THAMES RIVER FLOOD CONTROL

# WEST THOMPSON

## DAM & RESERVOIR

QUINEBAUG RIVER, CONNECTICUT

# DESIGN MEMORANDUM NO. 2

## SITE GEOLOGY

U.S. Army Engineer Division, New England
Corps of Engineers Waltham, Mass.

JANUARY 1963

407-670A

U. S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM 54, MASS.

ADDRESS REPLY TO:
DIVISION ENGINEER

REFER TO FILE NO.

NEDGW

18 January 1963

SUBJECT: West Thompson Dam and Reservoir, Quinebaug River, Thames River Basin, Connecticut
Design Memorandum No. 2 - Site Geology

TO: Chief of Engineers
ATTN: ENGCW-EZ
Department of the Army
Washington 25, D. C.

In accordance with EM 1110-2-1150, there is submitted Design Memorandum No. 2 - Site Geology, for the West Thompson Dam and Reservoir, Quinebaug River, Thames River Basin, Connecticut.

FOR THE DIVISION ENGINEER:

John Wm. Leslie

JOHN WM. LESLIE
Chief, Engineering Division

1 Incl (10 cys)
Design Memo No. 2
Site Geology

FLOOD CONTROL PROJECT

WEST THOMPSON DAM

QUINEBAUG RIVER

THAMES RIVER BASIN
CONNECTICUT

DESIGN MEMORANDA INDEX

| Number | | Submission Date | Approved |
|---|---|---|---|
| 1 | Hydrology and Hydraulic Analysis | | |
| | Preliminary | 10 May 1962* | 22 Jun 1962 |
| | Final | 20 Aug 1962 | 27 Sep 1962 |
| 2 | Geology | 18 Jan 1963 | |
| 3 | Real Estate | 28 Dec 1962 | |
| 4 | Relocations | 31 Oct 1962 | 12 Dec 1962 |
| 5 | General Design | 24 Aug 1962 | 28 Sep 1962 |
| 6 | Embankment | | |
| 7 | Concrete Materials | | |
| 8 | Detailed Design of Structures | 7 Dec 1962 | |
| 9A | Reservoir Management (Preliminary) | | |
| 9B | Reservoir Management (Final) | | |

*Initial submission in draft to secure approval of spillway design flood and top of dam.

WEST THOMPSON DAM AND RESERVOIR

Design Memorandum No. 2

Site Geology

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# WEST THOMPSON DAM AND RESERVOIR

## QUINEBAUG RIVER

## THAMES RIVER BASIN

## CONNECTICUT

DESIGN MEMORANDUM NO. 2

SITE GEOLOGY

JANUARY 1963

## A. DESCRIPTION OF PROJECT

1. The West Thompson Reservoir Project is located on the Quinebaug River in the Town of Thompson, Connecticut. The dam is located in the village of West Thompson, 2.0 miles upstream from the City of Putnam and about 1,000 feet upstream from the confluence of the Quinebaug and French Rivers.

2. The project structures and highway relocation are shown on the General Plan and Reservoir Map, Plate 2-1. The project consists of an earthfill dam approximately 2,550 feet long and 70 feet in height above the stream bed with a gated outlet works and a side channel spillway located in the right abutment. A low dike approximately 600 feet long will contain the reservoir at the saddle in the vicinity of Reardon Road, northeast of the dam.

## B. GENERAL GEOLOGY AND TOPOGRAPHY

3. The project is located in the eastern upland area of Connecticut. The topography is of moderate relief and largely rock controlled with some modification by glacial erosion and deposition. Damming of the valleys by ice remnant blocks during

glacial recession resulted in glacial lake and ice contact deposition in the valleys and along the walls. Thin sandy glacial till deposits blanket the rock surface and in the valleys and lower sides is overlain by terrace and lacustrine deposits.

4. Bedrocks of the eastern uplands are metamorphics, principally gneisses and schists of paleozoic and earlier age which are locally granitized by igneous intrusions, largely along original sedimentary bedding planes.

C. DESCRIPTION OF THE SITE

5. The topography of the project site presents a moderate relief of approximately 300 feet. The Quinebaug River flows in a broad valley filled with glacial lake sediments mantled by more recent pervious, alluvial deposits. The left abutment consists of outwash and gravel terrace remnants to approximately elevation 330 underlain by a moderately compact glacial till directly overlying the bedrock surface. The right abutment consists of an outlying terrace remnant separated from the main valley by a deep saddle. The main valley wall is bedrock controlled with a variable mantle of glacial drift with an abundance of boulders and large blocks at the surface.

D. SURFICIAL AND SUBSURFACE INVESTIGATIONS

6. Previous Investigations. Geological reconnaissance and seven borings and one foundation test trench were made in 1957 for the preparation of the Geology Appendix, in an "Interim Report on Review of Survey Thames River Basin," dated January 1958.

7. Current Investigations. A detailed geologic reconnaissance and limited seismic explorations were made in May 1962 to further determine the general surficial and subsurface conditions for planning of an exploration program of design scope. Design explorations by contract were initiated in August 1962. Initial borings on a proposed chute type spillway indicated unsatisfactory foundation conditions and the design was changed to the side channel type. Sufficient explorations have been completed to verify the present proposed design of structures and location of the major portions of materials for embankment fill. (See Plates 2-2 and 2-12) All foundation test borings were continuously sampled in overburden and bedrock was cored in a minimum penetration of 25-feet on the right abutment and 20-feet in the valley and left abutment area. One special sample boring was made adjacent to boring FD-5 in the valley section to obtain undisturbed samples for inspection and testing. Hydraulic pressure tests were conducted in borings on a proposed grout curtain along the spillway weir and where cutoff to bedrock will be made beneath the dam embankment. Investigations have been made in four areas to locate suitable impervious and random borrow materials by means of drive-sample borings, pits and hand auger borings.

8. Future Investigations. Foundation explorations will be made on highway and dike structures. Additional explorations will be made to further delineate quantities and types of borrow materials.

## E. SURFICIAL GEOLOGY

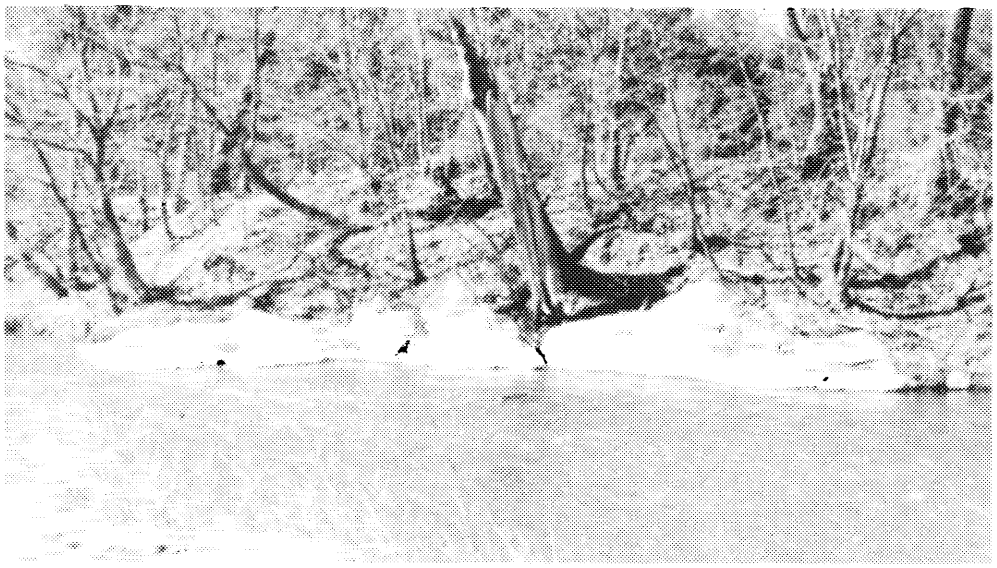
9. At the damsite, the Quinebaug River flows on recent alluvial deposits of sands and gravels in a broad valley bordered by hills which rise 100 feet above the river. Large boulders and blocks up to 50 cubic yards in size are scattered over the right abutment area which is separated from the main valley by a steep sloped terrace remnant. The left abutment is dissected by an old tail race at valley grade with the abutment presenting a smoothly contoured surface to about elevation 330 where shallow rock is reflected in an irregular ground surface. (See Plate 2-2)

10. Bedrock exposed on the right abutment within the area of embankment and spillway and outlet structures is principally a granitized mica schist locally known as the Putnam gneiss formation. The rock structure displays a north-westerly strike which nearly parallels the spillway alignment with a foliation dip of $30^{\circ}$ to $50^{\circ}$ to the West. The prominent joint pattern has a strike of N$15^{\circ}$ to $20^{\circ}$W and a dip to the east of $45^{\circ}$ to $55^{\circ}$. (See Plate 2-3).

## F. FOUNDATION CONDITIONS

11. Overburden on the right abutment is comprised of variable deposits of sandy till, overlain by sands, gravel and boulders in thickness varying from 45 feet in the terrace remnant riverward of the outlet works to 5 to 10 feet in the spillway approach channel. Large blocks scattered over the surface and in the overburden of the right abutment above elevation 325 are largely confined to

the area upstream of the centerline of the dam. (See Figure 1) This distribution in the spillway area is consistent with a sand stratum which, coupled with the general conformity of the bedrock surface, indicates a glacial spillway at approximately elevation 340. (See Plate 2-4) The sandy till which overlies the bedrock surface in thin pockets throughout the right abutment is apparently remnants of a former general distribution removed by discharging melt waters which have deposited sands and gravels over the bedrock surface. (See Plate 2-5) Deposition in the valley is in excess of 60 feet and consists of sandy till lying in thin pockets over the bedrock surface, blanketed by thick glacial lake deposits of stratified silts and sands which locally vary to highly micaceous zones and to zones of coarse sands. The surface of a continuous deposit of coarse sandy gravel forms the valley floor and varies from 10 to 20 feet in thickness. Buried, pervious-filled old stream channels may possibly exist within the valley section but their presence has not been revealed or indicated by the explorations. The overburden of the left abutment is comprised of till, outwash and terrace remnant materials containing cobbles and boulders, averaging 15 to 20 feet in thickness and thinning at higher elevations. The general stratigraphic sequence of the overburden in the dam foundation is shown on Plate 2-5.



OUTCROP (GNEISS) AT OUTLET WORKS INTAKE

BOULDERS ON SPILLWAY CENTERLINE

FIGURE 1

12. Bedrock as exposed in the right abutment area varies from a gneissic to massive granitic rock in the outlet approach channel (See Figure 1) along the river bank to a biotite schist highly metamorphosed and granitized in the vicinity of the spillway structures. Borings reveal the rock to be generally a granitized schist with zones of extensive granitization where the rock varies from a gneiss to granite. A slight to highly weathered and jointed condition prevails in the bedrock to a depth of 5 to 10 feet below the rock surface. (See Plates 2-5 and 2-6) In some areas, such as the northeast corner of the spillway weir and approach channel, the depth of weathering and jointing increases to approximately 15 feet. The trend of structural foliation nearly parallels the spillway structures and is generally N 50° to 60°W with a foliation dip at the surface of 30° to 55° to the west and generally becoming steeper with increasing depths. Random jointing occurs throughout the borings with the most persistent jointing being a steeply dipping strike to diagonal joint system. (See Page 2-3)

13. High water losses during drilling and extreme difficulty in installing pressure test equipment indicate an open rock condition which will require grouting to reduce seepage beneath structures. Particular high water losses were encountered in FD 46 of the left abutment, 12 gpm at 10 psi and in FD 40 on the north end of the spillway where losses of 12 gpm at 0 psi occurred. Conditions in other areas could not be determined because of inability to properly install and seat packers for satisfactory pressure tests.

