AD-A193 342 COMPLETION OF EMBANKMENT AND SPILLWAY JOE POOL LAKE MOUNTAIN CREEK TEXAS(U) ARMY ENGINEER DISTRICT FORT WORTH TX A J MARR FEB 88 1/3

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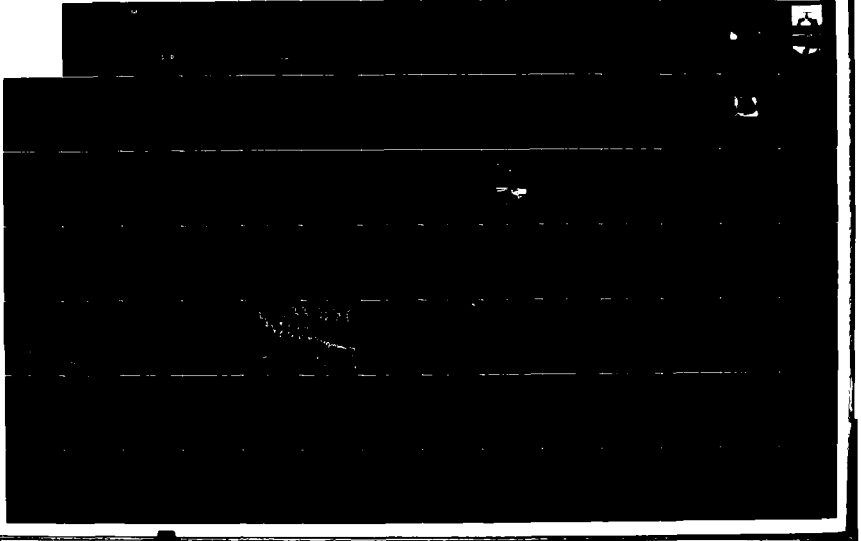

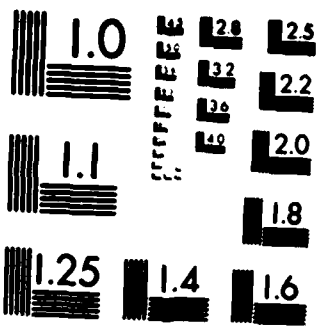

AD-A193 342

US Army Corps
of Engineers
Fort Worth District

FINAL
FOUNDATION
REPORT

COMPLETION OF EMBANKMENT AND SPILLWAY JOE POOL LAKE MOUNTAIN CREEK, TEXAS

February 1988

CORPS OF ENGINEERS
FORT WORTH DISTRICT, TEXAS

FINAL
FOUNDATION REPORT
COMPLETION OF EMBANKMENT AND SPILLWAY

JOE POOL LAKE

-BY-
ALAN J. MARR
ENGINEERING GEOLOGY SECTION

FEBRUARY 1988

PREFACE

This report was prepared in the Geotechnical Branch, Engineering Division, Fort Worth District. The report was authored by Project Geologist, Alan J. Marr, under the supervision of the Chief of the Engineering Geology Section, Robert C. Behm, and the Chief of the Geotechnical Branch, Melvin G. Green.

District Engineers for the Fort Worth District during construction of Joe Pool Lake were Colonel Donald Palladino and Colonel Albert J. Genetti, Jr. Mr. Shigeru Fujiwara was Chief of the Engineering Division. Messrs. Gary Hames, Mel Sadler, Sam Coleman, and James Leslie, each served as Resident Engineer during consecutive periods of construction. Area Engineer during construction was Mr. James D. Leslie.

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I INTRODUCTION

1. **Project Location and Description**. The Joe Pool Dam and Lake[1] project is located in southwest Dallas County near Grand Prairie, Texas. The dam is located at river mile 11.2 on Mountain Creek, a tributary to the West Fork of the Trinity River. Location of the project is shown on Plate 1. The principal features of the Joe Pool Dam and Lake Project include: (1) a rolled earth-fill embankment and dike approximately 24,340 feet long having a maximum height of 108.5 feet above streambed and a crest width of 30 feet (Figure 1); (2) a service spillway perched in the left abutment at embankment station 100+00 having a concrete uncontrolled rectangular broadcrested weir 50 feet wide (Figure 2); and (3) a 10.5-foot diameter cut-and-cover outlet works conduit controlled by two 4.75 by 10.0-foot service gates (Figure 3). An additional feature included in the project was a channel which diverted eastbound surface runoff around the spillway stilling basin. A concrete drop structure (Figure 57) was constructed in the channel to control flow velocities in the channel. A general plan of the Joe Pool project is shown on Plate 2.

2. **Construction Authority**. Congressional authority for the construction of Joe Pool Dam and Lake is contained in Public Works - Rivers and Harbor Act, approved 27 October 1965 (Public Law 89-298)

[1] In December 1982, Public Law 97-400 was passed by Congress which officially changed the name of the project from Lakeview Lake to Joe Pool Lake. All previously published documents, design memorandums, plans, and specifications are entitled **Lakeview Lake** and will be referred to under the name **Lakeview Lake** in this report.

Figure 1. Aerial view of Joe Pool Dam and Lake Project.
(Looking southwest)

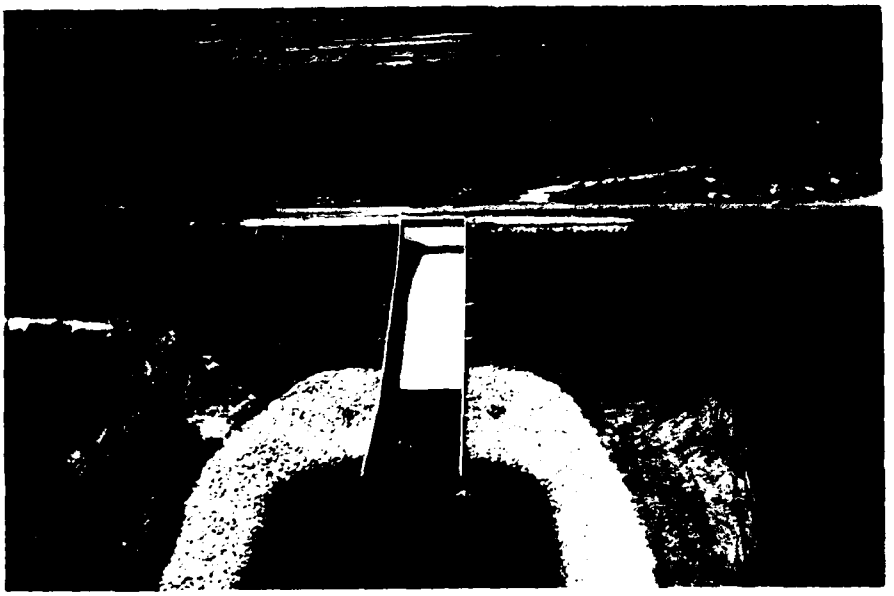


Figure 2. Spillway - Joe Pool Dam. (Looking upstream)

Figure 3. Outlet Works - Joe Pool Dam. (Looking downstream)

in accordance with the overall plan of improvement of the Trinity River Basin, Texas, as outlined in House Document No. 276 (89th Congress, 1st Session).

3. **Purpose of the Report**. This report was prepared in accordance with requirements as set forth by the Office, Chief of Engineers in ER 1110-1-1801. This is the second of two reports recording the foundation history of the appurtenant structural features of the Joe Pool project. The subject of this report is the embankment and spillway features of the project. The outlet works portion of the project was addressed in **THE JOE POOL LAKE OUTLET WORKS FINAL FOUNDATION REPORT** published in June 1983.

The purpose of this report is to provide a complete record of foundation conditions encountered during construction. Information contained in this report will be valuable when evaluating (1) necessary remedial action required to prevent or repair any problems resulting from foundation deficiencies; (2) contractor claims related to foundation conditions or alleged change of condition; and (3) planning and design of future comparable construction projects.

A copy of this report should be included in the permanent records maintained at the project office.

4. **Project History**. The Project Document Plan (House Document No. 276, 89th Congress, 1st Session) recommended the construction of the project at river mile 7.2 on Mountain Creek. However, upon initiation of advance planning studies for the project, it was found

that the Texas Highway Department had acquired land for the development of Interstate Highway 20 crossing Mountain Creek about one-half mile upstream from the site. The decision was made to move the dam site upstream from the interstate highway in order to avoid construction of a bridge or a costly relocation. Beginning in 1960, seven dam site locations were studied including four of them with foundation boring programs.

Fort Worth District submitted **Design Memorandum No. 4 - General** in December 1969 which established the location of the project at river mile 11.2 on Mountain Creek. The project plan in **Design Memorandum No. 4** provided for an earthfill embankment with an uncontrolled spillway located on the right abutment at embankment station 4+30 and a cut-and-cover outlet works located at embankment station 12+25, near the right abutment. Extensive subsurface investigations at the spillway and outlet works sites revealed the presence of unfavorable subsurface geologic conditions at both locations. Deep excavations would be required through unstable bedrock, necessitating the design of very flat excavation slopes in order to assure stability. In their review comments on **Design Memorandum No. 4**, it was recommended by the Office of Chief of Engineers that consideration be given to resiting the two structures. Subsequently, the Fort Worth District recommended that the structures be relocated at their present sites. In November 1978, Fort Worth submitted **Design Memorandum No. 24 - Outlet Works** which located the

outlet works on the main embankment section at station 76+00. **Design Memorandum No. 9 - Embankment and Spillway**, issued in April 1980, established the location of the spillway structure on the left embankment section at its present location, station 100+00.

Construction of Joe Pool Dam and Lake commenced with the award, on 19 November 1979, of a contract for the construction of the outlet works and two partial embankments. The initial contract included a floodplain embankment to elevation 514.0 from embankment station 27+00 to station 49+00; a preload embankment to elevation 564.5 from station 95+00 to station 105+00 (spillway location); the outlet works tower and associated structures, excluding the service bridge; and portions of the outlet works approach and discharge channels. Work was completed on this contract on 4 June 1982.

On 30 September 1981, Fort Worth District awarded the contract for completion of the project. Major work included in the completion contract included completion of the earthfill embankment, construction of the outlet works service bridge, construction of the spillway, and construction of the roadway atop the embankment. Other work included in this contract was the construction of the drop structure near the spillway, and completion of the outlet works approach and discharge channels. With the exception of some turfing, work on this contract was completed in April 1986.

Impoundment of Joe Pool Lake began on 7 January 1986, with conservation pool expected to be reached sometime during 1988.

Opening of the reservoir to the public is scheduled for 1988.

5. **The Contracts**. Joe Pool Dam and Lake was constructed under two major contracts. The contractors and pertinent data information related to the two major construction contracts are listed below:

a. **Outlet Works and Initial Embankment**.

Contract No.	DACW63-80-C-009
Contractor:	The Lane Construction Corporation, Meridian, CT
Bid:	$11,200,632.50
Contract Awarded:	19 November 1979
Notice to Proceed:	30 November 1979
Acknowledged:	6 December 1979
Work Commenced:	7 December 1979
Work Completed:	4 June 1982

b. **Completion of Embankment, Spillway, and Outlet Works**.

Contract No.:	DACW63-81-C-0191
Contractor:	Servidone Construction Corporation, Castleton, NY
Bid:	$25,781,338.18
Contract Awarded:	30 September 1981
Notice to Proceed:	18 May 1982
Acknowledged:	18 May 1982
Work Commenced:	1 June 1982
Work Completed:	April 1986

NOTE: A bid protest issued by one of the bidders delayed issuance of the notice to proceed until the protest was denied.

6. **Quality Control**. The quality control organization was furnished and compensated by the Contractor. Mr. Claude Wise was the quality control supervisor during both major contracts.

7. **Contract Supervision**. The Joe Pool Dam and Lake project was constructed under the immediate supervision of the District Engineer, U.S. Army Engineer District, Fort Worth, Texas. The District

Engineer's representative for administration of the contract was Mr. James D. Leslie, Area Engineer, North Texas Area Office. Field inspection was administered by the Joe Pool Project Office, which was located adjacent to the North Texas Area Office at the project site. The following personnel participated in administering the contract:

Project Engineer

Mr. Gary Hames	November 1979 - July 1981
Mr. Mel Sadler	July 1981 - August 1982
Mr. Sam Coleman	August 1982 - October 1984
Mr. Bill Gibbons (Acting Project Engineer)	October 1984 - present

Laboratory Supervisor

Mr. Willie Hudson	November 1979 - June 1982
Mr. David Hamlet	June 1982 - conclusion

II FOUNDATION EXPLORATIONS

1. **Investigations Prior to Construction**. Prior to final site selection a total of seven dam sites were investigated, four by subsurface explorations. Investigations at the selected site were initiated in 1969. Approximately 500 borings were drilled at the site, ranging in depths from 10 to 200 feet. The borings consisted predominantly of 8-inch flight auger, 6-inch Densison barrel, and 6-inch core. Several 3-inch fishtail borings were drilled for geophysical logging surveys to assess the presence and trends of structural features. Three 36-inch calyx holes were drilled at the right abutment. Ground-water levels were monitored at many of the boring locations by installing slotted plastic (PVC) casing in the boreholes.

Two spillway and outlet works sites were explored. Extensive subsurface explorations at the original sites of the spillway and outlet works on the right abutment revealed the presence of unsuitable geologic conditions. As a result of the investigations, it was determined that the two structures should not be located on the right abutment. Additional investigations resulted in the spillway and outlet works being resited at their present locations. Foundation boring locations are shown on Plates 4 through 7. Detailed logs of borings are presented on Plates 36 through 73.

2. **Investigations During Construction**. No unanticipated foundation

conditions or problems were encountered during construction. Therefore, no additional investigations were required.

III GEOLOGY

1. **Physiography and Regional Geology**. The Joe Pool Dam and Lake project is located at the eastern edge of the Eagle Ford Prairie section of the Gulf Coastal Plain physiographic province. The dam site is characterized topographically by a moderately steep east (right) abutment, a relatively flat 5,000 feet-wide floodplain, and a gently sloping west (left) abutment.

A major topographic feature of the area is the White Rock escarpment located about one-half mile east of the right abutment of the dam. This north-northeast trending escarpment marks the easternmost limit of the Mountain Creek drainage area. Immediately west of the White Rock escarpment are numerous remnants of a small cuesta formed by a resistant limestone bed in the Eagle Ford Formation. The cuesta was subsequently eroded into a series of subrounded hills or remnants rising 30-60 feet above the present Mountain Creek valley. One of these hills forms the dam's moderately steep east abutment, while other similar remnants generally form the eastern shore of the reservoir area. Low, gently rolling topography forms the western boundary of the reservoir area.

Bedrock strata underlying the embankment and reservoir area consist of Upper Cretaceous units of the Eagle Ford Formation. The regional structure of these beds is monoclinal, resulting in a gentle dip southeastward toward the Gulf Coast. The maximum thickness of the Eagle Ford Formation at the dam site is 225 feet as indicated by

borings along the dam axis which penetrated the Eagle Ford to the underlying Woodbine Formation. Lithologically the Eagle Ford Formation consists predominantly of soft to moderately hard clay shale. An areal geology map is presented on Plate 3.

2. **Geology of the Dam Site**.

a. **Description of the Overburden**. Overburden consisting of Quatermary age alluvial and terrace deposits cover all bedrock at the dam site with the exception of some isolated areas on the right abutment where weathered bedrock has been exposed by hillside erosion. The deposits consist predominantly of clay, with heterogeneous assortments of silt, sand, and gravel either mixed in or occurring separately. Overburden materials encountered during preconstruction investigations and observed during construction in the shallow inspection trench were predominantly clays, sandy clays, and gravelly clays. Impure sand and gravel deposits are generally found near the base of the overburden unit. Along the embankment centerline the thickness of the overburden ranged from 3 feet at station 69+50 to a maximum of 55 feet in a buried stream channel at station 15+00. A geologic profile along the embankment centerline is presented on Plates 8 through 11.

Overburden deposits at the right abutment consist of 4 to 10 feet of clay, sandy clay, and gravelly clay locally cemented into a weak conglomerate. A buried stream channel is located at the base of the right abutment (Plate 13). The channel, whose bottom was about 55

feet below ground surface, at elevation 442, contained alluvium and colluvium consisting of clay with variable amounts of sand, gravel, reworked shale fragments, and chalky limestone fragments.

In the valley section of the embankment, between stations 17+00 and 65+00, the overburden consists of Recent floodplain deposits having an average thickness of 45 feet. In general, these deposits consist of 35 to 40 feet of medium to high plasticity clay underlain by 5 to 10 feet of semi-impervious clayey sand and gravel immediately overlying bedrock. Excavations within this unit in the vicinity of the old Mountain Creek channel (station 53+00 to 56+00) encountered pockets of organic materials and some water-bearing sand and gravel zones (Figures 13 and 14).

Quaternary terrace deposits mantle the bedrock from about station 65+00 to the west end of the dam. These deposits consist of sandy clay and clayey sand. Fairly clean sand with some gravel was noted from station 72+00 to 75+00 (Figure 22). This area was formerly the site of an old abandoned gravel pit. Average thickness of the terrace deposits is about 30 feet.

Plans and profiles showing the materials observed in the embankment centerline inspection trench are presented on Plates 14 through 26. Photographs of the materials exposed in the inspection trench are shown in Figures 16 through 38. Boring logs presented on Plates 36 through 73 provide detailed descriptions of overburden encountered during drilling investigations.

b. **Bedrock Stratigraphy**. Primary strata beneath the dam site belong to the Britton member of the Eagle Ford Formation, Upper Cretaceous in age. Thickness of the Eagle Ford ranges from about 80 feet at the west end of the dam to approximately 250 feet at the right abutment. Immediately underlying the Eagle Ford are the interbedded sand and clay shale strata of the Woodbine Formation.

The Britton member, which is the lowest (oldest) member of the Eagle Ford Formation, is divided into three units based on lithology. In ascending order they are: (1) the Lower Britton, Unit I; (2) the Lower Britton, Unit II; and (3) the Upper Britton. During construction of the dam, strata belonging to the Upper Britton Unit were exposed in excavations for the spillway, the diversion channel and drop structure, the outlet works, and in the deep inspection trench at the right abutment. The Lower Britton, Unit II, was exposed during excavation for the outlet works stilling basin. None of the construction excavations penetrated the Lower Britton, Unit I.

Along the embankment alignment, beds of the Upper Britton Unit lie directly beneath the overburden between stations 0+00 and 45+00, and from station 63+00 to 113+00. Overburden is supported by strata of the Lower Britton, Unit II, from station 45+00 to 63+00, and between stations 113+00 and 168+00. From station 168+00 to the west end of the embankment, overburden is underlain by beds belonging to the Lower Britton, Unit I. The bedrock units dip southeastward resulting in the older strata occurring nearer the surface

progressively westward, and the contacts between the units occurring at greater depths as they progress eastward. A geologic profile along the embankment centerline showing the bedrock stratigraphy is presented on Plates 8 through 11.

c. **Bedrock Lithology**. All foundation excavations performed during this contract, which included excavations for the deep inspection trench, the spillway, and the drop structure, were confined to strata of the Upper Britton member of the Eagle Ford Formation. The Upper Britton consists of soft to moderately hard, slightly calcareous, highly jointed and fractured bentonitic clay shale. Unweathered Upper Britton strata varies from gray to dark gray and was generally described as thin bedded. Individual layers were usually less than 1 foot in thickness and often exhibited a laminated appearance. Bentonite seams observed within the Upper Britton strata were less than 1 inch in thickness, and appeared as very fine-grained, ashey, light gray to bluish gray, changing to tan soon after exposure. No where in any of the excavations were these bentonite seams prominent or continuous enough to be considered as mappable units. Scattered zones or pockets of fossil debris were found throughout the Upper Britton Unit. However, with only a few exceptions, as shown in Figure 4, the fossil fragments were unidentifiable. The strata of the Upper Britton Unit also contained scattered discontinuous limestone and claystone concretions.

d. **Bedrock Structure**. The regional structure of the Eagle Ford

Figure 4. Ammonites swallovi. Well preserved specimen observed in the exposed clay shale surface adjacent to the spillway training wall. Scattered fossil shell fragments occasionally observed in Upper Britton Formation belong to above family.

Formation is monoclinal with dip of the strata to the east-southeast at approximately 50 feet per mile. In the area of Joe Pool Lake and eastward toward Dallas, strata of the Eagle Ford Formation and the overlying Austin Chalk Formation are extensively faulted. The majority of the faults are normal faults, occurring as a result of consolidation and differential settlement of individual beds. Typical displacement across a fault line is normally less than 15 feet. Several small displacement faults were noted in the area of Joe Pool Lake, either by direct observation within excavation areas, or as inferred from preconstruction electric log interpretations and 6-inch core sample inspection. A discussion of bedrock faulting examined in the major excavation areas follows:

(1) **Right Abutment Deep Inspection Trench.** Subsurface investigations along the dam site centerline at the right abutment revealed that the top of bedrock dropped abruptly into the floodplain due to the erosion and cutting action of an ancient buried stream channel located at the base of the abutment. The buried channel contained a maximum of 55 feet of alluvium and colluvium consisting of clay with variable amounts of sand, gravel, shale, and limestone fragments. The right abutment was also investigated as a potential site for the outlet works and spillway structures. However, these investigations revealed the presence of a large bedrock slump block, consisting of highly jointed, fractured and brecciated shale. The slump block is located downstream of the embankment centerline in the

area where the outlet works stilling basin would be located. Rather than requiring deep excavations through unstable bedrock for the outlet works and spillway stilling basins, both structures were resited at their present locations.

As a result of these discoveries during early investigations, the decision was made to deepen the inspection trench at the right abutment so that any unstable bedrock or highly permeable channel deposits encountered could be treated and/or removed. The deep inspection trench, located between embankment stations 8+50 and 19+00, was designed to penetrate into bedrock, thus removing all pervious and semi-pervious materials from the buried stream channel. The design slopes of the trench were IV on 3H resulting in a maximum trench width of 420 feet, exposing a large surface area of bedrock for inspection. A geologic map and profile of the deep inspection trench is shown on Plate 15.

The deep inspection trench was closely inspected by geotechnical personnel from CESWF and CESWD after the bottom of the trench had reached elevation ±458, approximately 19 feet above the design excavation grade. Materials observed in the bottom of the trench consisted of unweathered clay shale of the Upper Britton member of the Eagle Ford Formation, an area of stiff, moist, brown alluvial clay, and a small pocket (less than 10 feet across) of very gravelly clay (described as colluvial material on preconstruction boring logs). The contact between the clay shale and the alluvial clay was

very distinct and vertically oriented, reflecting a buried vertical face in the bedrock which occurs at embankment centerline station 14+30. During the inspection, the decision was made to immediately terminate excavations in the deep inspection trench and start backfilling. The decision was based on the conclusion that the primary materials exposed in the floor of the trench were competent and the colluvial materials comprising the buried stream channel were sufficiently impervious so that stability and leakage through the embankment foundation would not be a problem. The material in the buried stream channel was predominantly clay and gravelly clay which would preclude excess flow beneath the dam. Although some minor faulting was present in the exposed clay shale, the bedrock generally appeared competent and in much better condition than the bedrock encountered by borings in the slump block area downstream of the embankment.

Faults that were examined in the exposed bedrock in the deep inspection trench were classified as normal faults of low displacement, generally a few feet or less. The most prominent fault crossed the embankment centerline at station 13+60 striking generally northwest, paralleling the edge of the buried stream channel. The angle of dip of the fault plane varied from 46° to 54° to the southeast and maximum vertical displacement across the fault plane was approximately 1.5 feet. A geologic map and profile of the deep inspection trench is shown on Plate 15.

(2) **Spillway.** The 50-foot wide spillway structure is perched in the embankment at station 100+00 on the gently sloping left abutment. The excavation for the spillway stilling basin is located at the downstream toe of the embankment. The spillway crest is founded on embankment fill. The remainder of the spillway structure rests on natural overburden and highly weathered to slightly weathered bedrock which supports the spillway stilling basin. The contact between overburden material and bedrock is located at station 11+67 on the spillway centerline. A geologic map and profile of the spillway excavation are presented on Plates 29 and 30, respectively.

Bedrock exposed in the stilling basin excavation belongs to the Upper Britton member of the Eagle Ford Formation. As predicted, some minor bedrock jointing and faulting were observed in the exposed foundation. The structural deformities in the bedrock beneath the spillway structure were predominantly classified as joints, rather than faults, because of the lack of notable displacement across the breaks. The angle of dip measured along the joints ranged from 70° to 90° (vertical). Strike of the joints was variable with an east-west direction being the dominant general trend. Jointing was more abundant within the highly weathered bedrock zones.

The bedrock strata beneath the spillway structure dips gently toward the southeast. Since there were no prominent geologic contacts, marker beds, or bentonite layers passing through the

excavation, bedding dip was most readily measured on bedding planes between the individual clay shale layers.

e. **Bedrock Weathering**. Bedrock in various stages of weathering was encountered immediately underlying the overburden in the deep inspection trench and in the excavations for the spillway and drop structure, and the embankment inspection trench between embankment stations 65+27 and 71+00. The characteristics of the intervals of weathering can be summarized in two categories:

(1) **Highly weathered to altered.** The upper zone of bedrock weathering consists of a 3- to 10-foot thick interval of residual shaley clay and clay shale weathered to a clay consistency. This zone is highly jointed, plastic, and usually moist to wet, depending on the moisture content of the overlying overburden materials. Colors of this zone are various shades of tan, brown, and gray. Where sand and/or gravel is absent, the contact between clay overburden and weathered shale can be difficult to identify.

(2) **Slightly to moderately weathered.** The lower zone of weathering consists of a 5- to 20-foot thick interval of soft, tan-to-gray clay shale characterized by numerous low to high angle joints and fractures which exhibit a blocky structure. The clay shale readily breaks along the joints and fractures, but individual pieces reflect a definite shale bedding structure. Color and strength alteration is limited to zones or "halos" along the joints and fractures caused by leaching and oxidation. The boundary between

the slightly weathered zone, the highly weathered zone, and the unweathered strata below is transitional in all cases.

f. **Ground Water**. Ground water is found in the semi-impervious clayey sand and gravel deposits immediately overlying bedrock throughout the valley section of the embankment. The ground water is encountered at depths of about 40 feet below the original ground surface, and the piezometric surface rises to about 20 feet below the surface. Free water was also encountered in borings in the pervious sandy strata of the Quaternary terrace deposits along the left abutment of the dam. Static water levels in this area were approximately 15 feet below the surface. A minor amount of free water was trapped in open joints and fractures in the Eagle Ford Formation; however, for the most part, the formation can be considered impervious with negligible ground-water flows. The excavations for the deep inspection trench, the spillway stilling basin, and the drop structure were entirely free of ground-water flows. No formation dewatering was required in any of the construction excavations.

3. **Engineering Characteristics of the Overburden and Primary Materials**. Engineering characteristics of the materials comprising the foundation for the Joe Pool embankment and spillway were determined by laboratory tests conducted on samples of the materials. Summaries of all laboratory test data are shown in the following publications produced by CESWF: **Design Memorandum No. 24 - Outlet**

Works. Supplement No. 1, Initial Embankment. February 1979. (Plates 16 through 60). **Design Memorandum No. 9 - Embankment and Spillway.** April 1980. (Plates VI-44 through VI-62). The types of laboratory testing performed are discussed in the following paragraphs:

a. **Overburden.** Classification tests, Q, R, and direct shear strength tests, and consolidation tests were performed on Denison barrel samples taken at varying depths. Classification and index tests were performed on jar samples taken from auger borings and Denison barrel samples. Based on field investigations, laboratory testing, and engineering judgement, the following properties were used describing overburden material units in descending order:

(1) General overburden found on both abutments and in upper zone of floodplain overburden unit:

moisture content 21 percent
dry density 107 pcf

Type Strength	c tsf	0 Degrees
Q	1.0	1.0
R	0.3	13.0
S	0	20.0

(2) Weaker unit located just above the sand and gravel zone at the base of the overburden beneath most of the floodplain embankment:

moisture content 28 percent
dry density 97 pcf

Type Strength	c tsf	0 Degrees
Q	0.6	0
R	0.3	13.0
S	0	20.0

(3) Sand and gravel unit located at the base of the overburden beneath most of the floodplain embankment:

Type Strength	c tsf	0 Degrees
S	0	30.0

b. **Primary Materials**. Primary materials tested included weathered and unweathered Eagle Ford shale and bentonite. Unconfined compression, Q triaxial compression, direct shear and presplit (residual) direct shear tests were performed on samples of both weathered and unweathered shale. The following properties were used for the primary materials as the design parameters:

Type Material	Strength	c tsf	0 Degrees
Shale	S	0.5	18
Bentonite	S	0	18

IV EXCAVATION PROCEDURES

1. **Inspection Trench**. For the purpose of describing the excavation procedures the inspection trench is divided into three areas: (a) deep inspection trench; (b) old river channel clean out; and (c) shallow inspection trench.

a. The right abutment deep inspection trench (Figures 5 and 6) discussed earlier in this report was excavated between embankment centerline stations 8+50 and 19+00. The maximum width of the top of the trench at natural ground was 424 feet measured at station 15+00. The sides of the excavation sloped downward at a IV on 3H slope to the trench floor whose maximum width was 117 feet at station 15+00. Maximum depth of the trench was 44 feet at station 14+50. A geologic map and profile of the deep inspection trench is shown on Plate 15.

As shown on the geologic map, the trench was excavated in overburden, weathered clay shale, and unweathered clay shale, in descending order. Overburden materials in the deep inspection trench included sandy clays, clayey sands, gravels, and colluvial deposits consisting of reworked shale and limestone fragments in varying mixtures as previously described. Overburden materials were excavated and removed using Caterpiller scrapers pushed by Caterpillar D-6 and D-8 bulldozers. As the bottom of the trench descended, the IV on 3H overburden slopes were shaved and finished using motor graders. Suitable overburden materials removed from the

Figure 5. Right abutment deep inspection trench after completion of bulk excavation and prior to start of final surface cleaning and backfill. Photo taken at embankment station 8+00, looking west.

Figure 6. Right abutment deep inspection trench after completion of bulk excavation and prior to start of final surface cleaning and backfill. Photo taken at embankment station 18+00, looking east.

deep inspection trench were used as random and semicompacted fill in the embankment.

Primary material excavated from the deep inspection trench included weathered and unweathered clay shale of the Eagle Ford Formation, Upper Britton Unit (Figures 7 through 12). The weathered clay shale was excavated using methods similar to those used to excavate overburden. Excavation of the soft to moderately hard unweathered clay shale was accomplished using Caterpillar D-8 bulldozers equipped with ripper teeth. The broken material was then removed by Caterpillar scrapers. Excavation slopes in the clay shale were cut and shaved to final grade using bulldozers and motor graders. Where the slopes were smooth and even, motor graders cleaned the surface sufficiently for mapping, foundation approval, and backfill. In areas where the surface was uneven due to broken rock or ledges, cleaning by hand to remove loose material was required. A total of 161,140 yd^3 of material was excavated from the deep inspection trench. Most of the material was suitable for use as fill in the embankment.

Ground water was not encountered in the deep inspection trench excavation, therefore, no dewatering provisions were required. The time period during which the trench was at its deepest - July thru October 1982 - was a relatively dry period with no significant rainfall events. All impervious backfill was placed on surfaces free of water.

As discussed earlier in Section III-2d, excavation in the deep inspection trench was terminated prior to reaching the design grade. Upon notification of this decision the Contractor immediately began operations for final shaving and cleaning of the excavation slopes in preparation for backfill with impervious clay. A record of approval of the exposed clay shale surfaces in the deep inspection trench is provided on Plate 34.

b. The former stream channel of Mountain Creek intersects the upstream toe of the embankment at station 60+50. The former channel then curves eastward and continues directly under the embankment centerline from station 57+00 to station 52+50 before curving northward and intersecting the downstream embankment toe at station 51+00. Borings indicated extensive concentrations of typical river channel deposits, including sandy, gravelly pockets and organic deposits, all of which were determined to be unsuitable as embankment foundation. The bulk of the unsuitable material was removed using Caterpillar scrapers pushed by Caterpillar D-6 and D-8 bulldozers. More saturated areas where equipment maneuverability was limited were excavated using a Caterpillar B200 track-mounted backhoe. The excavation to clean out the creek channel reached a maximum depth of about 20 feet, and a maximum width of approximately 200 feet. A map of the portion of the excavation occurring beneath the embankment is presented on Plate 18. All of the material removed from this excavation was classified as overburden material; bedrock was not

encountered.

Minor ground-water flows were encountered in some of the areas of this excavation where sand and/or gravel were present. Most of the flows were isolated, and eventually dried up after they drained. Two small areas, shown on Plate 18, as A and B, continued to produce minor flow until they were covered with fill. Area B was classified as a seep, merely causing the area to remain wet, but requiring no remedial measures. In Area A, where water exited along and at the base of a slope at a rate estimated at 5 gpm, actions were taken to cut off the flow prior to placement of backfill. A 2-foot wide by ±8-foot deep ditch was cut along the top of the slope intersecting the ground-water flow. The ditch was pumped dry and immediately backfilled with impervious clay, cutting off the flow to the slope. The wet material on the slope was then removed and the area was plated and sealed with impervious clay.

c. The shallow inspection trench at the embankment centerline was excavated to a minimum depth of 5 feet below the stripped surface. Bottom width of the trench was 12 feet with IV on 1H sideslopes. The trench was excavated in intervals up to 2,000 linear feet. Excavation of the shallow inspection trench was accomplished with Caterpillar scrapers pushed by Caterpillar D-6 and D-8 bulldozers. When the trench reached the approximate required depth, the sides were cut and shaved to a IV on 1H slope using motorgraders. The scrapers were then used again to complete

excavation and removal of loose material from the bottom of the trench. The shallow inspection trench was excavated almost exclusively in overburden materials. The only exception occurred between embankment stations 65+27 and 71+00 where weathered primary material was encountered. Ground water was not encountered in the shallow inspection trench. Geologic maps and profiles along the embankment inspection trench are presented on Plates 14 through 26.

2. **Spillway**. The excavation for the spillway chute and stilling basin was located at the downstream toe of the embankment at station 100+00. The materials encountered in the excavation were described in detail in Section III of this report. Generally, the materials consisted of overburden, and weathered primary material of the Upper Britton member of the Eagle Ford Formation. The maximum depth of the spillway excavation was approximately 30 feet as measured from the stilling basin floor to natural ground. A geologic map of the spillway excavation is presented on Plate 29.

Overburden and highly weathered primary materials were excavated using Caterpillar scrapers pushed by Caterpillar D-6 and D-8 bulldozers. The excavation slopes were smoothed and shaved to IV on 3H using bulldozers and motorgraders. Slightly weathered primary materials in the lower part of the excavation were excavated by first breaking and loosening the material with a Caterpillar D-8 bulldozer equipped with ripper teeth, and then removing with scrapers. A minimum of 2 feet of undisturbed material was left above grade for

protection from damage and weathering until excavation to final grade.

Excavation to final grade around the spillway structure was accomplished with various applicable excavation equipment. The evenly sloping surfaces and flat surfaces located beneath the spillway chute and stilling basin, respectively, were excavated to grade using a Caterpillar D-6 bulldozer, a John Deere 350C bulldozer, and a truck-mounted backhoe with a telescoping bucket. Loose material was removed from the excavation using a rubber-tired front-end loader. Trenches crossing the spillway floor for the spillway drainage system were excavated using the truck-mounted backhoe, as were the footings for the spillway training walls. The spillway end sill and keys were excavated using a Case *tractor-mounted* backhoe. Materials adjacent to the spillway walls were excavated using the truck-mounted backhoe with telescoping bucket and the 350C bulldozer. Final cleaning of all surfaces was done by hand using compressed air and shovels. Suitable materials removed from the spillway excavation were used as random and semicompacted fill in the embankment. Ground water was not encountered in the spillway excavation.

3. **Foundation Protection**. As a measure of foundation protection in the deep inspection trench and spillway, a minimum of 2 feet of undisturbed material was left in-place in areas where shale or clay shale were to be exposed at final grade. The final 2 feet was then

excavated in a continuous operation within a 2-hour period. This time limitation resulted in decreased exposure time for the surface and smaller areas being exposed at one time. The reason for this requirement was that laboratory testing and observation of the shale and clay shale materials revealed the tendency of the material to lose moisture upon exposure to air, resulting in cracking, slaking, and progressive deterioration of the material within hours of initial exposure. Additional requirements designed to limit time of exposure included requiring the first lift of fill material to be placed and compacted/sealed off within 8 hours of when excavation into the final 2 feet began or within 2 hours after achieving final grade, whichever required placement sooner.

Pneumatically placed concrete was used to seal the excavated surface on the nearly vertical walls of the spillway end sill. However, as shown in Figure 50, the first application of pneumatic concrete was unsuccessful. The concrete slumped away from the wall leaving void space and resulting in deterioration of the shale face. The contractor was required to remove the pneumatic concrete where it had slumped, achieve a fresh, undeteriorated shale surface, and reseal with pneumatic concrete. The second application was successful in protecting the shale face.

4. **Foundation Preparation**. The primary requirement for the final preparation of rock foundation surfaces prior to backfill was a thorough cleaning, which included the removal of all loose, drummy,

or deteriorated material using a combination of shovels, brooms, and blown compressed air. Backfill commenced immediately after final cleanup and approval. The strictly enforced time limitations, described above, eliminated any requirement for treatment of the exposed rock surfaces using moisture sealant spray.

There was no requirement to clean overburden surfaces by hand. Surfaces were shaved and finished with heavy equipment including scrapers and motor graders. Subsequent to inspection and approval, and prior to placement of fill, the overburden surfaces were scarified using a disc plow. Each layer of compacted impervious fill placed in the spillway and inspection trench excavations was benched in to the cut-slope on a per lift basis so that proper compaction could be performed to achieve a seal. A typical contact zone between the overburden and fill is exhibited on Figure 29.

V FOUNDATION ANCHORS

1. **General**. Permanent foundation anchors were installed in the spillway chute and stilling basin foundation and the drop structure foundation. A total of 214 foundation anchors were installed in the spillway and 20 in the drop structure foundation. Each was designed to extend a minimum of 15 feet into the clay shale beneath the floors of the spillway and drop structure. Plate 31 shows a plan view of the spacing of the anchors and a cross-section depicting the angle and depth of the anchors in the spillway.

2. **Equipment**. The 6-inch diameter holes for the foundation anchors were drilled using a Gardner-Denver track-mounted pneumatic drill. The anchors consisted of No. 11 rebar with a 90° bend in the top 4.67 feet and equipped with vertical bar spacers wire-fastened to the anchor for centering in the hole. A one-half inch diameter steel grout pipe designed to extend from the surface to the bottom of the anchor was permanently fixed to each anchor. The grout placed from the bottom of the hole up was delivered from an off-site source in ready-mix trucks. The following mix design was used for each truckload of grout delivered to the site:

2,600 lb SSD sand
540 lb Portland cement
45 gal water

3. **Procedures**. Drilling and installation of the foundation anchors occurred in the drop structure during the period February-March 1983, and in the spillway April-May 1983. All of the anchors in the chute

section of the spillway were installed at an angle of 59° from horizontal; anchors in the horizontal sections of the spillway and drop structure were set at a vertical angle. Six-inch diameter holes for the anchors in the spillway were drilled through the 4-inch protective concrete slab and 12-inch sand filter blanket to a total depth of 15 feet into the Eagle Ford Shale using the pneumatic drill. Holes in the drop structure penetrated the protective slab directly into the shale - no filter was present. In the spillway, collars were fitted into the drill holes to prevent caving and loss of the sand filter. Upon completion of drilling, the holes were cleaned with air and sealed with wooden plugs. Later the holes were recleaned and the anchor bars, equipped with centralizers, were set in the holes and supported at the correct depth using wooden blocks. All holes were maintained free of water until grouting commenced. The normal procedure was to drill and plug a number of holes, insert the anchor bars, and place grout all in the same day. After the anchors were fixed in the holes at the correct elevation, the grout mixture was pumped through the one-half inch steel grout pipe until grout returned to the surface, indicating the hole was filled.

4. **Pull-Out Tests**. Prior to installation of foundation anchors in the spillway and drop structure, pull-out tests were conducted to verify the capabilities of the anchors and the foundation bedrock to withstand maximum design loads. A test was conducted on 17 January 1983, on an anchor bar in the base of the drop structure, 12 feet

left of centerline at station 8+06.5. In the spillway, a test was conducted on 15 April 1983, on an anchor bar installed 20 feet left of centerline at station 11+70 (Figure 56). The anchors were stressed to a maximum of 45 tons. Results of the tests confirmed the adequacy of the anchor lengths and hole depths specified. A detailed evaluation of the pull-out tests will be presented in the Embankment Criteria Assessment Report. Data collected during the tests are included in Appendix I.

VI CHARACTER OF THE FOUNDATION

1. **General**. Clay shale belonging to the Upper Britton Member of the Eagle Ford Formation, Upper Cretaceous age, comprise the rock foundations supporting the spillway structure located at embankment station 100+00, as well as the drop structure situated adjacent to the spillway discharge channel, and the main embankment in the vicinity of the right (east) abutment deep inspection trench. Overburden consisting of heterogeneous mixtures of silt, clay, sand, and gravel mantle the bedrock in thicknesses up to 55 feet. Geologic maps of the materials exposed in excavations for the spillway and the embankment inspection trench are presented in this report. Engineering characteristics of the overburden and primary materials were presented in Section III of this report.

2. **Character of Primary Materials**. Primary materials observed in excavations for the spillway, drop structure, and main embankment inspection trench consisted of slightly to highly weathered clay shale. The clay shale is generally soft to moderately hard, gray to dark gray, medium-to thin-bedded, and contains scattered pockets of fossil shells (Ammonite fragments) which are only occasionally well preserved and intact. Thin, soft to moderately hard bentonitic shale seams occur throughout the exposed sequence. Minor faulting and associated jointing and fracturing were noted in the exposed clay shale surfaces. All observed faults were normal faults, usually of

high angle and low displacement, with less than 1-foot thick brecciated zones adjacent to the fault planes. No striations were observed on the fault planes due to the softness of the rock. Joints were generally tight, occasionally calcium filled, and tended to dissipate vertically. Soon after exposure, the bedrock began to show signs of deterioration such as lightened color, hair-line cracks, and minor slaking, all due to loss of moisture. The degree of weathering of the bedrock varied from slightly weathered, where bedrock jointing had allowed penetration of iron-rich ground water resulting in orange-colored streaks described as "weathering halos" within the gray to dark gray clay shale, to highly weathered in the upper zones where exposure to ground-water leaching had literally altered the bedrock to a soft, brown to yellow clay consistency. Bedding within the clay shale suggested a slight incline toward the southeast, with occasional locally abrupt dips or flexures occurring near fault zones. Bedding thicknesses varied from a few inches to a few feet, with the individual beds separated by very thin bedding planes consisting of slightly softer, dark gray, bentonitic clay shale seams. Excavations near the bottom of the right abutment deep inspection trench encountered isolated pockets of trapped ground water which had probably percolated down through bedrock joints or faults. No actual flow was observed and the zones quickly dried up after exposure.

3. **Character of Overburden Materials**. Overburden materials

encountered in excavations during construction of Joe Pool Lake are described in detail in Section III of this report. The overburden consisted predominantly of clay near the surface, grading downward into sandy clay with increasing amounts of sand and gravel near the base of the overburden. Near-surface clays, as observed in the 5-foot deep inspection trench along the embankment centerline, are medium stiff to hard, silty, varying in plasticity as a function of sand content, and varying in colors as a function of the content of organic matter and minerals, specifically iron and calcium. Basal overburden exposed in excavations for the spillway, drop structure, and right abutment deep inspection trench were described as sandy to very sandy clay, occasionally very gravelly, with local areas of clayey, sandy gravel and clayey sand. Pure, clean sand or gravel was not encountered.

Minor ground-water flow from overburden materials was observed in the river channel section of the main embankment, between stations 52+00 and 57+00. No other areas of the exposed overburden produced sustained flows of ground water.

VII FOUNDATION INSTRUMENTATION

1. **General**. Instrumentation for the project consists of 18 piezometers, 3 settlement plates, 3 deep settlement plates, outlet works reference pins, and spillway reference marks. Embankment and spillway plans of instrumentation are shown on Plate 33.

