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NATIONAL DAM SAFETY PROGRAM. NEW CENTRAL PARK RECEIVING RESERVO--ETC(U)
JUL 78 J B STETSON DACW51-78-C-0035

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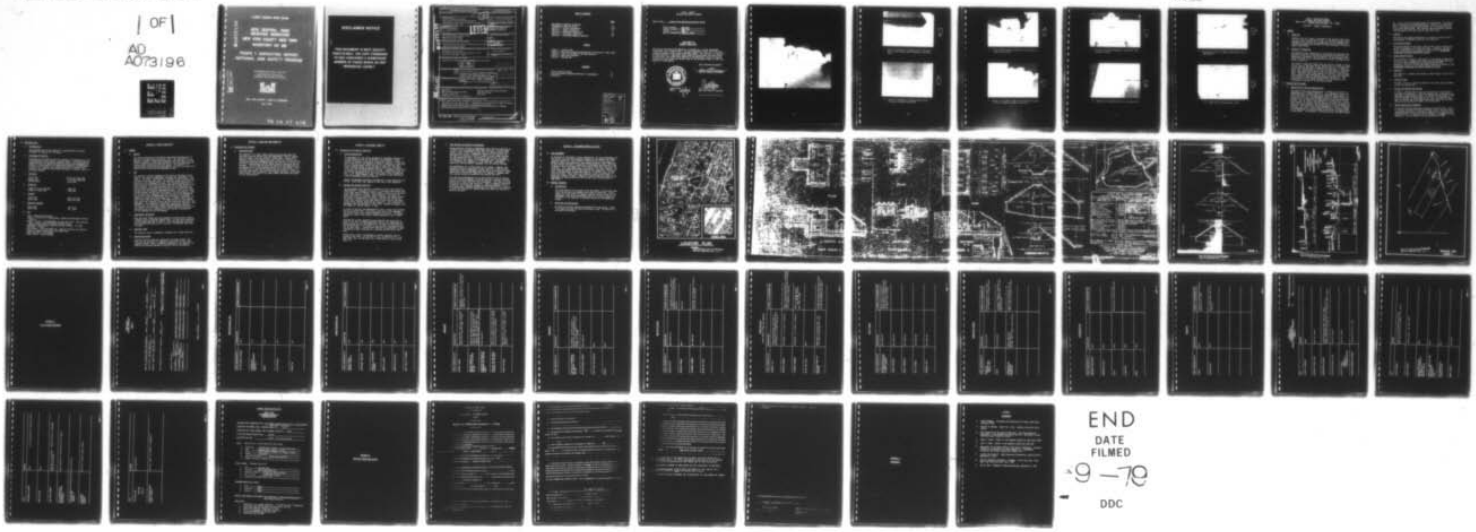

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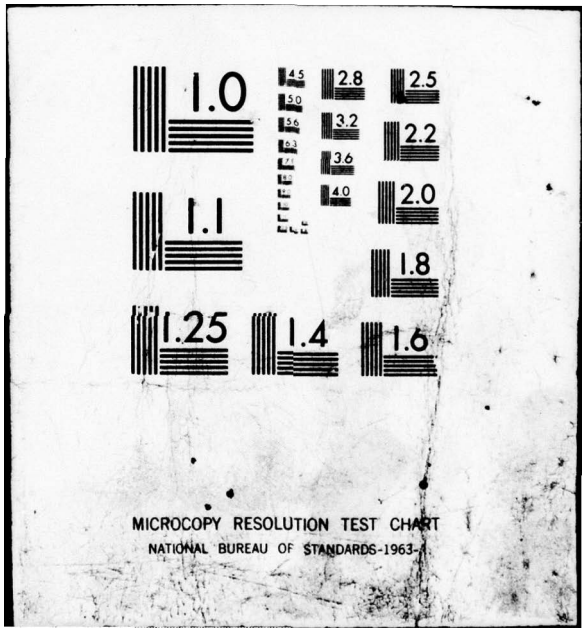
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LOWER HUDSON RIVER BASIN

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NEW CENTRAL PARK RECEIVING RESERVOIR NEW YORK COUNTY NEW YORK INVENTORY Nº 188

PHASE I INSPECTION REPORT NATIONAL DAM SAFETY PROGRAM

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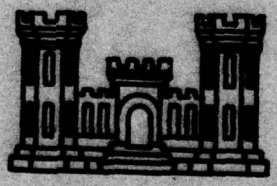

NEW YORK DISTRICT CORPS OF ENGINEERS

JULY 1978

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Lower Hudson River Basin, New York County, NY
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Central Park Receiving Reservoir
New York County
New York

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. Central Park Receiving Reservoir was found in good condition, although some maintenance actions were suggested.

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APPENDIX

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam Central Park Receiving Reservoir NY133

State Located New York
County Located New York
Stream None
Date of Inspection June 22, 1978

ASSESSMENT OF GENERAL CONDITIONS

The Central Park Receiving Reservoir is located on a perched embankment in New York City's Central Park. The main embankment areas are to the east along 5th Avenue and the south along 85th Street. The reservoir is generally in good condition. Some minor areas requiring maintenance have been noted. In particular, the large trees growing on the embankment should be removed and the sink hole along the service road in the northeast corner of the site should be investigated.