14. The soundness of the rock varies with composition and structural foliation. Most of the rock below the zone of surface weathering and jointing will be fresh and hard. Principle failure surfaces will parallel the bedding planes which will vary in inclinations and orientation. Randomly oriented strike or dip joints are expected to be continuous and will have a strong influence on structural excavation where their location is coincident with the design slopes. Shallow rock excavations within the area of weathering and frequent jointing will result in rock slopes approaching 3 on 1 with somewhat steeper slopes expected on northeasterly facing slopes. Slopes in the deeper rock cuts are expected to approach 4 on 1 with steeper slopes possible where line drilling or other special excavation methods are utilized.

G. SUBSURFACE WATER.

15. A measurement of the level of subsurface water was made in all borings during drilling and is shown by a symbol on the Record of Foundation Explorations. (Plates 2-8 thru 2-11) Observation wells designated OW were installed in representative borings in the dam and in the impervious and random-pervious borrow areas. The level of the subsurface water at the damsite is generally at or just above the rock surface on the abutments becoming conformable with the river level in the valley section.

H. RESERVOIR LEAKAGE.

16. A permanent very low pool at elevation 305 is planned for purpose of wild-life conservation. Explorations at the damsite

indicate a semi-pervious to pervious foundation condition in the valley section. The embankment design provides for control of excessive under-seepage. A divide along Reardon Road northeast of the damsite will require a low dike to contain the reservoir at maximum flood pool. In the remaining portion of the reservoir, the valley sides inclosing the reservoir are higher than the maximum pool elevation and no undesirable seepage is anticipated.

## I. CONSTRUCTION MATERIALS

17. General. The presently proposed dam embankment design consists of an inclined upstream compacted impervious fill section with an upstream blanket and a compacted random fill downstream section. A shallow cut-off will be made through the upper more pervious materials in the valley section and will be taken to rock with a grout curtain in the abutment areas. A foundation drain is planned for the valley section in the downstream portion of the embankment.

18. Impervious Fill Material. A source of impervious material is being explored in a drumloidal shaped feature approximately 1.3 miles northwest of the damsite (See Plate 2-12, Area F). The material in this area consists of a glacial till deposit of compact gray to brown silty sand to silty gravelly sand 30 to 40 feet thick overlying a highly weathered and decomposed bedrock surface. The till is overlain by a variably thick outwash deposit from 5 to 10 feet thick and contains sand and silt lenses. Water levels measured during drilling average from 10 to 20 feet below the ground surface. More

reliable readings of the subsurface water levels will be obtained during reading of observation wells. Sufficient topographic relief is available to allow drainage of the area during borrow excavation.

19. Random Fill Material. Pervious and semi-pervious materials have been explored in the immediate vicinity of the dam and dike sites and are designated Areas A, B, C, and E on Plate 2-12.

20. Area A. A narrow undulating terrace deposit immediately upstream of the dam on the left abutment is comprised of variably thick deposits of sands and gravels adjacent to the river, grading to a silty outwash and glacial till at approximately elevation 325 on the valley wall. No water was encountered in test pits which were excavated to depths of approximately 10 feet.

21. Area B. A steep-sided kame feature immediately south of the damsite on the left abutment is comprised of sands and gravels to a thickness of 30 to 35 feet. The sinuous ridge-like relief of this feature indicates a crevasse filling which by mode of deposition will be of highly variable composition. The subsurface water level is conformable with the adjacent mill pond. Excavations will be limited by the water table and for reason that the feature forms an abutment of the existing dam.

22. Area C. A broad flat terrace immediately upstream of the town of West Thompson, 0.5 miles from the damsite, is comprised of an average thickness of about 10-feet of sands and

gravel overlying a fine sandy silt and silty sand. In this type of feature deposition of coarse material is usually thicker toward the face. The subsurface water level gently slopes toward the terrace face at a depth of 5 to 10 feet.

23. Area E. Immediately north of the dike site, a terrace remnant up to 30-feet thick comprised of stratified sands and gravel lies adjacent to a rock-controlled ridge forming the main valley wall. The subsurface water level in the terrace feature is at or below the bedrock surface.

24. Rockfill and Slope Protection. Suitable rock materials are available from required excavations in sufficient quantities to construct the presently planned zones of rockfill and slope protection. It is estimated that less than 10% of the rock excavations will be unsuitable for use due to weathering. The rock is generally hard and durable and is estimated to have a bulking value of 25% and an angle of internal friction of $40^{\circ}$. Trafficking of rockfills or stockpiling and rehandling will cause some reduction of the estimated bulking value.

25. Concrete Aggregate. An estimated quantity of 7,600 c.y. of concrete will be required for the conduit and spillway weirs and walls. Aggregate investigations and usage made in conjunction with other flood control projects in this area have determined that satisfactory materials are obtainable from commercial sources within a 25-mile haul distance. Complete data on testing of concrete aggregates will be contained in Design Memorandum No. 7 (Concrete Materials).

## J. CONCLUSION AND RECOMMENDATIONS

26. The design of the project structures is being made giving full consideration to geologic data as it is developed. No problems of an unusual geologic nature have developed or are indicated at this stage of investigations. Explorations are in progress at the sites of the dike, highway relocation and borrow areas.

27. In accordance with established practice of this division, a digest of geologic factors pertinent to the design and construction of the project will be furnished to field construction personnel for information, guidance and instruction for the work. This digest will point out the availability of geology personnel for field consultation.

28. Sufficient earth materials will be available for construction of the embankments from required excavations and from borrow areas within 1.5 miles of the project. Required excavations should produce sufficient rock suitable for use as rockfill and for slope protection on the dam and dike.

29. Randomly oriented open jointing requires that consideration be given to this condition in design for uplift, anchorage, seepage control and rock excavations. Detailed examination of the borings and the results of pressure testing indicate an open condition in the rock which is most severe in the weathered zone in the upper 5 to 10 feet. Careful excavation should be made in the

upper 10 to 15 feet if foundation grades are to be established in this depth range or steep slopes are to be maintained within or below. Intersecting joint planes and structural foliation will govern to a large degree the shape of structural excavation. In areas of open rock cut, it is considered practical to excavate the rock to slopes of 4 on 1 after removal of loose and weathered surface rock. Rock bolts will be used where applicable in areas of deep cuts to assist in stabilizing the slopes.

30. Line drilling will be effective in reducing overbreak. Where line drilling may be employed, such as at the spring line of the outlet works conduit, the drilling should originate 4 to 5 feet above the design spring line grade to give greater assurance of preserving the side rock below.

31. Anchoring of concrete walls in the side channel spillway will be most effective if the anchors are inclined to the east at an angle of $50^{\circ}$ to the horizontal. Properly spaced and oriented drains in rock will effectively reduce hydrostatic pressures.

32. Where concrete structures on sound rock require the investigation of shearing resistance to horizontal movement, a coefficient of 0.6 is recommended.

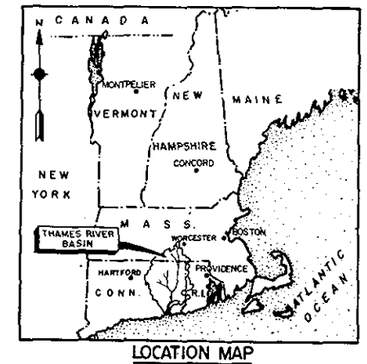
33. Seepage control by use of a grout curtain will be made beneath the spillway weir around the outlet works and where the dam embankment is taken to rock in cut-off on the abutments.

CORPS OF ENGINEERS

U. S. ARMY

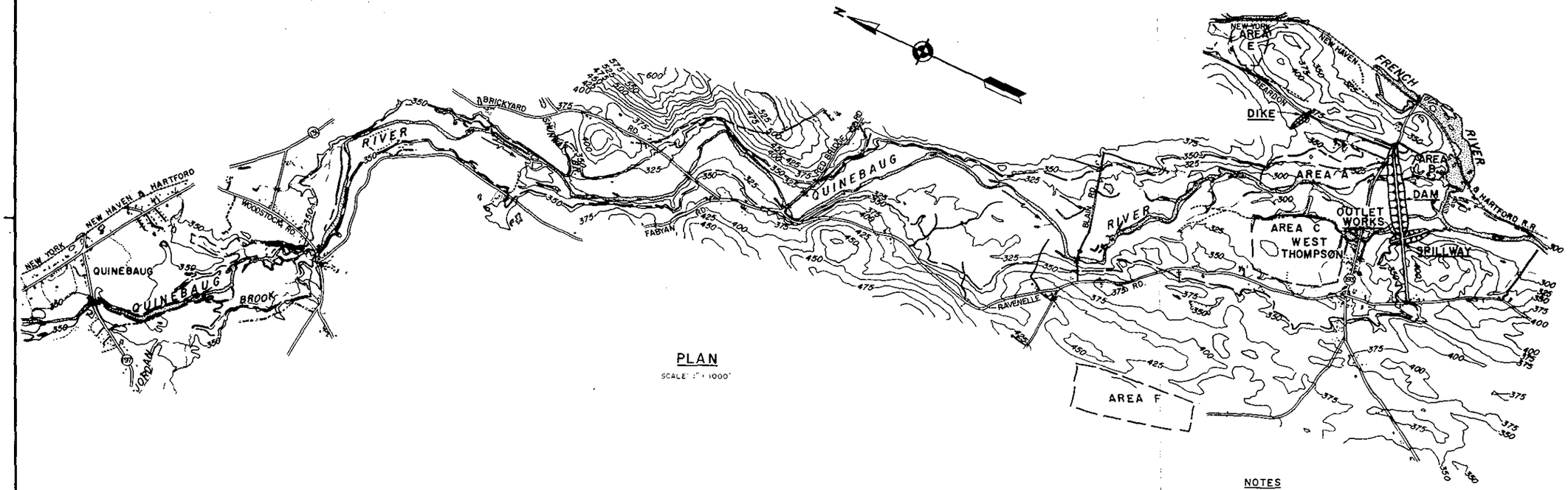
VICINITY MAP

SCALE 1" = 6 Miles




LOCATION MAP

SCALE: 1" = 50 Miles




PLAN

SCALE: 1" = 1000'

NOTES

Elevations refer to Mean Sea Level Datum

Area "F" Impervious Borrow Area

Areas "A", "B", "C" and "D" Random Borrow Areas

GRAPHIC SCALES

1" = 50 Miles: 50 Mi. 0 50 Mi. 100 Mi.

1" = 6 Miles: 6 Mi. 0 6 Mi. 12 Mi.