2. **Piezometers**.

a. **General**. Piezometers for the project were installed during both the initial and completion contracts. During the initial contract, six piezometers (P-1 through P-6) were installed. Twelve piezometers (P-7 through P-10 and P-12 through P-19) were installed during the completion contract. It was determined that P-11 would serve no useful purpose and was never installed. The piezometers installed were the porous plastic tip open tube type as manufactured by Slope Indicator Company, Seattle, Washington, with 3/8-inch diameter PVC risers.

b. **Embankment Station 16+00**. Piezometer P-10 is founded in a sandy clayey gravel in the overburden beneath the embankment. Piezometer P-12 is founded in the unweathered clay shale beneath the overburden.

c. **Embankment Station 38+30**, Piezometers P-1 and P-3 are founded in the unweathered Eagle Ford Shale beneath the floodplain section of the embankment. Piezometer P-3 is located in clay shale at the downstream toe. Piezometers P-2, P-4A, and P-13 are founded in sandy strata of the floodplain overburden.

d. **Embankment Station 50+00**. Piezometers P-14 and P-15 are founded in a sandy clay in the overburden of the closure section of the embankment. Piezometer P-16 is founded in a gravelly clay in the overburden beneath the closure section of the embankment.

e. **Embankment Station 63+00**. Piezometers P-17, P-18, and P-19, are all founded in the overburden of the Mountain Creek floodplain, just west of the closure section. Piezometer P-17 is founded in clay, P-18 is founded in a clayey gravel, and P-19 is founded in a sandy clay.

f. **Embankment Station 99+50**. Piezometer P-5 is founded in a sandy layer in overburden and P-6 is founded in the weathered clay shale adjacent to the uncontrolled spillway.

g. **Embankment Station 100+50**. Piezometers P-7, P-8, and P-9, are located adjacent to the spillway. Piezometer P-7 is founded in the overburden in a sandy layer. Piezometers P-8 and P-9 are founded in the weathered clay shale.

h. **Conclusions from Piezometer Observations to Date**. The piezometers (P-1, P-2, P-12, and P-15) that have shown an increase of pore pressure, with an increase in fill height, are at the present time showing a dissipation of excess pore pressure. Only one piezometer, P-1, has shown a significant amount of excess pore pressure. Several piezometers (P-3, P-13, P-16, P-18, and P-19) are showing an increase in excess pore pressure. These piezometers are located either upstream or downstream of the embankment. This

delayed increase in excess pore pressure can probably be attributed to time lag in the response of the foundation to the load being applied. The remainder of the piezometers have either shown a small increase in pore pressure since installation (P-10 and P-14) or have not shown any excess pore pressure since installation (P-4A, P-5, P-6, P-7, P-8, P-9, and P-17).

3. **Settlement and Deep Settlement Plates.**

a. **General.** Three settlement plates (SP-1, SP-2, and SP-3) and three deep settlement plates (DSP-1, DSP-2, and DSP-3) were installed during the initial contract. Each settlement plate consists of a 3-foot square, one-fourth inch thick steel plate placed on the embankment foundation (top of overburden) with steel riser pipes extending through the fill. Each deep settlement plate consists of a 30-inch diameter, one-fourth inch thick steel plate placed in primary material (clay shale) with the steel riser pipes extending through the fill. The settlement plates are used to monitor the vertical movement of the entire foundation, while the deep settlement plates were used to monitor the vertical movement of the primary (clay shale) material. A plan view of the locations of the settlement plates and deep settlement plates is shown on Plate 33. These vertical movement monitoring devices were installed in essentially two locations - the floodplain and the left embankment (spillway). Results of monitoring will be discussed at each of these general locations.

b. **Floodplain**. Settlement Plate SP-1 (top of overburden) and deep settlement Plate DSP-1 (top of clay shale) are located below the floodplain section of the embankment at station 38+70. The foundation has consolidated a total of 1.7± feet (with 0.9± feet occurring in the overburden and 0.8± feet occurring in the unweathered primary material). The total settlement and rate of settlement achieved are well within limits that could be expected for the materials and loading involved.

c. **Spillway**. Settlement Plate SP-2 (top of overburden) and deep settlement Plate DSP-2 (top of weathered shale) are located on the east (right) side of the spillway at station 99+50. The foundation has consolidated a total of 0.34± feet in this location (0.30± feet occurring in the overburden, and 0.04± feet occurring in the weathered and unweathered clay shale combined).

Settlement Plate SP-3 (top of overburden) and deep settlement Plate DSP-3 (top of unweathered shale) are located on the west (left) side of the spillway. The foundation has consolidated a total of 0.26± feet (0.18± feet occurring in the overburden and weathered primary combined, and 0.08± feet occurring in the unweathered clay shale).

The utilization of preload initial embankment, partial excavation thereof to construct the concrete structure, and then reloading by backfilling each caused vertical movement in the form of consolidation or heave. The amount of consolidation induced due to

backfilling around the concrete structure is very small indicating that the preload initial embankment was very successful in its purpose of eliminating significant differential settlement at the structure.

4. **Outlet Works Reference Pins**. Reference pins were installed along the invert of the conduit from the intake tower to the discharge chute, and also on the stilling basin walls. Reference pins were installed at each end of each conduit monolith, discharge chute slab, immediately downstream from the intake service gates, in the intake tower transition section immediately upstream from the first conduit monolith and on each side of each joint of both walls of the stilling basin. The reference pins consist of bronze bolts imbedded in the concrete. The surveys conducted on the reference pins show that no detectable movement has occurred in the outlet works monoliths to date.

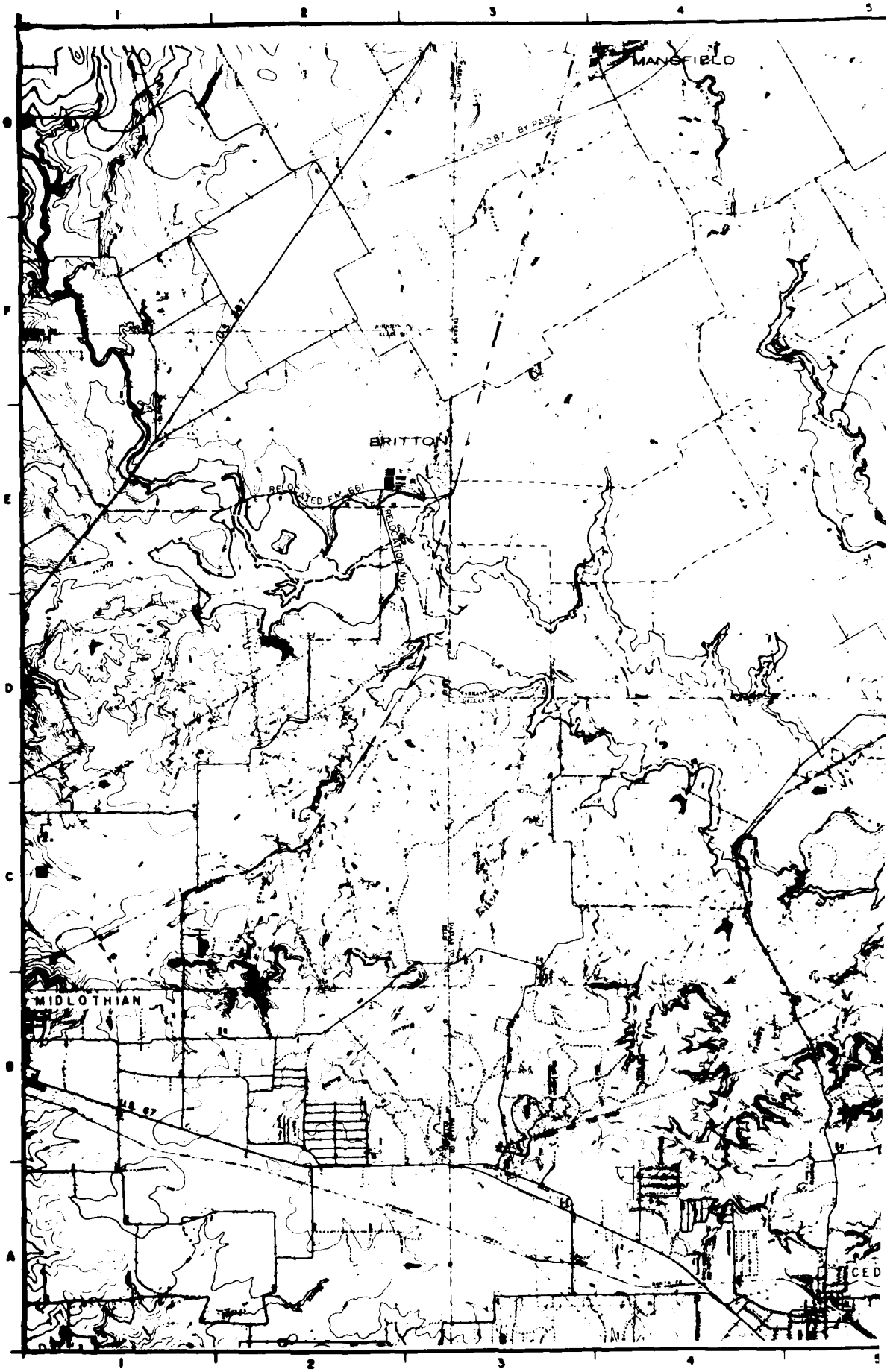
5. **Spillway Reference Marks**. Reference marks were installed in the concrete of the slabs and walls of the spillway to monitor the movement of the spillway. The reference marks consist of bronze bolts imbedded in the concrete. Initial readings have been made.

6. **Evaluation**. The above description of foundation instrumentation was extracted from Joe Pool Lake Pre-Inspection Brochure No. 1, dated February 1986. A detailed evaluation of the foundation instrumentation program and its performance will be presented in the **Embankment Criteria Assessment Report**.

VIII FUTURE CONSIDERATIONS

1. **Conditions That Could Cause Problems.** There were no unanticipated foundation conditions discovered during construction of Joe Pool Dam which would pose a threat to the stability of any of the pertinent features of the project. All bedrock surfaces were found to be competent and stable and remained so until covered by impervious backfill or protective concrete.

2. **Recommendations.** If pneumatically placed concrete is to be used for foundation protection in the future, consideration should be given to providing some type of support for the concrete when it is applied to vertical or nearly vertical slopes. When applied without support, as was the case in the spillway end sill and key trenches, the concrete tends to slump away from the slope, primarily due to its own weight, leaving a void space between the slope and the pneumatic concrete. Wire support attached to the slope and encased in the concrete would prevent this type of failure.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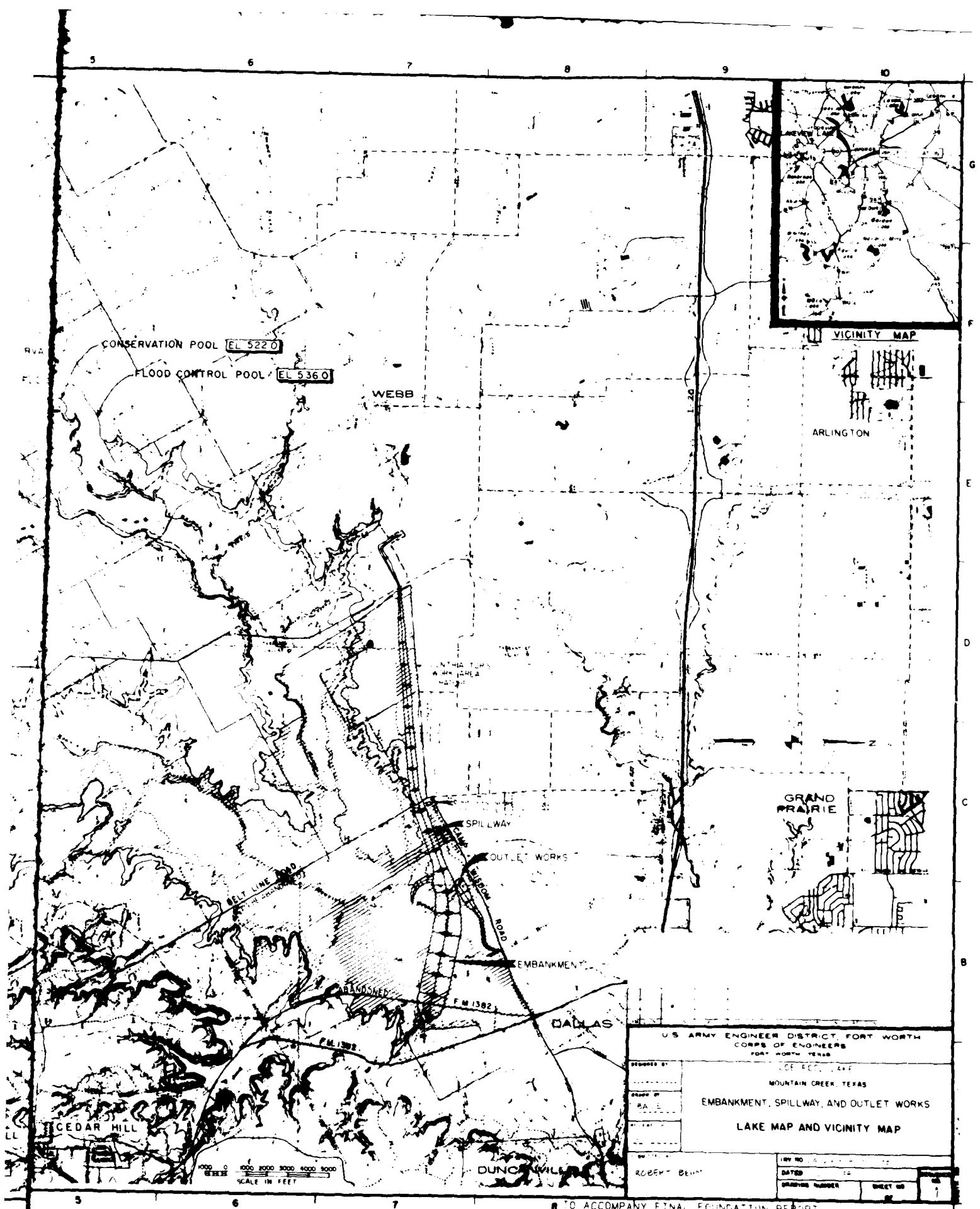
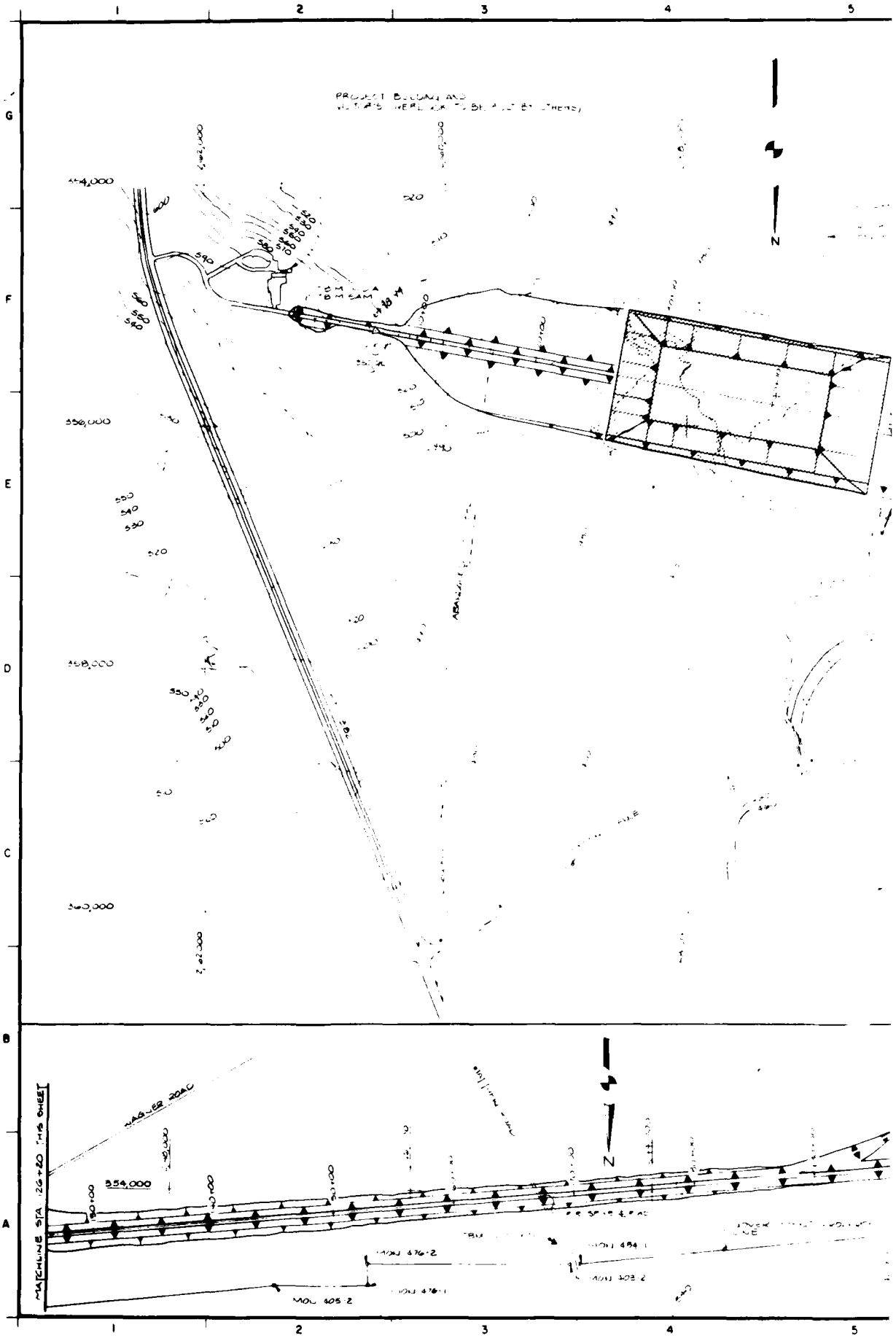


TO ACCOMPANY FINAL FOUNDATION REPORT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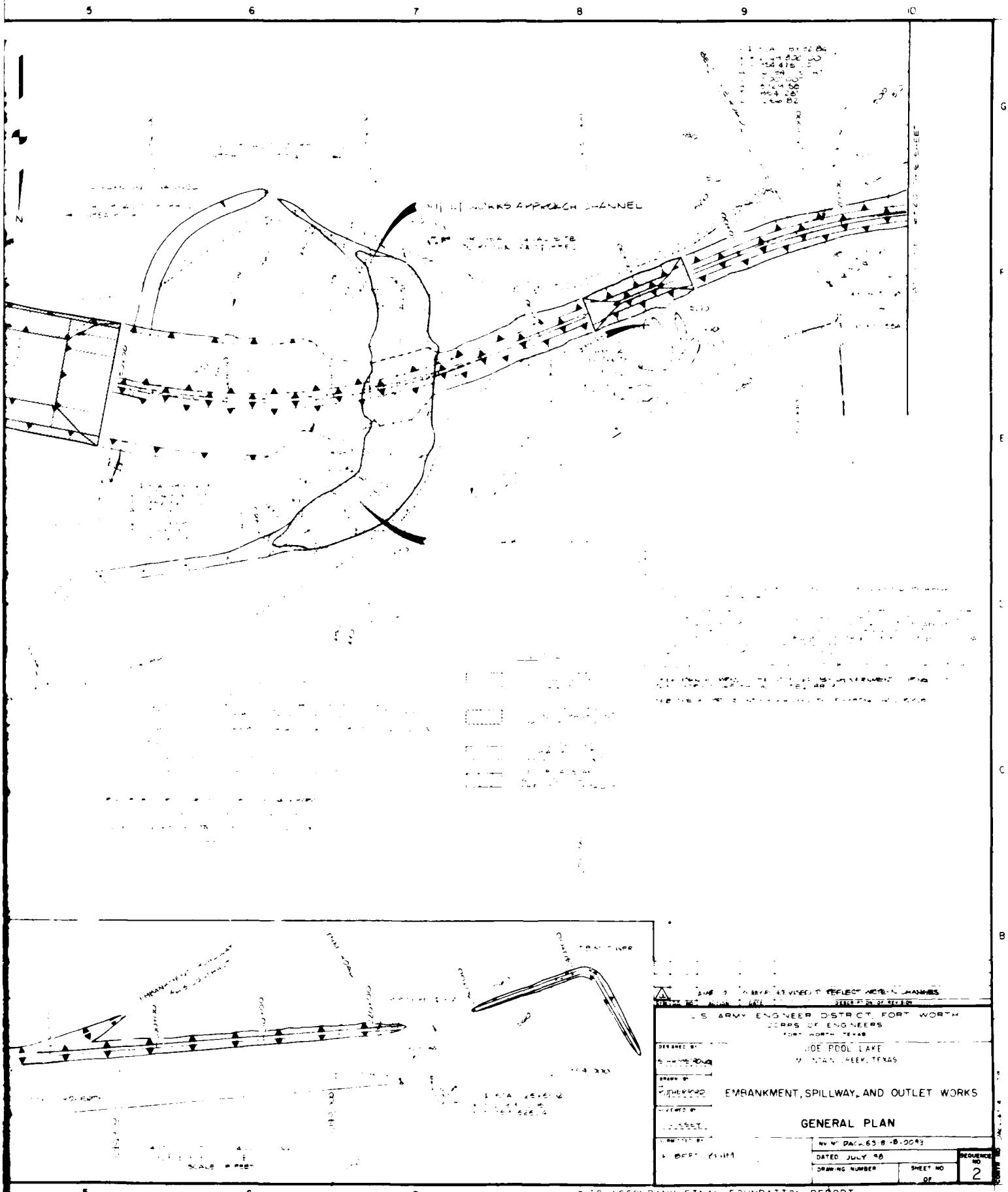


U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

JOE POOL LAKE
TRINITY RIVER, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

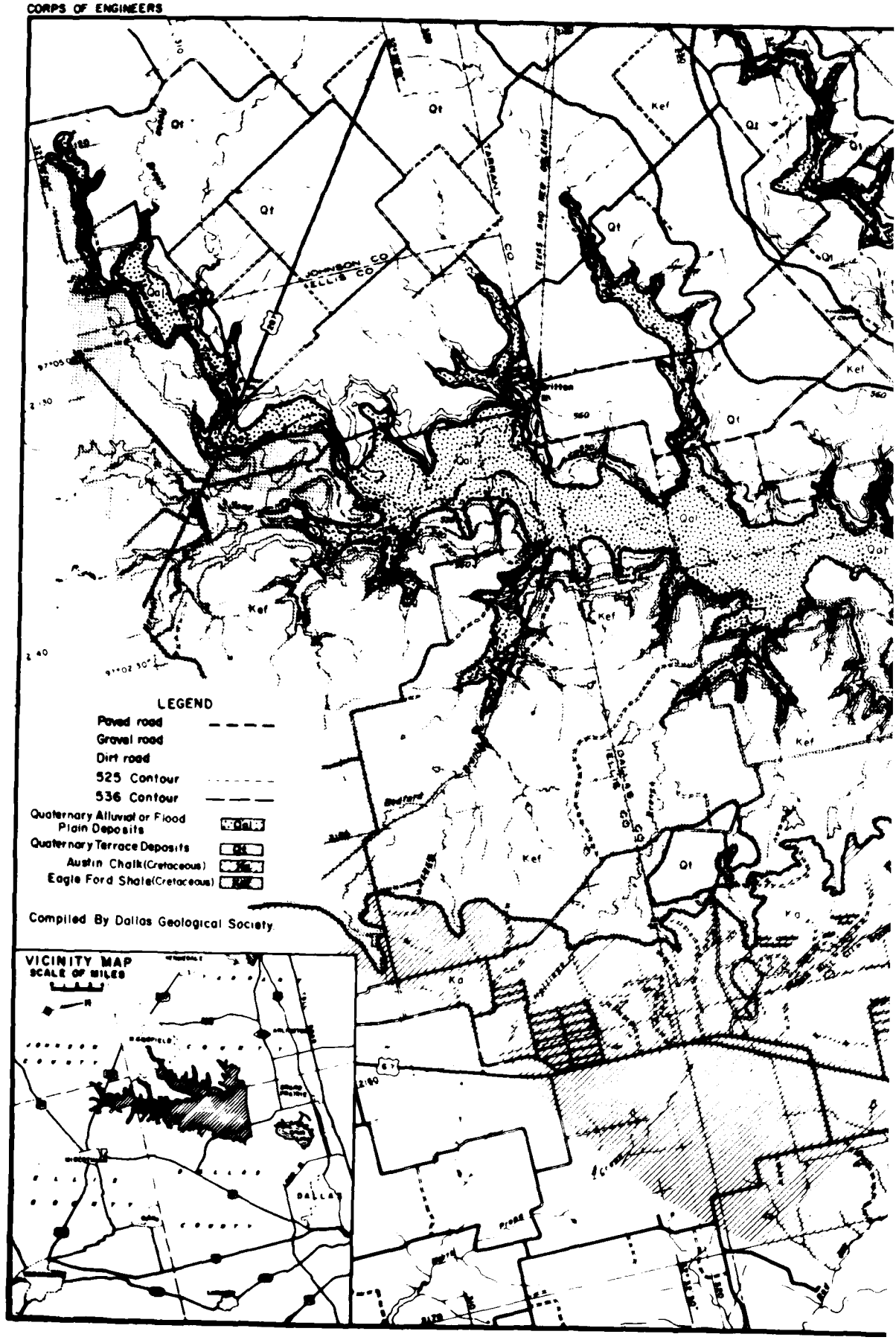
GENERAL PLAN

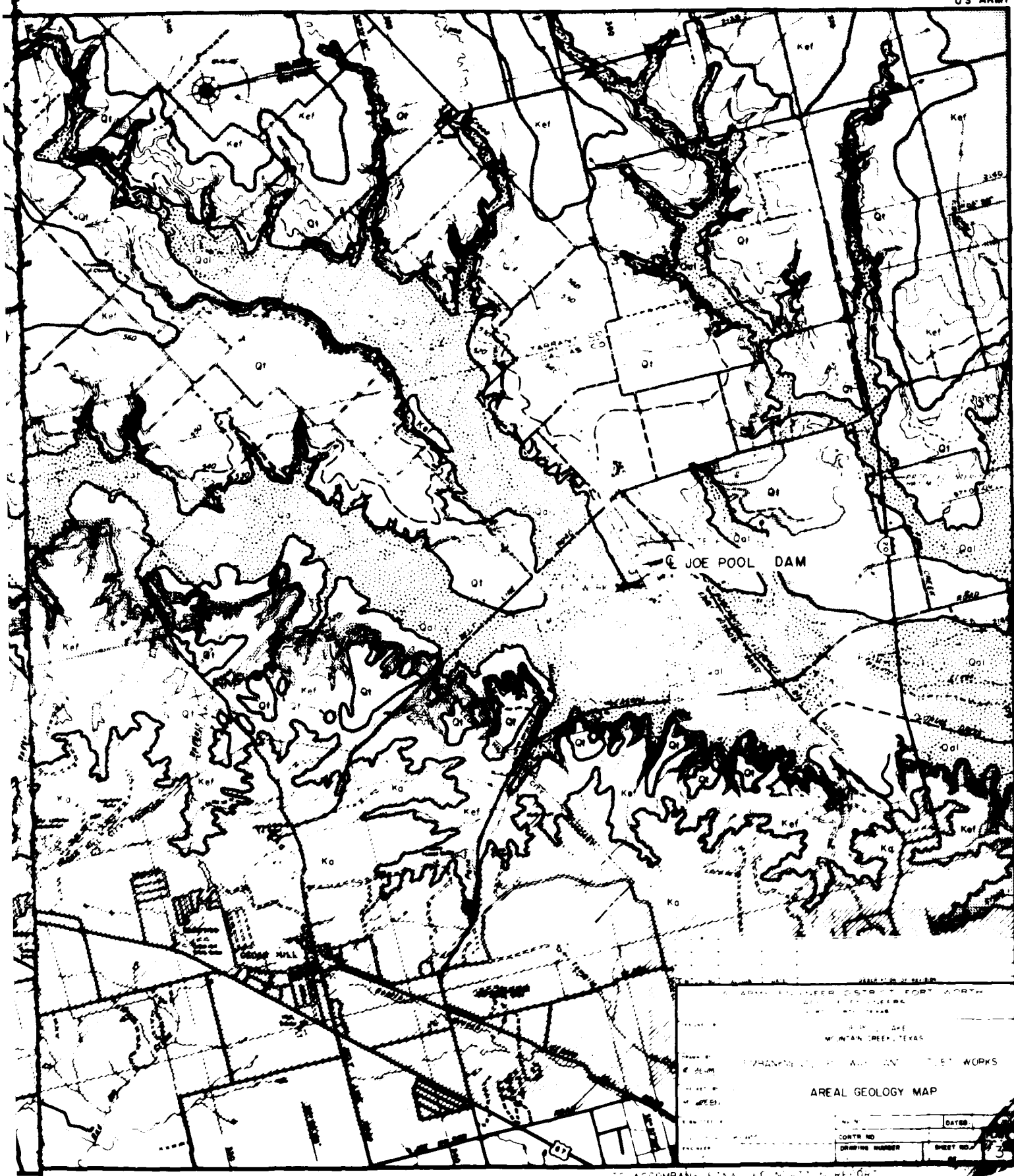
DATED JULY 98

SEQUENCE NO 2

TO ACCOMPANY FINAL FOUNDATION REPORT

CORPS OF ENGINEERS





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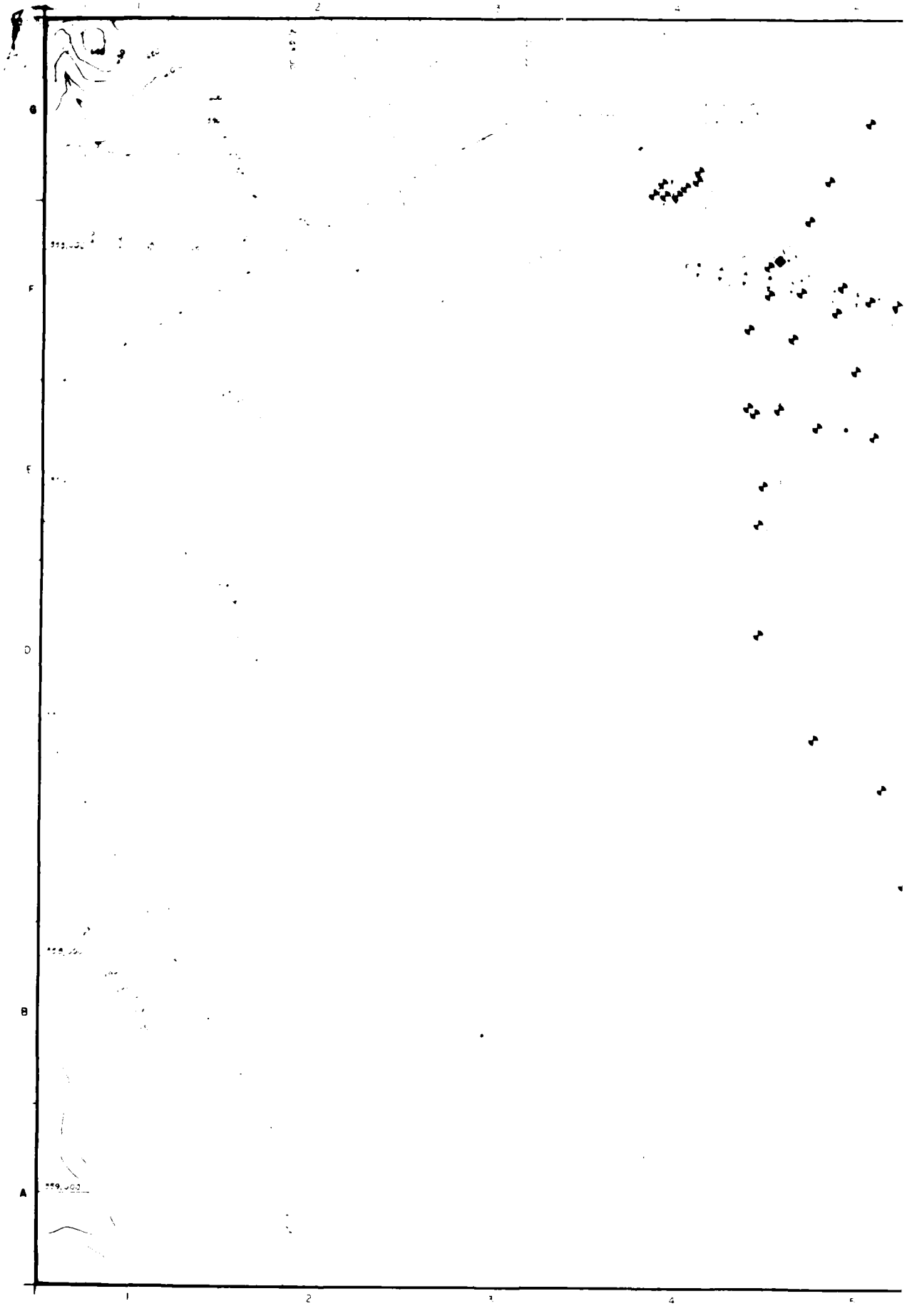

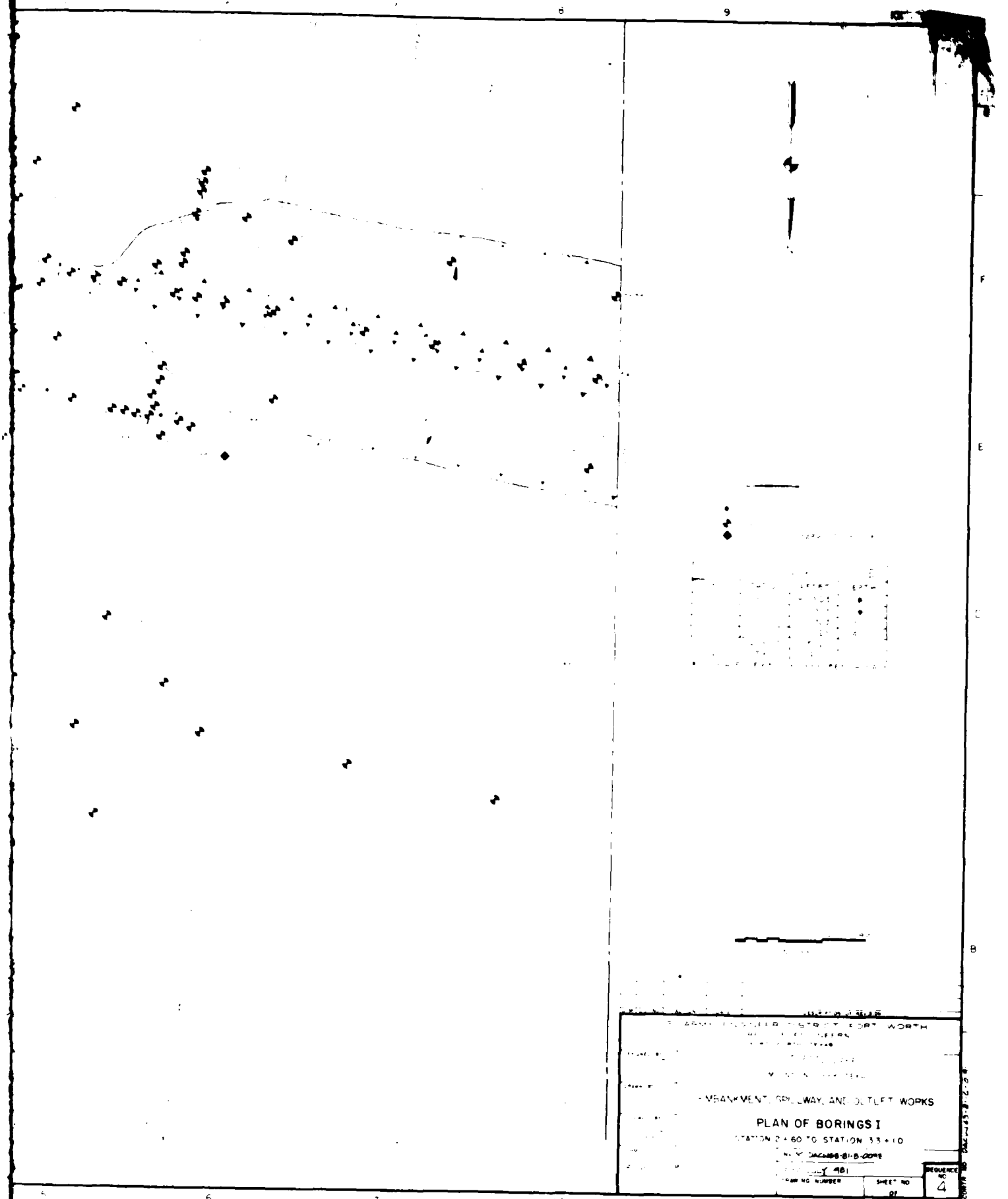

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

PLAN OF BORINGS I

STATION 2+60 TO STATION 33+10

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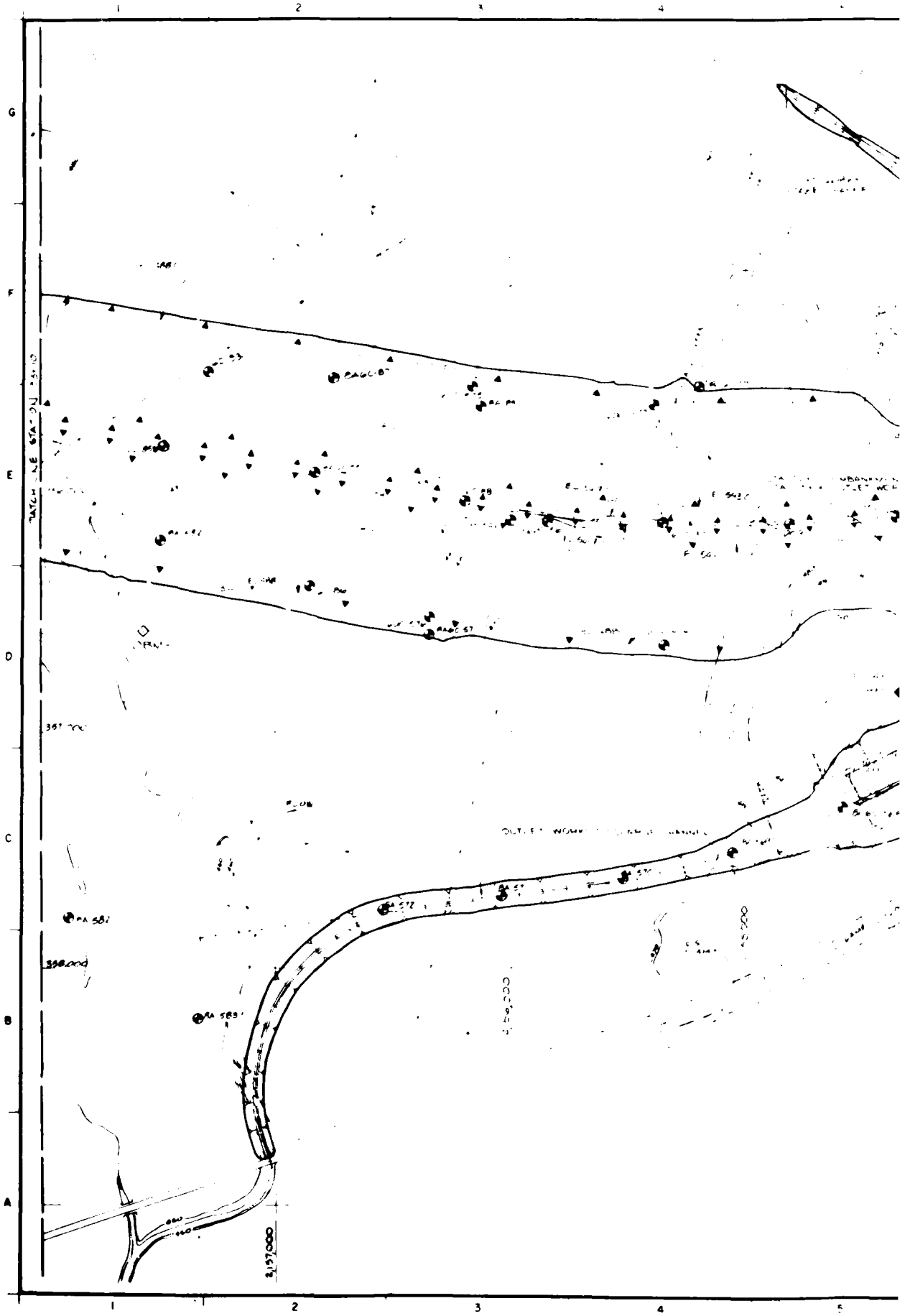
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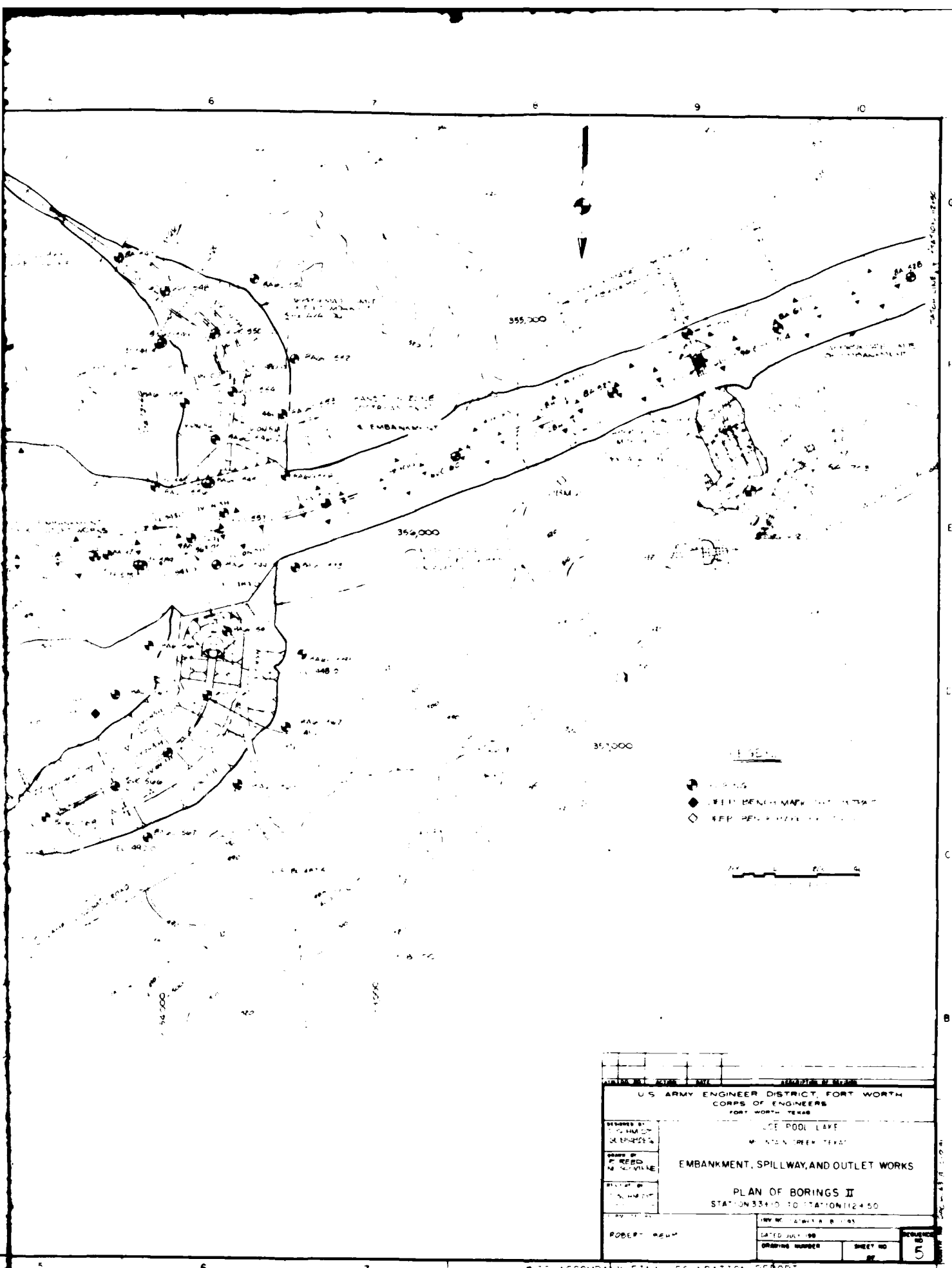

