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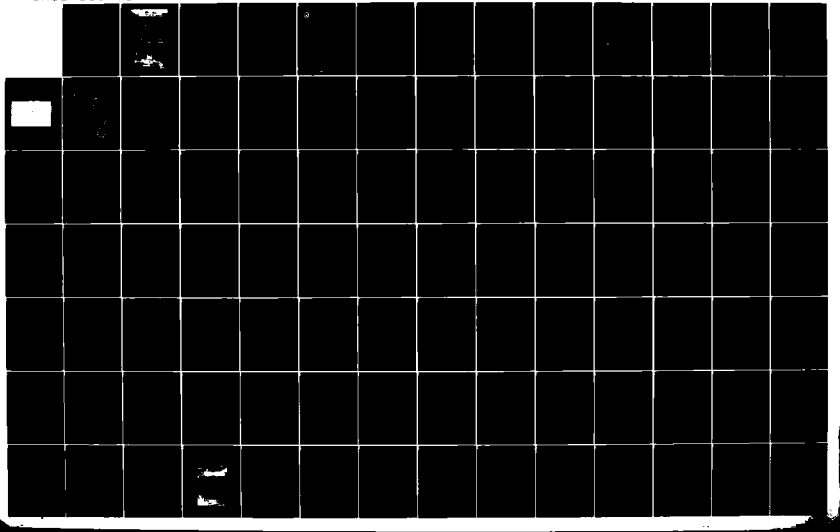

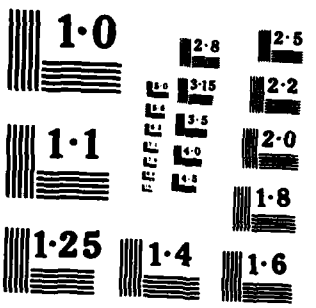
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DIAMOND HILL RESERVOIR DAM
RI 00802

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered) ADA 156 846

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
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18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

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

DAMS, INSPECTION, DAM SAFETY,

Blackstone RIver Basin
Cumberland Rhode Island
Burnt Swamp Brook

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

The dam is a zoned earth dam,. The dam has a maximum height of 44 ft. with a total length of 2000 ft. The dam is considered to be in good condition. It is recommended that potential movements along various faults be monitored. The test flood is equal to the PMF. Overtopping could result in the failure of the dam. There are various remedial measures which must be implemented by the owner.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF

NEDED

DEC 22 1978

Honorable J. Joseph Garrahy
Governor of the State of Rhode Island
and Providence Plantations
State House
Providence, Rhode Island 02903

Dear Governor Garrahy:

I am forwarding to you a copy of the Diamond Hill Reservoir Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Management, the cooperating agency for the State of Rhode Island. In addition, a copy of the report has also been furnished the owner, Pawtucket Water Supply Board, 250 Armistice Boulevard, Pawtucket, Rhode Island 02860, ATTN: Robert Blauvet, Chief Engineer.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Management for your cooperation in carrying out this program.

Sincerely yours,

JOHN P. CHANDLER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

DIAMOND HILL RESERVOIR DAM

RI 00802

BLACKSTONE RIVER BASIN

CUMBERLAND, RHODE ISLAND

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE 1 INSPECTION REPORT

IDENTIFICATION NO.:	RI 00802
NAME OF DAM:	Diamond Hill Reservoir Dam
TOWN:	Cumberland
COUNTY AND STATE:	Providence County, Rhode Island
STREAM:	Burnt Swamp Brook
DATE OF INSPECTION:	May 30, 1978

BRIEF ASSESSMENT

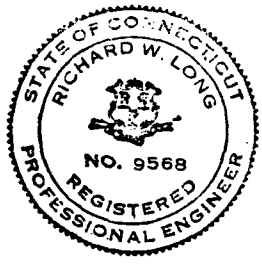
Diamond Hill Reservoir Dam is a zoned earth dam, designed and constructed in 1970. The dam has a maximum height of 44 feet and is approximately 2000 feet long (including the spillway). The embankment slopes are approximately 2.5H : 1.0V, with the downstream slope grassed and the upstream slope armored with riprap. The crest of the dam supports Reservoir Road. The spillway is located on the extreme left abutment of the main dam and is a free overflow ogee type weir 74 feet in length. The spillway discharges into the downstream channel which passes under Reservoir Road approximately 70 feet south of the spillway and then into Arnold

Mills Reservoir, which abuts the downstream toe of the main dam.

As a result of the visual inspection and the review of available design data, the dam is considered to be in GOOD condition. The following are the more significant recommendations which should be implemented to assure the long term performance of this dam: the intake structure needs immediate inspection and corrective repairs to correct vibration which occurs with the gates partially open; a regular maintenance and inspection program should be implemented; the east dike is constructed over a fault trace indicated on the USGS bedrock geology map of the area. It is recommended that potential movements along this fault be monitored.

Based on size and hazard classifications of the Corps of Engineers' guidelines, the "test flood" is equal to the Probable Maximum Flood (PMF). A PMF outflow of 13976 cfs (1680 csm) would overtop the dam by about 1.10 foot; therefore, the spillway capacity is considered to be inadequate. The spillway can safely pass 11900 cfs, or about 85 percent of the test flood outflow. Overtopping could result in the failure of the dam.

Additional recommendations and remedial measures that should be implemented by the Owner within 3 years after receipt of this Phase I Inspection Report are described in Section 7.



C-E MAGUIRE, INC.

BY: Richard W. Long
Richard W. Long, P.E.
Vice President

This Phase I Inspection Report on Diamond Hill Reservoir Dam has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Charles G. Tiersch

CHARLES G. TIERSCH, Chairman
Chief, Foundation and Materials Branch
Engineering Division

Fred J. Ravens Jr.

FRED J. RAVENS, Jr., Member
Chief, Design Branch
Engineering Division

Saul Cooper

SAUL COOPER, Member
Chief, Water Control Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

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

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

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

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

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TABLE OF CONTENTS (Cont.)

	6.	Spillway crest Elev. 198.0 (Water Supply Pool)	390
g.	Dam		
	1.	Type	Zoned earth embankment
	2.	Length	2000 feet (including spillway)
	3.	Height	70 feet from downstream bed of Arnold Mills Reservoir
	4.	Top Width	40 feet
	5.	Side Slopes	2H to 1V (approx.)
	6.	Zoning	Impervious core, chimney drain and filters
	7.	Impervious Core	Yes
	8.	Cutoff	Impervious soil to bedrock
	9.	Grout curtain	At spillway only
	10.	Other	----

2.	Top of dam	15680 at Elev. 210.0
3.	Water supply pool	11000 at Elev. 198.0 (Spillway Crest)
4.	Flood control pool	N/A

5. Net storage between top of dam and spillway crest is 4680 Ac-Ft., which represents 10.55 inches of runoff from the drainage area of 8.32 sq. mi.

6. One foot of surcharge storage is equal to 0.88 inches of runoff from the drainage area of 8.32 sq. mi.

f. Reservoir Surface (acres)

1.	Top dam @ Elev. 210.0	390 equals 7.32% of total drainage area.
2.	Maximum pool @ Elev. 210.0	390
3.	Flood-control pool	N/A
4.	Recreation pool	N/A
5.	Test-Flood pool @ Elev. 211.1	390

c. Elevations (ft. above NGVD)

1.	Top Dam	210.0
2.	Test flood pool elevation	211.1
3.	Full flood control pool	N/A
4.	Recreation pool	N/A
5.	Spillway crest	198.0
6.	Upstream invert at intake structure	141.0 (scaled)
	Downstream invert	139.0 (scaled)
7.	Streambed at centerline of dam	139.0 (estimated)
8.	Recorded Maximum tailwater	Unknown
9.	Observed tailwater at Inspection	160.55

d. Reservoir Lengths: (Feet)

1.	Length of maximum pool	6800 feet
2.	Length of recreation pool	N/A
3.	Lengths of flood control pool	N/A

e. Storage (acre-feet)

1.	Test flood elevations	16109 at Elev. 211.10

Watershed characteristics warranted the adoption of 1700 CSM as the "Test Flood", equal to the probable maximum flood (PMF) which gives an inflow value of 14144 cfs for this drainage area of 8.32 sq. miles.

b. Discharge at the Damsite. No discharge records exist for this reservoir. Listed below are discharge data for spillway and outlet works:

1. Outlet works: one 48-inch diameter pipe with Downstream Invert Elevation of 139.0.
2. Maximum known flood at damsite: unknown.
3. Overflow spillway capacity is 11,900 cfs at maximum pool level of Elevation 210.0 (Top of Dam).
4. Gated outlet capacity of the 48-inch conduit is 450 cfs with the pool at Elevation 198.0 (Spillway Crest).
5. Gated outlet capacity of 48-inch conduit is equal to 535 cfs at maximum pool level of Elevation 210.0 (Top of Dam).
6. Total spillway and outlet capacity is 12,435 cfs at maximum pool level of Elevation 210.0 (Top of Dam).

is maintained about 10.0 feet below the spillway crest until early October when the gates are closed and water collected. An auxilliary pump at the gatehouse allows the Water Supply Board to draw water from the lower Arnold Mills Reservoir and back pump to the larger capacity impoundment during periods of high rainfall when Arnold Mills Reservoir would normally overflow.

1.3 Pertinent Data

a. Drainage Area. The Diamond Hill Reservoir drainage basin is located in northeastern Rhode Island and has an oblong shape with a length of about 5.0 miles, an average width of 2.0 miles and an area of 8.32 square miles. The topography is generally rolling hills surrounding flat swampy areas. The highest elevation is 490.0 NGVD as compared to the normal reservoir level of 198.0 NGVD. Several swampy areas in the watershed tend to dampen the peaks generated by surface runoff from the higher elevations. The drainage basin is undeveloped, wooded terrain. A general basin map is shown in Appendix B.

Water Works and included an earth embankment with concrete core wall, a masonry spillway and a gatehouse with outlet works leading to Arnold Mills Reservoir. In February, 1926 a stone revetment was placed along the downstream toe of the embankment. The City of Pawtucket raised the level of the Diamond Hill Reservoir in 1961-62; constructed a new spillway and overflow channel; and rebuilt the highway bridge for Reservoir Road. In 1971, Diamond Hill Reservoir was raised for the second time to its present spillway crest level of Elevation 198.0 (feet) NGVD. This project included the construction of a new gatehouse, spillway, highway bridge, causeways and two earthen dikes. The main dam embankment is a zoned rolled earth structure with a crest Elevation of 210.0.

i. Normal Operational Procedures. The Pawtucket Water Supply Board, as a rule, begins to drawdown the water surface level at Diamond Hill Reservoir each year in early July by withdrawing water to Arnold Mills Reservoir at a rate of approximately 20 MGD. The level

d. Hazard Classification. This dam is classified as a HIGH HAZARD structure in accordance with the Corps of Engineers guidelines based on its potential failure impact on the downstream Arnold Mills impoundment, public utilities, highways and loss of life. See Appendix D for failure analysis.

e. Ownership. Diamond Hill Reservoir is owned and operated by the Pawtucket Water Supply Board.

f. Operator. Mr. A. Delude (401)-333-6970 (Gate Tender)
Reservoir Road
Diamond Hill
Cumberland, Rhode Island

Mr. Robert Blauvet, Chief Engineer
Pawtucket Water Supply Board
250 Armistice Boulevard
Pawtucket, Rhode Island
(401)-728-0500

g. Purpose. Diamond Hill Reservoir stores water for use in the water supply system for the City of Pawtucket.

h. Design and Construction History. Diamond Hill Reservoir was formed in 1885 when the original dam was constructed across Burnt Swamp Brook. The construction for the City of Pawtucket was supervised by the Pawtucket

The intake gate for the outlet works is located in a secured gatehouse structure which is entered by a 6-foot wide, 62-foot long foot bridge shown in Photo C-7. A chain-link fence with a locked gate provides additional security for this gate house. The intake gate is a manually-operated vertical hoist sluice gate. The outlet conduit leading from the gatehouse transitions from two 35-inch cast-iron pipes, approximately 105 feet in length to 40 feet of 54-inch diameter concrete pipe that has been reinforced by a 48-inch diameter one-half inch thick steel liner. The remainder of the conduit consists of 90 feet of 54-inch precast concrete cylinder pipe. This outlet conduit lies beneath the main embankment and discharges flows from the wet well of the gate house to Arnold Mills Reservoir downstream.

c. Size Classification. This dam is approximately 70.0 feet in height with an impoundment capacity at the top of the dam equal to 15680 Ac-Ft. and is classified as INTERMEDIATE in size.

riprapped while the downstream slopes are grassed. The lower portion of the downstream face of the dam is riprapped for a length of about 800 feet where the toe of slope extends below the water level of the adjacent Arnold Mills Reservoir.

The spillway is located near the left abutment of the main dam. The spillway is a reinforced concrete, free-flowing, ogee-type wier, 74 feet in length. The spillway is uncontrolled. The spillway is located 90 feet upstream from the longitudinal axis of the main embankment as shown in Photo C-6. Concrete core walls extend from the spillway abutments to the impervious core of the dam. Spillway flows discharge into a channel that was excavated through bedrock to Arnold Mills Reservoir approximately 225 feet downstream of the spillway. The channel is spanned by a bridge approximately 85 feet in length that supports Reservoir Road. The side slopes of the channel are about 1.5H : 1.0V and are paved to the downstream side of the bridge with dry-set and chinked stone slabs.

the impoundment. Reservoir Road passes over the crest of the dam.

b. Description of Dam and Appurtenances. The dam is an earth embankment structure with a crest length of about 2000 feet (including the spillway). The crest width is 40 feet and the upstream and downstream slopes of the dam are approximately 2.0H : 1.0V. See Photos C-2 and C-3. The West Dike is an earth embankment located to the immediate west and continuous with the right abutment of the main embankment. This dike is approximately 1000 feet in length, with a crest width of 10 feet and upstream and downstream slopes of 2.5H : 1.0V and 3.0H : 1.0V respectively. The East Dike is located approximately 500 feet east of Reservoir Road and is separated completely from the main embankment. This dike is about 600 feet in length with a crest width of 10 feet with slopes typically 2.5H : 1.0V, both upstream and downstream. The dikes are shown in Photos C-4 and C-5. (Also see record drawings in Appendix B). The upstream slopes of the dam and dikes are

b. Purpose

1. Perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.
2. Encourage and assist the States to initiate quickly effective dam safety programs for non-Federal dams.
3. To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location. Diamond Hill Reservoir, located in the Northeastern corner of Rhode Island in the Town of Cumberland, forms the headwaters of the Pawtucket Water Supply System. The reservoir is located immediately north of Reservoir Road approximately 0.75 miles east of Rhode Island Route 114. The watershed area extends northerly and easterly into Wrentham and Plainville, Massachusetts and is drained by Burnt Swamp Brook. The reservoir surface area is about 390.0 acres. The dam is located along the southern perimeter of

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

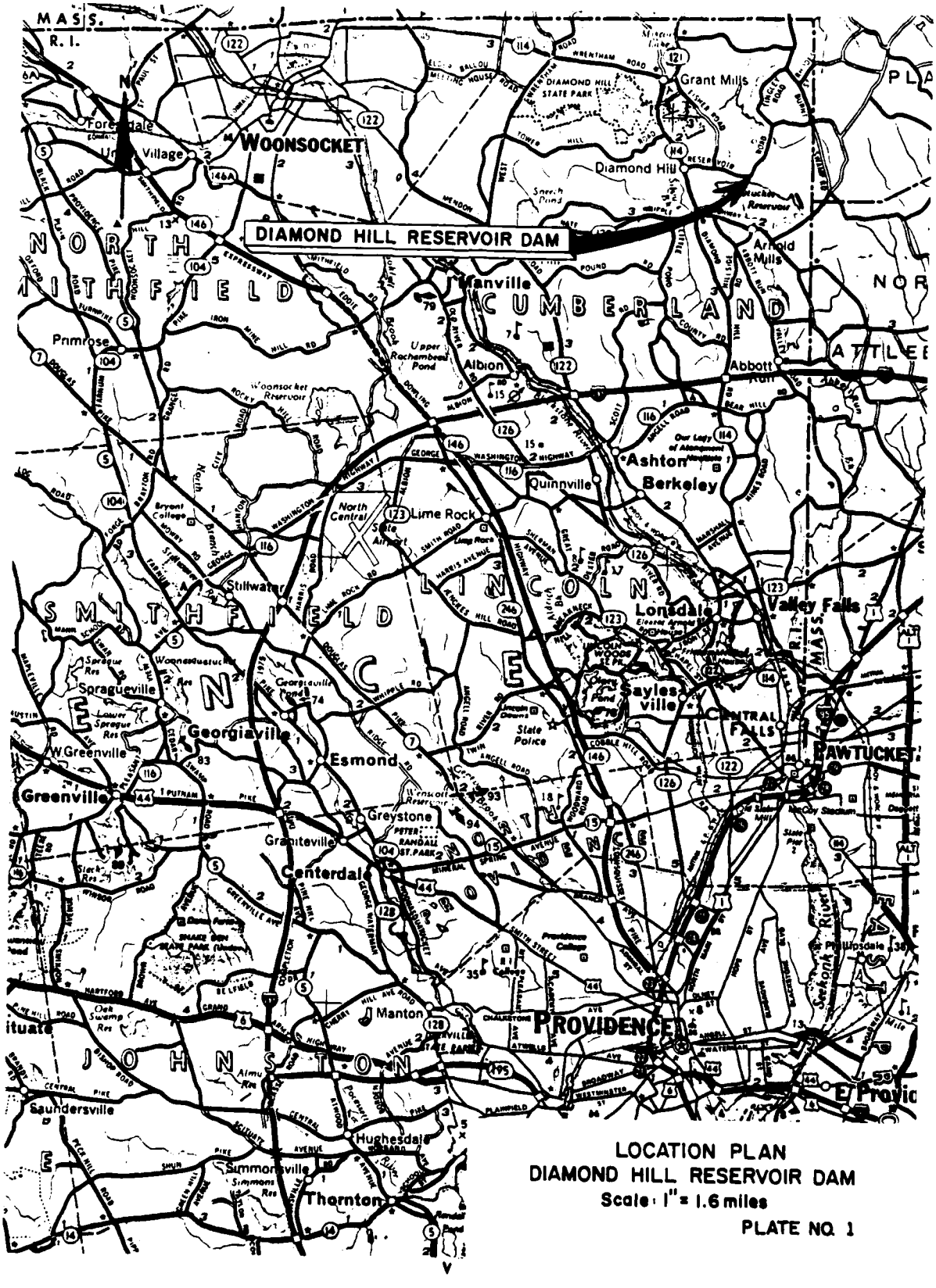
NAME OF DAM - DIAMOND HILL RESERVOIR DAM

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. C-E Maguire, Inc., has been retained by the New England Division to inspect and report on selected dams in the State of Rhode Island. Authorization and notice to proceed was issued to C-E Maguire, Inc., under a letter of 26 April, 1978, from Ralph T. Garver, Colonel, Corps of Engineers Contract No. DACW33-78-C0300 has been assigned by the Corps of Engineers for this work.



LOCATION PLAN
DIAMOND HILL RESERVOIR DAM
Scale: 1" = 1.6 miles

PLATE NO. 1

C-1 DIAMOND HILL RESERVOIR – LOOKING NORTH

h. West Dike

1.	Type	Zoned earth embankment
2.	Length	1040 feet
3.	Height	30 feet
4.	Top width	10 feet
5.	Side slopes	2.5H to 1V upstream 3H to 1V downstream
6.	Zoning	Impervious core with pervious embankment shells upstream and downstream. Constructed over previously existing dike.
7.	Impervious core	Yes
8.	Cutoff	Impervious soil core to bedrock
9.	Grout curtain	No
10.	Other	Toe drain

i. East Dike

1.	Type	Zoned earth embankment
2.	Length	635 feet
3.	Height	20 feet
4.	Top width	10 feet
5.	Side slopes	2.5H to 1V

6.	Zoning	Impervious core with pervious embankment shells upstream and downstream
7.	Impervious core	Yes
8.	Cutoff	Impervious soil core carried into in-situ impervious soil or to bedrock
9.	Grout curtain	No
10.	Other	Toe drain

j. Spillway

1.	Type	Free overflow ogee type weir
2.	Length of weir	74.0 feet
3.	Crest elevation	198.0
4.	Gates	None
5.	U/S Channel	Straight - natural bed
6.	D/S Channel	Excavated bedrock channel. Earth side slopes rip-rapped.

k. Regulating Outlets

Refer to Paragraph 1.2 b "Description of Dam and Appurtenances" Page 3 for description of outlet works.

1.	Downstream Invert	Elevation 139.0 (estimated)
2.	Size	2-36-inch converging to one 54-inch conduit with a 48-inch 1/2-inch steel liner leading to a 54-inch pipe
3.	Description	As above
4.	Control Mechanism	Manually operated hoist mechanism
5.	Other	All enclosed within gatehouse

SECTION 2

ENGINEERING DATA

2.1 Design

The details of the construction of the dam are presented in Section 1.2. The following documents which contain the principal information regarding this design were reviewed:

1. Contract Drawings for Enlargement of Diamond Hill Reservoir, Charles A. Maguire and Associates, 1970, Drawings 1-70
2. Contract Specifications for Enlargement of Diamond Hill Reservoir, Charles A. Maguire and Associates, Project 01-1-00329, 1970
3. Impervious Material Borrow Area Study, Modifications of Diamond Hill Reservoir, CEM Job No. 1078.16, Charles A. Maguire and Associates, July 1969
4. Revisions of Upstream Main Dam Cross Section, Diamond Hill Dam, Charles A. Maguire and Associates (undated - circa July 1969)
5. Revision of Downstream Main Dam Cross Section, Diamond Hill Dam, Charles A. Maguire and Associates (undated - circa July 1969)

6. Stability Analysis of Proposed Diamond Hill Dam, Charles A. Maguire and Associates (undated - circa July 1969)

7. Results of Laboratory and Field Investigations, Enlargement of Diamond Hill Reservoir, Goldberg-Zoino & Associated, Inc., Jan. 1971.

2.2 Construction

A complete series of record photographs (8-inch by 10-inch black and white) were taken during the most recent construction activity between August, 1970 and April 1972. These photographs were reviewed as part of the Phase I inspection. In addition, information about the construction was provided by members of the C-E Maguire staff who were the designers for the last raising of the crest.

2.3 Evaluation

a. Availability. The records for this project are available in the files of C-E Maguire in Providence, Rhode Island.

b. Adequacy. Engineering analyses for the hydrologic, hydraulic and geotechnical aspects of the design were available for review. The adequacy of this dam therefore was

assessed utilizing the design and construction data, the visual inspection and the performance history.

c. Validity. The documents used for this review were the "As Built" plans and specifications.

SECTION 3

VISUAL INSPECTION

3.1 FINDINGS

a. General: Diamond Hill Reservoir Dam appears to be a well-maintained facility with only a few items requiring attention. The gate house is fenced and locked. The dikes are fenced restricting unnecessary trespassing and erosion from overuse. The residence of the gate tender is adjacent to the reservoir. The dam and appurtenances are, therefore, observed almost daily. A few animal burrows were observed on the face of the dam along with trees that should be cut (see Photos C-10 and C-11). Some areas of seepage were also noted (Photo C-13). The water flowing from these seeps was clear and they were located at the abutments and at the toes of slope. In general, the overall appearance of the dam and its appurtenances is GOOD.

b. Dam and Dikes:

Main Dam: There are three zones on the downstream side where seepage was observed.

First, on both sides of the spillway, there are seeps emanating from the joints in the red conglomerate bedrock, at levels up to 9 feet above the tailwater level (Elev. 160.55) of Arnold Mills Reservoir and as far as 15 feet to the right of the spillway discharge channel. These seeps were clear and of small volume (less than 2 gpm, estimated) at the time of inspection.

Second, there is a zone at about Sta 16+50 on the right side of the dam where seepage is emerging from the toe of dam about 2 feet above tailwater level. The zone of seepage occurs at the left end of the spoil area on the downstream side of the dam. This spoil area apparently consists of old concrete, asphalt and unsuitable excavation material from the dam construction. It has a level surface and is triangular in plan view. The seepage was observed where the spoil area terminates, indicating that these spoil materials are interrupting the flow through the dam and channeling it laterally to the location where it was observed.

A small pond, which appears in Photo C-14, was noted at the toe of the dam at the left abutment. This may be caused by seepage or blocked surface drainage.

The water level in an observation well at Sta 18+57, Right 51 (BH-13) was measured on May 31, 1978 and found to be 2.4 feet above the tailwater level on that date. The ground surface at this point is 31.6 feet above tailwater.

In recent years, trees have been allowed to grow on the downstream slope and through the riprap upstream as shown in Photos C-10 and C-3.

On the downstream slope of the dam, there are a few eroded spots that appear to be caused by localized surface runoff. In particular, there is a substantial zone at the right side of the spillway discharge channel where the grass is dying and the underlying material exposed. On the upstream side there are several holes in the gravelly sand, indicating that this sand cover material has washed into the voids in the riprap.

Erosion was also noted immediately downstream of the west abutment of the highway bridge. See Photo C-12.

Numerous animal holes ("burrows") were also found concentrated in the middle third of the downstream slope. A typical burrow appears in Photo C-11. Some of these holes were more than 6 feet deep.

West Dike: The west dike contains a series of shallow undulations on the downstream slope that apparently formed due to surface runoff. The grass has partially eroded away at these locations. A rather regular series of undulations, spaced 12 feet to 20 feet apart, also exists on the upstream slope. These were filled with crushed stone. The upstream edges of the pavement on the surface, which is a thin coat of asphalt, have broken up by erosion of the base course into the riprap below.

There was a wet zone found below the downstream toe of the west dike. This wet zone is due, in part, to surface runoff from the surrounding land, which drains into it.

The seepage and surface runoff are led through ditches to a headwall and culvert that apparently drains into Arnold Mills Reservoir downstream of the main dam. A second small wet area was observed at the left abutment in a natural depression in the bedrock. This zone apparently was due to surface runoff, since the surface elevation was slightly above the lake level upstream of the West Dike. There was no seepage observed exiting from the downstream face of the West Dike. A water level measurement was made on May 31, 1978, in the observation well at Sta 4+32, offset distance Right 47 feet (BH-31). The elevation was 185.5, which was 10.2 feet below the lake level in Diamond Hill Reservoir at that time. One animal "burrow" was found on the downstream side of the West Dike.

East Dike: A review of the bedrock map for the Pawtucket Quadrangle shows that the East Dike is situated directly over a fault that separates the Wamsutta formation (red conglomerate, sandstone, and shale) from the

Pondville conglomerate and Rhode Island formation (gray to black sedimentary rocks). These two formations outcrop at the right and left abutments, respectively, of the East Dike. The weathered surface of the Pondville exposure appears in the foreground of Photo C-5. The axis of the fault, which is approximately located on the bedrock map, and the axis of the East Dike, intersect at about a 60° angle.

No seepage was observed emanating from the downstream face of the East Dike. Downstream of the toe there is a catch basin, which drains both surface runoff and seepage from the toe drain system to a point well downstream of the dike. The zone downstream is swampy, as it was before the dike was built.

Numerous trees are growing in the riprap on the upstream side.

One animal hole was located about in the middle of the downstream slope near the right abutment.

c. Appurtenant Structures: Vibrations and apparent surges in the flow of water could be heard in the wet well chamber of the gate-house when the intake gates were opened. The interior of the gate house contained a large amount of trash and rubbish and the general lack of proper maintenance was obvious.

There are pumping facilities in the gate house which can pump water from Arnold Mills Reservoir up into the Diamond Hill Reservoir. These pumps were not operated at the time of the inspection.

Spalled concrete which appears in Photo C-9 was noted on the crest of the spillway. Exposed wire-mesh reinforcing was also visible on the spillway face. Seepage was emanating from a hole at the intersection of a construction joint and a crack in the concrete near the downstream base of the left spillway abutment (See Photo C-8). The placed stone at the downstream toe of the spillway was inadequate to fully dissipate energy from high stage flows in the reservoir. On the right side slope of the spill-

way discharge channel, beneath the Reservoir Road bridge, a 2.5 foot thick concrete wall has been placed on bedrock to line the channel.

At one location on the downstream end of this wall, a 1/32 inch wide crack has formed in the concrete on the extension of a joint in the bedrock. The cause of this crack is not known.

d. Reservoir Area: Two causeways carry Reservoir Road around the east side of the impoundment. These causeways measure approximately 1800 and 800 feet in length. The side slopes have stone armor for erosion protection. "Equalizer" pipes were installed beneath the embankments to assure that no hydrostatic pressure differentials occur. Several bedrock outcrops near the dam were noted around the perimeter of the reservoir.

e. Downstream Channel. The downstream channel is short (225 feet in length), as Arnold Mills Reservoir is situated at the downstream toe of the dam. The majority of the downstream spillway channel was excavated in bedrock. Where bedrock is not exposed, the

b. Experience Data: Because this is a comparatively new dam (construction was completed in 1972), it has not yet experienced any major flood flows. Water has overflowed the spillway to a depth of one inch or so on several occasions and, reportedly, has reached a maximum depth of six inches.

c. Visual Observations: The dam, dikes and spillway are in good condition with the exceptions noted in Section 3.2 of this report.

d. Overtopping Potential: The spillway capacity is hydraulically inadequate to pass the "test flood" (PMF) and would overtop the dam approximately 1.10 feet. The inflow and outflow discharge values for the test flood are 14144 and 13976 cfs respectively. The maximum outflow capacity of the spillway is 11900 cfs which represents 85.1% of the test flood outflow discharge. For more data including a spillway rating curve, refer to Appendix D.

e. Dam Failure Analysis: The calculated dam failure discharge of 364,000 cfs, with the impounded water level at the top of the dam

INFLOW, OUTFLOW AND SURCHARGE DATA

FREQUENCY IN YEARS	24-HOUR TOTAL RAINFALL IN INCHES	24-HOUR* EFFECTIVE RAINFALL IN INCHES	MAXIMUM INFLOW IN C.F.S.	MAXIMUM** OUTFLOW IN C.F.S.	SURCHARGE HEIGHT IN FEET	SURCHARGE STORAGE ELEVATION
10	5.0	2.6	2684	947	2.04	200.04
50	6.5	4.1	4233	1490	2.76	200.76
100	7.0	4.6	4750	2570	4.30	202.30
1/2 PMF	11.9	9.5	7072	6244	7.80	205.80
TEST FLOOD = P.M.F.	21.4	19.0	14144	13976	13.10	211.10

*Infiltration assumed as 0.1"/hour

**Lake assumed initially full at spillway crest elevation 198.0 .
(Top of dam = 210.0 .)

NOTES:

1. $Q_{10}; Q_{50}; Q_{100}$; inflow discharges computed by approximate methodology of Soil Conservation Service.

2. 1/2 PMF and "test flood" computation based on COE instructions and guidelines.

3. Maximum capacity of spillway without overtopping the top of the dam elevation 210.0 is equal to 11900 C.F.S.

4. All discharges indicated are dependent upon the continued integrity of upstream storage reservoirs.

5. Surcharge storage is allowed to overtop the dam when exceeding the spillway capacity.

6. Test Flood = P.M.F. = 1700 CSM = 14144 CFS (D.A. = 8.32 sq. mi.).

that the impoundment surface area remained constant above the spillway crest. Hydraulic design data including Elevation-storage relationships for the reservoir were obtained from the files of C-E Maguire. Diamond Hill Reservoir Dam was classified as INTERMEDIATE in size having a storage capacity of 15680 Ac-Ft. at the top of dam. To determine the hazard classification for this dam, the impact of its failure at maximum pool (top of dam) was assessed. As a result of the analysis, Diamond Hill Reservoir Dam was classified as a HIGH hazard structure as detailed in Appendix D. The dam failure discharge was computed as 364,000 cfs (See Appendix D) and an approximate dam failure profile was developed. It is estimated that the failure discharge of 364,000 cfs will enter Arnold Mills Reservoir and will increase the depth of flow in the reservoir by approximately 10.0 feet and could trigger its failure. Additional design data developed for this investigation is as follows:

SECTION 5

HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. Design Data: Sufficient design data and contruction drawings are available to make a Phase-I hydraulic analysis of this dam. The lack of design data with respect to the Arnold Mills Reservoir and dam hinder the evaluation of the adverse downstream effects of a dam failure. Dam failure hydraulic profiles, therefore, could not be developed.

Existing data and USGS topographic mapping (Scale 1" = 2000') were used to develop hydrologic parameters such as drainage area, basin slope, reservoir surface area, runoff characteristics and time of concentration. Inflow and outflow discharges were developed using Corps of Engineers' guidelines assuming the initial reservoir level at the spillway crest elevation (see Appendix D). A "Test Flood" equal to the PMF was calculated to be 1700 csm equal to 14144 cfs for a drainage area of 8.32 sq. miles. Surcharge storage was approximated assuming

and debris has not occured recently. Operating instructions indicating procedures to be followed, limits of gate travel for varying water flows or other significant instructions were not posted for use in emergency cases when normal operating personnel are unavailable.

4.4 DESCRIPTION OF ANY WARNING SYSTEM: There is no pre-planned warning system for the failure of Diamond Hill Reservoir Dam. An emergency action plan must be developed in order that operating personnel can notify authorities for mobilization of State and local emergency forces, organize remedial measures to minimize or prevent complete failures when possible, and have an awareness of the locations of supplies of standby equipment and materials.

slopes. Near the highway bridge small areas of surface erosion need to be repaired. Along the upstream face of the dam embankment and dikes coarse bedding and cover material have washed into the voids of the riprap. Structural cracks and seepage at the spillway abutments should be investigated and repaired, as necessary. The interior of the gatehouse was littered with miscellaneous debris. However, none of these maintenance aspects pose an immediate threat to the dam.

4.3 MAINTENANCE OF THE OPERATING FACILITIES: Periodic operation of gates and the operating equipment are performed by the City of Pawtucket Water Supply personnel each time the water level of the reservoir is regulated. (Several times a year). The mechanical equipment appeared to be well lubricated and serviceable and to operate in accordance with the manufacturer's instructions. At the time of the inspection, the gates were opened. Considerable vibration and noise along with apparent flow surges were noted and reported to the gate tender for further investigation at the time of the visual inspection. Inspection of the trash racks at the inlets for accumulation of sediment

collection, the Water Supply Board has the option to reverse pump from Arnold Mills Reservoir, which is the surface supply reservoir immediately downstream. This operation can be employed during periods when "spill-over" would occur from the downstream smaller reservoir and the water "wasted".

b. Emergency Operations: Water levels are monitored daily by the on-site gatekeeper and a reservoir water level transmitter that is tied directly to the water treatment plant in Pawtucket. Approaching storms are monitored using local forecasts and inquiries to the U.S. Weather Bureau (NOAA) at Warwick, Rhode Island. Regulation of the control gates is authorized by the Chief Engineer or the Supervisor of Water Supply prior to and/or during floods.

4.2 MAINTENANCE OF THE DAM: Maintenance of the dam and its appurtenances appears to be intermittent and in some respects neglected. Slopes of the embankments are overgrown in areas with brush and small trees. Animal holes and burrows were observed at several locations on the embankment

SECTION 4

OPERATIONAL PROCEDURES

4.1 PROCEDURES: Diamond Hill Reservoir is the largest and the uppermost surface water supply reservoir in the Pawtucket water supply system. The reservoir level is therefore regulated by the Pawtucket Water Supply Board to provide a safe and adequate yield for its users throughout the year by storing and releasing waters to the lower reservoirs as needed.

a. Normal Operations: In early July, the gatekeeper is normally directed to draw the water level down at Diamond Hill Reservoir at the rate of 20MGD to a level approximately 10.0 feet below the spillway crest. This drawdown supplements the supply withdrawn from the lower impoundment and prepares the Diamond Hill facility for the storage of late summer and fall storm events. Depending on weather conditions, this level is maintained through the summer months until October, at which time the gates are closed and runoff collected. As a supplement to the normal runoff

on the highway bridge. Although this crack does not appear to have any significant consequences, it should be monitored during each annual inspection.

e. Outlet Works: The gatehouse was locked and properly secured. Minor leakage was observed in the rectangular stone masonry base of the gatehouse wet well. When the gates were partially open, intermittent vibrations and surges in the flow were noted. This should be investigated and remedial measures taken immediately if necessary. The pumps which lift water from Arnold Mills Reservoir into the Diamond Hill impoundment were not operated during the inspection. Lack of proper maintenance was conspicuous in the gatehouse due to the presence of large accumulations of trash and rubbish on the operating floor level.

The trees in the riprap on the upstream side have been allowed to grow quite large and should be removed. The trees should be cut on a regular basis as part of a maintenance program. None of the trees are currently large enough to require root removal.

The animal burrows on the downstream side should be surveyed to ensure that they do not penetrate too closely to the core of the dam.

d. Spillway: Spalling of concrete and exposed wire-mesh reinforcing were observed on the spillway crest. Cracks are present in the spillway abutments and training walls. Seepage resulting in rust-stains was emanating from the junction of a crack and construction joint in the left downstream training wall. A need was noted for large, energy-dissipating stones at the toe of the spillway.

The crack in the concrete wall that borders the right side of the spillway discharge channel may be caused by bedrock movements, temperature fluctuations, or loads

the East Dike could be subject to failure during high water periods.

A suggested method to allow recording the behavior of this dike would be to install a system of monuments along the crest. Accurate measurements of the relative position of the monuments in all three dimensions would reveal any appreciable movement. These monuments should be surveyed when installed and after any significant regional earth tremor. Furthermore, the seepage through the dike, and the flow from the catch basin at the toe should be measured during a period of normal water level as a comparison to readings taken during high impoundment levels. At the same time, the turbidity of the seepage and the outflow should also be recorded.

The impervious core of the East Dike was composed of a widely graded glacial till, according to the records. The core is relatively wide. For both of these reasons, the East Dike is quite resistant to "piping" that could result from minor movements during earthquakes.

stone, which appears to be a suitable filter material with respect to the riprap. A continual check should be made to ensure that this material is effective, and subsequent repairs should be made with material that satisfies the filter requirements. In addition, the eroded undulations on the downstream side should be filled and grassed.

c. East Dike: The East Dike, located over a fault, requires special attention. Nothing currently is known about the characteristics of the fault interface with regard to permeability, susceptibility to erosion, etc. It may provide a path whereby the East Dike could be undermined. The hydrostatic differential across the East Dike was only 4 feet (maximum) on the day of inspection. However, the probability that the presence of the fault could lead to difficulty under such low head is small. Seepage through the fault interface material would be noticed, if at all, during high water conditions in the reservoir. Furthermore, if this fault were to move during an earthquake, even slightly,

The trees that are growing on the slopes and in the riprap, the numerous animal burrows, and the localized areas of erosion all present no apparent difficulty at this time. However, it is necessary to repair these features on a regular basis to avoid future difficulties. The animal holes should be surveyed to determine how far into the downstream they extend, the trees should be cut, and the eroded spots should be seeded and inspected periodically. The seepage observed near Sta 16+50 and Sta 27+00 should be monitored on a regular basis for changes in volume or indications of turbidity.

b. West Dike: The water level in the middle of the downstream face is about one foot above the toe of the dike at Station 4+32. This water level is within the material comprising the old dike that was covered by the new construction in 1970. Thus, the downstream pervious shell appears to be functioning as designed.

The eroded locations at the top of the upstream slope have been filled with crushed

concrete and stone paving slope protection appears to be in satisfactory condition. Erosion was noted on the downstream side of Reservoir Road adjacent to the right bridge abutment (See Photo C-12).

3.2 Evaluation

a. Main Dam: The main dam appears to be in good condition. The water level in the downstream pervious shell is only 2.4 feet above the tailwater level, at a point where the difference in head across the dam is 35 feet. Hence, the downstream shell appears to be functioning as would be anticipated, based on the design.