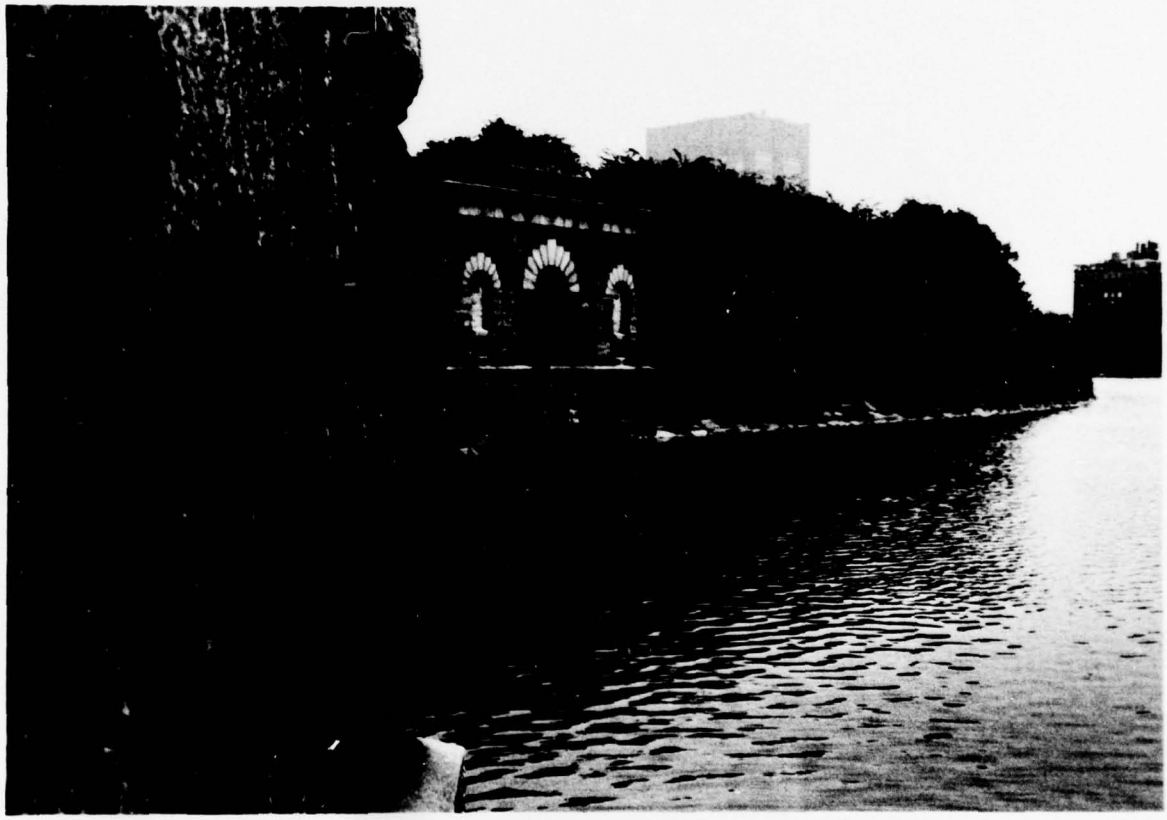
Dale Engineering Company

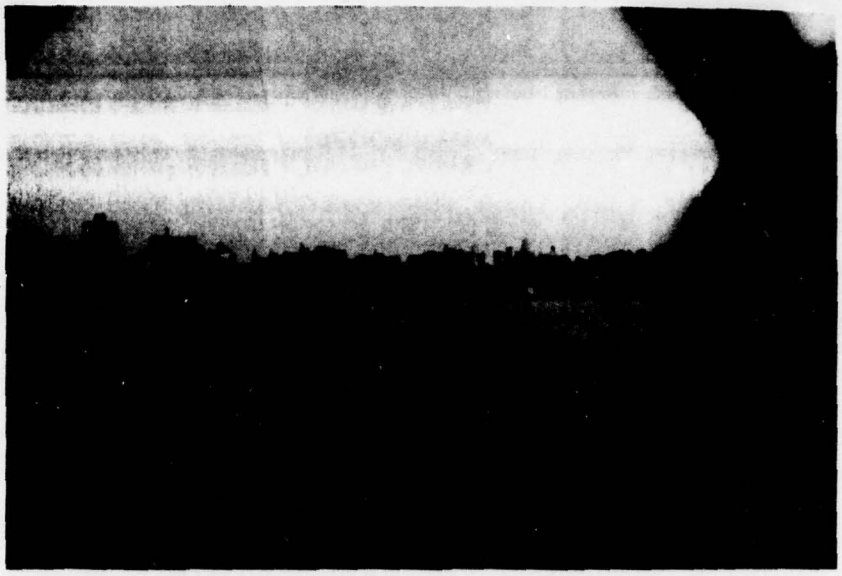
John B. Stetson, President

STATE OF NEW YORK
DALE ENGINEERING COMPANY, INCORPORATED
NO. 075
LICENSED PROFESSIONAL ENGINEER

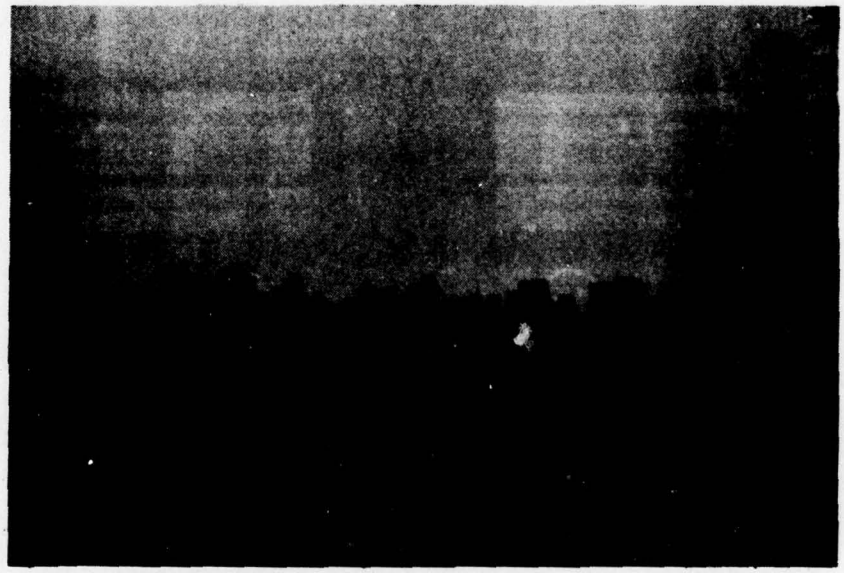
Approved By:
Date: 28 July 78

Col. Clark H. Benn
New York District Engineer

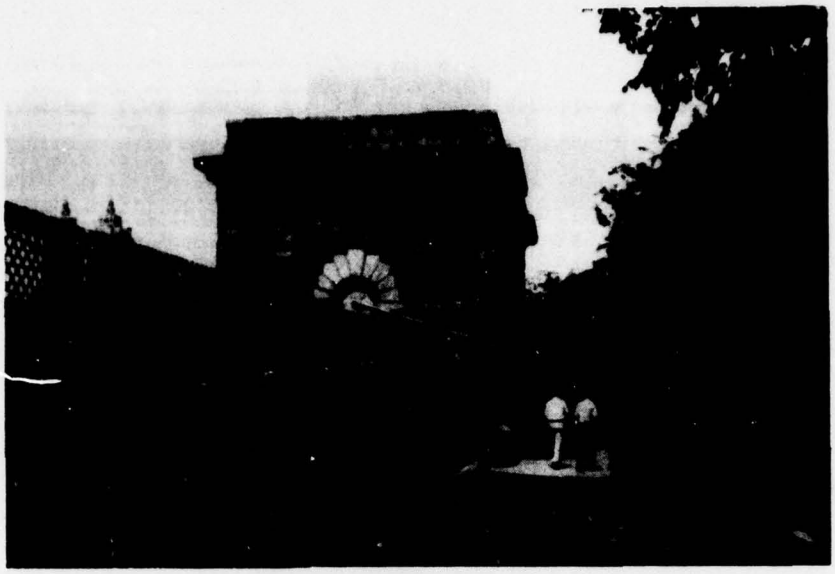




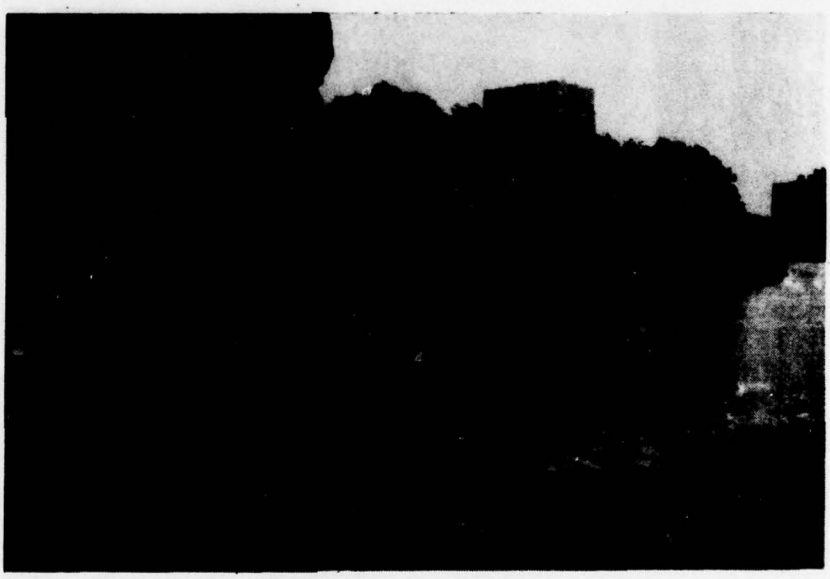
1. View of reservoir looking north through fence from south gate downtake structure (#3).

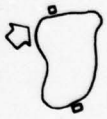


2. View of reservoir looking south from northern intake structure.

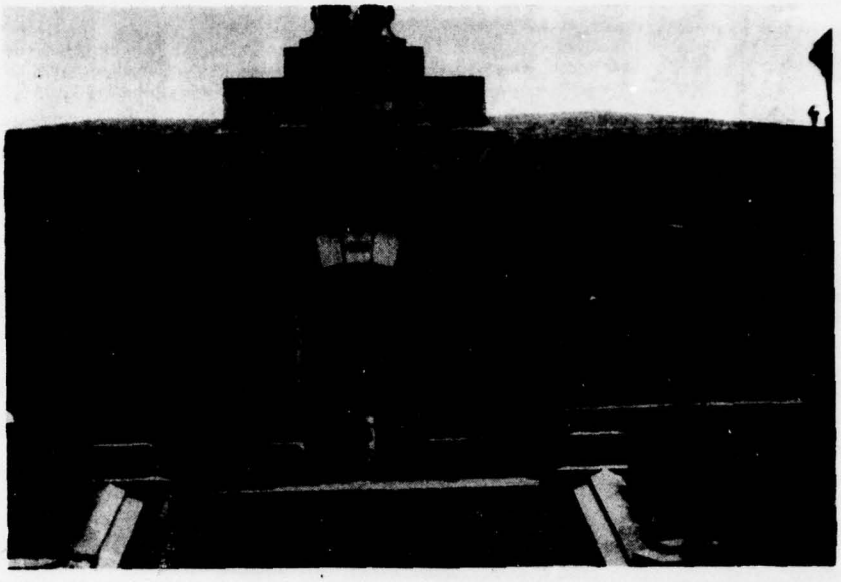


3. View along reservoir path at location of intake structure.

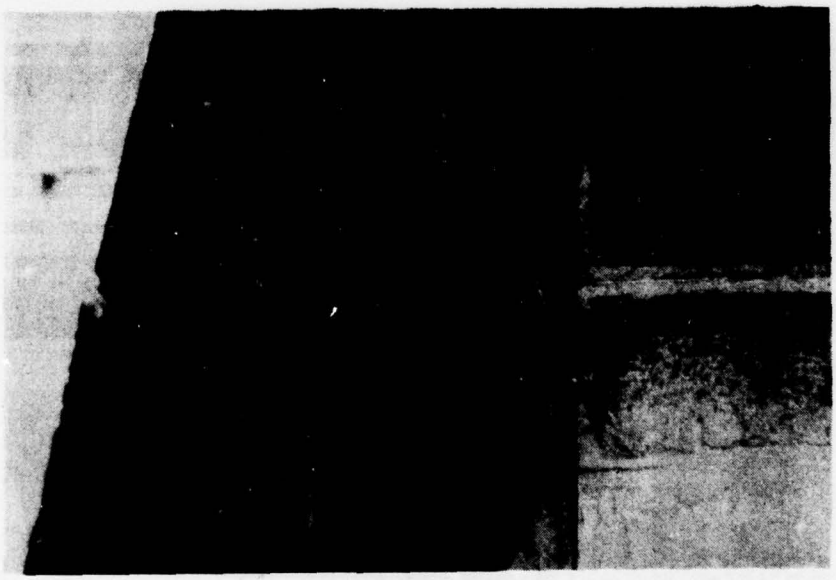




4. Detail of riprap taken from reservoir side of the northern intake structure.



5. Picture of south downtake structure and control center.



6. Detail of overflow weir at structure #3.

7. Typical detail of large trees near top of embankment.

8. Sink hole along access road.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
NAME OF DAM - CENTRAL PARK RECEIVING ID# - NY198

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

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

b. Purpose of Inspection

The purpose of this inspection is to evaluate the structural and hydraulic condition of the Central Park Receiving Reservoir and appurtenant structures, and to determine if the dam constitutes a hazard to human life or property and to transmit findings to the State of New York.