1" = 1000': 1000' 0 1000' 1000'

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DR. BY E A B | TR. BY H C S | CK. BY R C G

SUBMITTED: HEAD, GEOLOGY SECTION

PROJECT ENGINEER

APPROVAL RECOMMENDED: CHIEF, F.O.N. & MAT'LS BRANCH

APPROVAL RECOMMENDED: CHIEF, P. & P. BRANCH

THAMES RIVER FLOOD CONTROL

WEST THOMPSON DAM

GENERAL PLAN AND RESERVOIR MAP

QUINEBAUG RIVER CONNECTICUT

APPROVED: CHIEF, ENGINEERING DIVISION

DATE JAN 1963

SCALE: AS SHOWN | SPEC. NO. CIV. ENG.-19-016-

DRAWING NUMBER

SHEET

PLATE NO. 2-1

CORPS OF ENGINEERS U. S. ARMY

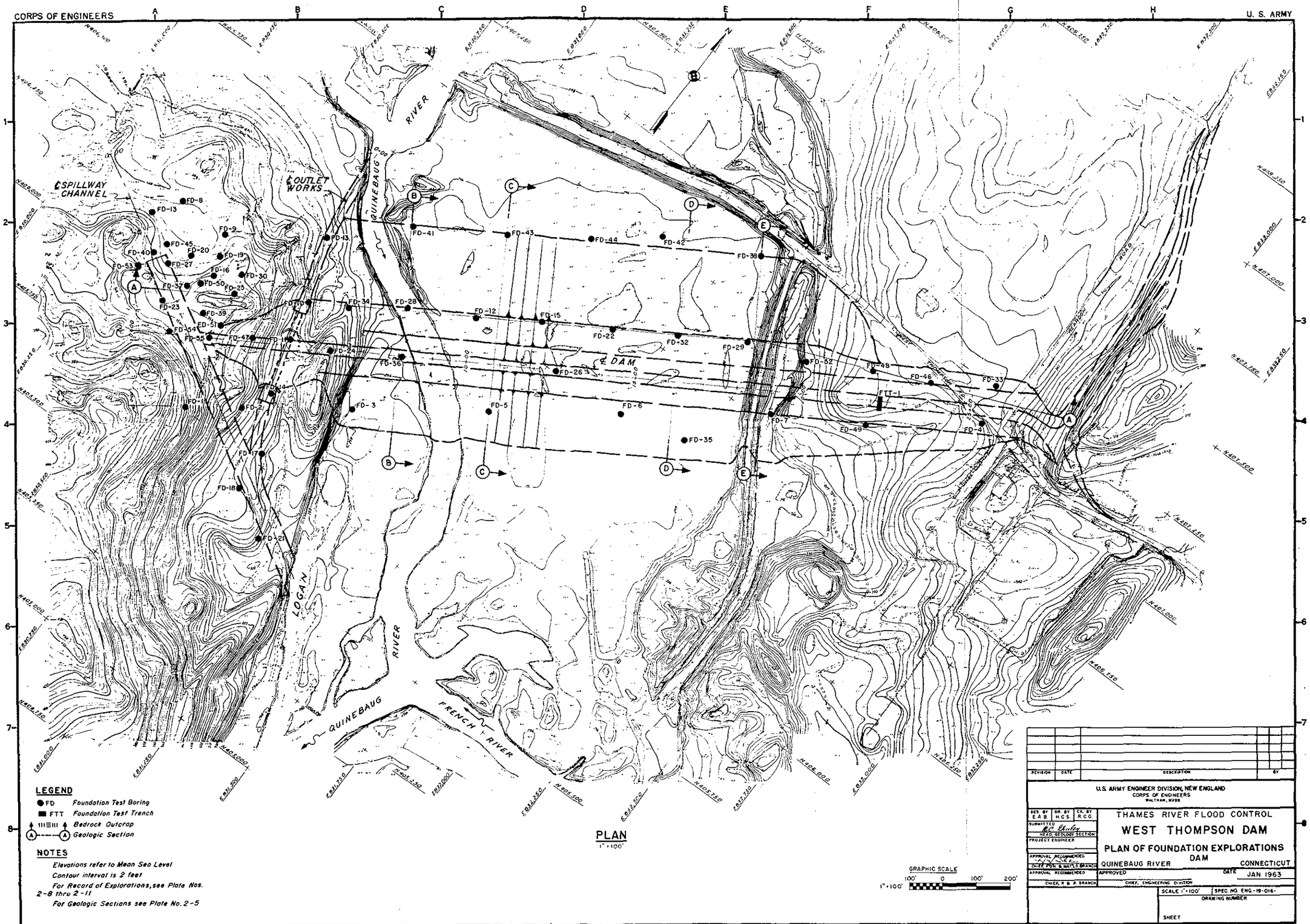



PLATE NO. 2-2

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U. S. ARMY

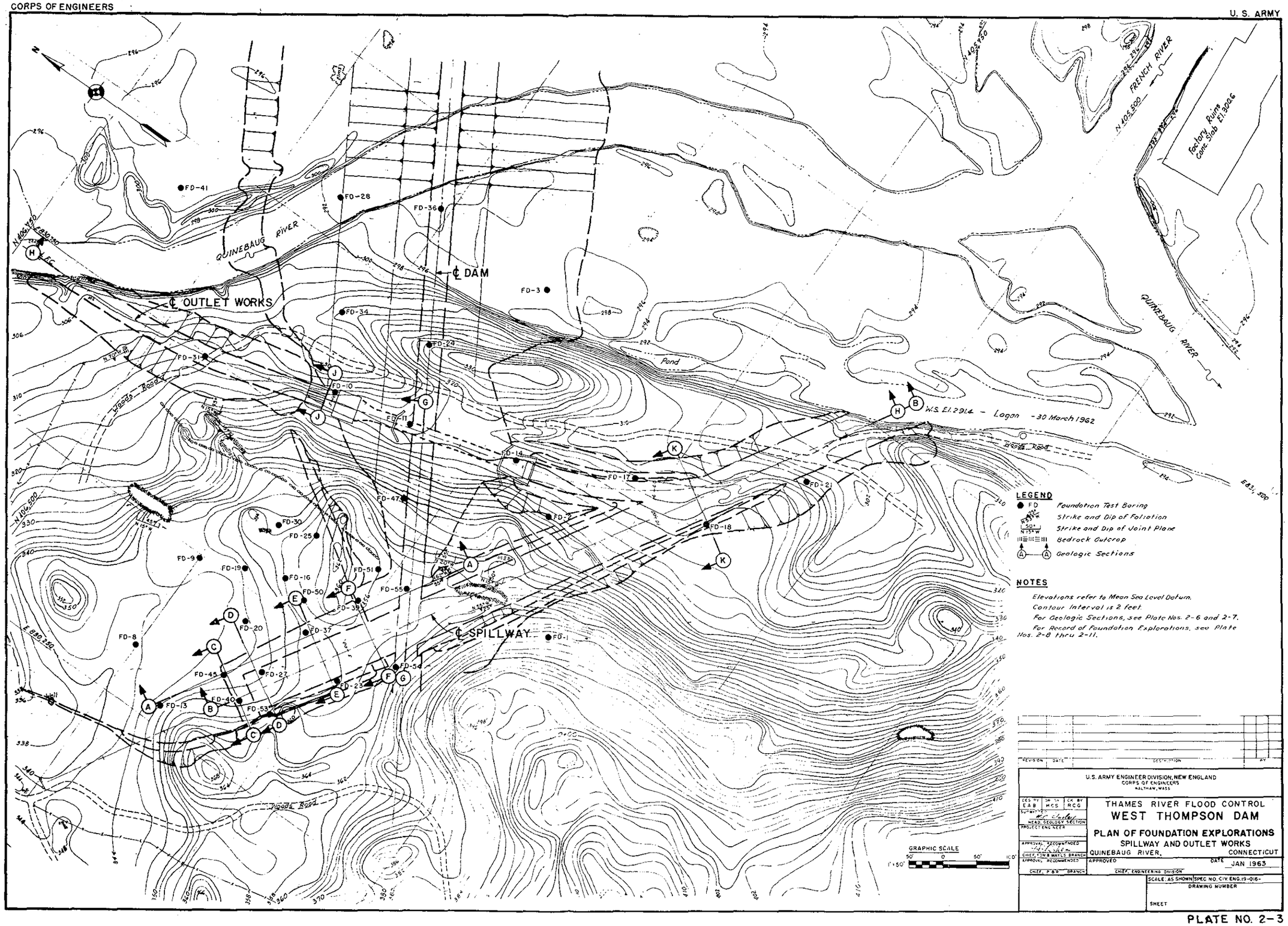


PLATE NO. 2-3

CORPS OF ENGINEERS

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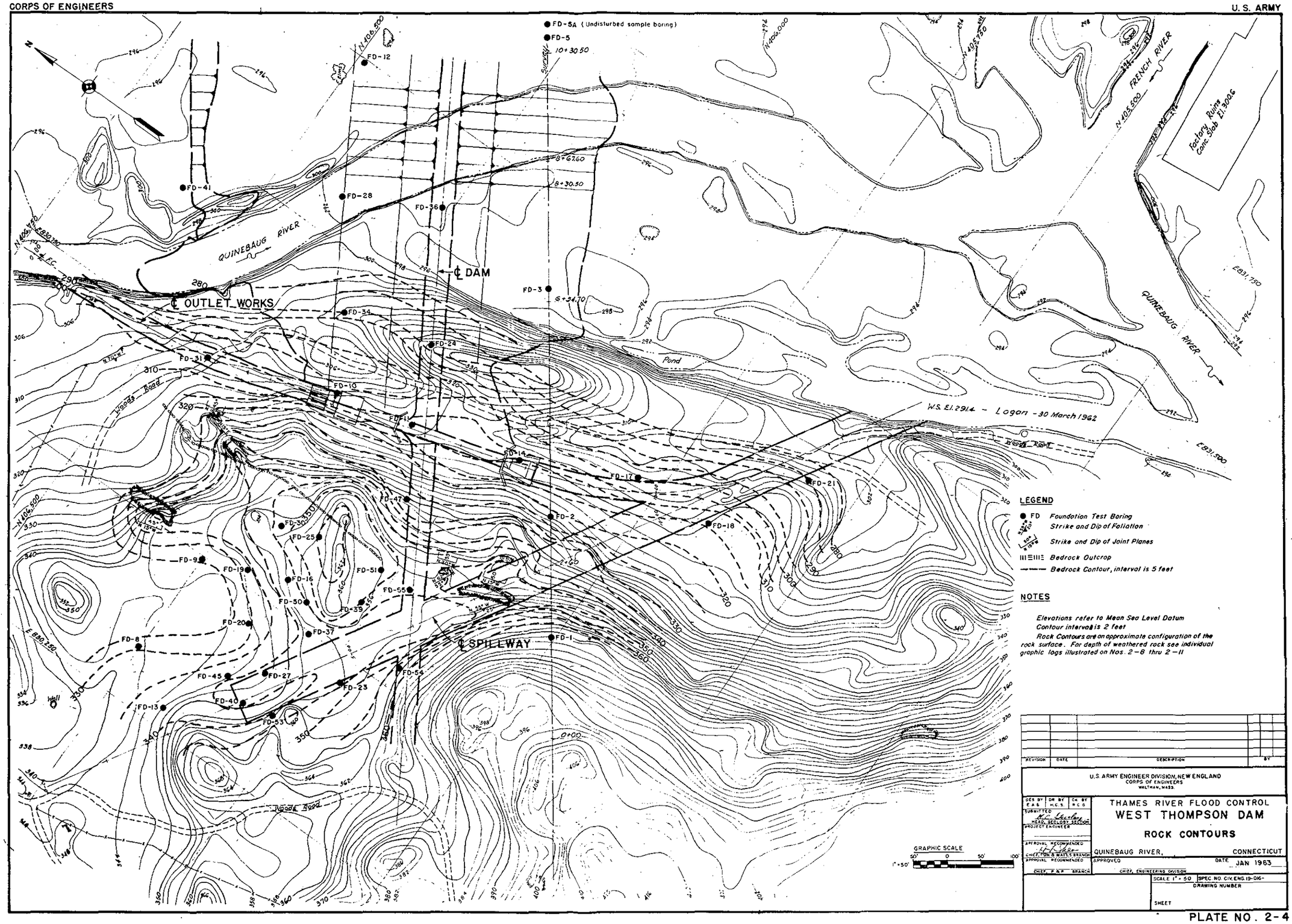