Under severe wave action, erosion of the gravel bedding into the riprap could take place and result in the shifting of some stones. The riprap layer is of such a thickness that periodic inspection and repair will be a suitable means for avoiding major maintenance problems in the future. However it is recommended that a re-analysis of the filter design be performed.

at failure produces an approximate water surface elevation of 172.0 immediately downstream from the dam in the Arnold Mills Reservoir. This will raise the water surface approximately 10 feet above the depth just prior to failure when the discharge is 12435 cfs. Probable consequences of dam failure, hazard classification and additional details of the dam failure profile are listed in Appendix D.

SECTION 6

STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations: There were no visual observations made that would indicate any concern about the stability of this dam. Certain minor zones of erosion, and movement of fines into the riprap, as mentioned in Section 3, that some maintenance is required to ensure continued good performance.

b. Design and Construction Data: Analyses were made in conjunction with construction work performed in 1972 for the stability of the upstream and downstream slopes of the main dam at the most critical (highest) cross-section.

Given the assumptions made for the friction angles and unit weights, the effective stresses that exist in this dam, and the degree of compaction required in the specifications, it would appear that the factors of safety for normal seepage conditions are lower than would usually be required. The difference is small and could

easily be absorbed in the assumptions. However, the assumptions are reasonable and not conservative. Because the critical failure surfaces under normal seepage conditions are shallow, surficial surfaces, there is no reason for concern about these factors of safety.

The factor of safety for the upstream slope under conditions of instantaneous drawdown is satisfactory, since this rather critical mode of failure can only occur if the dam breaches suddenly.

The construction data that may be available to show the degree of density achieved in the various zones was not obtained. Hence, no comparison can be made between the required and achieved degree of density. The dam was inspected during construction by Charles A. Maguire and Associates, therefore, it is assumed that any significant deviations between specified and achieved densities would have been detected at that time.

c. Operating Records: No operating records were available relative to the structural stability aspects of the Phase I inspection.

d. Post Construction Changes: The growth of trees, erosion, and the presence of animal holes, have all occurred since construction was completed. These deficiencies were discussed in Section 3. No other post-construction changes are known.

e. Seismic Stability: The dam is located in seismic zone 1 and in accordance with recommended Phase I guidelines does not warrant seismic analysis.

SECTION 7

ASSESSMENT, RECOMMENDATIONS & REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. The dam, dike and the appurtenances are in GOOD condition.

b. Adequacy of Information. The information available was adequate for a Phase I inspection. In addition to visual observations, design plans, specifications, stability analyses and construction photographs were available. The evaluation of stability was limited by the absence of any strength data about the soils in the new fill and the old dam that forms the base of the present dam. Also, no data was available on the degree of density attained during construction. As this dam has been completed for only six years, historical flood records are not available.

c. Urgency. The recommendations and remedial measures described below should be implemented by the Owner within a three year period after receipt of this Phase I inspection report.

d. Need for Additional Investigations. The collection of further data and subsequent investigations of the East Dike should be carried out, as described in 7.2 below. It is also recommended that the Arnold Mills Reservoir Dam receive a Phase I inspection under this program as soon as practical. Failure of the larger capacity Diamond Hill facility will severely impact on the conditions of Arnold Mills Reservoir.

7.2 Recommendations

Engage the services of an engineer experienced in the design of earth dams to accomplish these recommendations.

a. Determine the source of vibrations in the intake structure and take the necessary corrective measures.

b. Initiate repairs to the spillway to correct spalling, cracking, and areas of exposed reinforcing. Size and place stones at the base of the spillway for energy dissipation.

c. Design a seepage monitoring and collection system to measure quantity and turbidity of flows downstream of the east dike and downstream of the main dam near station 17 + 00.

d. Investigate the fault (indicated on the USGS bedrock geology map) beneath the East Dike and institute a program to monitor movements on opposite sides of the fault trace.

e. Analyze and upgrade the spillway capacity and freeboard requirements with respect to the "test flood" criteria.

7.3 Remedial Measures

a. Operation and Maintenance Procedures. While the dam is generally in GOOD condition, it is considered important that the following items be implemented:

1. Develop and establish a regular systematic program of continuing maintenance along with monitoring of the dam and its appurtenant structures.

2. Replace dislodged riprap and riprap bedding.

3. Observation wells should be read and seepage areas should be inspected on a regular basis to watch for change in flow or turbidity.

4. Prepare an emergency action plan to prevent or minimize the impact of failure listing the expedient action to

be taken and the authorities to be contacted and develop an effective warning system.

5. Repair areas of erosion with seeding or replacement of rip-rap bedding as appropriate.

6. During each technical inspection, check the crack in the concrete wall which borders the right side of the spillway channel to determine whether any changes are occurring.

7. Clean and perform the necessary maintenance to restore the interior of the gatehouse to good condition.

8. Continue the technical periodic inspections of this facility on an annual frequency.

7.4 Alternatives

a. Alternatives: As this dam is judged to be in GOOD condition, no alternatives to the recommendations made in the previous section are required.

APPENDIX A

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT Diamond Hill Reservoir Dam DATE May 30, 1978

TIME 8:00 am

WEATHER Clear - Hot

W.S.ELEV. _____ U.S. _____ D.S.

PARTY:

1. R. Long - CEM
2. S. Poulos - GEI
3. A. Reed - CEM
4. R. Brown - CEM
5. S. Khanna - CEM

Also in attendance:

6. A. Delude - City of Pawtucket
7. C. Asprinio - State of Rhode Island
8. R. Bleauvelt - City of Pawtucket
9. R. Knibb - City of Pawtucket
10. E. Prout - State of Rhode Island

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 30, 31, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	Elev. 210 NGVD
Current Pool Elevation	Elev. 198 NGCD
Maximum Impoundment to Date	11,000 Ac-Ft Normal, 12,000 Ac-Ft Max
Surface Cracks	None Observed
Pavement Condition	Good to Excellent
Movement or Settlement of Crest	None Observed
Lateral Movement	None Observed
Vertical Alignment	No misalignment observed
Horizontal Alignment	No misalignment observed
Conditon at Abutment and at Concrete Structures	Condition good at both abutments and at service bridge. See downstream seepage below re spillway abutments.
Indications of Movement of Structural	None observed at service bridge. Headwall of discharge conduit not visible.
Trespassing on Slopes	Numerous animal holes on downstream face. Free access.
Sloughing or Erosion of Slopes or Abutments	Erosion of gravel cover into riprap near top of ups. slope. Minor localized erosion on ds. slope.
Rock Slope Protection - Riprap Failures	None observed
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	Small wet zone ds. of embankment to left of spillway where toe intersects natural ground. Emanating at toe or below, not on slope. Seeps from rock joints both sides spillway discharge channel. Seepage from toe at Sta 16+50. See text.

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 30, 31, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT - continued	
Piping or Boils	None observed
Foundation Drainage Features	Pervious downstream chimney drain and shell shown on plans.
Toe Drains	None shown or observed. Riprap along toe for erosion protection, apparently.
Instrumentation System	Observation wells on downstream slope.
Vegetation	Many small trees and shrubs on upstream and downstream slopes.

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 31, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DIKE EMBANKMENT	East Dike
Crest Elevation	Elev. 210 NGVD
Current Pool Elevation	Elev. 198 NGVD
Maximum Impoundment to Date	
Surface Cracks	None observed
Pavement Condition	Skim coat of asphalt for erosion protection
Movement or Settlement of Crest	None observed
Lateral Movement	None observed
Vertical Alignment	No misalignments observed
Horizontal Alignment	No misalignments observed
Conditon at Abutment and at Concrete Structures	No seepage observed downstream
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Free access. Motorcycle path on ds. face. Animal holes present.
Sloughing or Erosion of Slopes or Abutments	None observed
Rock Slope Protection - Riprap	Good condition
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	None observed from ds. slopes. Wet area ds. of toe.
Piping or Boils	None observed
Foundation Drainage Features	Plans show pervious ds. shell

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 31, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DIKE EMBANKMENT - continued	East Dike
Toe Drains	Plans show pipe in toe to collect water.
Instrumentation System	None observed
Vegetation	Many small trees in riprap upstream 5-6 years old.

APPENDIX B-2

Previous inspection reports, December 4, 1947; February 13, 1973; April 6, 1978.

DIAMOND HILL DAM (cont.)

Sheet No.	Date	Description
15 & 16	May 7, 1970	Letter from City Solicitor to Division of Harbors and Rivers regarding the acquiring of necessary land.
17	May 7, 1978	Letter from City Solicitor to Public Works Division regarding the acquiring of necessary land to raise the dam.
18	May, 1978	Letter from the V.P. of Maguire to the Division of Harbors and Rivers acknowledging receipt of previous letter.
19	April 27, 1970	Letter from the Cumberland Town Administrator to the Division of Harbors and Rivers in regards to the proposed improvements on the dam.
20-21-22	April 20, 1970	Letter from the U.P. of Maguire to the Division of Harbors and Rivers acknowledging the receipt of data on enlargement of dam.
23	April 15, 1970	Letter from Division of Harbors and Rivers to Sen. Hanaway regarding the safety and concern of the citizen in his district when the dam is enlarged.
24&25	April 9, 1970	Letter from Pawtucket City Solicitor to the Division of Harbors and Rivers regarding the steps taken to acquire land needed to enlarge dam.
26	April 8, 1970	Letter from Sen. Hanaway to the Division of Harbors to Rivers stating the concern of the people of his district about the enlargement of the dam.
27	April 8, 1970	Letter from Rep. Manning to the Division of Harbors and Rivers stating the water problem ensued by the last enlargement of the Reservoir in his district.

DIAMOND HILL DAM

Sheet No.	Date	Description
1	May 9, 1978	Letter - Army Engineering Division to State Resources Division.
2	May 5, 1978	Inspection and Elevation of Dams.
3	May 5, 1978	Letter - from Project Manager to Department of Environmental Management regarding inspection dates.
4	April 6, 1978	Results of Inspection.
5	March 24, 1978	Letter from Department of Environmental Management regarding high risk dams.
6	Feb. 28, 1978	Letter from Department of Natural Resources acknowledging preview letter.
7	Jan. 30, 1978	Letter from Pawtucket Water Supply Board to Division of Planning and Development requesting consideration to inspection of city dams.
8 & 9	No date	Dam Inventory.
10	Feb. 13, 1973	Report on General Inspection of new construction.
11	Jan. 11, 1973	Letter from project manager to Dept. of Natural Resources regarding the complete set of as-built drawings.
12	June 29, 1972	Letter from project manager to Water Supply Board transmitting dam data.
13	June 22, 1970	Letter from Division of Harbors and Rivers to Director of Public Works explaining the plans to increase the storage capacity of Diamond Hill Reservoir.
14	May 14, 1970	Approval of Plans.

APPENDIX B-1

1. Design, Construction and Maintenance Records and Location.

   a. Contract Documents entitled "Enlargement of Diamond Hill Reservoir", U.S. Department of Commerce, Economic Development Administration Project No. 01-1-00329 prepared for the City of Pawtucket, Rhode Island DPW, Water Division. Contract Documents were prepared by Charles A. Maguire and Associates of Providence, Rhode Island and dated April 3, 1970. Documents on file at Pawtucket Water Supply Board, Pawtucket, Rhode Island.

   b. Maintenance Records - Pawtucket Water Supply Board, Pawtucket, Rhode Island.

   c. Correspondence concerning previous inspections and history on file at State of Rhode Island Department of Environmental Management, Division of Land Resources, Providence, Rhode Island.

APPENDIX B

1. Listing of Locations for Available Correspondence
2. Copies of Past Inspection Reports
3. Plans, Sections, Details

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	
Bearings	Good
Anchor Bolts	Good
Bridge Seat	Good
Longitudinal Members	Good
Underside of Deck	Good
Secondary Bracing	None observed
Deck	Good
Drainage System	Unobstructed
Railings	Fair - some rusting noted.
Expansion Joints	
Paint	Fair
b. Abutment & Piers	
General Condition of Concrete	Good
Alignment of Abutment	No misalignment noted.
Approach to Bridge	Gate - good condition.
Condition of Seat & Backwall	Good

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Old spillway training walls visible underwater. Bottom of Channel unobservable.
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Not observable
b. Weir and Training Walls	Ogee weir uncontrolled
General Condition of Concrete	Ogee spillway crest good.
Rust or Staining	Observed at weep holes and joints. Cold joint on surface at left training wall weeping.
Spalling	Observed on skim coat at crest of spillway.
Any Visible Reinforcing	Wire mesh exposed on ogee spillway.
Any Seepage or Efflorescence	Small amount observed at joints.
Drain Holes	None observed
c. Discharge Channel	Natural bed
General Condition	Unobstructed, good (bedrock).
Loose Rock Overhanging Channel	Yes
Trees Overhanging Channel	None observed
Floor of Channel	Bedrock - red conglomerate
Other Obstructions	None

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	Submerged - not observable.

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	Fifty-four-inch diameter RCP with steel lining (48-inch dia.) all underwater and not observable.

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - GATEHOUSE - continued	
Emergency Power System	
Wiring and Lighting System	Satisfactory Gatehouse has two electrical heaters to prevent freezing of equipment. Diesel engine with 36-inch pump last operated three years ago (Diesel and pump are for pumping water from Arnold Mills Reservoir up to Diamond Hill Reservoir). Gates were operated and the water level in the wet well dropped. Seepage was visible in wet well from old masonry construction. Two gates to Arnold Mills Reservoir in fully opened position since 1976. One gate partially opened. Water appears to be discharging into Arnold Mills Reservoir. Intermittant surging, vibration and intermittant noise noted when gate was partially opened. Recommend complete inspection of wet well and gates.

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - GATEHOUSE	
a. Concrete and Structural	
General Condition	Good but very dirty
Condition of Joints	Good
Spalling	None observed
Visible Reinforcing	None observed
Rusting or Staining of Concrete	Very minor staining noted
Any Seepage or Efflorescence	None observed
Joint Alignment	Good
Unusual Seepage or Leaks in Gate Chamber	None observed but seepage through masonry of wet well observed.
Cracks	None observed
Rusting or Corrosion of Steel	Equipment in gatehouse dirty.
b. Mechanical and Electrical	
Air Vents	Electrically operated fans to reduce heat build up when operating diesel
Float Wells	Operable
Crane Hoist	Two-ton manual crane hoist kept at filtration plant.
Elevator	None
Hydraulic System	None
Service Gates	Operable - satisfactory
Emergency Gates	None
Lightning Protection System	

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 30, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	Not observable underwater
Slope Conditions	
Bottom Conditons	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	Not observable underwater
Condition of Concrete	
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 31, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DIKE EMBANKMENT - continued	West Dike
Piping or Boils	None observed
Foundation Drainage Features	None observed. Plans show pervious downstream shell.
Toe Drains	None observed. Plans show pipe in toe leading to catch basin.
Instrumentation System	One observation well on ds. slope.
Vegetation	A few small trees on both slopes.

PERIODIC INSPECTION CHECK LIST

PROJECT Diamond Hill Dam DATE May 31, 1978

INSPECTOR _____ DISCIPLINE _____

INSPECTOR _____ DISCIPLINE _____

AREA EVALUATED	CONDITION
DIKE EMBANKMENT	West Dike
Crest Elevation	Elev. 210 NGVD
Current Pool Elevation	Elev. 198 NGVD
Maximum Impoundment to Date	
Surface Cracks	None observed
Pavement Conditon	Poor. Thin coat of asphalt on sand. Edges serrated by erosion.
Movement or Settlement of Crest	None observed
Lateral Movement	None observed
Vertical Alignment	No misalignments observed.
Horizontal Alignment	No misalignments observed.
Condition at Abutment and at Concrete Structures	Both abutments appear to be in good condition.
Indications of Movement of Structural Items on Slopes	None observed
Trespassing on Slopes	Trespassing not allowed. A few animal holes observed.
Sloughing or Erosion of Slopes or Abutments	Undulations on downstream slope, apparently due to surface runoff. Grass eroded away. On ups. slope, the undulations are spaced 12 to 20 ft. apart and are filled with crushed stone.
Rock Slope Protection - Riprap Failures	Riprap in good condition.
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	Wet area at toe of dike may be runoff.

R. I. DEPARTMENT OF PUBLIC WORKS
DIVISION OF HARBORS AND RIVERS

DAM NO. 77

SPECIAL INSPECTION REPORT

INSPECTED BY J.V. KEILY

TOWN OF CUMBERLAND

DAM NO. 77 NAME DIAMOND HILL RESERVOIR ON BROOK Abbott Run / RIVER / TRENCH

WATERSHED BLACKSTONE RIVER

OWNER CITY OF PAWTUCKET

ADDRESS Water Dept., City Hall, Pawtucket, R.I.

REPORT ON—NEW CONSTRUCTION REPAIRS INSPECTION ONLY X

PLANS BY APPROVED CONTRACTOR

TICKLER

SPILLWAY
- TYPE
- CONDITION

DRAW-OFF GATES
- NUMBER
- CONDITION

TRENCHES & WELLS

EMBANKMENT
- TYPE
- CONDITION

APPROACHES

EROSION

BRUSH & TREES

RIPRAP

PRESENT USE

WHO CONTROLS

WHO CONTACTED AT SITE

INSTRUCTIONS LEFT

IN EMERGENCY CALL

INSPECTION REPORT BY REASON Routine DATE 12/4/47

EMERGENCY:

1. Thomas Harding, City Engineer Res. 231 Williston Way, Pawtucket – Tel. BL 2053 Office – PE 3240

2. William Fortin, Comm. of Public Works Res. 6 Webster St., Pawtucket, R.I. Tel. PE 7882

12/4/47 Condition good. Extensive reservoir built in 1885 to furnish water supply for City of Pawtucket. Clay dike some 1200 feet long, maximum width 55 feet, top width 30 feet supports road. Stone riprap on pond side. Gate house (located near east end of dam) controls run-off. Masonry spillway 30 feet wide and 6 feet below top of dam is spanned by bridge near E end of dam. The original embankment has been strengthened in 1926 by the addition of a sand fill on the down – stream side with heavy stone revetment at toe of slope and adjacent to a new lower reservoir (see #78). Condition of embankment and spillway generally good today.

6/26/51 Data from City Engineer's Office – Pawtucket – John Hanna
Elevation top of dam – 178.25 & 16'-0" head.
Top of dam to invert of outlet pipe – 36'-0"
Area – 11,290,000 sq. ft.
Contents – 1,456,000,000 gals.

DEPARTMENT OF NATURAL RESOURCES

DAM INSPECTION REPORT

DAM: 77 RIVER: Burnt Swamp Br WATERSHED: Blackstone/ Abbott Run

NAME: Diamond Hill Res/ Pawtucket Res. upper TOWN: Cumberland

OWNER:
City of Pawtucket
Water Supply Board
Pawtucket, RI

REPORT ON: Cursory Insp. of General Conditions prior to Phase I inspection by Corps of Engineers/Consulting Engineers

REASON FOR INSPECTION: N.P.S.I.D. High/Intermediate Hazard

INSPECTION BY:
Earle Prout
Carmine Asprinio

DATE OF INSPECTION: April 6, 1978

REPORT: Existing Conditions:

Some signs of spalling of face of concrete at crest of spillway and approximately 1/3 up from toe of dam on face.

No signs of scouring of concrete abutments at spillway.

No evidence of erosion or leakage through dam core.

Comments

This was a cursory investigation prior to the Corps of Engineers/Consulting Engineers thorough "PhaseI" investigation soon to be performed under the "National Program For Safety Inspection of Dams"

DEPARTMENT OF NATURAL RESOURCES

DAM INSPECTION REPORT

DAM: #77 RIVER: Burnt Swamp Brook WATERSHED: Abbot Run

NAME: Diamond Hill Reservoir TOWN: Cumberland

OWNER: City of Pawtucket
Water Supply Board
137 Roosevelt Ave.
Pawtucket, R. I.

REPORT ON: General inspection of new construction.

REASON FOR INSPECTION: Notification of project completion.

INSPECTION BY: Peter M. Janaros
William B. Brinson

DATE OF INSPECTION: February 13, 1973

REPORT: Met with representatives of C. E. Maguire, Inc., Consulting Engineers on this project. Present were Mr. F. Pierce, Mr. V. Calabretta and Mr. A. Reed.

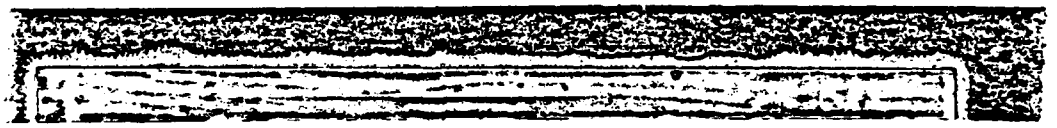
This recently completed project was the third raising of the uppermost water supply reservoir for the City of Pawtucket. This last raising brought the spillway crest from elevation 188.38 feet above M.S.L. to elevation 198.0 feet above M.S.L. and included construction of cut-off dikes in two locations.

Our meeting concentrated on a tour of the new construction and a discussion of various techniques used in solving the unique problems of raising the large rolled-earth dam.

Our cursory inspection revealed no evidence of leakage through the dam core nor any slope or spillway instability. A more thorough investigation of the dam will soon be performed under the "National Program for Safety Inspection of Dams."

Peter M. Janaros
SENIOR CIVIL ENGINEER

#77 DIAMOND HILL RESERVOIR - LOOKING WEST ALONG EARTH EMBANKMENT WITH SPILLWAY IN FOREGROUND — WATER IN LOWER RESERVOIR VERY LOW—NO WATER OVER SPILLWAY TODAY. 12/4/47

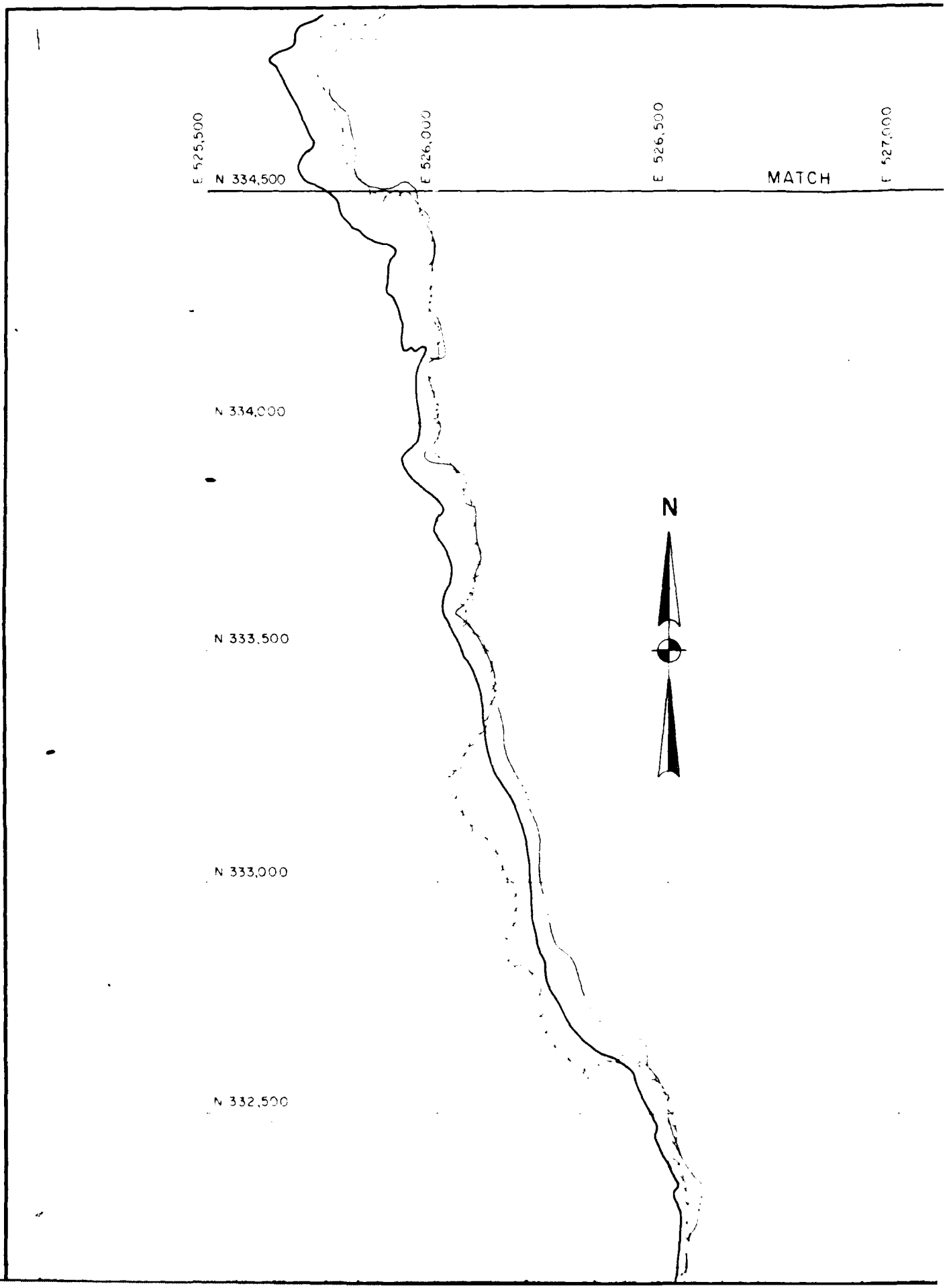


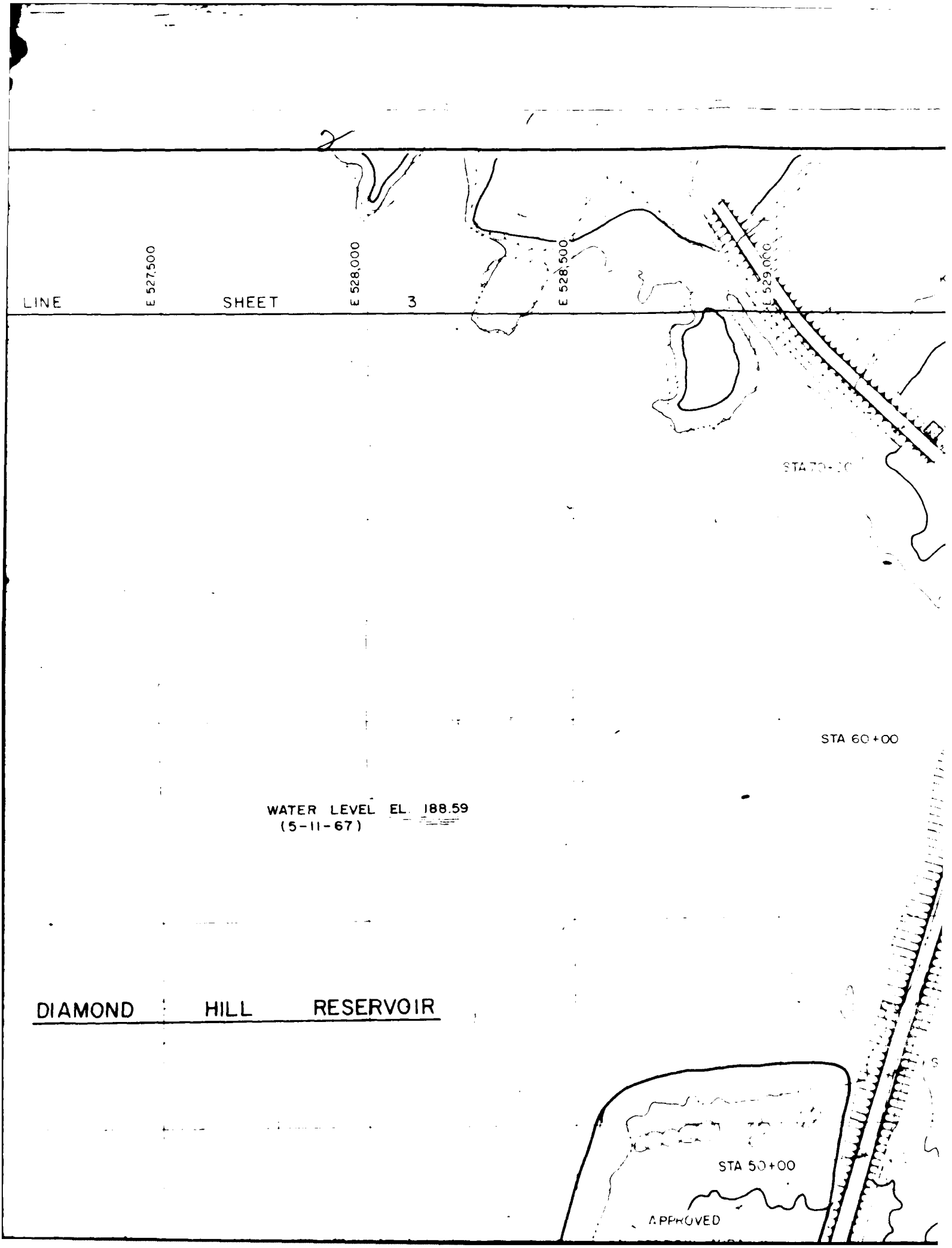
#77 DIAMOND HILL RESERVOIR - FROM EAST SIDE OF RESERVOIR LOOKING SW AT LONG EARTH EMBANKMENT TOPPED WITH CONCRETE WALL AND WITH RIP RAP ON POND SIDE 12/4/47

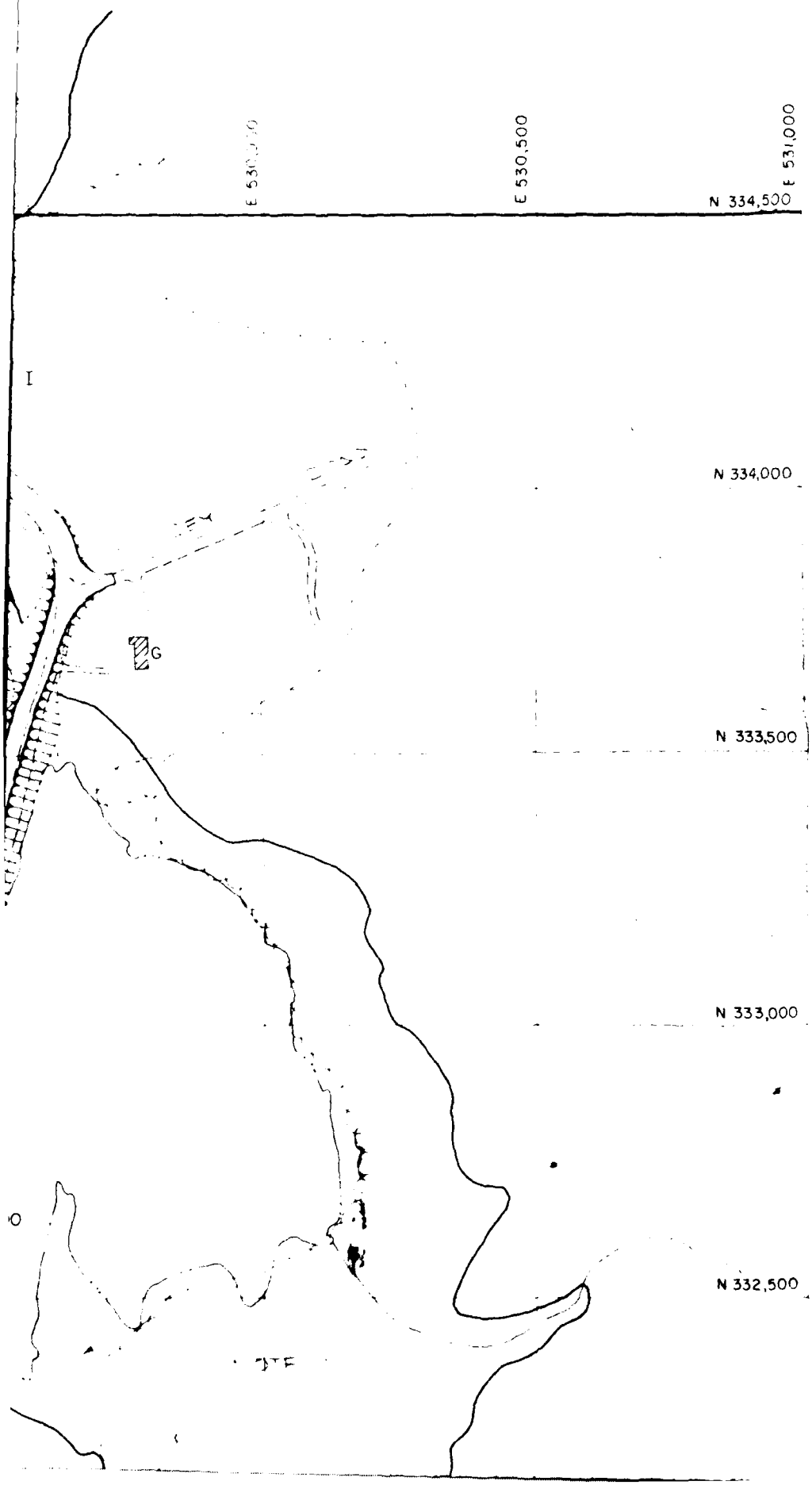
APPENDIX B-3

Plans, Sections, Details.

(Drawings are from contract set of as-built plans)


E 525,500
E 526,000
E 526,500
E 527,000
N 334,500
MATCH
N 334,000
N 333,500
N 333,000
N 332,500
N


LINE
E 527,500
SHEET
3
E 528,000
E 528,500
E 529,000
STA 70+00
STA 60+00
WATER LEVEL EL. 188.59
(5-11-67)
DIAMOND HILL RESERVOIR
STA 50+00
APPROVED



LEGI

P

NOTE 1

NOTE 2

E 530,500

E 531,000

N 334,500

N 334,000

N 333,500

N 333,000

N 332,500

LEGEND

EXISTING STRUCTURE

EXISTING STRUCTURE TO BE REMOVED

EXISTING ROADWAY & DIKES

NEW ROADWAY

TOP OF SLOPE

WATER LINE OR STREAM AT TIME OF SURVEY (5-11-67)

LIMIT OF RESERVOIR CLEARING - ELEVATION 20 CONTOUR - TO BE LOCATED BY OWNER

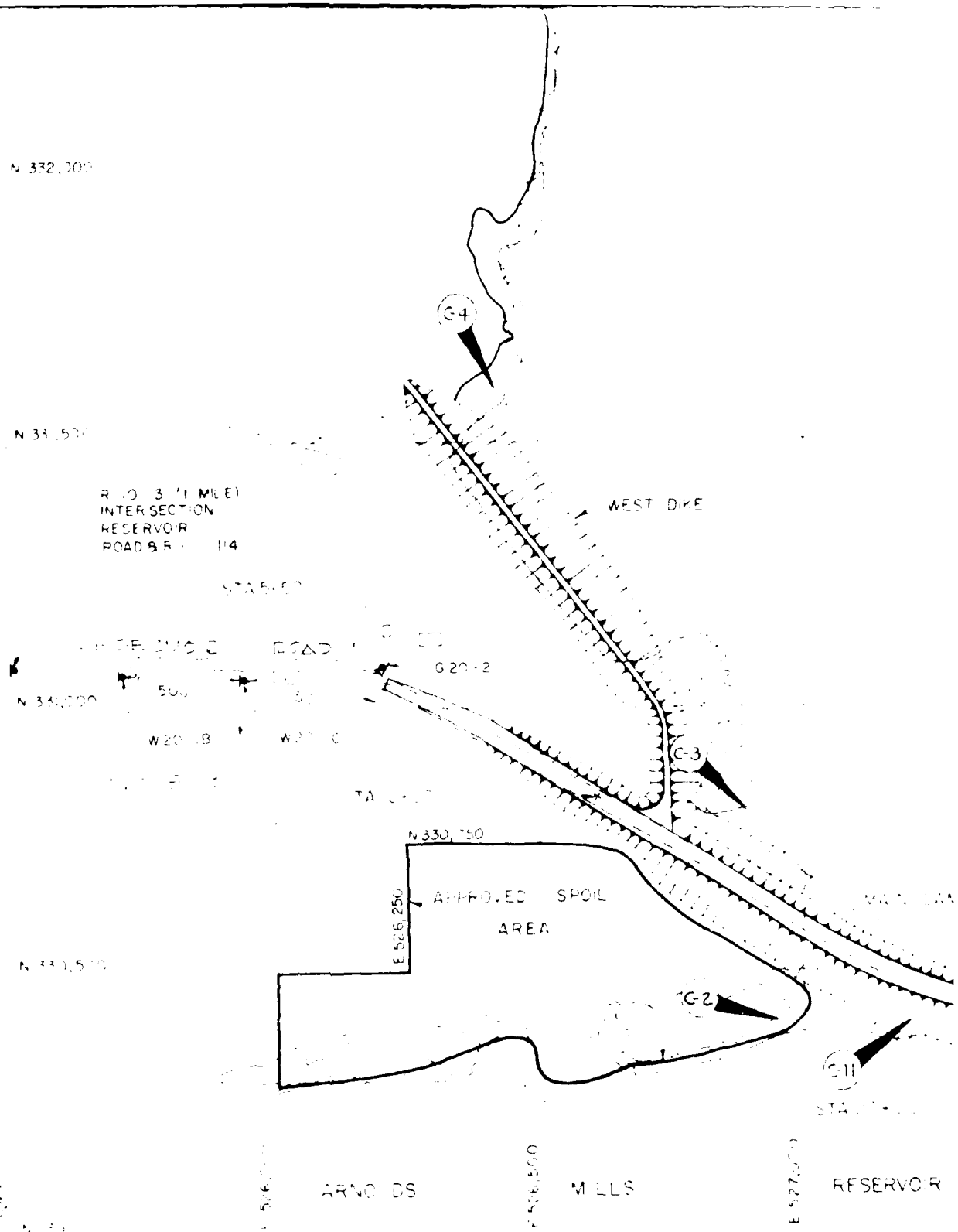
APPROX TREE LINE

NOTE 1

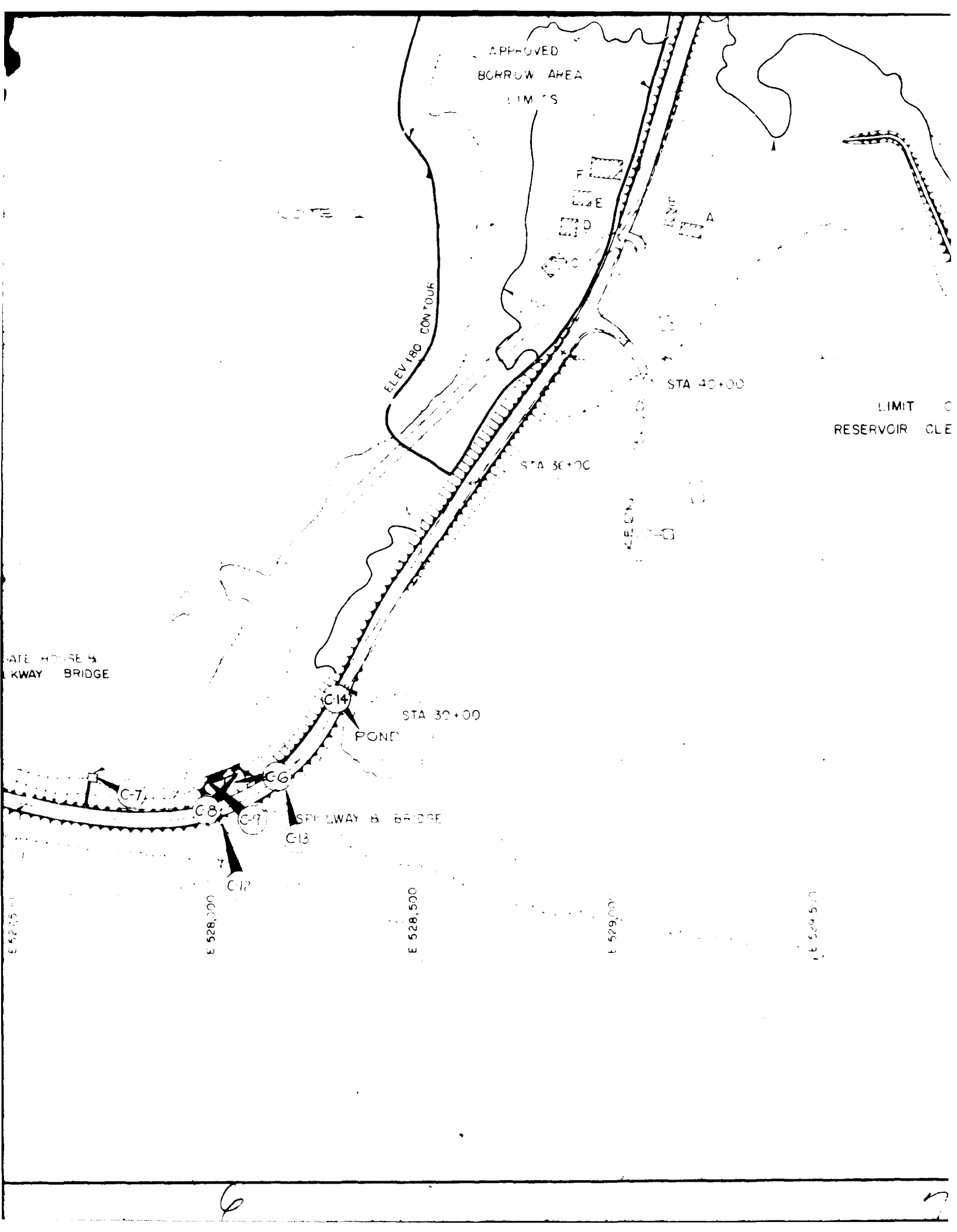
EXCAVATE EXISTING FILL DOWN TO ADJACENT GROUND LEVEL, 30 FEET WIDE TO ALLOW FOR SWAMP DRAINAGE