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

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

The Central Park Receiving Reservoir is formed by an earth fill embankment with a puddled core wall. This embankment covers the entire perimeter of the reservoir and measures approximately 1.6 miles along the top. The embankment varies in height around the perimeter up to a maximum of approximately 38 feet above original ground. The top width of the reservoir is approximately 15 feet. The reservoir is divided into two basins by a center dividing wall with a top approximately 9 feet below the top of the perimeter embankment. The inside face of the embankment is heavily riprapped from the top of wall to the bottom of the basin. Exterior slopes of the embankment are heavily grown up with trees through most of the perimeter. The reservoir is fed by New York City Water Tunnel

No. 1 and no off-site drainage enters the impoundment. An overflow weir is located at the south gate house. The weir is 6 feet wide with 2 feet headroom and allows overflow to be conducted into the citys storm sewer system. The reservoir may be drained by controlling the gates at the north end of south gate house.

b. Location

The Central Park Receiving Reservoir is located in Central Park in the Borrough of Manhattan, New York City, New York.

c. Size Classification

The maximum height of the dam is about 38 feet and the storage capacity is estimated to be 4,013 acre feet. Therefore, the dam is in the intermediate size category as defined by the Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

This facility is located in the center of the Borough of Manhattan. Failure of this structure could cause wide spread damage and loss of life in areas of Manhattan surrounding the reservoir. Therefore, the dam is in the high hazard category as defined by the Recommended Guidelines for Safety Inspection of Dams.

e. Ownership

The reservoir is owned by the Bureau of Water Supply of the City of New York.

f. Purpose of Dam

The dam is used as a receiving reservoir for water supply purposes in the City of New York.

g. Design and Construction History

In 1858, a contract was let for the construction of the Central Park Receiving Reservoir. Accounts indicate that construction was completed in approximatley 1862. No information was found to indicate the designer of the reservoir facility. The reservoir has been in constant use since 1863 and has been maintained throughout the years by the Bureau of Water, City of New York.

h. Normal Operational Procedures

No specific relevant operating information has been given. There is an operating staff on the site 24 hours a day. The facility is continually maintained. Drainage of reservoir is by gravity with 80 MGD capacity. In addition, up to 50 MGD can be pumped from the reservoir. In 1977 maximum flow was measured at 72 MGD.

1.3 PERTINENT DATA

a. Drainage Area

The drainage area of the reservoir is approximately 107 acres. Perimeter of reservoir is 1.5 miles.

b. Discharge of Dam Site

Discharges at the overflow weir are related to the operation of the Croton Aqueduct rather than by rainfall events. There have been no reported historical operating conditions which have endangered the condition of the reservoir or caused overtopping of the embankment. Inflows to the reservoir are controlled by staff personnel stationed at the reservoir and by other personnel at central points in the supply system.

c. Elevation

Top of dam	124.10 feet above MSL
Normal pool	119.4 feet above MSL
Average depth	37.10 feet

d. Reservoir

Length of top of dam pool	2800 feet
Length of normal pool	2700 feet

e. Storage

Top of dam	4013 acre feet
Normal pool	3352 acre feet

f. Reservoir Surface

Top of dam	96+ acres
Normal pool	96 acres

g. Dam

Type - Compacted earth bank.
Length - 1.5 miles in circumference, largely perched above existing terrain.
Height - Varies. High embankment to east and south. High sections about 30 feet above 5th Avenue and 86th Street.
Freeboard between normal reservoir and top of dams - 4.7 feet.
Top width - 16 feet.
Side Slopes - 1-1/2 horizontal to 1 vertical interior and exterior.
Zoning - Comparted earth with clay puddle core.
Impervious Core - Clay puddle.
Grout Curtain - None recorded.

SECTION 2 - VISUAL INSPECTION

2.1 SUMMARY

a. General

The visual inspection of the Central Park Receiving Reservoir in New York City took place on June 22, 1978. The reservoir has undergone a program of continued maintenance over the years. At the time of inspection, divers were working in the north gate house intake structure repairing one of the gates. The reservoir is perched above the existing terrain and has virtually no runoff area above the pool other than the embankment slope.

b. Dam

The reservoir visually conforms to the plans as provided in this report. The reservoir embankment surrounds the impoundment a distance of 1.5 miles. The reservoir is fenced in with a path on the outside of the reservoir area. The path was walked with visual inspection of the impoundment riprap. The riprap was generally in good condition and fairly well maintained and cleared of heavy vegetative growth. The north and west sides of the impoundment approach natural ground elevation contours while the east and south portions have the greatest embankment heights. There are no trees located between the path and the reservoir surface, however, a number of trees exist adjacent to the path on top of the embankment. The exterior slope of embankments has significant tree growth. A number of surface areas had exposed soil. However, there were no significant signs of erosion. The lower portions of high embankment areas were inspected along a service road below the toe of the embankment. No sloughing or significant erosion was observed. One limited size sink hole was located (see photographs included in this report) and the Bureau of Water Supply indicated they were investigating the hole, suspecting it was related to underground utility problems and not dam seepage.

c. Appurtenant Structures

Both the north intake and south downtake structures were visually inspected with no observed problem areas. As previously mentioned, a north intake gate was in repair. The south gate weir overflow was inspected and found to be in service. Flashboards were found in place.

d. Reservoir Area

The reservoir area is completely riprapped and in good condition.

e. Downstream Channel

Overflow from the reservoir enters the city sewer system. The flow into the reservoir is completely controlled via the city's aqueduct system. There is adequate freeboard in the reservoir to contain the probable maximum of rainfall without overtopping.

SECTION 3 - HYDROLOGY AND HYDRAULICS

3.1 EVALUATION OF FEATURES

a. Experience Data

The reservoir is a water supply holding area perched above the surrouding terrain and has only the impoundments interior embankment for runoff, the area of which is only minor. Based on information given by the operations staff, there will be more than sufficient operations freeboard within the reservoir to store a PMP rainfall of approximately 25-30 inches without overtopping the embankment. The only way the reservoir would be overtopped would be an operator error on the aqueduct supply end of the system. Since the reservoir is continually staffed with the reservoir level in continual observation, and with the aqueduct operators in continued radio contact, this possibility seems remote and beyond the scope of this investigation.

SECTION 4 - STRUCTURAL STABILITY

4.1 Evaluation of Structural Stability

a. Visual Observations

The embankment for the entire perimeter of impounded reservoir is in good condition with no indication of misalignment or other structural movement, cracking or significant erosion. Riprap visible on the face of the impounding slopes is generally in good condition although mortar joints are poor at many locations and a light to medium growth of low foliage is occurring. The width across the top of high embankment sections is somewhat variable but is typically on the order of 10 to 15 feet. Downstream slopes of most of the embankment areas have plant growth which includes mature, tall, large diameter trees. No seepage through embankments or below embankment toes was observed.

Uptake and downtake structures are generally in good operating condition. Some repair was ongoing at the time of the inspection.

b. Geology and Seismic Stability

The rock beneath the reservoir is Manhattan Schist which overlies Inwood Marble. Although the schist is a resistant and durable rock, it has been known to weather readily under a condition of excessive water along foliation planes. Such weathering is unlikely to affect the reservoir structure above. However, the marble beneath the schist is susceptible to solution, and thus the possibility arises that solution of the lower marble could lead to subsidence of the schist thereby affecting the reservoir. Such speculation is dependent upon the thickness of the schist, unknown at present, and the degree of "rotted" schist, if any.

As shown on the map, the Manhattanville fault crosses the northeast corner of Central Park. This fault plane dips to the southwest. Two smaller faults are located northwest of the park. The general structural trend of the closely folded metamorphic rock is about N35°E.

Although the seismic probability map indicates the area to be in Zone 1, this map is highly generalized and is not recommended for sophisticated seismic interpretation. The New York State Geological Survey believes this region is more suitably considered as being at least Zone 2. Survey staff considers an earthquake of Modified Mercalli (MM) intensity VII a distinct possibility in this area.

Historically, several earthquakes of varying intensity have occurred in this area: in 1737 (M.M. VII), in 1804 (M.M. III), in 1841 (M.M. III), in 1848 (M.M. V), in 1878 (M.M. V), and in 1939 (M.M. II).

c. Data Reviews and Stability Evaluation

Design drawings indicate an embankment cross section consisting of a puddle core and compacted earth outer sections. The core penetrates to rock underlying the site but the compacted earth shell sections bear on soil. Embankment slopes of 1-1/2 vertical on 1 horizontal are specified, with a riprap of broken stone provided for the impounding face. Top widths of some 15 feet are shown. Information on soil types in the embankment shell, and methods of soil placement and compaction, is not provided. Observable conditions indicate general agreement with the design drawings.

The embankments are in good condition at present. However, the presence of mature large trees at many locations on the outside/downstream slope of embankment sections which are limited in cross-section will provide the opportunity for seepage to commence when root systems eventually penetrate the puddled core wall.

The constructed embankments are in good condition with no indication of structural damage or distress from past loadings including effects of at least one minor area earthquake. This site is in an area having a Seismic Zone rating of 1 (with a suggested upgrading to Zone 2), and convention assumes no earthquake hazard. It is anticipated that, properly maintained, this reservoir will continue to serve satisfactory for loading conditions which are similar to those of the past.

SECTION 5 - ASSESSMENT/REMEDIAL MEASURES

5.1 DAM ASSESSMENT

On the basis of the Phase I visual examination, the earth embankmment of the Central Park Receiving Reservoir appears to be adequate for normal reservoir operation. The location of this facility in the center of Manhattan makes the detection of any seepage problems almost immediate. At the time of the Phase I inspection, a settlement had occurred on the northeast side of the reservoir in the service road which encircles the reservoir. This settlement shows no evidence of any water seepage. Its cause remained unknown at the conclusion of the inspection. The outer face of the embankment forming the reservoir is heavily grown up with trees and brush. These trees are relatively large and have been in place for a number of years. Pedestrian traffic down the slopes of the embankment has deteriorated the turf so that minor erosion occurs in some areas.