PLATE NO. 2-4

CORPS OF ENGINEERS

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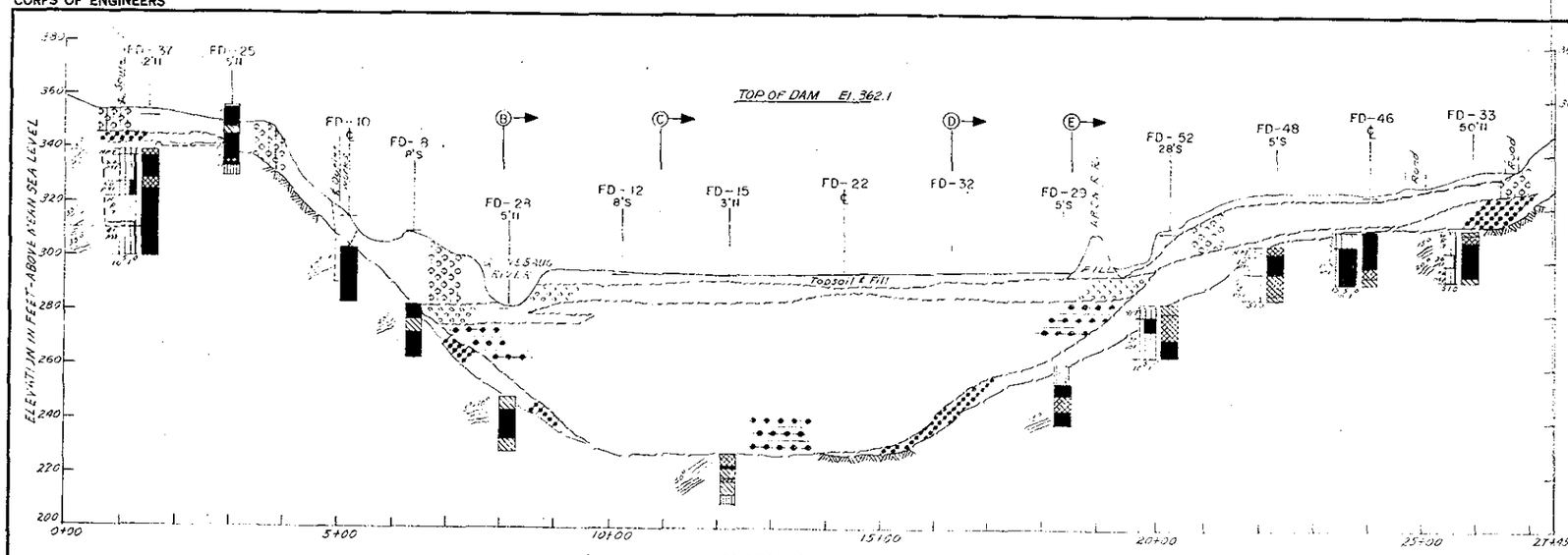
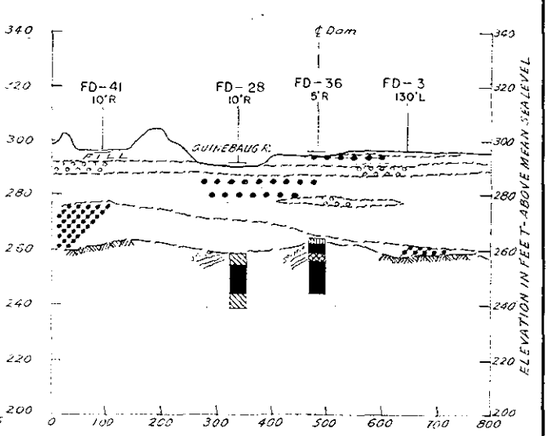



GEOLOGIC SECTION A-A (LOOKING UPSTREAM)
SCALE: HORIZ 1"=100' VERT 1"=20'




GEOLOGIC SECTION B-B
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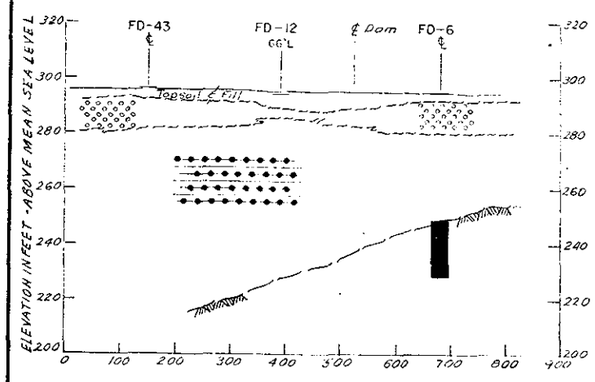


GEOLOGIC SECTION C-C
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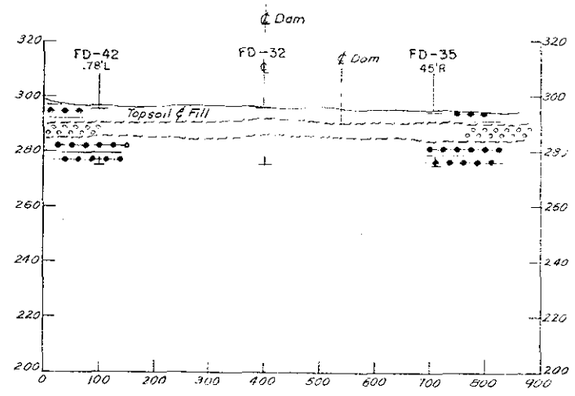
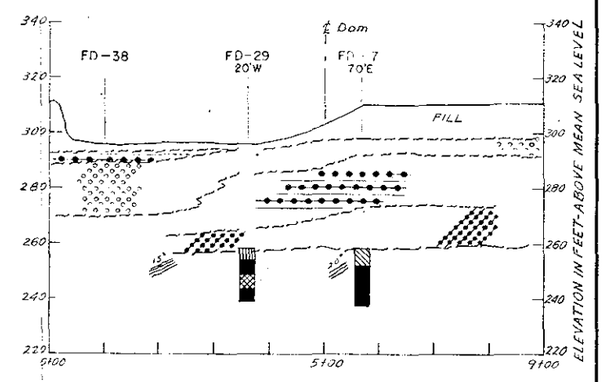



GEOLOGIC SECTION D-D
HORIZ 1"=100' VERT 1"=20'




GEOLOGIC SECTION E-E
SCALE: HORIZ 1"=100' VERT 1"=20'

## LEGEND

- Varies from silty, sandy GRAVEL to gravelly, silty SAND and silty SAND (TILL)
- Gravelly, silty SAND to silty, sandy GRAVEL with cobbles and boulders
- Silty SAND to sandy SILT (stratified) with zones of gravelly SAND
- Silty, sandy GRAVEL
- Assumed Bedrock Surface. Bedrock is generally Granitized SCHIST with zones of Gneiss and Granite
- 54-10° Assumed Foliation Dip

## LEGEND FOR CORE BORING ROCK

FD-37 Foundation Test Boring
12'S Distance and direction of offset

HORIZONTAL JOINTS observed in core.

DIP JOINTS, observed depth and angle in core. Orientation unknown.

NPT
10 psi
1.0 psi
13 5.9 10.1
Loss in gpm

- 0-25 % Rock core recovery
- 25-50 % Rock core recovery
- 50-75 % Rock core recovery
- 75-90 % Rock core recovery
- 90-100 % Rock core recovery

NPT No pressure test performed. Asterick denotes that section could not be sealed for testing.

10 psi Constantly maintained pressure for 1 to 5 minutes.

Volume loss in gallons per minute under constant pressure, tested continuously in 5-foot sections. Scale expanded from 0gpm to 1gpm for clarification of low pressure losses.

## NOTES

For Record of foundation explorations, see Plate Nos. 2-B thru 2-11

For location of Geologic Sections, see Plate No. 2-2

GRAPHIC SCALES
SCALE 1"=20' 20' 0 20' 40'
SCALE 1"=100' 100' 0 100' 200'

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

DES. BY E.A.S. | DR. BY H.C.S. | CK. BY R.C.O.

SUBMITTED: HEAD, GEOLOGY SECTION
PROJECT ENGINEER
APPROVAL RECOMMENDED: CHIEF, FDN. & MATLS. BRANCH
APPROVAL RECOMMENDED: CHIEF, P.G.E. BRANCH

THAMES RIVER FLOOD CONTROL
WEST THOMPSON DAM
GEOLOGIC SECTIONS NO. 1
DAM
QUINEBAUG RIVER CONNECTICUT

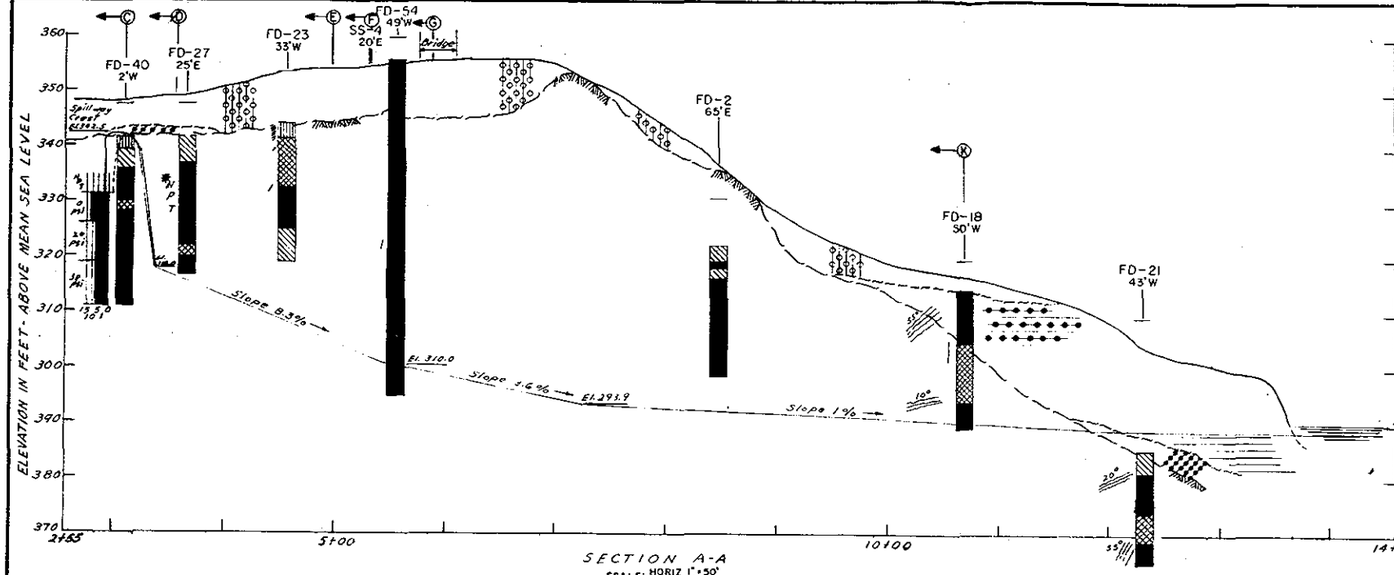
APPROVED: CHIEF, ENGINEERING DIVISION
DATE JAN 1963