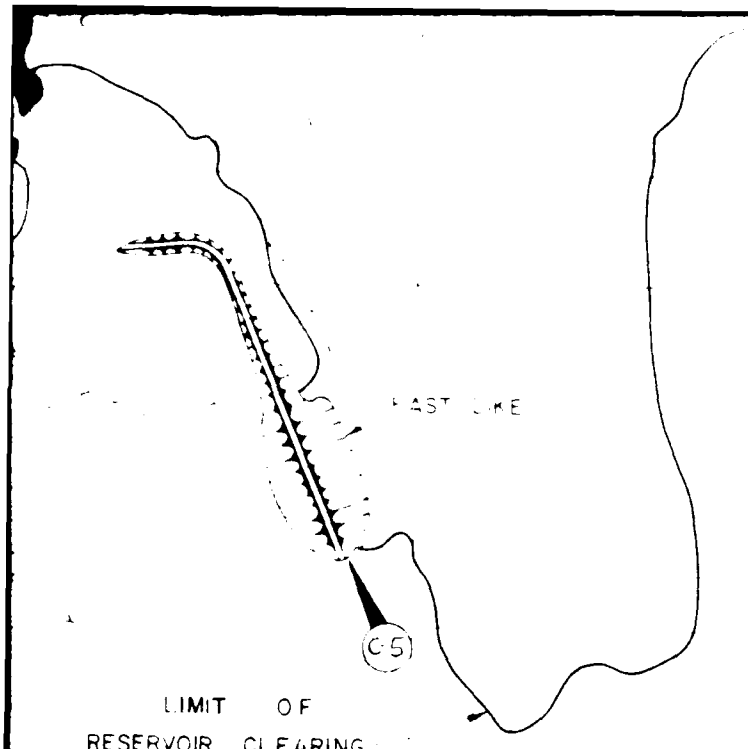
NOTE 2

RESERVOIR CLEARING WITHIN APPROVED BORROW AREA ALLOWED FOR PAYMENT ONLY IF APPROVED BORROW AREA NOT USED BY CONTRACTOR


N 332,000
G-4
WEST DIKE
G20+2
G-3
N330,750
E 526,250
APPROVED SPOIL
AREA
G-2
G-11
ARNOLDS
MILLS
RESERVOIR

5


APPROVED
BORROW AREA
LIMITS
F
E
D
A
ELEV 180 CONTOUR
STA 40+00
LIMIT
RESERVOIR CLE
STA 30+00
KWAY BRIDGE
C-14
STA 30+00
POND
C-7
C-8
C-9
C-6
SPILLWAY B BRIDGE
C-13
C-12
E 528,000
E 528,500
E 529,000



LIMIT OF
RESERVOIR CLEARING

N 332,000

N 331,500

E 530,500

E 531,000

N 330,500

E 530,000

N 330,000

GRAPHIC SCALE

200' 100' 0 200 400'

1" = 200'

CHARLES A MAGUIRE & ASSOCIATES — ENGINEERS — PROVIDENCE · HARTFORD · BOSTON	
DESIGNED C R DARLING	ENLARG
DRAWN R J HERCHEN & J R LYONS	
CHECKED [illegible]	
SUBMITTED E GREENE	
APPROVED F C PIERCE	
	APPROVED DIR
	APPROVED WA
	DATE:
	SCALE: 1"

N 332,000

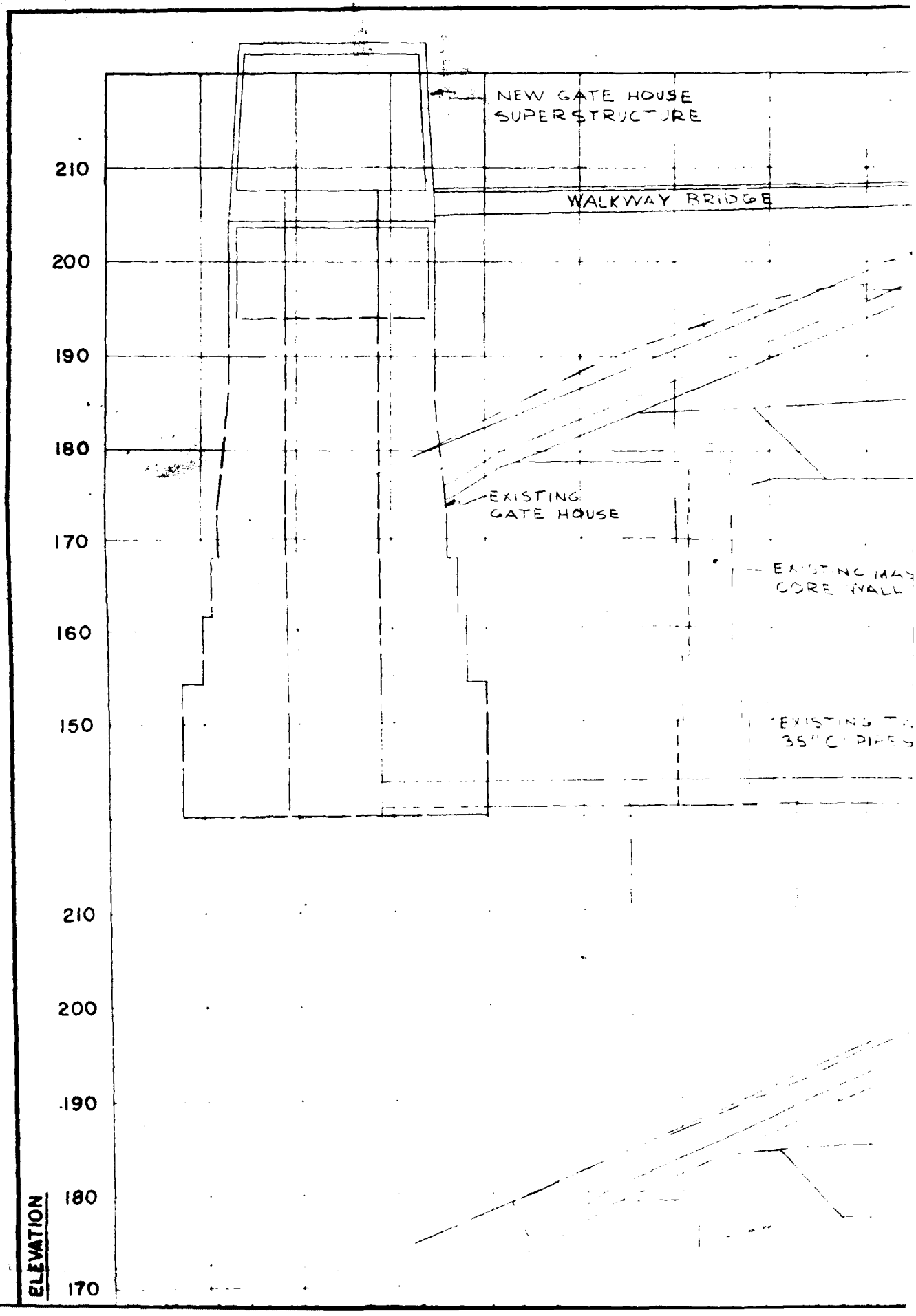
N 331,5[illegible]

N 331,0[illegible] E 531,000

E 53[illegible]

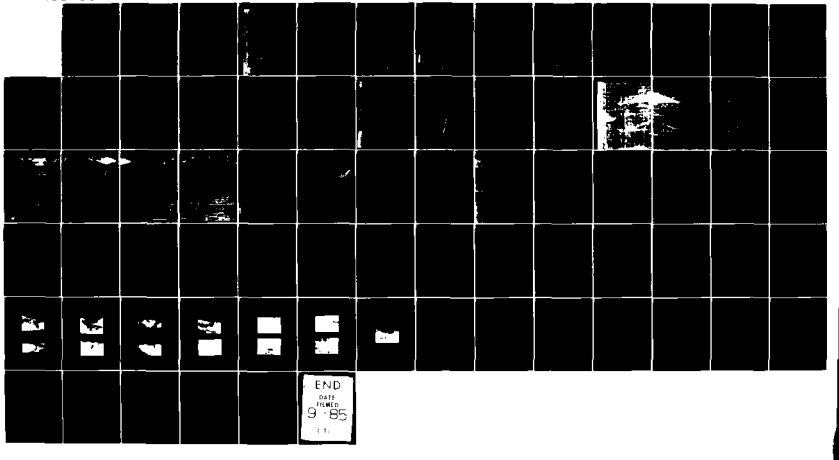
GRAPHIC SCALE

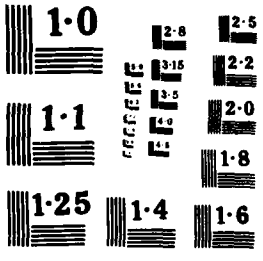
CHARLES A MAGUIRE & ASSOCIATES — ENGINEERS — PROVIDENCE · HARTFORD · BOSTON	CITY OF PAWTUCKET, RHODE ISLAND DEPARTMENT OF PUBLIC WORKS WATER DIVISION
DESIGNED C R DARLING	ENLARGEMENT OF DIAMOND HILL RESERVO
DRAWN R J HERC[illegible] & J R LYONS	
CHECKED [illegible]	GENERAL PLAN I
SUBMITTED E GREENE	PHOTOGRAPH INDEX
APPROVED F C PIERCE	
	APPROVED _____ DATE _____ DIRECTOR OF PUBLIC WORKS
	APPROVED _____ DATE _____ WATER SUPERINTENDENT
	DATE: / DRAWING NO.

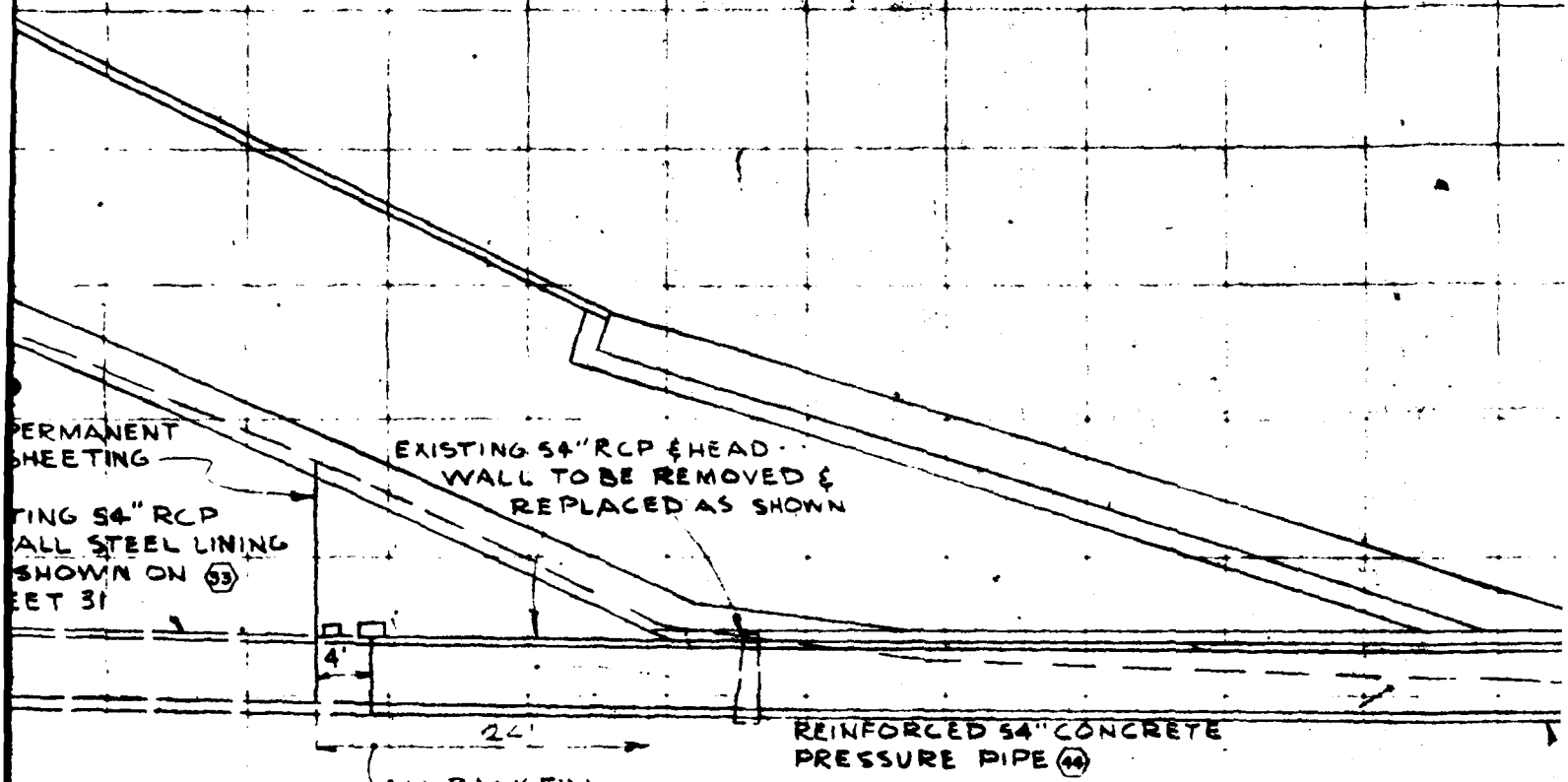

NEW GATE HOUSE
SUPERSTRUCTURE
WALKWAY BRIDGE
EXISTING
GATE HOUSE
210
200
190
180
170
160
150
ELEVATION

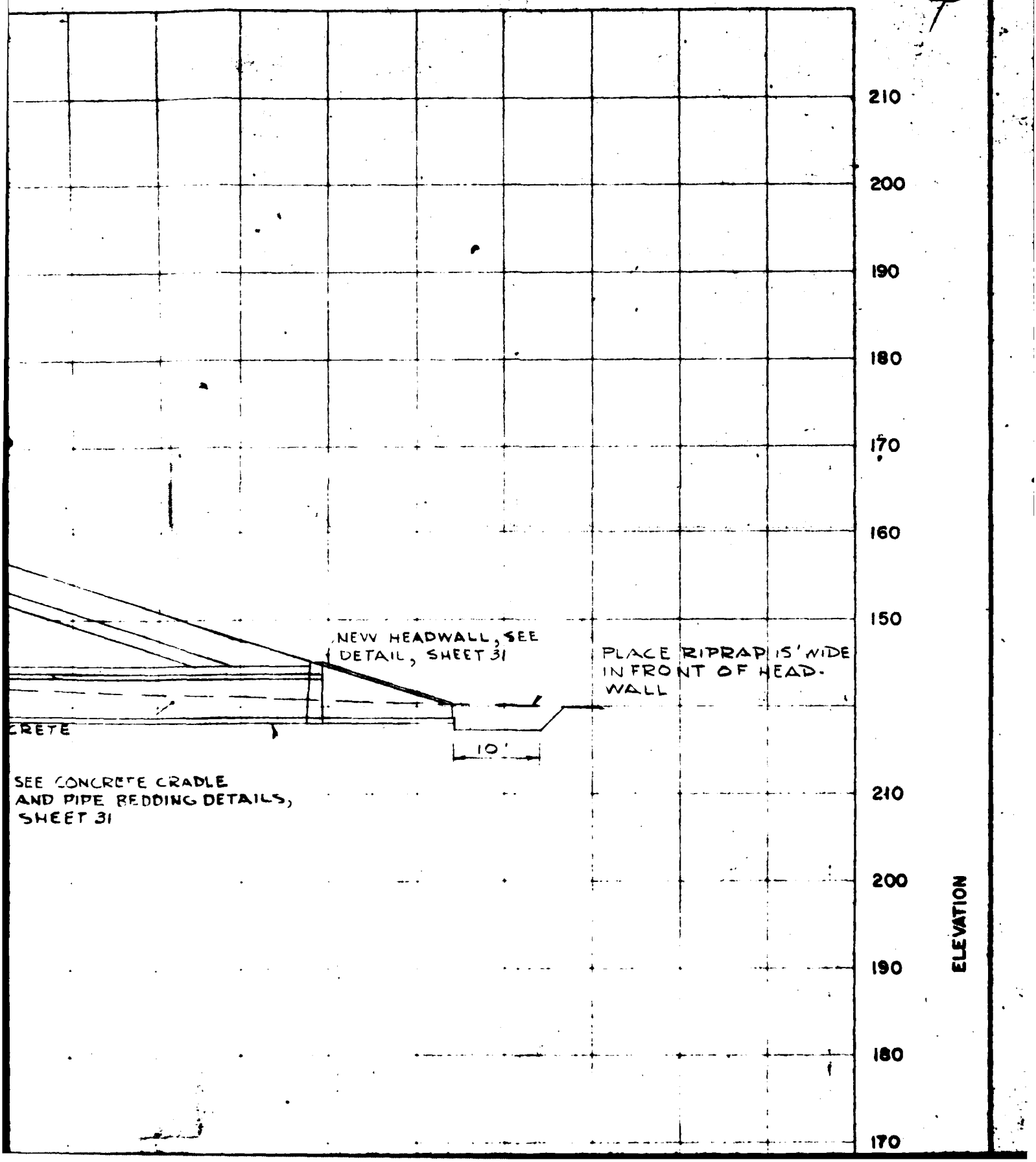
AD-A156 846 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS DIAMOND HILL RESERVOI..(U) CORPS OF ENGINEERS WALTHAM MA NEW ENGLAND DIV NOV 78 2/2

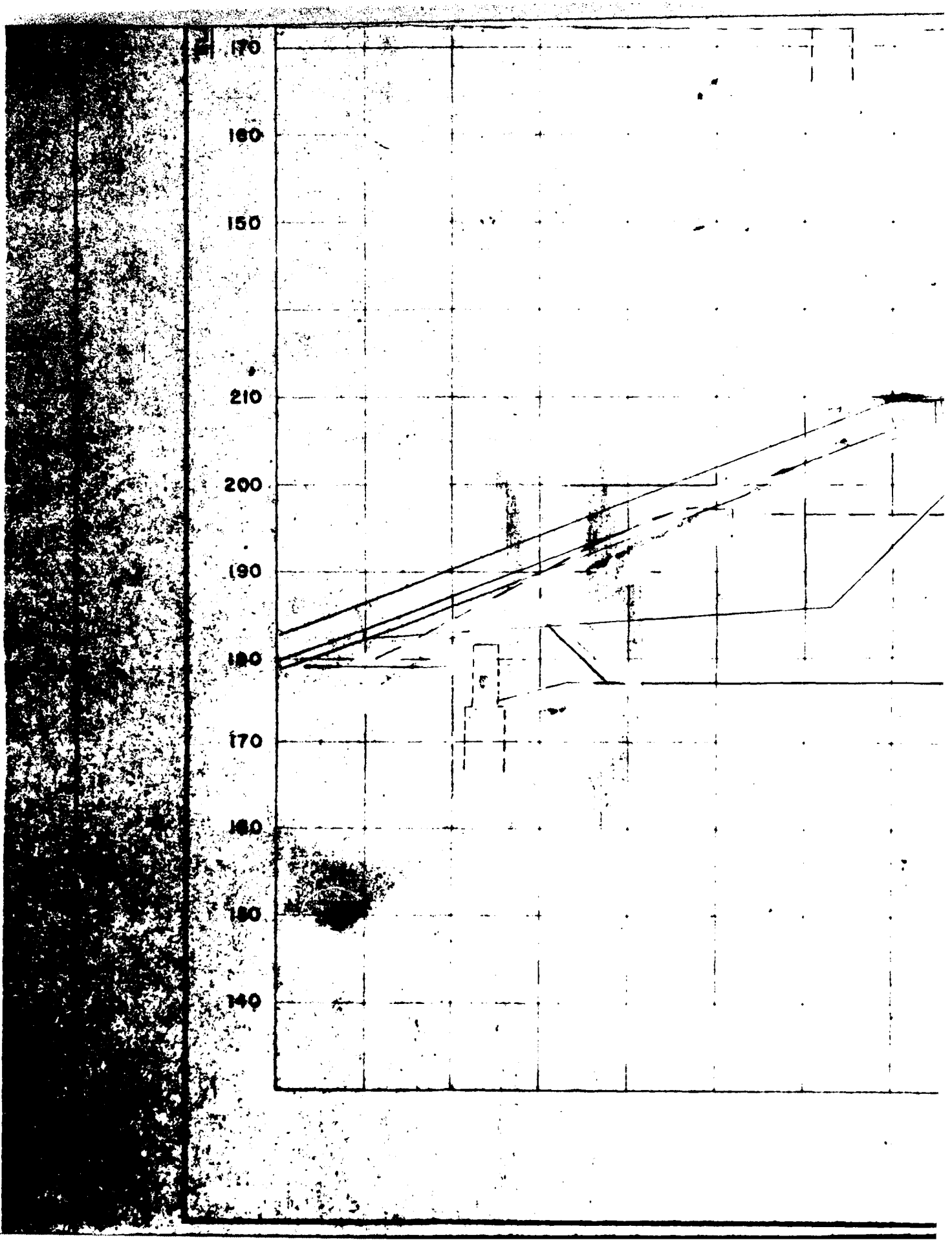
UNCLASSIFIED F/G 13/13 NL




1·0
1·1
1·25
1·4
1·6
1·8
2·0
2·2
2·5
2·8
3·15
3·5
4·0


ERMANENT
SHEETING
TING 54" RCP
ALL STEEL LINING
SHOWN ON (53)
EET 31
EXISTING 54" RCP & HEAD WALL TO BE REMOVED & REPLACED AS SHOWN
4'
24'
REINFORCED 54" CONCRETE PRESSURE PIPE (44)
ALL BACKFILL WITHIN THIS AREA TO BE SELECT IMPERVIOUS (10) FILL.
SEE CONCRETE CRADLE AND PIPE BEDDING DETAILS SHEET 31


210
200
190
180
170
160
150
NEW HEADWALL, SEE DETAIL, SHEET 31
PLACE RIPRAP 15' WIDE IN FRONT OF HEAD-WALL
CRETE
10'
SEE CONCRETE CRADLE AND PIPE BEDDING DETAILS, SHEET 31
210
200
190
180
170
ELEVATION


170
160
150
210
200
190
180
170
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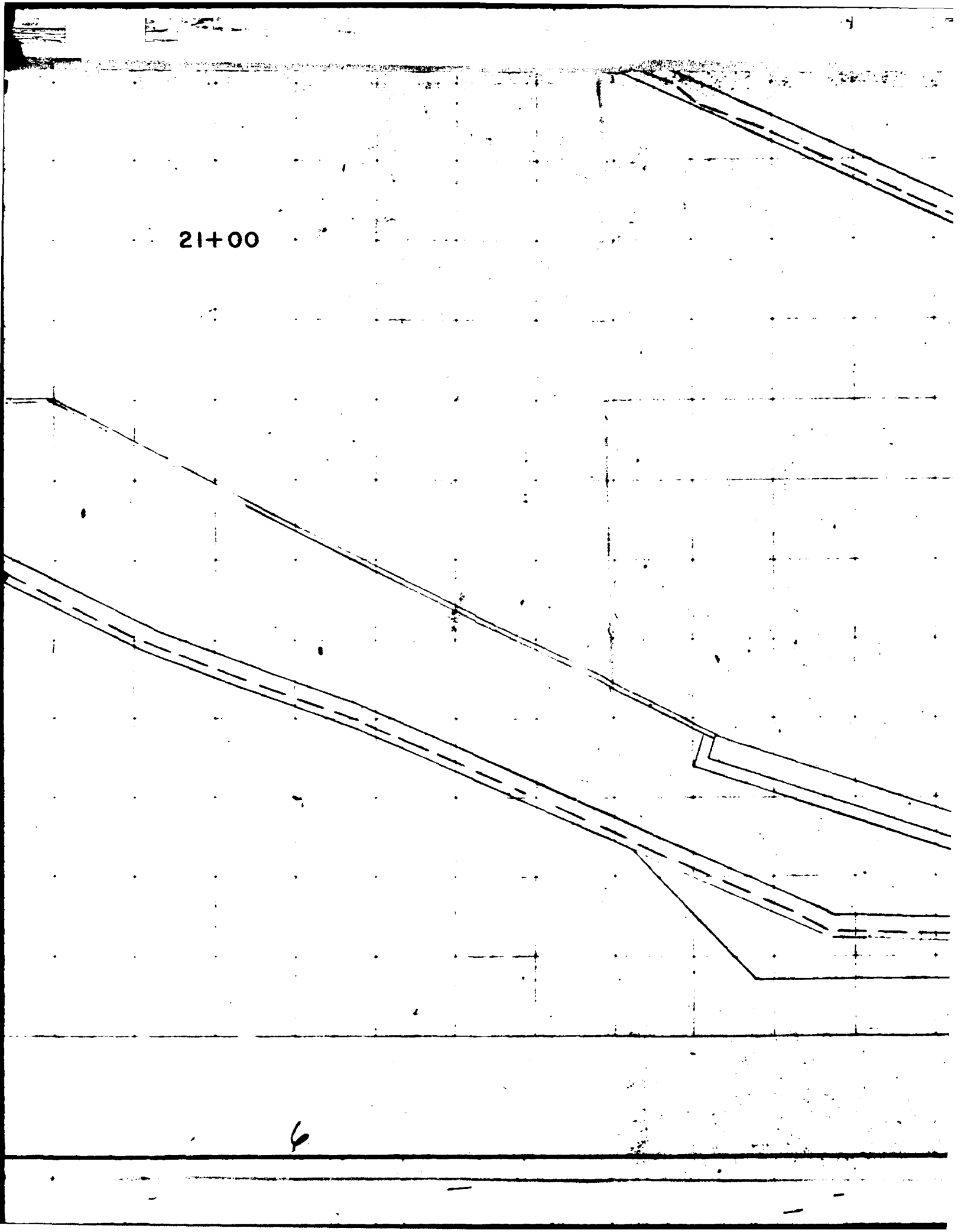
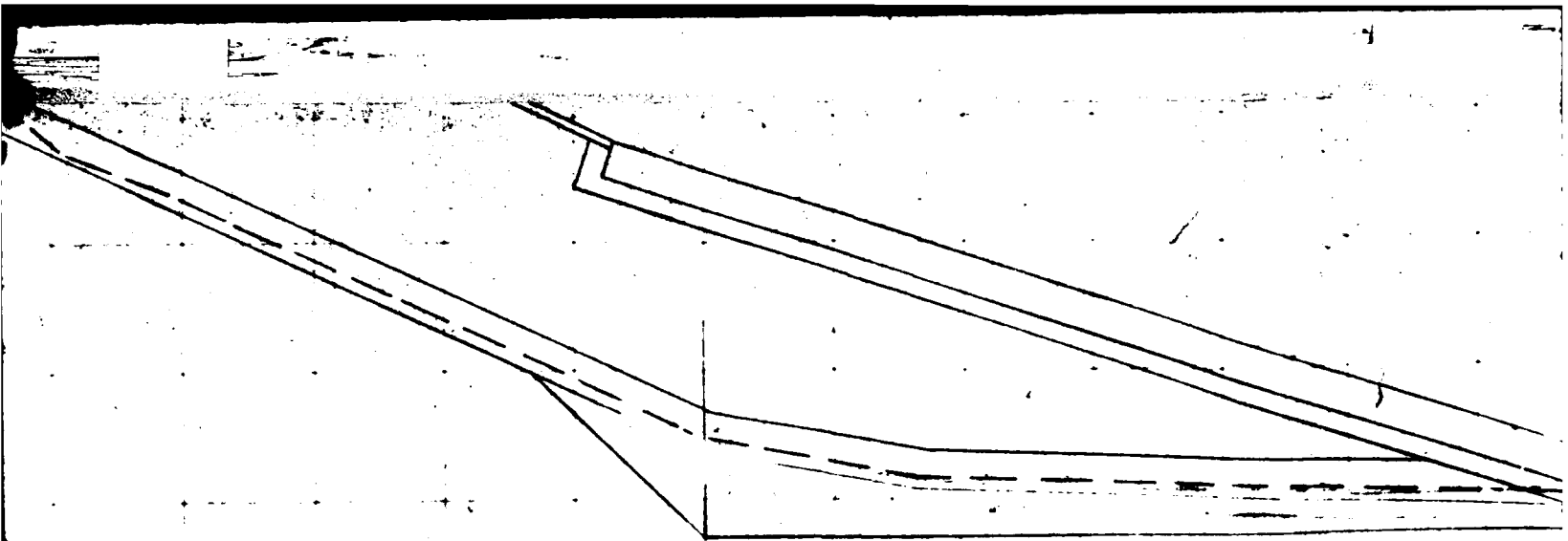
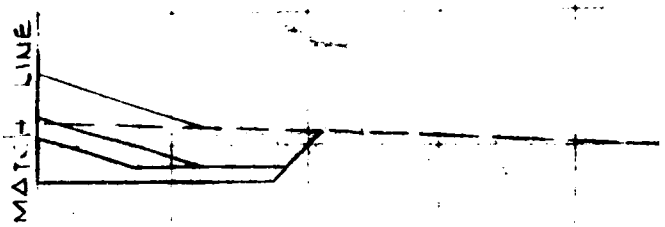
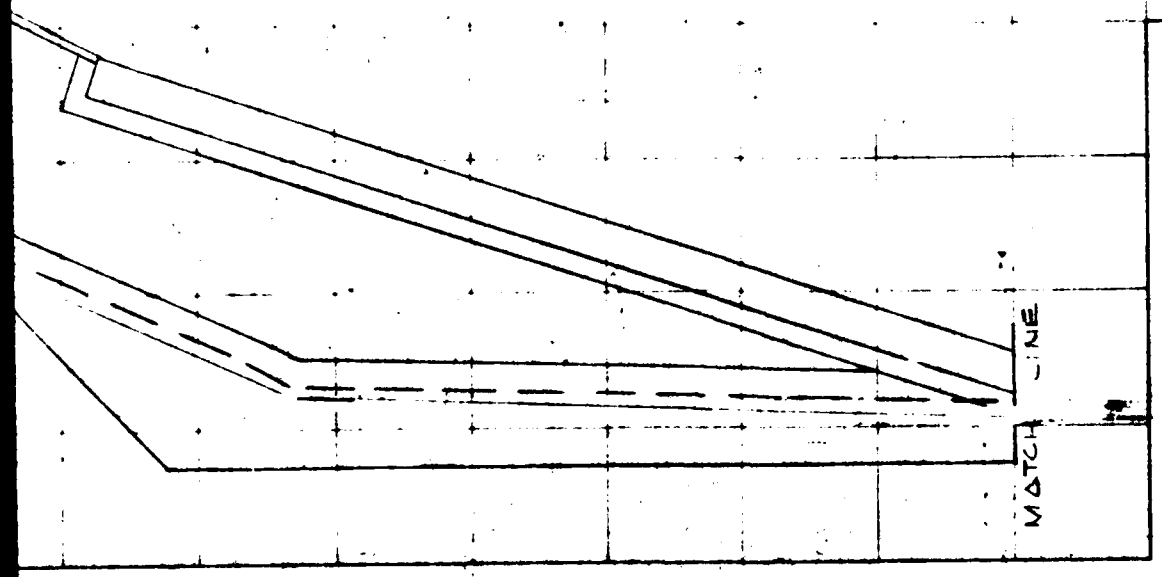
140


21+00



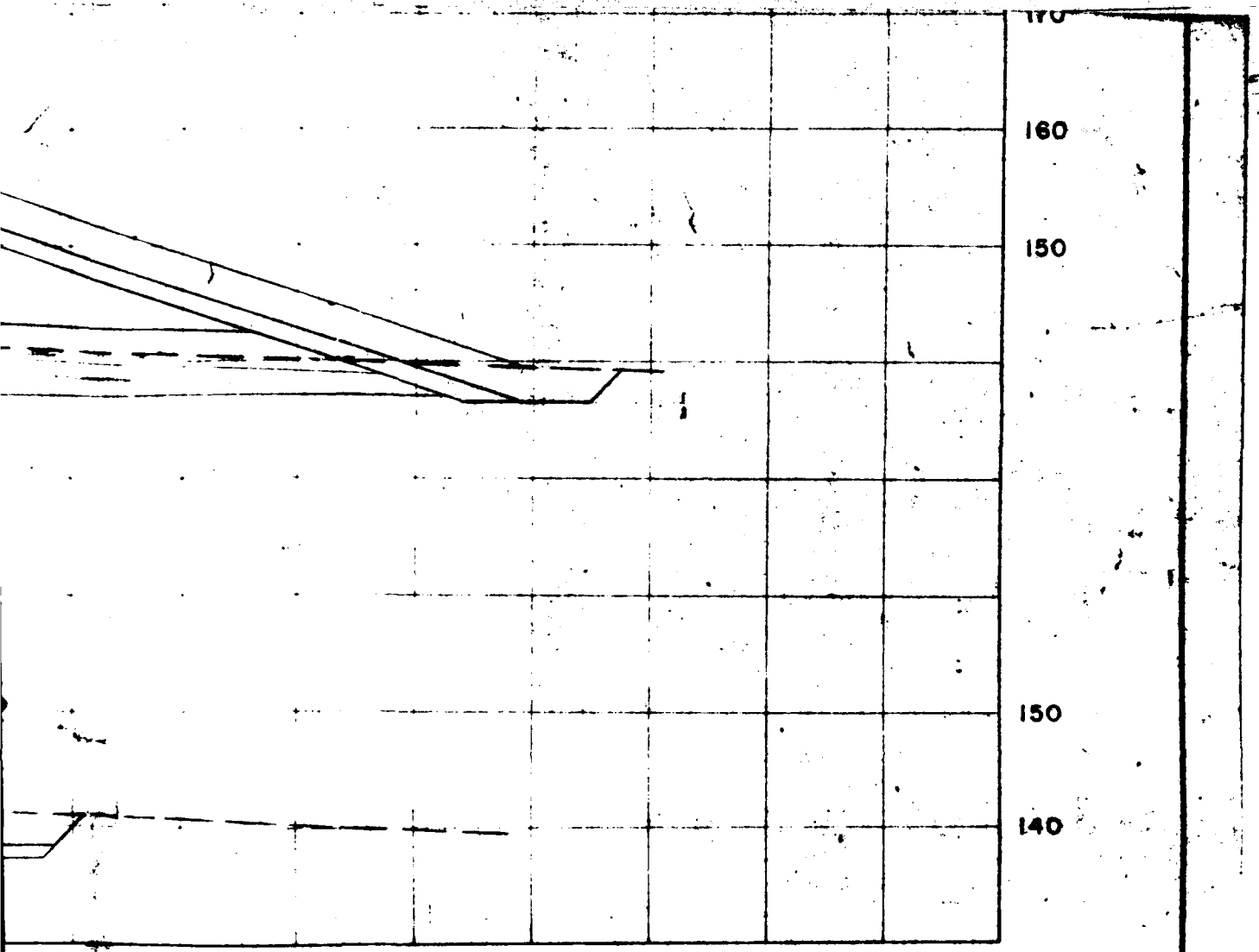




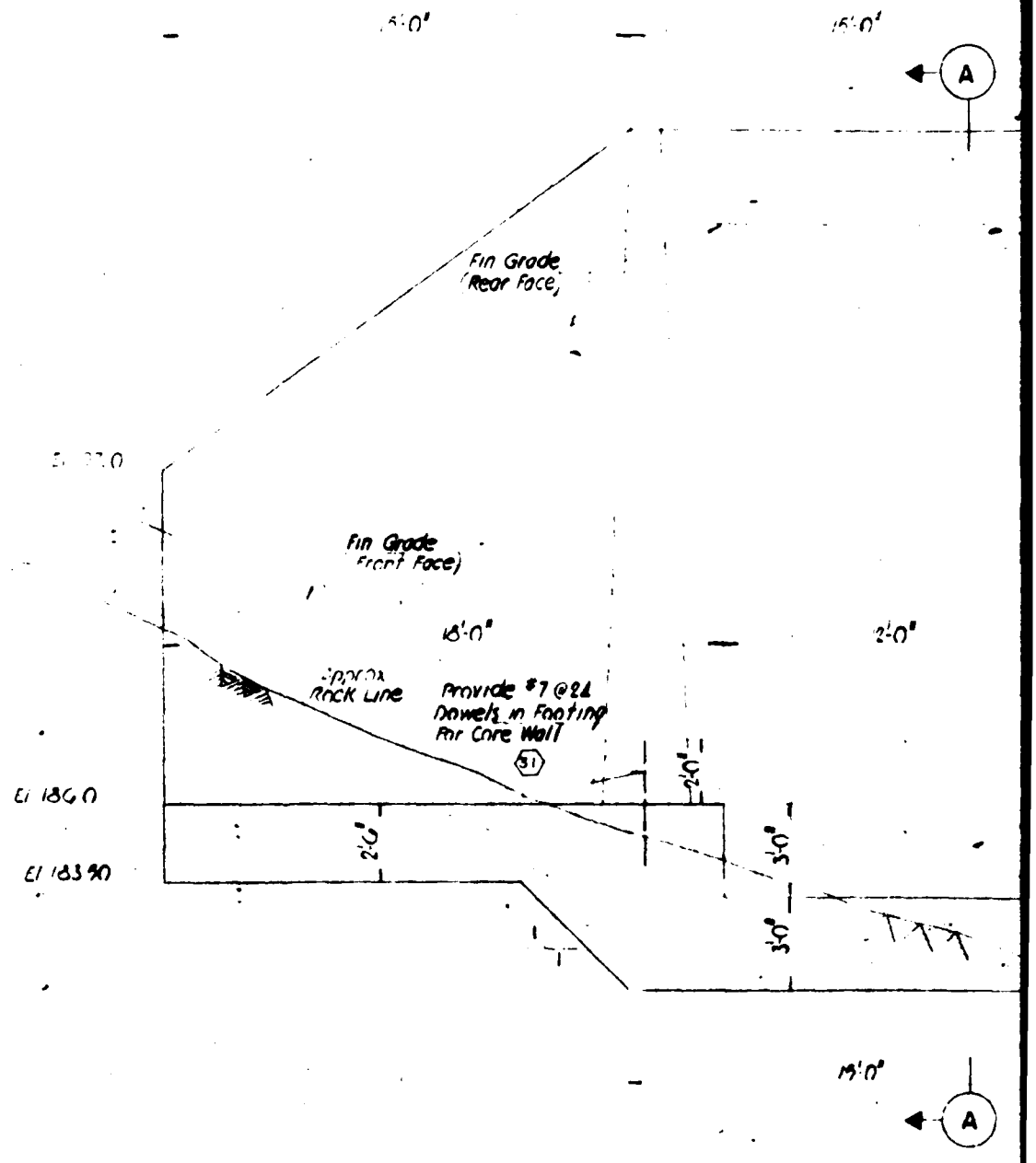
GRAPHIC SCALE

10' 0 10' 20'

