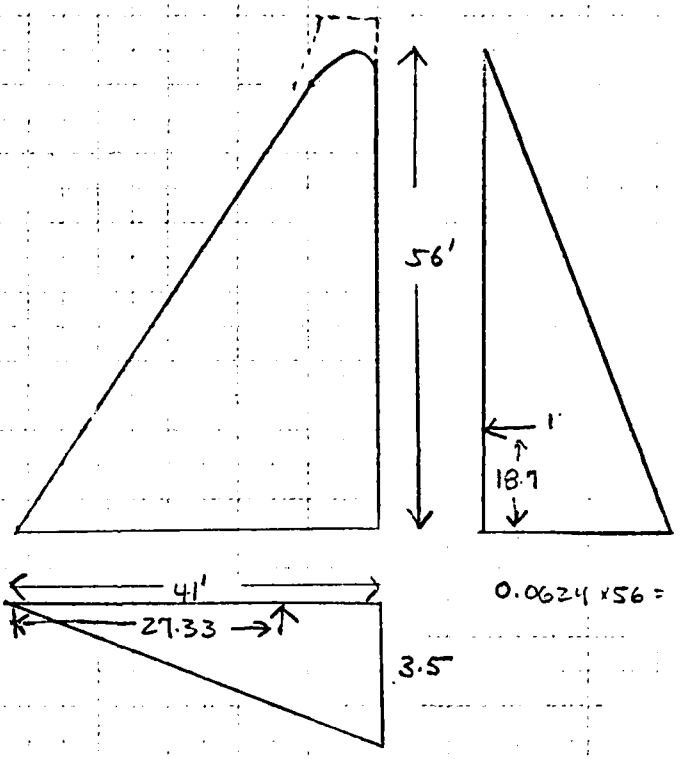
$$\Sigma M_y = 28(56.7) + 265.2(18) = 6361.2$$

$$\bar{y} = \frac{6361.2}{321.9} = 19.76$$

TAMS

Job No. 1551-06 Sheet 3 of
Project NYS Dam Insp - Harlem Valley Date 8-15-80
Subject Stability Analysis By JJF
Ch'k. by