SCALE: AS SHOWN SPEC. NO CIV. ENG.-19-016
DRAWING NUMBER
SHEET

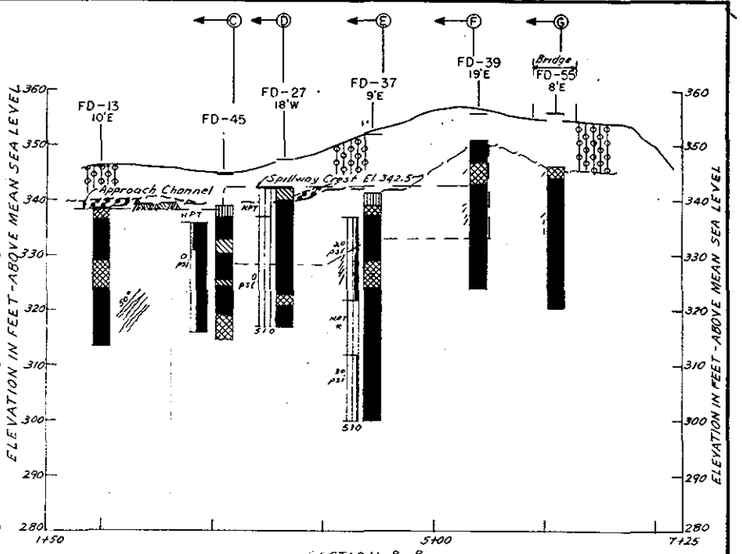
PLATE NO. 2-5

CORPS OF ENGINEERS

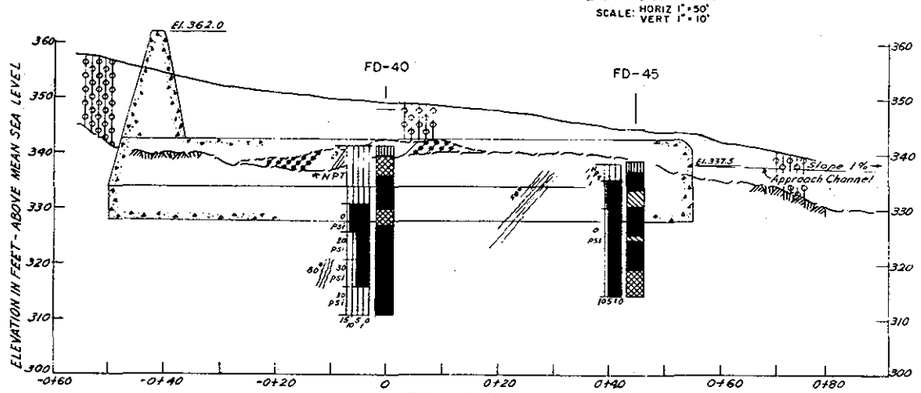
U. S. ARMY



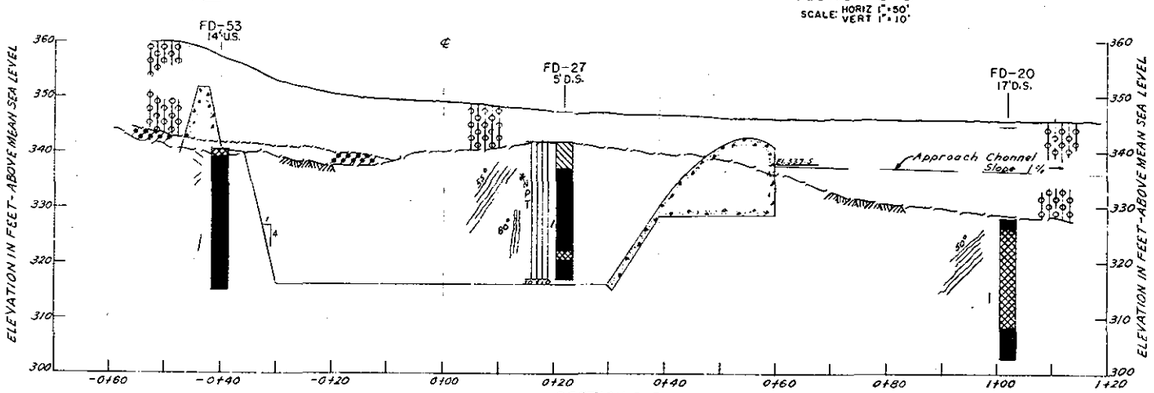

SECTION A-A
SCALE: HORIZ 1" = 50' VERT 1" = 10'



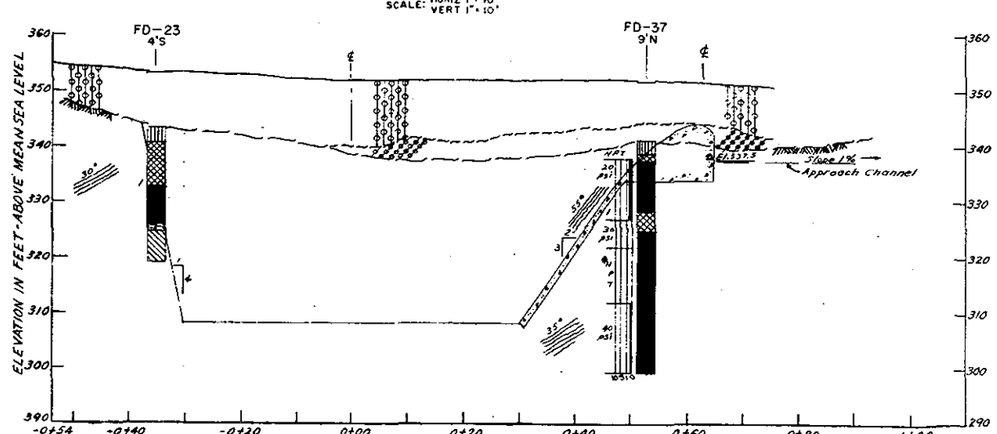

SECTION B-B
SCALE: HORIZ 1" = 50' VERT 1" = 10'



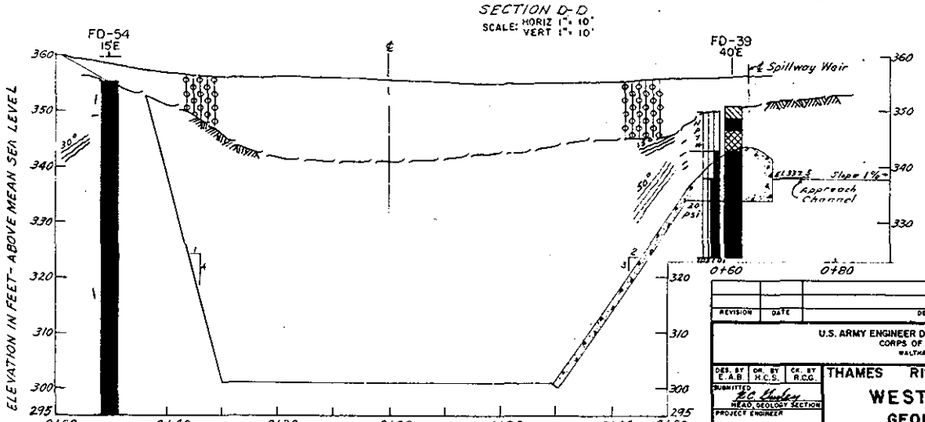

SECTION C-C
SCALE: HORIZ 1" = 10' VERT 1" = 10'




SECTION D-D
SCALE: HORIZ 1" = 10' VERT 1" = 10'




SECTION E-E
SCALE: HORIZ 1" = 10' VERT 1" = 10'




SECTION F-F
SCALE: HORIZ 1" = 10' VERT 1" = 10'

GRAPHIC SCALES

NOTES

For locations of Explorations and Geologic Sections, see Plate No. 2-3
For record of Foundation Explorations, see Plate Nos 2-8 through 2-11
For Legend and other notes applicable to this sheet, see Plate No. 2-5

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISON, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY E.A.B. | DR. BY H.C.S. | CK. BY R.C.G.

SUBMITTED: HEAD, GEOLOGY SECTION
PROJECT ENGINEER
APPROVAL RECOMMENDED: CHIEF, FDN & MAT'LS BRANCH
APPROVAL RECOMMENDED: CHIEF, P & R BRANCH

THAMES RIVER FLOOD CONTROL

# WEST THOMPSON DAM

## GEOLOGIC SECTIONS NO. 2

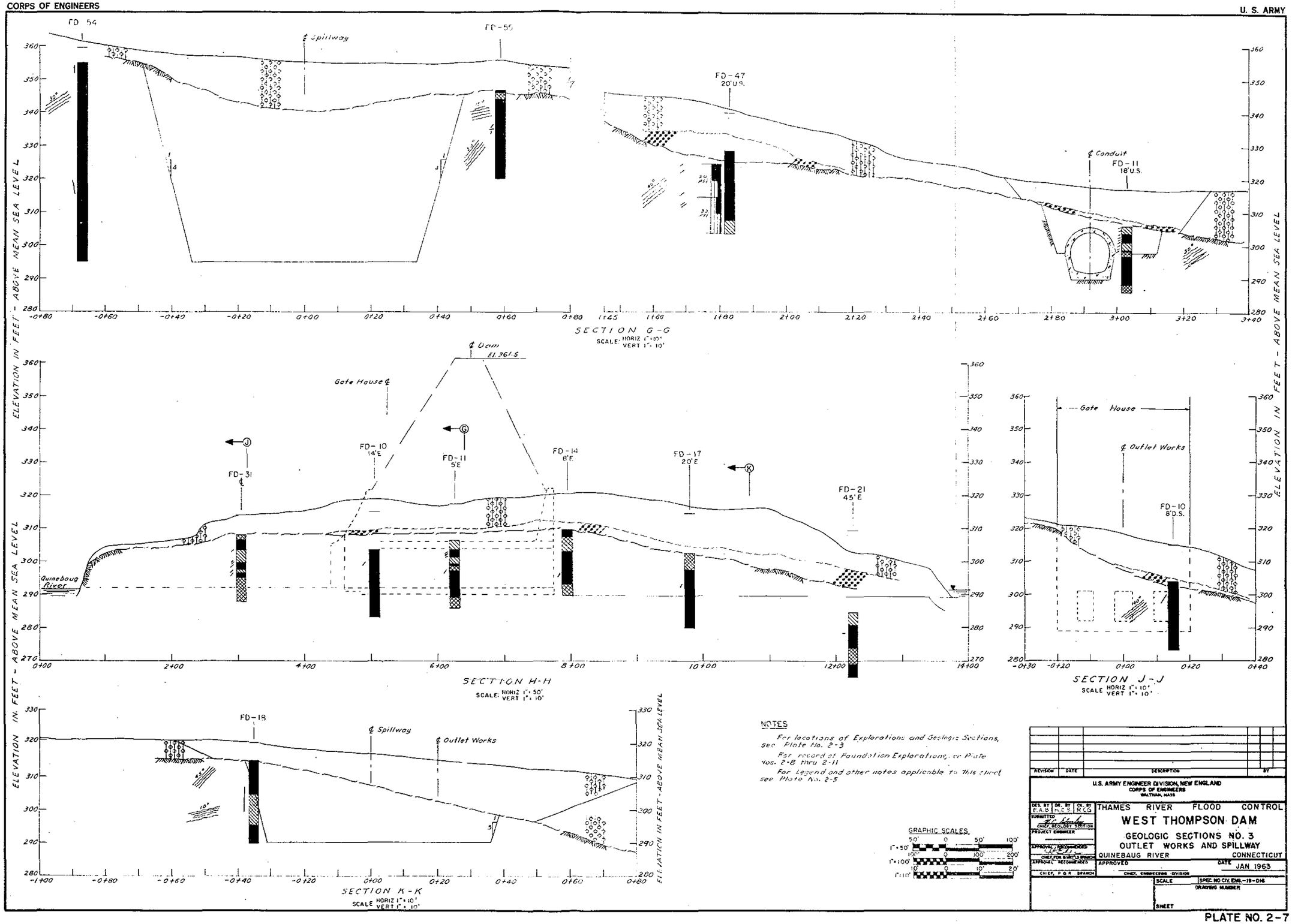
## SPILLWAY

QUINEBAUG RIVER — CONNECTICUT

APPROVED: CHIEF, ENGINEERING DIVISION — DATE JAN 1963

SCALE AS SHOWN | SPEC. NO CIV. ENG.-19-016
DRAWING NUMBER
SHEET

PLATE NO. 2-6




NOTES

For locations of Explorations and Geologic Sections, see Plate No. 2-3

For record of Foundation Explorations, see Plate Nos. 2-8 thru 2-11

For Legend and other notes applicable to this sheet see Plate No. 2-5

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

DES. BY F.A.S. | DR. BY H.C.S. | CK. BY R.C.G.