CHARLES A MAGUIRE & ASS	
— ENGINEERS —	
PROVIDENCE · HARTFORD ·	
DESIGNED	F. C. PIERCE
DRAWN	R. J. HERCHEN
CHECKED	
SUBMITTED	E. GREENE
APPROVED	F. C. PIERCE

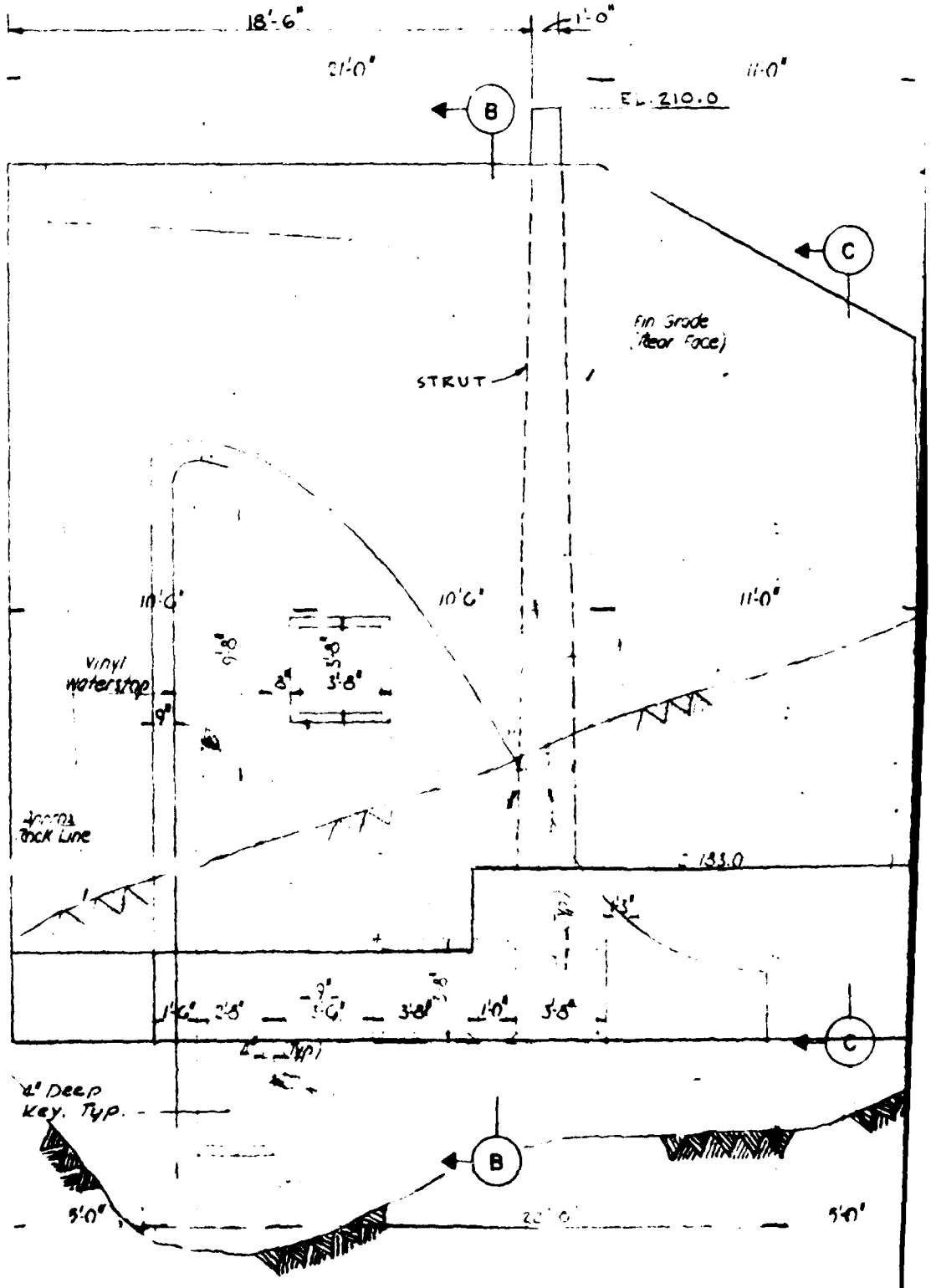


CHARLES A MAGUIRE & ASSOCIATES — ENGINEERS — PROVIDENCE · HARTFORD · BOSTON	CITY OF PAWTUCKET, RHODE ISLAND DEPARTMENT OF PUBLIC WORKS WATER DIVISION
DESIGNED F. C. PIERCE DRAWN R. J. HERCHEN CHECKED QUANTITIES E. GREENE APPROVED F.C.PIERCE	ENLARGEMENT OF DIAMOND HILL RESERVOIR CROSS SECTIONS STA. 20+50 TO STA. 21+50
	APPROVED _____ DIRECTOR OF PUBLIC WORKS DATE _____ APPROVED _____ WATER SUPERINTENDENT DATE _____
DATE:	DRAWING NO.
SCALE: 1"=10'	SHEET 47 OF 70 8



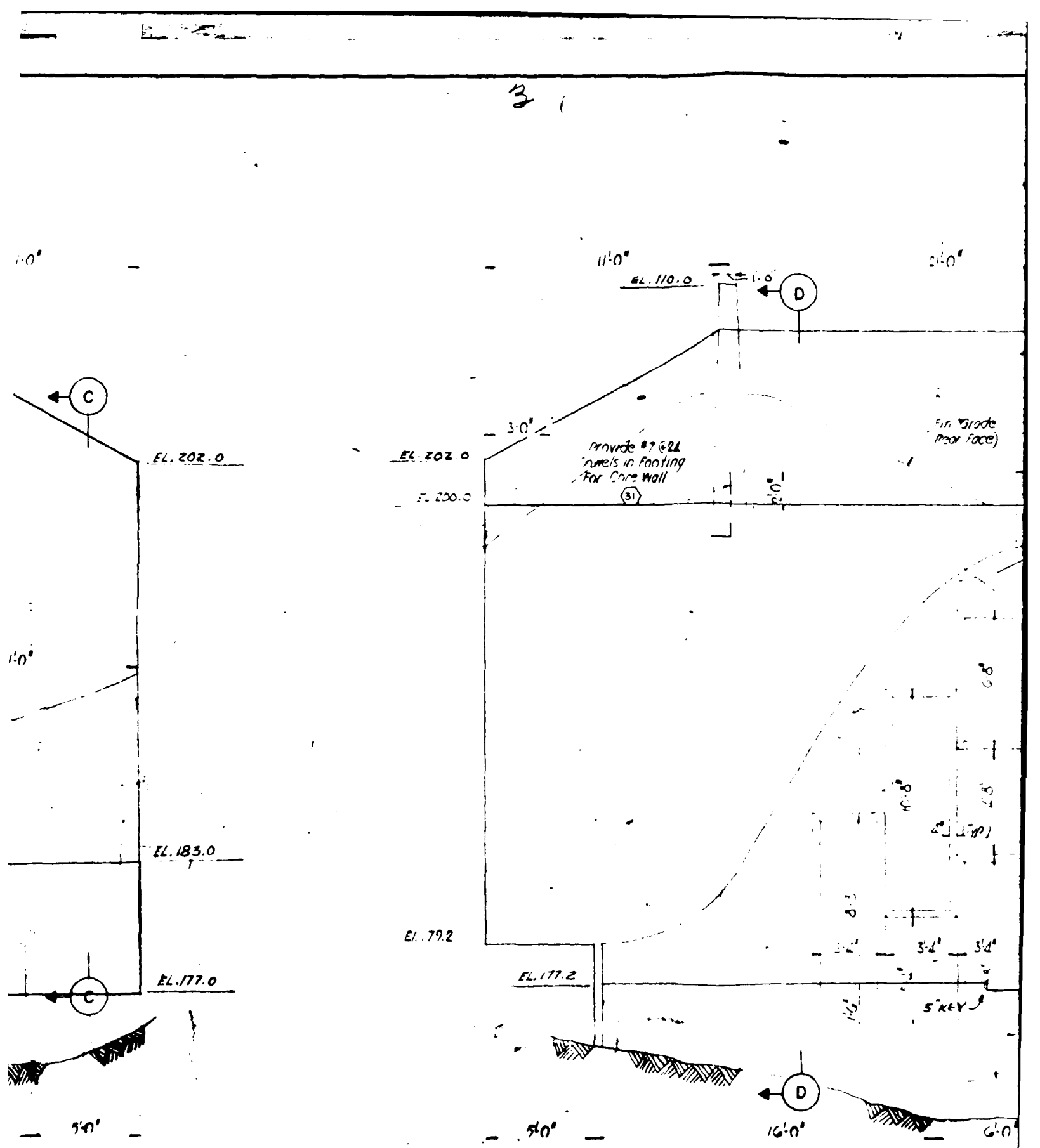
WING WALL ELEVATION

SCALE 1/4"=1'-0"



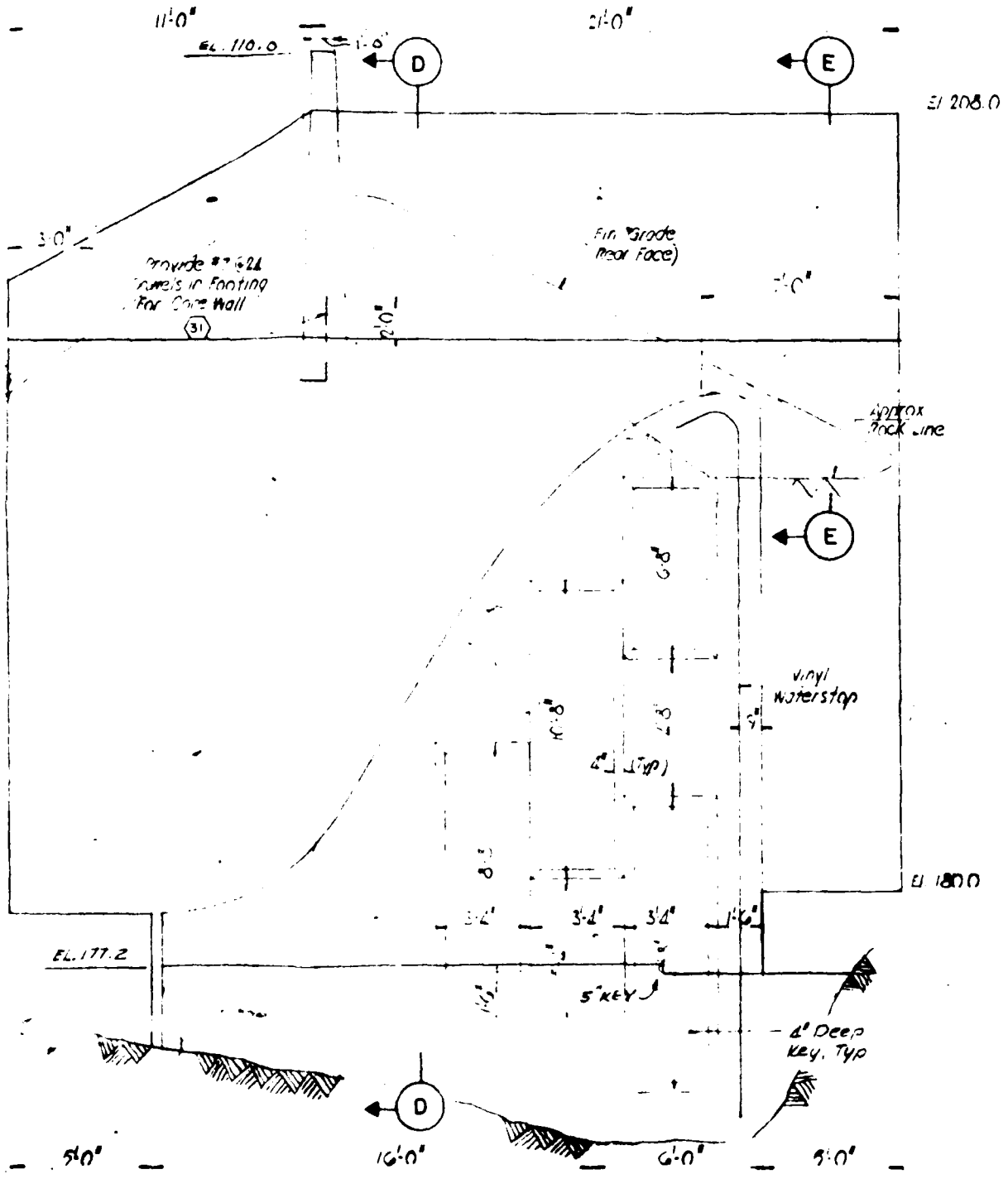
EAST ABUTMENT

SCALE: 1/4"=1'-0"



WEST ABUTMENT ELEVATION

SCALE 1/4"=1'-0"

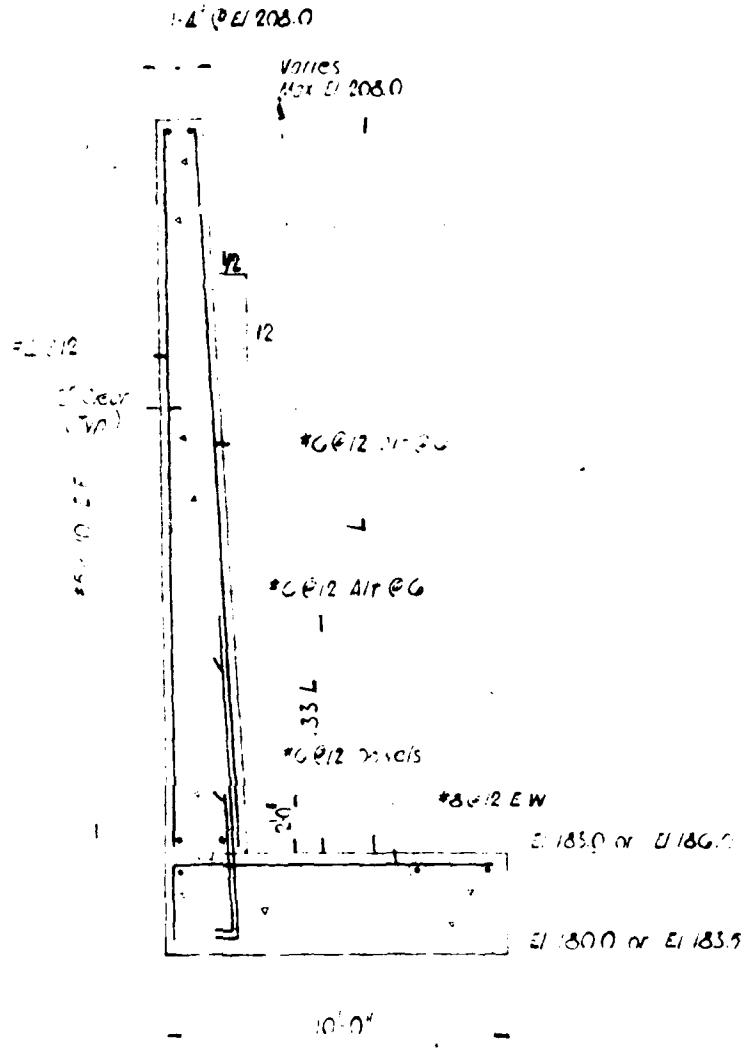


WEST ABUTMENT ELEVATION

SCALE 1/4"=1'-0"

Y

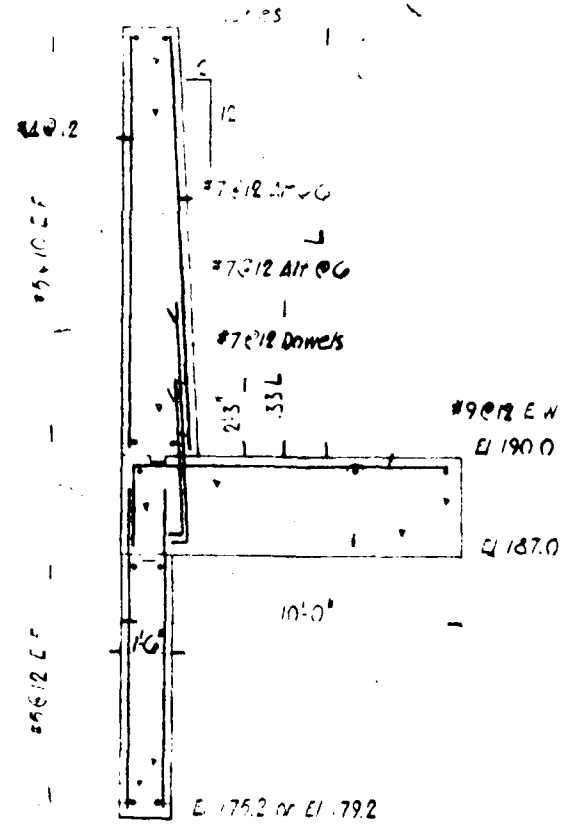
X



SECTION A

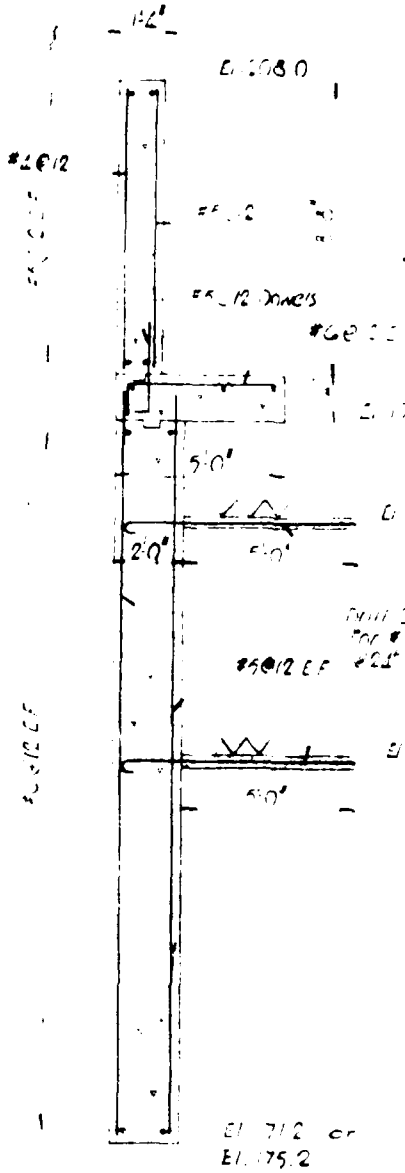
SCALE 1/4"=1'-0"

SCALE 1/4 = 1'-0



SECTION C

SCALE 1/4"= 1'-0"



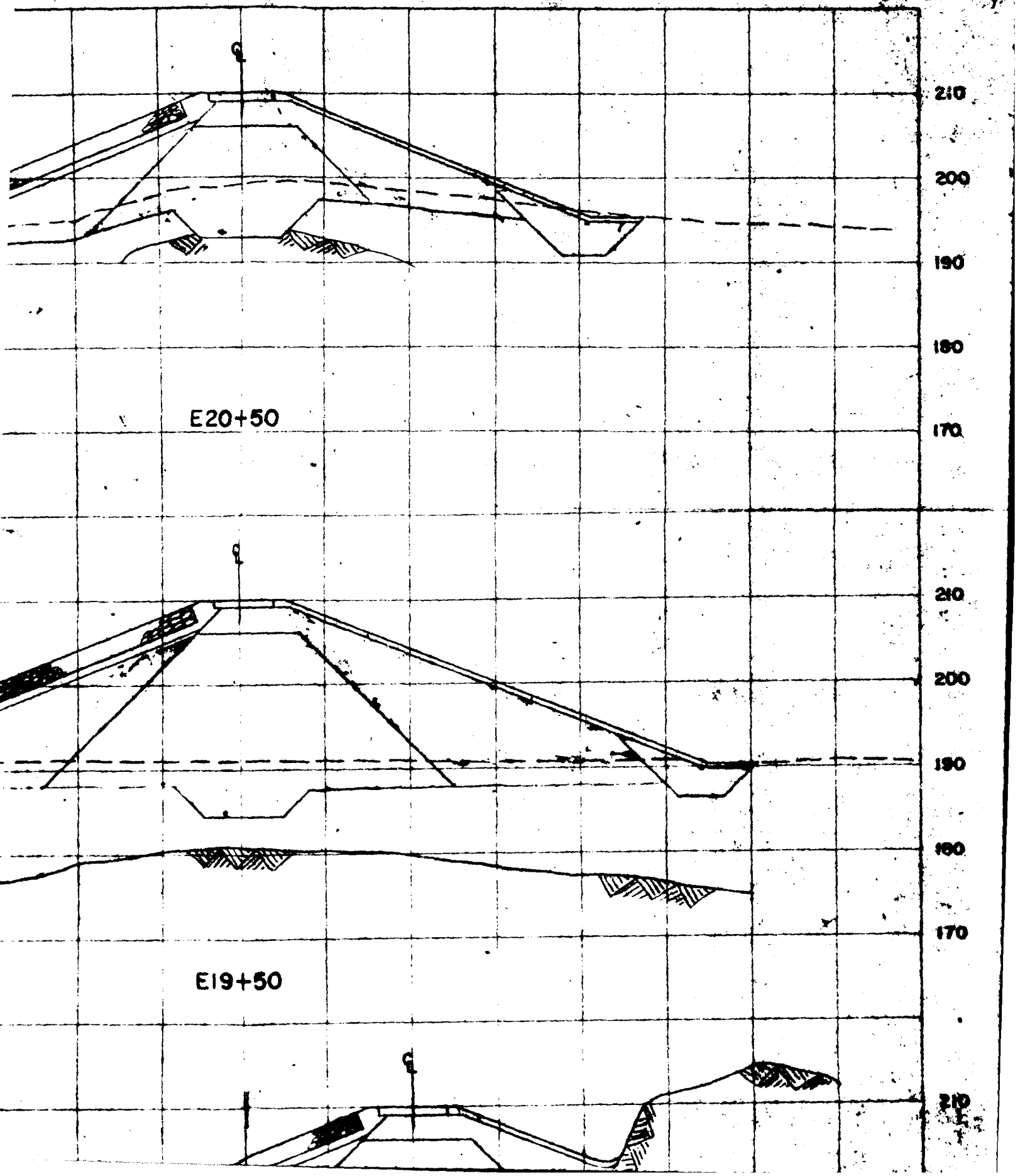
SECTION D

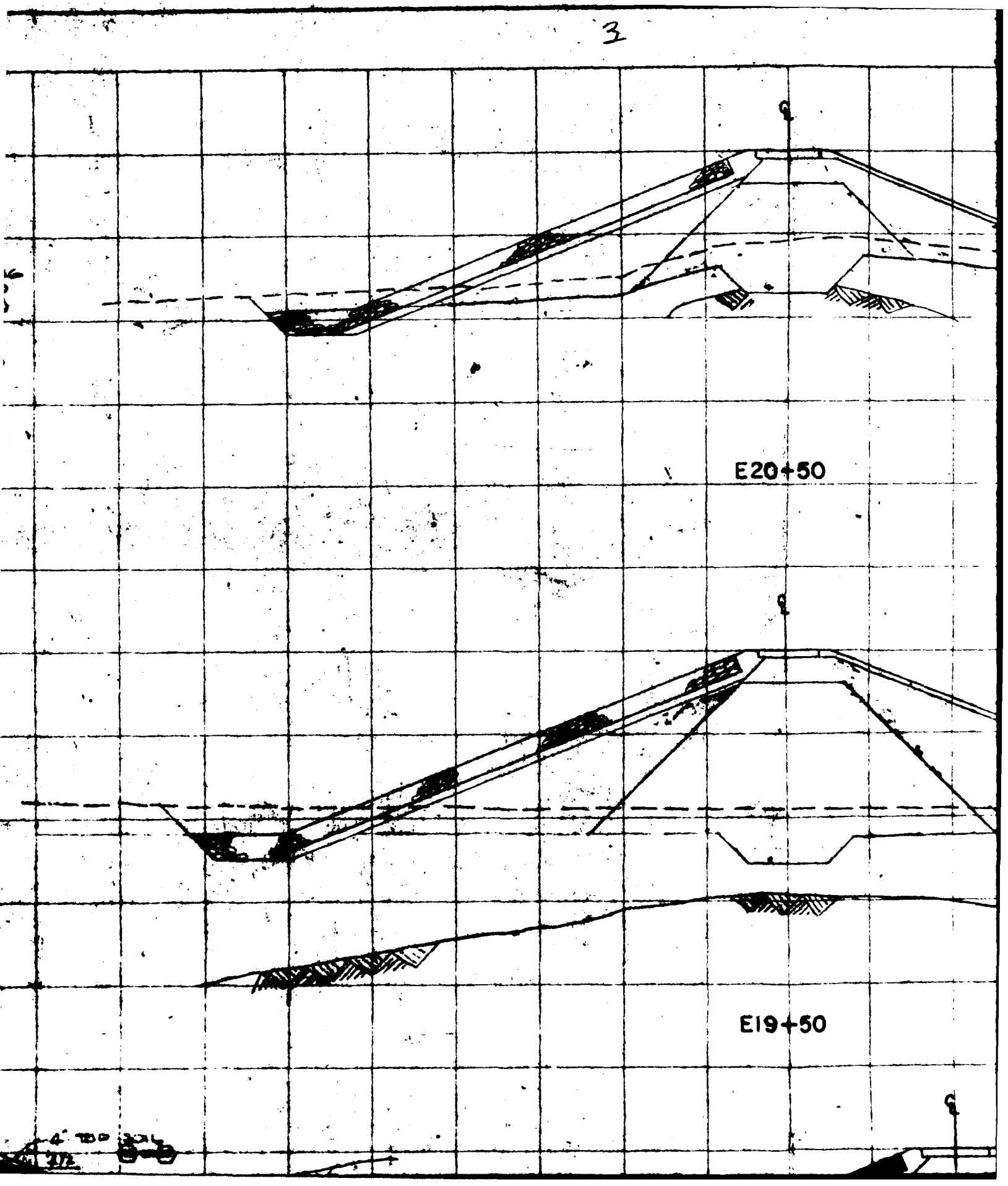
SCALE 1/4"= 1'-0"

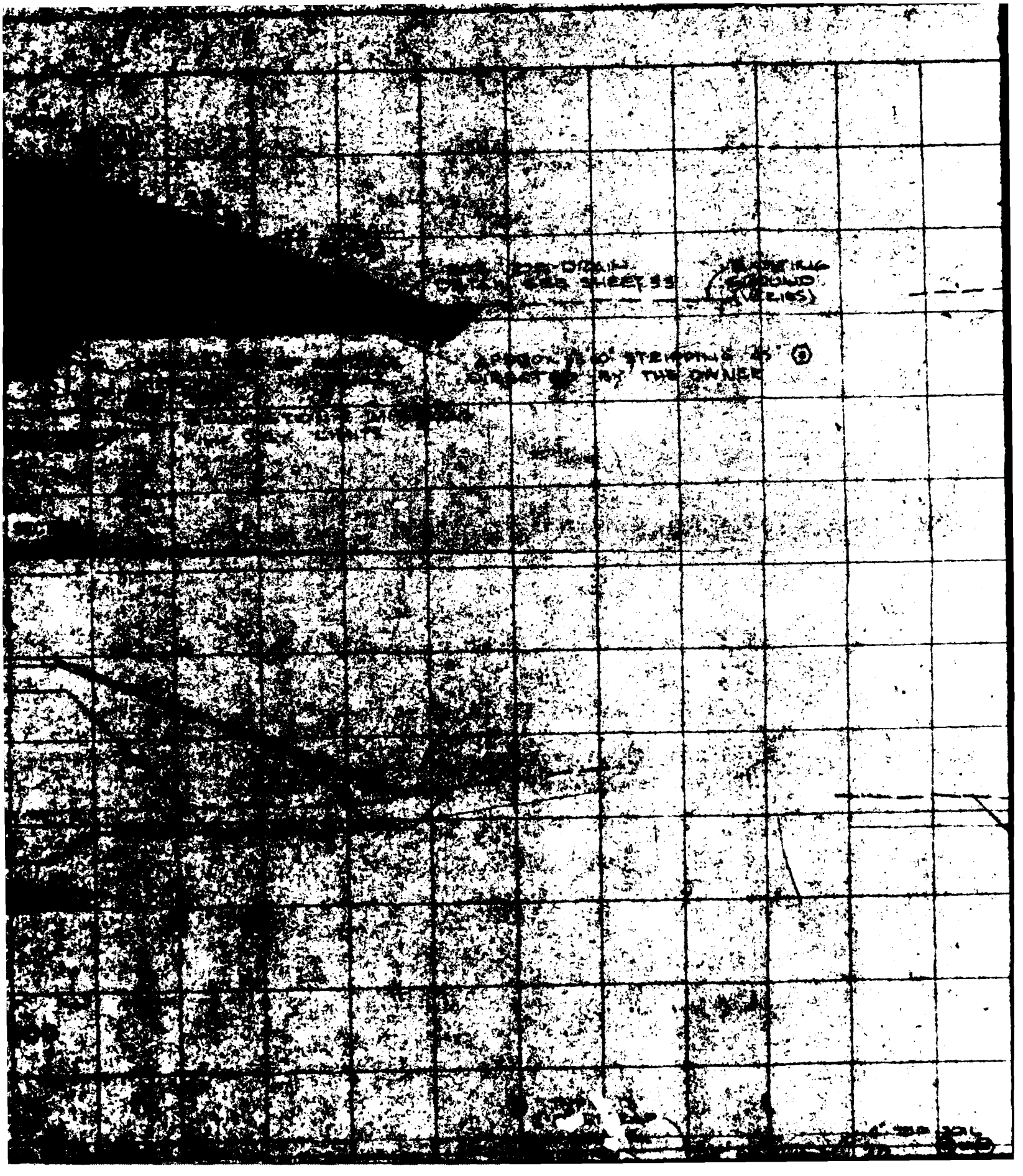
NOTE:

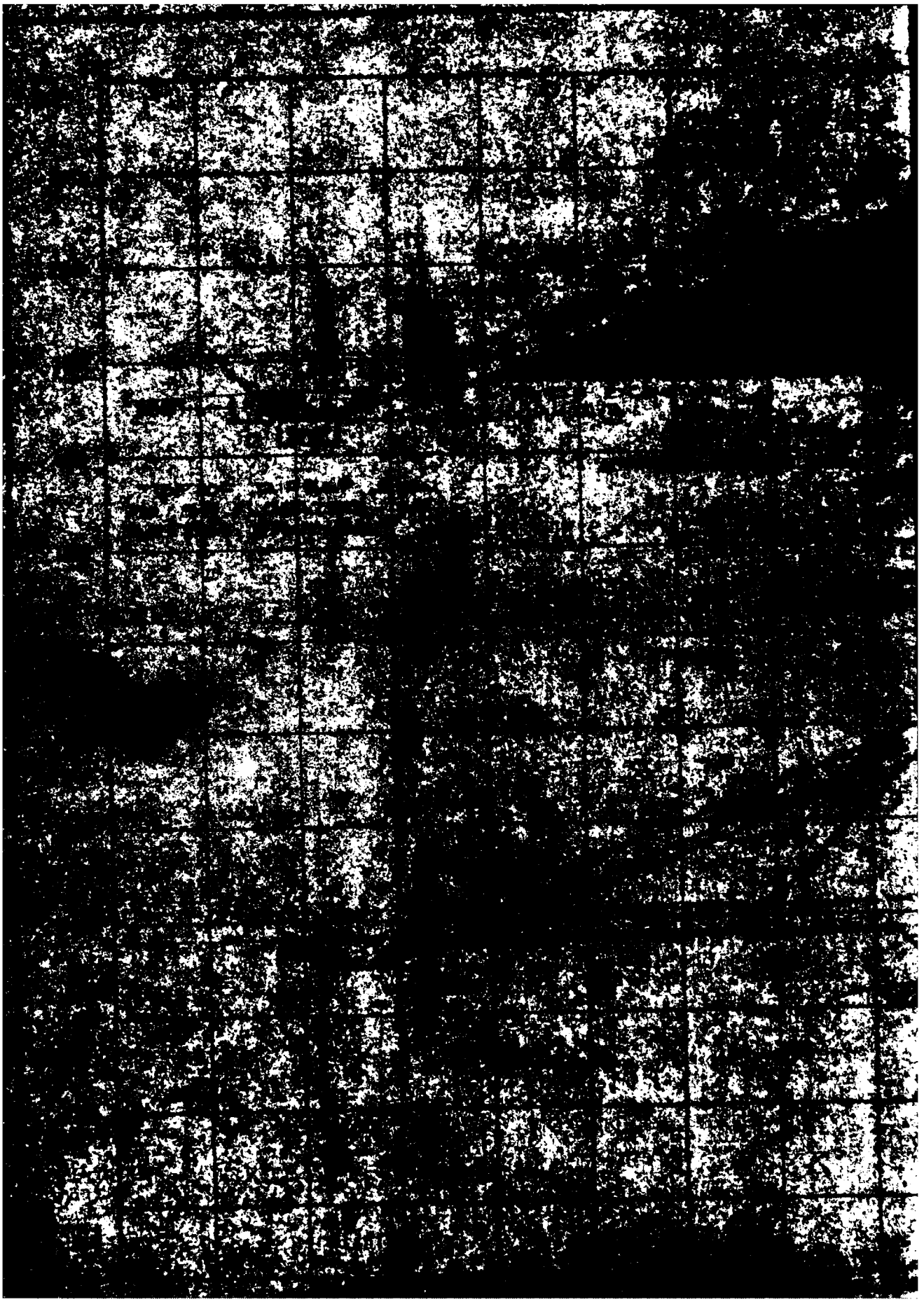
WHERE CONCRETE IS TO BE PLACED DIRECTLY AGAINST ROCK, THE LIMITS SHOWN ABOVE ARE THE MINIMUM THICKNESS OF CONCRETE ("A" LINE). THE PAYMENT LINES FOR ROCK EXCAVATION AND CONCRETE ("B" LINE) SHALL BE 6' OUTSIDE OF THE "A" LINE. SEE SPECS. (14), (25) & (26).