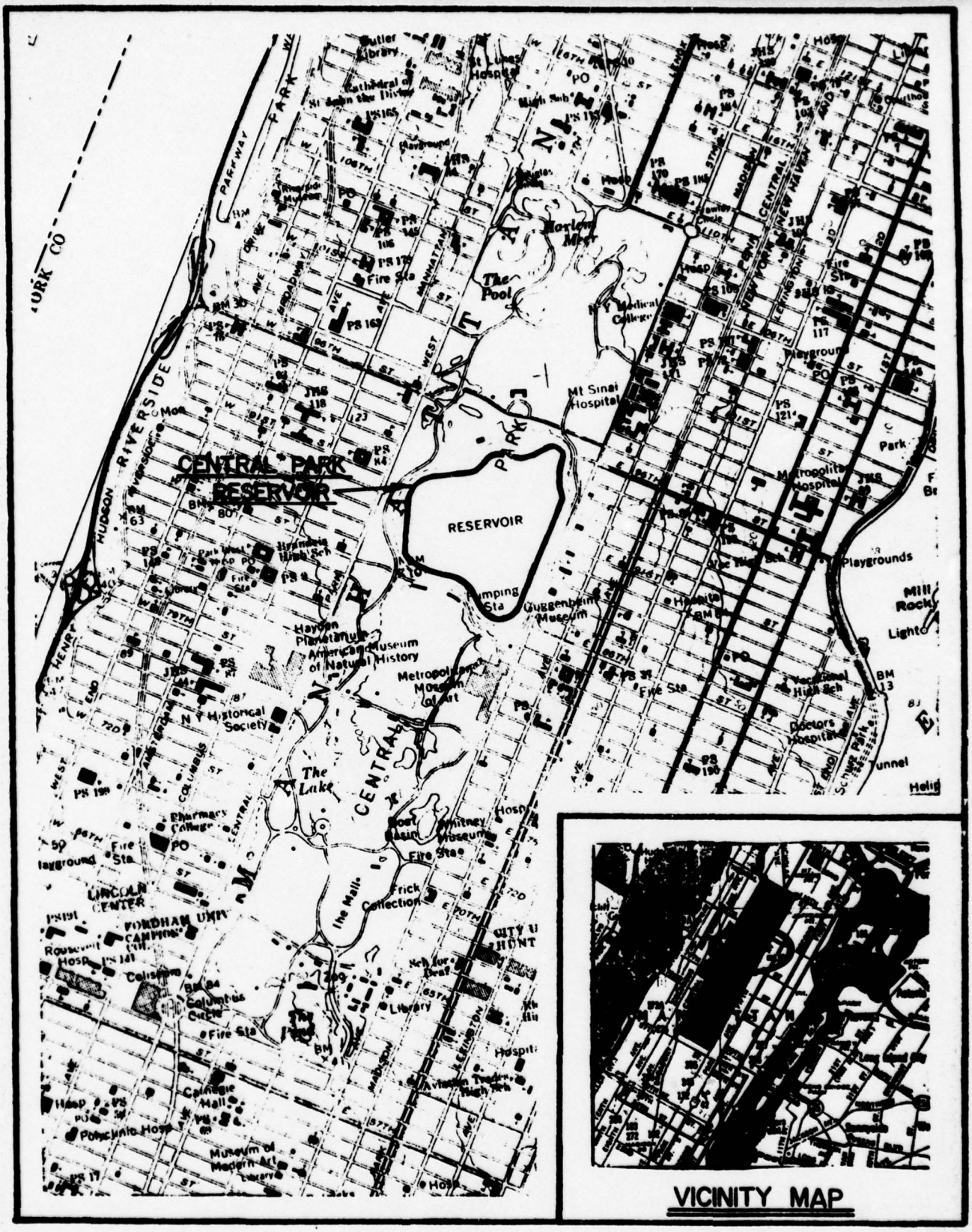
5.2 REMEDIAL MEASURES

a. Alternatives

The investigation of the cause of the settlement in the bridle path should be pursured and remedial work taken as necessary. Trees, stumps and brush should be removed from the exterior slopes of the embankment. Continuing maintenance should be conducted around the perimeter of the reservoir to minimize erosion of the downstream slopes.

b. Operation and Maintenance

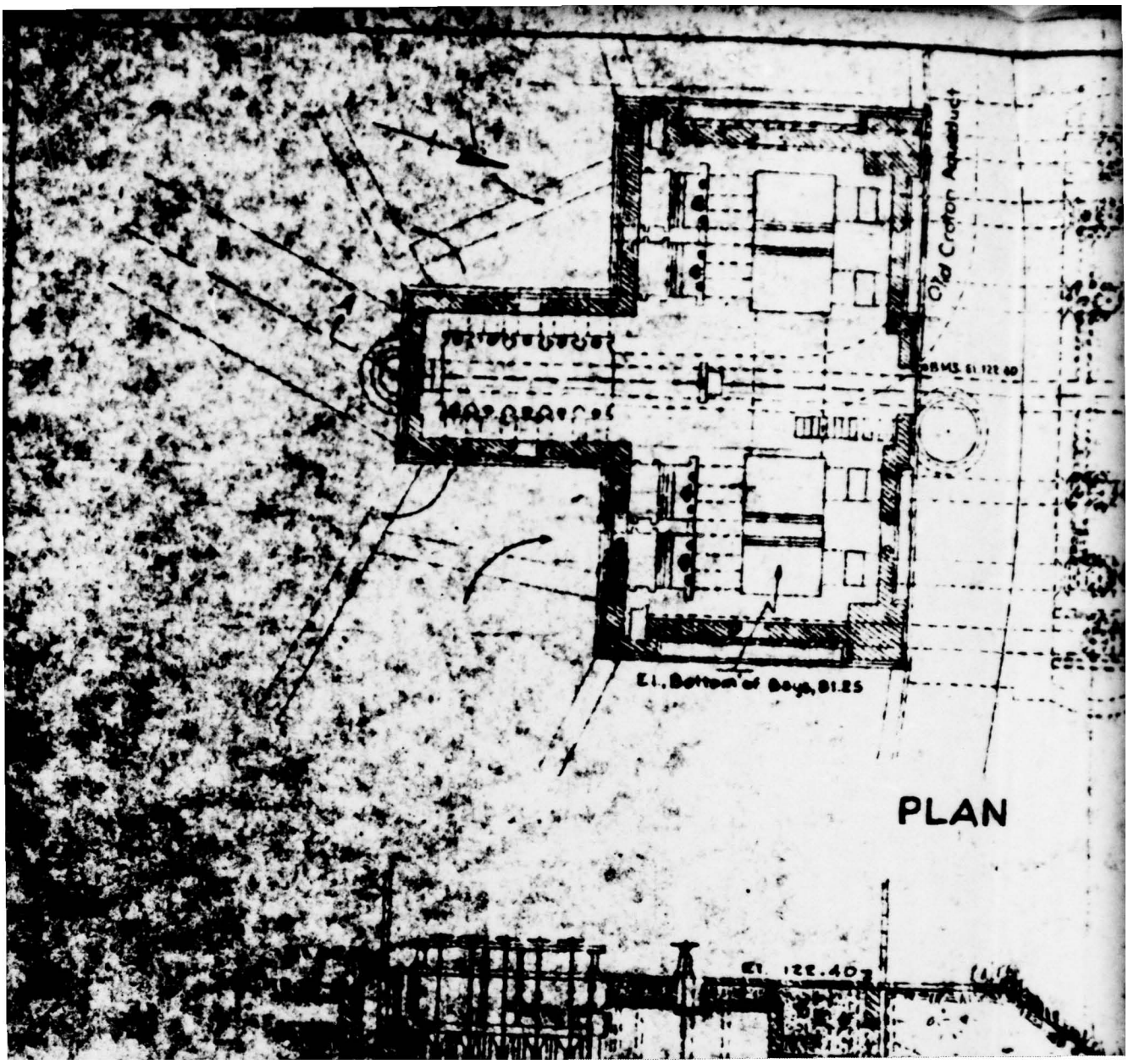
No specific relevant operating information has been given. There is an operating staff on the site 24 hours a day. The facility is continually maintained.