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

LAKE POOL LAKE
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EMBANKMENT, SPILLWAY, AND OUTLET WORKS

PLAN OF BORINGS II
STATION 334+10 TO STATION 1124+50

ROBERT [illegible]

DATED JULY 1968

DRAWING NUMBER

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TO ACCOMPANY FINAL FOUNDATION REPORT


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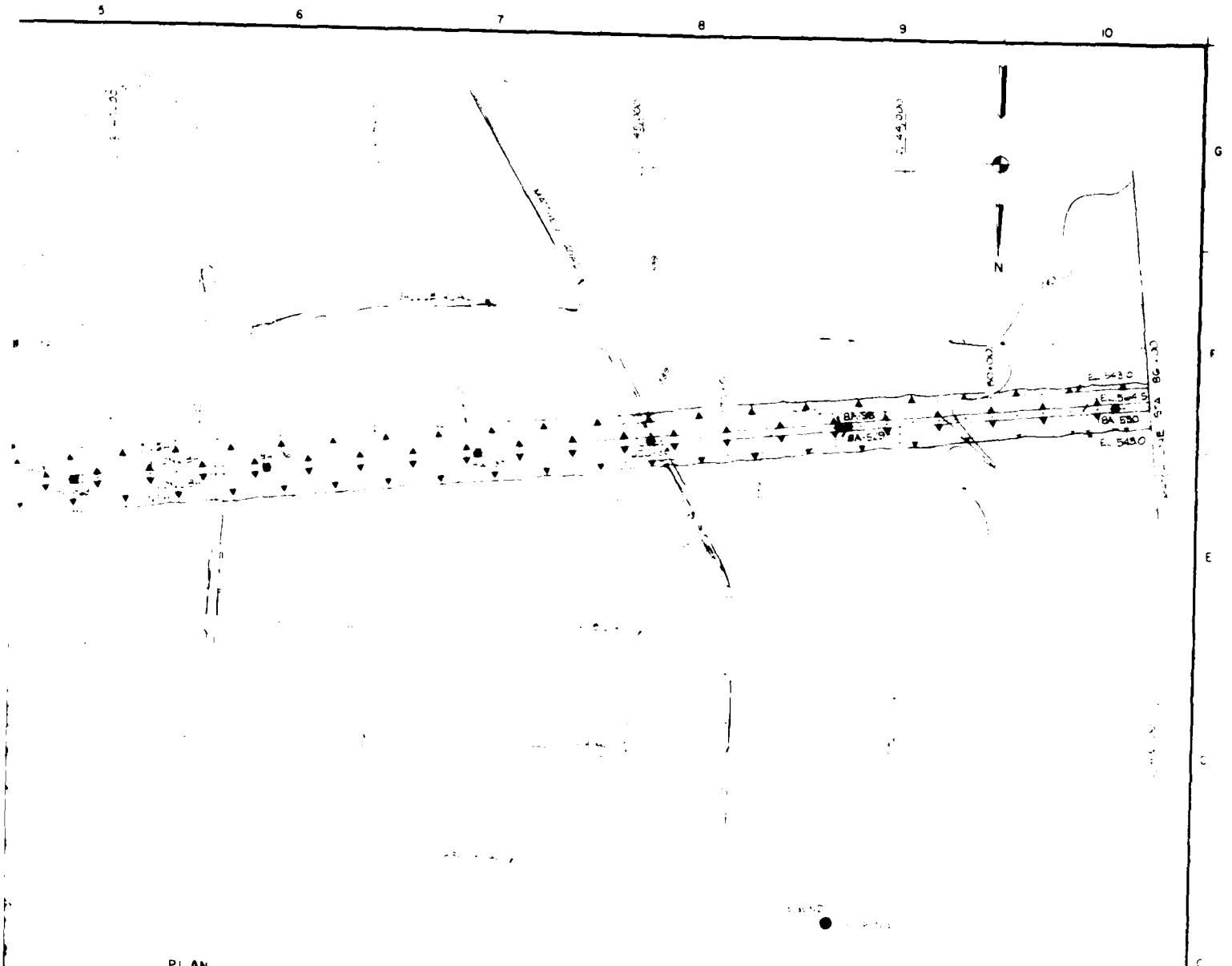

PLAN

U.S. ARMY ENGINEER DISTRICT FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

PLAN OF BORINGS III
STA 74+50 TO 86+00

DATED JULY 1961

SEQUENCE NO. 6

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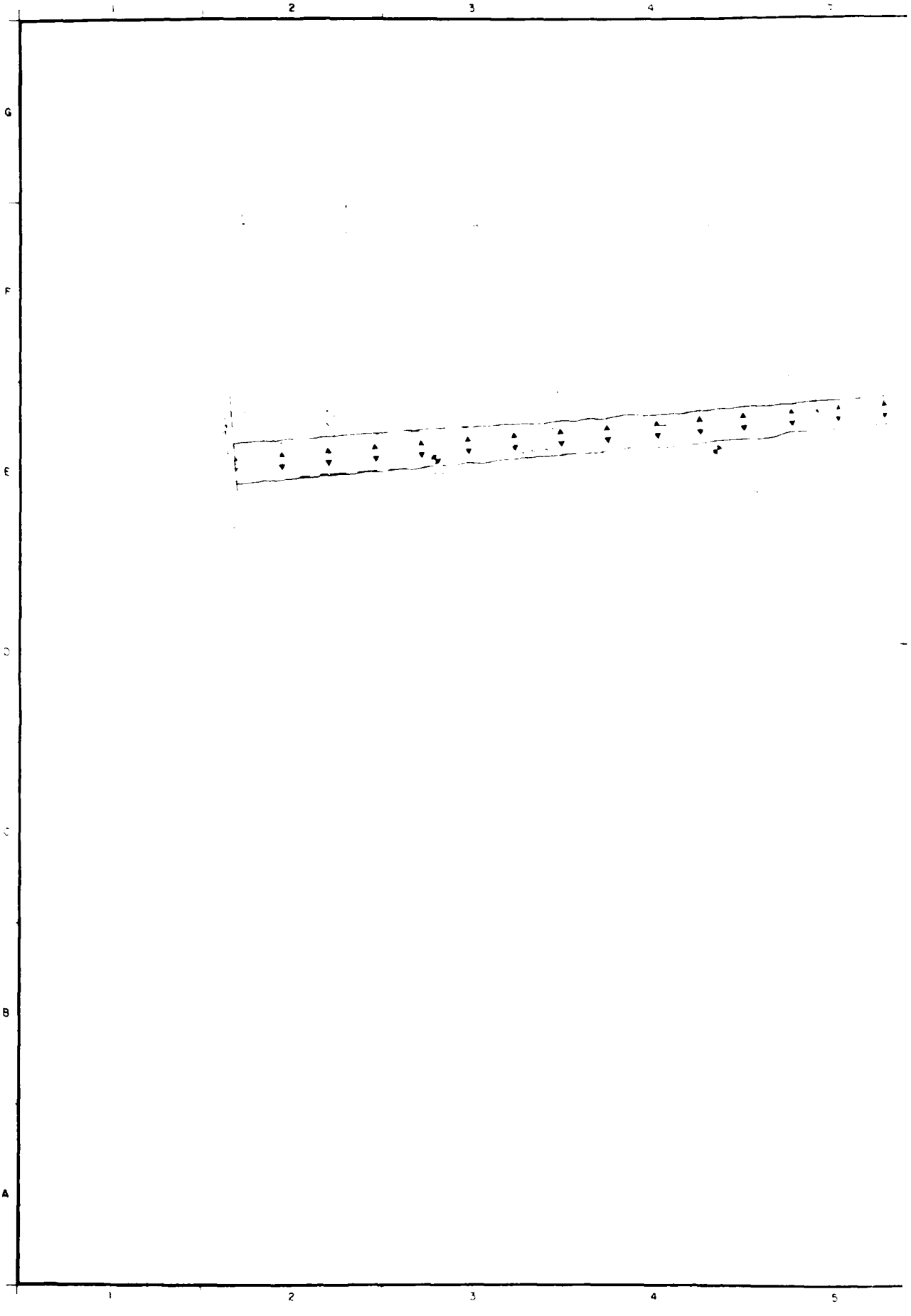
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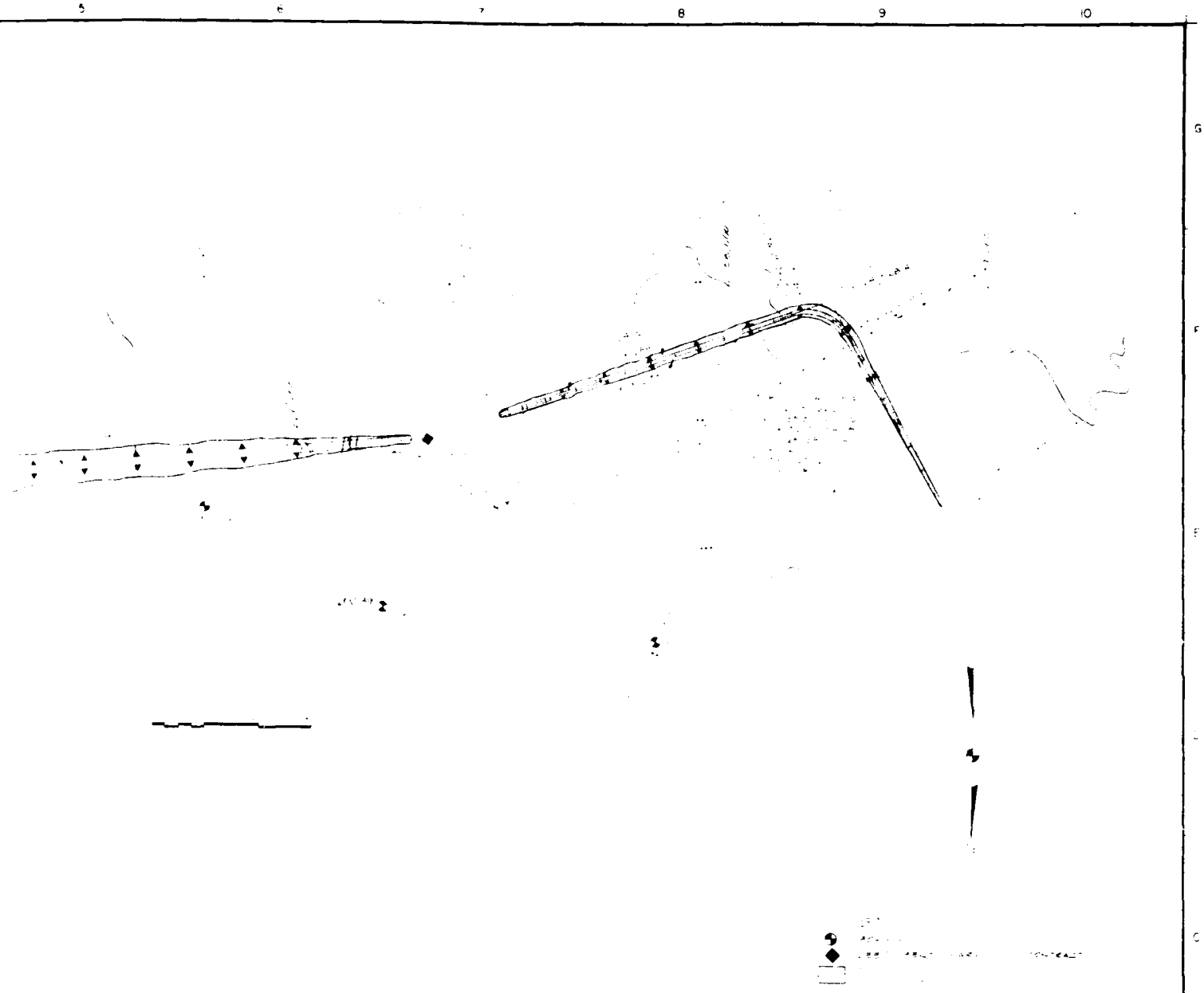


U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

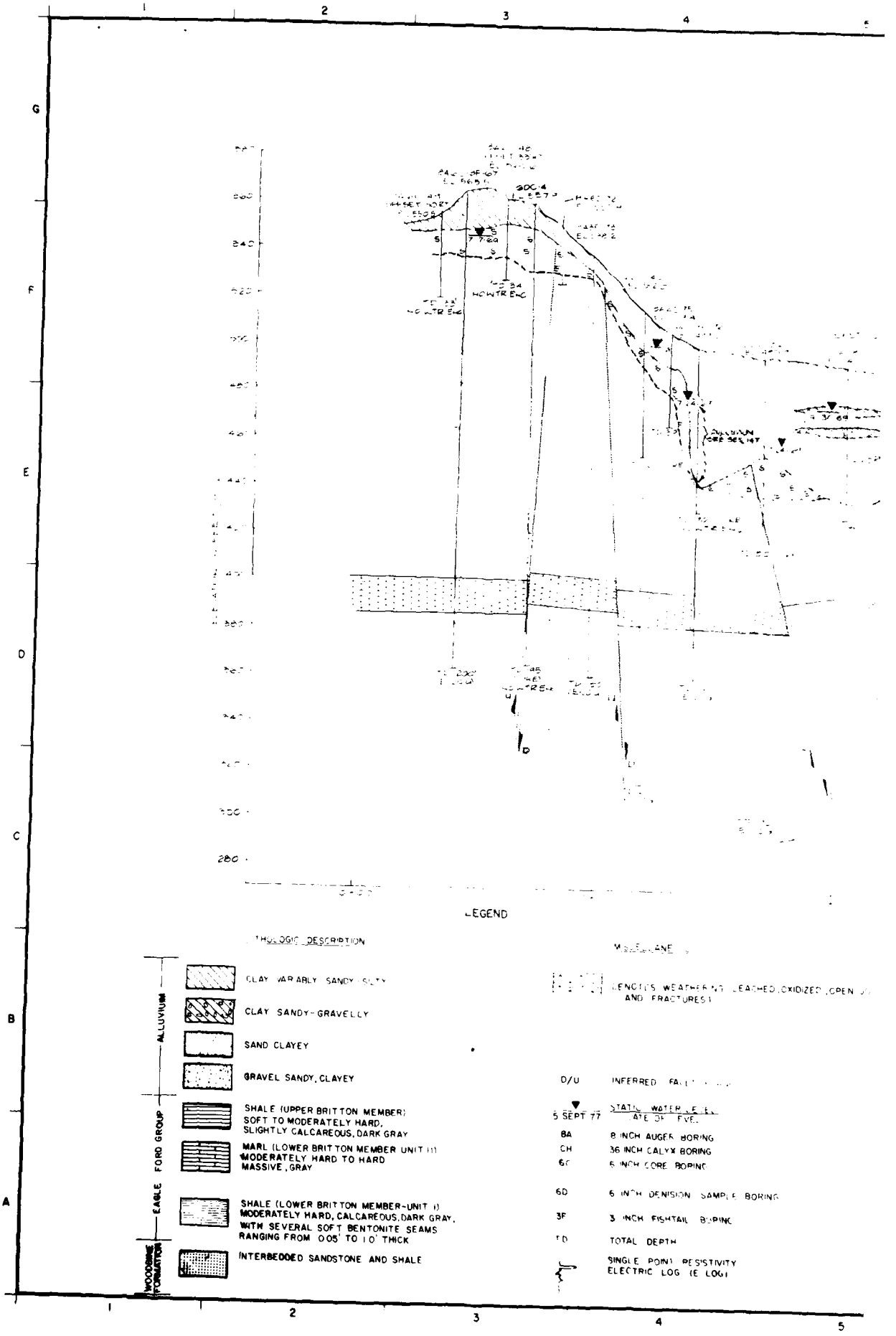
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

PLAN OF BORINGS IV
STATION 186+00 TO 249+60

DATED JULY 1961

SEQUENCE NO 7

ACCOMPANY FINAL FOUNDATION REPORT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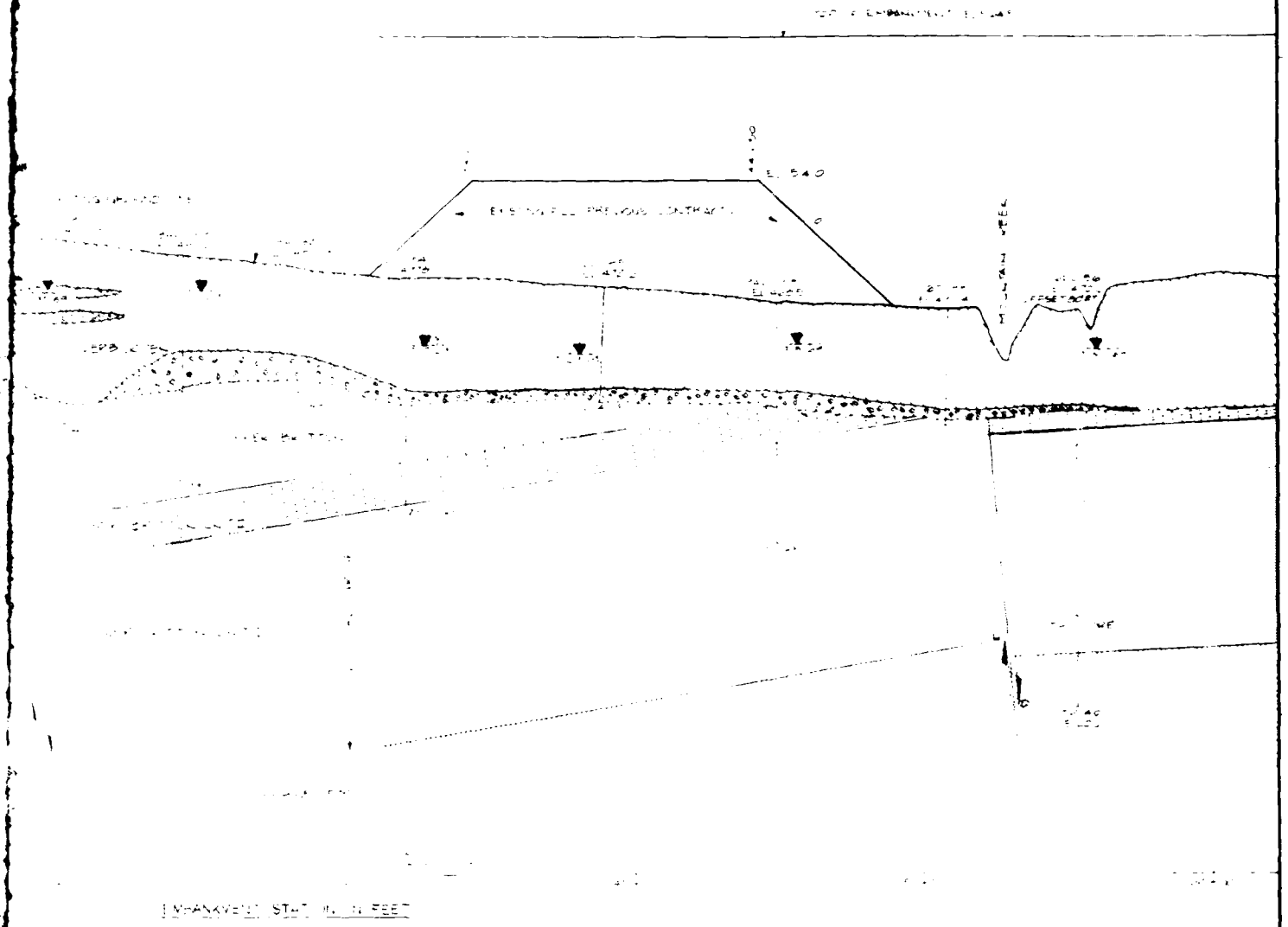
GRAVEL SANDY, CLAYEY
FORD GROUP
SHALE (UPPER BRITTON MEMBER) SOFT TO MODERATELY HARD, SLIGHTLY CALCAREOUS, DARK GRAY
MARL (LOWER BRITTON MEMBER UNIT II) MODERATELY HARD TO HARD MASSIVE, GRAY
EAGLE
SHALE (LOWER BRITTON MEMBER-UNIT I) MODERATELY HARD, CALCAREOUS, DARK GRAY, WITH SEVERAL SOFT BENTONITE SEAMS RANGING FROM 0.05' TO 1.0' THICK
WOODBINE FORMATION
INTERBEDDED SANDSTONE AND SHALE
MISCELLANEOUS
LENGTHS WEATHERED, LEACHED, OXIDIZED, OPEN JOINTS AND FRACTURES
D/U
INFERRED FAULT
5 SEPT 77
STATIC WATER LEVEL AND DATE OF LEVEL
8A
8 INCH AUGER BORING
CH
36 INCH CALYX BORING
6C
6 INCH CORE BORING
6D
6 INCH DENISON SAMPLE BORING
3F
3 INCH FISHTAIL BORING
TD
TOTAL DEPTH
SINGLE POINT RESISTIVITY ELECTRIC LOG (E LOG)



NOTES

1. DETAILED LOGS OF CORE BORINGS ARE PRESENTED ON SEQ ... THRU SEQ ...
2. WHILE THE BORINGS AND GEOLOGIC INTERPRETATIONS ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS FOR THE VERTICAL AND HORIZONTAL REACHES AS SHOWN, VARIATIONS IN CHARACTERISTICS OF MATERIALS MAY BE ENCOUNTERED.
3. ABSENCE OF GROUND WATER LEVELS OPPOSITE BORING LOGS DOES NOT NECESSARILY MEAN THAT GROUND WATER WILL NOT BE ENCOUNTERED AT THE LOCATION OR WITHIN THE VERTICAL REACHES OF THE BORINGS.

U.S. ARMY ENGINEER DISTRICT FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

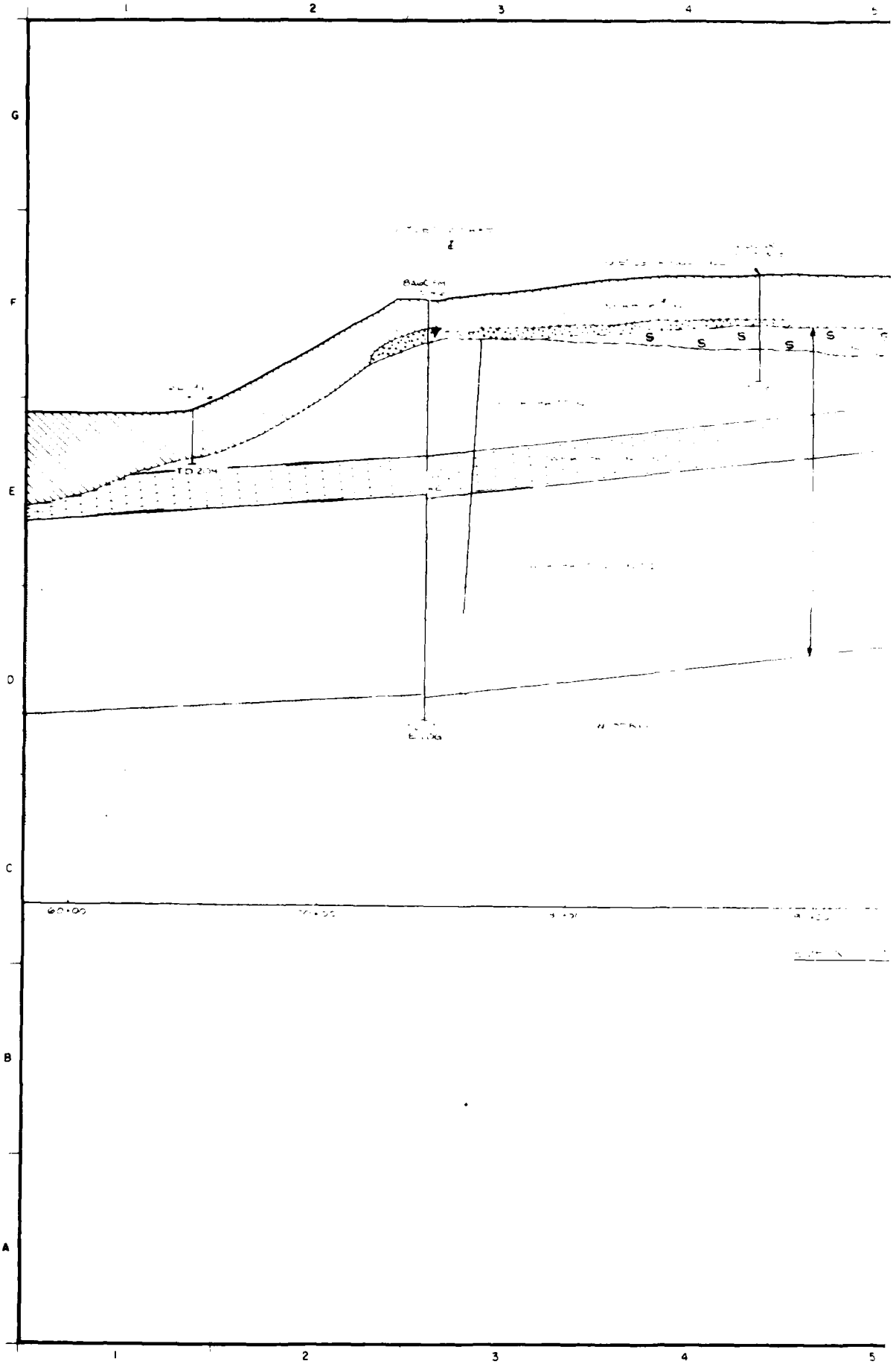
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

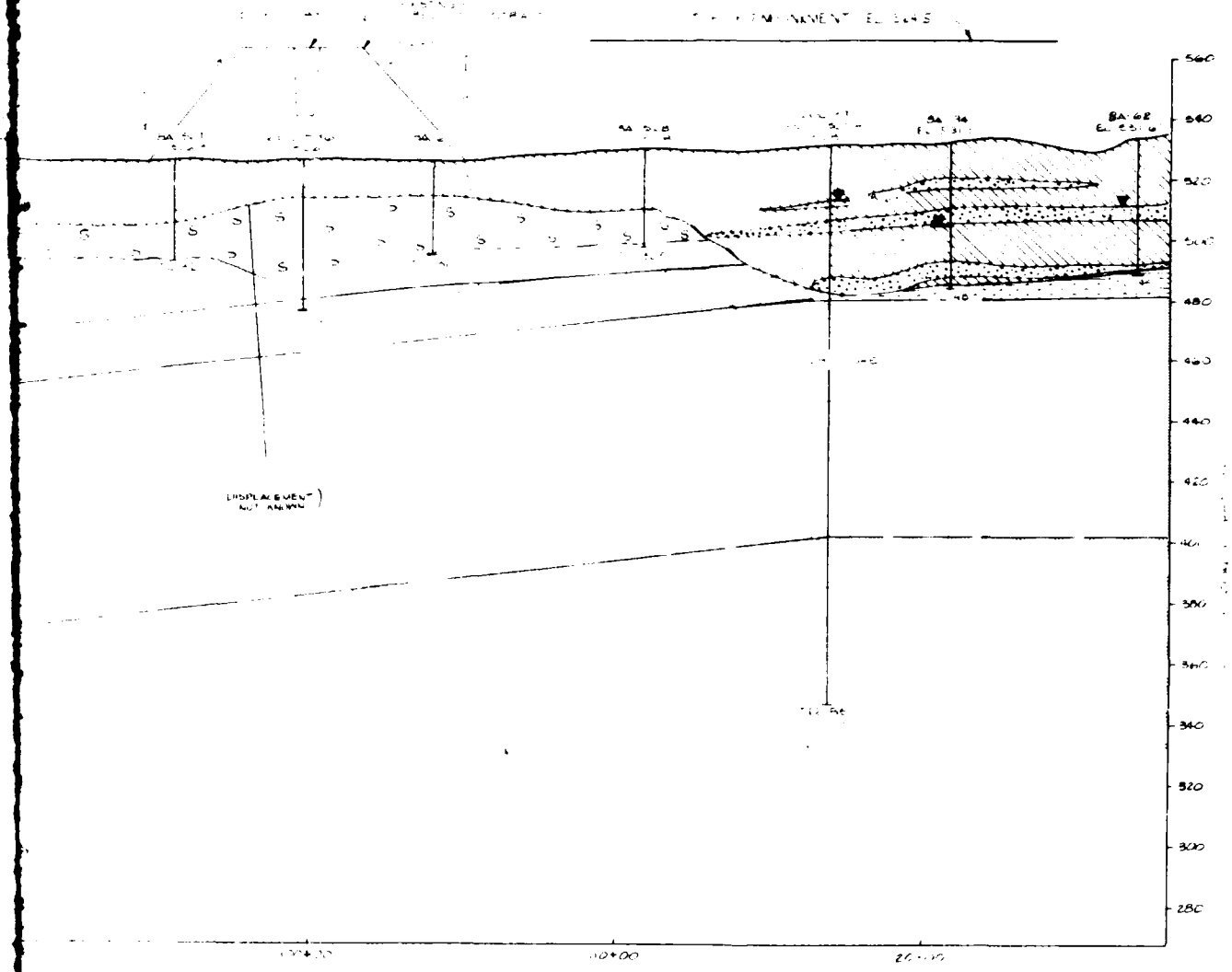
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

GEOLOGIC PROFILE
EMBANKMENT CENTERLINE
(STATION 0+00 TO STATION 62+00)

DESIGNED BY: DLHW
DRAWN BY: LEM W.
CHECKED BY: E.J.B.
SUBMITTED BY: R. APPLEBEE

REVISED DACW 63-8-8-0093
DATED JULY 1958
DRAWING NUMBER
SHEET NO. 8 OF
REFERENCE NO. 8


1
2
3
4
5
G
F
E
D
C
B
A



			DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: R. BOWN
DRAWN BY: R.E.L.W.
TRACED BY: J.E.B.
SUBMITTED: R. BOWN

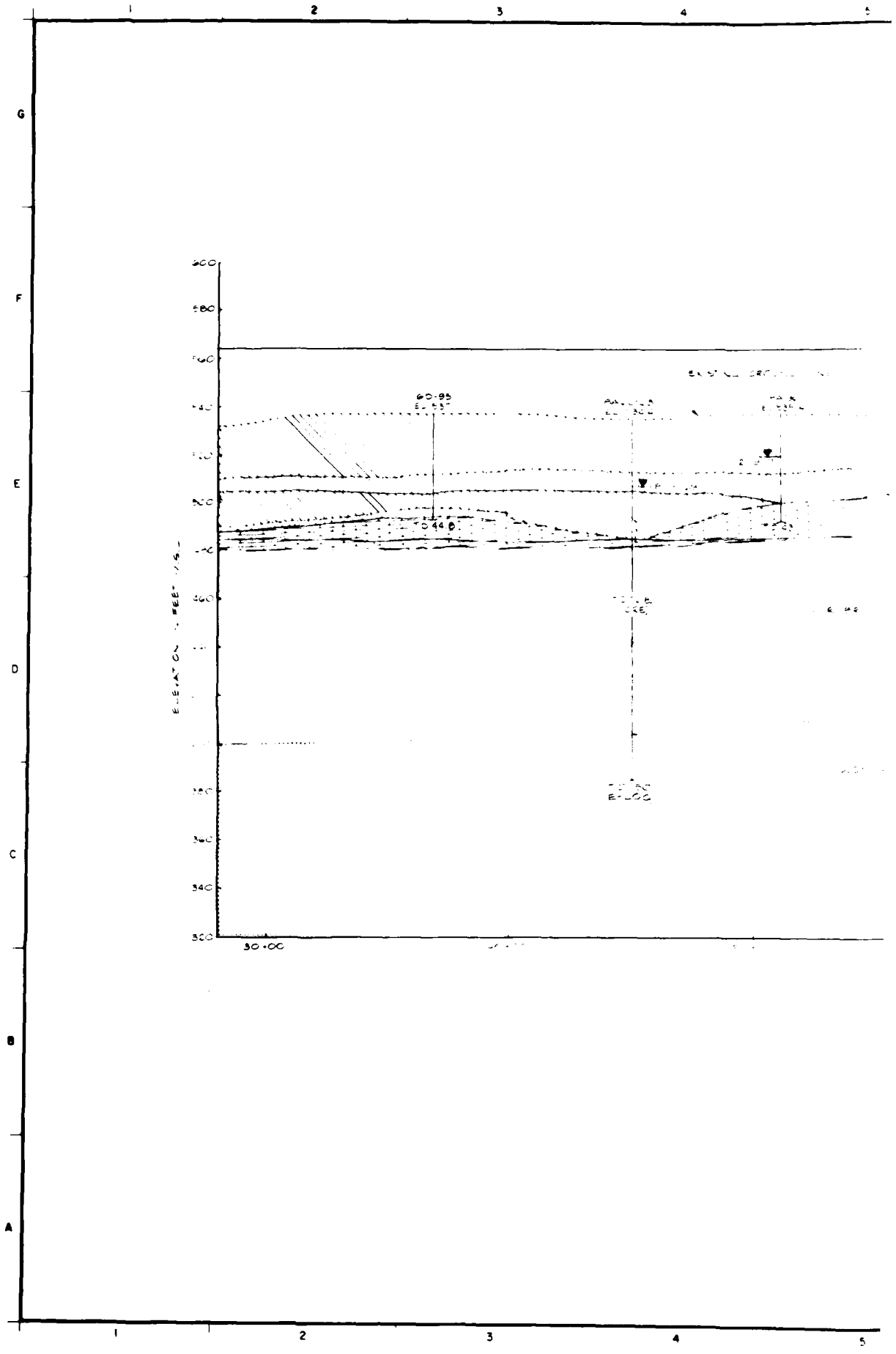
JOE POOL LAKE
[illegible] CREEK, TEXAS

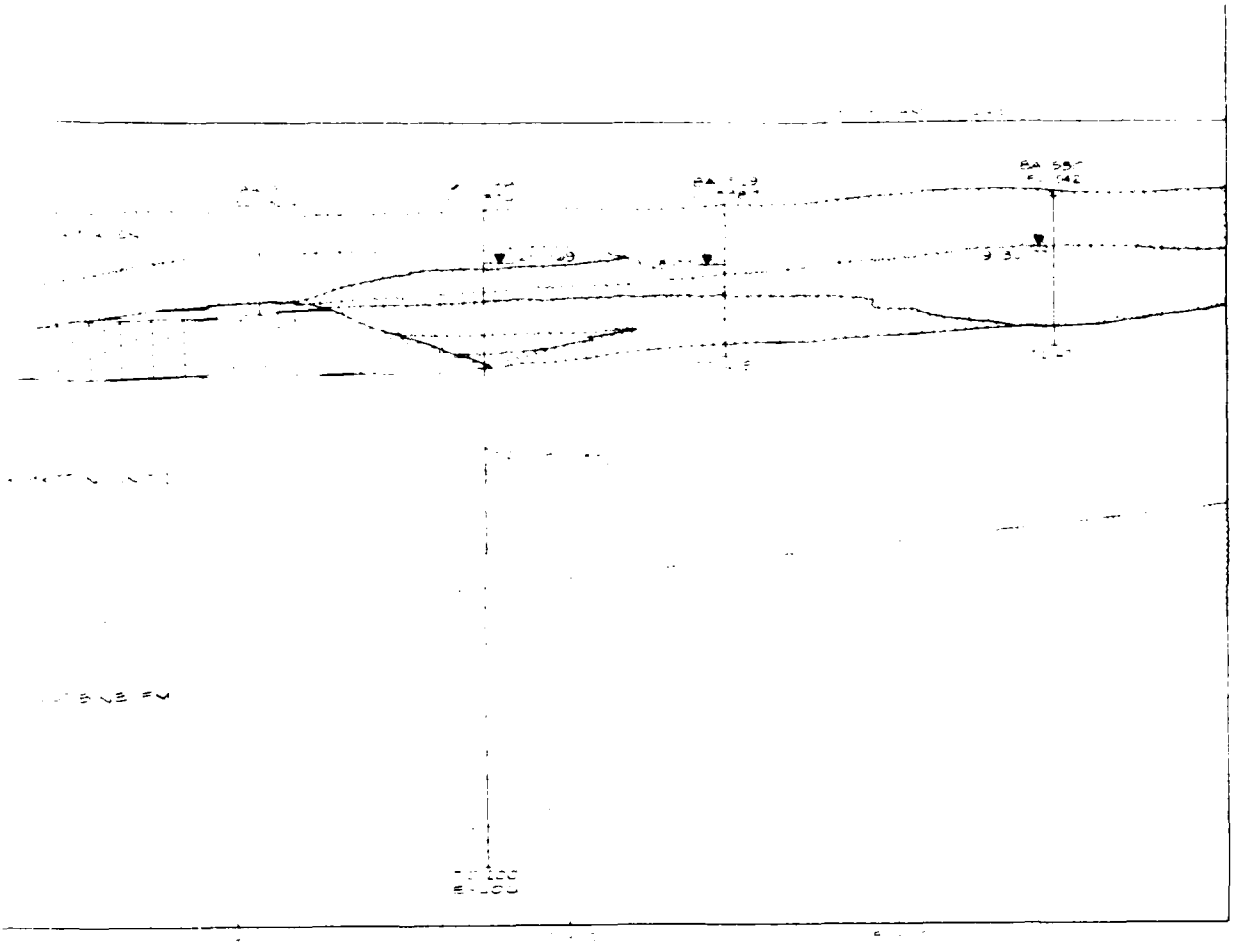
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

GEOLOGIC PROFILE
EMBANKMENT CENTERLINE
(STA 62+00 TO STA 128+00)

CONTRACT NO. DACW63-81-C-0093
DATED JULY 1981
DRAWING NUMBER
SHEET NO. 9 OF
SEQUENCE NO. 9

TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
5
G
F
E
D
C
B
A
600
580
560
540
520
500
480
460
440
420
400
380
360
340
320
ELEVATION - FEET
30+00



PROFILE

U. S. ARMY ENGINEER DISTRICT FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

JOE POOL LAKE
MANSFIELD, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

GEOLOGIC PROFILE
EMBANKMENT CENTERLINE
STA 28+00 TO STA 90+00

CONTRACT NO. DACW63-81-C-0089

DATED JULY 1981

DRAWING NUMBER

SHEET NO. 07

SEQUENCE NO. 10

TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
G
F
E
D
C
B
A

G

F

E

D

C

B

FEET

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

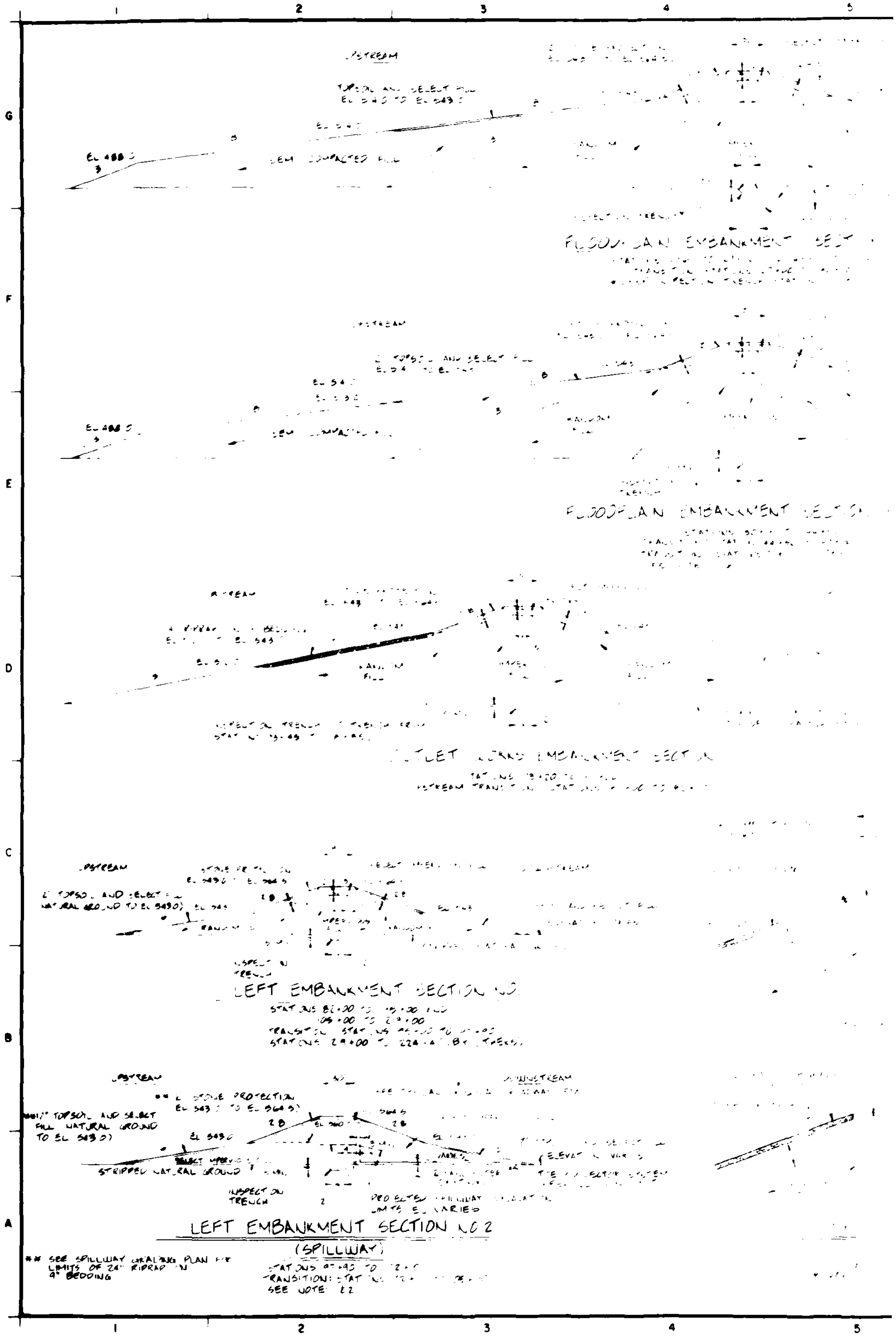
JOE POOL LAKE
WINTERS CREEK, TEXAS

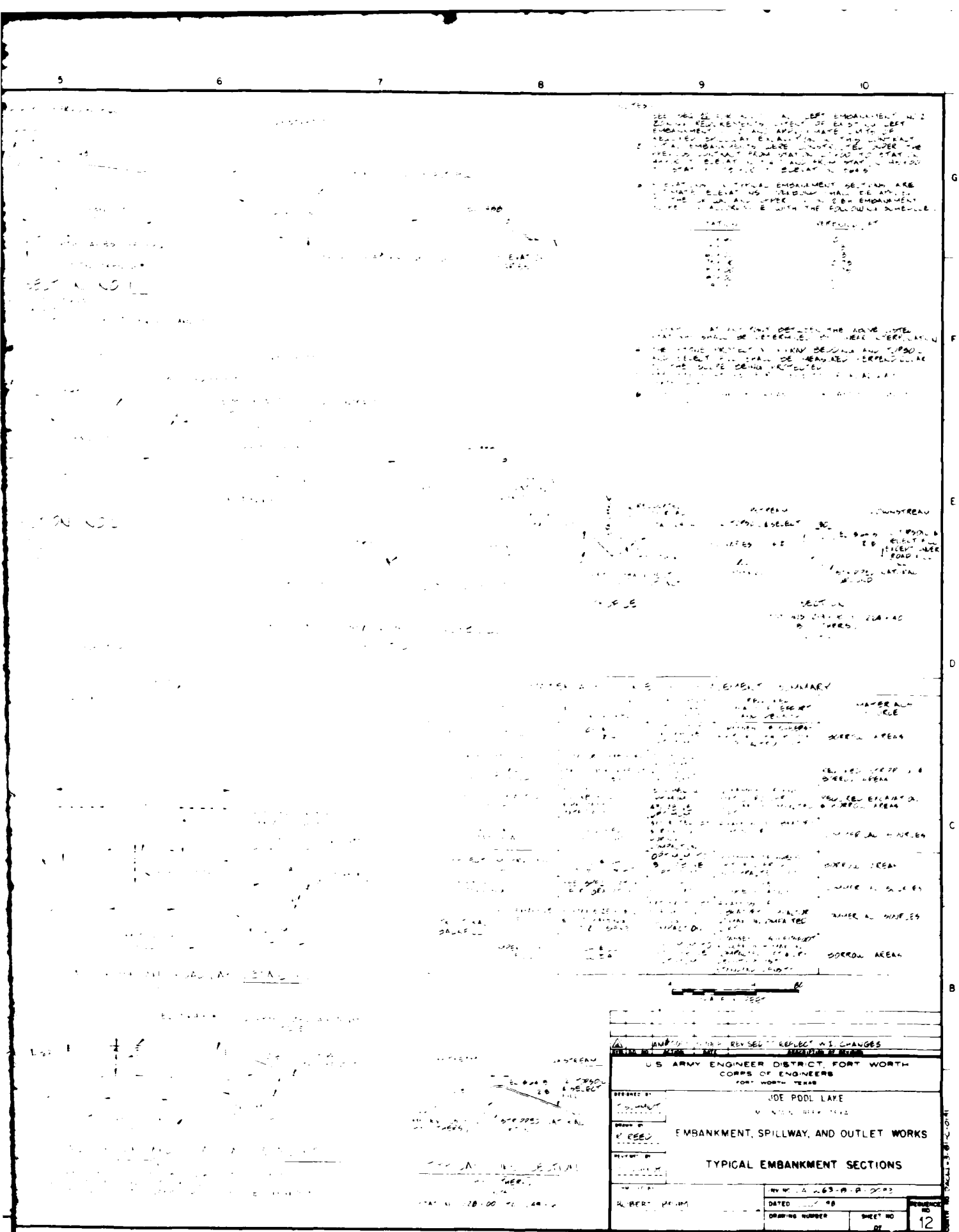
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