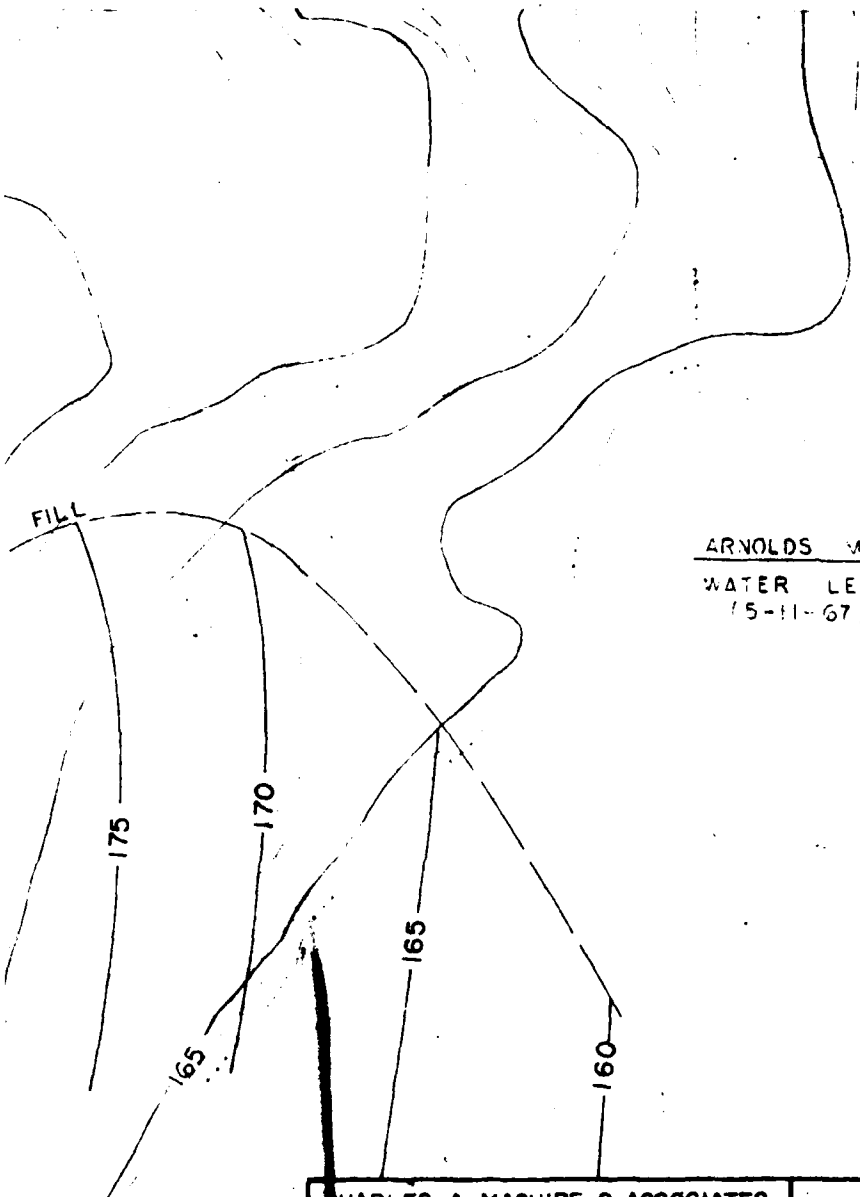
3




E20+50
E19+50







ARNOLDS MILLS RESERVOIR
WATER LEVEL EL 163.83
(5-11-67)

U. S. DEPARTMENT OF COMMERCE
ECONOMIC DEVELOPMENT ADMINISTRATION
PROJECT NO. 01-1-03324

CHARLES A MAGUIRE & ASSOCIATES
— ENGINEERS —
PROVIDENCE · HARTFORD · BOSTON

CITY OF PAWTUCKET, RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS
WATER DIVISION

DESIGNED	F.C. PIERCE
DRAWN	J.R.LYONS & L.A.CAYCE
CHECKED	M.R.Hopton
SUBMITTED	E.GREENE
APPROVED	F.C.PIERCE

ENLARGEMENT OF DIAMOND HILL RESERVOIR

BRIDGE & SPILLWAY PLAN

APPROVED _____ DIRECTOR OF PUBLIC WORKS DATE 4-3-70

APPROVED _____ WATER SUPERINTENDENT DATE _____

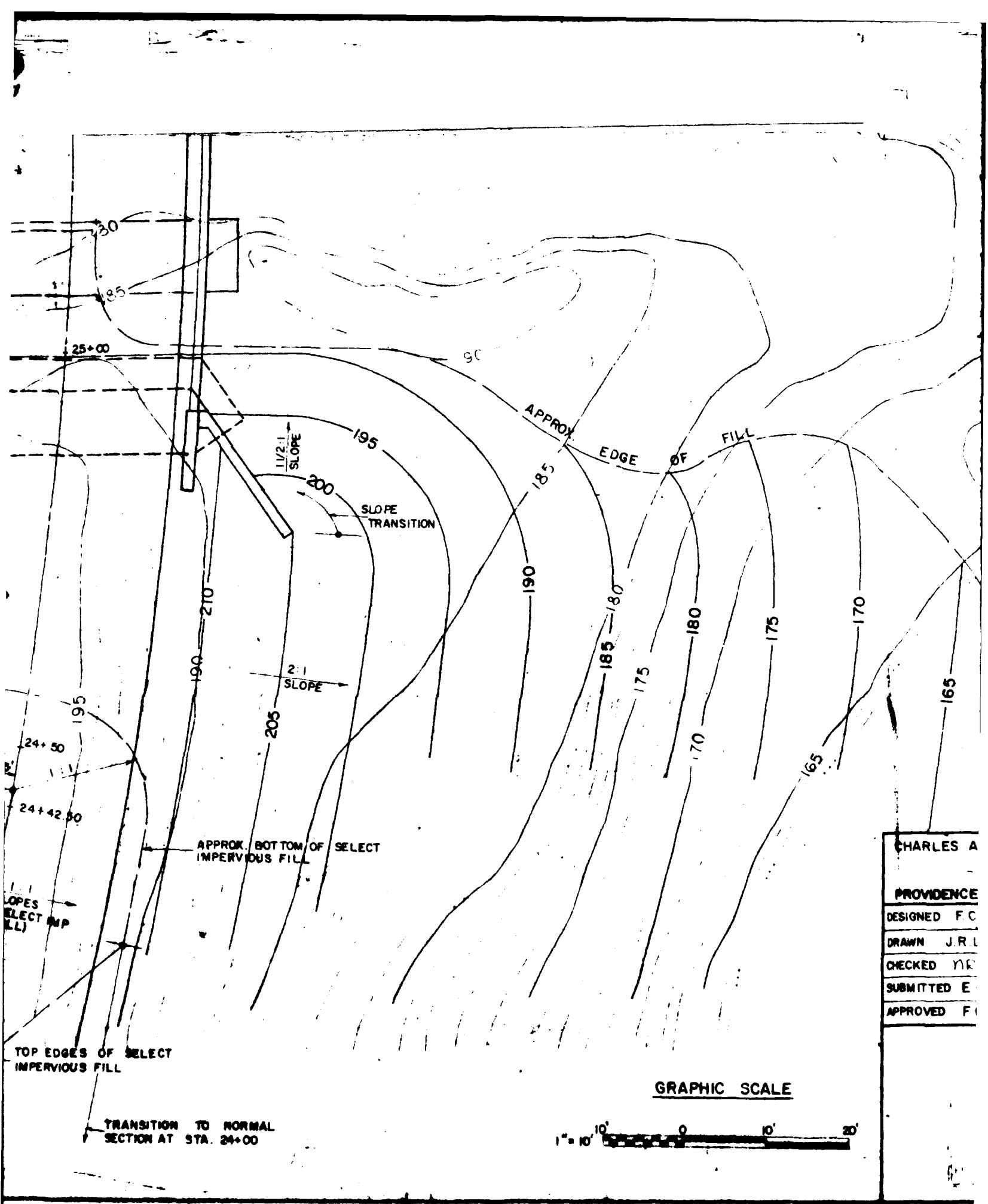
REGISTERED PROFESSIONAL ENGINEER

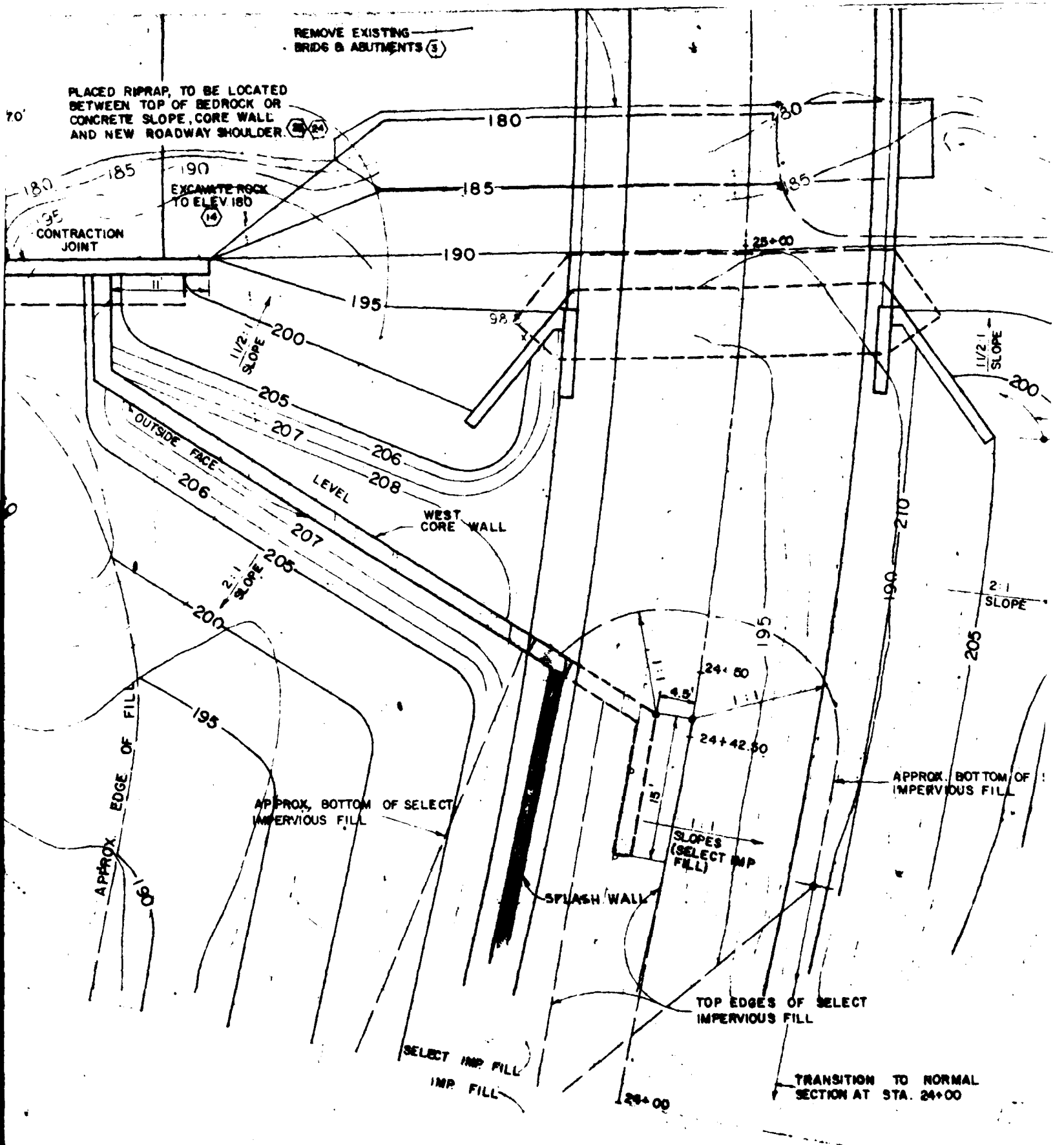
GRAPHIC SCALE

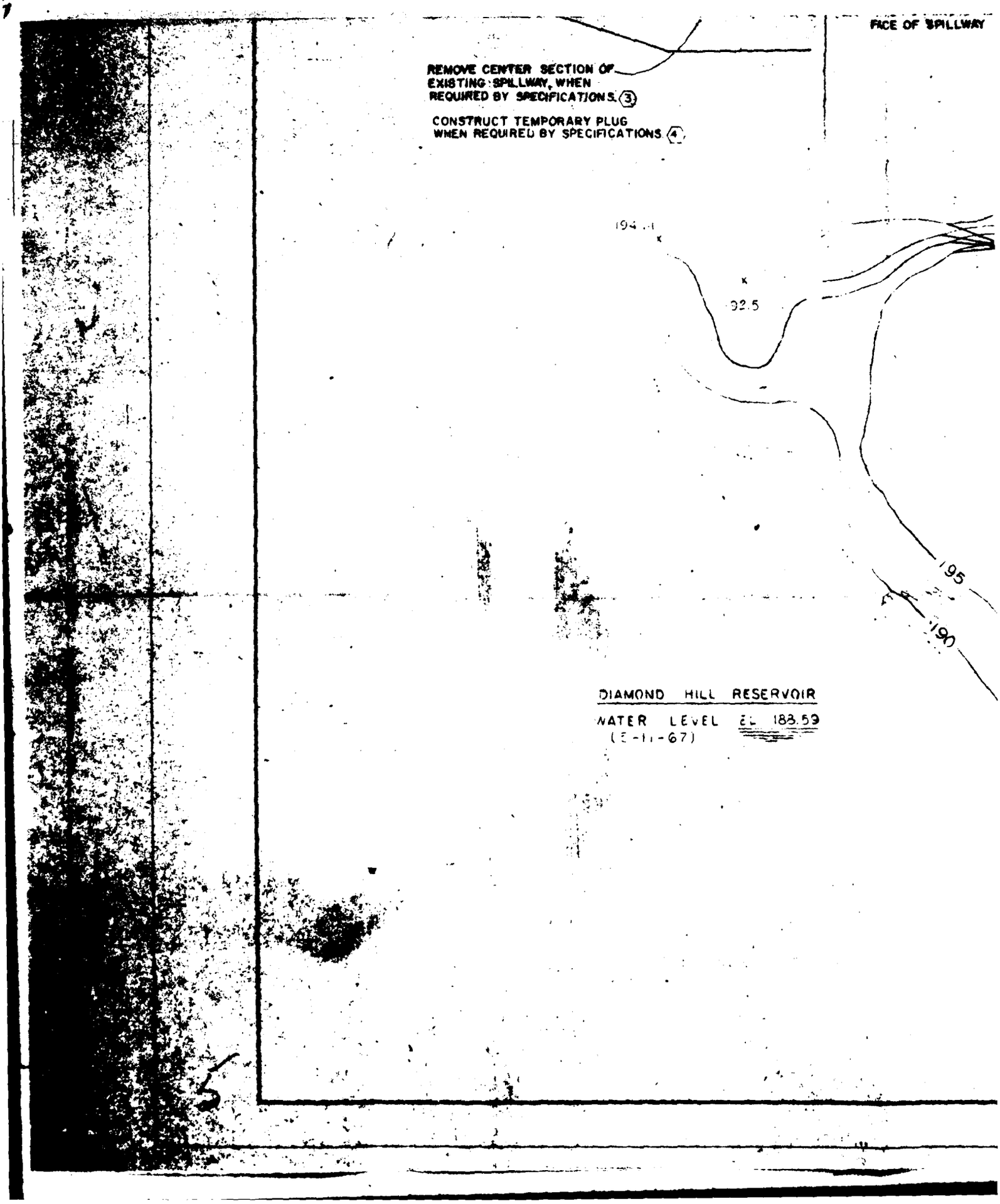
10' 20'

DATE: _____ DRAWING NO. _____

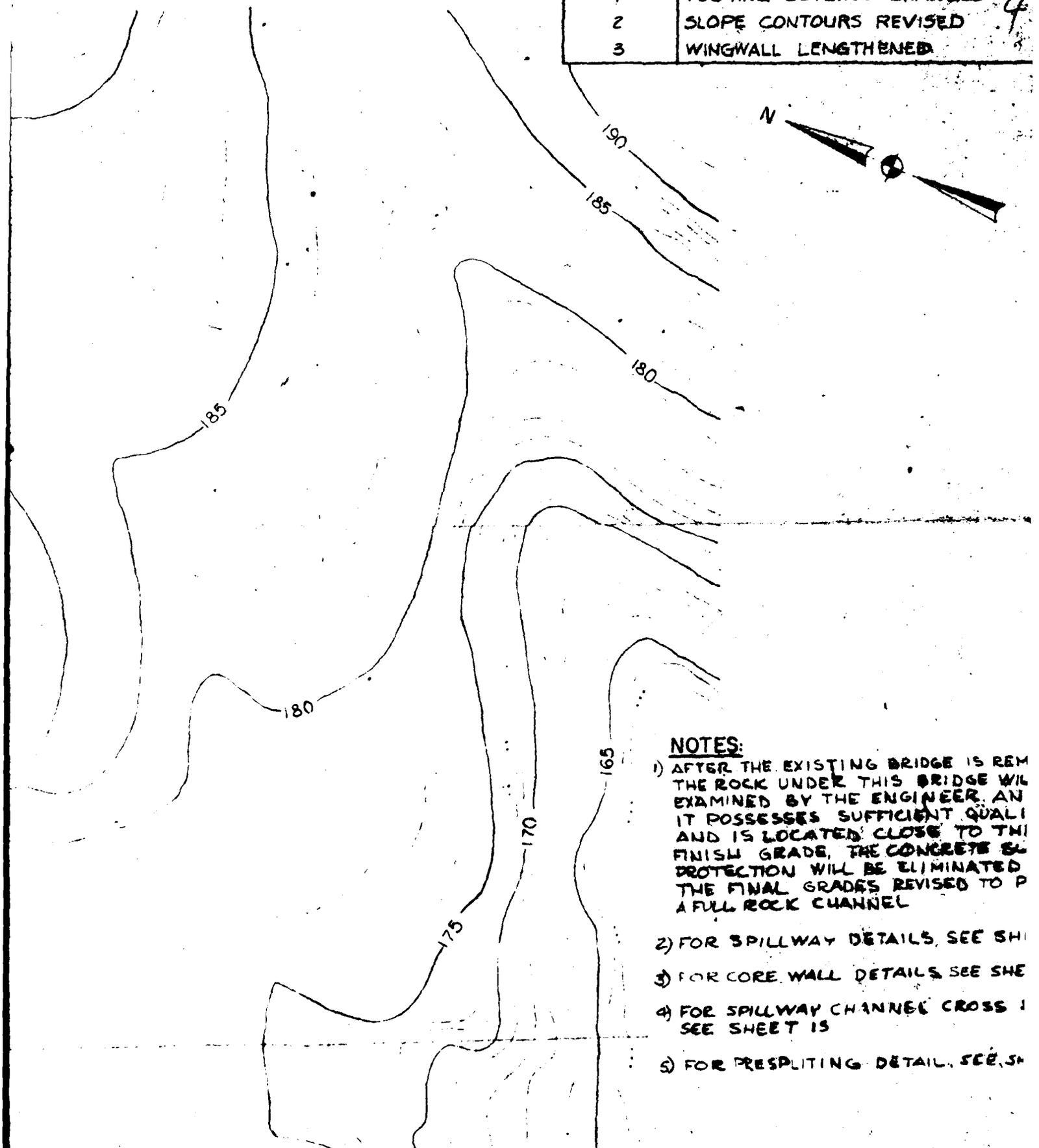
SCALE: 1" = 10' SHEET 12 OF 70


30
185
25+00
1 1/2:1 SLOPE
195
200
SLOPE TRANSITION
APPROX
EDGE
OF
FILL
185
190
210
190
2:1 SLOPE
205
195
24+50
24+42.50
APPROX. BOTTOM OF SELECT IMPERVIOUS FILL
TOP EDGES OF SELECT IMPERVIOUS FILL
TRANSITION TO NORMAL SECTION AT STA. 24+00
180
175
170
165
GRAPHIC SCALE
1" = 10'
10'
0
10'
20'
CHARLES A
PROVIDENCE
DESIGNED F.C
DRAWN J.R.L
CHECKED
SUBMITTED E
APPROVED F


REMOVE EXISTING BRIDG & ABUTMENTS (3)
PLACED RIPRAP, TO BE LOCATED BETWEEN TOP OF BEDROCK OR CONCRETE SLOPE, CORE WALL AND NEW ROADWAY SHOULDER (25) (24)
EXCAVATE ROCK TO ELEV 180 (14)
CONTRACTION JOINT
180
185
190
195
200
205
206
207
208
210
25+00
24+50
24+42.50
24+00
1 1/2:1 SLOPE
2:1 SLOPE
OUTSIDE FACE
LEVEL
WEST CORE WALL
APPROX. EDGE OF FILL
APPROX. BOTTOM OF SELECT IMPERVIOUS FILL
APPROX. BOTTOM OF IMPERVIOUS FILL
SLOPES (SELECT IMP FILL)
SPLASH WALL
TOP EDGES OF SELECT IMPERVIOUS FILL
SELECT IMP FILL
IMP FILL
TRANSITION TO NORMAL SECTION AT STA. 24+00
4.5'
15'
98'


FACE OF SPILLWAY
REMOVE CENTER SECTION OF EXISTING SPILLWAY, WHEN REQUIRED BY SPECIFICATIONS. (3)
CONSTRUCT TEMPORARY PLUG WHEN REQUIRED BY SPECIFICATIONS (4)
194
192.5
195
190
DIAMOND HILL RESERVOIR
WATER LEVEL EL 183.59
(3-11-67)

REV. NO.	REVISION
1	FOOTING OUTLINE CHANGED
2	SLOPE CONTOURS REVISED
3	WINGWALL LENGTHENED



NOTES:

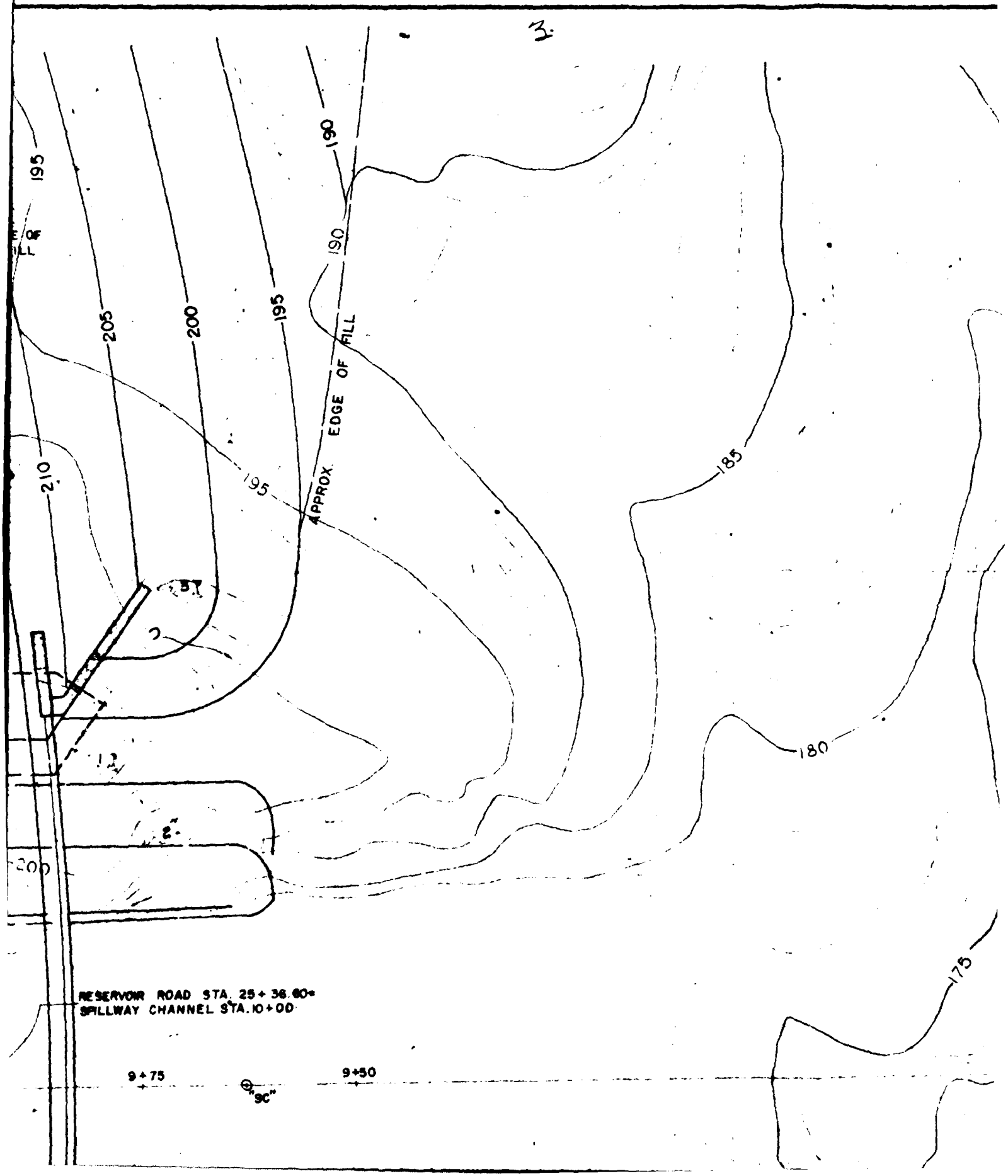
1) AFTER THE EXISTING BRIDGE IS REM
THE ROCK UNDER THIS BRIDGE WIL
EXAMINED BY THE ENGINEER. AN
IT POSSESSES SUFFICIENT QUALI
AND IS LOCATED CLOSE TO THI
FINISH GRADE, THE CONCRETE SL
PROTECTION WILL BE ELIMINATED
THE FINAL GRADES REVISED TO P
A FULL ROCK CHANNEL

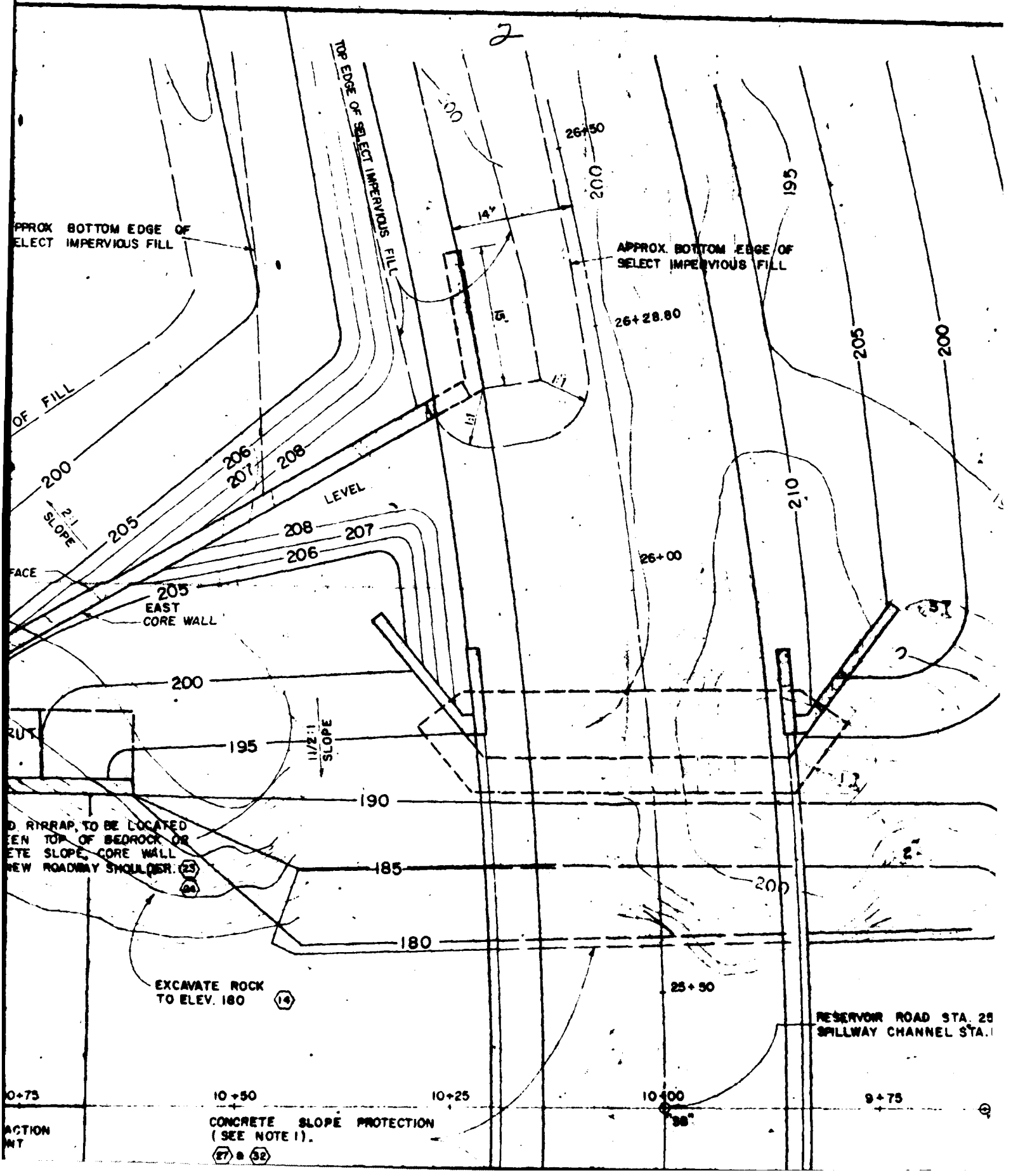
2) FOR SPILLWAY DETAILS, SEE SH

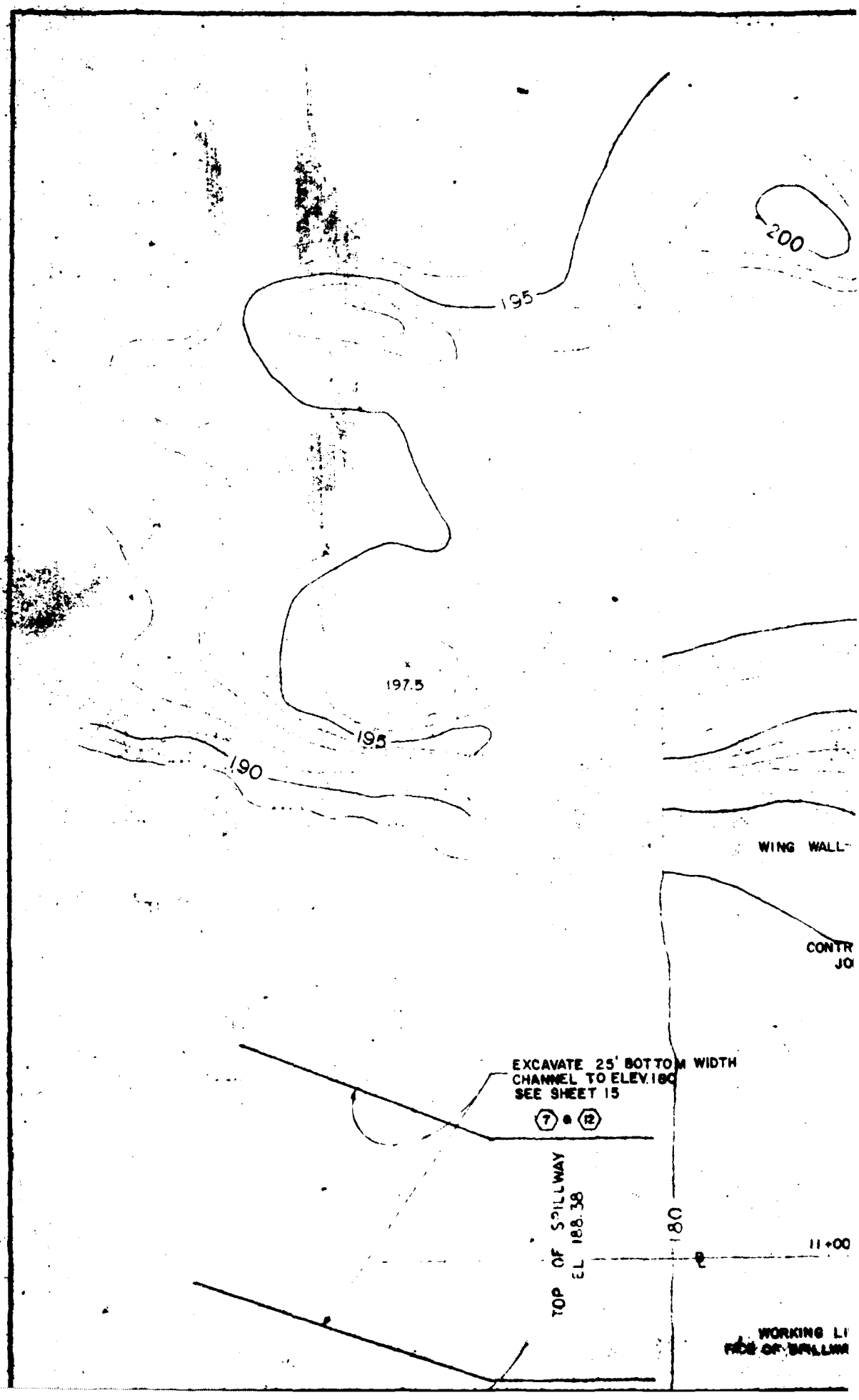
3) FOR CORE WALL DETAILS SEE SHE

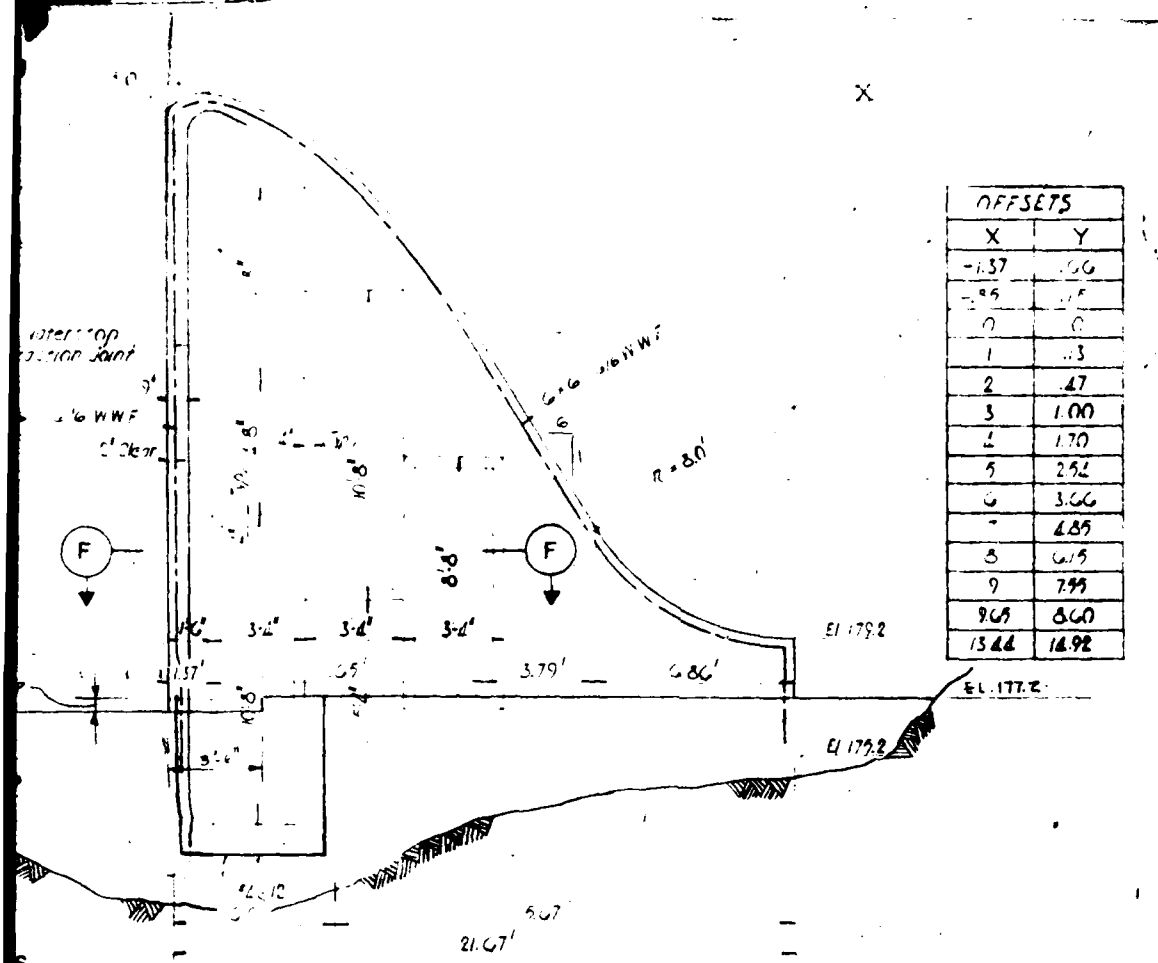
4) FOR SPILLWAY CHANNEL CROSS
SEE SHEET 15

5) FOR PRESPLITING DETAIL, SEE SH


3.
195
190
205
200
195
190
APPROX EDGE OF FILL
210
195
185
180
175
RESERVOIR ROAD STA. 25+36.60=
SPILLWAY CHANNEL STA. 10+00
9+75
"SC"
9+50


TOP EDGE OF SELECT IMPERVIOUS FILL
APPROX. BOTTOM EDGE OF SELECT IMPERVIOUS FILL
26+50
26+28.80
26+00
25+50
14'
15'
2:1 SLOPE
LEVEL
EAST CORE WALL
1:1
1:1 1/2:1 SLOPE
200
205
206
207
208
210
195
190
185
180
EXCAVATE ROCK TO ELEV. 180
CONCRETE SLOPE PROTECTION (SEE NOTE 1).
RESERVOIR ROAD STA. 25
SPILLWAY CHANNEL STA.
10+75
10+50
10+25
10+00
9+75


200
195
197.5
195
190
WING WALL
CONTR
JO
EXCAVATE 25' BOTTOM WIDTH
CHANNEL TO ELEV. 180
SEE SHEET 15
7 & 12
TOP OF SPILLWAY
EL 188.38
180
11+00
WORKING LI
RIDGE OF SPILLWA



TYPICAL SPILLWAY SECTION

SCALE 1/4"=1'-0"

PROJECT NO. 02

CHARLES A MAGUIRE & ASSOCIATES
— ENGINEERS —
PROVIDENCE · HARTFORD · BOSTON

CITY OF PAWTUCKET, RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS
WATER DIVISION

DESIGNED F.C. PIERCE
DRAWN A. BALDISSERI
CHECKED M.R. Hopton
SUBMITTED E. GREENE
APPROVED F.C. PIERCE

ENLARGEMENT OF DIAMOND HILL RESERVOIR

SPILLWAY DETAILS

APPROVED _____ DIRECTOR OF PUBLIC WORKS DATE 4-2-70

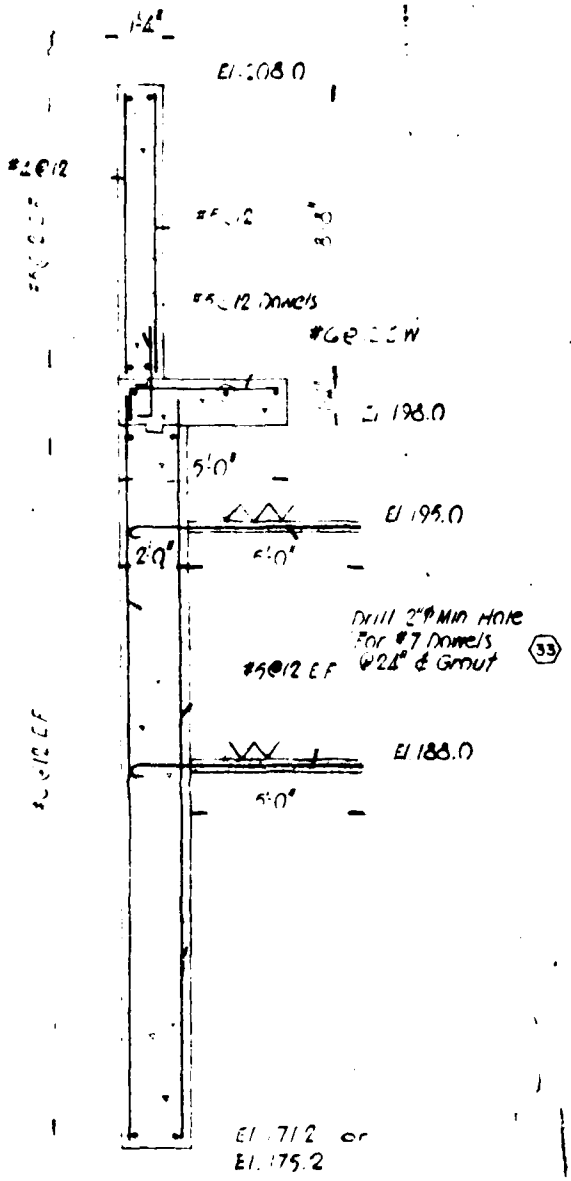
APPROVED _____ WATER SUPERINTENDENT DATE _____

DATE:

DRAWING NO.