VICINITY MAP

LOCATION PLAN

FIGURE 1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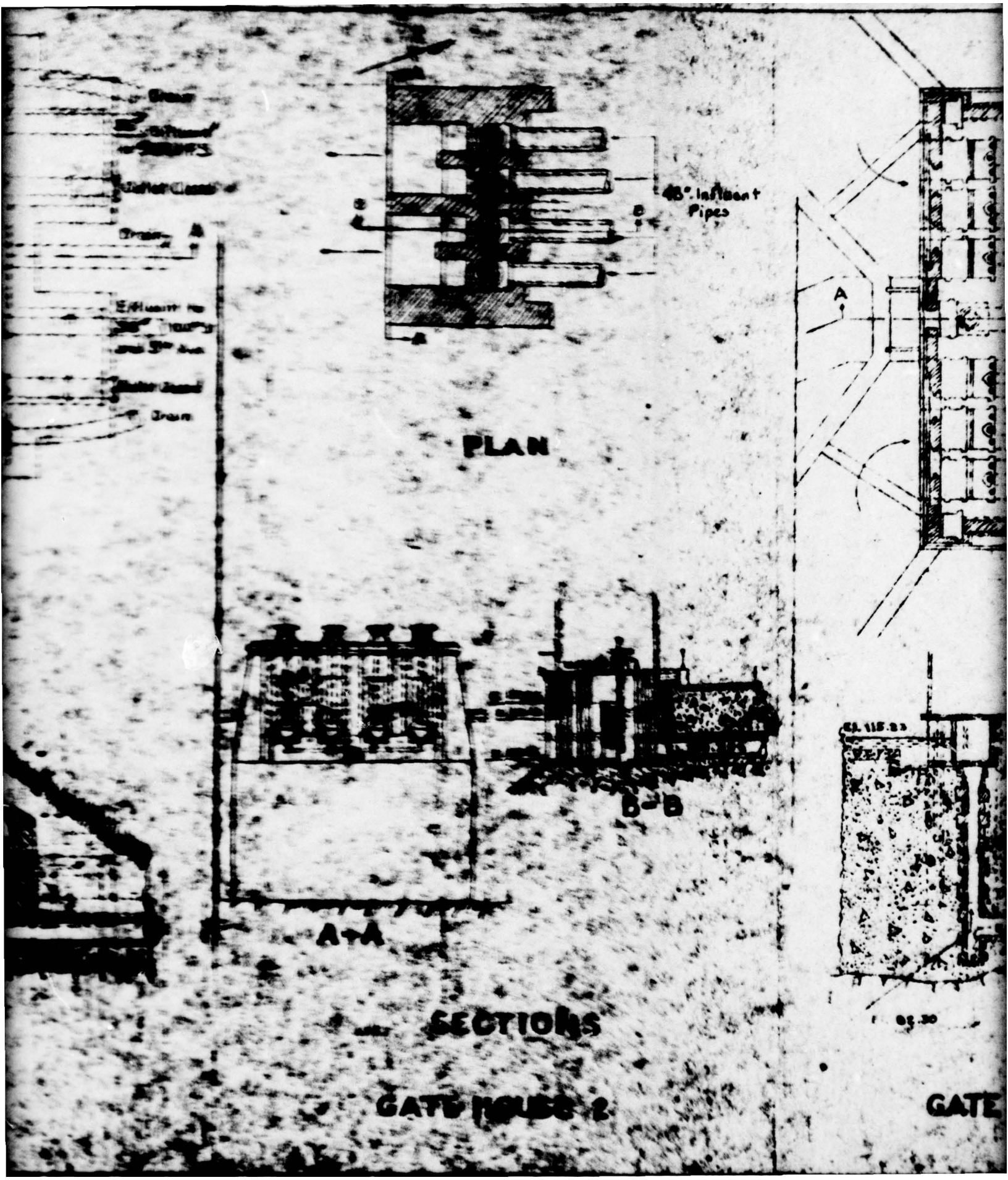
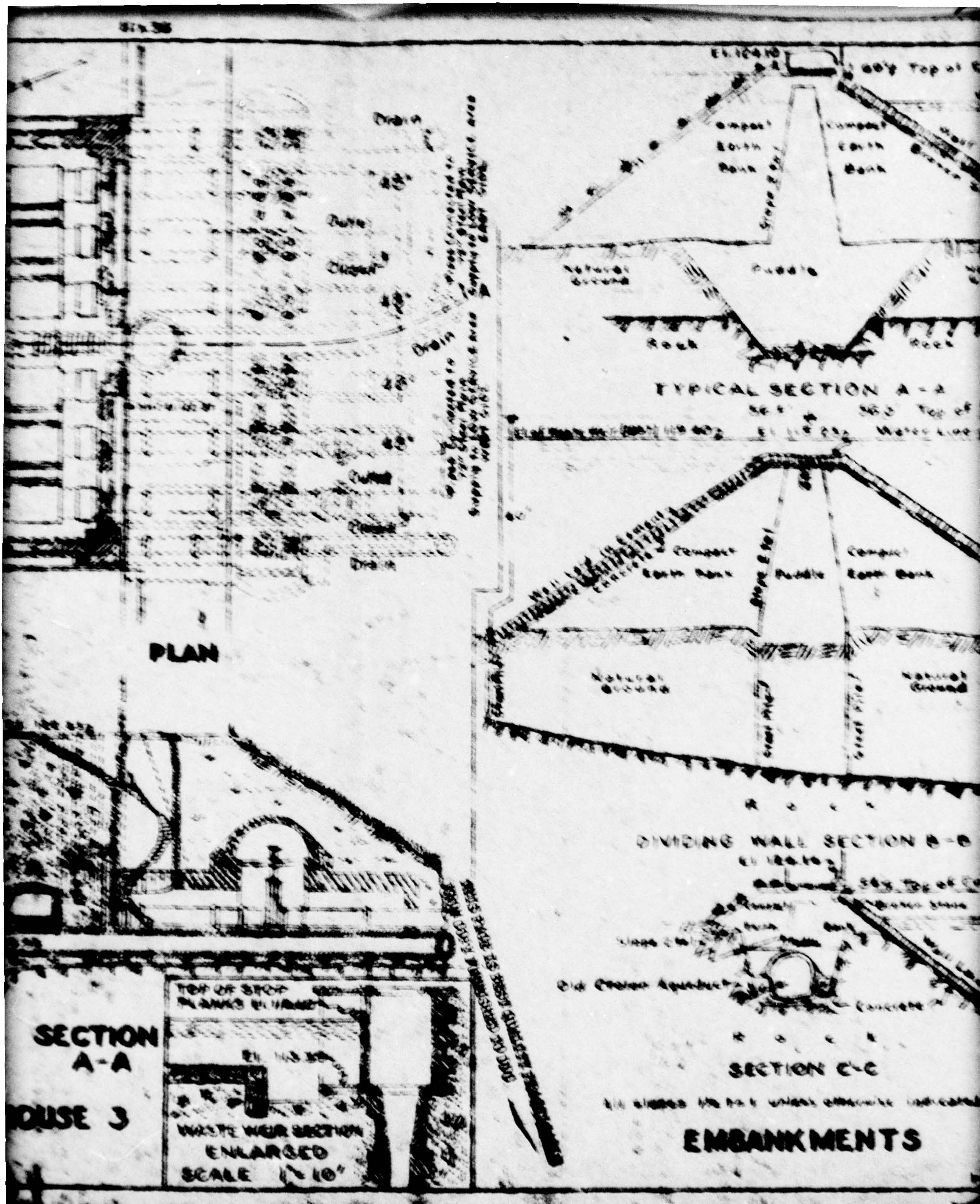
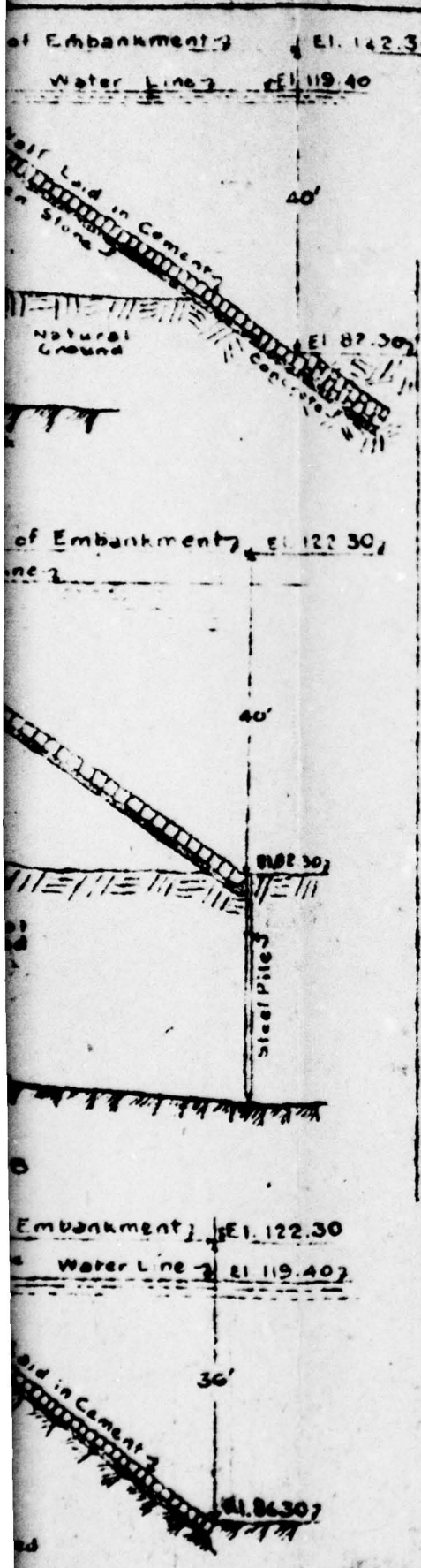
PLAN
El. 122.40