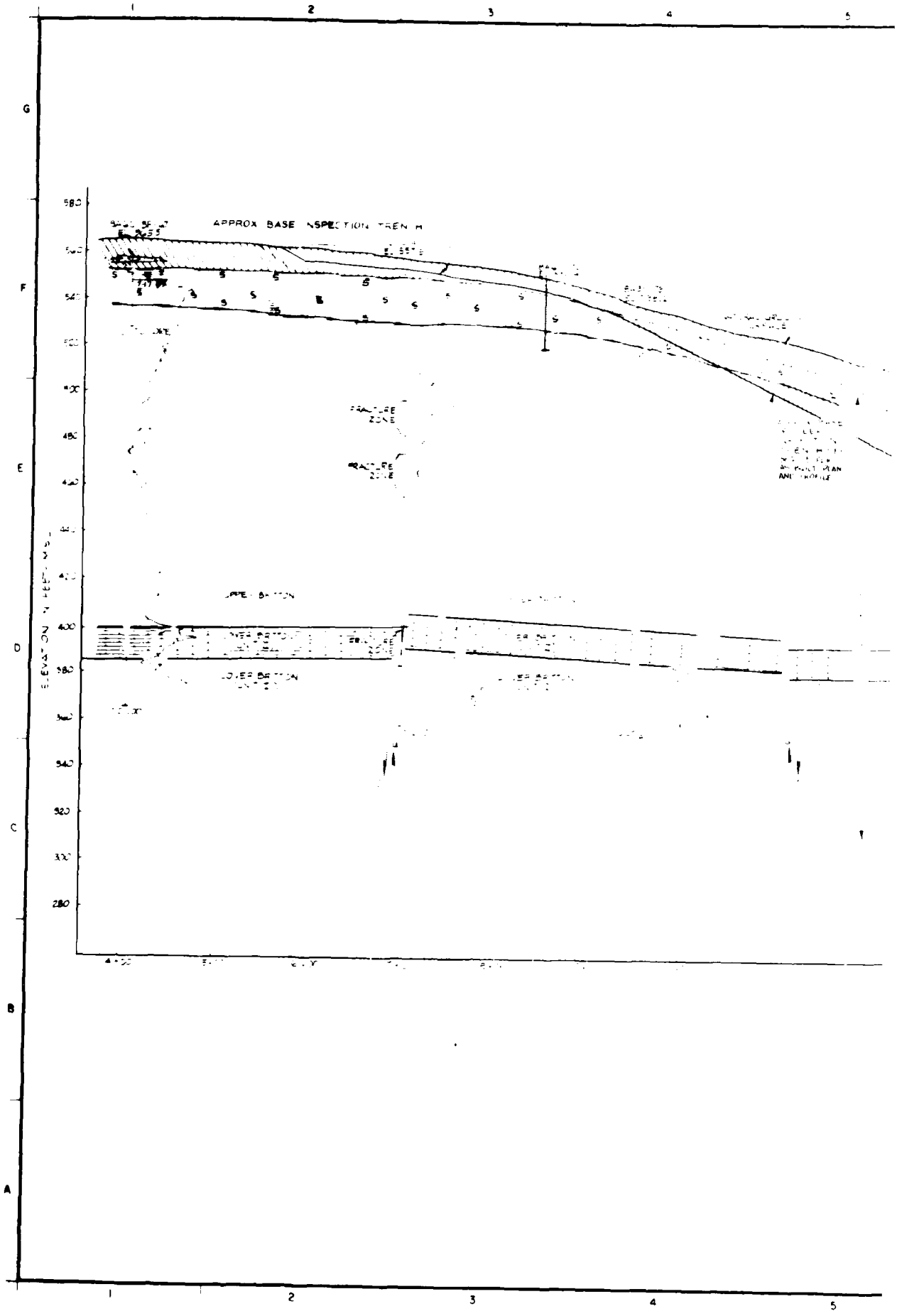
GEOLOGIC PROFILE
EMBANKMENT CENTERLINE
STATION 190+00 TO 225+00

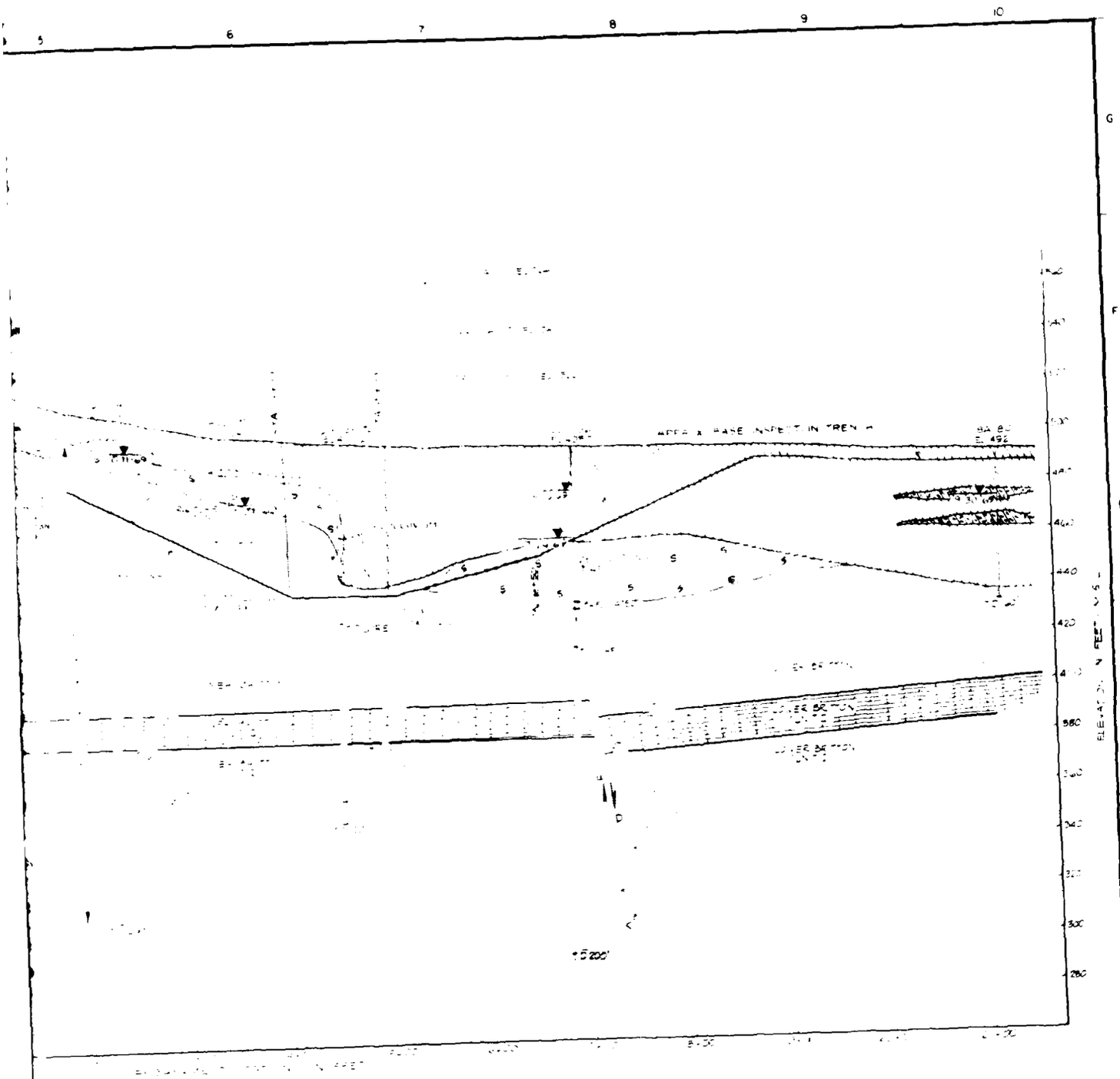
DATED JULY 68

SEQUENCE NO. 11


UPSTREAM
TOPSOIL AND SELECT FILL
SEMI COMPACTED FILL
EL 488.0
RANDOM FILL
LEFT EMBANKMENT SECTION
STRIPPED NATURAL GROUND
INSPECTION TRENCH
LEFT EMBANKMENT SECTION NO 2
(SPILLWAY)
SEE NOTE
LIMITS OF 24" RIPRAP
9" BEDDING


US ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS
JOE POOL LAKE
EMBANKMENT, SPILLWAY, AND OUTLET WORKS
TYPICAL EMBANKMENT SECTIONS
DRAWING NUMBER
SHEET NO
12


APPROX BASE INSPECTION TRENCH
FRACTURE ZONE
FRACTURE ZONE
UPPER BENTON
LOWER BENTON
LOWER BENTON
ELEVATION IN FEET M.S.L.
580
540
500
460
420
400
380
340
320
300
280
1
2
3
4
5
A
B
C
D
E
F
G



U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

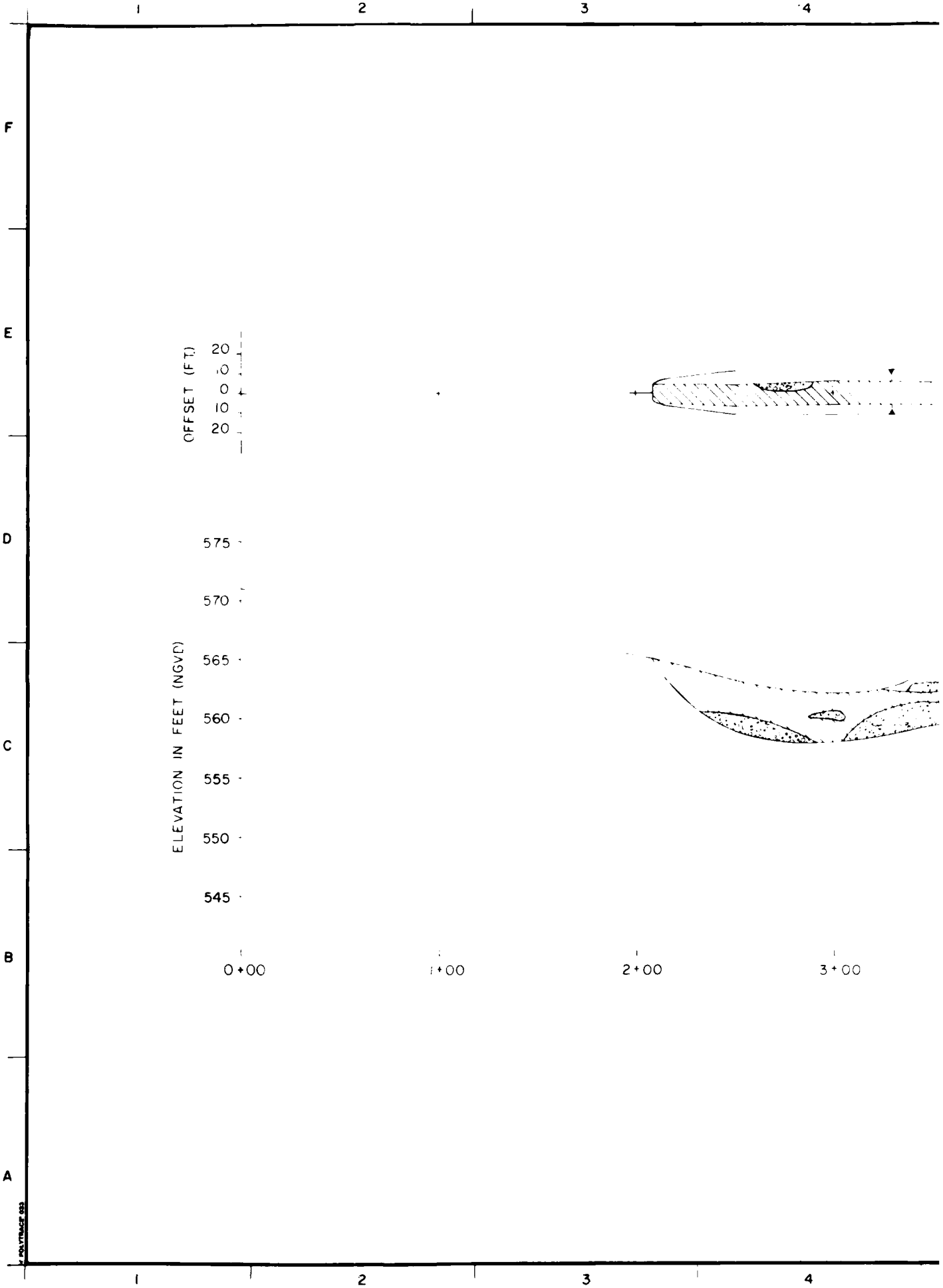
JOE POOL LAKE
MAINTENANCE, TEXAS

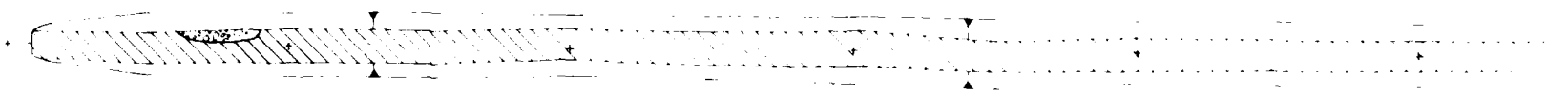
EMBANKMENT, SPILLWAY, AND OUTLET WORKS
GEOLOGIC PROFILE
EMBANKMENT CENTERLINE
EMBANKMENT CENTERLINE-RIGHT ABUTMENT

DESIGNED BY: [illegible]
DRAWN BY: [illegible]
TRACED BY: [illegible]
SUBMITTED BY: ROBERT BEHM

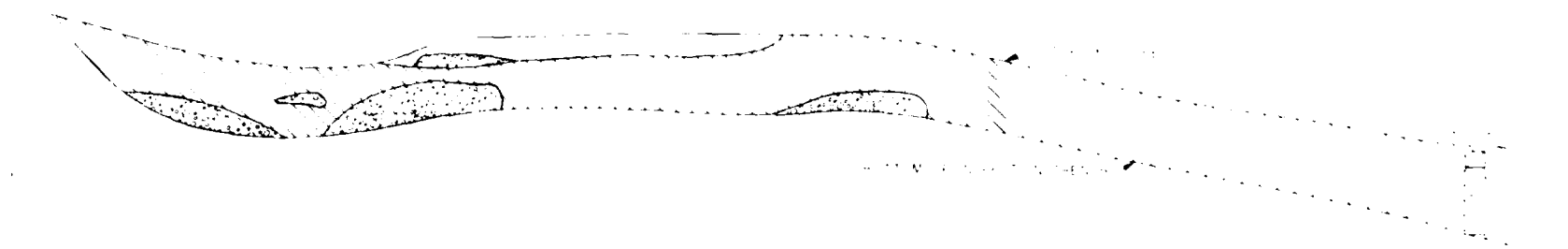
NAVY NO. DACW63-B-E-XXXX
DATED JULY 68
DRAWING NUMBER
SHEET NO. OF
SEQUENCE NO. 13

8 TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
F
E
D
C
B
A
OFFSET (FT.)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
575
570
565
560
555
550
545
0+00
1+00
2+00
3+00



PLAN

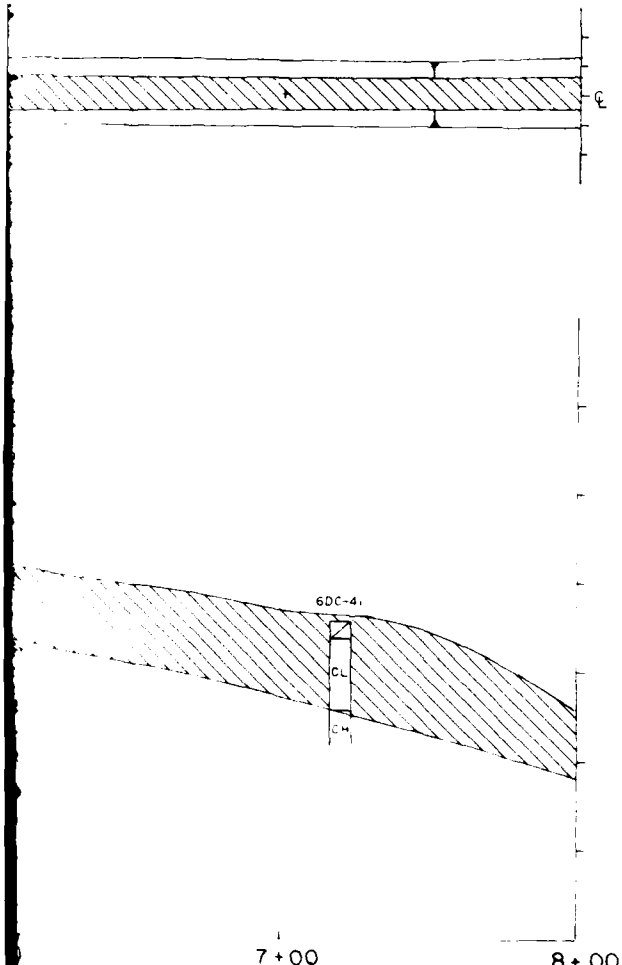


3+00 4+00 5+00 6+00 7+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

36 73



LEGEND

- OVERBURDEN (RECENT): CLAY
- OVERBURDEN (RECENT): SAND
- OVERBURDEN (RECENT): GRAVEL
- UPPER BRITTON FORMATION (CRETACEOUS): SHALE, WEATHERED
- SEEPAGE ZONE
- 6DC-xx / CH: PRE CONSTRUCTION BORING W/LABORATORY DESCRIPTION
- (INTERVAL NOT TESTED)

FOR DETAILED LOGS OF BORINGS SEE PLATES 36 THRU 73

ATM. DR. NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

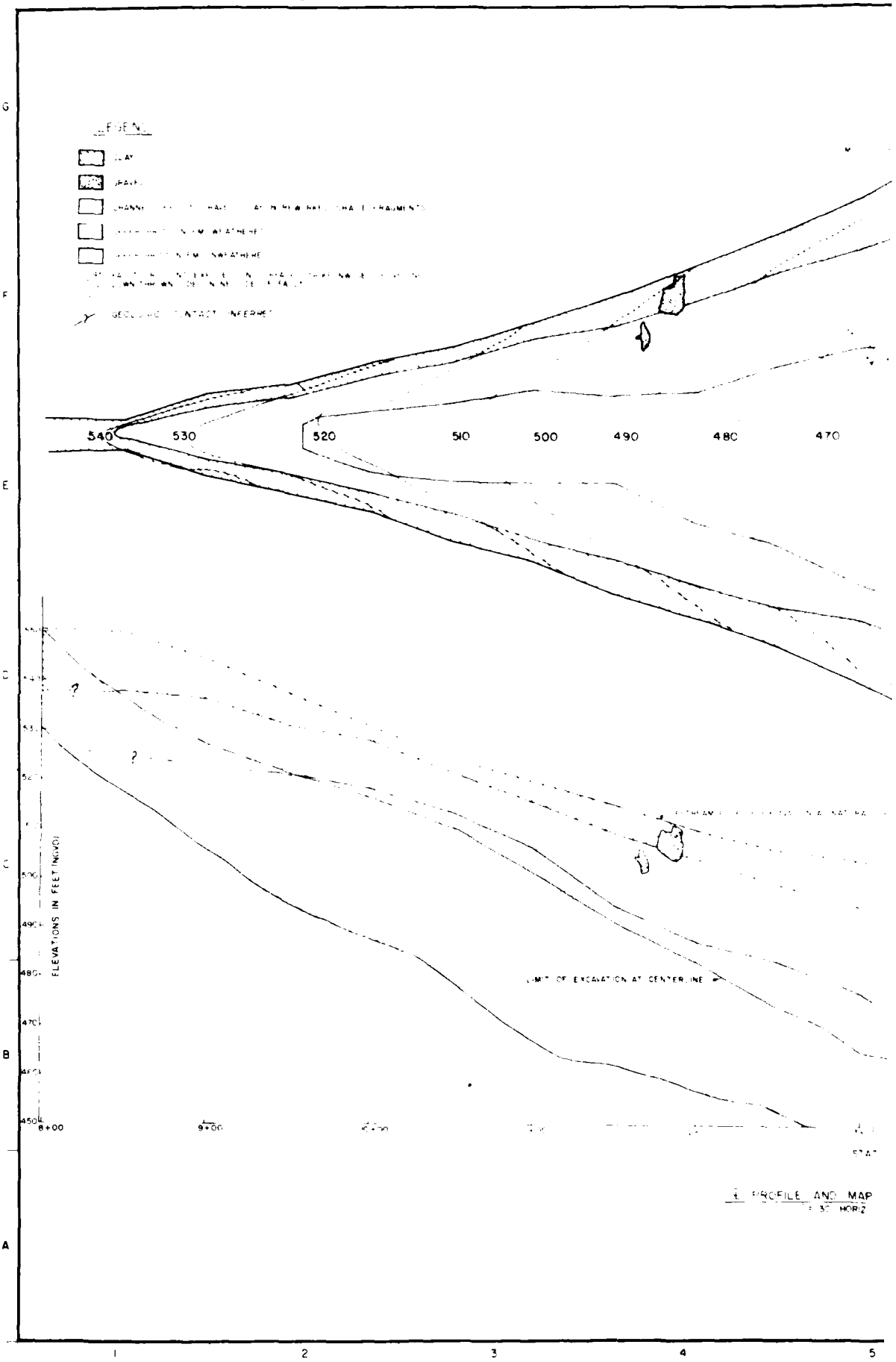
DESIGNED BY A.M.A.
DRAWN BY
REVIEWED BY

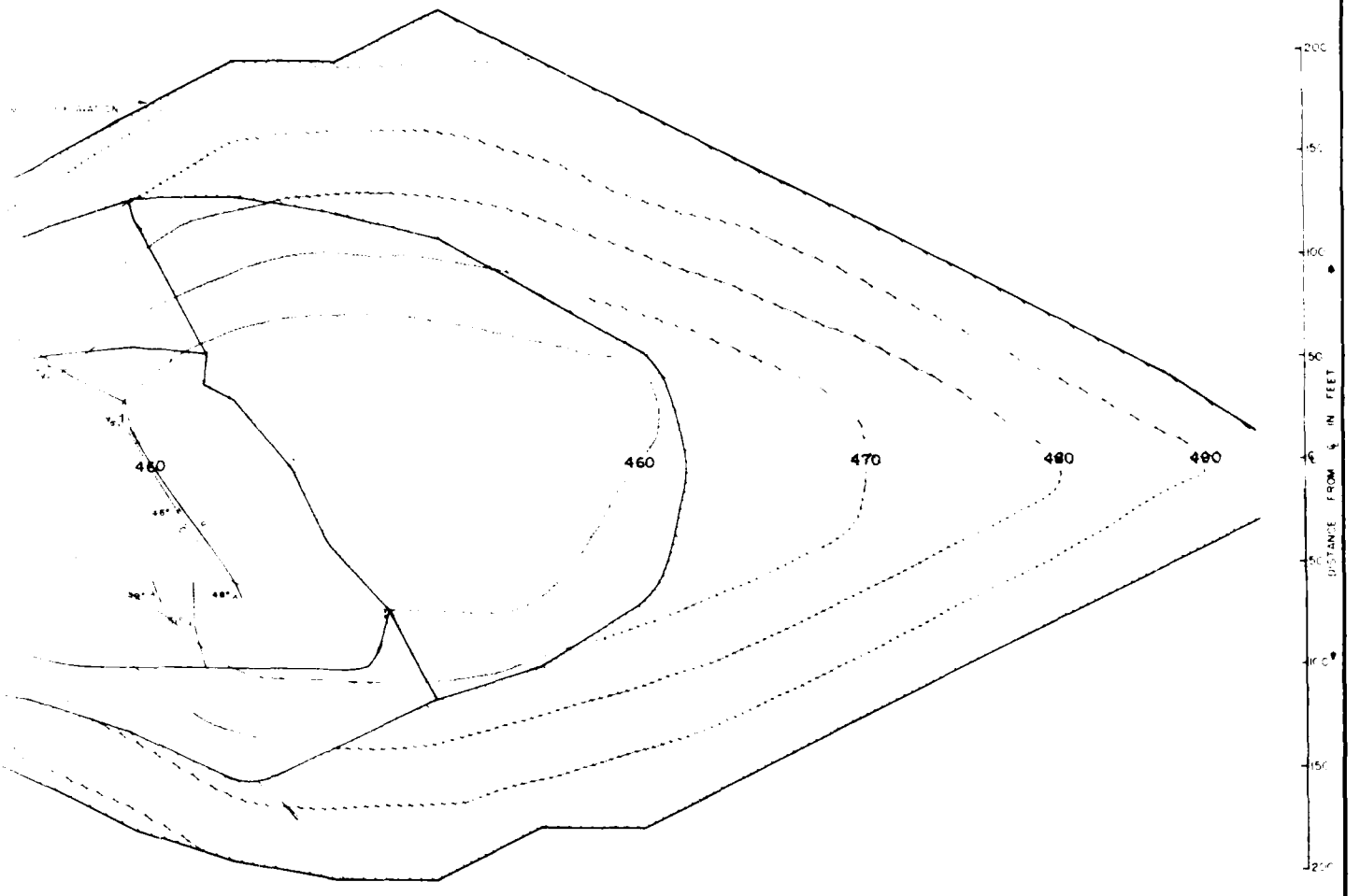
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 0+00 TO 8+00

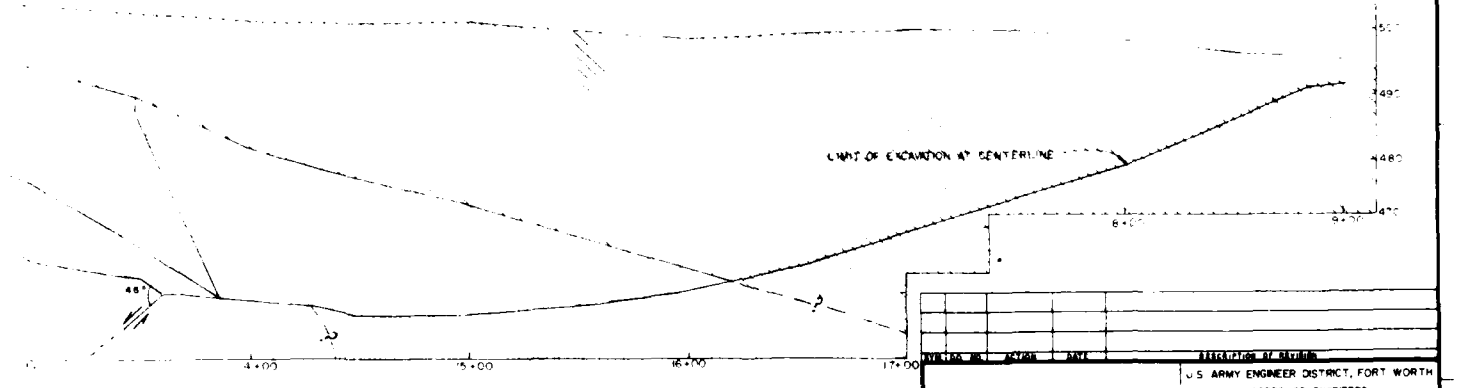
SUBMITTED BY
ENGINEER

INVITATION NO. | DATE
CONTRACT NO
DRAWING NUMBER | SHEET NO. OF | SEQUENCE NO. 14
CONTRACT NO


LEGEND
CLAY
SHALE
SEDIMENTARY ROCK
540
530
520
510
500
490
480
470
ELEVATIONS IN FEET (NGVD)
LIMIT OF EXCAVATION AT CENTERLINE
8+00
9+00
PROFILE AND MAP
1" = 30' HORIZ



PLAN

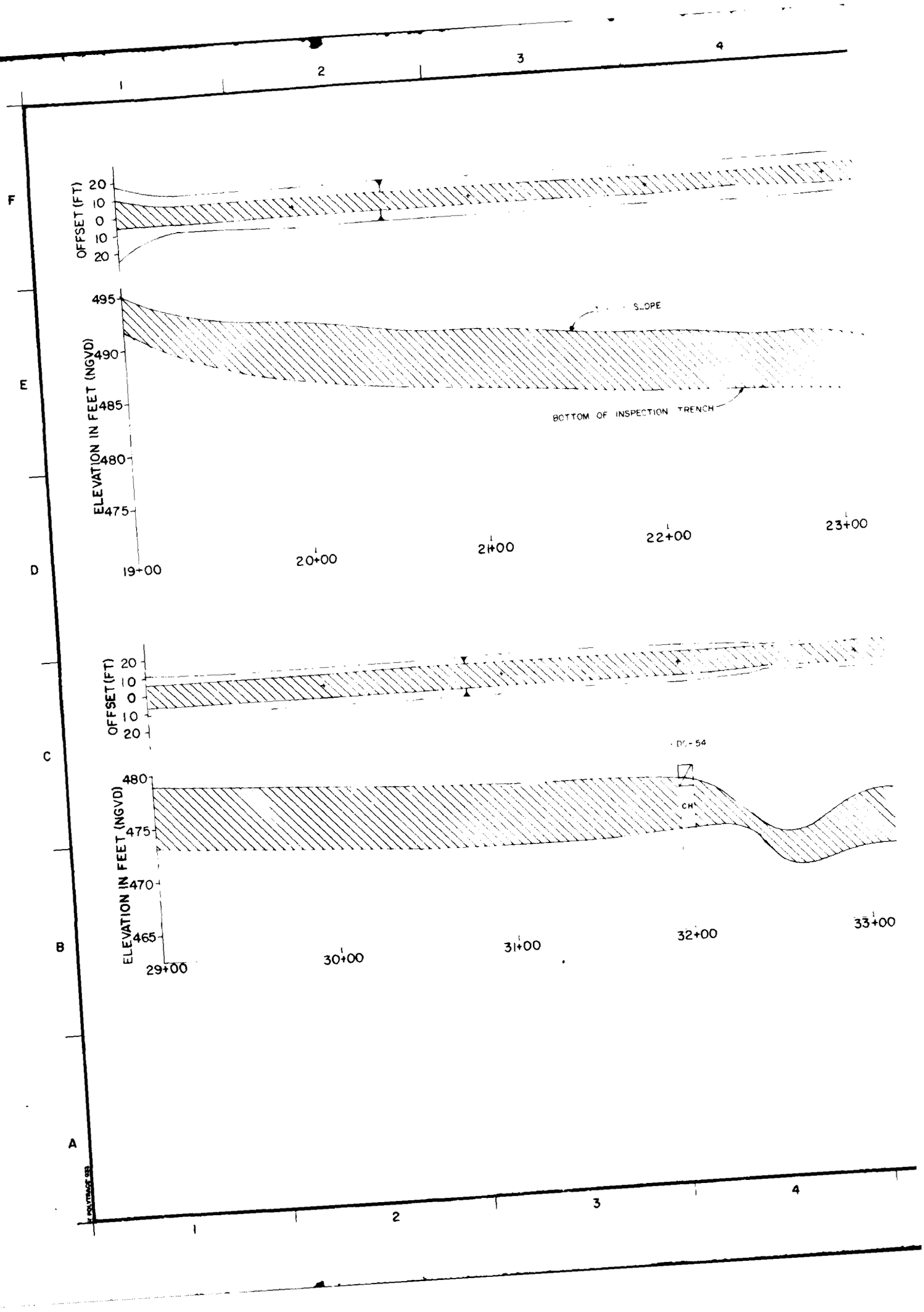


STATIONS IN FEET

MAP OF UPSTREAM EXCAVATION SLOPE

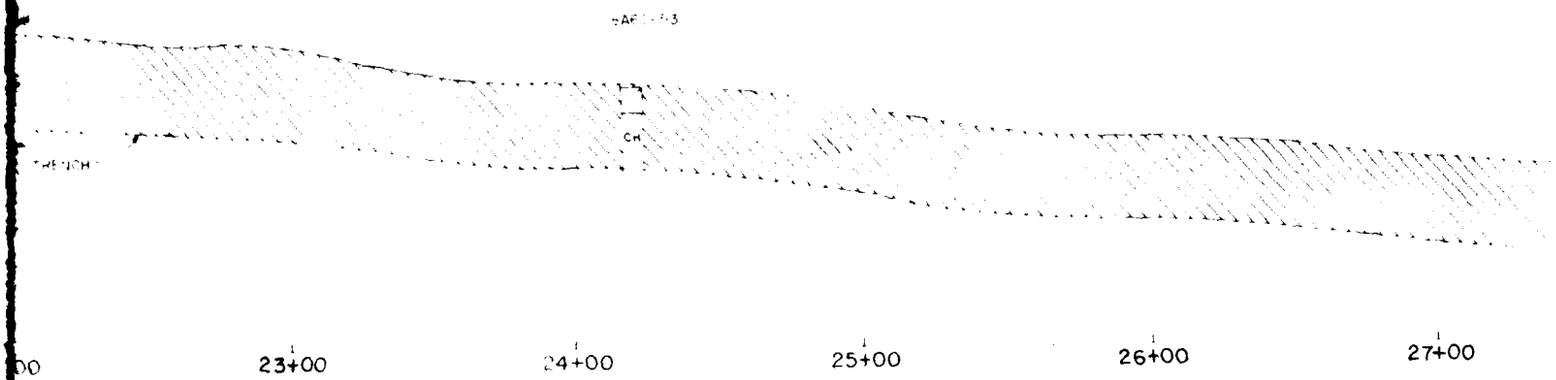
DESIGNED BY A. MARR		U.S. ARMY ENGINEER DISTRICT, FORT WORTH CORPS OF ENGINEERS FORT WORTH, TEXAS		
DRAWN BY C. KIRBY	JOE POOL LAKE MOUNTAIN CREEK, TEXAS			
REVIEWED BY R. BEHM	RIGHT ABUTMENT DEEP INSPECTION TRENCH AS-BUILT PLAN AND PROFILE STATION 8+00 TO 19+00			
SUBMITTED BY ROBERT BEHM ENGINEER	ROL NO	DATED	SEQUENCE NO 15	CORPS NO
	CONTR NO			
	DRAWING NUMBER	SHEET NO OF		

TO ACCOMPANY FINAL FOUNDATION REPORT


OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
495
490
485
480
475
SLOPE
BOTTOM OF INSPECTION TRENCH
19+00
20+00
21+00
22+00
23+00
OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
480
475
470
465
DC-54
CH
29+00
30+00
31+00
32+00
33+00

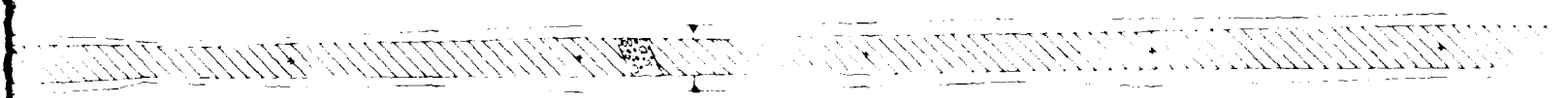
4 5 6 7 8

PLAN

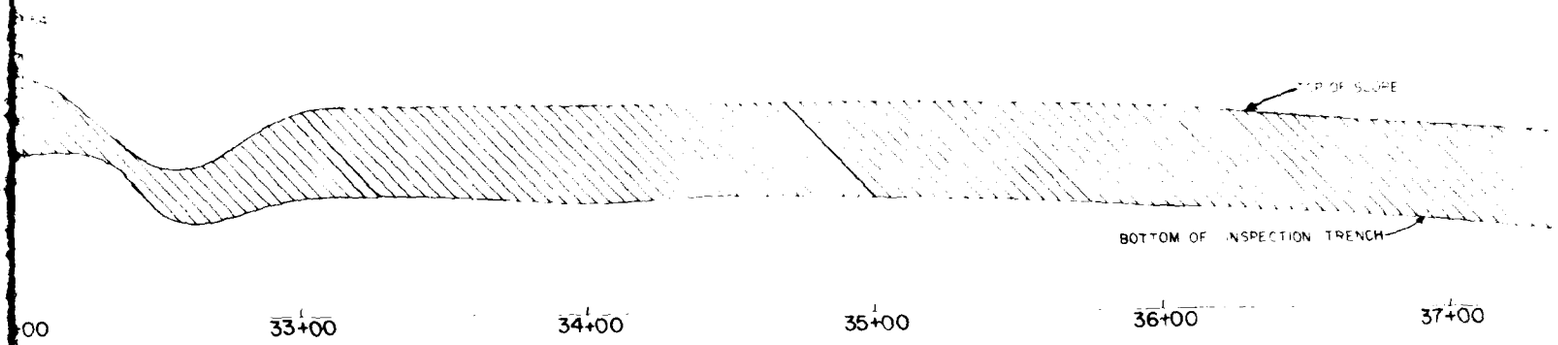


PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)



PLAN



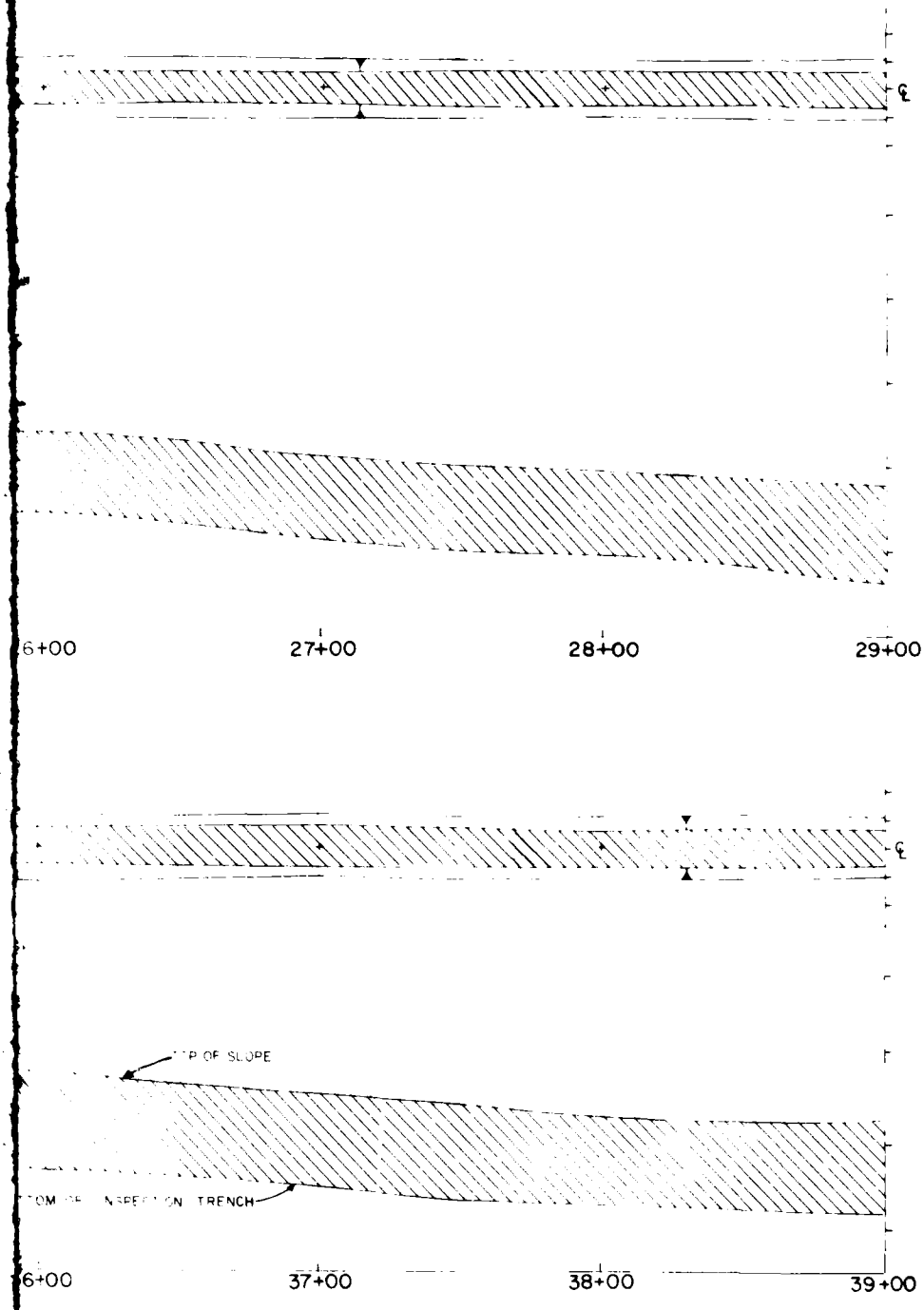
PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

NOTES

1 FOR LEGEND SEE PLATE 14.
2 FOR DETAILED LOGS OF BORINGS PLATES 36 THRU 73.

4 5 6 7 8



SYM.	DWG. NO.	ACTION	DATE	DESCRIPTION OF REVISION

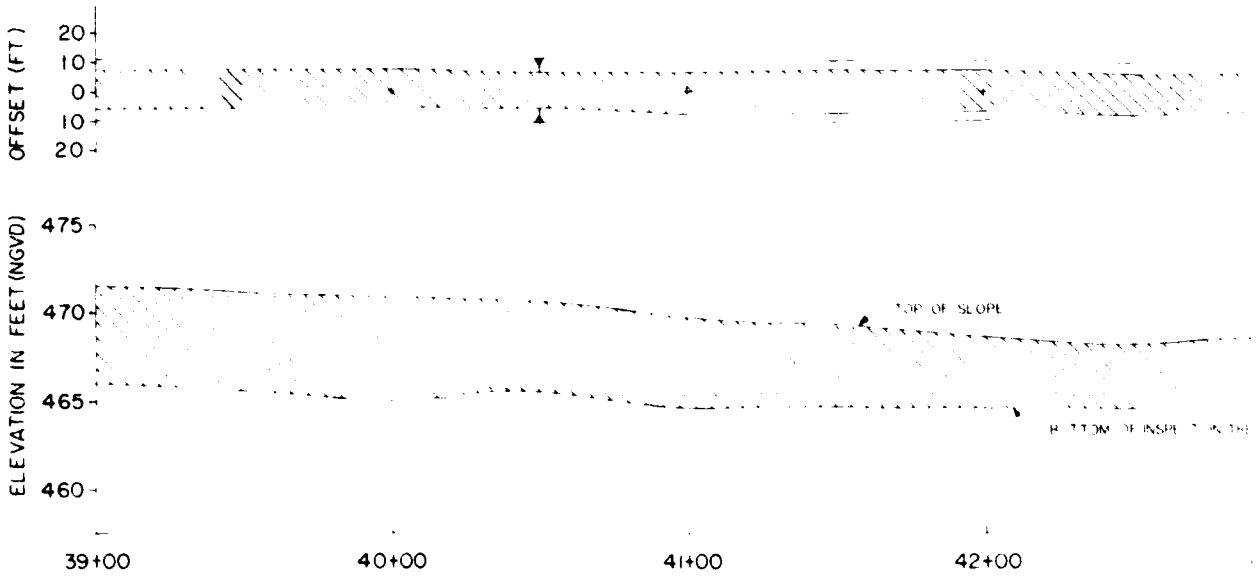
U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

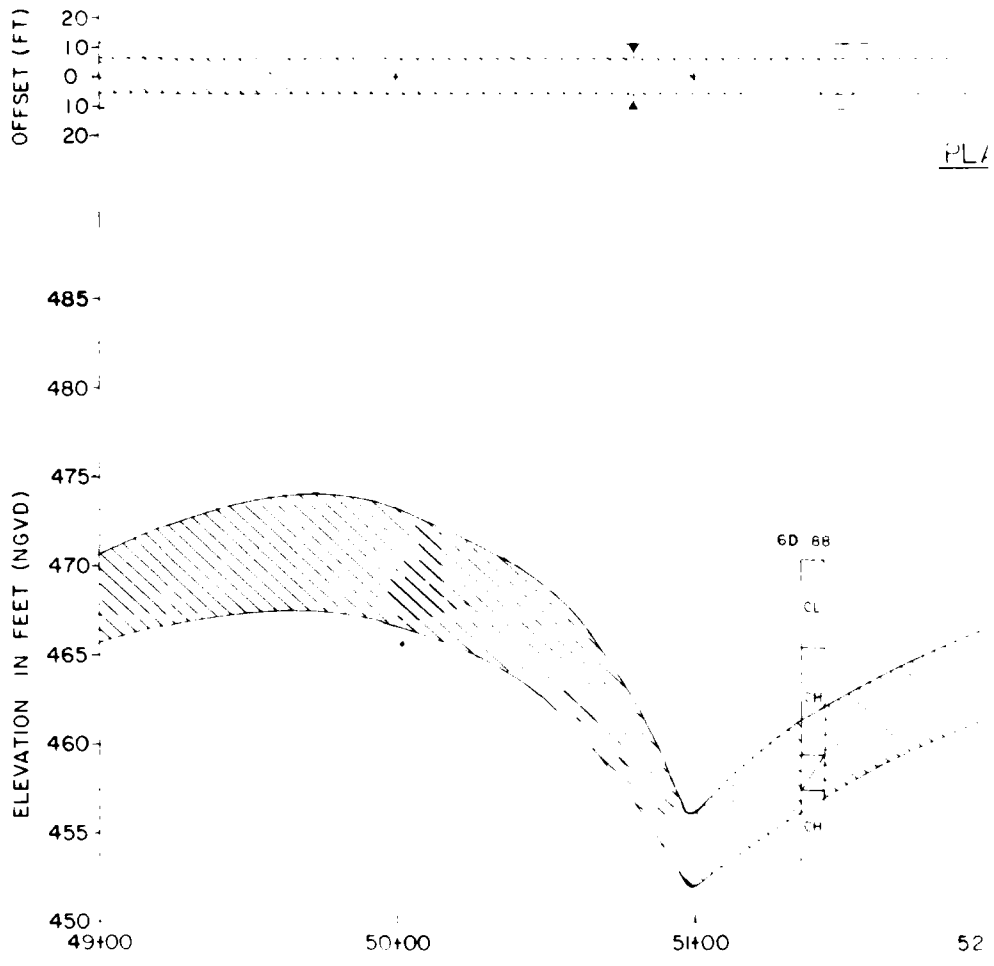
DESIGNED BY A.MARR
DRAWN BY C.KIRBY
REVIEWED BY R.BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS
INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 19+00 THRU 39+00

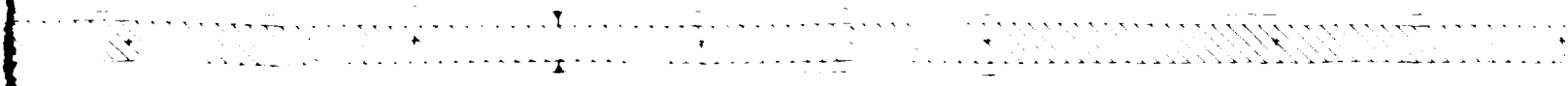
SUBMITTED BY ROBERT BEHM
ENGINEER

INVITATION NO. | DATE
CONTRACT NO.
DRAWING NUMBER | SHEET NO. OF
SEQUENCE NO. 16
CONTRACT NO.