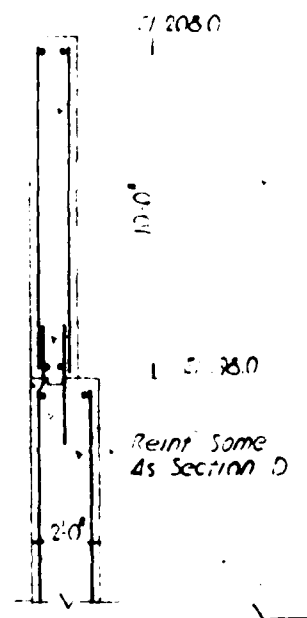
SCALE: AS SHOWN

SHEET 13 OF 70



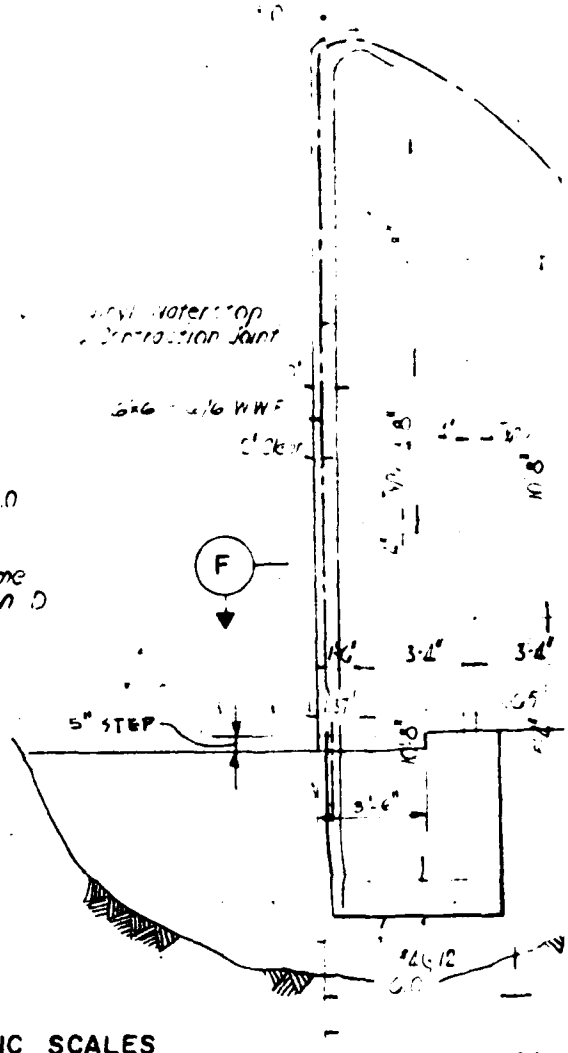
SECTION D

SCALE 1/4"=1'-0"



SECTION E

SCALE 1/4"=1'-0"

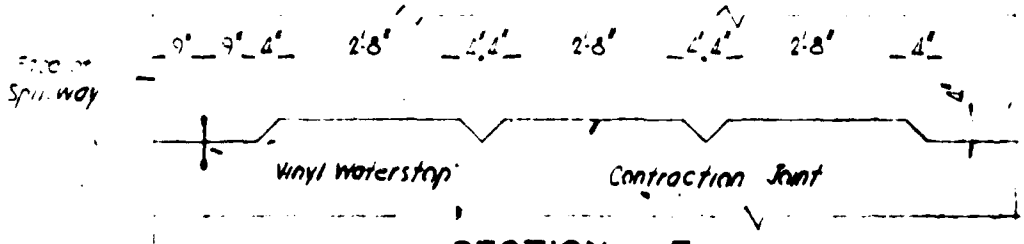


GRAPHIC SCALES

1/4"=1'-0" 4' 0 4' 8'

3/4"=1'-0" 1' 0 1' 2' 3'

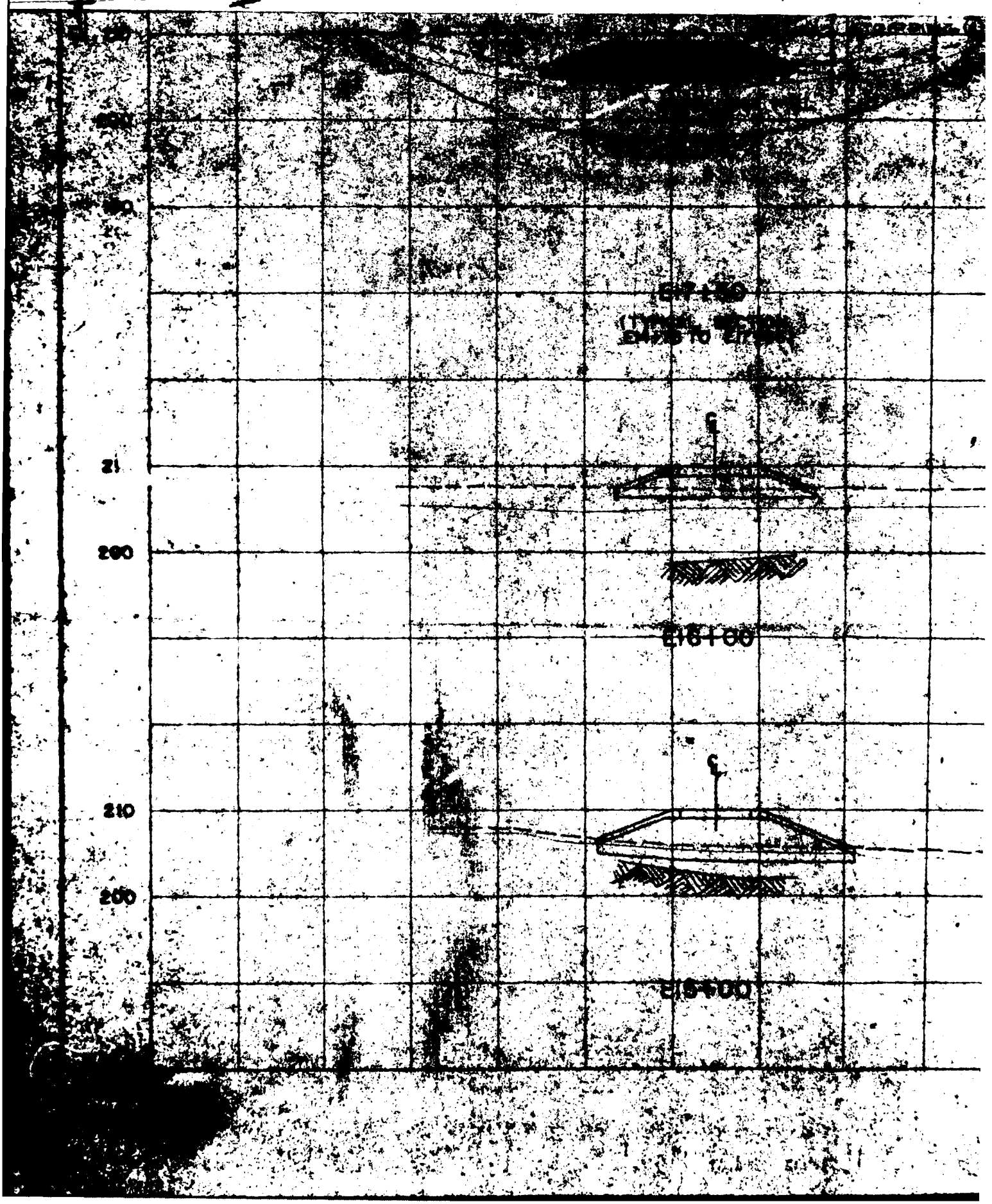
TYPICAL

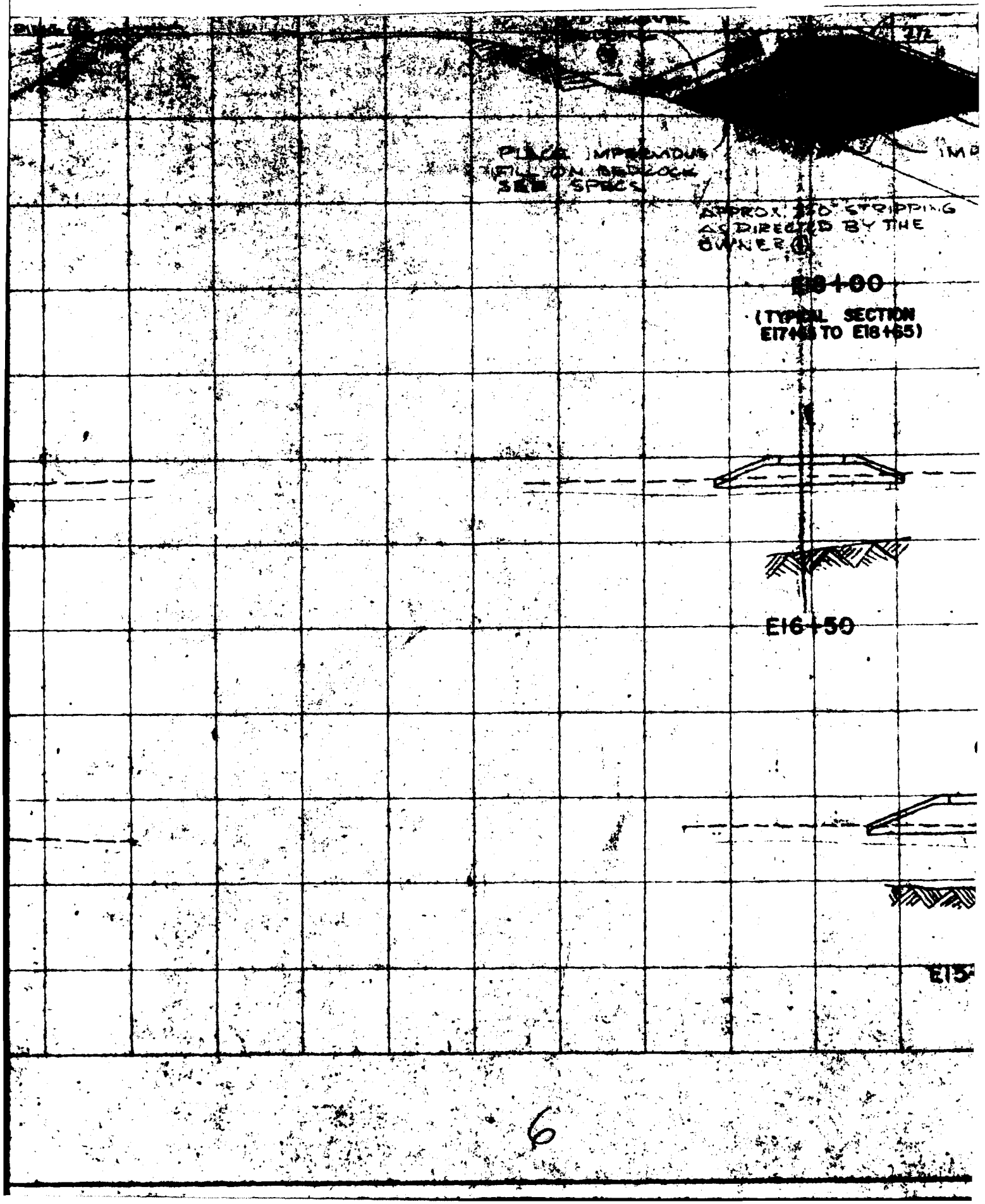


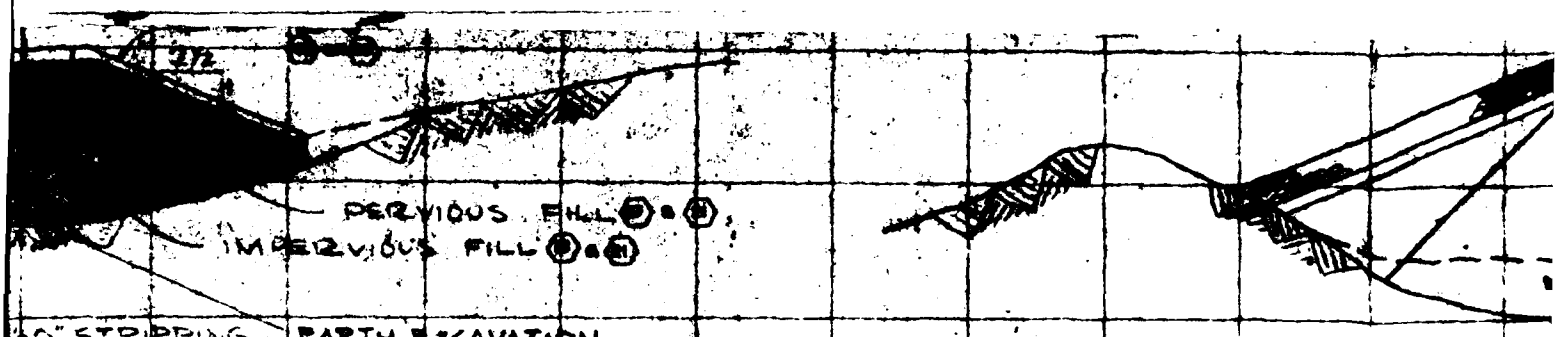
SECTION F

SCALE 3/4"=1'-0"

CHARLES A MAGU	
— ENGINE	
PROVIDENCE · HAR	
DESIGNED	FC PIERCE
DRAWN	A BALDISS
CHECKED	MR Hopton
SUBMITTED	E. GREEN
APPROVED	F C PIER


220
210
200
E16+00
E15+00


PLACE IMPERVIOUS FILL ON BEDROCK SEE SPECS
APPROX. 250' STRIPPING AS DIRECTED BY THE OWNER
E18+00
(TYPICAL SECTION E17+65 TO E18+65)
E16+50
E15

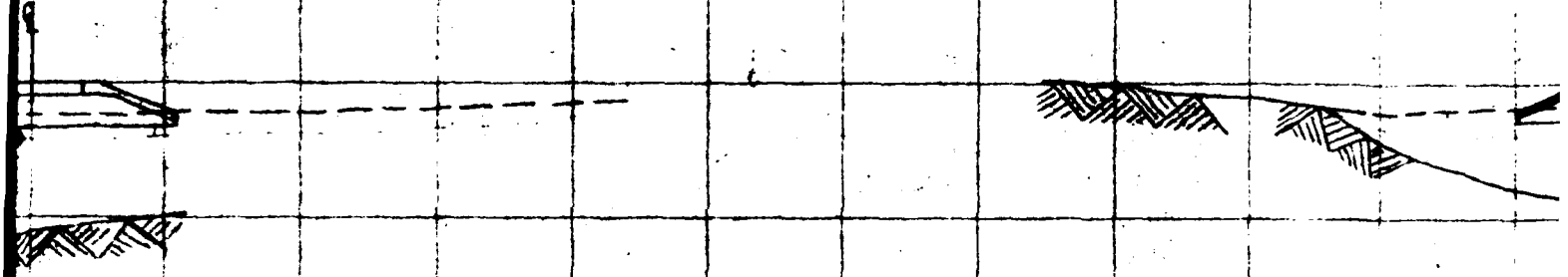


"O" STRIPPING
ED BY THE

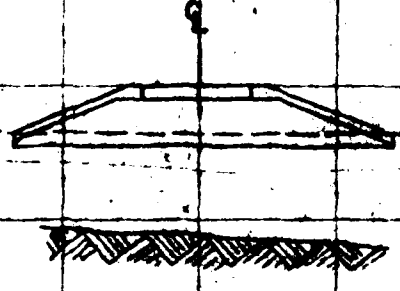
EARTH EXCAVATION
COMMON ⑦

18+00

CAL SECTION
SS TO E18+65)



+50



E15+50

210

200

CHARLES A

PROVIDENCE

DESIGNED

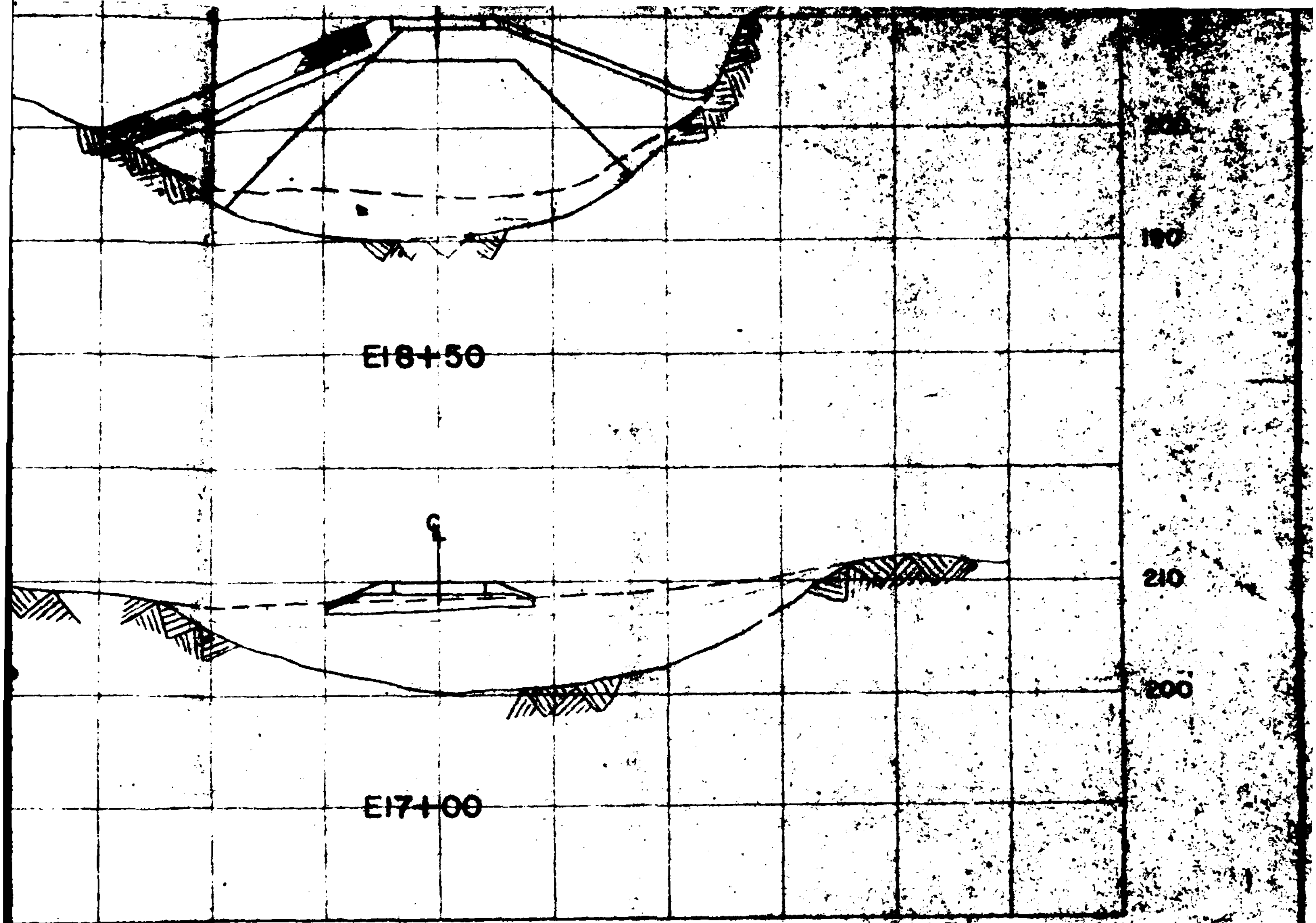
DRAWN

CHECKED

SUBMITTED

APPROVED

GRAPHIC SCALE



210

200

SCALE

U. S. DEPARTMENT OF COMMERCE
ECONOMIC DEVELOPMENT ADMINISTRATION
PROJECT NO. [illegible]

CHARLES A. MAGUIRE & ASSOCIATES
— ENGINEERS —
PROVIDENCE · HARTFORD · BOSTON

DESIGNED	E. G. [illegible]
DRAWN	R. J. HERCHEN
CHECKED	[illegible]
SUBMITTED	E. GREENE
APPROVED	F.C. PIERCE

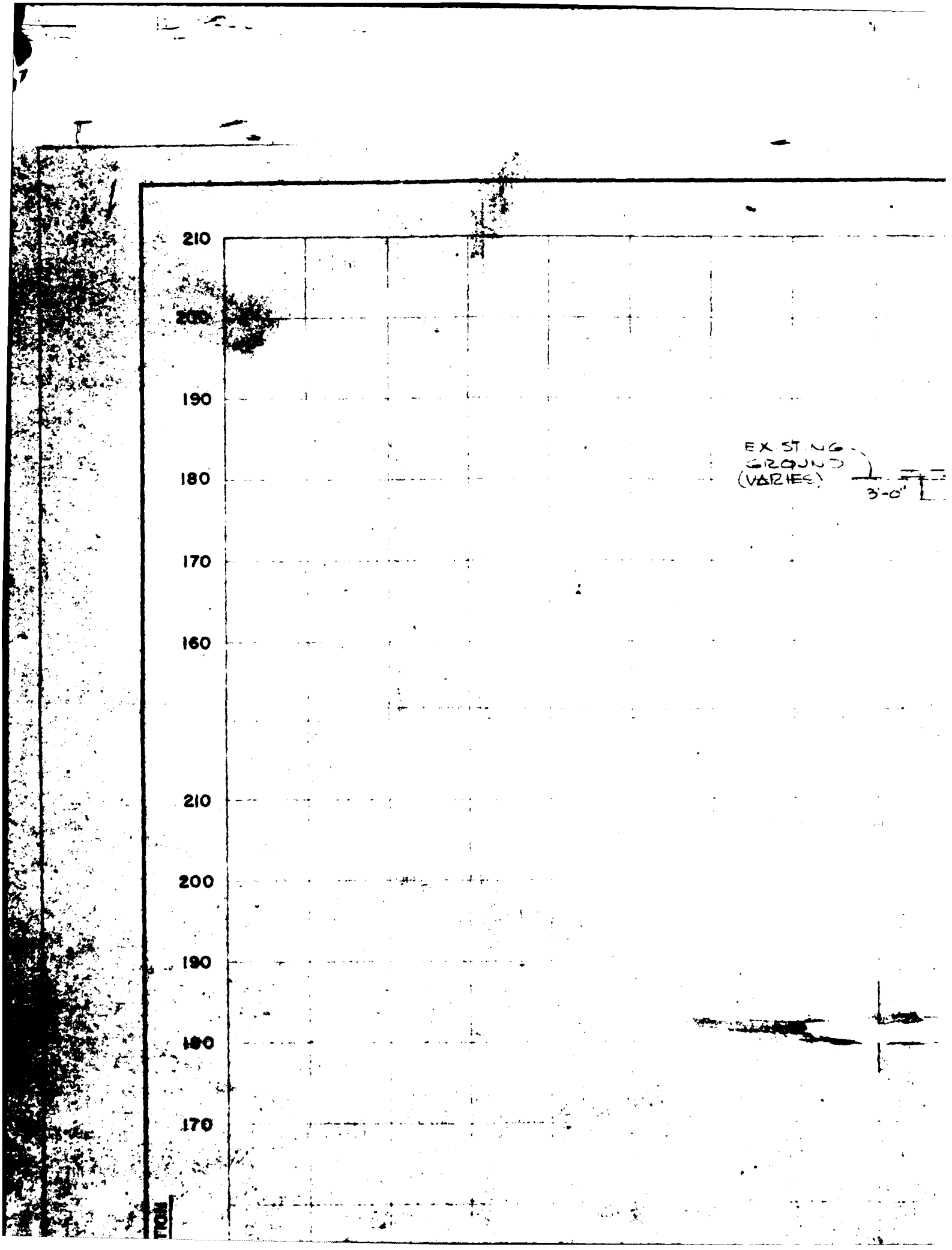
FRANCIS C. PIERCE
No. [illegible]
REGISTERED PROFESSIONAL ENGINEER

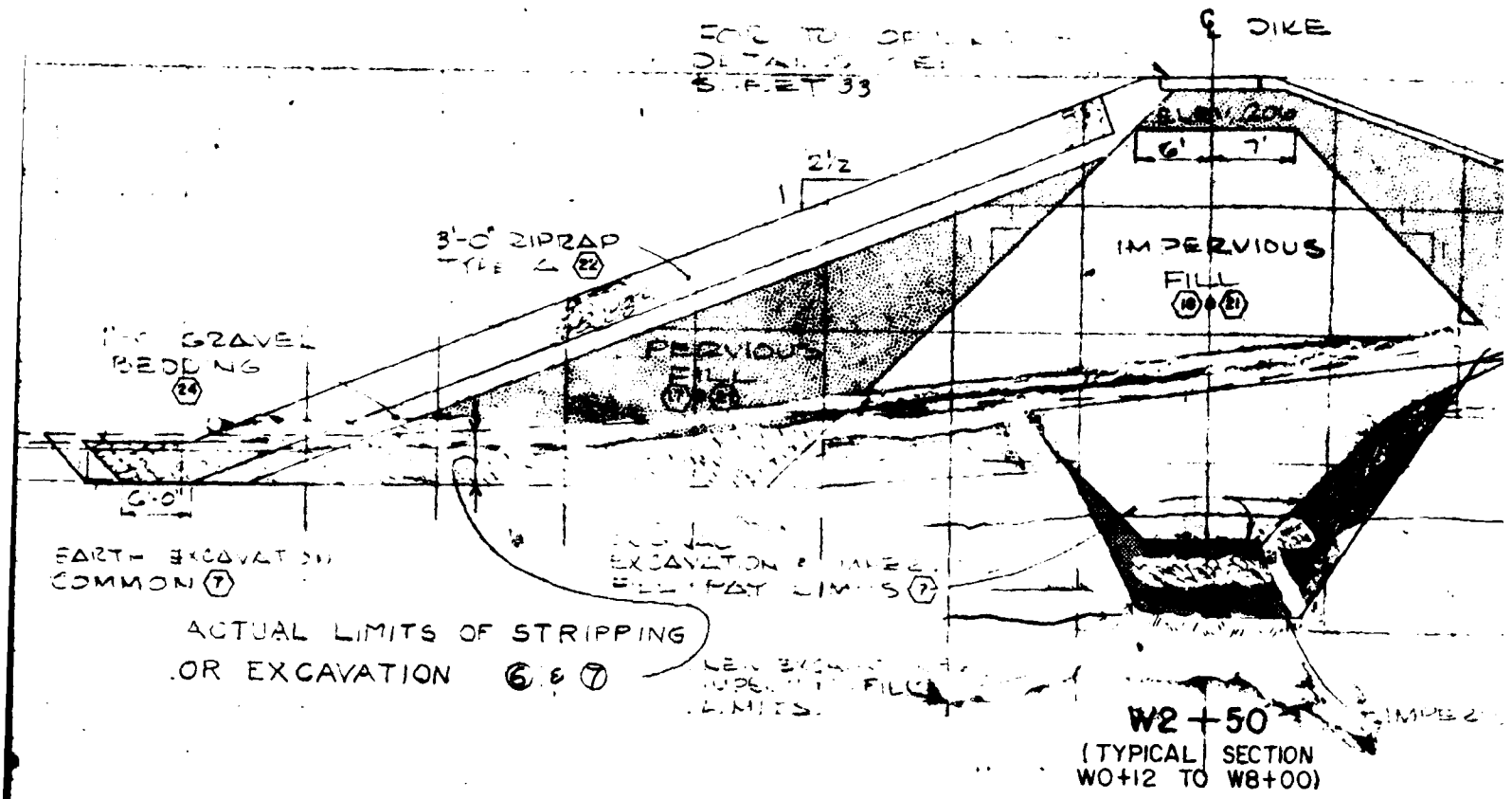
CITY OF [illegible], RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS
WATER DIVISION

ENLARGEMENT OF [illegible] HILL RESERVOIR

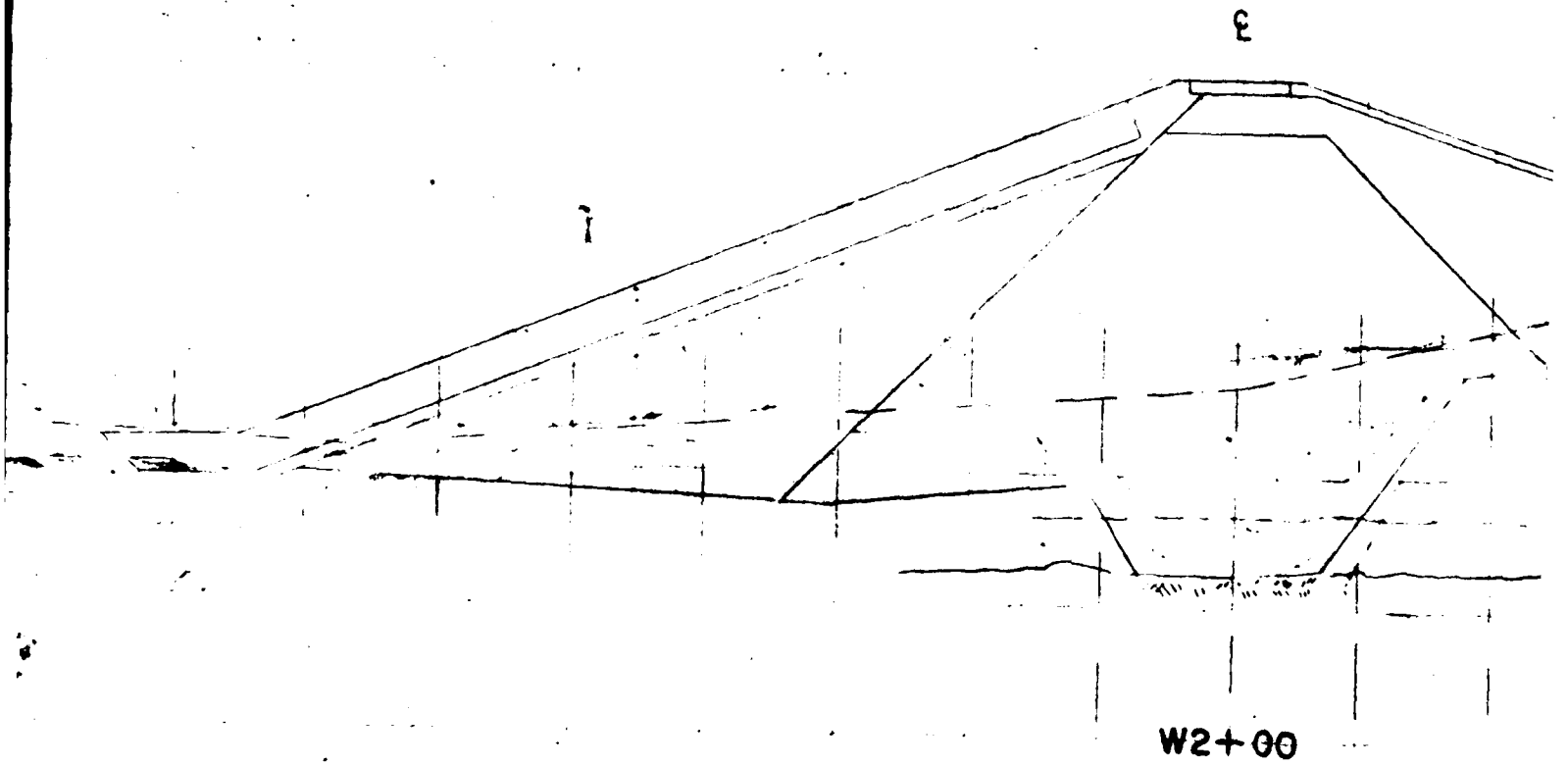
EAST DIKE
CROSS SECTIONS

8

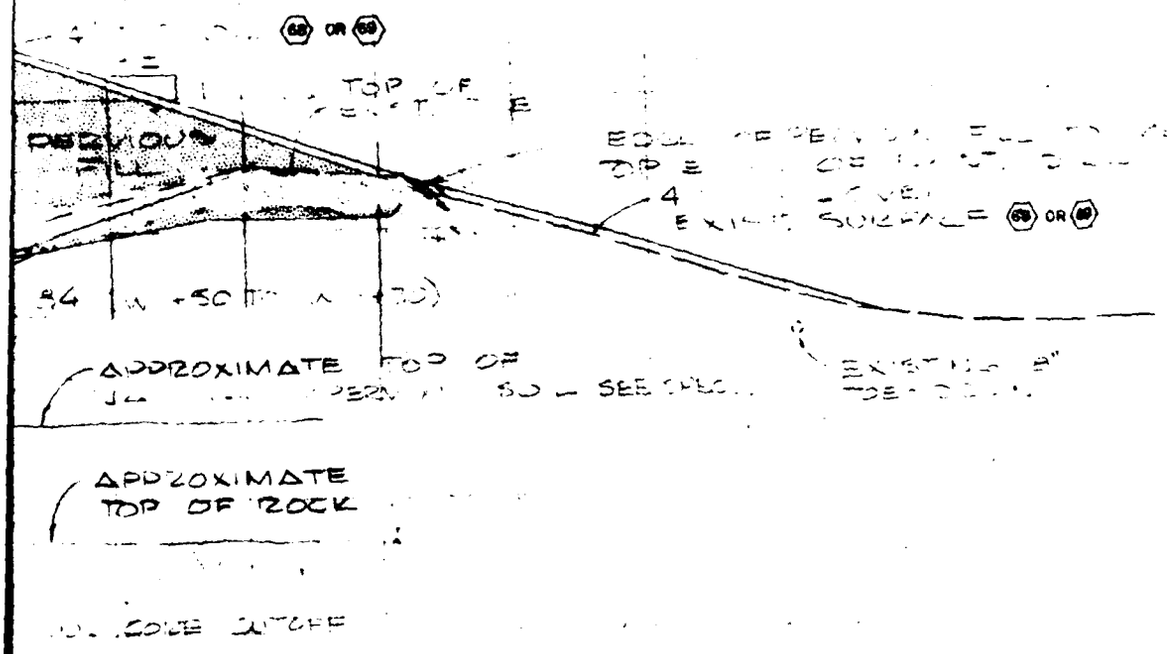

210
200
190
180
170
160
EXISTING GROUND (VARIES)
3'-0"
210
200
190
180
170

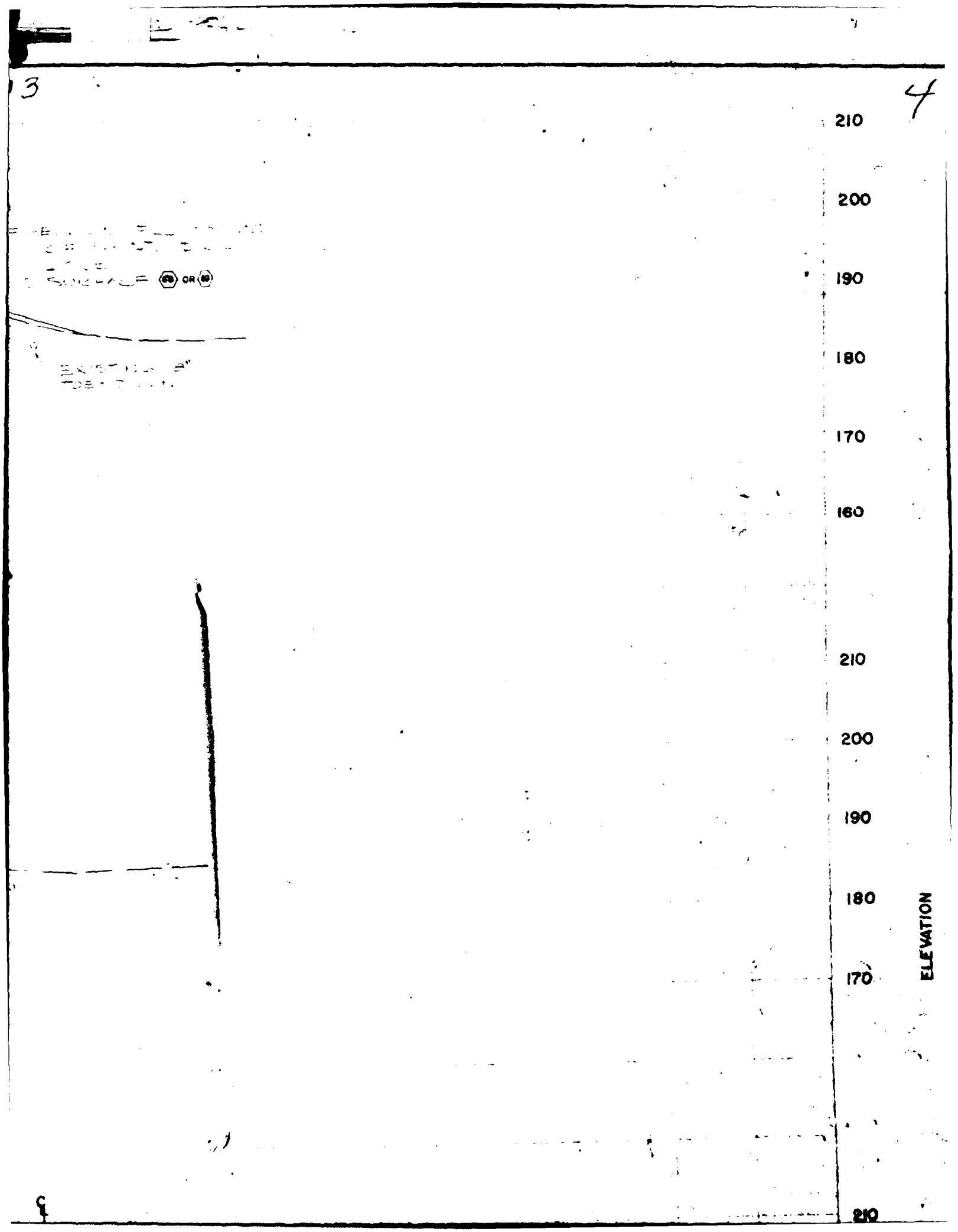


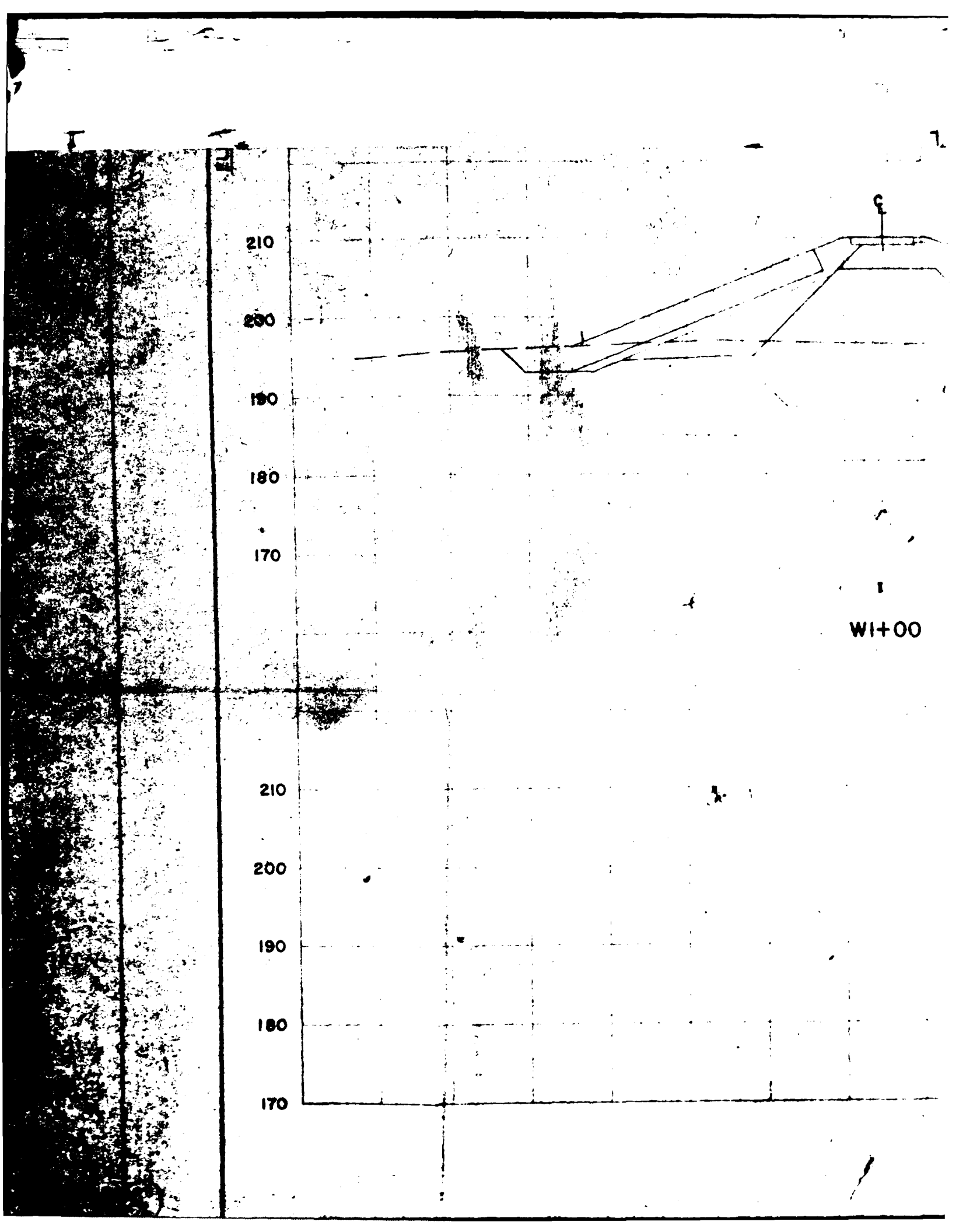
W2+50
(TYPICAL SECTION W0+12 TO W8+00)