SUBMITTED: CHIEF, GEOLOGY SECTION
PROJECT ENGINEER
APPROVAL RECOMMENDED: CHIEF, FDN & MATLS BRANCH
APPROVAL RECOMMENDED: CHIEF, P.O.R. BRANCH

THAMES RIVER FLOOD CONTROL

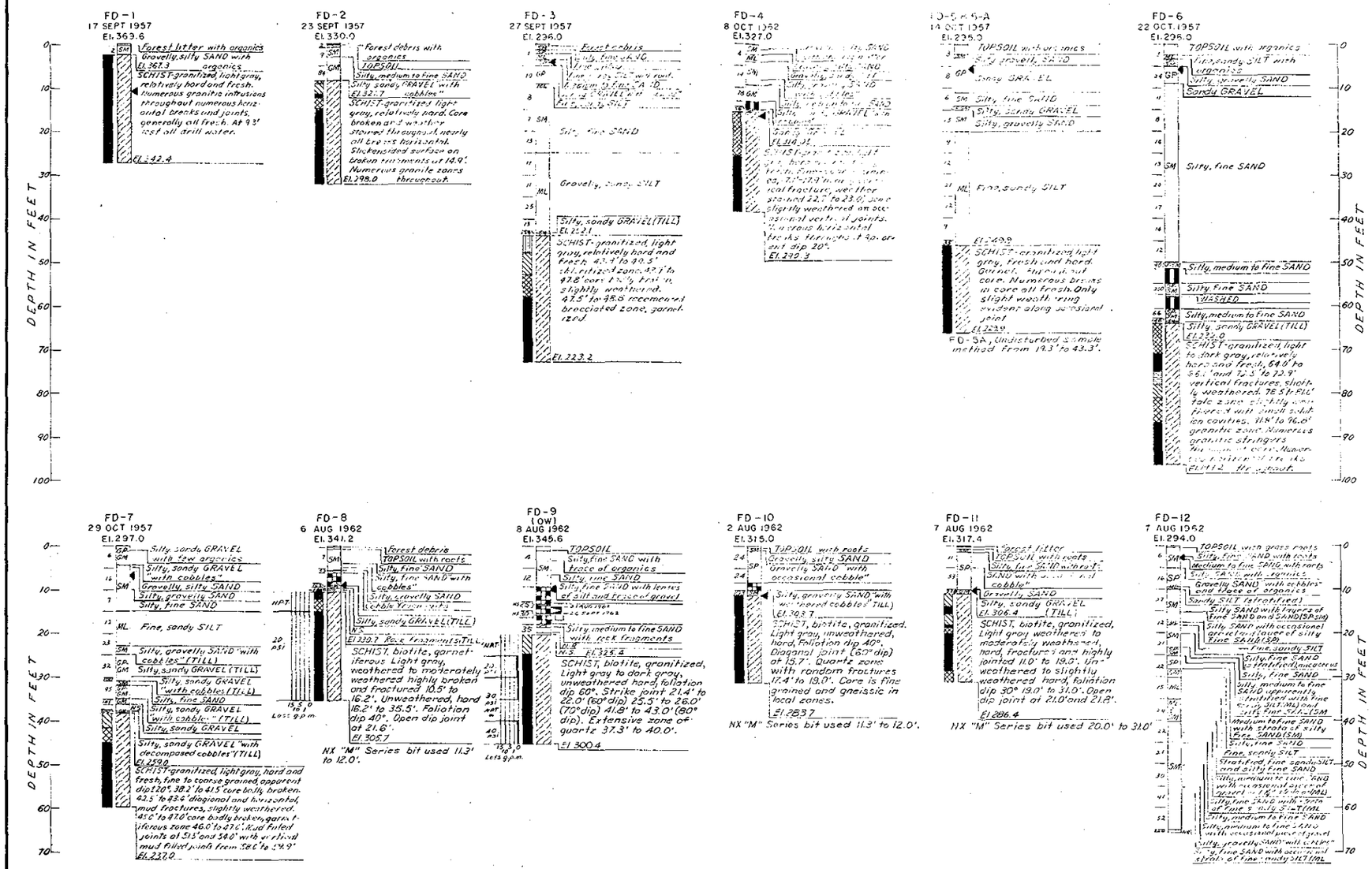
# WEST THOMPSON DAM

## GEOLOGIC SECTIONS NO. 3
## OUTLET WORKS AND SPILLWAY

QUINEBAUG RIVER CONNECTICUT

APPROVED: CHIEF, ENGINEERING DIVISION
DATE JAN 1963

SCALE
SPEC. NO CIV. ENG.-19-016
DRAWING NUMBER
SHEET




## LEGEND FOR GRAPHIC LOGS

| | |
|---|---|
| FD | Foundation Test Boring |
| FT | Foundation Test Pit |
| FTT | Foundation Test Trench |
| BA | Borrow Hand Auger Boring |
| BD | Borrow Test Boring |
| BT | Borrow Test Pit |
| BTT | Borrow Test Trench |
| (OW) | Observation well installed |
| 17 SEPT. 1957 | Date exploration completed |
| El. 369.6 | Elevation of ground surface during time of exploration |

- Maximum artesian head
- Subsurface water level in boring at time of exploration
- Range of subsurface water during period of observation
- Artesian flow encountered
- SM — Group letter symbol according to unified soil classification System
- NR — No Recovery or unsatisfactory soil samples recovered
- NS — Not Sampled. Hole advanced by Core-drilling, blasting and/or wash boring due to operational difficulty
- U — Bottom of observation well
- CD — Sampling in overburden by Core-drilled method
- 25 — Blows per foot of penetration considered most representative for each sample drive using a 300 or 350 pound hammer with a free fall of about 18" on a 1½" I.D. or 2" O.D., 2" I.D. or 2½" O.D. and or 2½" I.D. or 3" O.D. size sample spoon equipped with a beveled and sharpened drive shoe
- Blow counts not recorded or not considered representative
- Cobble or boulder (Core-drilled)
- Cobbles or boulders, continous or nested (Core-drilled) and/or blasted and chopped
- El. 457.2 — Elevation of bedrock surface
- Rock symbol
- El. 482.0 — Elevation bottom of exploration
- NPT — Rock core recovery 0 - 25%
- 10 psi — Rock core recovery 25 - 50%
- Rock core recovery 50 - 75%
- Rock core recovery 75 - 90%
- Rock core recovery 90 - 100%

Loss in gpm

NPT No Pressure Test Performed Asterisk denotes that section could not be sealed for testing

10 psi Constantly maintained pressure for the 5 minutes. Volume loss in gallons per minute under constant pressure, tested continuously in 5 foot sections. Scale expanded from 0 gpm 1 l/gpm for clarification of low pressure losses.

Water levels recorded during subsurface explorations seldom correspond with natural levels of free ground water except in extensive and thick deposits of sands and gravels which are sufficiently pervious to permit rapid stabilization of water level in the graphic log of any exploration is not necessarily to be construed that ground water will not be encountered in excavation at that location.

While the borings are representative of subsurface conditions at their respective locations and for their respective vertical trenches, local minor variations characteristic of the overburden and rocks of this region are anticipated and if encountered, such variations will not be considered as differing "materially" from represented conditions within the purview of Article 4 of the Contract.

## NOTES

Elevations refer to Mean Sea Level Datum

For location of Foundation Explorations, see Plate No. 2-2

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

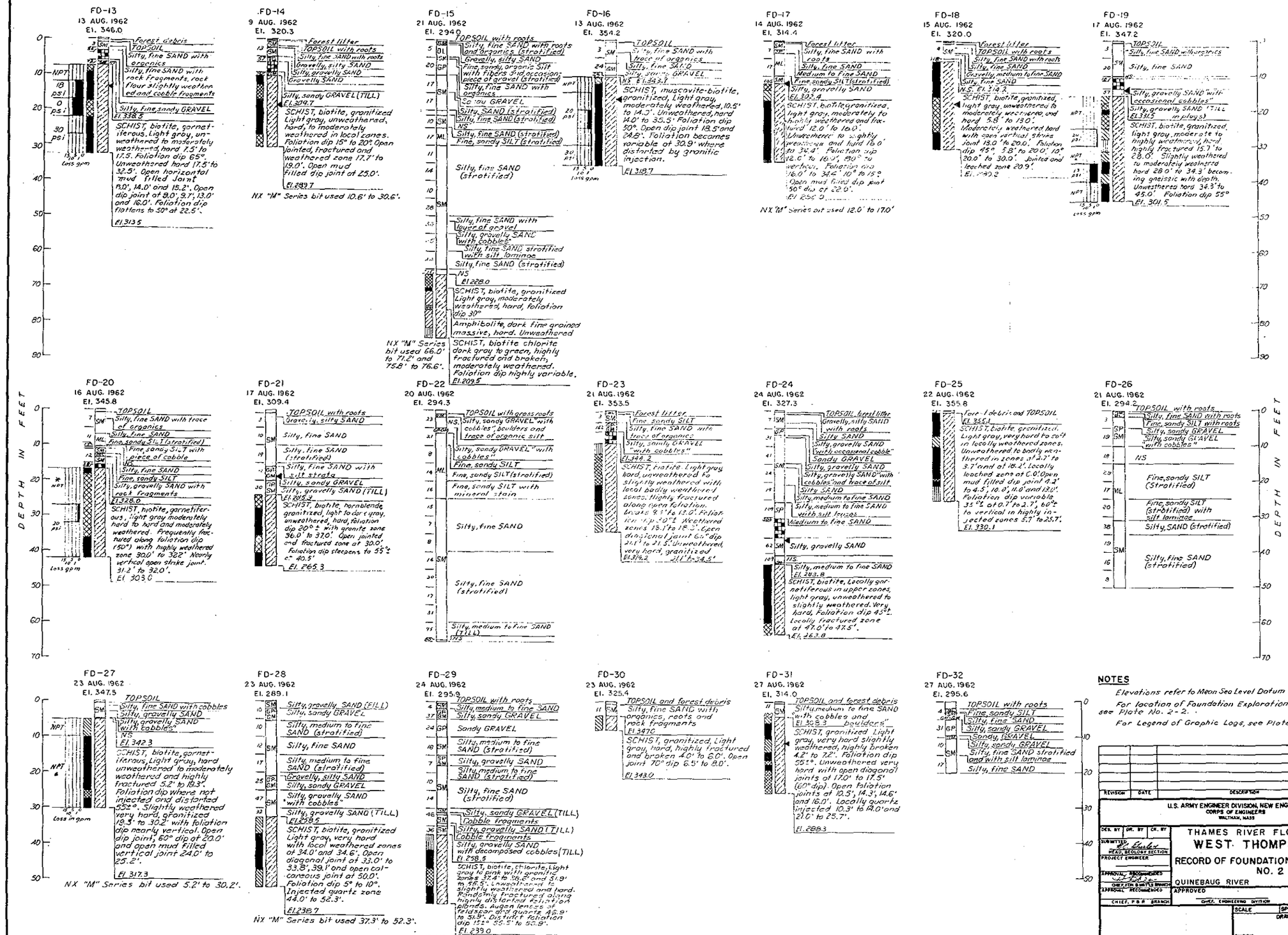
DES. BY | DR. BY | CK. BY
SUBMITTED
HEAD, GEOLOGY SECTION
PROJECT ENGINEER
APPROVAL RECOMMENDED
CHIEF, FDN. & MAT'LS BRANCH
APPROVAL RECOMMENDED
CHIEF, P. D. & R. BRANCH

THAMES RIVER FLOOD CONTROL
# WEST THOMPSON DAM
RECORD OF FOUNDATION EXPLORATIONS
NO. 1

QUINEBAUG RIVER — CONNECTICUT

APPROVED — DATE JAN 1963
CHIEF, ENGINEERING DIVISION

SCALE | SPEC. NO CIV. ENG.-19-016
DRAWING NUMBER
SHEET




**NOTES**

Elevations refer to Mean Sea Level Datum

For location of Foundation Explorations, see Plate No. 2-2.