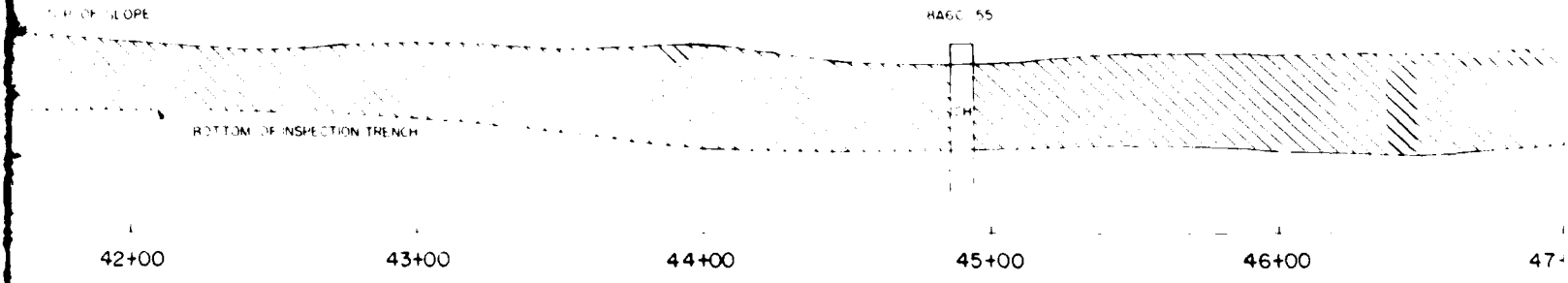

OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
475
470
465
460
TOP OF SLOPE
39+00
40+00
41+00
42+00


OFFSET (FT)
20
10
0
10
20
485
480
475
470
465
460
455
450
ELEVATION IN FEET (NGVD)
6D 68
CL
49+00
50+00
51+00

PROFILE

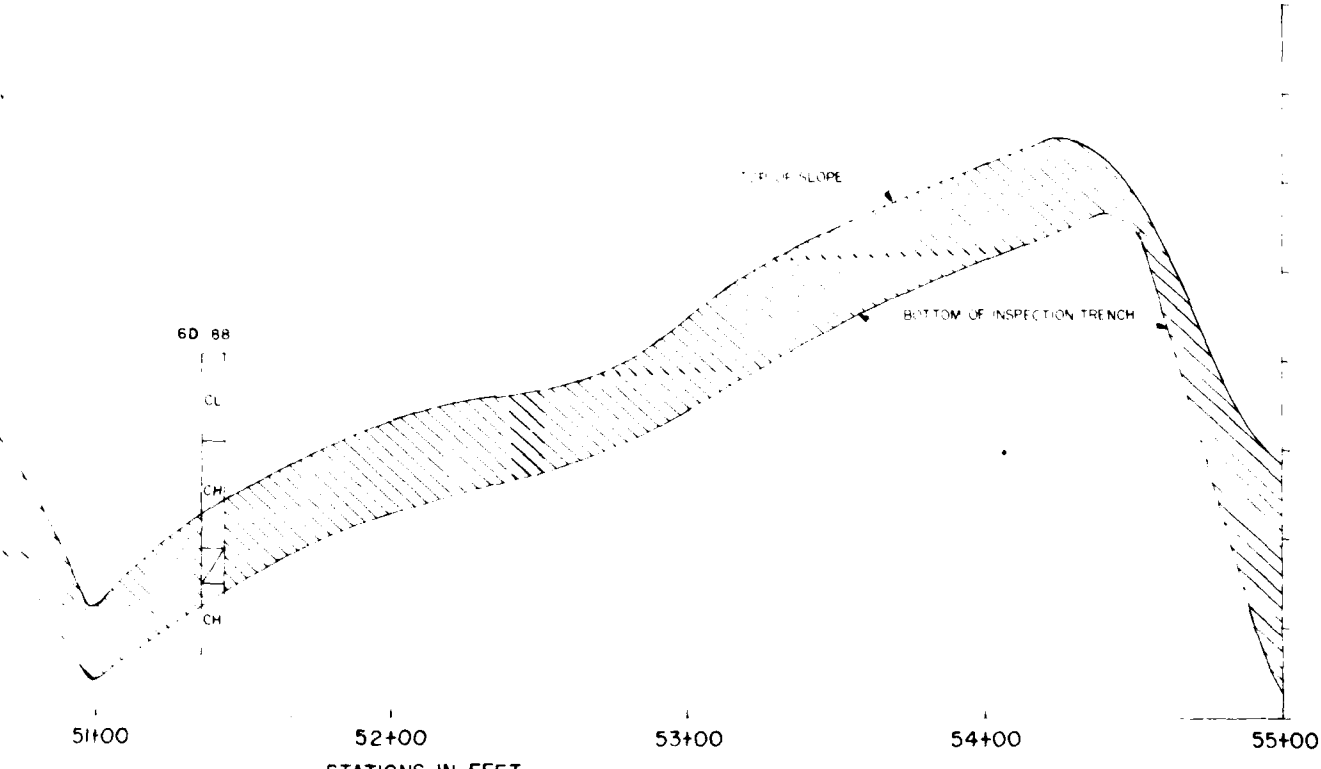


PLAN

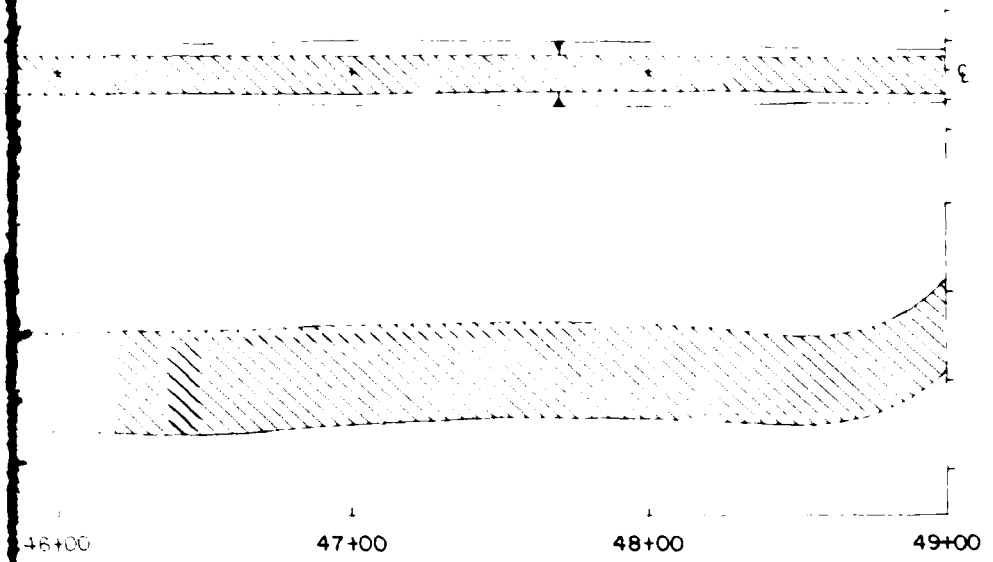


PROFILE
STATIONS IN FEET
(LOOKING UPSTREAM)

PLAN



PROFILE STATIONS IN FEET
(LOOKING UPSTREAM)



NOTES

1 FOR LEGEND SEE PLATE 14

2 FOR DETAILED LOGS OF BORINGS SEE PLATES 36 THRU 73.

SYM	NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

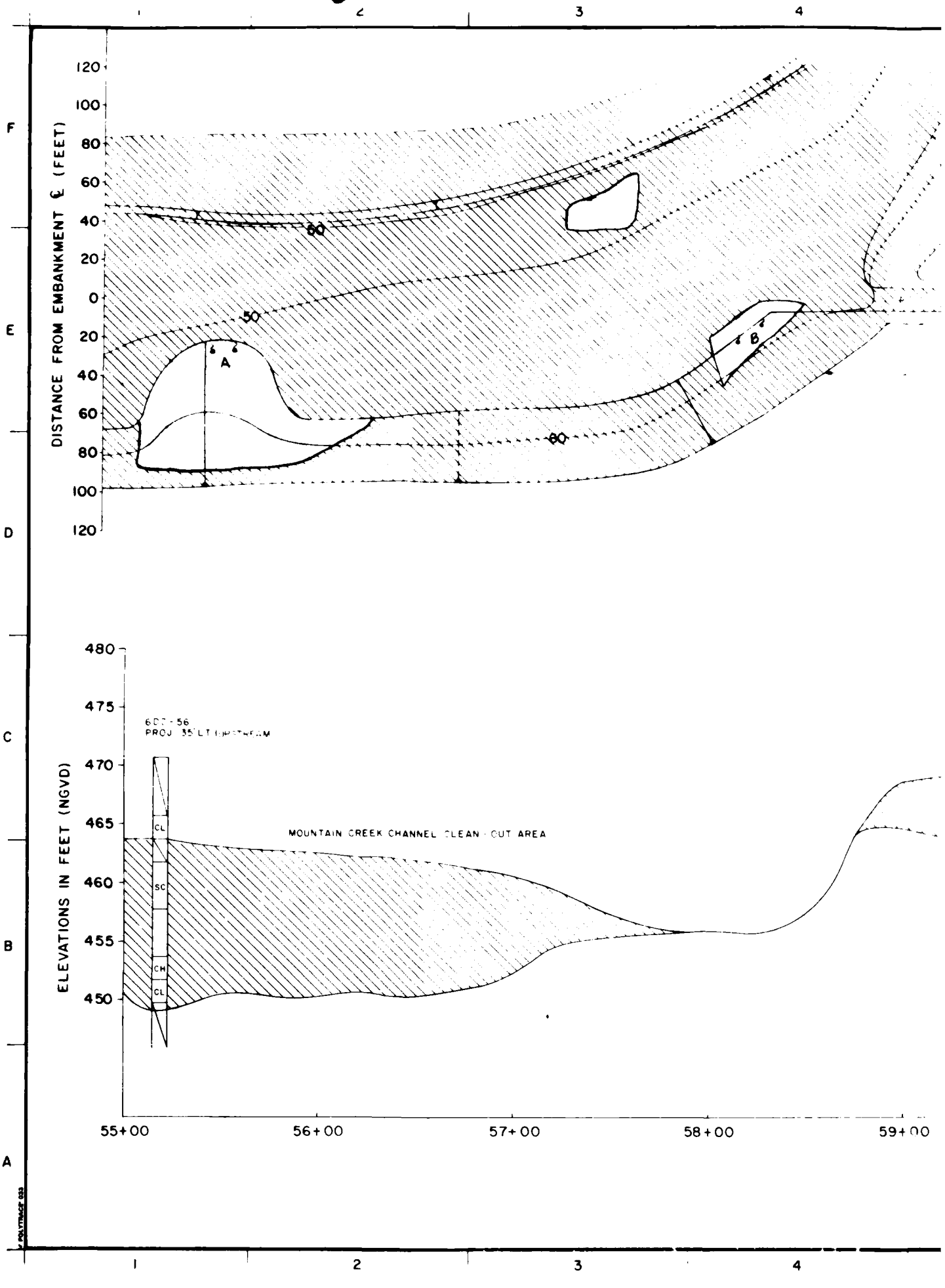
DESIGNED BY A. MARR
DRAWN BY R. SHIELDS
REVIEWED BY R. BEHM

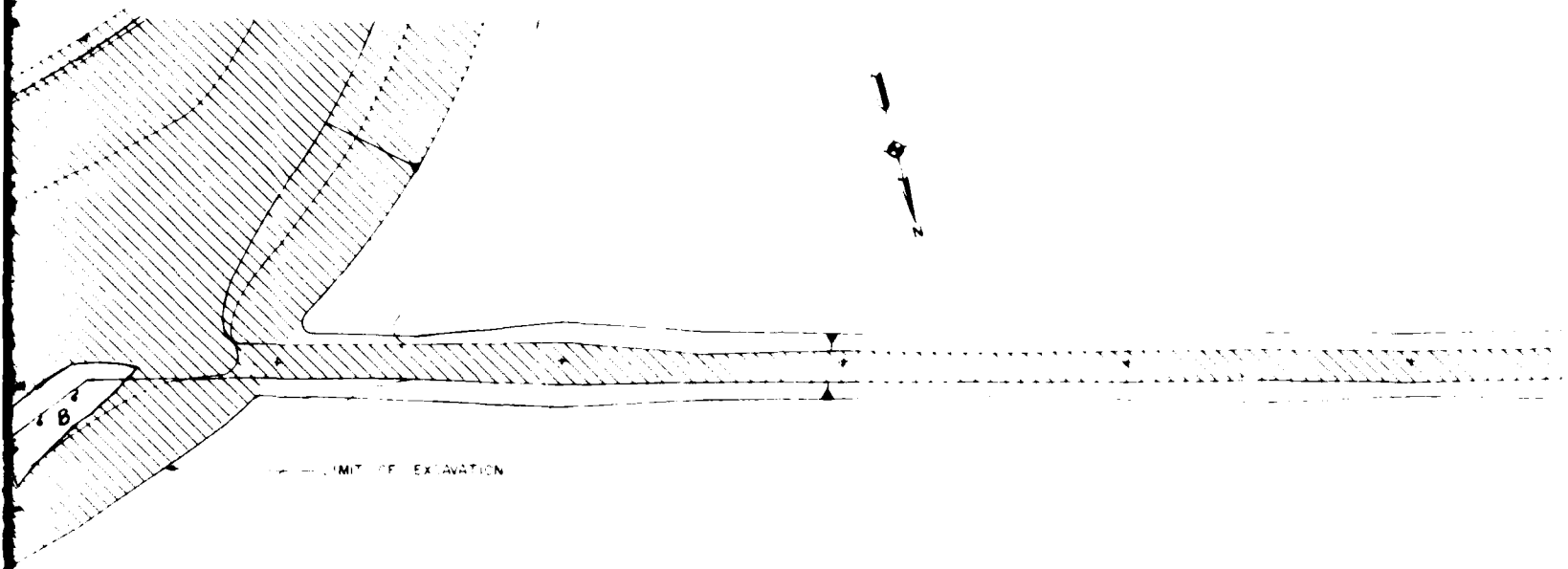
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 39+00 TO 55+00

SUBMITTED BY ROBERT BEHM
ENGINEER

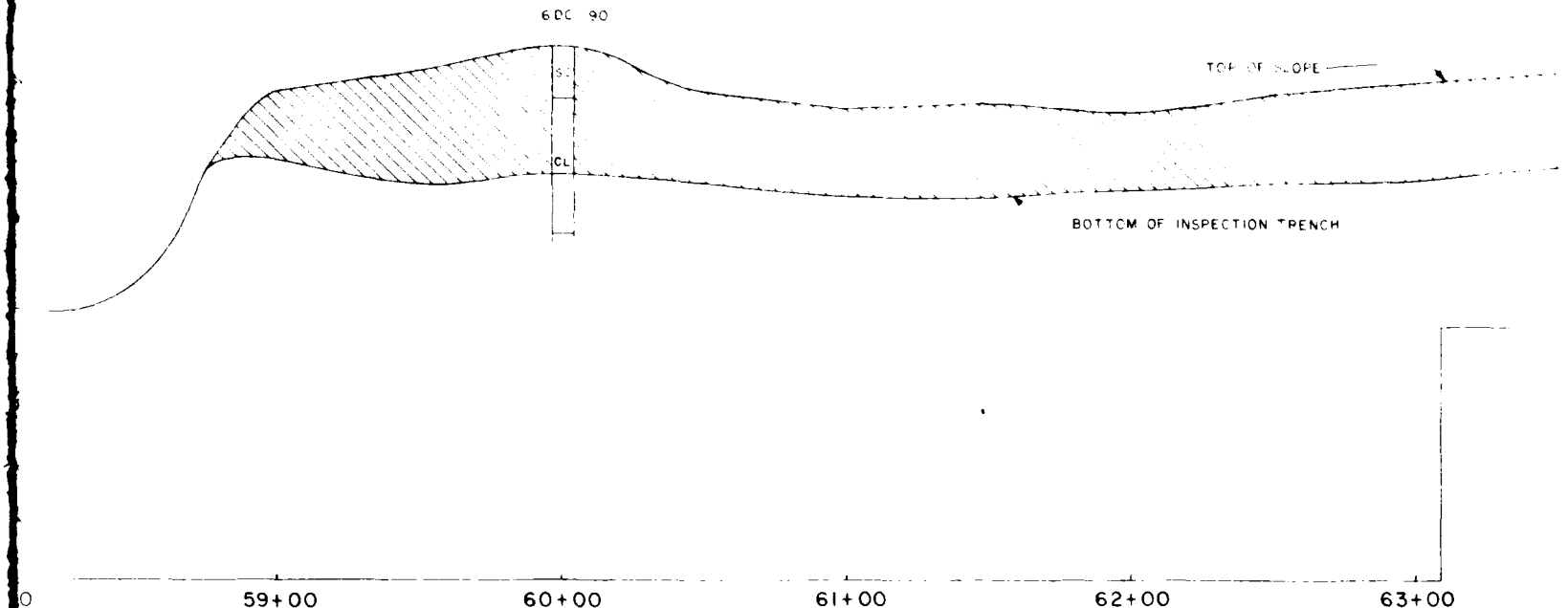
INVITATION NO. | DATE
CONTRACT NO
DRAWING NUMBER | SHEET NO OF
SEQUENCE NO 17
CONTRACT NO


DISTANCE FROM EMBANKMENT ℄ (FEET)
120
100
80
60
40
20
0
20
40
60
80
100
120
50
60
A
B
ELEVATIONS IN FEET (NGVD)
480
475
470
465
460
455
450
CL
SC
CH
CL
MOUNTAIN CREEK CHANNEL CLEAN-OUT AREA
55+00
56+00
57+00
58+00
59+00
1
2
3
4
A
B
C
D
E
F



PLAN

CONTOUR INTERVAL



PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

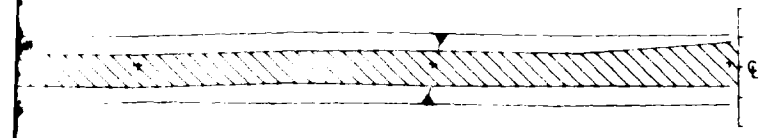
NOTES

1 FOR LEGEND SEE PLATE 14
2 FOR DETAILED LOGS OF BORINGS SEE PLATES 56 THRU 73

8 9 10

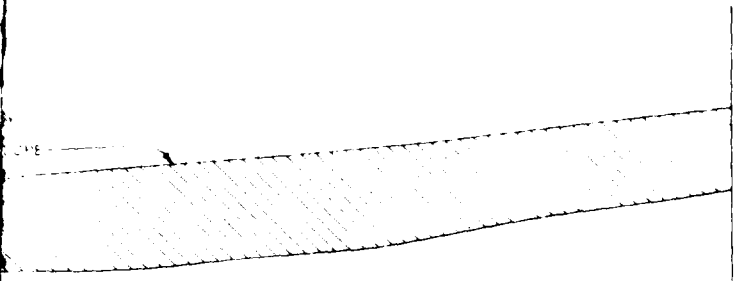
F

E



D

C



B

63+00

GS SEE

SYMBOL NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A. MARR
DRAWN BY M. MINOR
REVIEWED BY R. BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

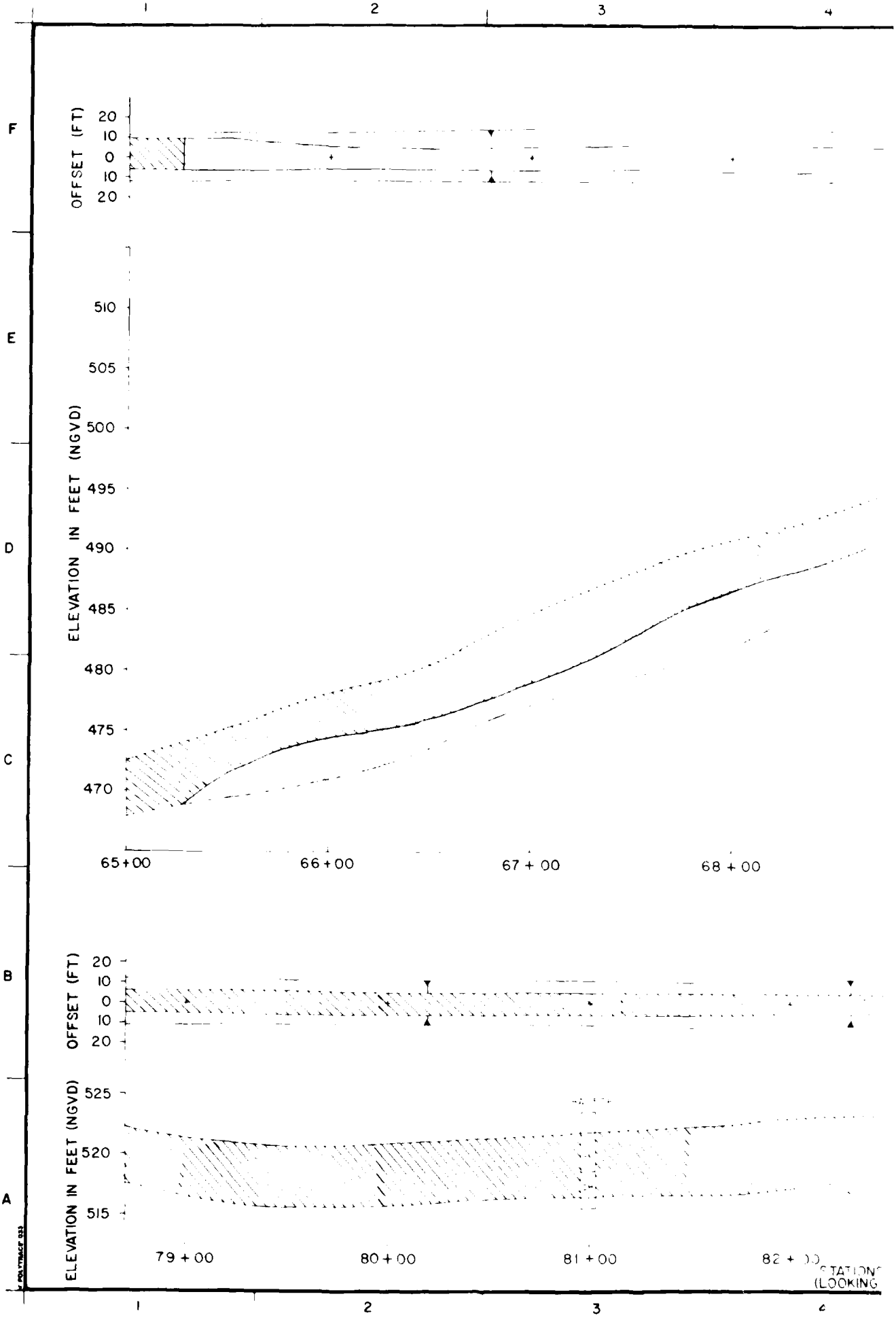
INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 55+00 TO 65+00

SUBMITTED BY
ROBERT BEHM
ENGINEER

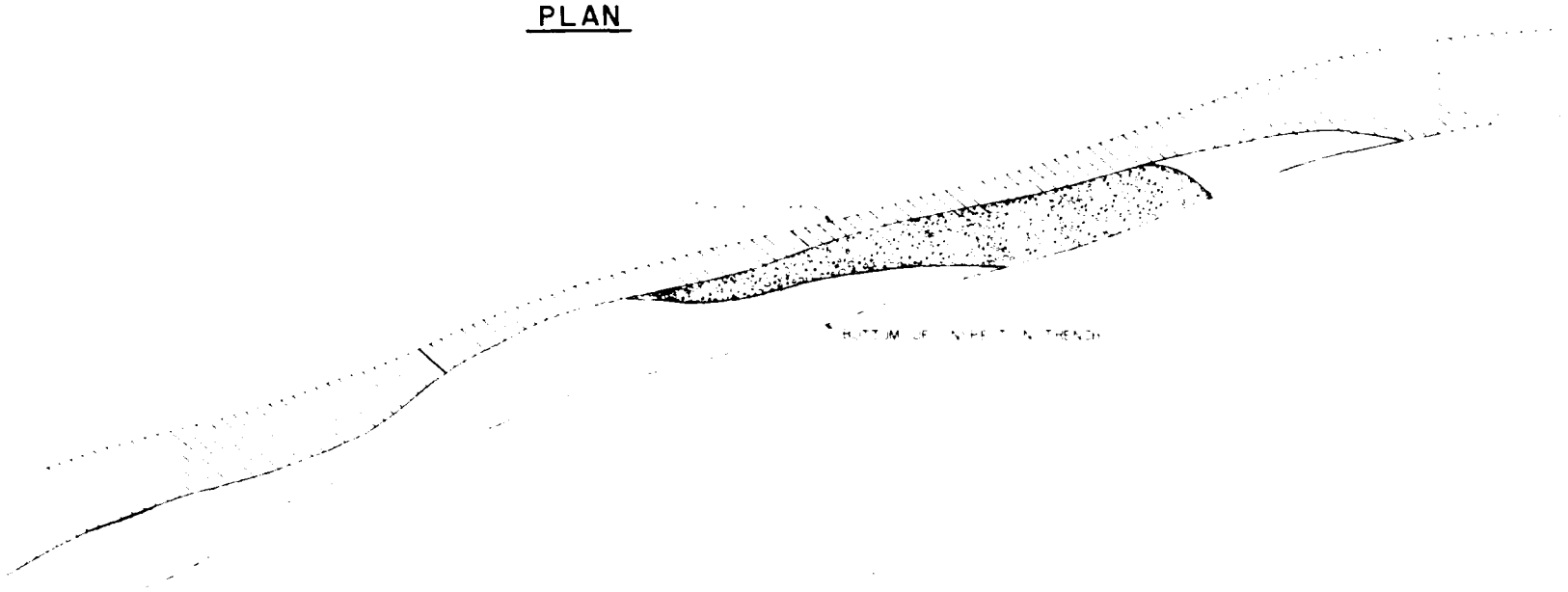
INVITATION NO.
DATE
CONTRACT NO.
DRAWING NUMBER
SHEET NO. OF
SEQUENCE NO. 18
CONTRACT NO.

8

ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
F
E
D
C
B
A
OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
510
505
500
495
490
485
480
475
470
65+00
66+00
67+00
68+00
OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
525
520
515
79+00
80+00
81+00
82+00
STATIONS
(LOOKING
1
2
3
4

PLAN

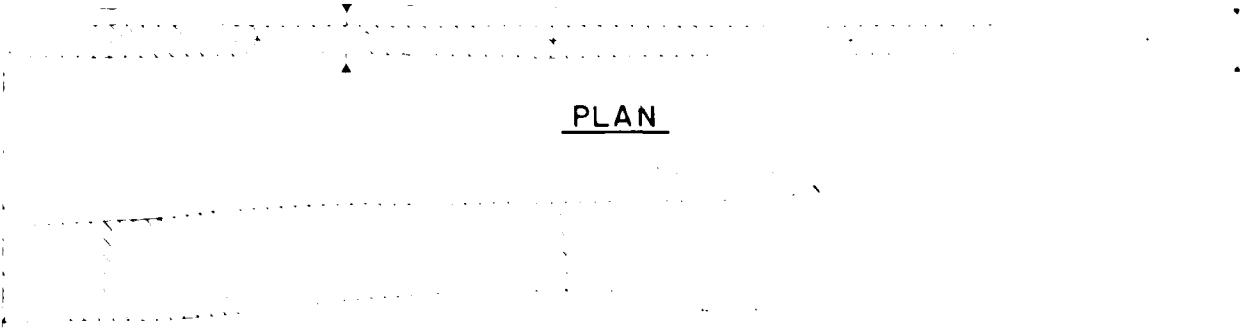


68+00 69+00 70+00 71+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

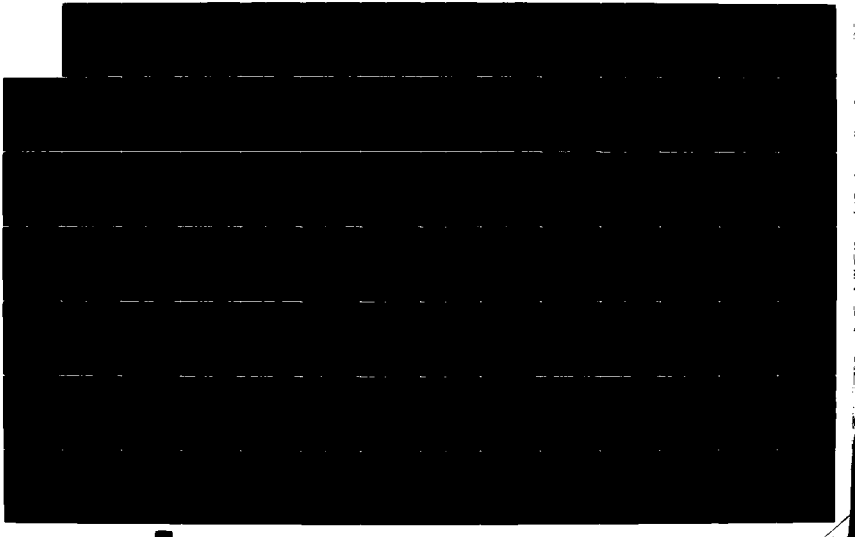
PLAN

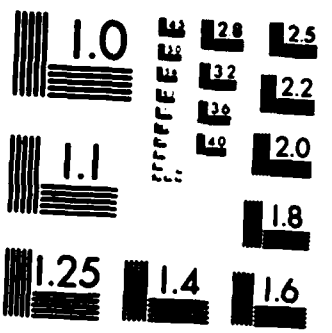


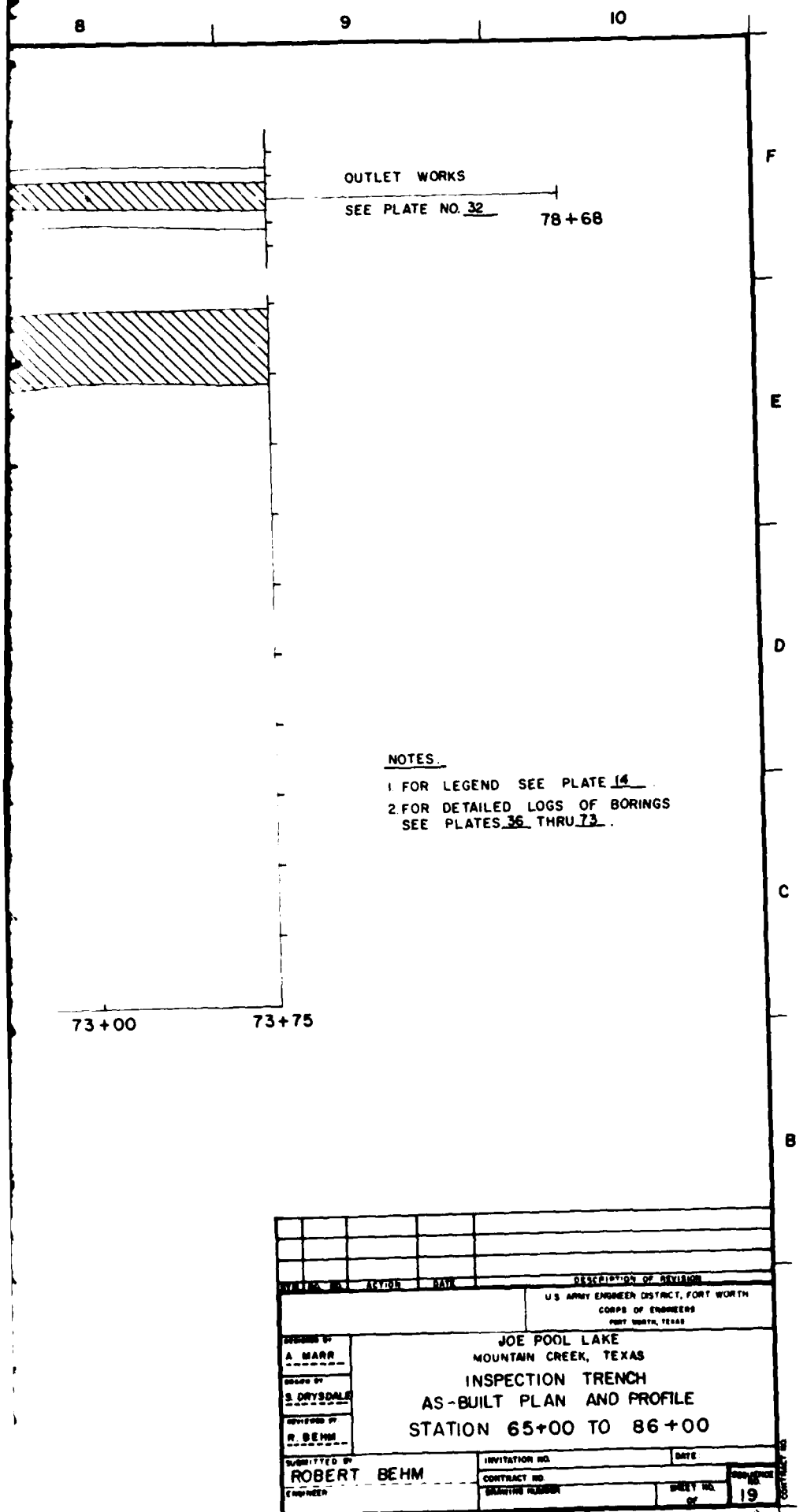
PROFILE

AD-A193 342 COMPLETION OF EMBANKMENT AND SPILLWAY JOE POOL LAKE MOUNTAIN CREEK TEXAS(U) ARMY ENGINEER DISTRICT FORT WORTH TX A J MARR FEB 88 2/3

UNCLASSIFIED F/G 13/2 NL







NOTES.

1. FOR LEGEND SEE PLATE 14.
2. FOR DETAILED LOGS OF BORINGS SEE PLATES 36 THRU 73.

NO.	REVISION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A. MARR
DRAWN BY S. DRYSDALE
CHECKED BY R. BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS
INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 65+00 TO 86+00

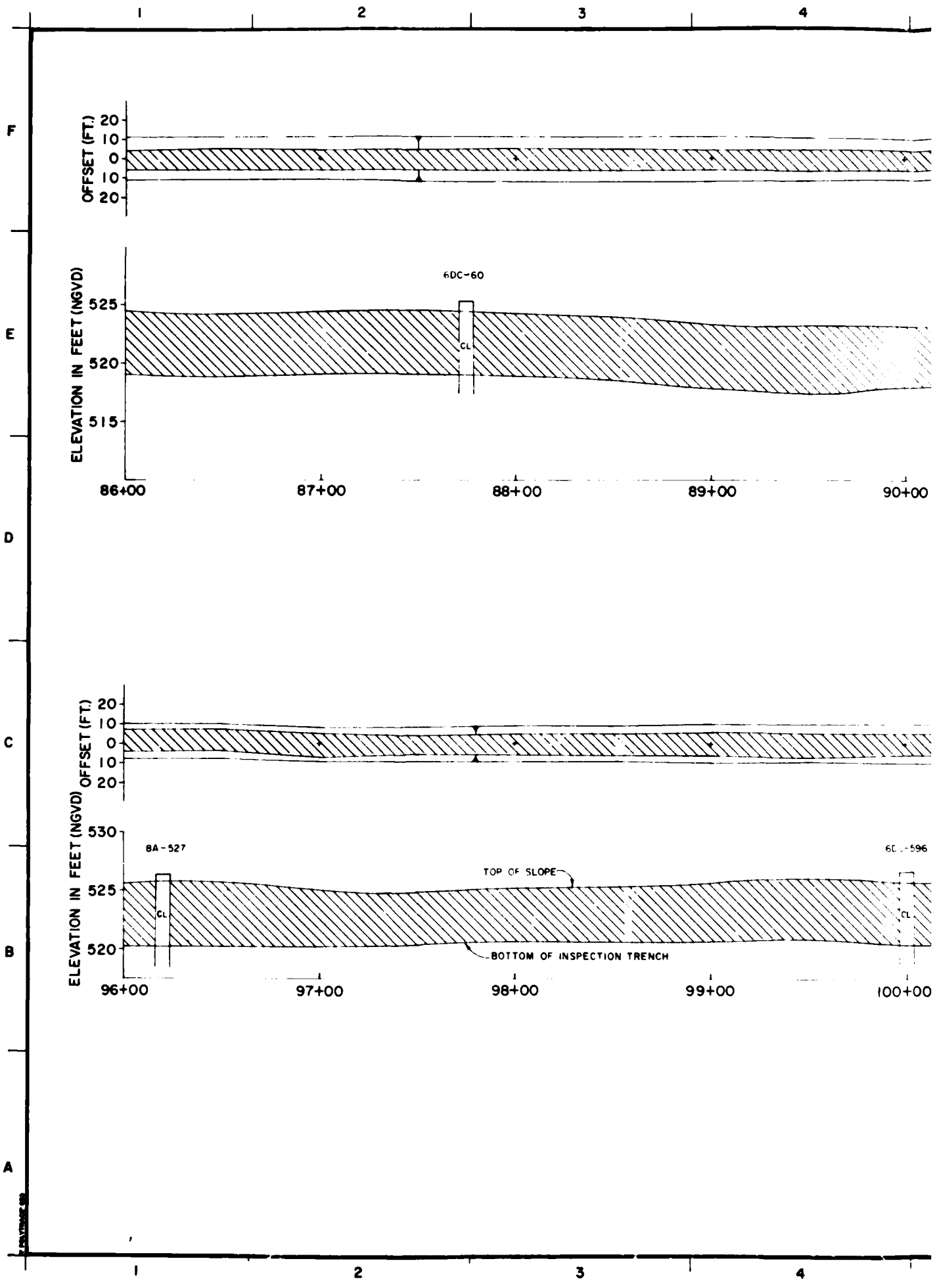
SUBMITTED BY ROBERT BEHM
ENGINEER

INVITATION NO. | DATE
CONTRACT NO.
DRAWING NUMBER | SHEET NO. OF

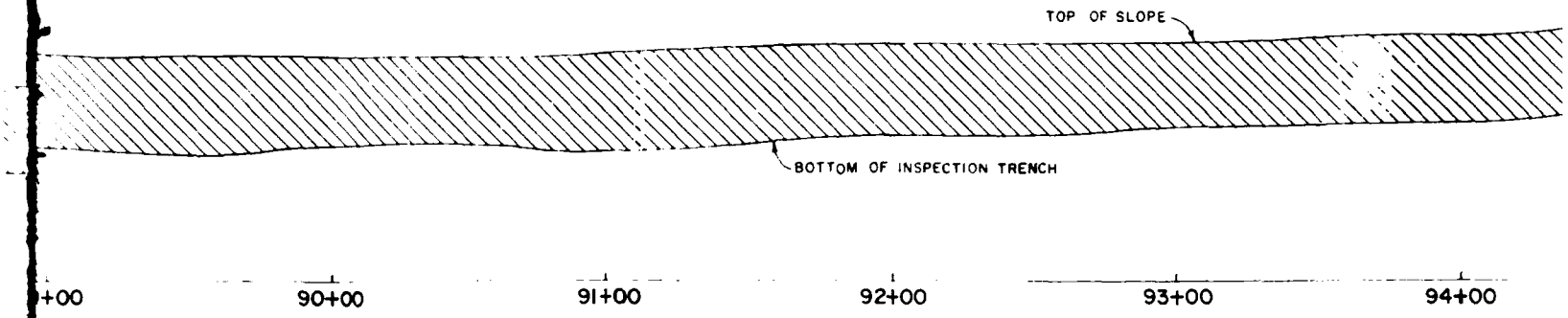
DRAWING NO. 19
CONTRACT NO.