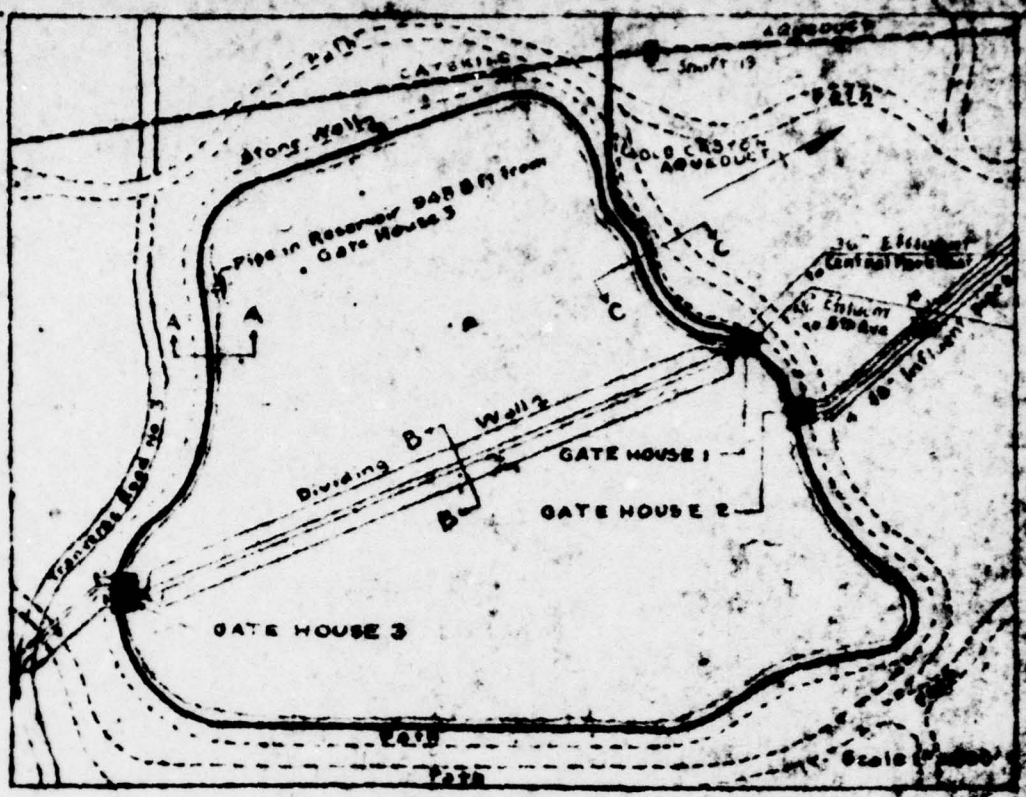

48". Influent Pipes
PLAN
B-B
A-A
SECTIONS
GATE HOUSE 2
GATE



Drain
Outlet
PLAN
SECTION A-A
WASTE WEIR SECTION
ENLARGED
SCALE 1"=10'
Compact Earth Bank
Puddle
Natural Ground
Rock
TYPICAL SECTION A-A
Compact Earth Bank
Puddle
Compact Earth Bank
Natural Ground
Natural Ground
DIVIDING WALL SECTION B-B
Old Croton Aqueduct
Concrete
SECTION C-C
EMBANKMENTS

File 149





LIST OF ELEVATIONS

DATUM, MEAN SEA LEVEL, AT SANDY HOOK

DESCRIPTION	ELEVATION	DESCRIPTION	ELEVATION
GATE HOUSE 1		**GATE HOUSE 3**	
B.M. 3 Brass knob, 10' W of door	122.48	B.M. E Brass Knob, 15' W. of door	122.[illegible]
Floor of Gate House	122.40	Floor of Gate House	[illegible]
Bottom of Bays	91.25	Floor at Waste Weir	118.[illegible]
Top of Gate Slides	116.48	Masonry Spillway	118.[illegible]
Bottom of North Bay	109.46	Bottom of Bays	82.[illegible]
Wood platform over Spillway	120.07	Bottom of Drainage Sump	93.[illegible]
Spillway, Top Step	119.43		
Spillway, Bottom Step	118.37		
GATE HOUSE 2		**MISCELLANEOUS**	
B.M. I, cut, 5' W. Cor railing base	126.88	Wall, typical Section	128.10
Floor of Gate House, grating	126.86	Wall, containing Aqueduct	124.18
Dividing Wall	122.86	Dividing Wall	116.28
Top of Arch, inlet to Res.	119.48		
Invert of Influent Pipes	109.59		
Bottom of Bays	109.45		

INFORMATION FROM BRASS PLATES IN GATE HOUSES 1 & 3

Construction began	April 8, 1858	Area (probably includes embankments)	106.75 Acres
Water first introduced	Aug. 19, 1862	Capacity	1,000,000,000 Gals.

OTHER INFORMATION

Area of Water Surf. at el. 119.40	96 Acres.	Capacity, water at el. 119.40	1,018,000,000 Gals.
Average Depth	37.10 Feet	Perimeter at top of stone wall	1.6 Miles