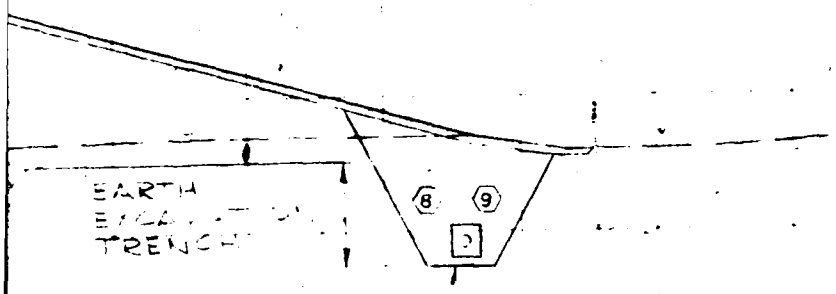


W2+00

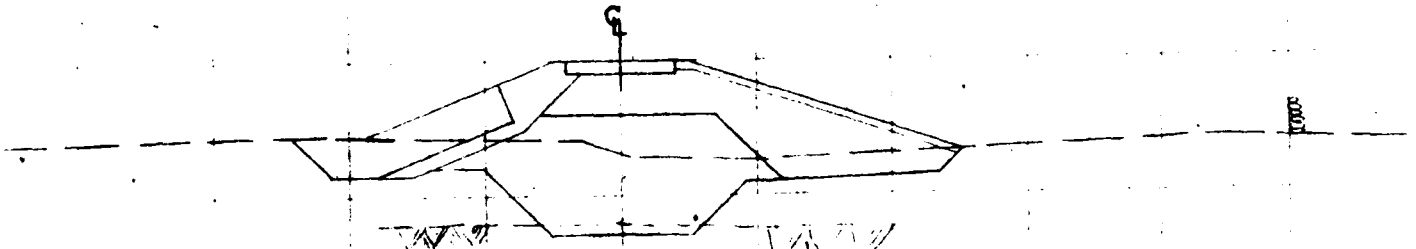

APPROXIMATE TOP OF ROCK


3
4
210
200
190
180
170
160
210
200
190
180
170
ELEVATION
210

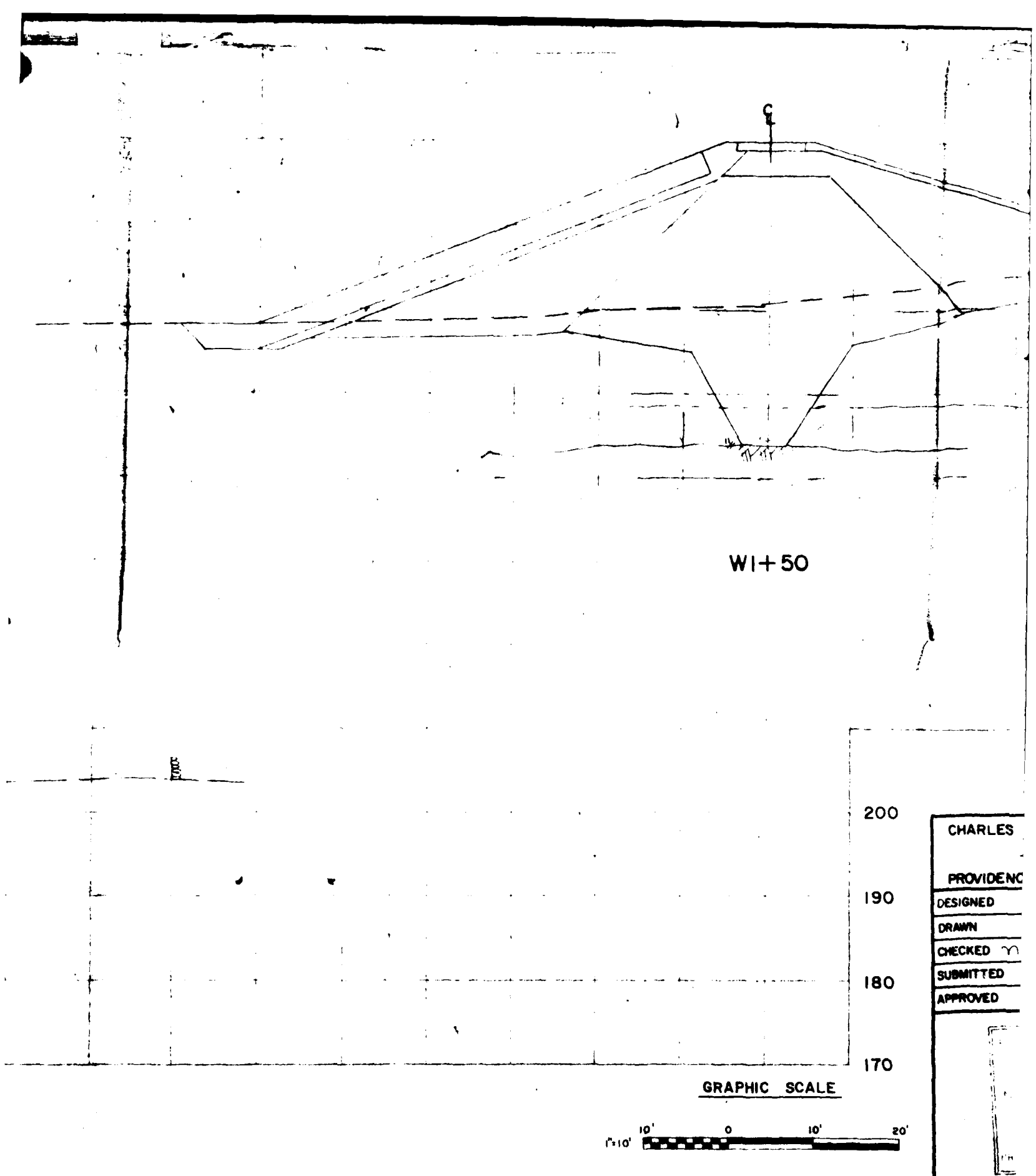

210
200
190
180
170
W1+00
210
200
190
180
170

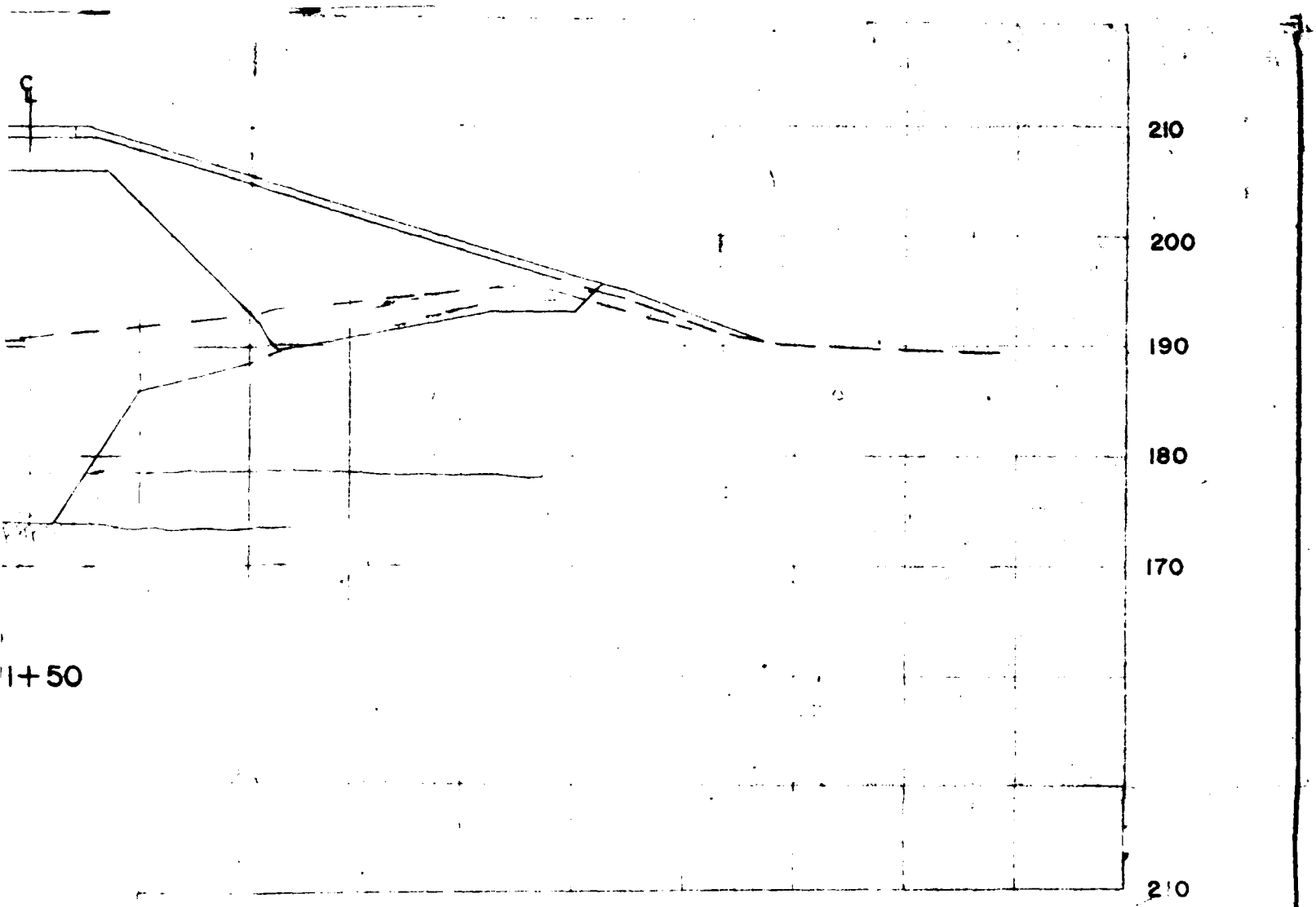


EXTEND Ø TO ~~SEE~~ SHEET 5 & DETAIL, SHEET 33



W0+50


W1+50
200
190
180
170
GRAPHIC SCALE
1"=10'
10'
0
10'
20'
CHARLES
PROVIDENC
DESIGNED
DRAWN
CHECKED
SUBMITTED
APPROVED



U. S. DEPARTMENT OF COMMERCE
ECONOMIC DEVELOPMENT ADMINISTRATION
PROJECT NO. 01—1—00329

200
190
180
170

HIC SCALE

10' 20'

CHARLES A MAGUIRE & ASSOCIATES
— ENGINEERS —
PROVIDENCE · HARTFORD · BOSTON

CITY OF PAWTUCKET, RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS
WATER DIVISION

DESIGNED	F.C. PIERCE
DRAWN	R.J. ERCHEN
CHECKED	R. Hopkin
SUBMITTED	E.GREENE
APPROVED	F.C.PIERCE

REGISTERED
PROFESSIONAL ENGINEER

ENLARGEMENT OF DIAMOND HILL RESERVOIR

WEST DIKE

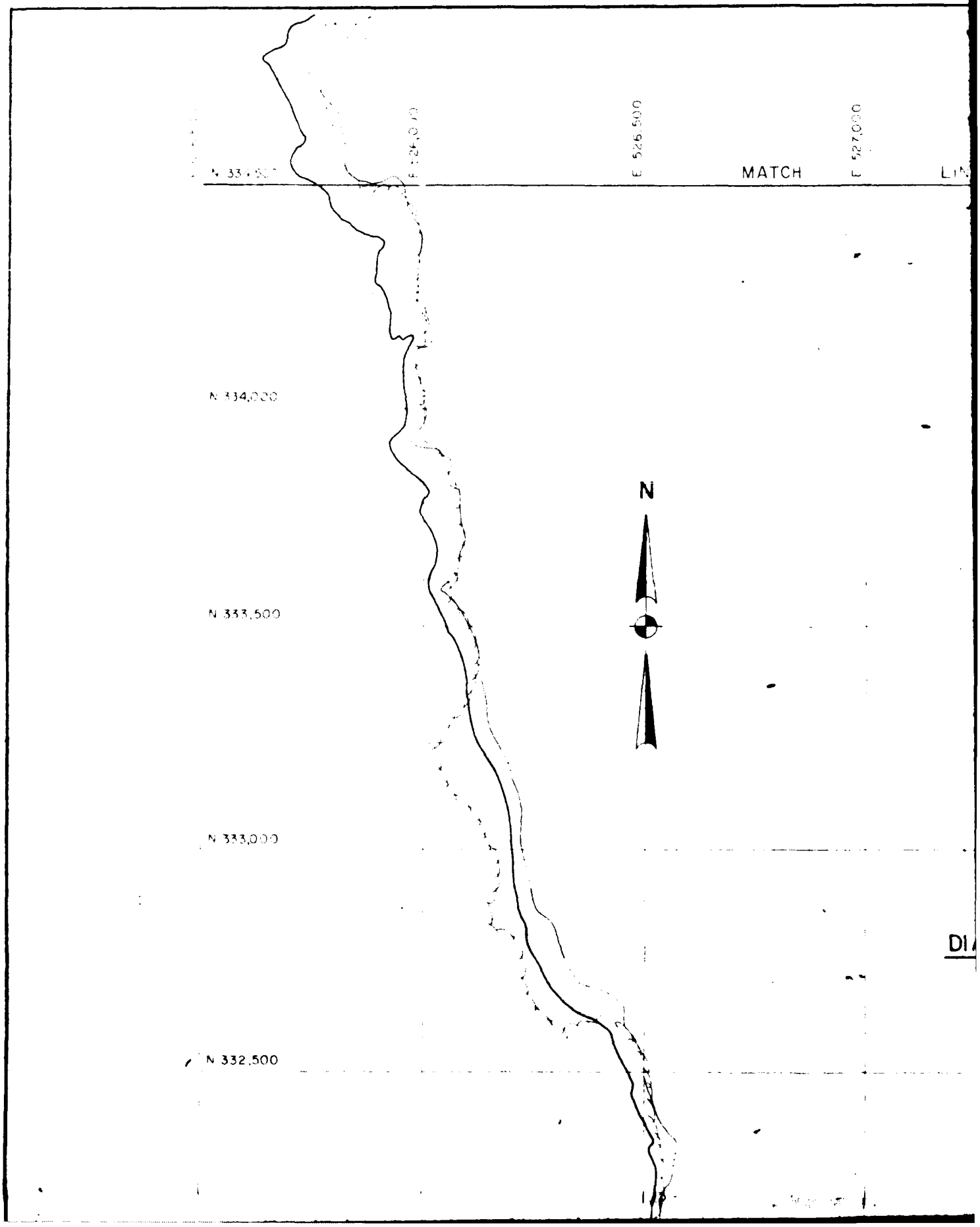
CROSS SECTIONS
STA. W0+50 TO STA. W2+50

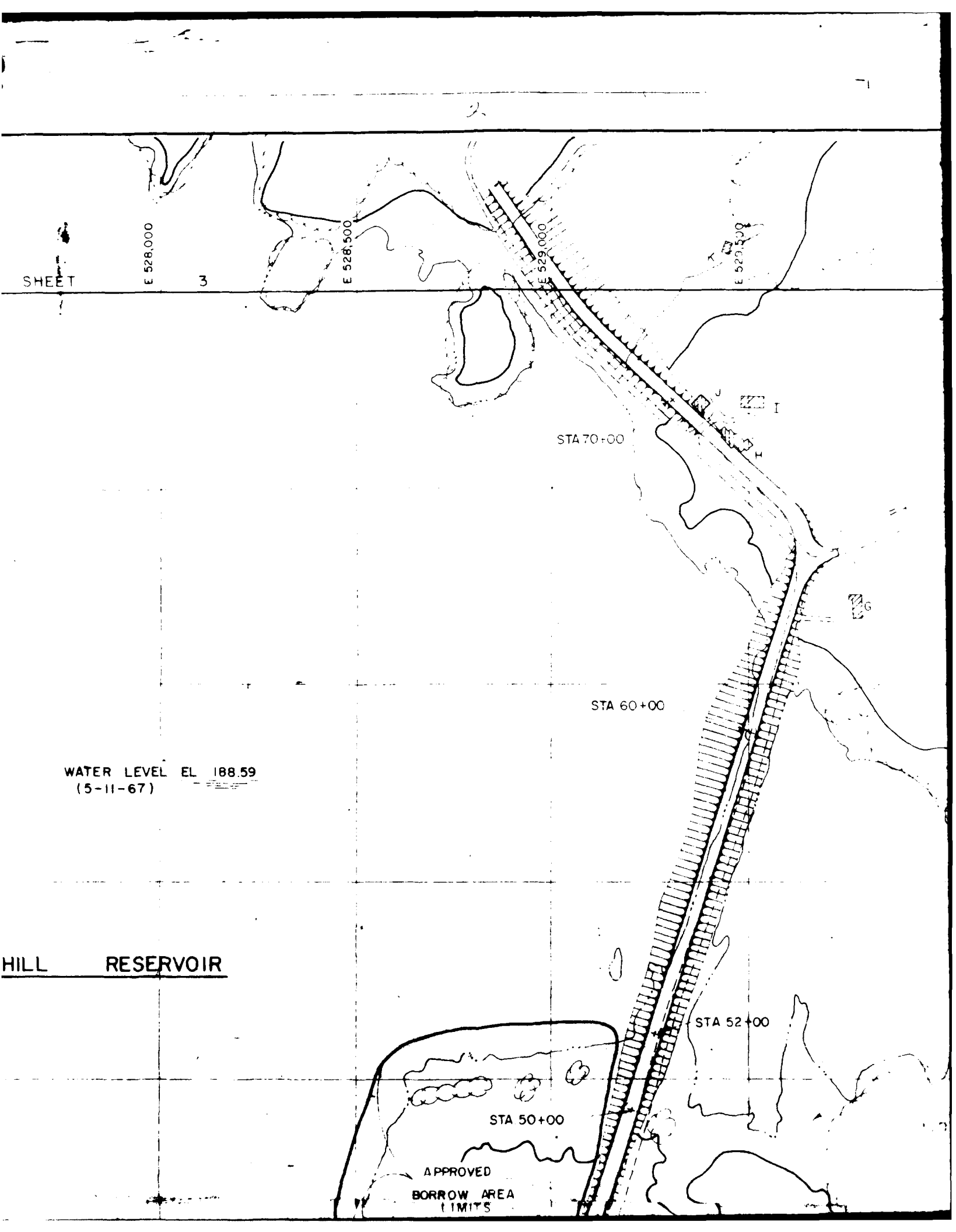
APPROVED _____ DATE 1-3-72
DIRECTOR OF PUBLIC WORKS

APPROVED _____ DATE _____
WATER SUPERINTENDENT

DATE:	DRAWING NO:
SCALE: 1"=10'	SHEET 35 OF 70

8


E 525,500
E 527,000
MATCH
N 334,000
N 333,500
N 333,000
N 332,500
N


SHEET 3
E 528,000
E 528,500
E 529,000
E 529,500
I
H
G
STA 70+00
STA 60+00
WATER LEVEL EL 188.59
(5-11-67)
HILL RESERVOIR
STA 52+00
STA 50+00
APPROVED
BORROW AREA
LIMITS

APPENDIX C

SELECTED PHOTOS

NOTE:
FOR LEGEND, SEE SHEET 2

CHARLES A MAGUIRE & ASSOCIATES
— ENGINEERS —
PROVIDENCE · HARTFORD · BOSTON

CITY OF PAWTUCKET, RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS
WATER DIVISION

DESIGNED C. R. DARLING
DRAWN R. J. HERCHEN
CHECKED MRH
SUBMITTED E GREENE
APPROVED F.C PIERCE

ENLARGEMENT OF DIAMOND HILL RESERVOIR

GENERAL PLAN II

SCALE
200' 400'

APPROVED _____ DATE _____
DIRECTOR OF PUBLIC WORKS

APPROVED _____ DATE _____
WATER SUPERINTENDENT

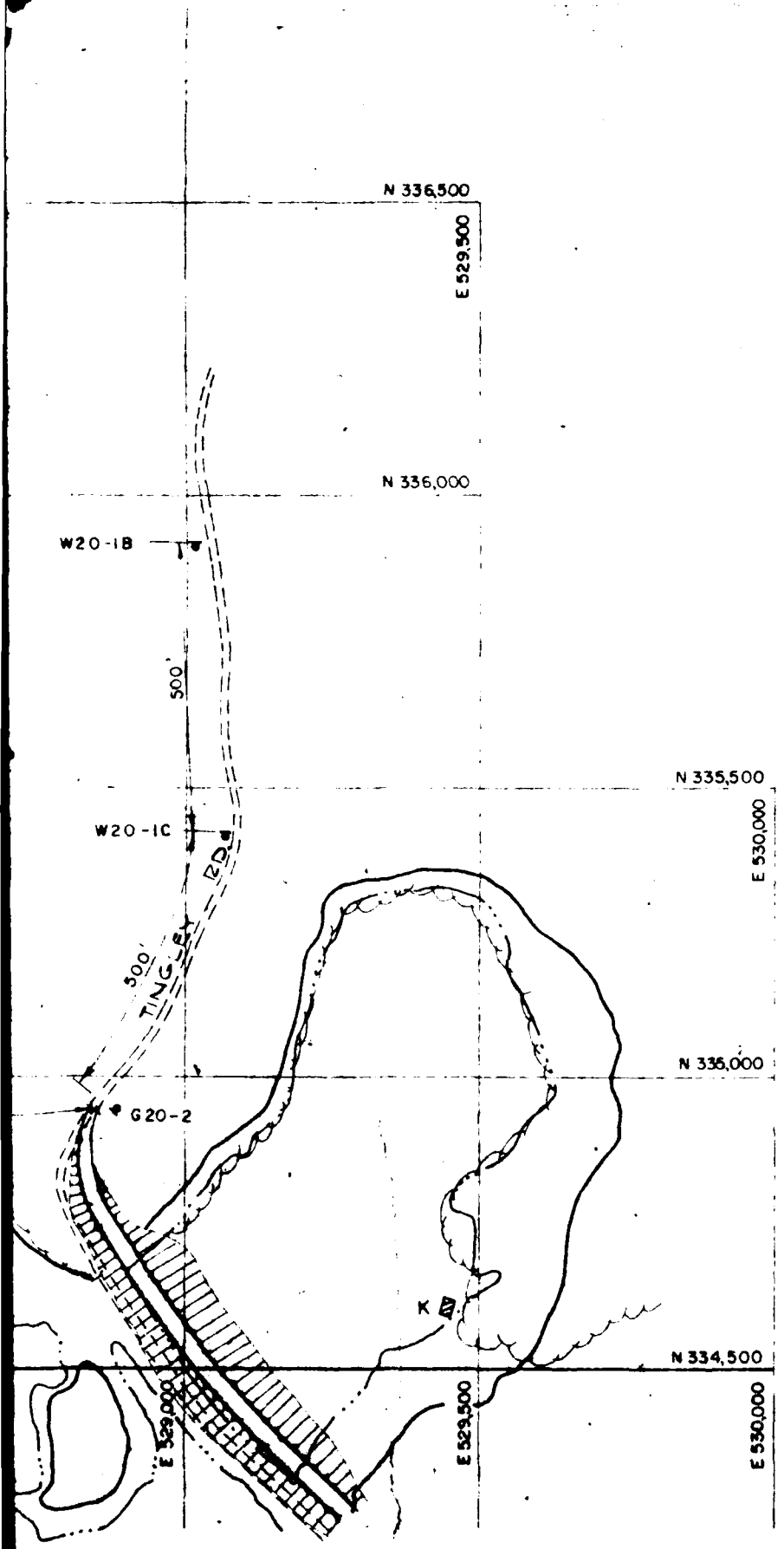
DATE:

DRAWING NO.

SCALE: 1" = 200'

SHEET 3 OF 70

8

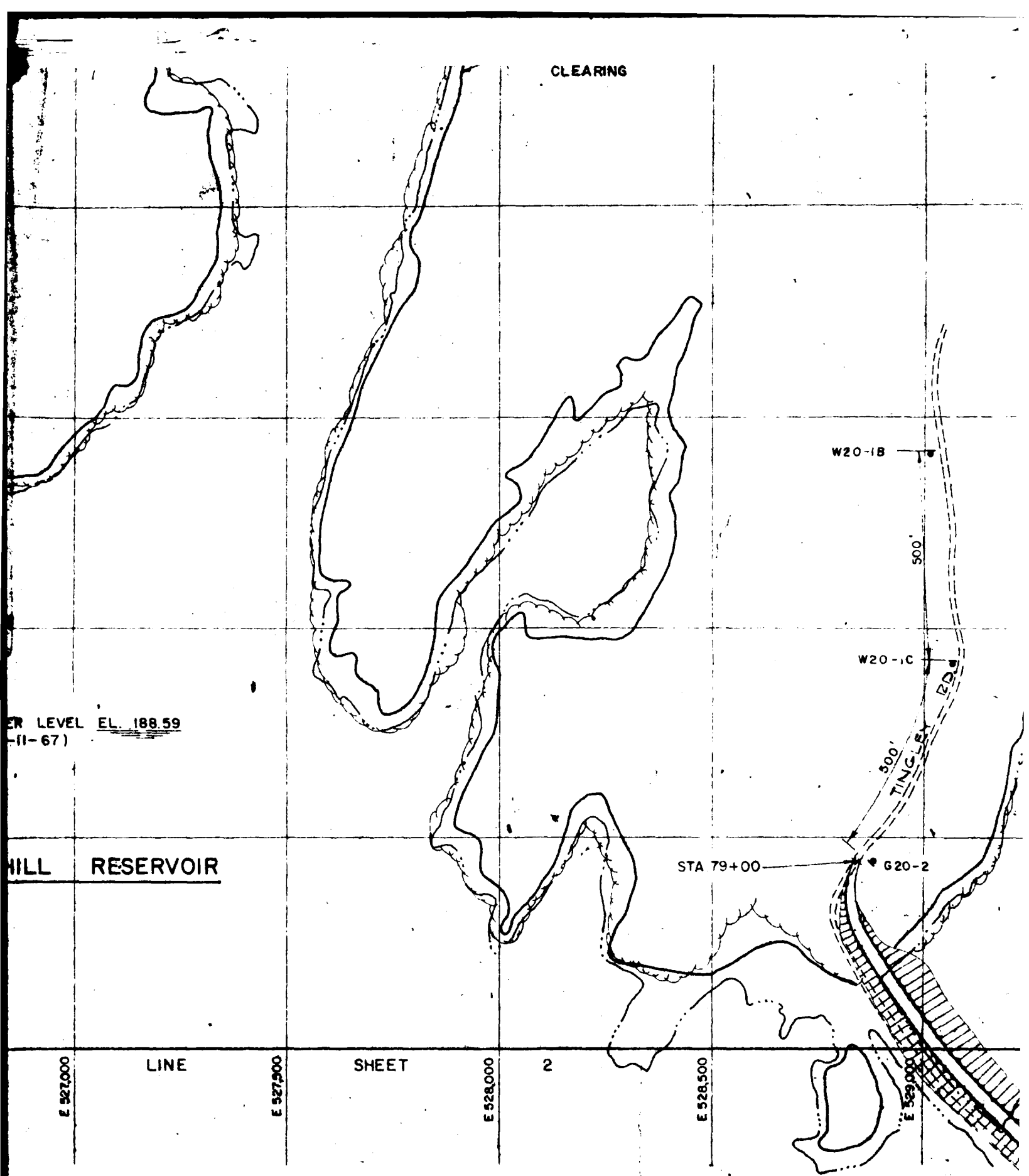


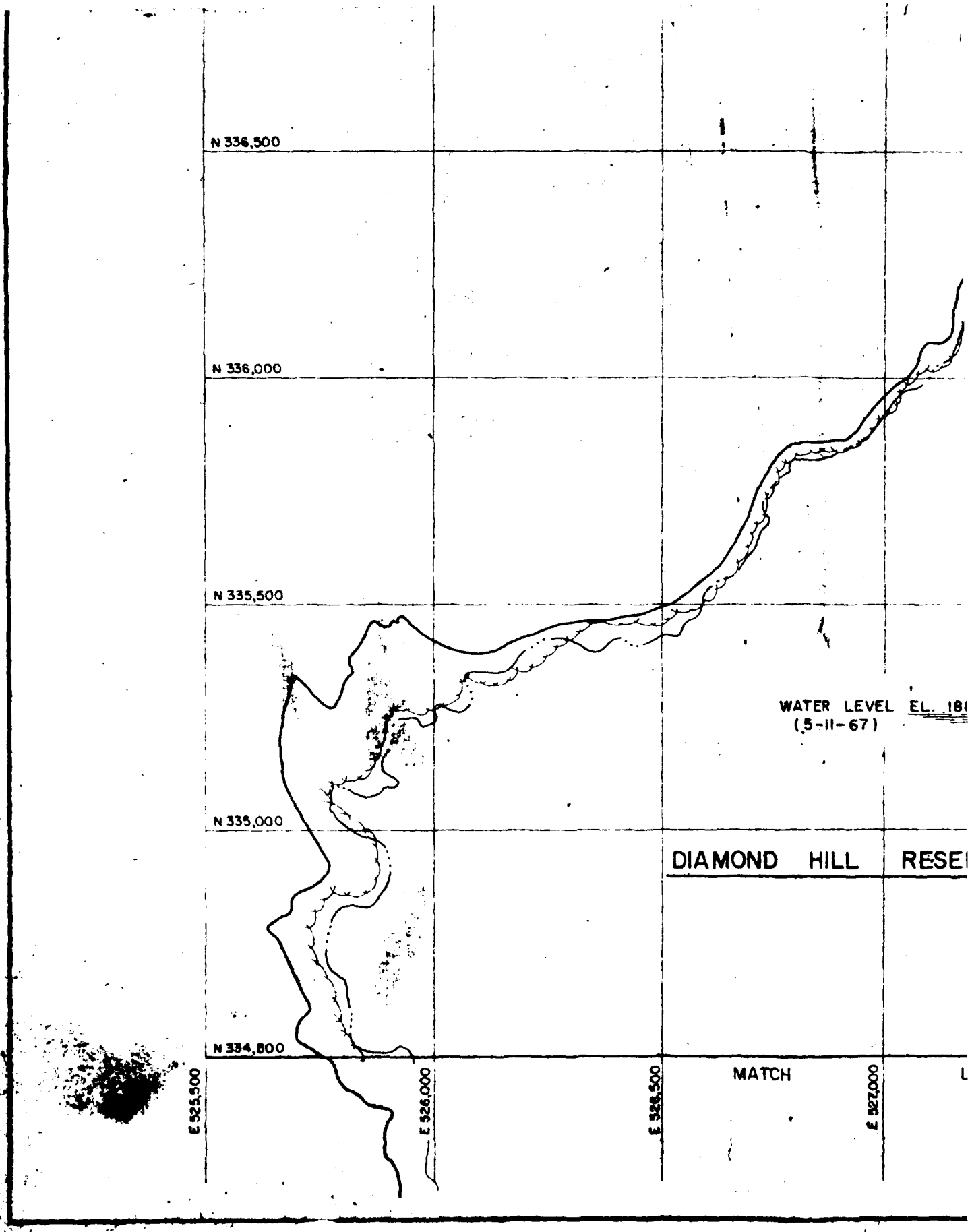
GRAPHIC SCALE

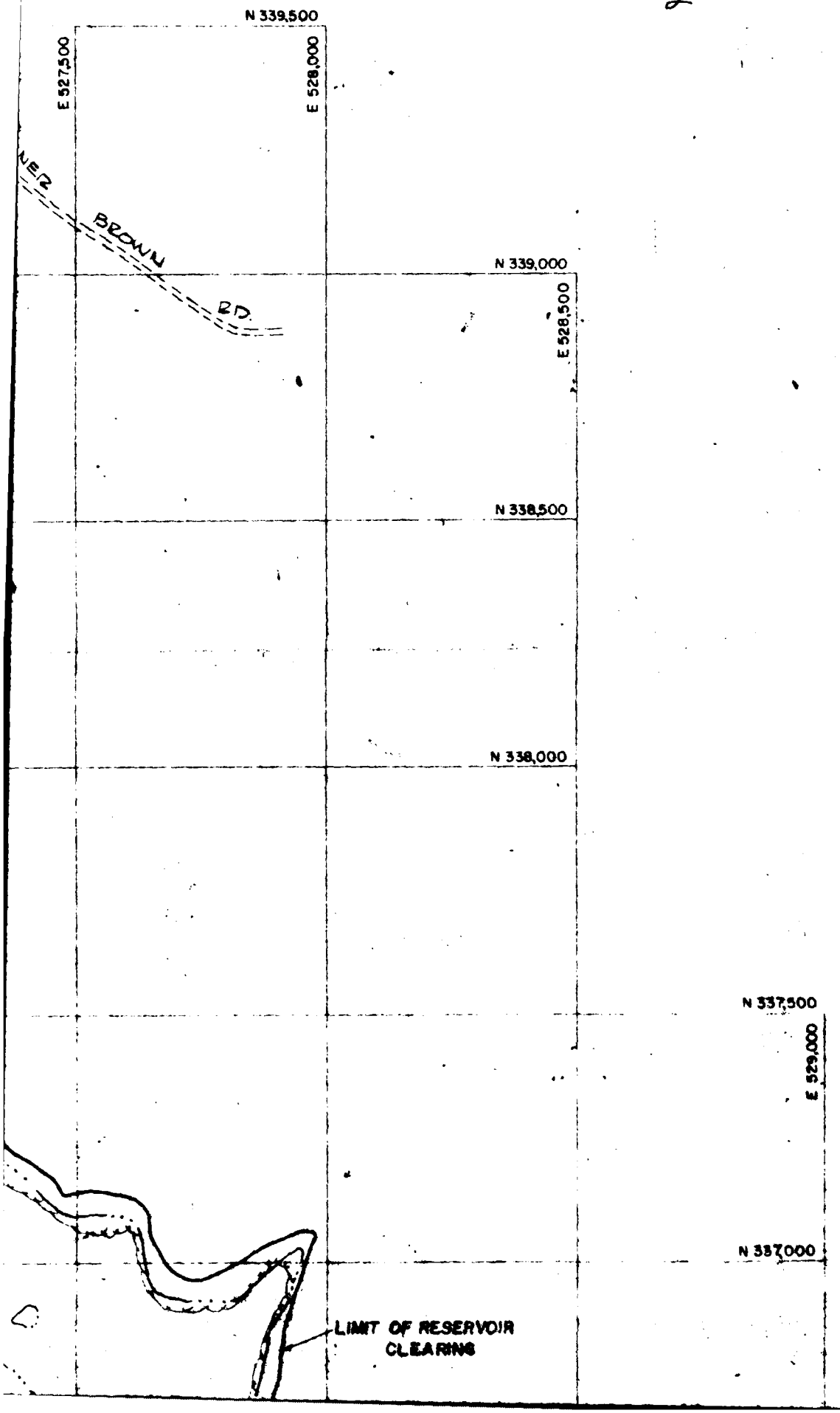
200' 100' 0 200' 400'

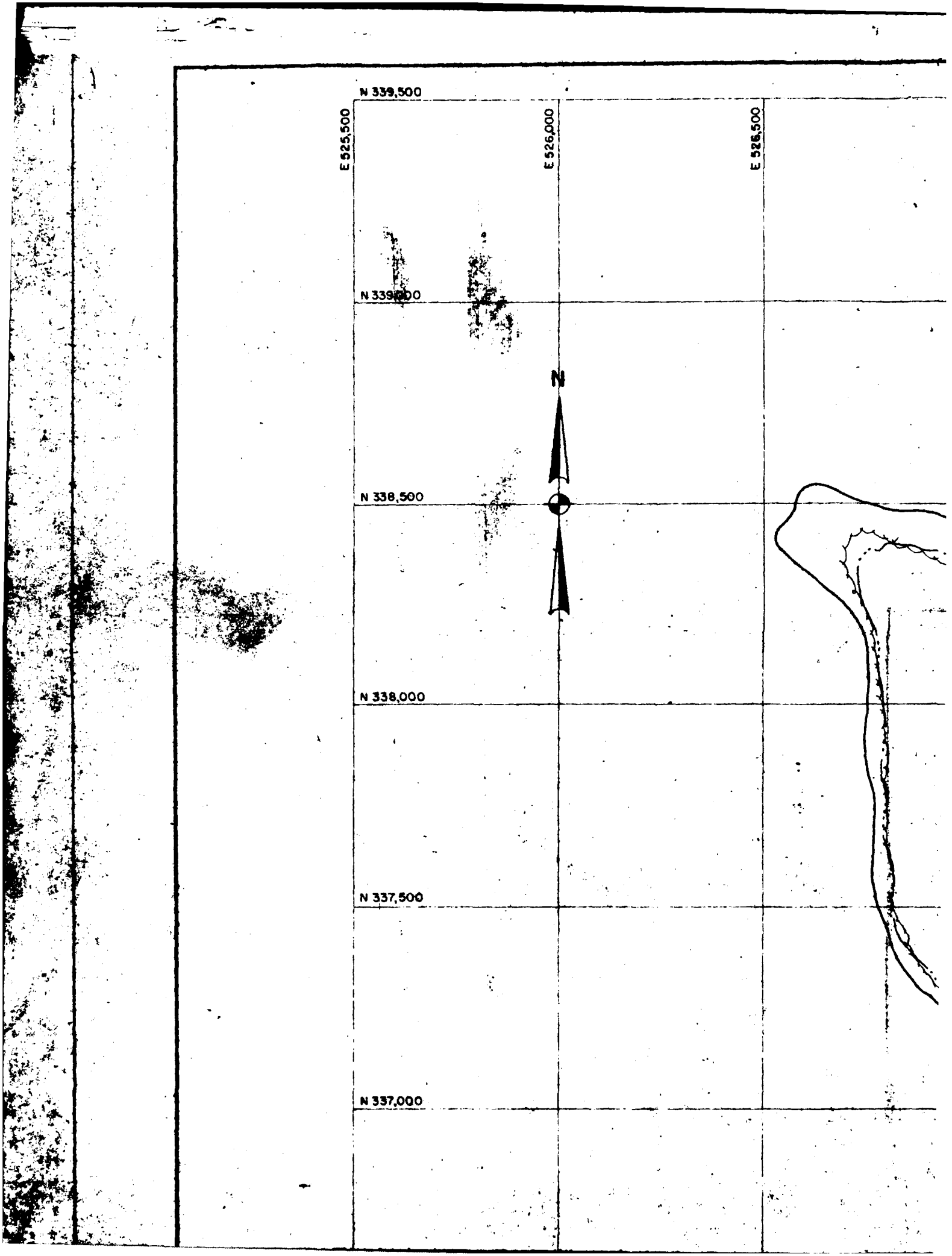
1" = 200'

CHARLES	
PROVIDENC	
DESIGNED	C
DRAWN	R
CHECKED	MD
SUBMITTED	E
APPROVED	F


CLEARING
W20-1B
500'
W20-1C
TINGLEY RD
500'
ER LEVEL EL. 188.59
-11-67)
HILL RESERVOIR
STA 79+00
G20-2
LINE
SHEET
2
E 527,000
E 527,500
E 528,000
E 528,500
E 529,000


N 336,500
N 336,000
N 335,500
N 335,000
N 334,800
E 325,500
E 326,000
E 326,500
E 327,000
WATER LEVEL EL. 18
(5-11-67)
DIAMOND HILL RESE
MATCH


N 339,500
E 527,500
E 528,000
NER
BROWN
RD.
N 339,000
E 528,500
N 338,500
N 338,000
N 337,500
E 529,000
N 337,000
LIMIT OF RESERVOIR CLEARING


N 339,500
E 525,500
E 526,000
E 526,500
N 339,000
N
N 338,500
N 338,000
N 337,500
N 337,000

N 332,000

N 331,500

E 531,000

N 331,000

IC SCALE

200' 400'

CHARLES A MAGUIRE & ASSOCIATES
— ENGINEERS —
PROVIDENCE · HARTFORD · BOSTON

DESIGNED C. R DARLING
DRAWN R. J HERCHEN & J R. LYONS
CHECKED
SUBMITTED E. GREENE
APPROVED F.C. PIERCE

CITY OF PAWTUCKET, RHODE ISLAND
DEPARTMENT OF PUBLIC WORKS
WATER DIVISION

ENLARGEMENT OF DIAMOND HILL RESERVOIR

GENERAL PLAN I

APPROVED _____ DATE _____
DIRECTOR OF PUBLIC WORKS

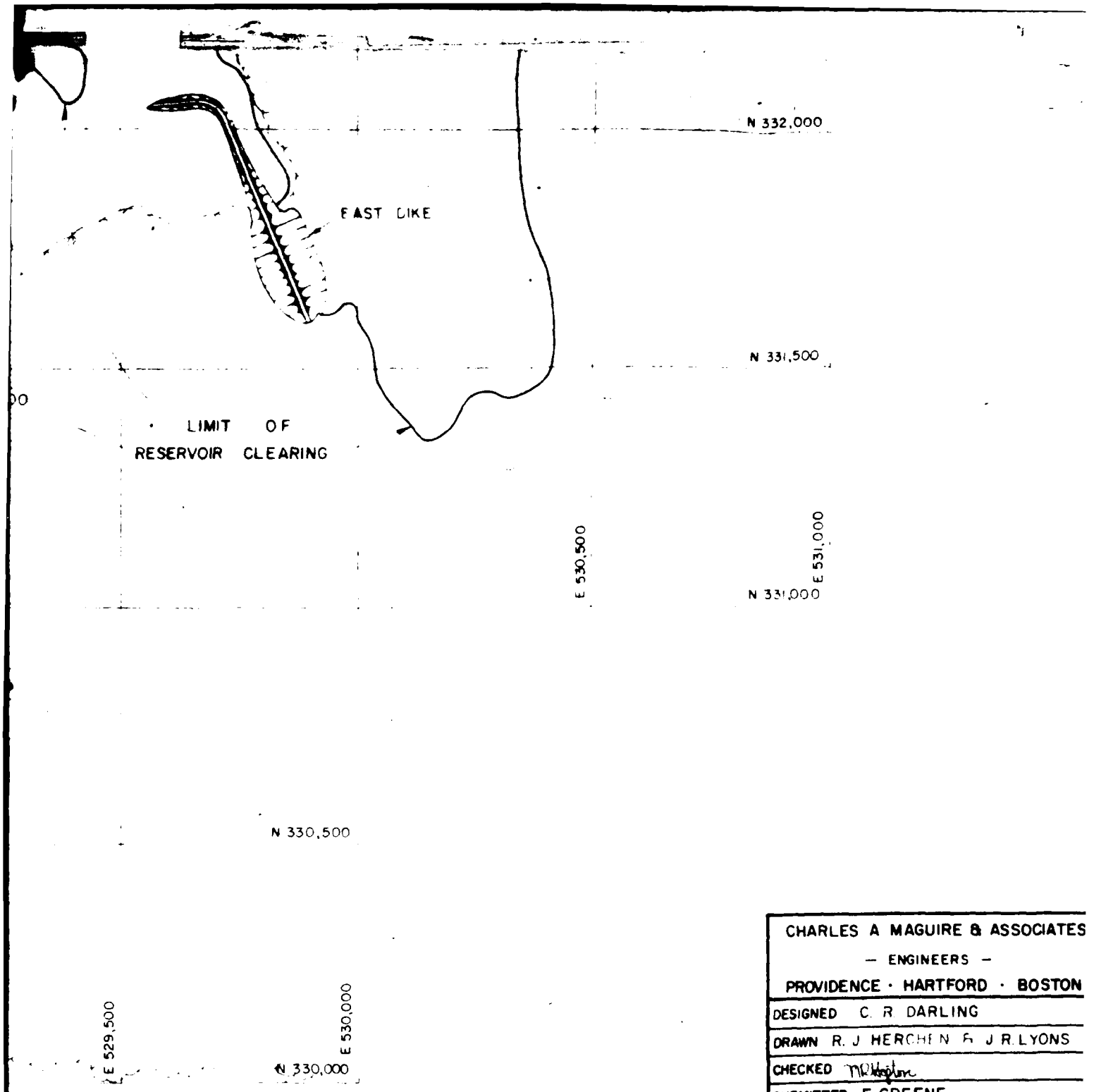
APPROVED _____ DATE _____
WATER SUPERINTENDENT

DATE:

DRAWING NO.