Hydrostatic Forces a) Normal Loading



0.0624 x 56 = 3.5

ΣM TOE

		K	×	MA	=	M_o
P = 1/2 × 3.5 × 56	=	98	×	18.7	=	1832.6
U = 1/2 3.5 × 41	=	71.75	×	27.33	=	1960.92

ΣFV = 71.75 ↑ ΣMo = 3793.52
ΣFH = 98.0 ←

ICE LOAD

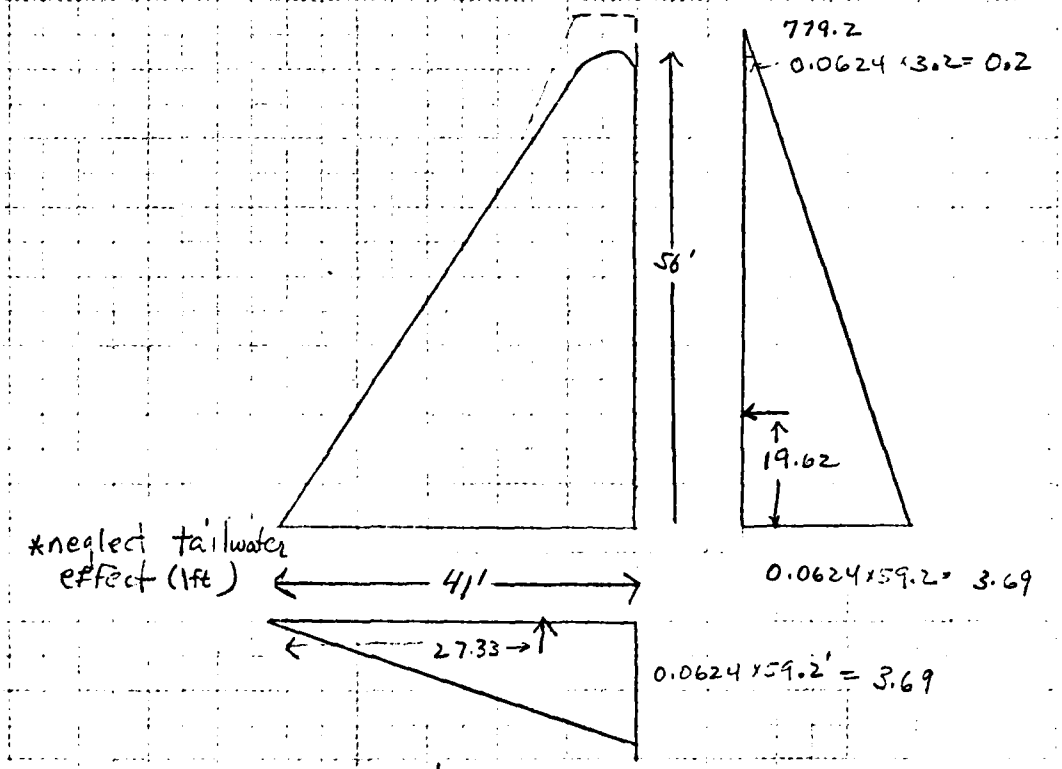
K	×	MA	=	M_o
5.0	×	55.5	=	277.5

ΣFH = 5.0 ←
ΣMo = 277.5

TAMS

Job No. 1571-06 Sheet 4 of _____
Project NYS Dam Insp. Harlem Valley Res. Date 8-19-99
Subject Stability Analysis By JJF
Ch'k. by _____

Hydrostatic Forces b) 1/2 PMF WS ELEV = 779.2



	k	x	m_H	= m_O
$P_H = \frac{3.69 + 0.2}{2}(56) =$	108.92 ←		19.62	2137.0
$u = 1/2(3.69)(41') =$	75.64 ↑		27.33	= 2067.37
	ΣF_V = 75.64			4204.4
	ΣF_H = 108.92			