For Legend of Graphic Logs, see Plate No. 2-8

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

DES. BY | DR. BY | CK. BY

SUBMITTED: HEAD, GEOLOGY SECTION — PROJECT ENGINEER

APPROVAL RECOMMENDED: CHIEF, FDN & MAT'LS BRANCH

APPROVAL RECOMMENDED: CHIEF, P & R BRANCH

# THAMES RIVER FLOOD CONTROL
# WEST THOMPSON DAM
## RECORD OF FOUNDATION EXPLORATIONS NO. 2

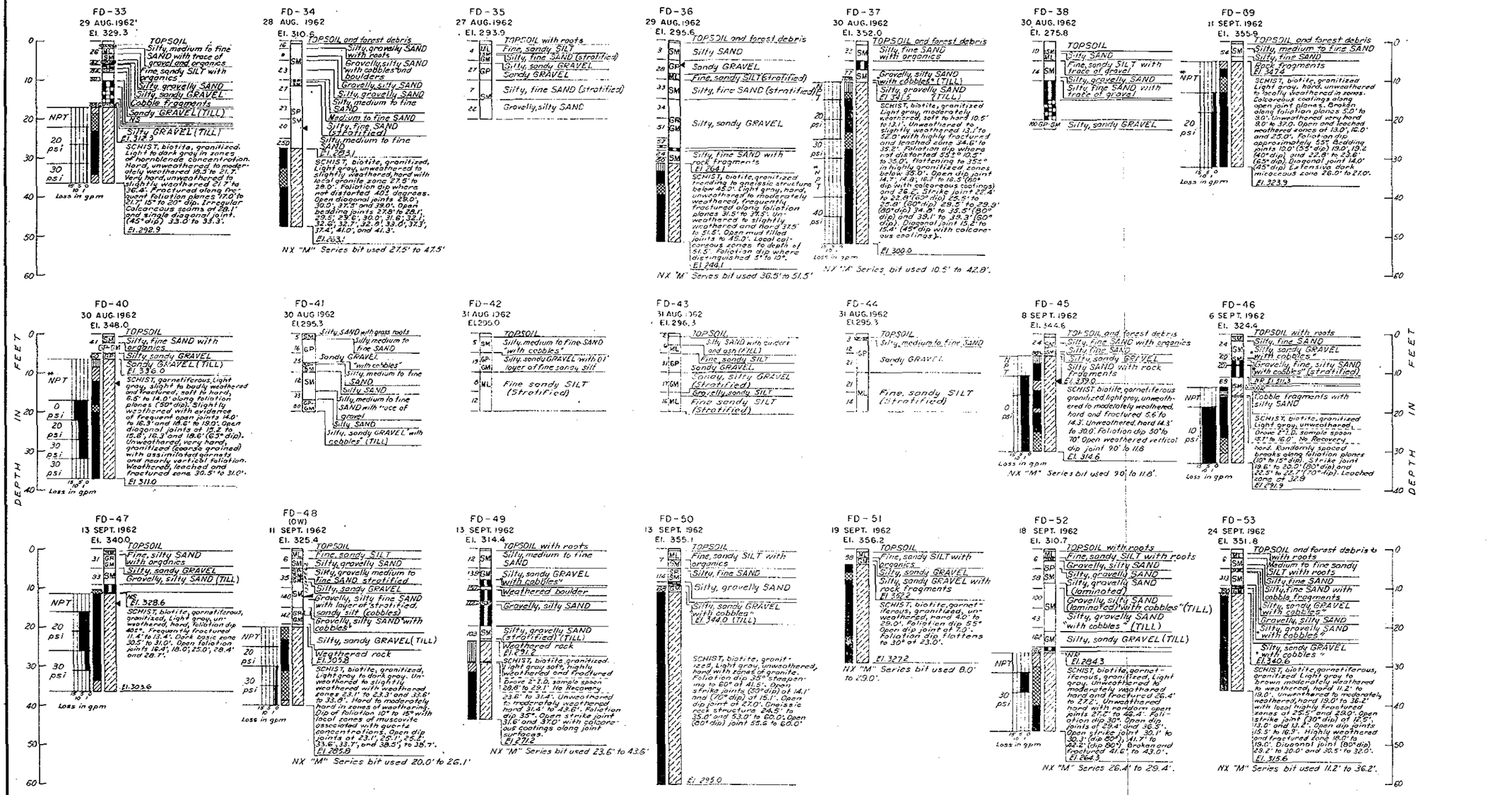
QUINEBAUG RIVER — CONNECTICUT

APPROVED: CHIEF, ENGINEERING DIVISION — DATE JAN 1963

SCALE — SPEC. NO. CIV. ENG.-19-016

DRAWING NUMBER

SHEET




**NOTES**

Elevations refer to Mean Sea Level Datum

For location of Foundation Explorations, see Plate No. 2-2

For Legend of Graphic Logs, see Plate No. 2-8

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY | DR. BY | CK. BY

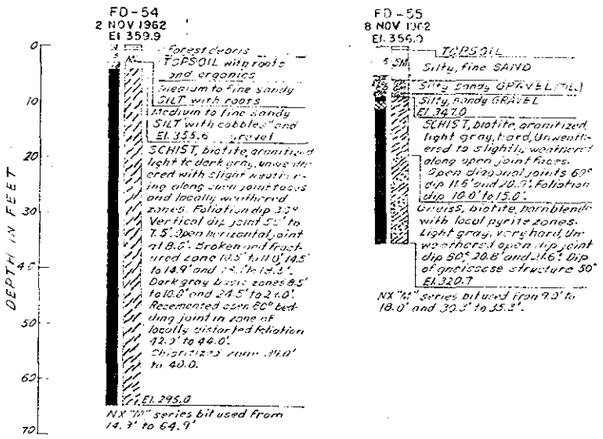
SUBMITTED: Head Geology Section
PROJECT ENGINEER
APPROVAL RECOMMENDED: Chief, F&S & Mat'ls Branch
APPROVAL RECOMMENDED: Chief, P&R Branch

THAMES RIVER FLOOD CONTROL
# WEST THOMPSON DAM
## RECORD OF FOUNDATION EXPLORATIONS NO. 3

QUINEBAUG RIVER — CONNECTICUT

APPROVED: Chief, Engineering Division — DATE: JAN 1963

SCALE | SPEC. NO CIV. ENG.-19-016
DRAWING NUMBER
SHEET







NOTES

Elevations refer to Mean Sea Level Datum

For location of Foundation Explorations, see Plate No. 2-2.

For Legend of Graphic Logs, see Plate No. 2-8

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

DES. BY | DR. BY | CK. BY

SUBMITTED
HEAD, GEOLOGY SECTION
PROJECT ENGINEER

APPROVAL RECOMMENDED
CHIEF, FDN. & MAT'LS BRANCH

APPROVAL RECOMMENDED
CHIEF, P & R BRANCH

THAMES RIVER FLOOD CONTROL

# WEST THOMPSON DAM

RECORD OF FOUNDATION EXPLORATIONS
NO. 4

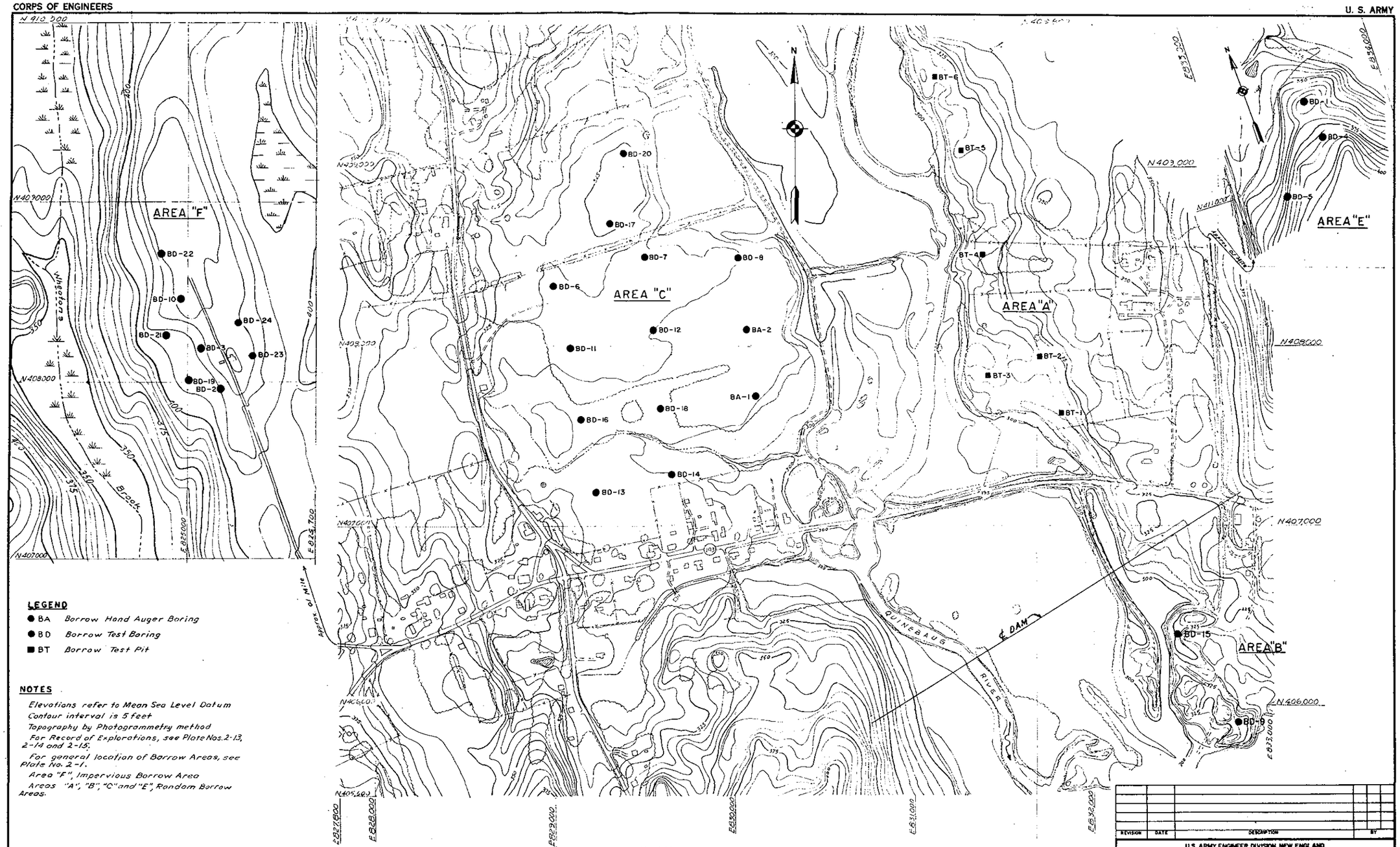
QUINEBAUG RIVER CONNECTICUT

APPROVED DATE JAN 1963
CHIEF, ENGINEERING DIVISION

SCALE | SPEC. NO CIV. ENG.-19-016
DRAWING NUMBER
SHEET

CORPS OF ENGINEERS

U. S. ARMY




**LEGEND**

- ● BA Borrow Hand Auger Boring
- ● BD Borrow Test Boring
- ■ BT Borrow Test Pit

**NOTES**

Elevations refer to Mean Sea Level Datum
Contour interval is 5 feet
Topography by Photogrammetry method
For Record of Explorations, see Plate Nos. 2-13, 2-14 and 2-15.
For general location of Borrow Areas, see Plate No. 2-1.
Area "F", Impervious Borrow Area
Areas "A", "B", "C" and "E", Random Borrow Areas.