CITY OF NEW YORK
DEPARTMENT OF WATER SUPPLY GAS & ELECTRICITY

GATE HOUSE SUBSTRUCTURES
CENTRAL PARK RESERVOIR

BOROUGH OF MANHATTAN
MAY 1937 — SCALE - 1 INCH = 80 FEET

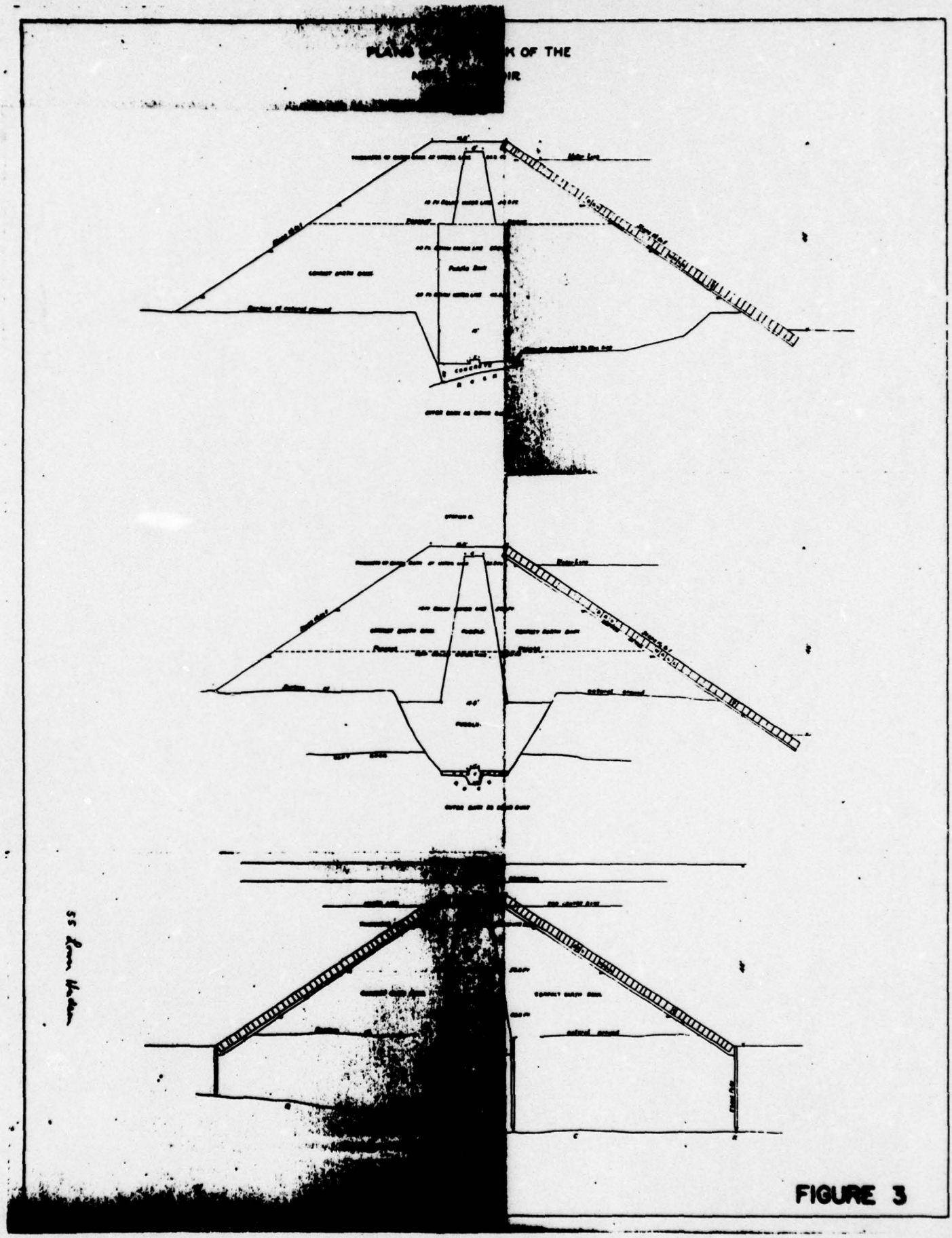


FIGURE 3

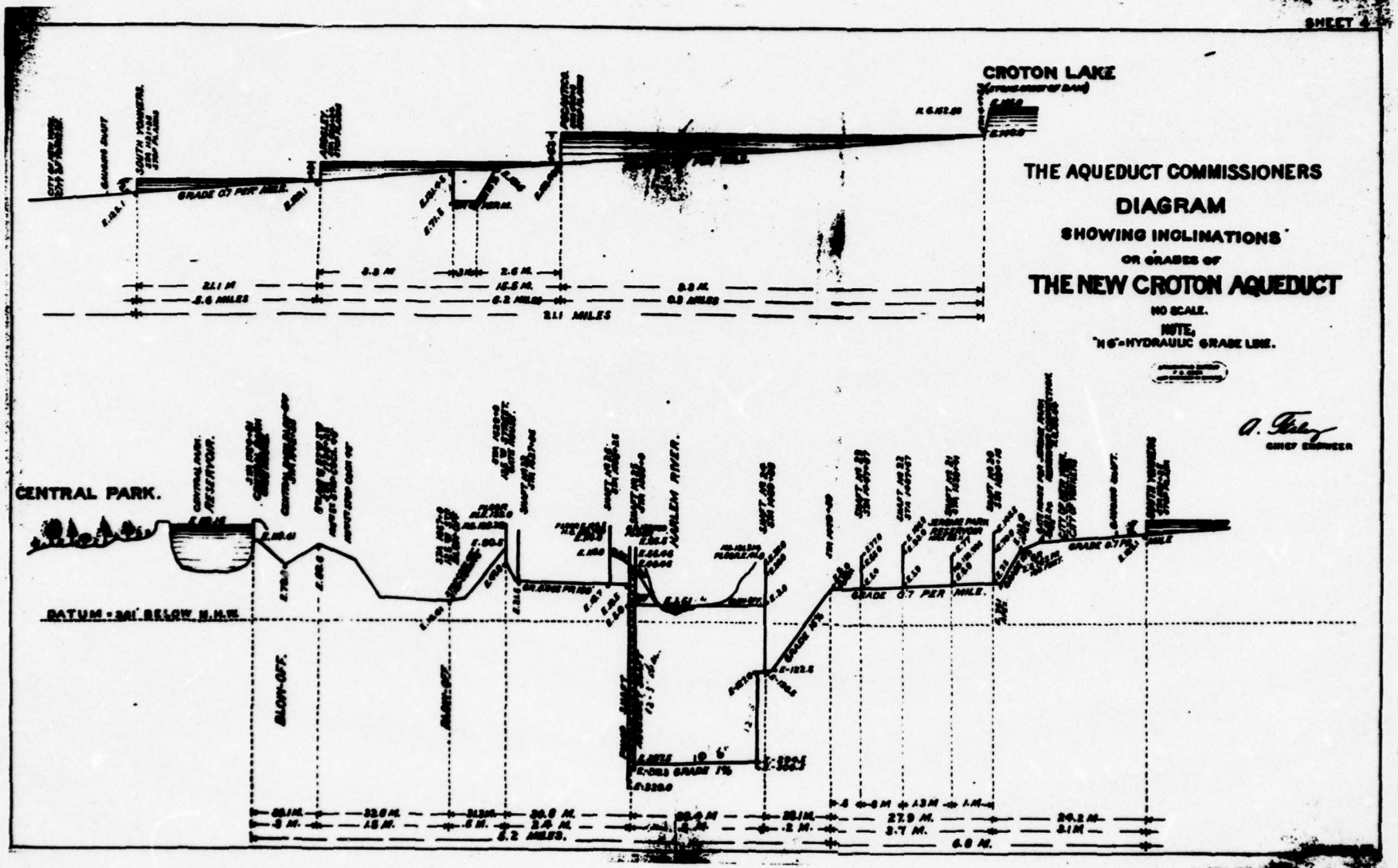
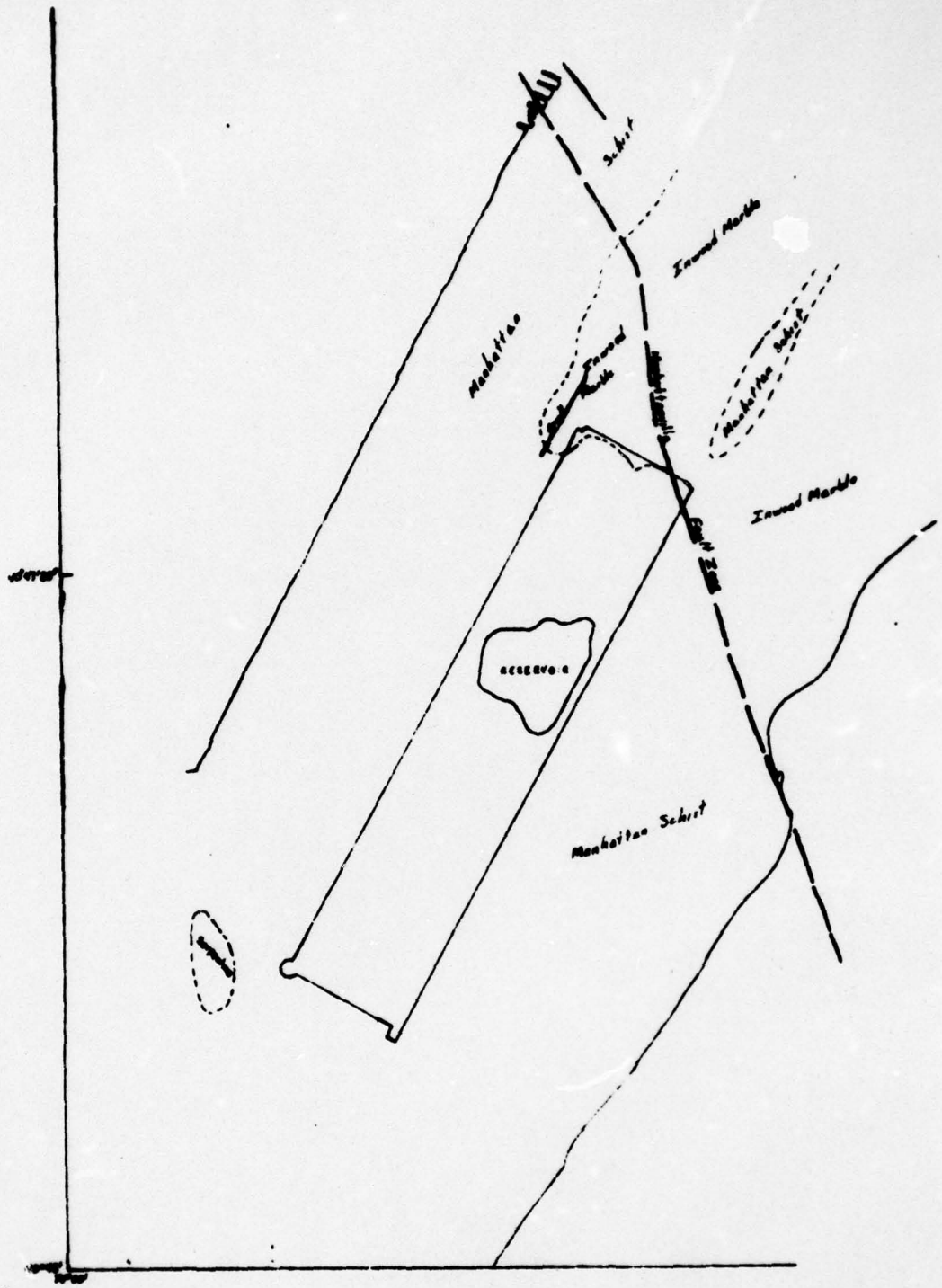


FIGURE 4



GEOLOGIC MAP
FIGURE 5

APPENDIX A

FIELD INSPECTION REPORT

CHECK LIST
VISUAL INSPECTION

PHASE 1

Name Dam Central Receiving Reservoir County New York State New York ID # 198

Type of Dam Earthen Reservoir Hazard Category 1

Date(s) Inspection June 22, 1978 Weather Cloudy Temperature 70°

Pool Elevation at Time of Inspection 116.5 M.S.L. Tailwater at Time of Inspection Not applicable. (Reservoir is a closed water supply system)

Inspection Personnel:

N.F. Dunlevy - Dale Engineering Company
James Hennessey, Deputy Engineer, Bureau of Water Supply
F.W. Byszewski - Dale Engineering Company
Stanley Goldstein, N.Y.C. Bureau of Water Supply
D. McCarthy - Dale Engineering Company
William Melnichuk, N.Y.C. Bureau of Water Supply

Neal F. Dunlevy Recorder

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
ANY NOTICEABLE SEEPAGE	N/A	
STRUCTURE TO ABUTMENT/EMBANKMENT JUNCTIONS	N/A	
DRAINS	N/A	
WATER PASSAGES	N/A	
FOUNDATION	N/A	

CONCRETE/MASONRY DAMS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS CONCRETE SURFACES	N/A	
STRUCTURAL CRACKING	N/A	
VERTICAL & HORIZONTAL ALIGNMENT	N/A	
MONOLITH JOINTS	N/A	
CONSTRUCTION JOINTS	N/A	
STAFF GAGE OF RECORDER	N/A	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None observed. Reservoir impoundment faced with concrete capped riprap.	Embankment 1.6 miles in circumference. Embankment slope mainly to east and south side.
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	Unusual hole beyond toe on northeast side of reservoir on extreme side of service road. The hole was 3' in diameter and 2-3 feet deep. N.Y.C. suspects main break & will investigate.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None observed.	
VERTICAL AND HORIZONTAL ALINEMENT OF THE CREST	Reservoir topped with path and fenced. Top of reservoir is serpentine shaped. No unusual movement observed.	
RIPRAP FAILURES	None observed. Some growth in riprap. Vegetative growth is usually cleared annually.	

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	No abutment. Perched reservoir. Junction of toe of embankment with natural terrain showed no unusual movement or seepage.	
ANY NOTICEABLE SEEPAGE	None observed.	
STAFF GAGE AND RECORDER	None.	
DRAINS	None.	

UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
OVERFLOW WEIR	Good condition.	In downtake structure, consists of a masonry weir with flash boards. Dimensions 6 feet wide with 2-foot opening.
APPROACH CHANNEL	None.	Reservoir
DISCHARGE CHANNEL	Not observed.	Discharges into downtake structure; flows into storm drains.
BRIDGE AND PIERS	None.	

GATED SPILLWAY

WATER SUPPLY INTAKE AND DOWNTAKE

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	Intake and downtake structures in working order. Maintenance was being performed on an intake leaky gate.	
APPROACH CHANNEL	Submerged; not visible to observe.	Supply from Jerome Reservoir to 135th St under pressure. Then via pipe and aquadu into reservoir by gravity.
DISCHARGE CHANNEL	Submerged; not visible to observe.	Peaks at 50 MGD pumped plus 80 MGD gravity Max. 1977 72 MGD
BRIDGE AND PIERS	None.	
GATES AND OPERATION EQUIPMENT	Reportedly in working order. Full time operating personnel at site.	Intake gate being repaired by divers at time of inspection as part of routine maintenance and repair.