SCALE: 1" = 20.0'

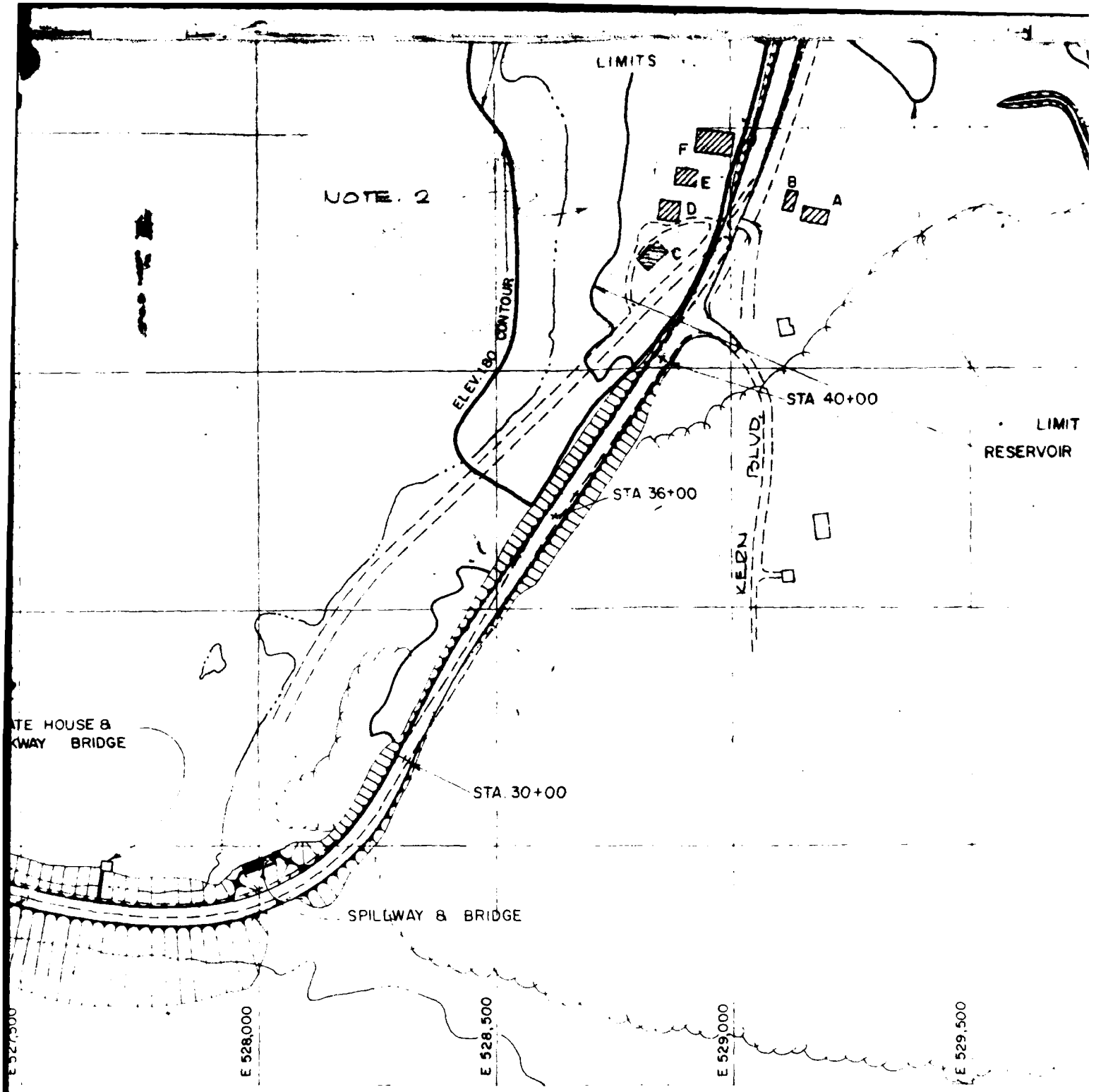
SHEET 2 OF 70

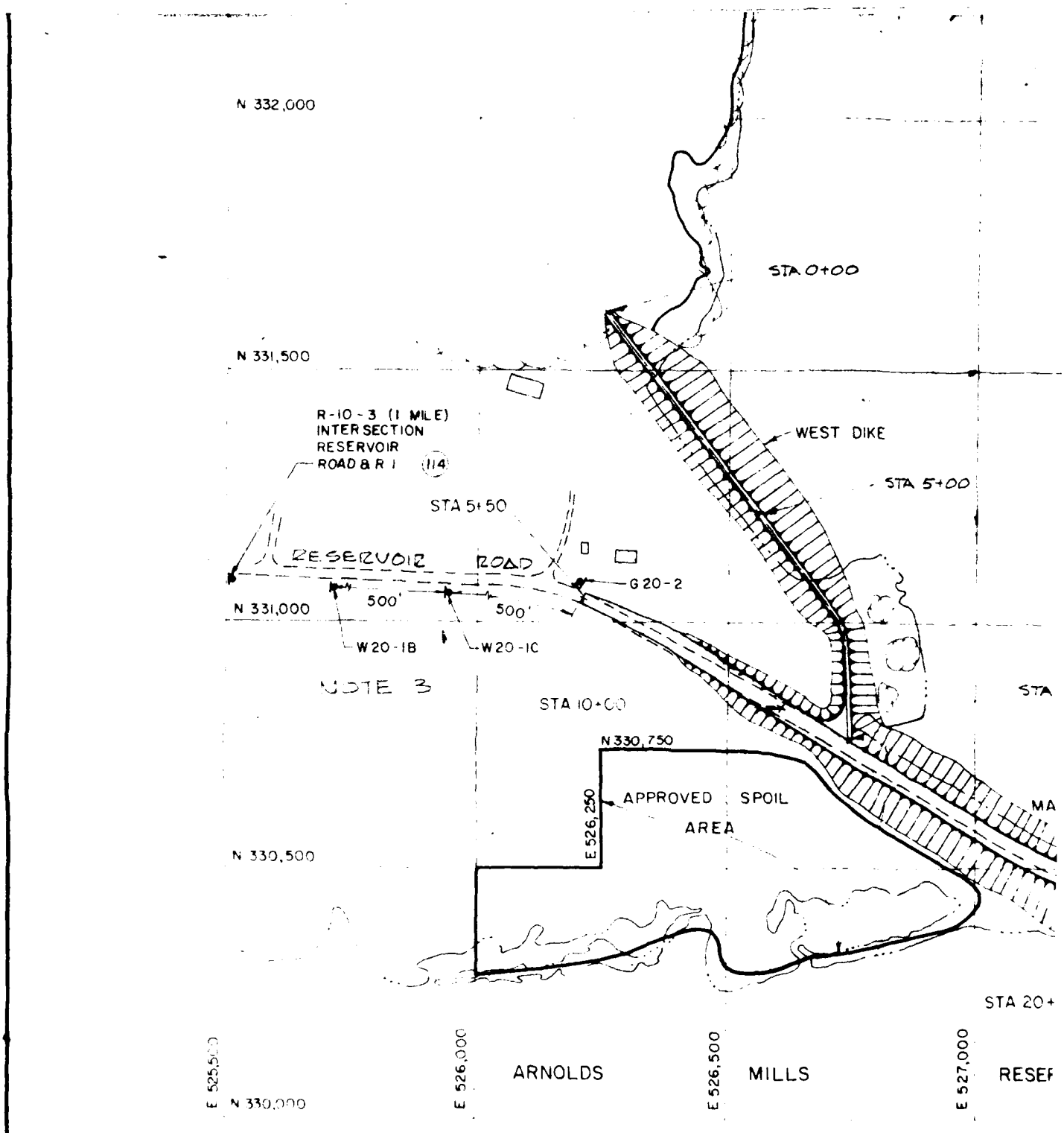


GRAPHIC SCALE

1" = 200' 200' 100' 0 200' 400'

CHARLES A MAGUIRE & ASSOCIATES	
— ENGINEERS —	
PROVIDENCE · HARTFORD · BOSTON	
DESIGNED	C. R. DARLING
DRAWN	R. J. HERCHEN & J. R. LYONS
CHECKED	
SUBMITTED	E. GREENE
APPROVED	F. C. PIERCE


LIMITS
NOTE. 2
F
E
D
C
B
A
ELEV. 190 CONTOUR
STA 40+00
LIMIT
RESERVOIR
STA 36+00
KERN BLVD.
TE HOUSE &
KWAY BRIDGE
STA 30+00
SPILLWAY & BRIDGE
E 528,000
E 528,500
E 529,000
E 529,500


N 332,000
STA 0+00
N 331,500
R-10-3 (1 MILE)
INTERSECTION
RESERVOIR
ROAD & R 1
114
WEST DIKE
STA 5+00
STA 5+50
RESERVOIR ROAD
G 20-2
N 331,000
500'
500'
W20-1B
W20-1C
NOTE 3
STA 10+00
STA
N 330,750
E 526,250
APPROVED SPOIL
AREA
MA
N 330,500
STA 20+
E 525,500
E 526,000
ARNOLDS
E 526,500
MILLS
E 527,000
RESEF
N 330,000

E 551,000

N 334,000

N 333,500

N 333,000

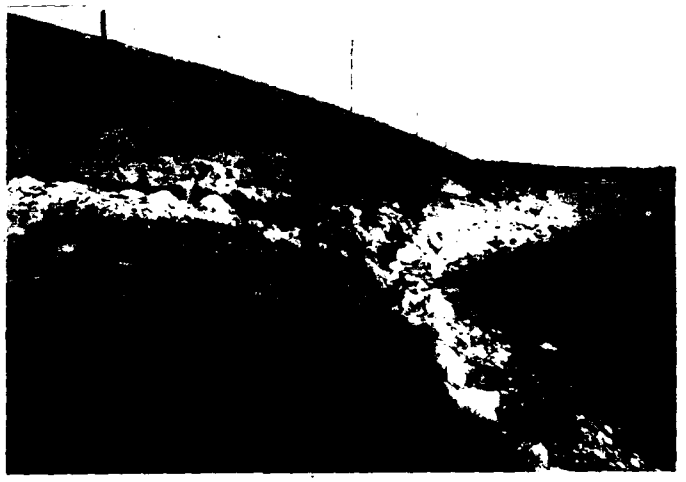
N 332,500

LEGEND

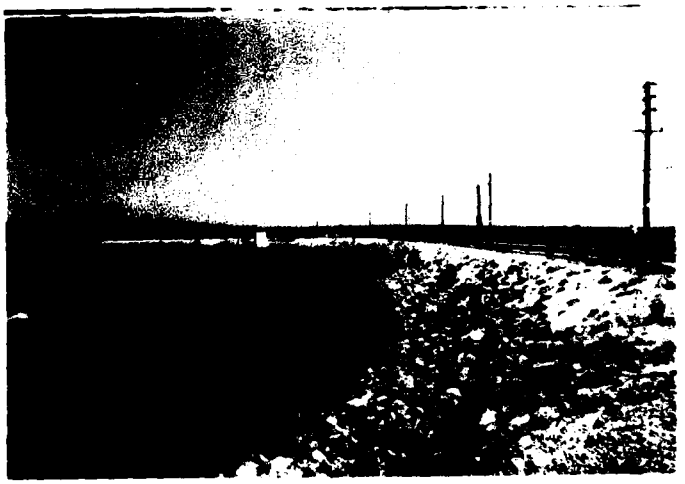
P

NOTE 1

NOTE 2



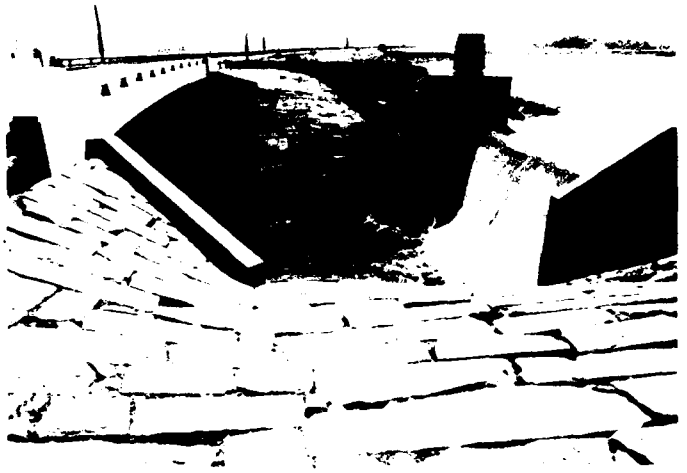
C-2 MAIN EMBANKMENT - DOWNSTREAM FACE (ARNOLD MILLS RESERVOIR AT TOE).



C-3 MAIN EMBANKMENT - UPSTREAM FACE

C-4 WEST DIKE EMBANKMENT-UPSTREAM FACE

C-5 EAST DIKE-LOOKING NORTH ALONG CREST

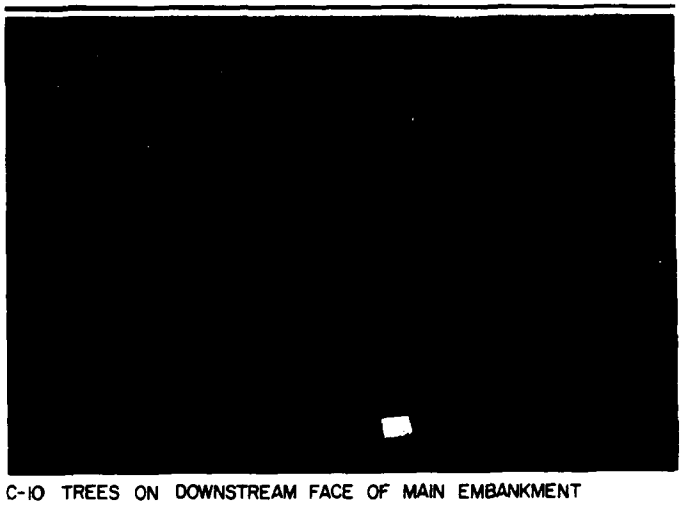


C-6 SPILLWAY AND HIGHWAY BRIDGE - LOOKING WEST

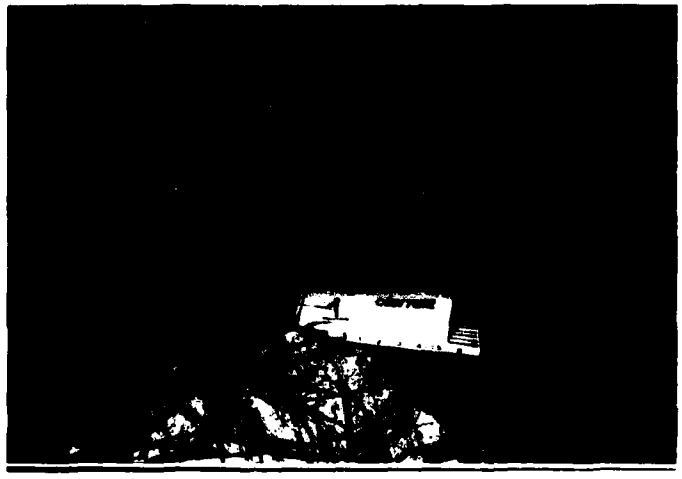
C-7 GATEHOUSE - LOOKING WEST

C-8 SEEPAGE AT COLD JOINT IN LEFT TRAINING WALL OF SPILLWAY

C-9 SPALLING OF CONCRETE - SPILLWAY CREST



C-10 TREES ON DOWNSTREAM FACE OF MAIN EMBANKMENT



C-11 WOODCHUCK HOLE ON DOWNSTREAM FACE OF MAIN EMBANKMENT

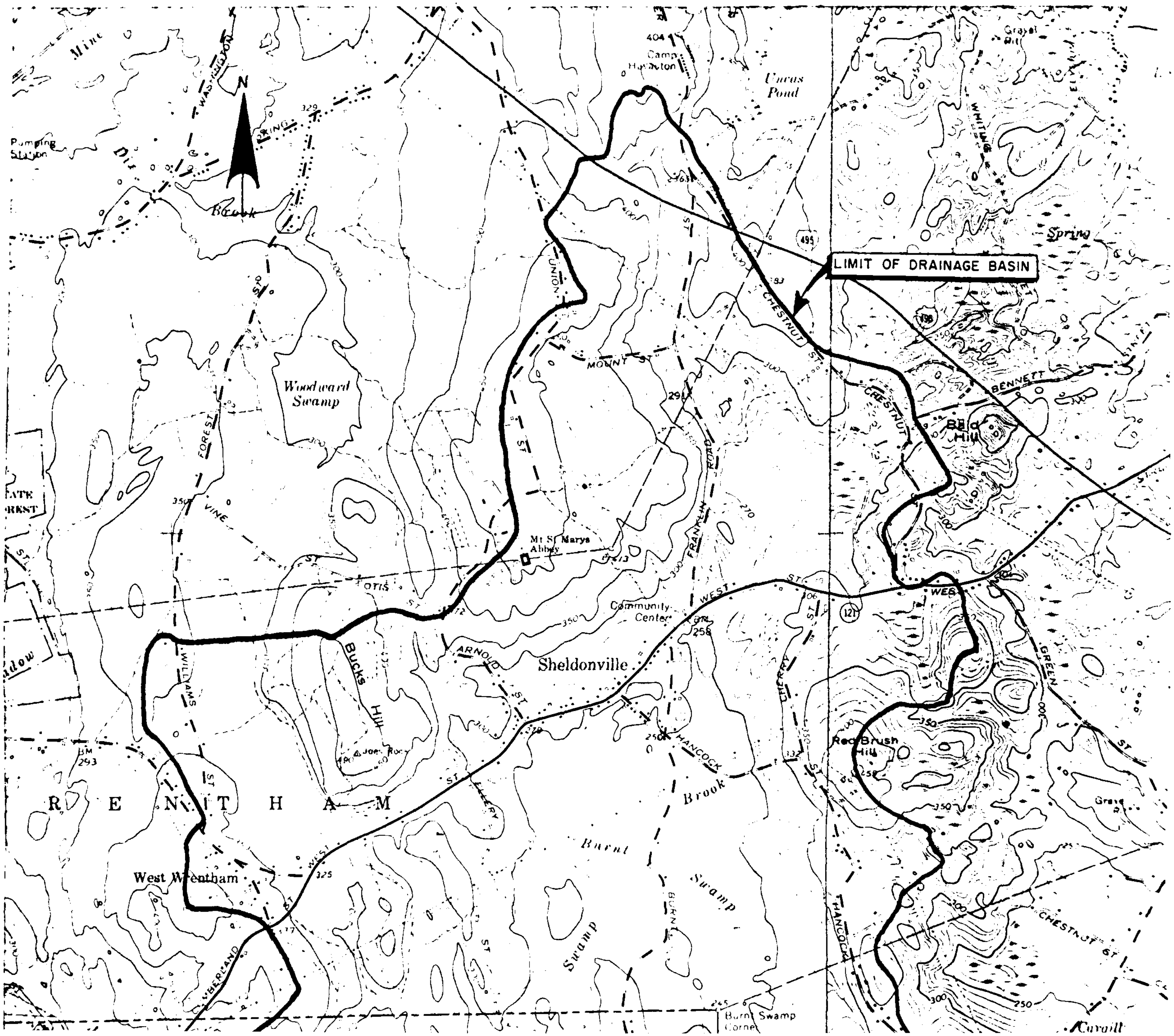
C-12 SURFACE EROSION AT HIGHWAY BRIDGE WEST ABUTMENT

C-13 SEEPAGE AT LEFT ABUTMENT OF MAIN EMBANKMENT

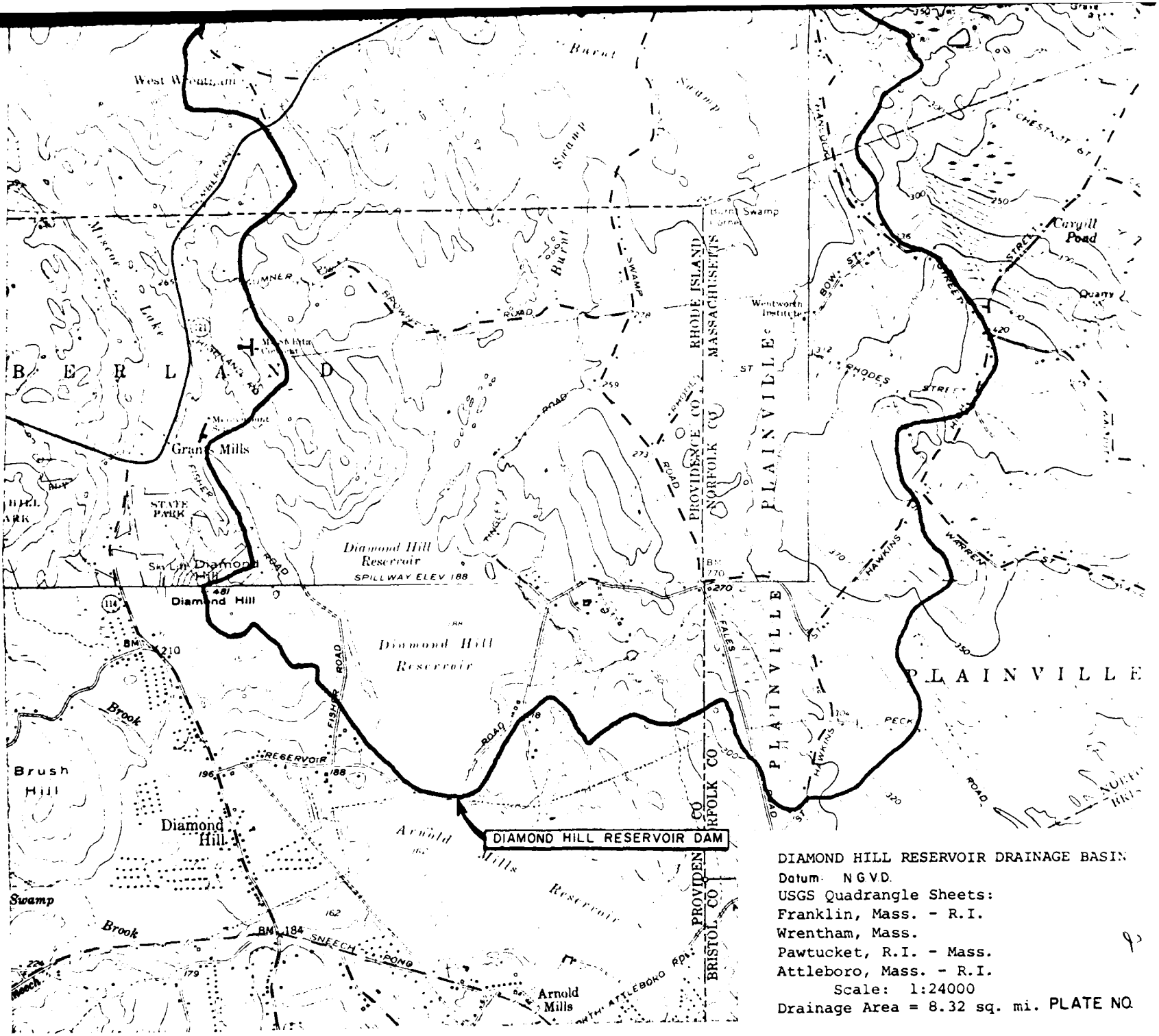
C-14 POND AT TOE NEAR LEFT ABUTMENT OF MAIN DAM

APPENDIX D

HYDROLOGIC COMPUTATIONS



LIMIT OF DRAINAGE BASIN
N
Sheldonville
Bucks Hill
Woodward Swamp
Burnt Swamp
Brook
West Wrentham
R E N T H A M
Uncas Pond
Red Brush Hill
Mt St Marys Abbey
Community Center
Camp Hamilton
Pumping Station
Burnt Swamp Corner
CHESTNUT ST
WHITING
BENNETT
GREEN ST
HANCOCK
FRANKLIN ROAD
CHERRY ST
MOUNT ST
UNION ST
ARNOLD ST
ELLERY ST
OTIS ST
WEST ST
WILLIAMS ST
FOREST ST
VINE ST
Spring



DIAMOND HILL RESERVOIR DRAINAGE BASIN
Datum N.G.V.D.
USGS Quadrangle Sheets:
Franklin, Mass. - R.I.
Wrentham, Mass.
Pawtucket, R.I. - Mass.
Attleboro, Mass. - R.I.
Scale: 1:24000
Drainage Area = 8.32 sq. mi. PLATE NO.

A. Size Classification

Height of Dam = 70 feet; Hence [illegible]DIATE

at crest elevation reservoir storage = 11000 AC-ft.], hence INTERMEDIATE
At top of dam reservoir storage = 15680 AC-ft.]

adopted size category INTERMEDIATE

B. Hazard Potential

DAM IS LOCATED IN AN AREA WHERE ITS FAILURE CAN TRIGGER A CHAIN REACTION OF FAILURE OF DAMS LOCATED DOWNSTREAM IN THE ABBOT RUN SYSTEM OF WATER SUPPLY FOR THE CITY OF PAWTUCKET AND ALSO CAN CAUSE SERIOUS DAMAGE TO HOMES, INDUSTRIAL AND COMMERCIAL UTILITIES, ETC.

It is estimated from the rule of "thumb" failure hydrograph as follows:

Category	Loss of Life	Economic Loss *
		Homes = YES (50+)
HIGH	YES	Buildings = YES (50+)
		Farms = YES
		Miscellaneous = YES
		Highways or roads = YES
		Utilities = YES

C. Hazard Size "Test Flood" or Spillway Design Flood

HIGH INTERMEDIATE PMF

Adopted S.D.F. (test flood) = PMF

Allotted value of test flood due to watershed characteristics = 1700 CSM

*Failure of Diamond Hill Dam could trigger failure of Arnold Mills Reservoir.

Estimating Maximum Probable Discharges - Inflow and Outflow Values Date of Inspection: 5/30/78

Name of Dam DIAMOND HILL RESERVOIR ; Location of Dam BURNT SWAMP BROOK Town CUMBERLAND, R.I.

Watershed Characterization ROLLING HILLS WITH SOME FLAT SWAMPS

Adopted "test" flood = FULL PMF = 1700 CSM = 14144 C.F.S.

D.A. = Drainage Area = 8.32 Square Miles = _____ Acres

S.A. = Surface Area of Reservoir = 0.609 Square Miles = 390 Acres

Shape and Type of Spillway = UNGATED, OVERFLOW- OGEE TYPE

B = Width of Spillway = 74.0 feet; C = Coefficient of Discharge = (3.97 - Friction) = 3.87

Maximum Capacity of Spillway Without Overstopping = 11900 C.F.S. = 84 % of test flood

Top of Dam Elevation = 210.00 ; Spillway Crest Elevation = 198.00

Length of Dam= 600 FT. AS OVERFLOW

Name of Dam	Test Flood Qp_1 CSM	Test Flood Qp_1 CFS	Inflow Characteristics h_1 in feet	Inflow Characteristics S_1 in inc.	Outflow Characteristics First Approximation Qp_2 CFS	First Approximation h_2 in feet	First Approximation S_2 in inc	Outflow Characteristics Second Approximation S_3 in inc	Second Approximation h_3 in ft.	Second Approximation Qp_3 CFS	Outflow Characteristics Third Approximation S_4 in inc.	Third Approximation h_4 in ft.	Third Approximation Qp_4 CFS
1	2	3	4	5	6	7	8	9	10	11	12	13	14
DIAMOND HILL RESERVOIR	PMF = 1700	14144	13.15	11.55	14144	13.15	11.55	11.47	13.06	13874	11.51	13.10	13976
	1/2 PMF: 850	7072	8.46	7.43	7072	8.46	7.43	6.31	7.18	5531	6.87	7.80	6244

Qp = Discharge; h = Surcharge height S = Storage in inches

NOTE: Outflow discharge values are computed as per C.O.E. guidelines but with due consideration given to storage in reservoir and maximum spillway capacity.

Overtopping Potential

Spillway crest elevation = 198.0 M.S.L.

Top of dam elevation = 210.0 M.S.L.

Maximum discharge capacity of Spillway without overtopping = 11900 C.F.S.

"Test flood" outflow discharge = 13976 C.F.S.

% of "Test flood" carried by Spillway without overtopping = 85.1 % 1

"Test flood" outflow discharge which flows over the dam = 2076 C.F.S.

= 14.9 % of "Test flood" 2

1 + 2 = 100%

"Rule of Thumb Guidance for Estimating
Downstream Dam Failure Hydrograph"

BASIC DATA

Name of dam Diamond Hill Reservoir Name of Town Cumberland, RI

Drainage area = 8.32 sq.mi. Top of Dam 210.0 NGVD

Spillway type = overflow ogee Crest of spillway 198.0 NGVD

Surface area at crest elevation = 390 Acres

Reservoir bottom near dam = 179.0 NGVD Estimated

Assumed side slopes of embankments = 2.5:1

Depth of reservoir at dam site 70 ft. = y_o = 70 ft.

Mid-height elevation of dam = 200.5 NGVD

Length of dam at crest = 2,000 ft.

20% of dam length at mid-height = W_b = 370 feet

Step 1:

Elevation (ft.) NGVD	Reservoir Estimated Storage In AC-ft.
198.0	11,000
200.0	11,780
202.0	12,560
204.0	13,340
206.0	14,120
208.0	14,900
210.0	15,680

Step 2:

$$Q_{pl} = \frac{8}{27} W_b \sqrt{g}\ y_o^{3/2}$$

$$= 1.68\ W_b\ y^{3/2} = 364{,}000 \text{ CFS}$$

Note: Failure of dam is assumed to be instantaneous when pool reaches top of dam.

DAM FAILURE ANALYSIS

DIAMOND HILL RESERVOIR

1. Failure discharg with pool at top of dam = 364,000 CFS

2. Depth of water in Reservoir at time of failure = 70.0 feet

3. Maximum possible depth of flow downstream of dam = 47.0 feet

4. Water surface elevation just downstream in Arnold Mill Reservoir at time of failure with due modification due to storage in Arnold Mill = 172.0

The failure discharge of 364,000 CFS will enter Arnold Mills Reservoir and will overflow the Arnold Mills spillway after filling the available surcharge storage. Assuming that Arnold Mills Dam does not fail, it is estimated the failure discharge of 364,000 CFS will increase the water surface leval an additional ten feet of depth and the outflow discharge will be of the order of magnitude of 300,000 CFS. Downstream from Arnold Mills Reservoir the depth of flow will be 12.0 feet approximately within a distance of 1,000 feet. Beyond 1,000 feet from the Arnold Mills Reservoir, the failure discharge of 300,000 CFS will flow with the below given hydraulic channel characteristics.

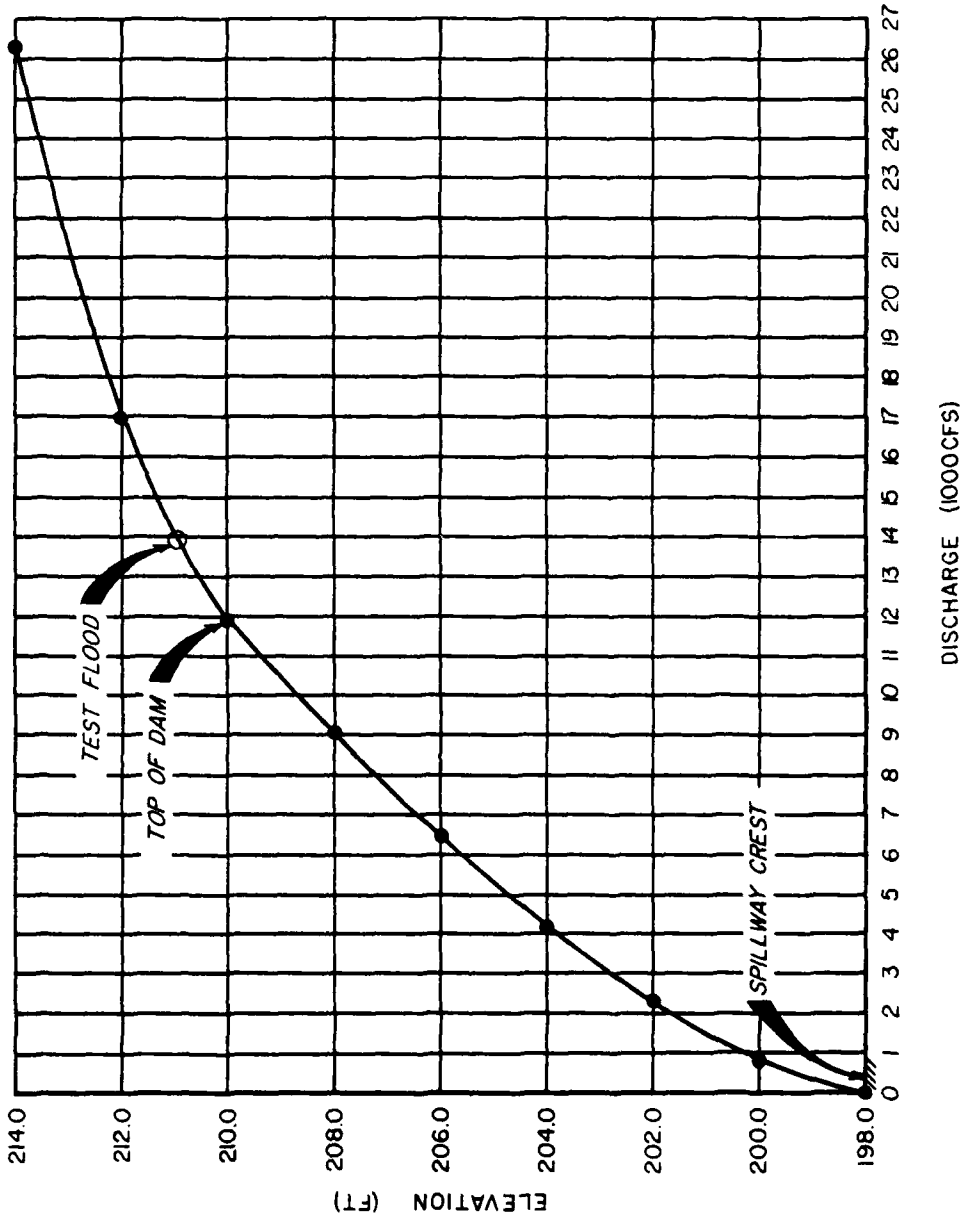
Q = 300,000 CFS
n = 0.05
b = 822 feet
d = 12.0 feet
s = 0.033
Side Slopes = 1V on 2H

Spillway Rating Curve Computations
Diamond Hill Reservoir Dam

Spillway width = 74.0 ft.; Spillway crest elevation = 198.0 NGVD
Overflow length = 600.0 ft.; Top of dam elevation = 210.0 NGVD

Elevation (ft.) NGVD	Discharge (CFS)	Remarks
198.0	0	Spillway Crest
200.0	810	
202.0	2,291	
204.0	4,209	
206.0	6,480	
208.0	9,056	
210.0	**11,900**	Top of Dam
211.1	13,976	Test Flood
212.0	16,991	
214.0	26,300	

Frequency and Discharge (CFS)		Elevation (ft.) NGVD
Q_{10} =	947	200.04
Q_{50} =	1,490	200.76
Q_{100} =	2,570	202.30
$Q_{\frac{1}{2}PMF}$ =	6,244	205.80
Q_{PMF} =	13,976	211.10



SPILLWAY RATING CURVE
DIAMOND HILL RESERVOIR DAM

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(9) NAME	(10) LATITUDE (NORTH)	(11) LONGITUDE (WEST)	(12) REPORT DATE DAY | MO | YR
RI	802	NED	RI	007	01				DIAMOND HILL RESERVOIR DAM	4159.4	7123.9	21SEP78

(13) POPULAR NAME	(14) NAME OF IMPOUNDMENT
	DIAMOND HILL RESERVOIR

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	06	DUNNY SWAMP BROOK	ARNOLD MILLS	1	

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	(27) IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)	(28) DIST	(29) DAM	(30) FED R	(31) PRV/FED	(32) SCS A	(33) VER/DATE
ERTHEN	1971	S	71	71	15000	11000	NED	N	N	N	N	20JUL78

(34) REMARKS

(35) D/S HAS	(36) SPILLWAY CONTROL	(37) SPILLWAY TYPE	(38) SPILLWAY WIDTH (FT.)	(39) MAXIMUM DISCHARGE (CFS)	(40) VOLUME OF DAM (CY)	(41) POWER CAPACITY INSTALLED (MW)	(42) POWER CAPACITY PROPOSED (MW)	(43) NAVIGATION LOCKS NO	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
1	2885	U	74	11900												

(44) OWNER	(45) ENGINEERING BY	(46) CONSTRUCTION BY
CITY OF PAWTUCKET	CHARLES A MAGUIRE ASSOC	FORTE BROTHERS INC.

(47) REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

(48) INSPECTION BY	(49) INSPECTION DATE DAY | MO | YR	(50) AUTHORITY FOR INSPECTION
C.E MAGUIRE, INC	31MAY78	PL 92-367

(51) REMARKS


DAT
FILM