TAMS

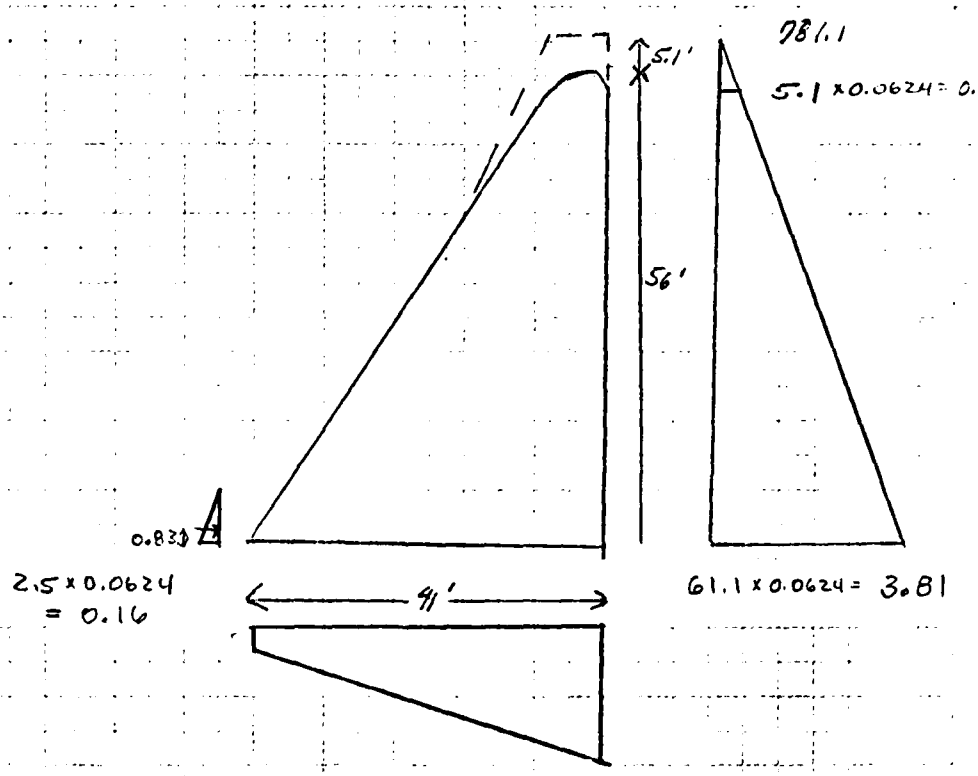
Job No. 1551-06 Sheet 5 of _____

Project NYS Dam Insp - Harlem Valley Date 8-15-80

Subject Stability Analysis By JJF

Ch'k. by _____

Hydrostatic Forces c) PMF W.S. Elev. 781.1



		K	× MA	= Mo
$P_H = \frac{3.81+0.32}{2}(56) =$		115.62	20.1	2324.0
$U = \frac{3.81+0.16}{2}(41) =$		81.38	26.78	2179.6
$P_T = \frac{1}{2}(0.16)(2.5)(0.6) =$		0.12	0.83	0.1
				4503.7

$F_H = 115.5 \leftarrow$

$F_V = 81.38 \uparrow$

TAMS

Job No. 1551-06 Sheet 6 of _____

Project NYS Dam Insp Harlem Valley Res. Date 8-15-90

Subject Stability Analysis By JJF

Ch'k. by _____

Case I - Normal Loading - without Ice

	F_V	F_H	M_R	M_O
Dead Load	321.9		8119.8	
Hydrostatic	71.8	98.0		3793.5
	250.1	98.0	8119.8	3793.5

$EM = 8119.8 - 3793.5 = 4326.3$

$\bar{x} = \frac{4326.3}{250.1} = 17.29$

$e = \frac{41}{2} - 17.29 = 3.2$ OK - inside middle 1/3

$p = \frac{250.1}{41}\left(1 \pm \frac{6 \times 3.2}{41}\right)\frac{1000}{144} = 42.34 \pm 19.82 = 62.2$ psi Toe, 22.5 psi Heel

Friction Factor of Safety

$FFS = \frac{250.1\ (\tan 45°)}{98.0} = 2.55$ OK

TAMS

Job No. 1551-06 Sheet 7 of
Project NYS Dam Incp. - Harlem Valley Res. Date 8-15-90
Subject Stability Analysis By JJF
Ch'k. by

Case II - Normal Loading - With Ice

	F_V	F_H	M_R	M_O
Dead Load	521.9↓		8119.8	
Hydrostatic Load	71.8↑	98.0←		3793.5
Ice Load		5.0←		277.5
	250.1	103.0	8119.8	4071.0

$\Sigma M = 8119.8 - 4071.0 = 4048.8$

$\bar{x} = \frac{4048.8}{250.1} = 16.2$ OK - inside center 1/3

$\bar{e} = \frac{41}{2} - 16.2 = 4.3$

$P = \frac{250.1}{41}\left(1 \pm \frac{6 \times 4.3}{41}\right)\frac{1000}{144} = 42.34 \pm 26.6 = 68.9$ psi Toe
15.7 psi Heel

Friction Factor of Safety

$FFS = \frac{250.1\ (\text{Tan } 45°)}{103.0} = 2.43$ OK

TAMS

Job No. 1551-06 Sheet 10 of _____

Project NYS Dam Insp. Harlem Valley Reservoir Date 8-15-80

Subject Stability Analysis By JJF

Ch'k. by _____

CASE III - 1/2 PMF

	F_V	F_H	M_R	M_O
Dead Load	321.9 ↓		8119.8	
Hydrostatic	75.64 ↑	108.92 ←		4204.4
	246.26	108.92	8119.8	4204.4

$\Sigma M = 8119.2 - 4204.4 = 3914.8$

$\bar{N} = \frac{3914.8}{246.26} = 15.9$ OK inside middle 1/2

$\bar{e} = \frac{41}{2} - 15.9 = 4.6$

$p = \frac{246.26}{41}\left(1 \pm \frac{6 \times 4.6}{41}\right)\frac{1000}{144} = 41.71 \pm 28.09 = 69.8$ psi Toe
13.62 psi Heel