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Not observed.	Outlet works in reservoir. Supply gravity fed water supply to structures in Manhattan with 40 feet or less of head.
INTAKE STRUCTURE	Not observed.	
OUTLET STRUCTURE	Not observed.	
OUTLET CHANNEL	Not observed.	
EMERGENCY GATE	Not observed.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Not applicable.	Perched reservoir would flood over embankment or through breech.
SLOPES	Not applicable.	In case of breech or overflow of embankment, maximum head is to the south and east.
APPROXIMATE NO. OF HOMES AND POPULATION	Highly urbanized. Midtown Manhattan 5th Ave. between 85th & 94th Streets.	Damage and/or potential loss of life in case of a breech is great.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None.	
OBSERVATION WELLS	None.	
WEIRS	None.	Overflow weir could be monitored.
PIEZOMETERS	None.	
OTHER	None.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	None.	Reservoir perched above adjacent ground on all sides.
SEDIMENTATION	None.	Only treated water gets into reservoir.

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE 1

NAME OF DAM Central Receiving Reser

ID # 198

ITEM	REMARKS
AS-BUILT DRAWINGS	None.
REGIONAL VICINITY MAP	See this report.
CONSTRUCTION HISTORY	Limited data available. See this report. Other information can be found in books on N.Y.C., Central Park and from data at N.Y.C. Bureau of Water Supply.
TYPICAL SECTIONS OF DAM	See this report.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See this report.
RAINFALL/RESERVOIR RECORDS	Available for N.Y.C. area.

ITEM	REMARKS
DESIGN REPORTS	Little or no information available. None were found and included in this report.
GEOLOGY REPORTS	Limited data. See this report.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	None.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	None.
POST-CONSTRUCTION SURVEYS OF DAM	None.
BORROW SOURCES	Not known.

ITEM	REMARKS
MONITORING SYSTEMS	None. City can determine inflow and outflow.
MODIFICATIONS	None.
HIGH POOL RECORDS	Generally not available. Records could be researched from daily records.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None available or disclosed for this report.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None disclosed.
MAINTENANCE OPERATION: RECORDS	See N.Y.C. Bureau of Water Supply.

ITEM	REMARKS
SPILLWAY PLAN SECTIONS DETAILS	Not applicable.
OPERATING EQUIPMENT PLANS & DETAILS	See this report for general information.

CENTRAL PARK RECEIVING DAM

CHECK LIST
HYDROLOGIC & HYDRAULIC
ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: None (Water supply fed by N.Y.C. Croton System)
(Pool area - 95 acres)

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 119.0

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 119.0

ELEVATION MAXIMUM DESIGN POOL: 122.30

ELEVATION TOP DAM: 124.14 (1.6 miles around)

CREST: Overflow weir in Gate House #3 (see Plans)

a. Elevation 119.40 top of planks, 113.39 top of wier
b. Type Masonry Weir (planks in use)
c. Width 18-24 inches, masonry; 4 inches, planks
d. Length 72 inches
e. Location Spillover Below Gate House #2
f. Number and Type of Gates 1

OUTLET WORKS: (Drawdown Facility)

a. Type 60-inch pipe
b. Location Below Gate House #3
c. Entrance Inverts 113.39 to 119.40 w/planks
d. Exit Inverts 77.00 feet scaled
e. Emergency Draindown Facilities

HYDROMETEOROLOGICAL GATES:

a. Type None
b. Location None
c. Records None

MAXIMUM NON-DAMAGING DISCHARGE: Not applicable. Inflow controlled by N.Y.C. Water Board Operation.

OTHER DATA:

a. Reservoir is a storage reservoir. It supplies water in Manhattan with head requirements below 40 feet fed by gravity.
b. Additional pump out capacity of 50 MGD.
c. Daily flow capacity is 80 MGD by gravity.
d. Storage 35,000,000 gallons per foot.
e. Eight-year peak 72 MGD.

APPENDIX B

PREVIOUS INSPECTION REPORTS

STATE OF NEW YORK

DEPARTMENT OF

State Engineer and Surveyor

ALBANY

Report of a Structure Impounding Water

... provisions of Section 22 of the Conservation Law, being Chapter LXV of the ... New York State, relating to safeguarding life and property and the erection, reconstruction, ... for impounding water, owners of such structures are requested to fill out as completely ... for each such dam or reservoir owned within the State of New York for which no plans ... are on file in this Department, and to return this report form, together with prints or ... thereof to this department.

The New Central Park Receiving Reservoir.

... is in Central Park .... Borough of ....

... New York .... and ....

(... distance and direction from a well-known bridge, dam, village main cross-roads or mouth of a stream)

... of the structure built upon or does its pond flood any State lands? no

... address of the owner is City of New York

... is used for receiving & distributing water for water supply

... of the right bank, in the direction with the current, is ....; at the ... this material has a top slope of .... inches vertical to a foot horizontal on the ... structure, a vertical thickness at this elevation of .... feet, and the top surface extends ... of .... feet above the spillway crest.

... material of the left bank is ....; has a top slope of .... inches ... thickness of .... feet and a height of .... feet.

... material of the bed on which the structure rests is (clay, sand, gravel, boulders, granite, shale, ...

... character of the bed and the banks in respect to the hardness, perviousness, water bearing, ... to water, uniformity, etc. ....

Reservoir was constructed by excavation and embankment. It is practically water-tight.

9. If the bed is in layers, are the layers horizontal or inclined? ..... If inclined what is the direction of the horizontal outcropping relative to the axis of the main structure and the inclination and direction of the layers in a plane perpendicular to the horizontal outcropping?

10. What is the thickness of the layers?.....

11. Are there any porous seams or fissures?.....

12. The watershed at the above structure and draining into the pond formed thereby is.....square miles.

13. The pond area at the spillway crest elevation is 96 acres and the pond impounds 133,600 cubic feet of water.

14. The maximum known flow of the stream at the structure was.....cubic feet per second on

.....
(Date)

15. Has the spillway capacity ever been exceeded by a high flow? no

Can any possible flood flow from the pond otherwise than through the wastes noted under 17 and 18 of this report? no If so, give the location, the length and the elevation relative to the spillway crest and the character and slopes of the ground of such possible wastes.....

16. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the above structure. Describe the location, the character and the use of buildings below the structure which might be damaged by any failure of the structure; of roads adjacent to or crossing the stream below the structure, giving the lowest elevation of the roadway above the stream bed and giving the shape, the height and the width of stream openings; and of any embankments or steep slopes that any flood could pass over. Also state the character and use made of the ground below the structure.....

If the reservoir should fail, the neighboring streets would be flooded

17. WASTES. The spillway of the above structure is see opposite page. feet long in the clear, held at the right end by a.....the top of which is.....feet above the spillway crest, and has a top width of.....feet; and at the left end by a..... top of which is.....feet above the spillway crest, and has a top width of.....

18. There is also for flood discharge a pipe.....inches inside diameter, [illegible] feet below the spillway crest; and a (slide) gate outlet..... feet wide in the clear, and the bottom is..... feet below the spillway crest.

...below the spillway there is an apron built of..... (Material) .....

... feet thick. The downstream side of the apron has a thickness of..... feet

..... feet.

...structure any weaknesses which are liable to cause its failure in high flows?.....

No.

...s. On the back of this report make a sketch to scale for each different cross-section of the above ...atest depth; giving the height and the depth from the surface of the foundation, the bottom width, ...r a concrete or masonry spillway at two feet below the crest), the elevation of the top in reference ...rest, the length of the section, and the material of which the section is constructed; on the spillway ...ss section of the apron, giving its width, thickness and material, and show the abutment or wash ...f the spillway, giving its heights and thickness. Mark each section with a capital letter. Also ...w the above sections by their top lines, giving the mark and the length of each; the openings by ...dimensions; the abutments by their top width and top lengths from the upstream face of the spill- ...outline the apron. Also sketch an elevation of each end of the structure with a cross section of ...the depth and width excavated into the banks.

... SUPPLY. The waters impounded by the above structure have (not) been used for a public water ...

1862 ..... by..... The City of New York .....

.....

The reservoir is divided into an East and West Basin by a ... division wall. An inlet gatehouse constructed at the north ... an outlet gate-house at the south end of the reservoir.

The maximum depth of the water in the reservoir is 38 feet.

A waste-passage, 2 by 6 feet is formed on the top of the ...-... wall, where it ~~forms~~ joins the south gate-house.

A 4-foot culvert conveys the waste-water to the 86th St. sewer.

[illegible] profiles of dams of the New Central Park Reservoir, [illegible] horoto.

The above information is correct to the best of my knowledge and belief.

Municipal Building, New York
(Address of person)

February-1925.
(Date)

Chief Engineer-Bureau of Water [illegible]
(A person signing [illegible])
Dept. of W. S. G. & [illegible]

APPENDIX C

REFERENCES

APPENDIX

REFERENCES

1. Edward Wegmann: The Design and Construction of Dams, John Wiley and Sons (1918)

2. Charles H. Weidner: Water for a City - Rutgers University Press (1974)

3. The University of the State of New York - The State Education Department - State Museum and Science Service - Geological Survey: Geological Map of New York (1961)

4. James C. Duane: Report to the Aqueduct Commission 1887-1895 (1895)

5. John F. Cowan: Report to the Aqueduct Commission 1895-1907

6. Department of the Army, Office of the Chief of Engineers. National Program of Investigation of Dams; Appendix D: Recommended Guidelines for Safety Inspection of Dams, 1976

7. Linsley and Franzini: Water Resources Engineering, Second Edition, McGraw-Hill (1972)

8. Sherard, Woodward, Gizienski, Clevenger: Earth and Earth - Rock Dams, John Wiley and Sons, Inc., 1963

9. Ven Te Chow: Handbook of Applied Hydrology, McGraw-Hill, 1964