8 1

TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
F
E
D
C
B
A
OFFSET (FT.)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
525
520
515
6DC-60
CL
86+00
87+00
88+00
89+00
90+00
OFFSET (FT.)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
530
525
520
8A-527
CL
TOP OF SLOPE
BOTTOM OF INSPECTION TRENCH
CL
96+00
97+00
98+00
99+00
100+00

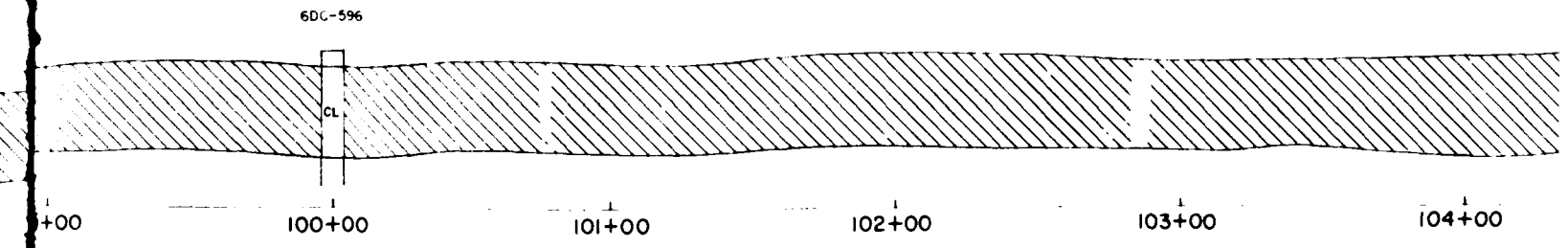
PLAN



PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

PLAN



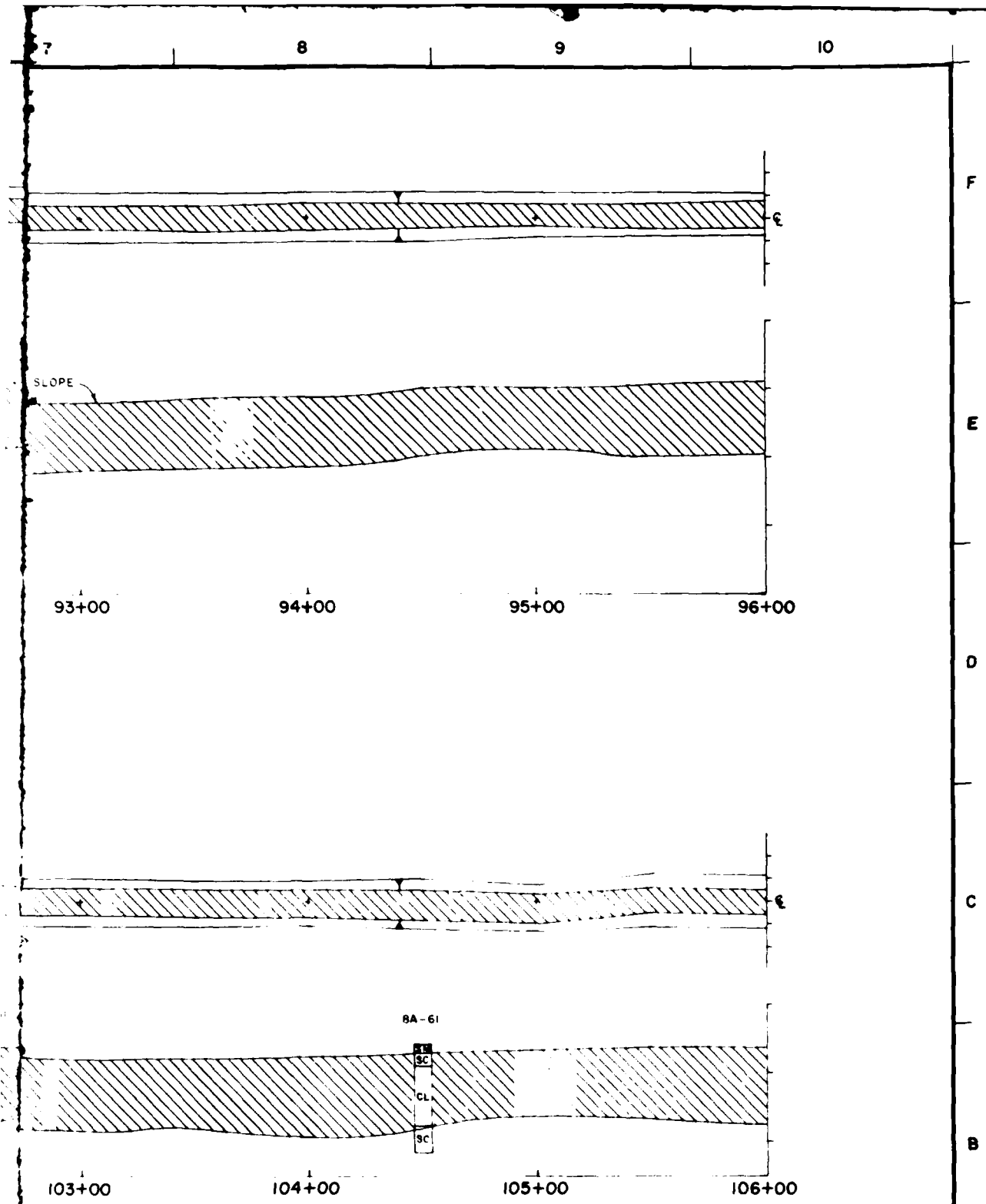
PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

NOTES

1 FOR LEGEND SEE PLATE 14

2 FOR DETAILED LOGS OF BORINGS SEE PLATES 36 THRU 75



LEGEND SEE PLATE 14

DETAILED LOGS OF BORINGS SEE ES 36 THRU 73

NO.	REVISIONS	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

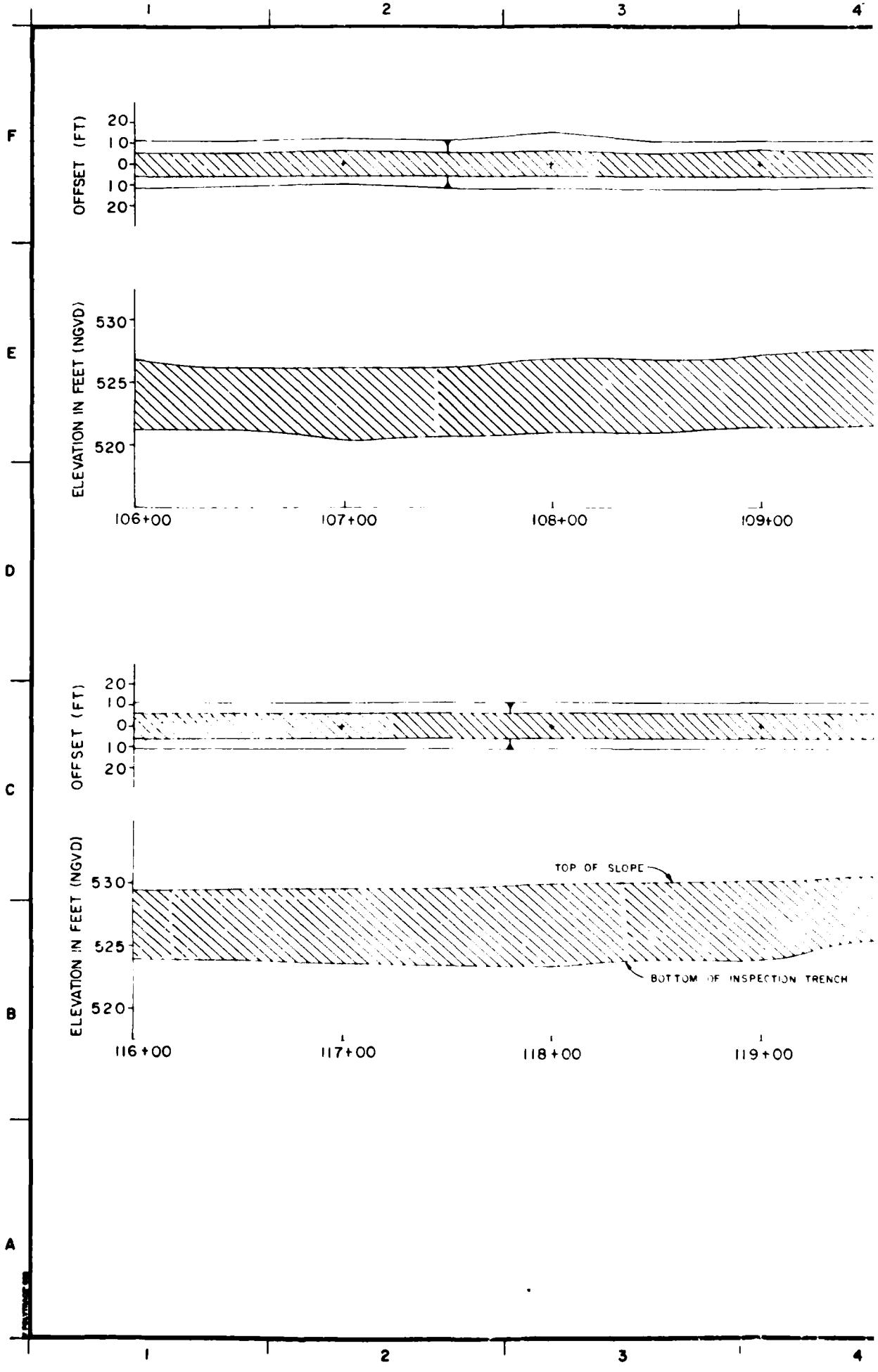
DESIGNED BY A. MARR
DRAWN BY A. MARR
REVIEWED BY R. BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

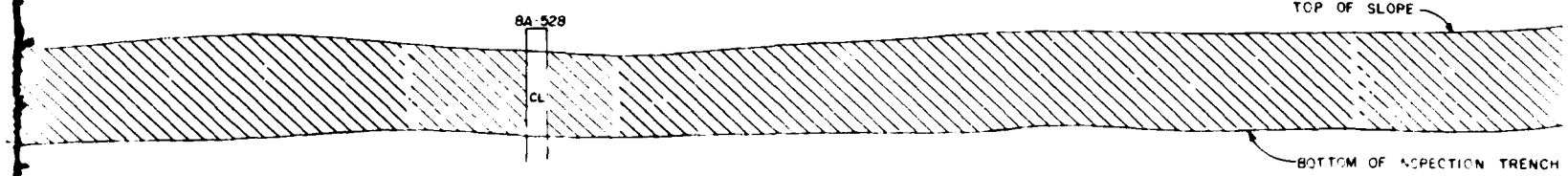
INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 86+00 TO 106+00

SUBMITTED BY ROBERT BEHM
ENGINEER

INVITATION NO. | DATE
CONTRACT NO.
DRAWING NUMBER | SHEET NO. OF | DRAWING NO. 20


1
2
3
4
F
E
D
C
B
A
OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
530
525
520
106+00
107+00
108+00
109+00
OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
530
525
520
TOP OF SLOPE
BOTTOM OF INSPECTION TRENCH
116+00
117+00
118+00
119+00

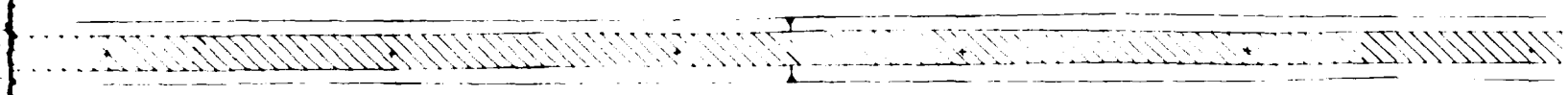
PLAN



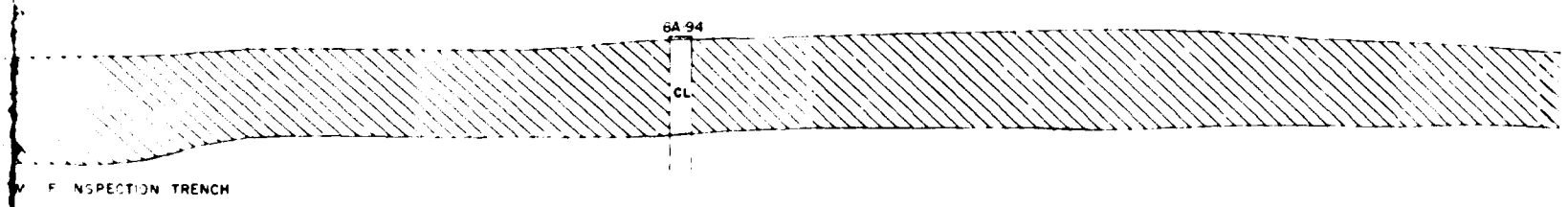
109+00 110+00 111+00 112+00 113+00 114+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)



PLAN



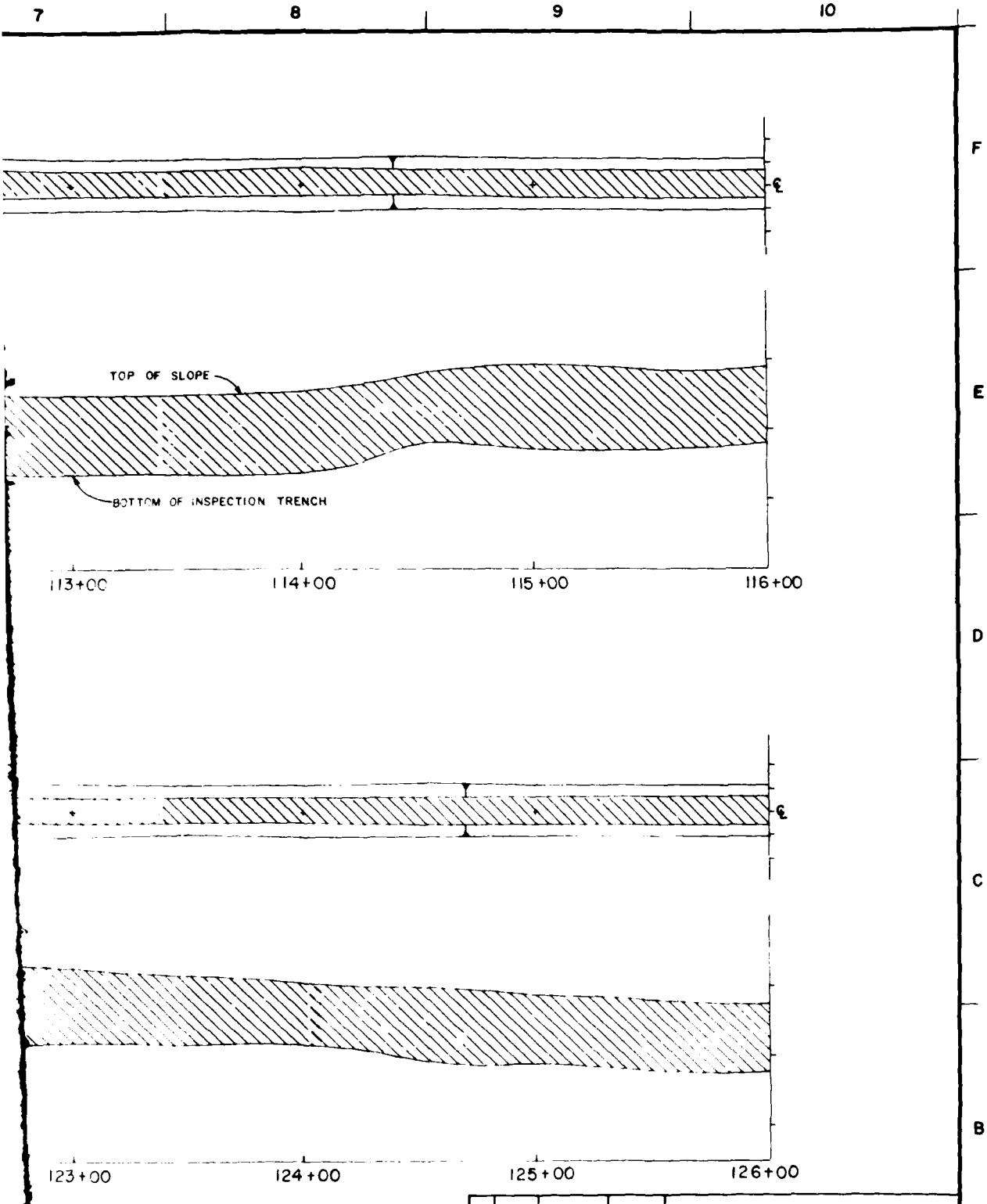
119+00 120+00 121+00 122+00 123+00 124+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

NOTES

1. FOR LEGEND SEE PLATE 14
2. FOR DETAILED LOGS OF BORINGS SEE PLATES 36 THRU 73



LEGEND SEE PLATE 14

DETAILED LOGS OF BORINGS SEE
TES 36 THRU 73

SYM	NO.	ACTION	DATE	DESCRIPTION OF REVISION

US ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A. MARR
DRAWN BY S. WOMACK
REVIEWED BY R. BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 106+00 TO 126+00

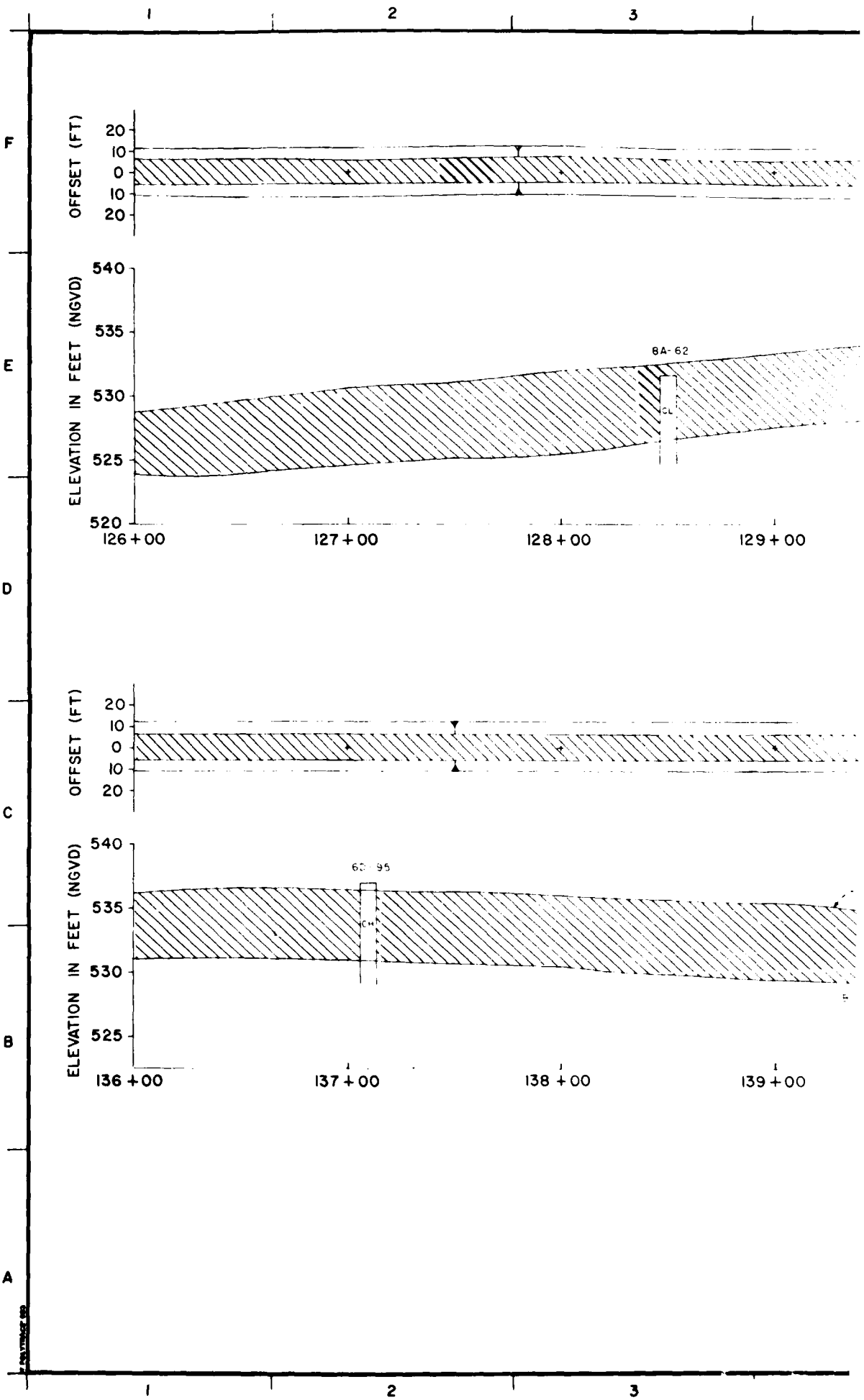
SUBMITTED BY ROBERT BEHM
ENGINEER

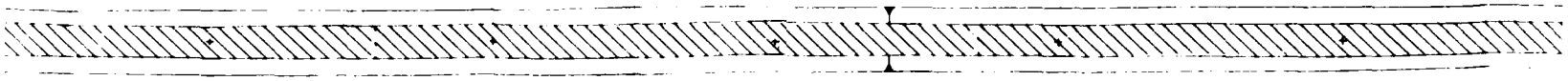
INVITATION NO. | DATE
CONTRACT NO.
DRAWING NUMBER | SHEET NO. OF

DRAWING NO. 21

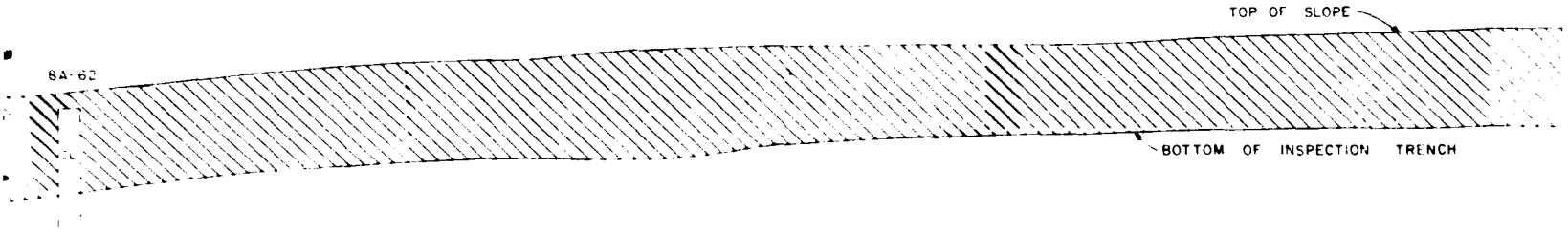
CONTRACT NO.

TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
F
E
D
C
B
A
OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
540
535
530
525
520
8A-62
CL
126+00
127+00
128+00
129+00
OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
540
535
530
525
63-95
CH
136+00
137+00
138+00
139+00



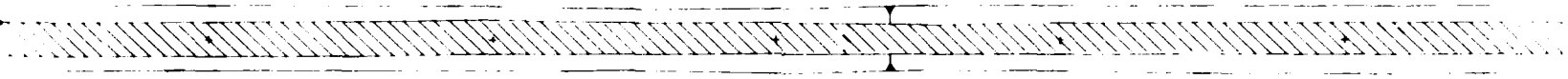
PLAN



129+00 130+00 131+00 132+00 133+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)



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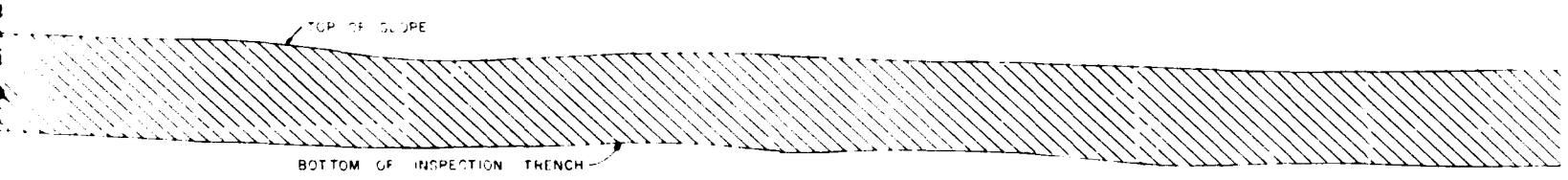


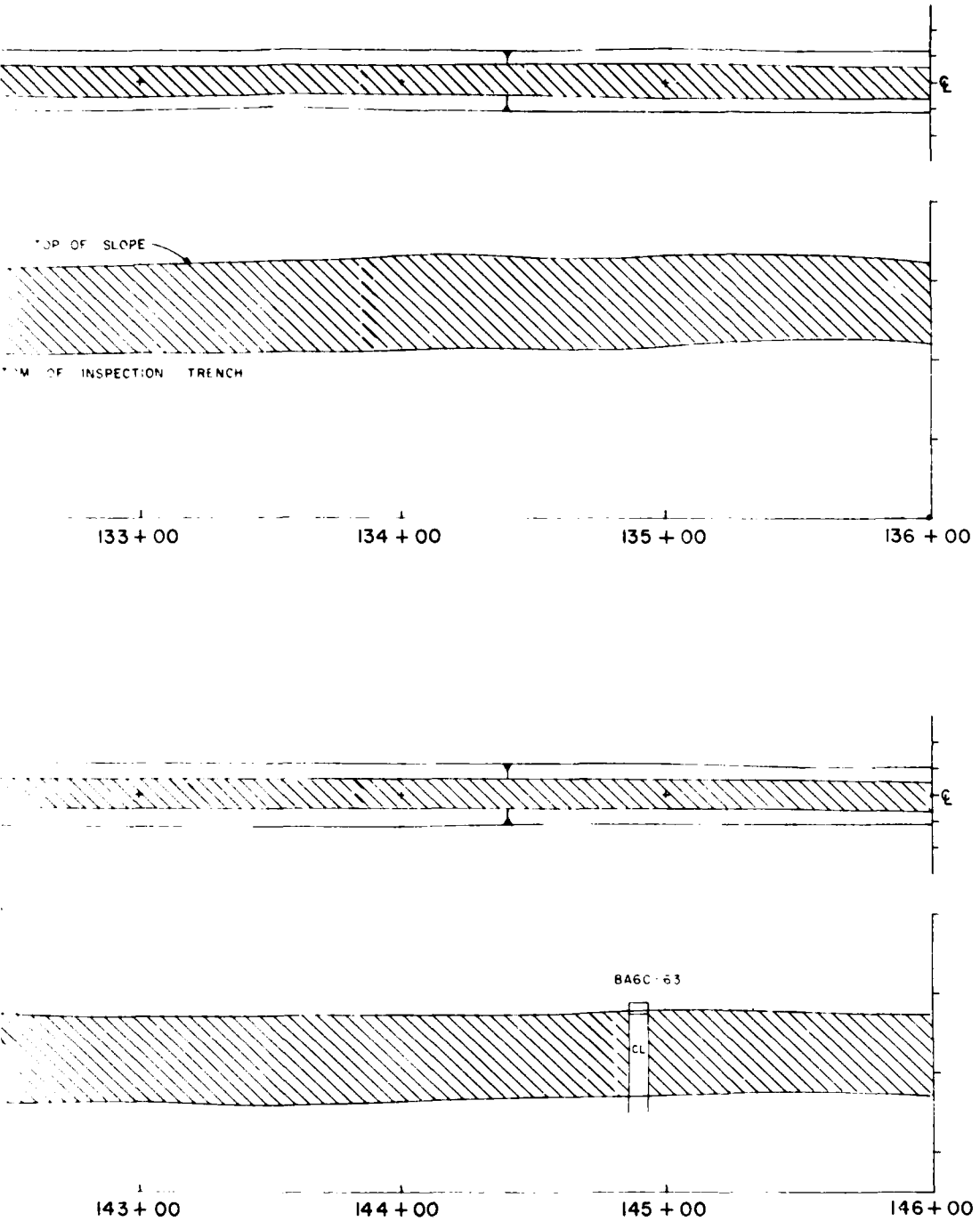
139+00 140+00 141+00 142+00 143+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

NOTES

1 FOR LEGEND SEE PLATE 14.
2 FOR DETAILED LOGS OF BORINGS SEE PLATES 36 THRU 73.



F
E
D
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B

ES

OR LEGEND SEE PLATE 14 .

OR DETAILED LOGS OF BORINGS
EE PLATES 36 THRU 73 .

SYMBOL	NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A. MARR
DRAWN BY S. REYDALE
REVIEWED BY R. BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 126+00 TO 146+00

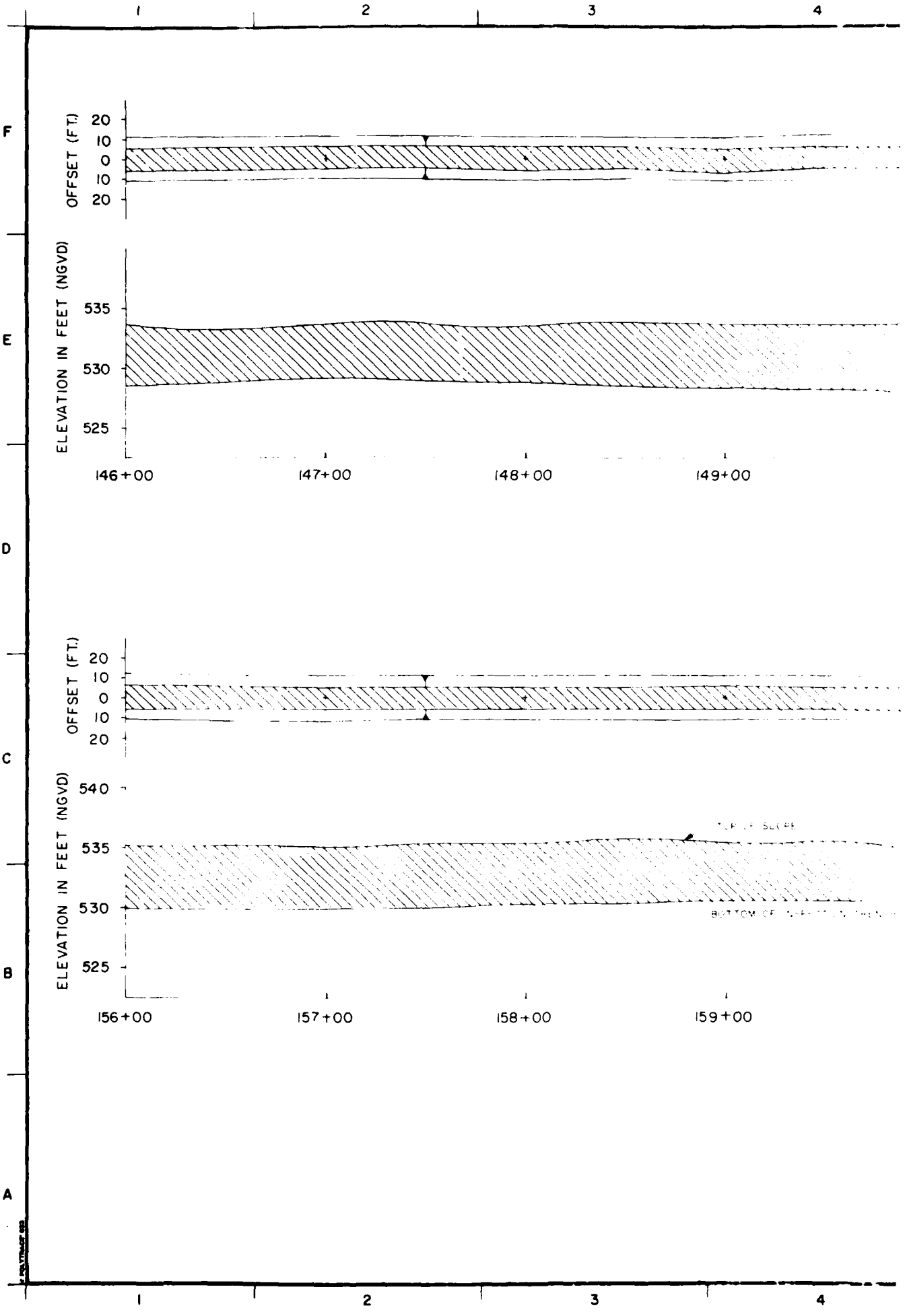
SUBMITTED BY ROBERT BEHM
ENGINEER

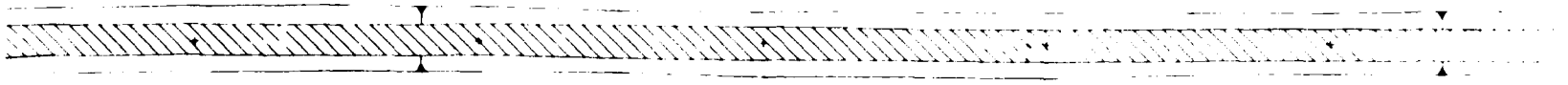
INVITATION NO. | DATE
CONTRACT NO.
DRAWING NUMBER | SHEET NO. OF

DRAWING NO. 22

CONTRACT NO.

TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
F
E
D
C
B
A
OFFSET (FT.)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
535
530
525
146+00
147+00
148+00
149+00
OFFSET (FT.)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
540
535
530
525
156+00
157+00
158+00
159+00



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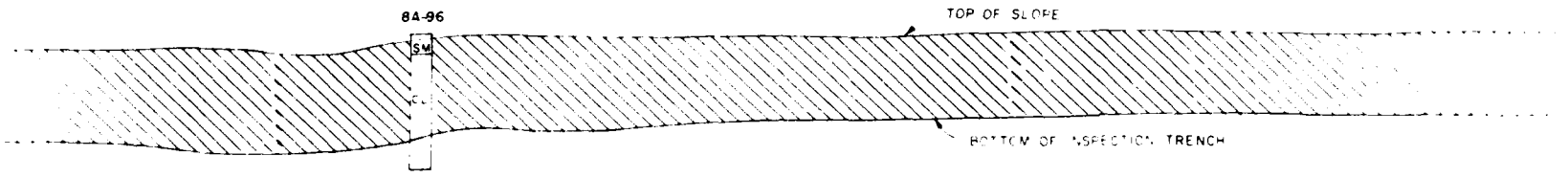
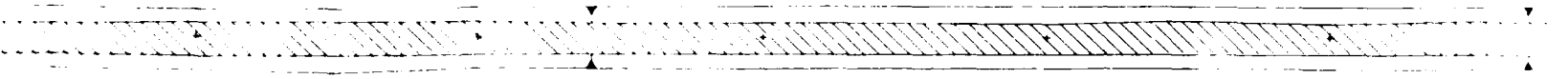


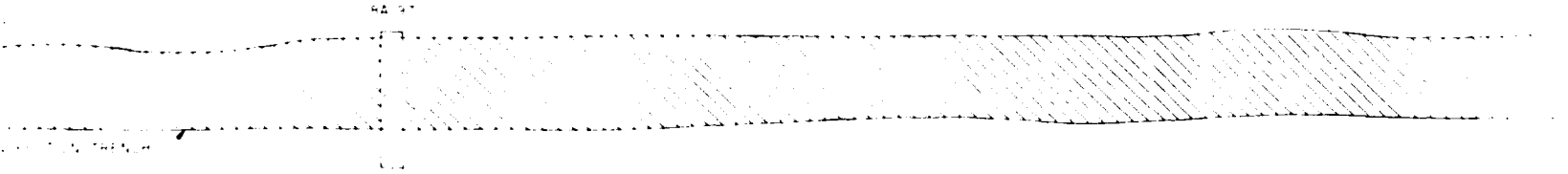
150+00 151+00 152+00 153+00 154+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)



PLAN

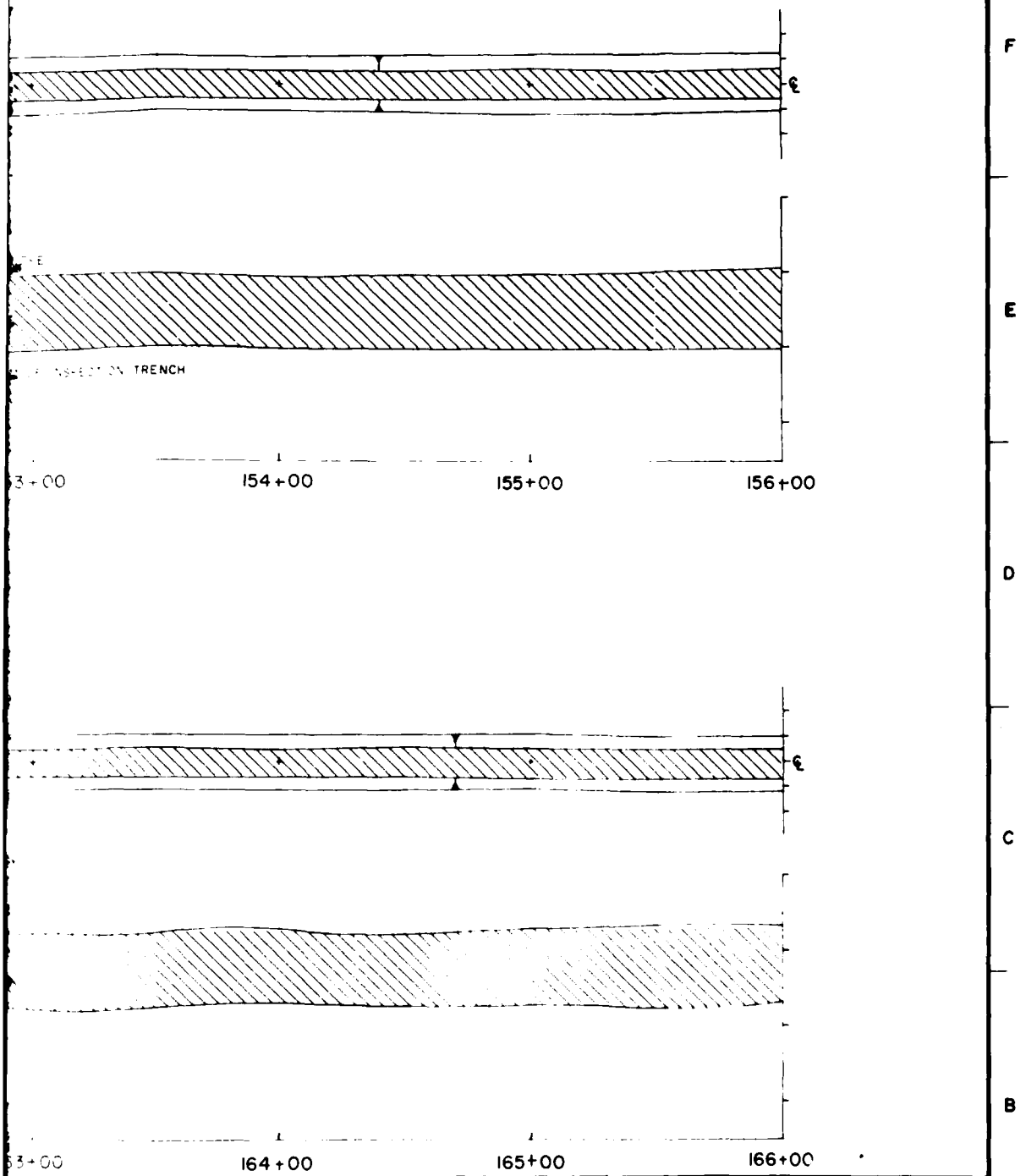


160+00 161+00 162+00 163+00 164+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

NOTES
1 FOR LEGEND SEE PLATE 14
2 FOR DETAILED LOGS OF BORINGS SEE PLATES 36 THRU 73



FOR LEGEND SEE PLATE 14.

FOR DETAILED LOGS OF BORINGS SEE PLATES 36 THRU 73.

SYMBOL NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

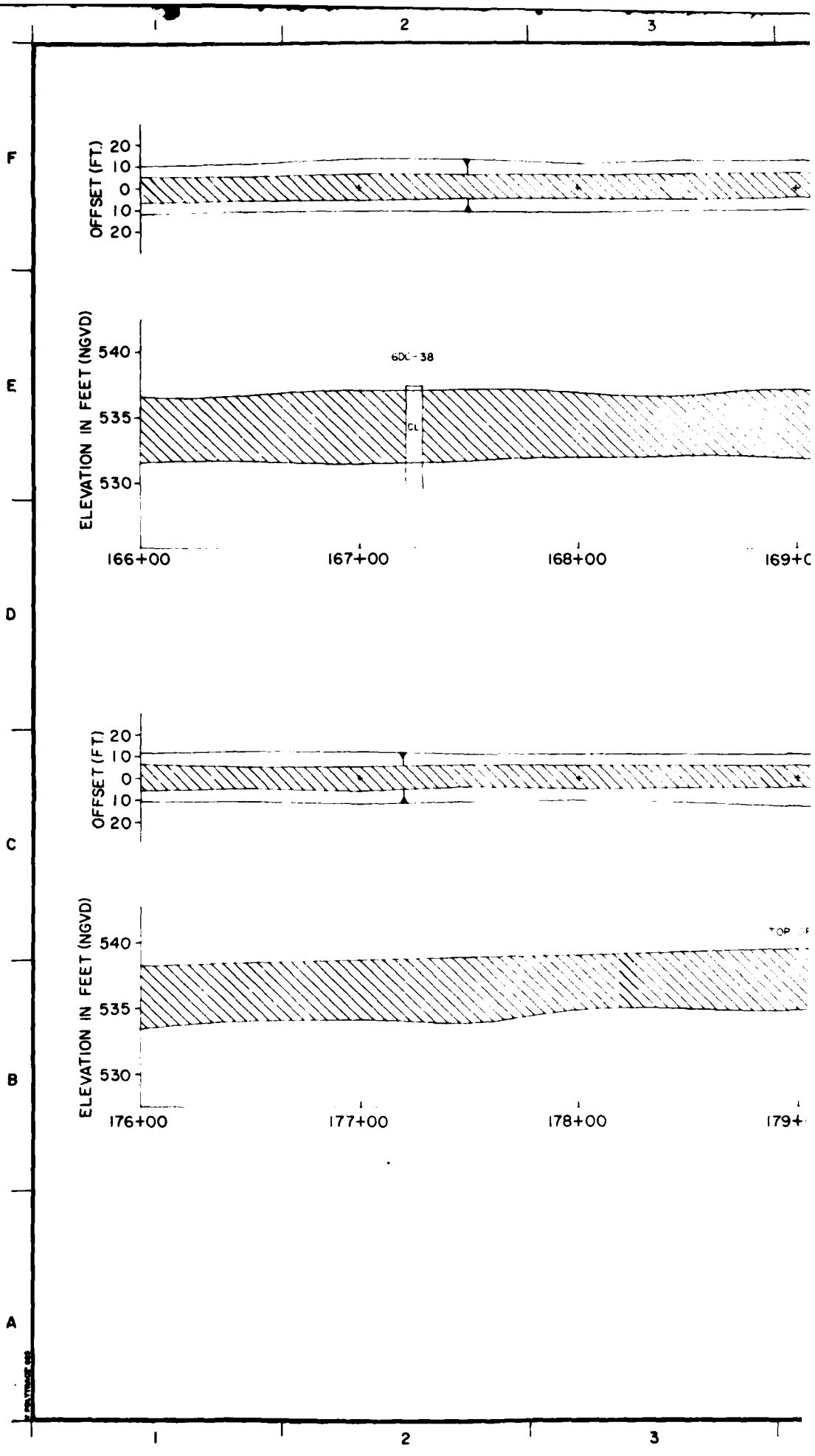
DESIGNED BY A. MARR
DRAWN BY A. MARR
REVIEWED BY R. BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS
INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 146+00 TO 166+00

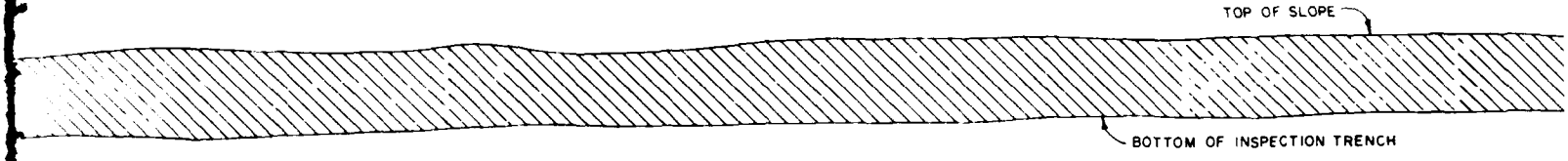
SUBMITTED BY ROBERT BEHM
ENGINEER

INVITATION NO. | DATE
CONTRACT NO.
DRAWING NUMBER | SHEET NO. OF
DRAWING NO. 23
CONTRACT NO.

TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
F
E
D
C
B
A
OFFSET (FT.)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
540
535
530
60C - 38
CL
166+00
167+00
168+00
169+0
OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
540
535
530
TOP
176+00
177+00
178+00
179+
1
2
3

PLAN

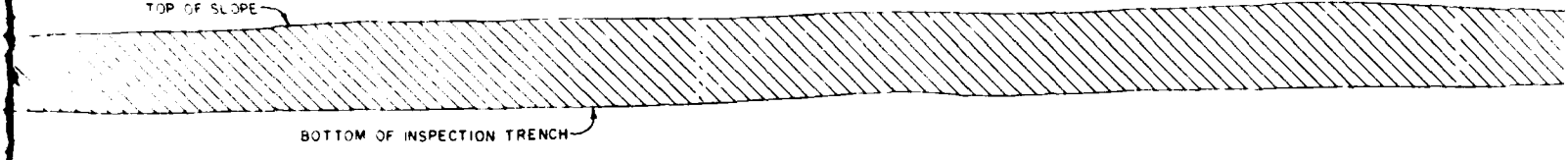


169+00 170+00 171+00 172+00 173+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

PLAN

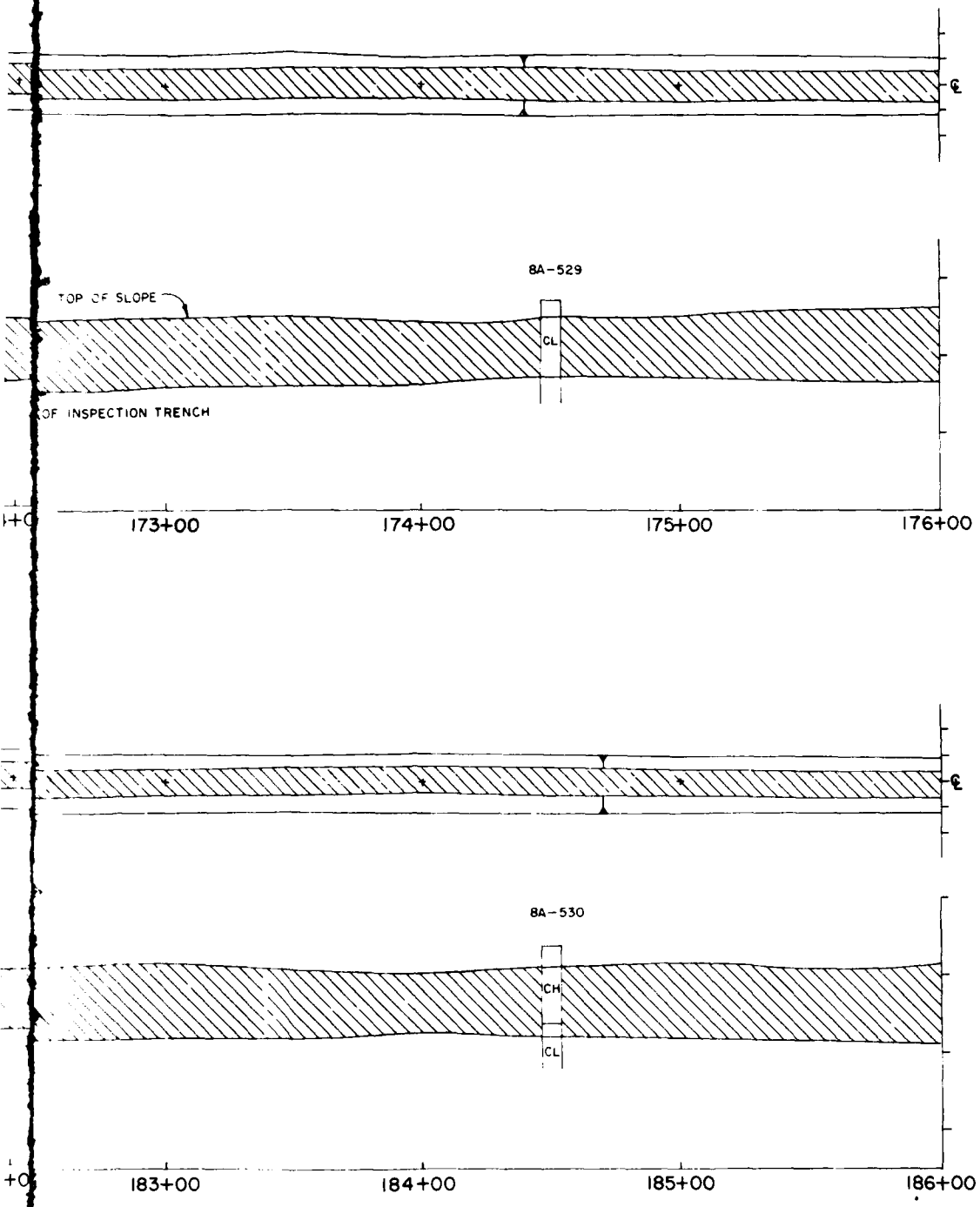


179+00 180+00 181+00 182+00 183+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

NOTES
1 FOR LEGEND SEE PLATE 14
2 FOR DETAILED LOGS OF BORINGS SE
PLATES 36 THRU 73



NOTES

1 FOR LEGEND SEE PLATE 14

2 FOR DETAILED LOGS OF BORINGS SEE PLATES 36 THRU 73

SYM.	DD NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A. MARR
DRAWN BY J. MERRFIELD
REVIEWED BY R. BEHM

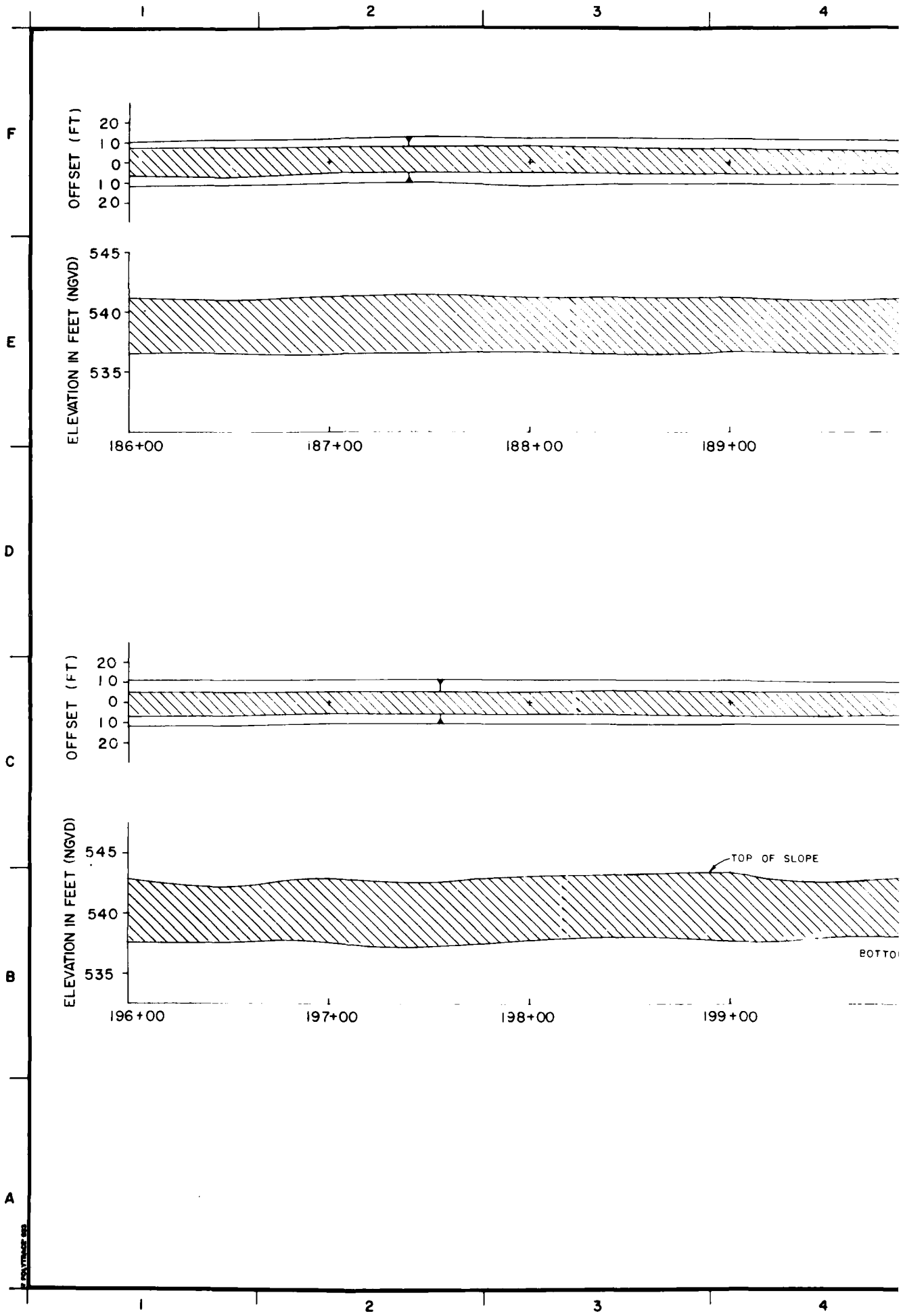
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS
INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 166+00 TO 186+00

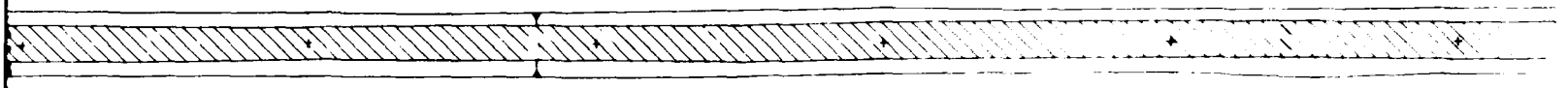
SUBMITTED BY ROBERT BEHM
ENGINEER

INVITATION NO. | DATE
CONTRACT NO.
DRAWING NUMBER | SHEET NO. OF

DRAWING NO. 24
CONTRACT NO.

TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
F
E
D
C
B
A
OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
545
540
535
186+00
187+00
188+00
189+00
OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
545
540
535
TOP OF SLOPE
196+00
197+00
198+00
199+00



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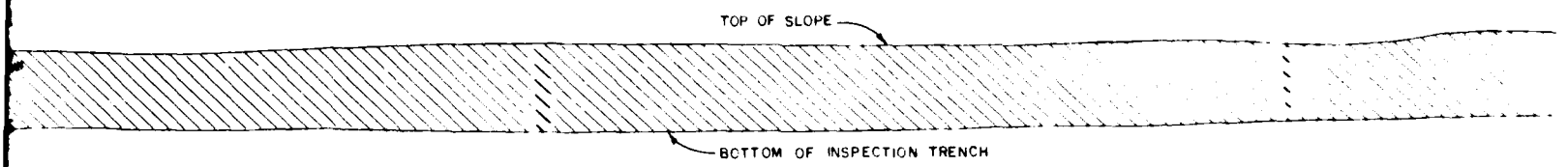
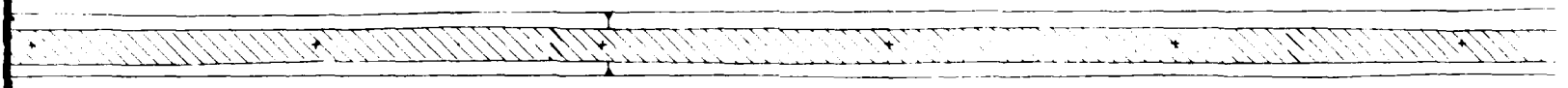


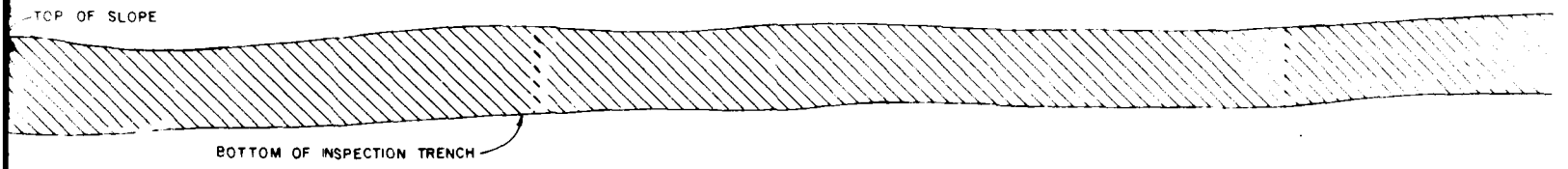
9+00 190+00 191+00 192+00 193+00 194+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)



PLAN



9+00 200+00 201+00 202+00 203+00 204+00

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

NOTES

1 FOR LEGEND SEE PLATE 14

2 FOR DETAILED LOGS OF BORINGS, SEE PLATES 36 THRU 73

8 9 10

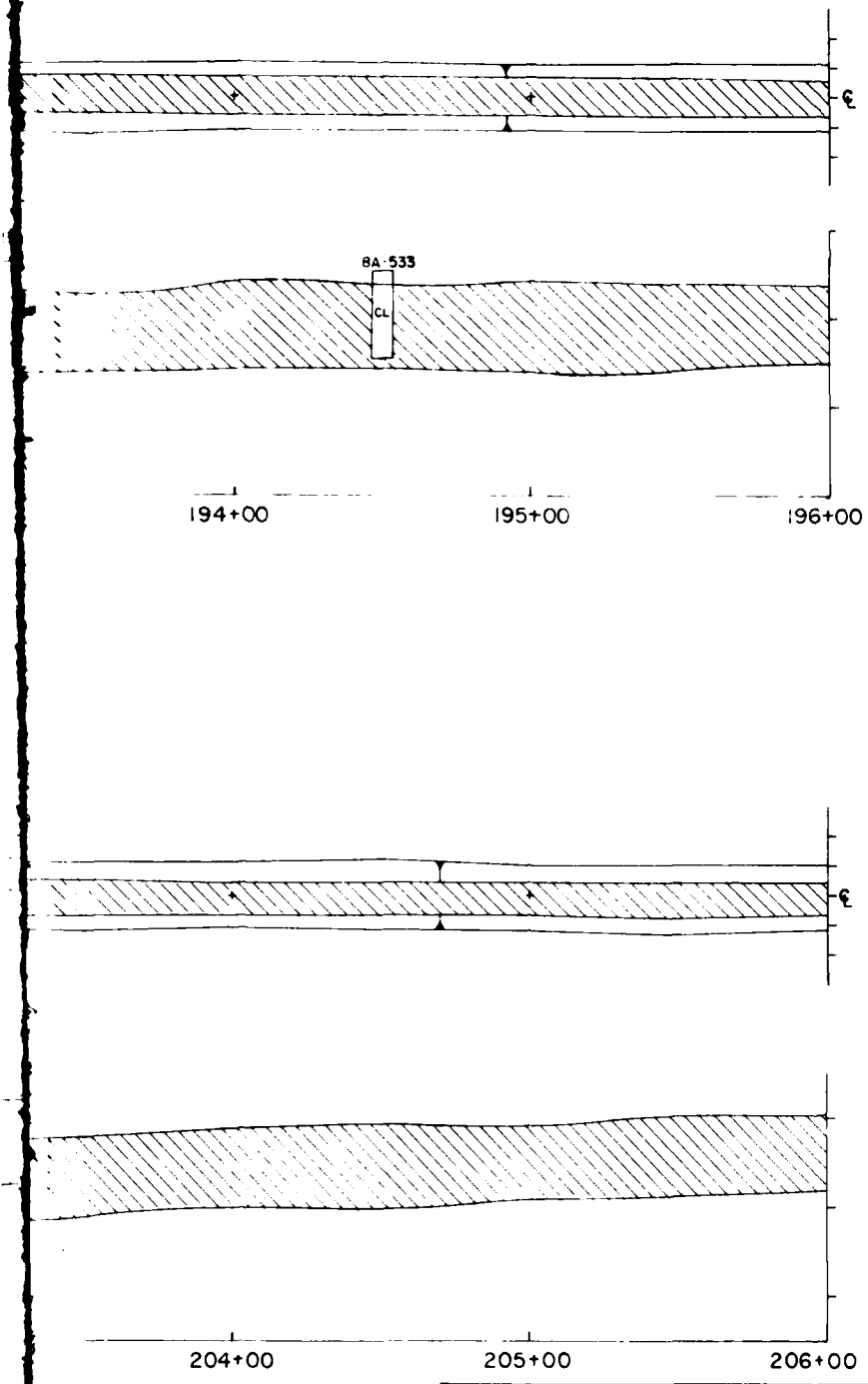
F

E

D

C

B



ATM/DO NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A. MARR
DRAWN BY S. WOMACK
REVIEWED BY R. BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS
INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 186+00 TO 206+00

SUBMITTED BY ROBERT BEHM
ENGINEER

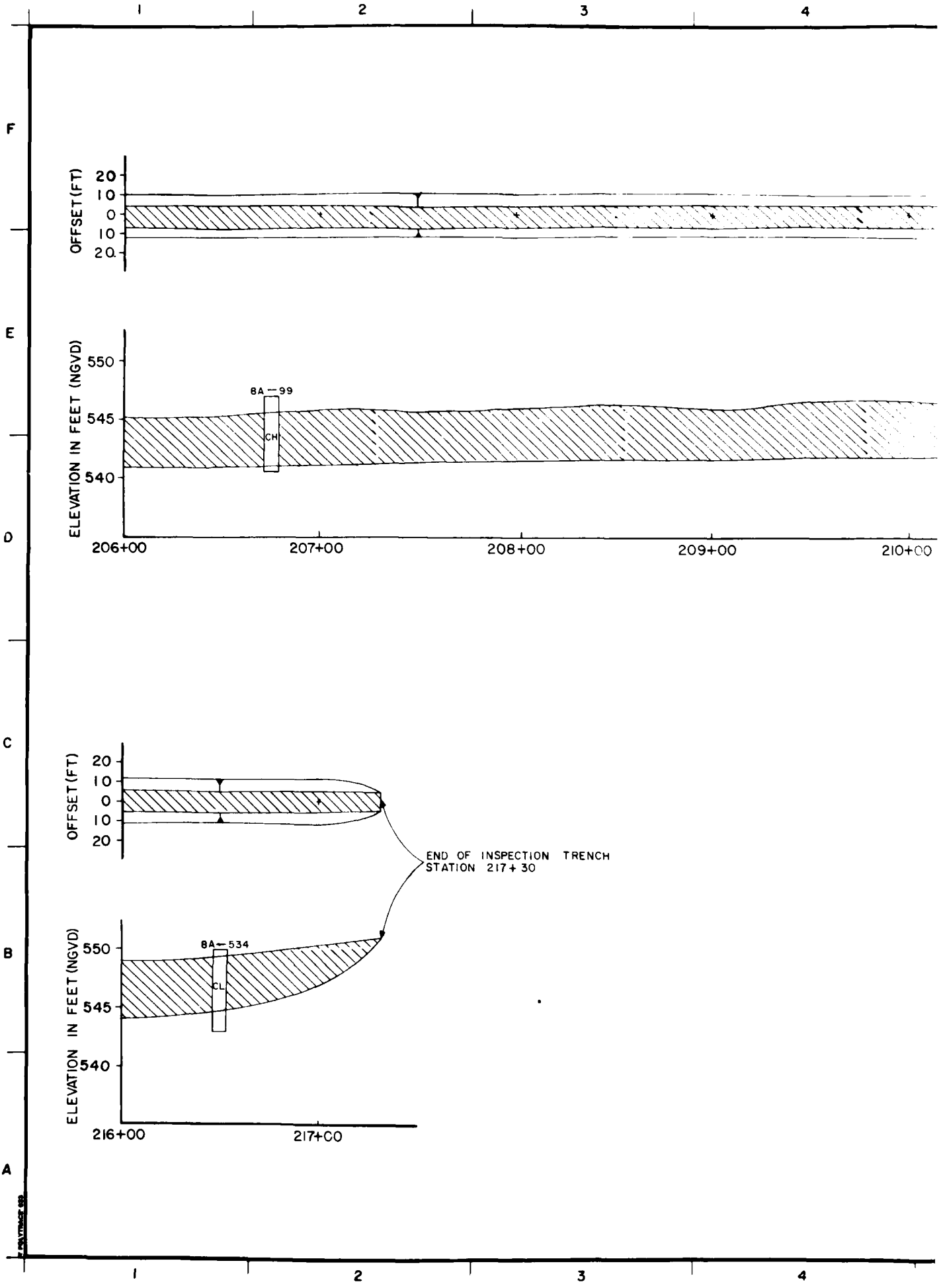
INVITATION NO. | DATE
CONTRACT NO
DRAWING NUMBER | SHEET NO OF
SEQUENCE NO 25
CONTRACT NO

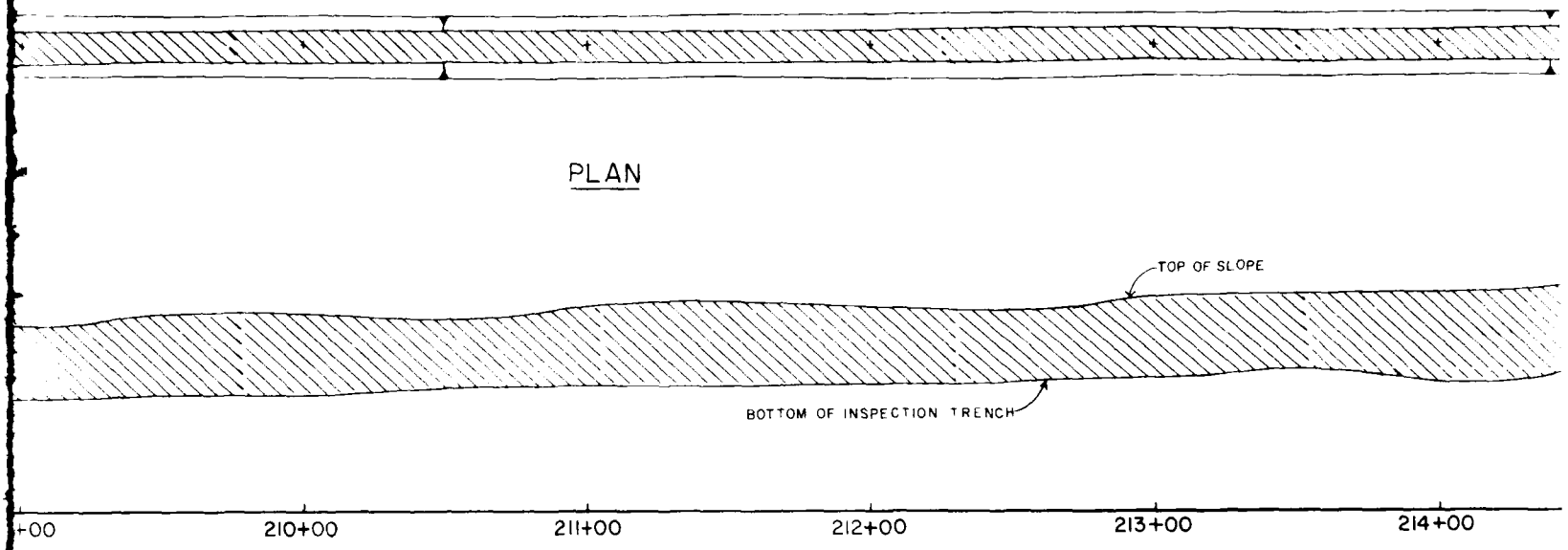
ATE 14

S OF BORINGS, SEE
RU 73

8

TO ACCOMPANY FINAL FOUNDATION REPORT


OFFSET (FT)
20
10
0
10
20
ELEVATION IN FEET (NGVD)
550
545
540
8A — 99
CH
206+00
207+00
208+00
209+00
210+00
OFFSET (FT)
20
10
0
10
20
END OF INSPECTION TRENCH
STATION 217+30
ELEVATION IN FEET (NGVD)
550
545
540
8A — 534
CL
216+00
217+00



PLAN

PROFILE

STATIONS IN FEET
(LOOKING UPSTREAM)

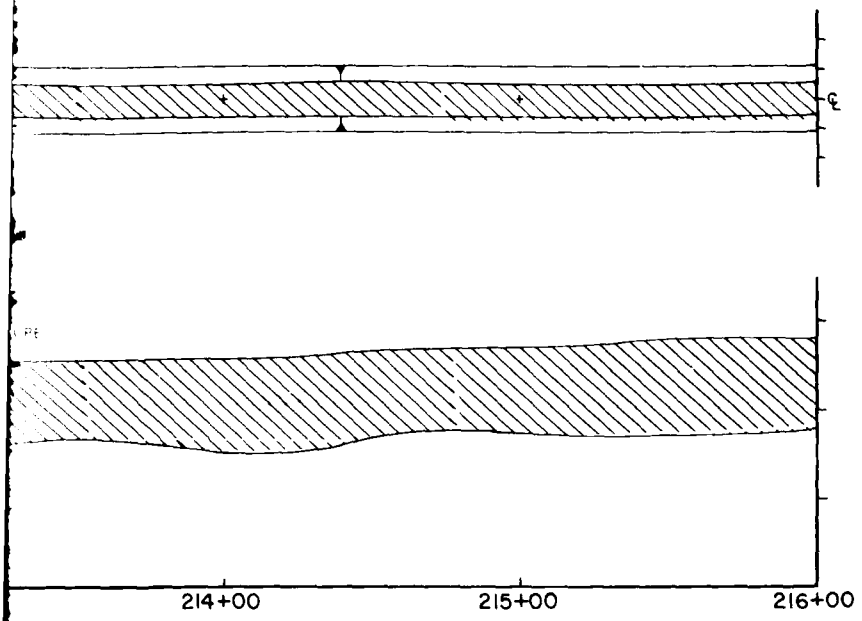
NOTES

1. FOR LEGEND SEE PLATE 14
2. FOR DETAILED LOGS OF BORINGS SEE PLATES 36 THRU 73.

8 9 10

F

E



D

C

B

SYM	DG. NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A. MARR
DRAWN BY A. MARR
REVIEWED BY R. BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

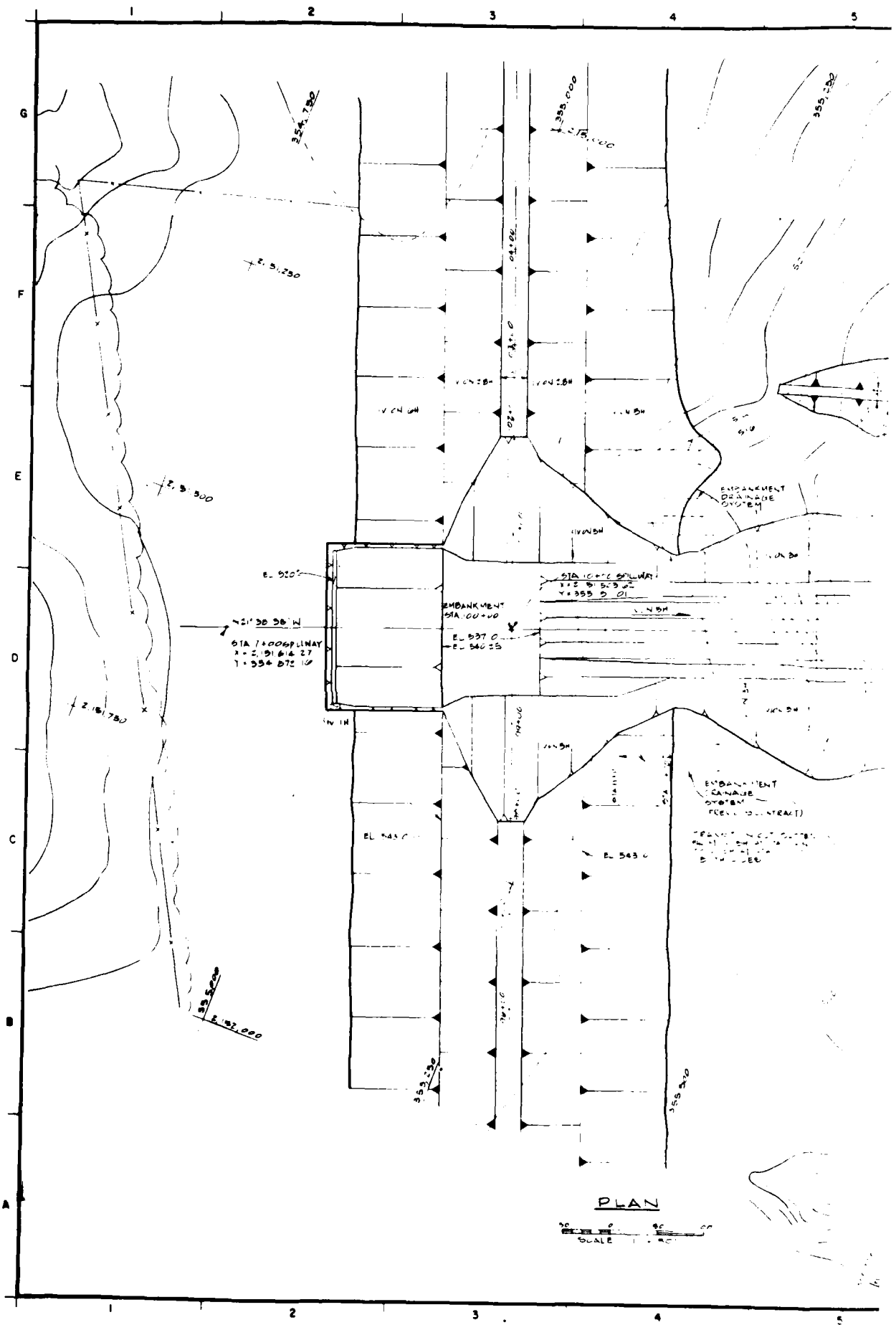
INSPECTION TRENCH
AS-BUILT PLAN AND PROFILE
STATION 206+00 TO 217+00

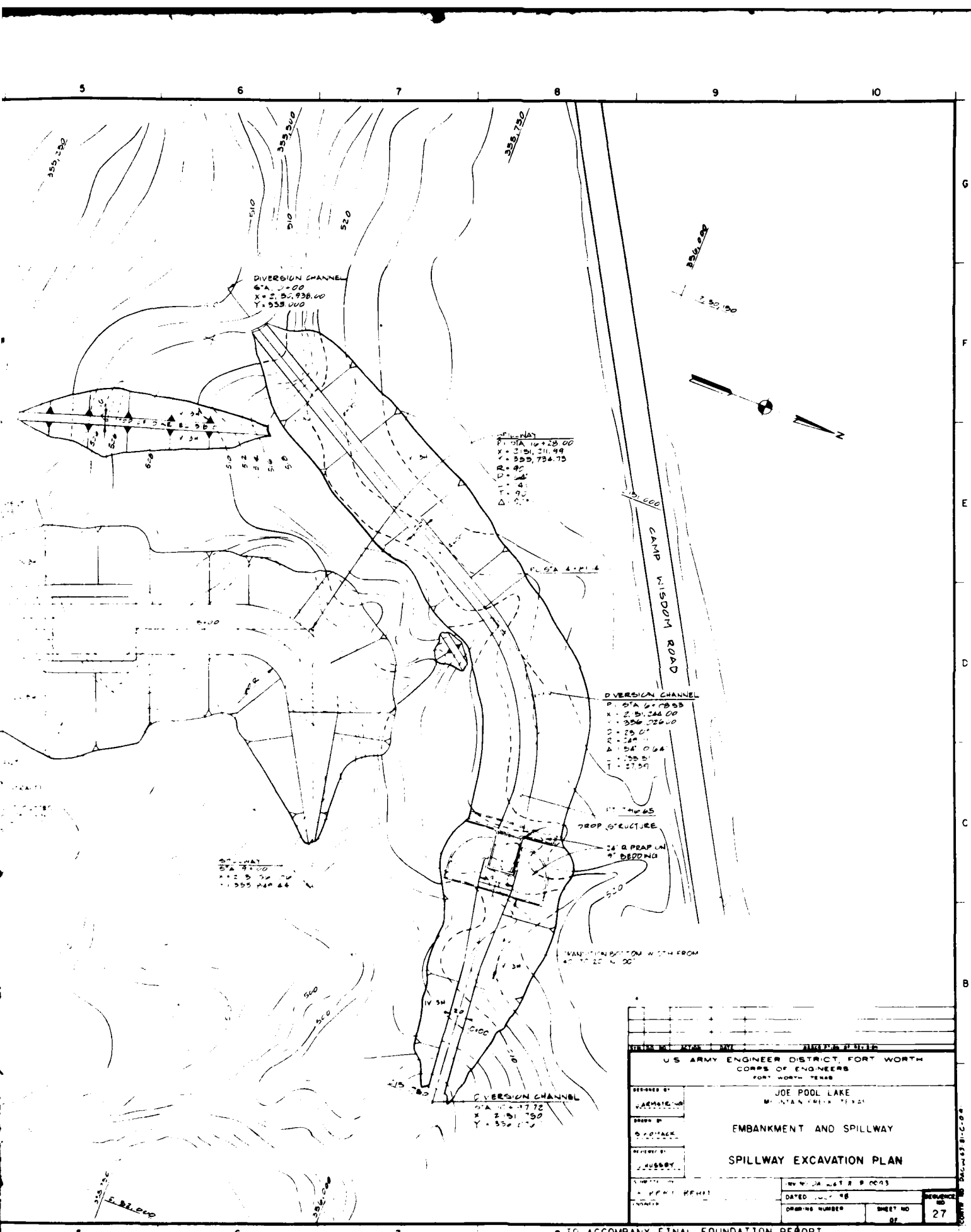
SUBMITTED BY ROBERT BEHM
ENGINEER

INVITATION NO. | DATE
CONTRACT NO.
DRAWING NUMBER | SHEET NO. OF
SEQUENCE NO. 26
CONTRACT NO.

8

TO ACCOMPANY FINAL FOUNDATION REPORT


EMBANKMENT
DRAINAGE
SYSTEM
EMBANKMENT
STA 100+00
EL 537.0
EL 560±5
EMBANKMENT
DRAINAGE
SYSTEM
EL 543.0
EL 543.0
PLAN
SCALE



U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

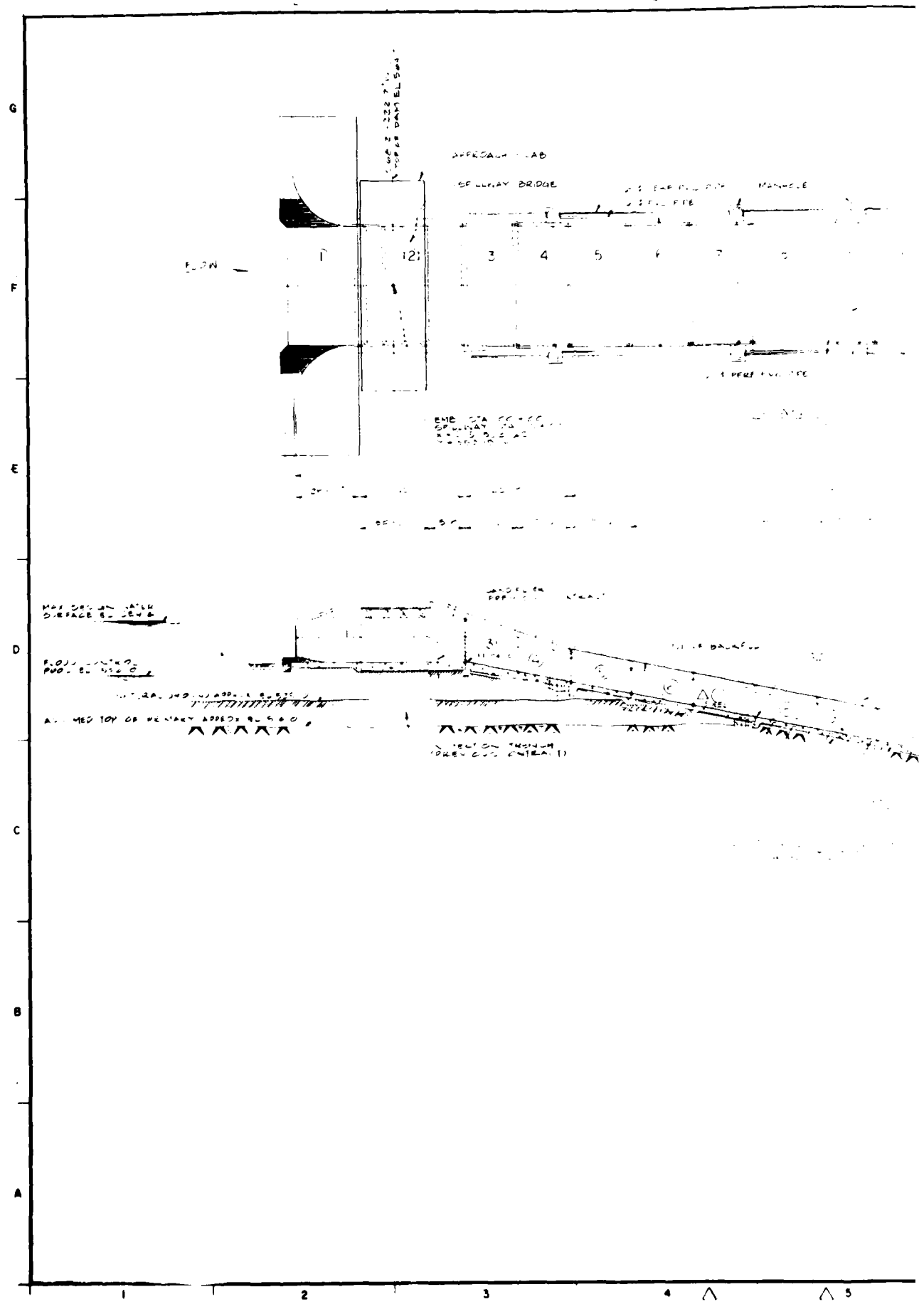
JOE POOL LAKE

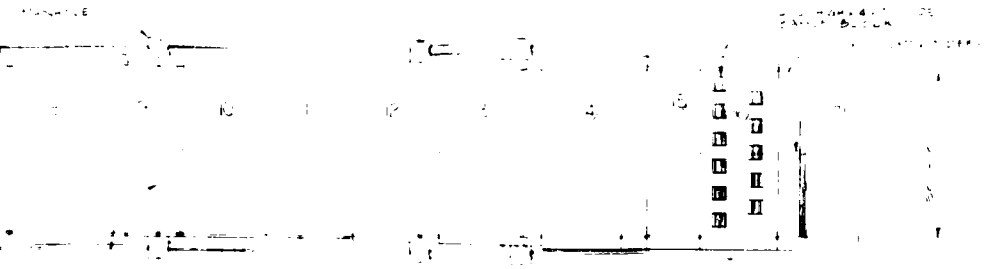
EMBANKMENT AND SPILLWAY

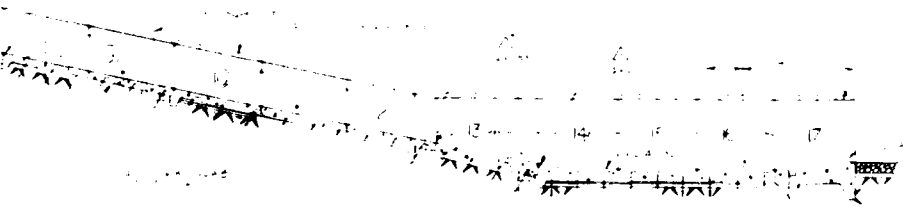
SPILLWAY EXCAVATION PLAN

SEQUENCE NO. 27

TO ACCOMPANY FINAL FOUNDATION REPORT


G
F
E
D
C
B
A
1
2
3
4
5
SPILLWAY BRIDGE
FLOW
MANHOLE





CLASS C TENS ON LAP BAR AND EMBANKMENT

f_c	f_y	BAR SIZE	LAP LENGTH (INCH) OTHER BAR	LAP LENGTH (INCH) TOP BAR	EMBEDMENT LENGTH (INCH) OTHER BAR	EMBEDMENT LENGTH (INCH) TOP BAR

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

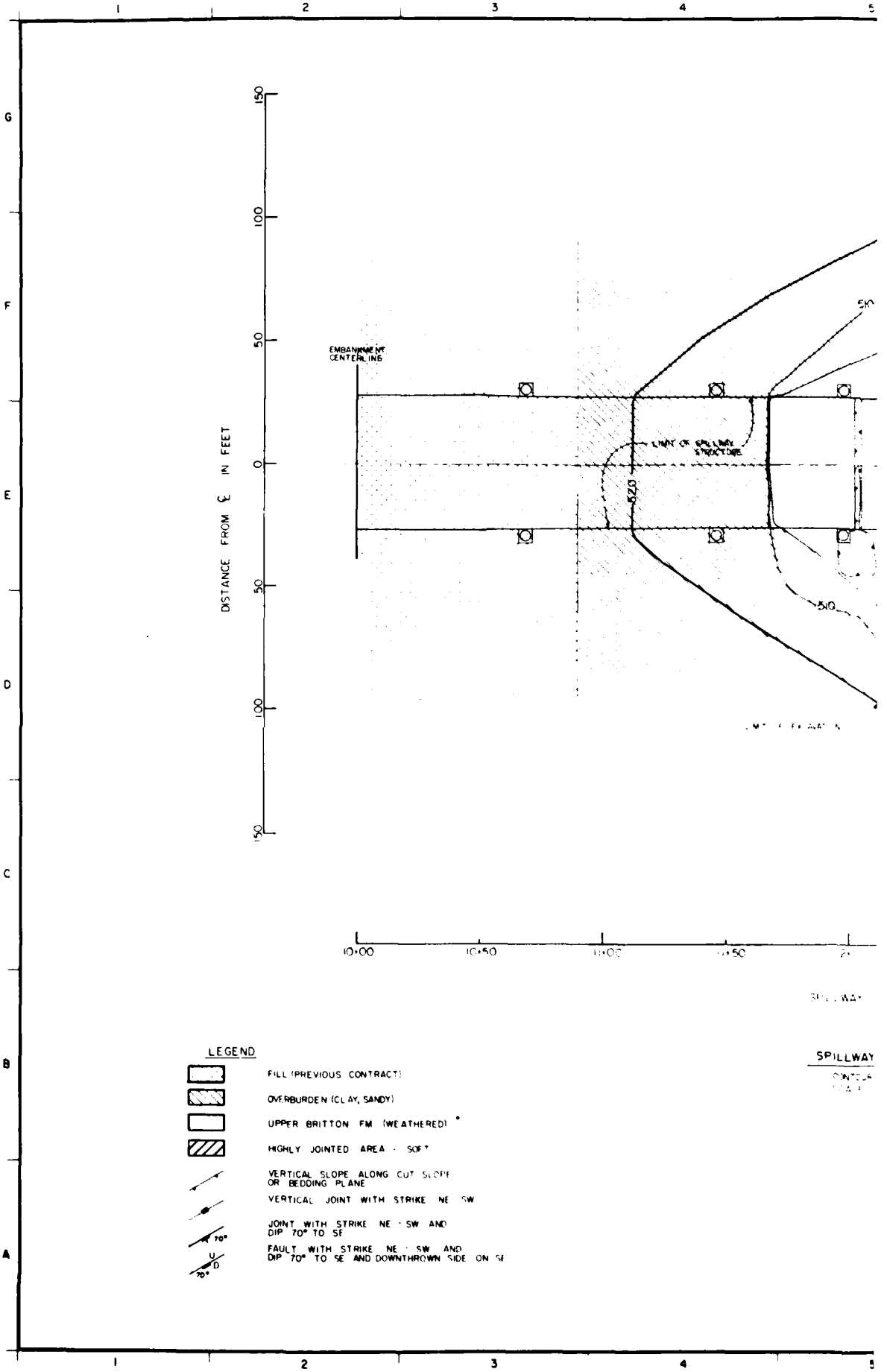
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