**PLAN**
SCALE 1" = 200'

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

| DES. BY | DR. BY | CH. BY |
|---|---|---|
| E.A.B. | L.H.E. | R.C.G. |

SUBMITTED
HEAD GEOLOGY SECTION
PROJECT ENGINEER
APPROVAL RECOMMENDED
CHIEF, FDN & MAT'LS BRANCH
APPROVAL RECOMMENDED
CHIEF, F & R BRANCH

THAMES RIVER FLOOD CONTROL

# WEST THOMPSON DAM

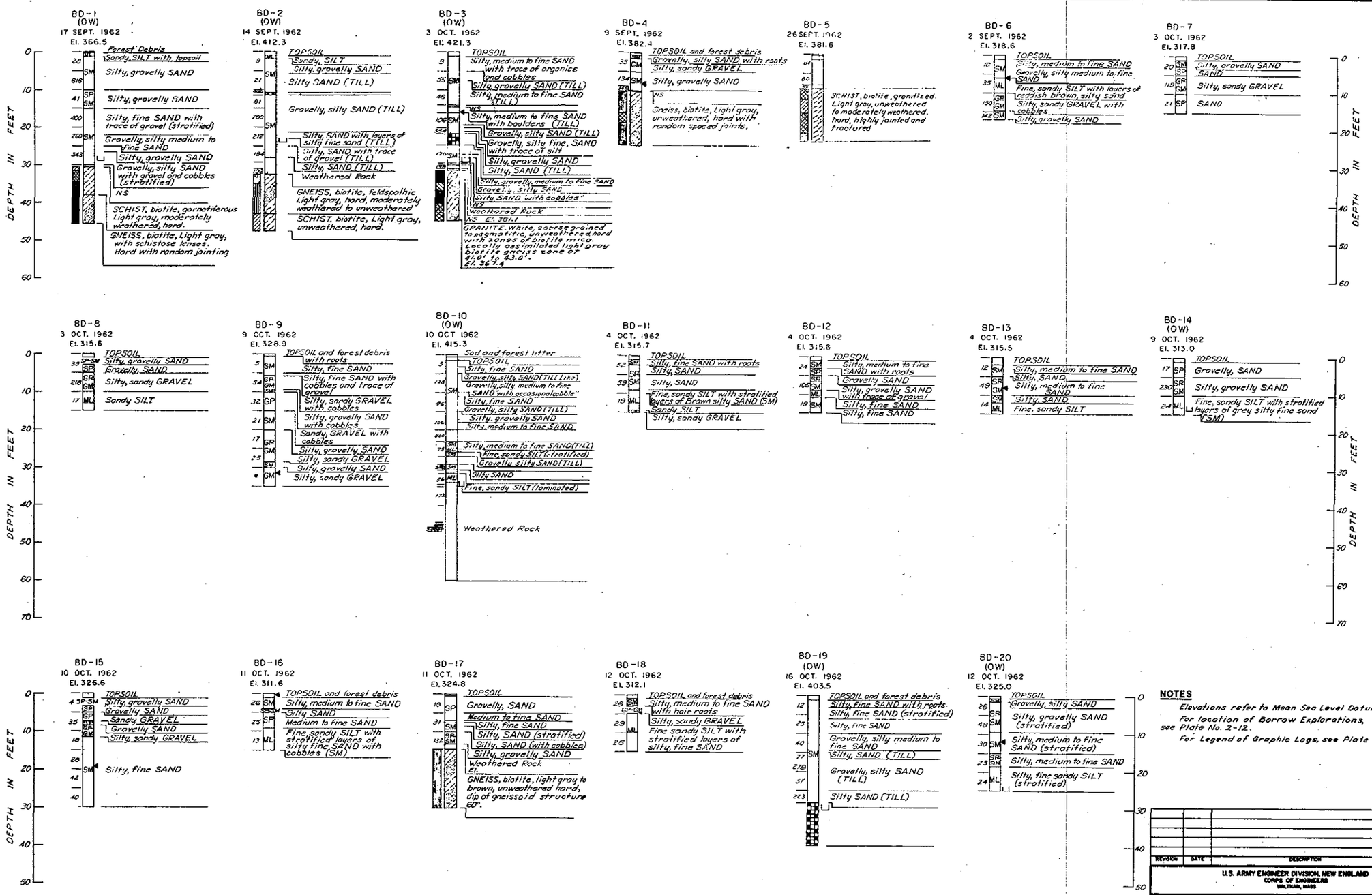
## PLAN OF BORROW EXPLORATIONS

QUINEBAUG RIVER CONNECTICUT

APPROVED DATE JAN 1963
CHIEF, ENGINEERING DIVISION

SCALE
SPEC. NO CIV. ENG.-19-016
DRAWING NUMBER
SHEET

PLATE NO. 2-12




**NOTES**

Elevations refer to Mean Sea Level Datum

For location of Borrow Explorations, see Plate No. 2-12.

For Legend of Graphic Logs, see Plate 2-8.

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

DES. BY | DR. BY | CK. BY

SUBMITTED: HEAD, GEOLOGY SECTION

PROJECT ENGINEER

APPROVAL RECOMMENDED: CHIEF, FDN. & MAT'LS BRANCH

APPROVAL RECOMMENDED: CHIEF, P & R BRANCH

# THAMES RIVER FLOOD CONTROL
# WEST THOMPSON DAM
## RECORD OF BORROW EXPLORATIONS NO. 1

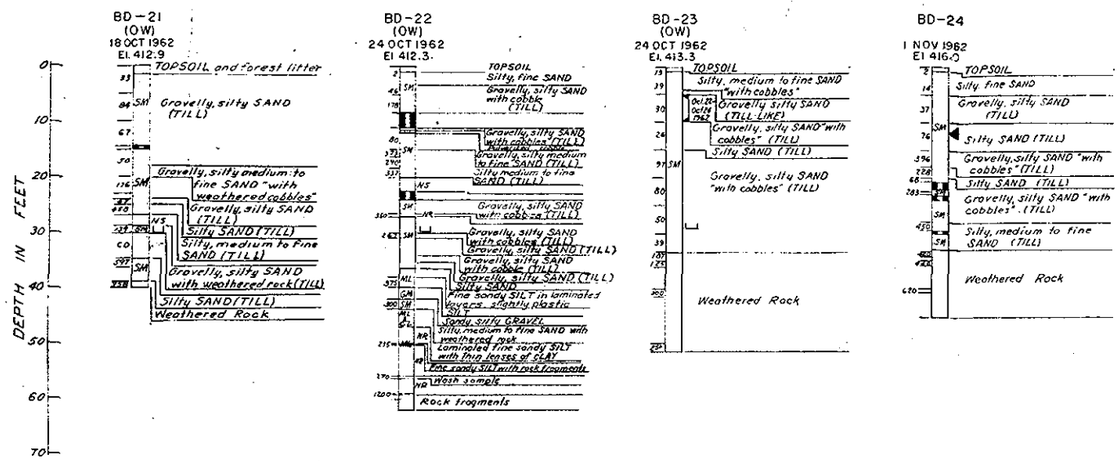
QUINEBAUG RIVER — CONNECTICUT

APPROVED: CHIEF, ENGINEERING DIVISION — DATE: JAN 1963

SCALE | SPEC. NO CIV. ENG.-19-016

DRAWING NUMBER

SHEET




**NOTES**

*Elevations refer to Mean Sea Level Datum.*
*For location of Borrow Explorations, see Plate No. 2-12.*
*For Legend of Graphic Logs, see Plate No. 2-8.*

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

DES. BY E.A.B. | DR. BY H.C.S. | CK. BY R.C.G.

SUBMITTED
HEAD, GEOLOGY SECTION
PROJECT ENGINEER
APPROVAL RECOMMENDED
CHIEF, FOUND. & MATLS. BRANCH
APPROVAL RECOMMENDED
CHIEF, P. & S. BRANCH

THAMES RIVER FLOOD CONTROL

# WEST THOMPSON DAM

## RECORD OF BORROW EXPLORATIONS NO. 2

QUINEBAUG RIVER — CONNECTICUT

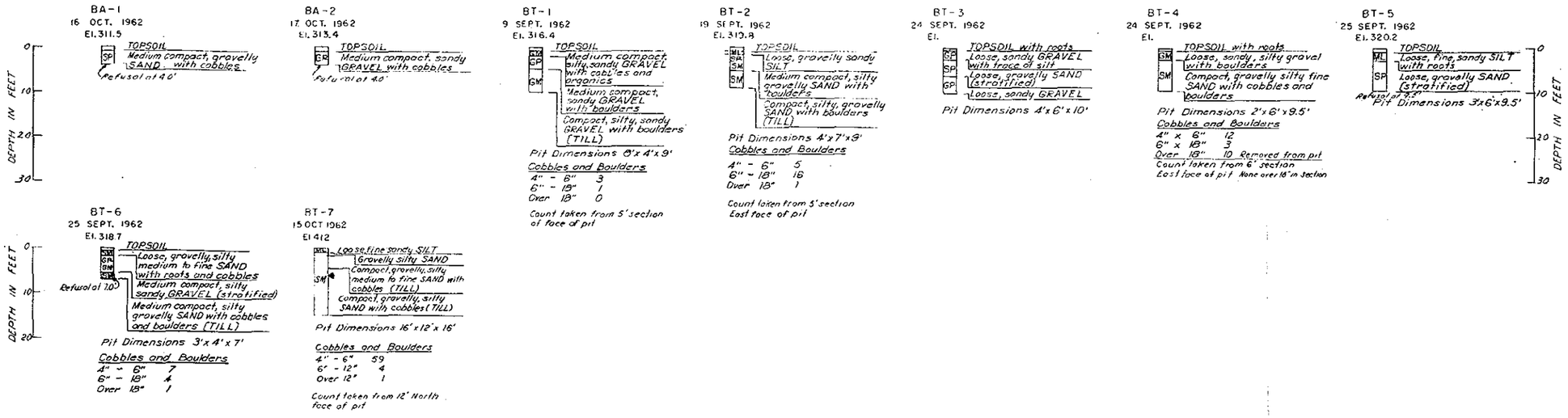
APPROVED
CHIEF, ENGINEERING DIVISION

DATE JAN 1963

SCALE AS SHOWN | SPEC. NO. CIV. ENG.-19-086

DRAWING NUMBER

SHEET




**NOTES**

Elevations refer to Mean Sea Level Datum.

For location of Borrow Explorations, see Plate No. 2-12

For Legend of Graphic Logs, see Plate No. 2-8

| REVISION | DATE | DESCRIPTION | BY |
|---|---|---|---|

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

DES. BY E.A.B. | DR. BY R.D.B. | CK. BY R.C.G.

SUBMITTED R.C. Bailey
HEAD, GEOLOGY SECTION

PROJECT ENGINEER

APPROVAL RECOMMENDED
CHIEF, FDN. & MATLS. BRANCH

APPROVAL RECOMMENDED
CHIEF, P. & R. BRANCH

THAMES RIVER FLOOD CONTROL
WEST THOMPSON DAM
RECORD OF BORROW EXPLORATIONS
NO. 3

QUINEBAUG RIVER CONNECTICUT

APPROVED DATE JAN 1963
CHIEF, ENGINEERING DIVISION

SCALE AS SHOWN SPEC. NO CIV. ENG.-19-068

DRAWING NUMBER

SHEET