Friction Factor of Safety

$\frac{246.26\ (\tan 45)}{108.92} = 2.26$ OK

TAMS

Job No. 1551-06 Sheet 9 of _____

Project NYS Dam Insp. Harlem Valley Reserv Date 8-15-90

Subject Stability Analysis By JJF

Ch'k. by _____

CASE IV – PMF

	FV	FH	MR	MO
Dead Load	321.9		8119.8	
Hydrostatic	81.38 ↑	115.5 ←		4503.7
	240.52	115.5	8119.8	4503.7

$\varepsilon m = 8119.8 - 4503.7 = 3616.1$

$\bar{x} = \frac{3616.1}{240.52} = 15.03$ OK - inside center 1/3

$e = \frac{41}{2} - 15.03 = 5.47$

$\bar{p} = \frac{240.52}{41}\left(1 \pm \frac{6 \times 5.47}{41}\right)\frac{1000}{144} = 40.74 \pm 32.6 = 73.34 \text{ psi}$ Toe, 8.14 psi Heel

Friction Factor of Safety

$\frac{240.52 \ (\tan 45°)}{115.5} = 2.08$ OK

TAMS

Job No. 1551-06 Sheet 10 of _____
Project NYC Dam ENSP - Harlem Valley Reservoirs Date 8-15-90
Subject Stability Analysis By JJF
Ch'k. by _____

Case V - Unusual Loading Earthquake

① Hydrodynamic Forces

$P = 1.0 \times 0.05 \times 0.0624 \times (56)^2 = 9.78$

$M_p = (9.78)(0.4)(56) = 219.08$

② Dynamic Forces

$W_D = (321.9)\ 0.05) = 16.09$

$M_D = 16.09 \times 18.7 = 300.5$

Summing Forces & Moments

	F_V	F_H	M_R	M_O
Dead Load	321.9 ↓		8119.8	
Hydrostatic	71.8 ↑	98.0 ←		3793.5
Hydrodynamic		9.78 ←		219.08
Dynamic		16.09 ←		300.5
	250.1	123.87	8119.8	4313.08

$\Sigma M = 8119.8 - 4313.08 = 3806.7$

$\bar{x} = \frac{3806.7}{250.1} = 15.2$ OK inside Center 1/2

$e = \frac{41.0}{2} - 15.2 = 5.3$

$p = \frac{250.1}{41}\left(1 \pm \frac{6 \times 5.3}{41}\right)\frac{1000}{144} = 42.34 + 32.8 = 75.2$ psi Toe
$= 9.5$ psi Heel

Friction Factor of Safety

$FFS = \frac{250.1\ (\tan 45^\circ)}{123.87} = 2.0$

REFERENCES

APPENDIX F

References

1. "HEC-1 Flood Hydrograph Package for Dam Safety Investigations", U.S. Army Corps of Engineers, September 1978

2. "Lower Hudson River Basin Hydrolic Flood Routing Model" for New York District Corps of Engineers, Water Resources Engineers, Inc., January 1977

3. "Standard Project Flood Determination", EM-1110-2-1411, Army Corps of Engineers, Washington, D.C., Rev. 1965

4. "Probable Maximum Precipitation Estimates, United States East of the 105th Meridian", Hydrometeorological Report No. 51, National Weather Service, June 1978

5. "National Program of Inspection of Dams", Vol. 3, Department of the Army, Office of the Chief of Engineers, 1975

6. "Flood Hydrograph Analyses and Computations", EM-1110-2-1405, U.S. Army Corps of Engineers, August, 1959

7. "Recommended Guidelines for Safety Inspection of Dams", Department of the Army, Office of the Chief of Engineers, Appendix D

8. "The Geology of New York State", by Broughton, J.E., et al., N.Y. State Museum and Science Service, Geological Survey, Albany, New York, Map and Chart Series: No. 5, 1962

9. "Soil Association Map of New York State", by M.G. Cline, New York State College of Agriculture, Cornell University, Ithaca, New York, February, 1963

10. "Orange County Soils. Soil Association Leaflet 2", by E.G. Knox, et al., New York State College of Agriculture, Cornell University, Ithaca, New York, October, 1954

END

DATE
FILMED

1-81

DTIC