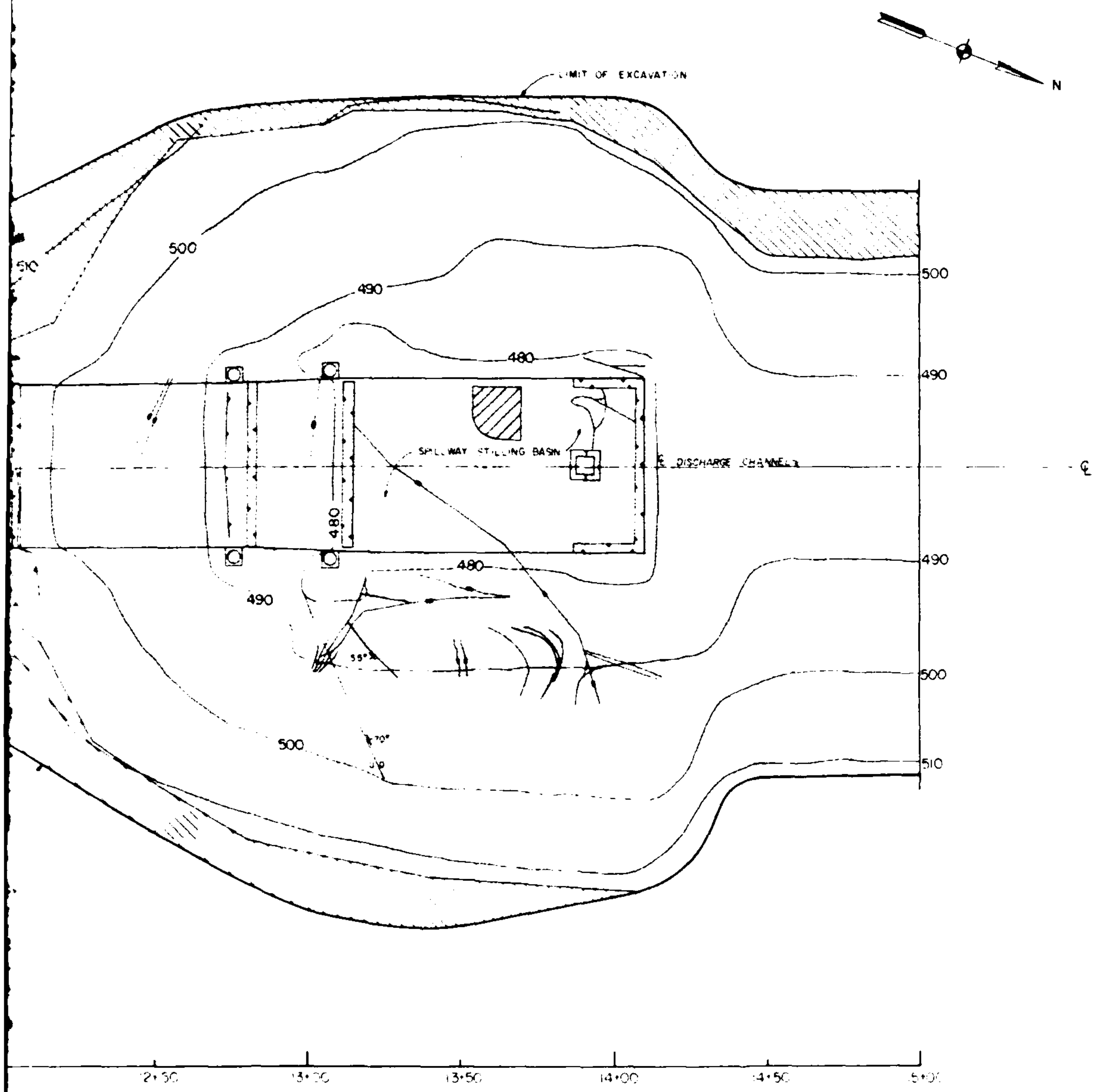
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

SPILLWAY
PLAN & PROFILE

DRAWING NUMBER

SHEET NO. 28


DISTANCE FROM ℄ IN FEET
150
100
50
0
50
100
150
EMBANKMENT CENTERLINE
LIMIT OF SPILLWAY STRUCTURE
520
510
10+00
10+50
LEGEND
FILL (PREVIOUS CONTRACT)
OVERBURDEN (CLAY, SANDY)
UPPER BRITTON FM (WEATHERED)
HIGHLY JOINTED AREA - SOFT
VERTICAL SLOPE ALONG CUT SLOPE OR BEDDING PLANE
VERTICAL JOINT WITH STRIKE NE - SW
JOINT WITH STRIKE NE - SW AND DIP 70° TO SE
FAULT WITH STRIKE NE - SW AND DIP 70° TO SE AND DOWNTHROWN SIDE ON SE
70°
U
D
SPILLWAY



STATIONS IN FEET

WAY EXCAVATION MAP

SYMBOL	DESCRIPTION	DATE	APPROVAL

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A. MARR
DRAWN BY C. KIRBY
REVIEWED BY R. BEHM

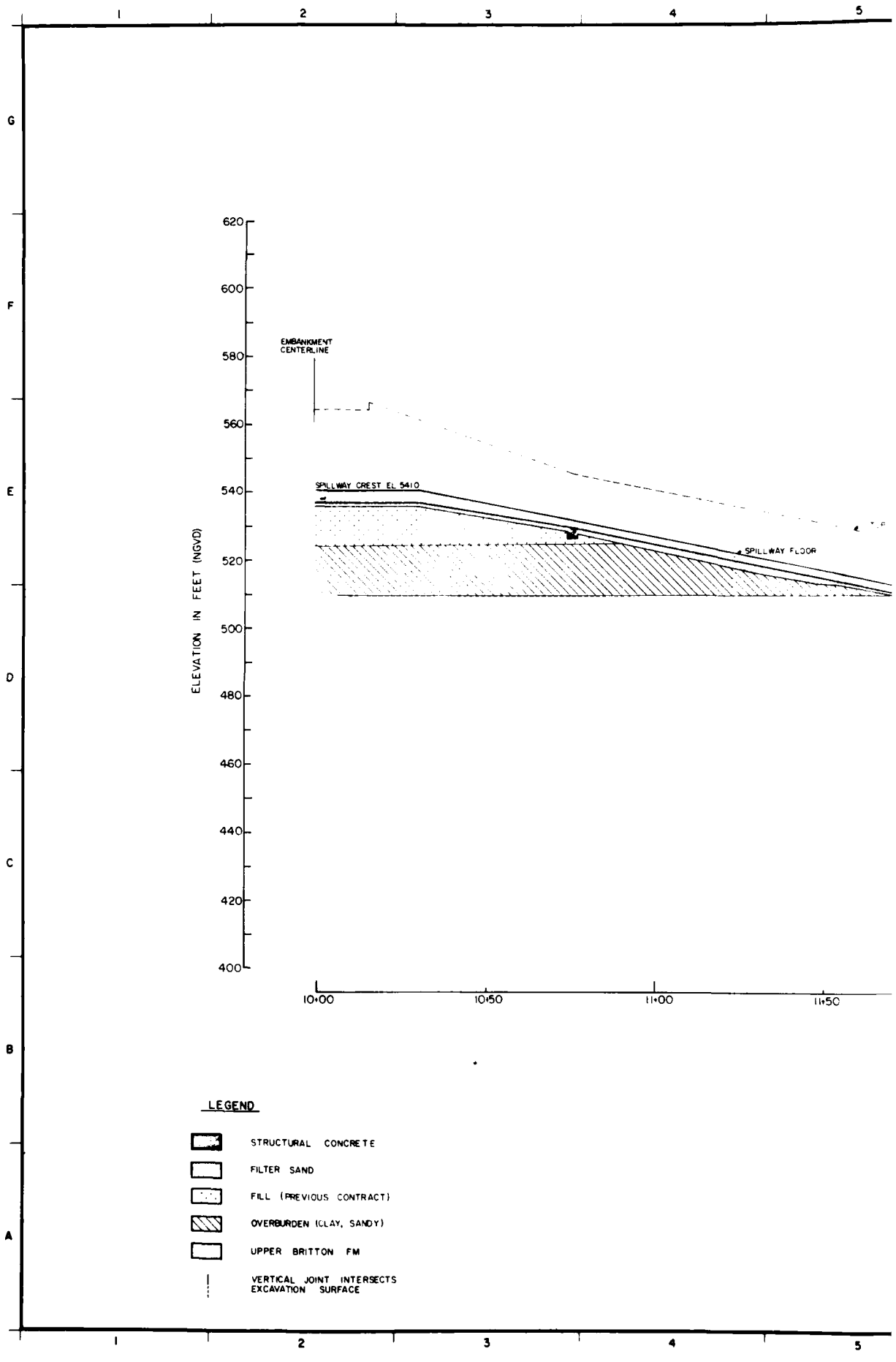
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

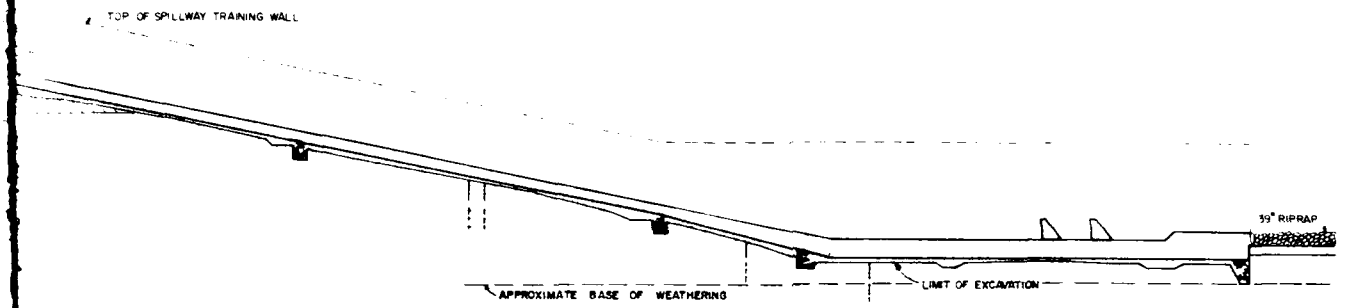
SPILLWAY
AS-BUILT
EXCAVATION MAP

SUBMITTED BY ROBERT BEHM, ENGINEER

SOL NO | DATED
CONTR NO
DRAWING NUMBER | SHEET NO OF | SEQUENCE NO 29

TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
5
G
F
E
D
C
B
A
620
600
580
560
540
520
500
480
460
440
420
400
ELEVATION IN FEET (NGVD)
EMBANKMENT CENTERLINE
SPILLWAY CREST EL 5410
SPILLWAY FLOOR
10+00
10+50
11+00
11+50
LEGEND
STRUCTURAL CONCRETE
FILTER SAND
FILL (PREVIOUS CONTRACT)
OVERBURDEN (CLAY, SANDY)
UPPER BRITTON FM
VERTICAL JOINT INTERSECTS EXCAVATION SURFACE



12+00 12+50 13+00 13+50 14+00 14+50

STATIONS IN FEET

SPILLWAY PROFILE

U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A. MARR
DRAWN BY C. KIRBY
REVIEWED BY R. BEHM
SUBMITTED BY ROBERT BEHM
ENGINEER

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

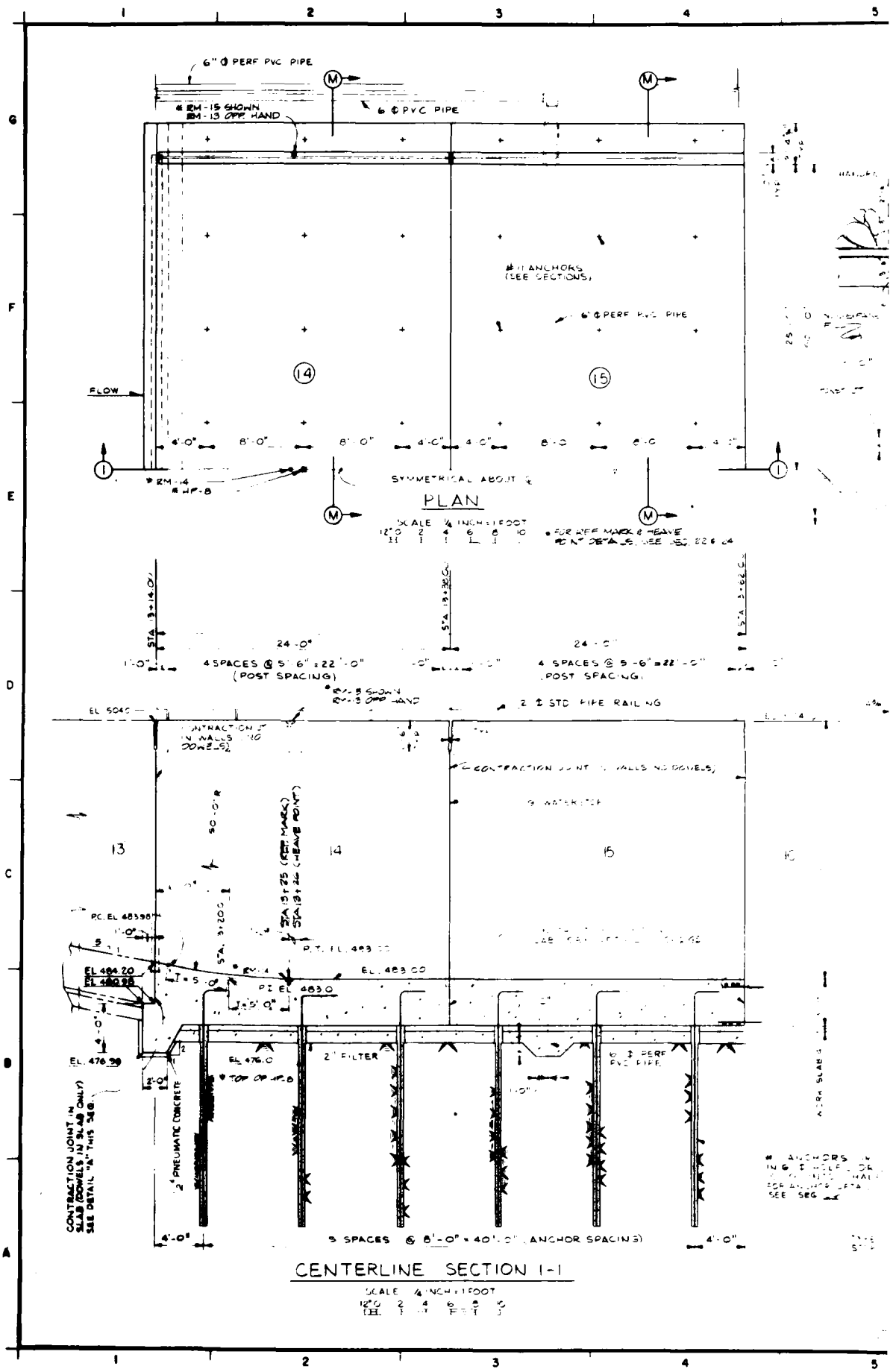
GEOLOGIC PROFILE

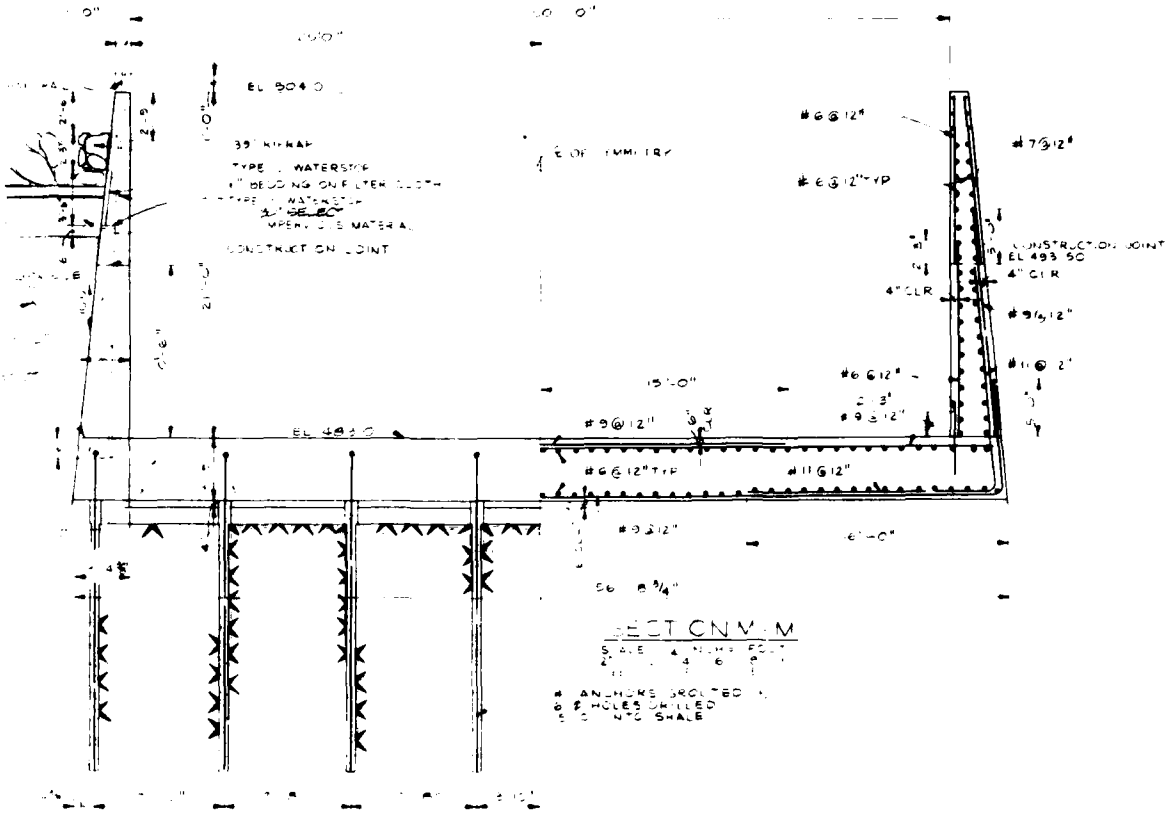
SPILLWAY CENTERLINE (AS-BUILT)

SOL NO | DATED
CONTR NO
DRAWING NUMBER | SHEET NO OF

DRAWING NO. 30

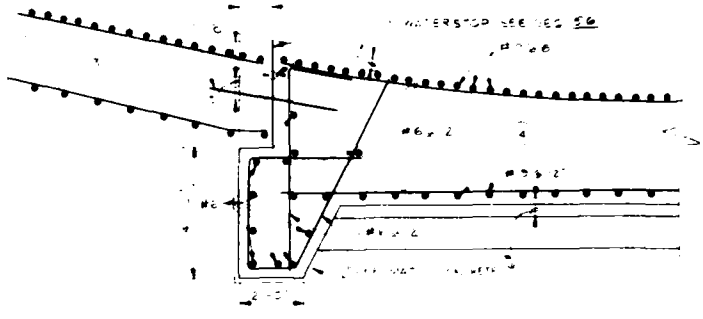
TO ACCOMPANY FINAL FOUNDATION REPORT


6" ϕ PERF PVC PIPE
6 ϕ PVC PIPE
RM-15 SHOWN
RM-13 OPP HAND
#11 ANCHORS
(SEE SECTIONS)
6" ϕ PERF PVC PIPE
FLOW
14
15
4'-0"
8'-0"
8'-0"
4'-0"
4'-0"
8'-0"
8'-0"
4'-0"
RM-14
WF-8
SYMMETRICAL ABOUT ℄
PLAN
SCALE 1/4 INCH = 1 FOOT
12" 0 2 4 6 8 10
* FOR WEEP MARK & HEAVE
# ANCHOR DETAILS, SEE SEC. 22 & 24
STA. 3+14.01
STA. 1+38.00
STA. 2+62.00
24'-0"
4 SPACES @ 5'-6" = 22'-0"
(POST SPACING)
24'-0"
4 SPACES @ 5'-6" = 22'-0"
(POST SPACING)
* RM-5 SHOWN
RM-13 OPP HAND
2 ½ STD PIPE RAILING
EL 504.0
CONTRACTION JOINT
IN WALLS
(DOWEL'D)
CONTRACTION JOINT IN WALLS (NO DOWELS)
WATERSTOP
13
14
15
16
50'-0" R
STA. 1+25 (TOP MARK)
STA. 1+26 (HEAVE POINT)
STA. 3+20.00
P.C. EL. 485.98
P.T. EL. 483.00
EL. 484.20
EL. 480.98
T = 5'-0"
* RM-4
EL. 483.00
P.I. EL. 483.0
T = 5'-0"
EL. 476.98
EL. 476.0
2" FILTER
6" ½ PERF PVC PIPE
* TOP OF WF-8
2'-0"
2" PNEUMATIC CONCRETE
CONTRACTION JOINT IN SLAB (DOWELS IN SLAB ONLY) SEE DETAIL "A" THIS SEC.
4'-0"
5 SPACES @ 8'-0" = 40'-0" (ANCHOR SPACING)
4'-0"
ANCHORS IN 6" ϕ HOLES, DRILLED
FOR ANCHOR DETAILS SEE SEC.
CENTERLINE SECTION 1-1
SCALE 1/4 INCH = 1 FOOT
12" 0 2 4 6 8 10

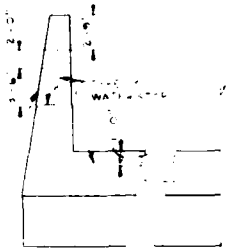


SECTION M

ANCHORS GROUTED IN
HOLES DRILLED
INTO SHALE



DETAIL A



DETAIL OF WATERSTOP AT
JOINT BETWEEN MONOLITHS NO. 13 & 14

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

SPILLWAY MONOLITHS NO 14 AND 15

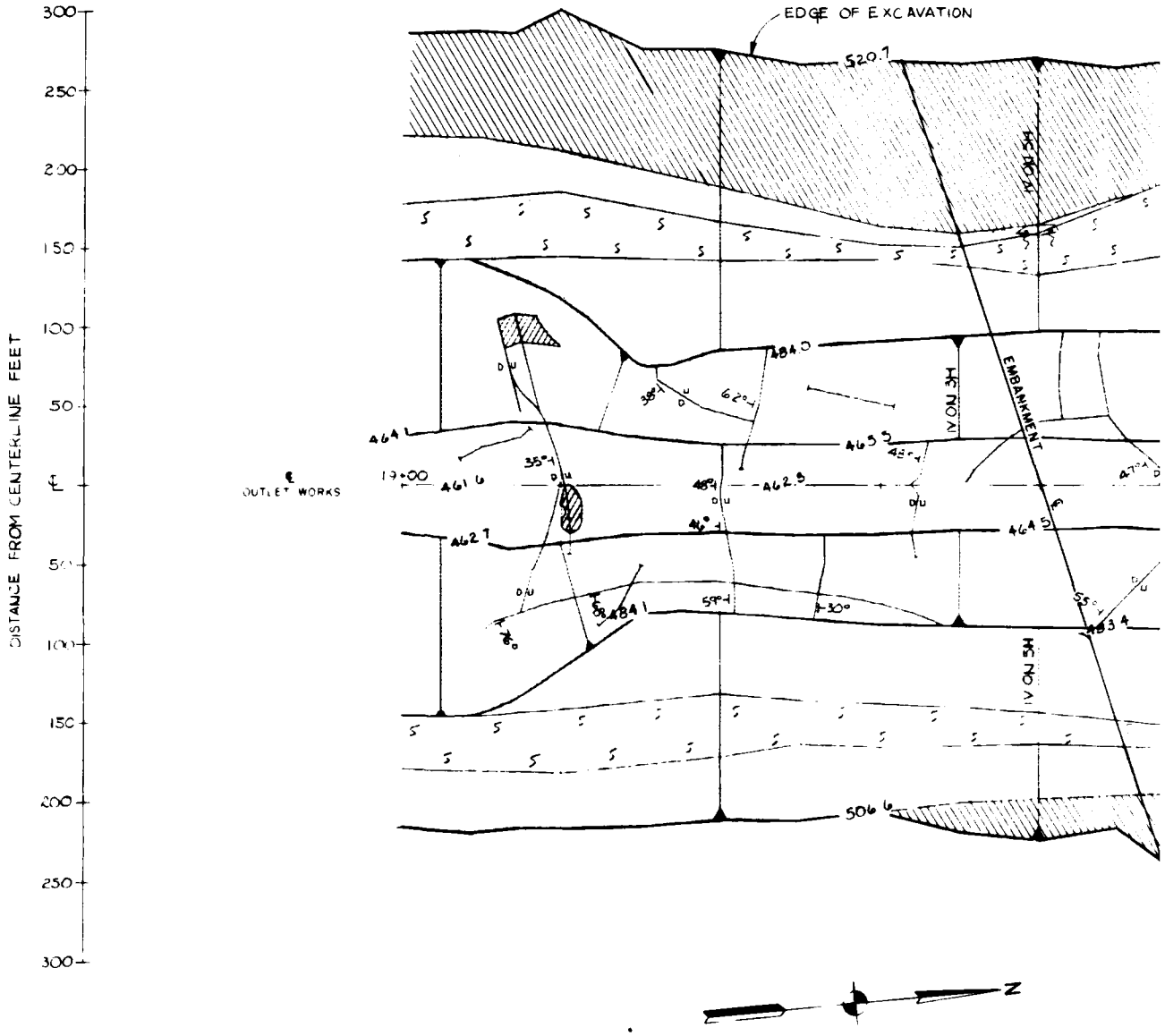
PLAN AND SECTIONS

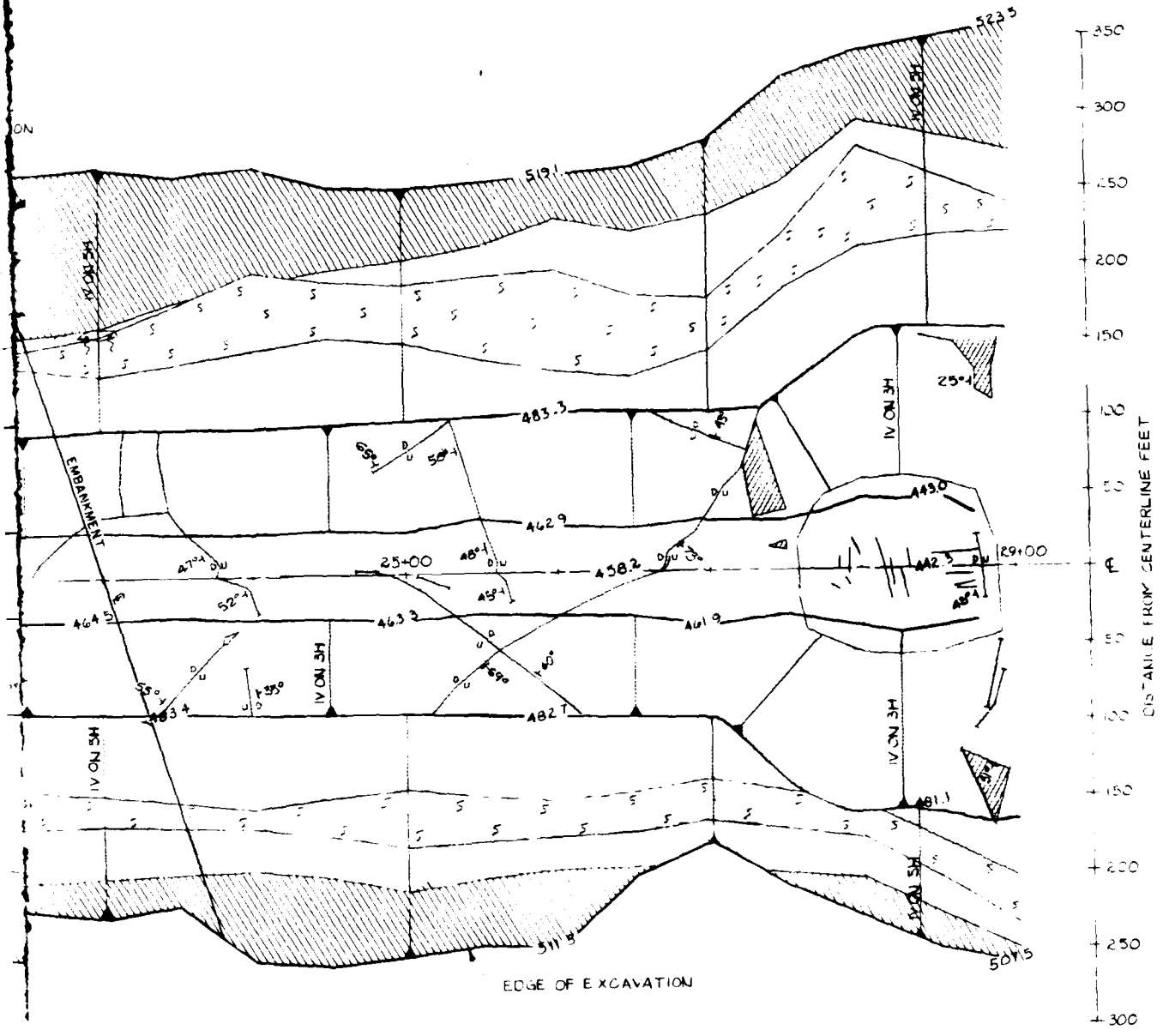
DATED JULY

SHEET NO 07

DRAWING NO 31

8 TO ACCOMPANY FINAL FOUNDATION REPORT


EDGE OF EXCAVATION
520.7
484.0
464.1
463.5
462.8
462.7
461.6
484.1
506.6
EMBANKMENT
1H ON 5H
1V ON 5H
1V ON 4H
19+00
℄ OUTLET WORKS
DISTANCE FROM CENTERLINE FEET
300
250
200
150
100
50
0
50
100
150
200
250
300
N



N

DESIGNED BY A MARK

DRAWN BY M CASTELLON

CHECKED BY R BEHM

SUBMITTED BY ROBERT BEHM ENGINEER

TO ACCOMPA

8 9 10

F E D C B

+350 +300 +250 +200 +150 +100 +50 ℄ -50 -100 -150 -200 -250 -300

DISTANCE FROM CENTERLINE FEET

LEGEND

- CLAY
- SAND & GRAVEL
- UPPER BRITTON FM., WEATHERED
- UPPER BRITTON FM. UNWEATHERED
- LOWER BRITTON FM.
- U/D +45° — FAULT OR JOINT EXPOSED ON SURFACE. STRIKE NW-SE DIP 45°NE DOWNTHROWN SIDE ON NE SIDE OF FAULT.
- ZONE OF JOINTED OR BROKEN PRIMARY
- SEEPAGE AREA

STM/SO NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A MARR
DRAWN BY M. CASTELLON
CHECKED BY R. BEHM
SUBMITTED BY ROBERT BEHM, ENGINEER

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

OUTLET WORKS

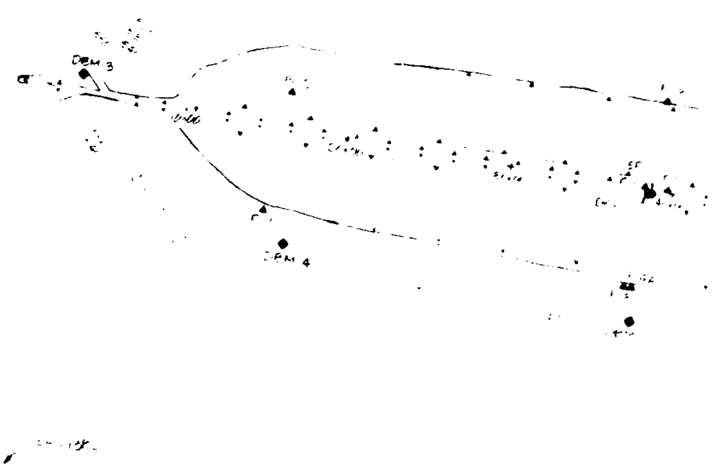
AS-BUILT FOUNDATION EXCAVATION PLAN

STATION 19+00 THRU STATION 29+00

INV NO | DATED
CONTR NO
DRAWING NUMBER | SHEET NO of

PLATE 32

CONTR NO



POROUS PLASTIC PIEZOMETERS				
NO	EMB STATION	OFFSET	FILTER LOCATION	TIP ELEV. [illegible]
P-1	38+90	17 /S	SHALE	494
P-2	38+59	18 /S	CLAY	440.5
P-3	38+20	600 D/S	SHALE	[illegible]
P-4A	38+57	600 D/S	SANDY CLAY	498.2
P-5	99+50	57 U/S	SANDY CLAY	[illegible]
P-6	99+90	30' D/S	WEA SHALE	504.6
P-7	100+50	102' D/S	CLAY	512.0
P-8	100+50	85' D/S	WEA SHALE	503.[illegible]
P-9	100+50	805 D/S	WEA SHALE	[illegible]
P-10	15+70	500 D/S	SANDY CLAY	474.4
P-12	16+00	220' U/S	WEA SHALE	454.7
* ~~P-13~~	~~[illegible]~~	~~500' U/S~~	~~SANDY CLAY~~	~~493.6~~
P-14	50+00	610 D/S	SANDY CLAY	484.5
P-15	49+95	16 U/S	SANDY CLAY	499.0
* ~~P-16~~	~~50+00~~	~~400' U/S~~	~~GRAVELLY CLAY~~	~~495.2~~
P-17	68+00	578' D/S	CLAY	465.7
P-18	63+00	18' U/S	GRAVELLY CLAY	443.7
* ~~P-19~~	~~[illegible]~~	~~400' U/S~~	~~SANDY CLAY~~	~~492.7~~

* INUNDATED/ABANDONED

DEEP BENCH MARKS			
NO	STATION	OFFSET	TOP OF RISER ELEV
DBM-1	39+00	800' D/S	471.532 #
DBM-2	95+00	800' D/S	526.734 #
DBM-3	3+00	70' D/S	565.426 ##
DBM-4	17+00	700' D/S	492.176 ##
DBM-5	69+00	750' D/S	511.940 ##
DBM-6	225+00	℄	569.559 ##

ELEVATION FROM OCTOBER 1982
ELEVATION FROM 1980

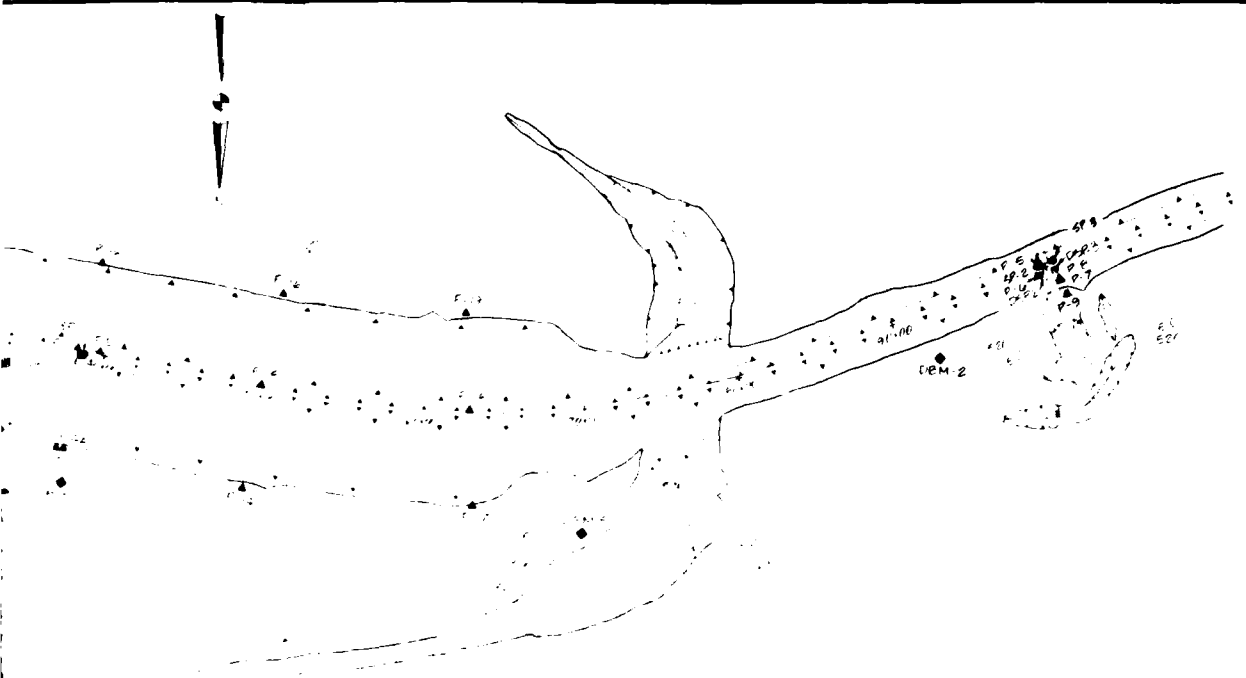
SETTLEMENT PLATES			
NO	STATION	OFFSET	[illegible]
SP	98+[illegible]	[illegible]	[illegible]
SP-2	99+[illegible]	[illegible]	[illegible]
SP-3	[illegible]	[illegible]	[illegible]
DSP	98+[illegible]	[illegible]	[illegible]
DSP-2	99+[illegible]	[illegible]	[illegible]
DSP-3	[illegible]	[illegible]	[illegible]

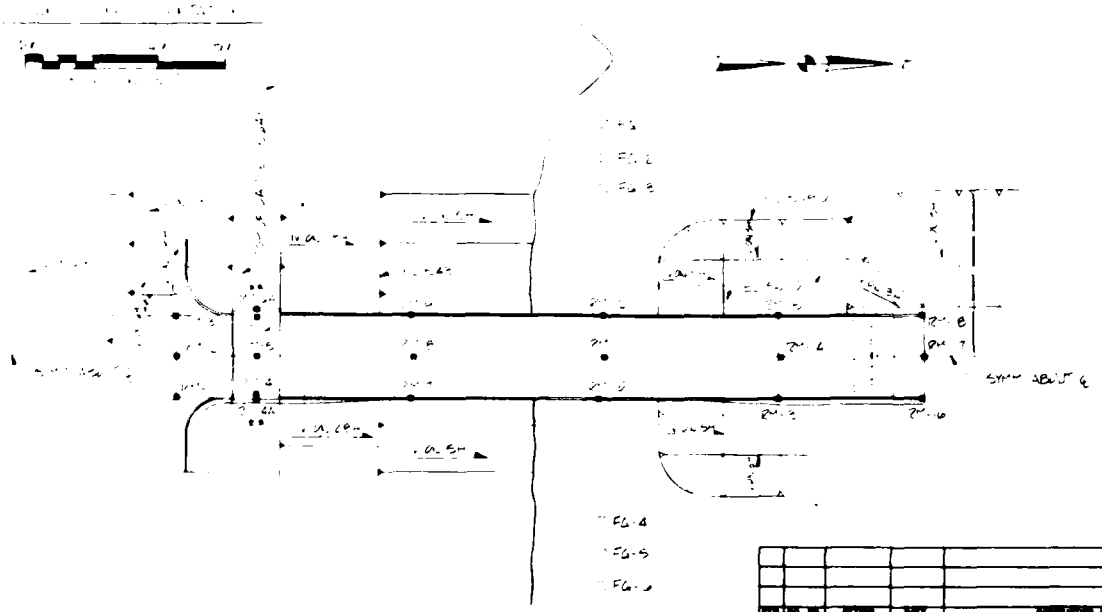
LEGEND

▲ P PIEZOMETER
● SP SETTLEMENT PLATE
▼ DSP DEEP SETTLEMENT PLATE
◆ DBM DEEP BENCH MARK
■ [illegible] REFERENCE MARK
[illegible]

REFERENCE MARKS			
NO	[illegible] STATION	OFFSET	LOCATION
RM-1	9+[illegible]	[illegible]	[illegible] SLAB
RM-2	9+[illegible]	[illegible]	[illegible] SLAB
RM-3	9+[illegible]	[illegible]	[illegible]
RM-4	[illegible]	[illegible]	[illegible]
RM-5	[illegible]	[illegible]	[illegible]
RM-6	[illegible]	[illegible]	[illegible]
RM-7	10+[illegible]	25' [illegible]	[illegible]
RM-8	10+[illegible]	[illegible]	[illegible]
RM-9	10+[illegible]	[illegible]	[illegible]
[illegible]	2+[illegible]	[illegible]	[illegible]
[illegible]	12+[illegible]	[illegible]	[illegible]
[illegible]	2+[illegible]	25' [illegible]	[illegible]
RM-[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible] SLAB
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	4+[illegible]	25' [illegible]	[illegible]
RM-17	4+[illegible]	℄	[illegible]
RM-18	[illegible]	25' [illegible]	[illegible] SLAB
** RM-4A	[illegible]	25' [illegible]	[illegible]
** RM-6A	[illegible]	25' [illegible]	[illegible]

** [illegible] BRONZE [illegible]





PLAN OF ℄ REFERENCE MARKS

SCALE IN FEET

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

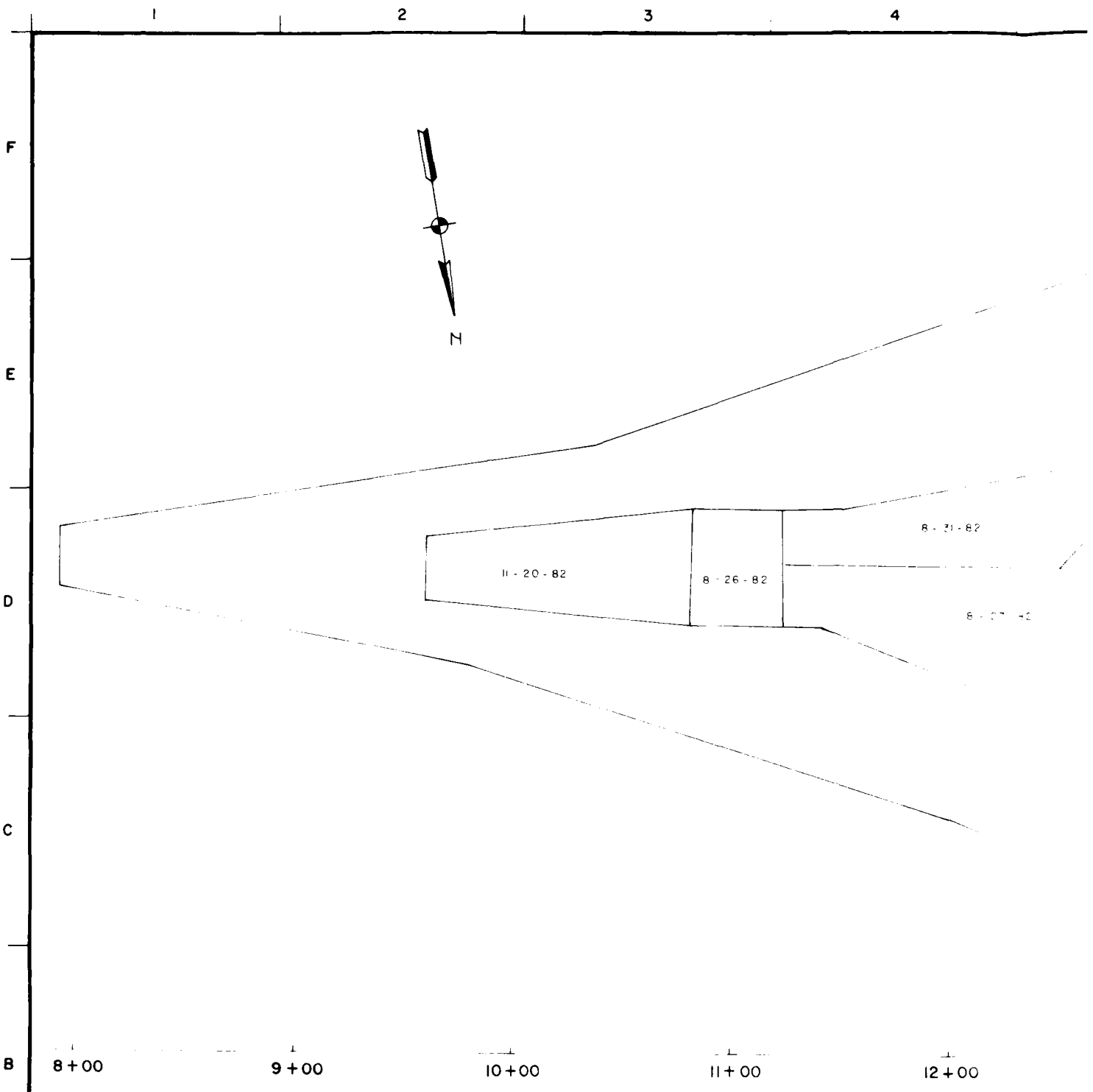
DESIGNED BY: J. ARNOLD & RAE
DRAWN BY: R. PYLER, L. ZELAZNE
REVIEWED BY: T. SCHMIDT
SUBMITTED BY: H E KARBS
CHECKED:

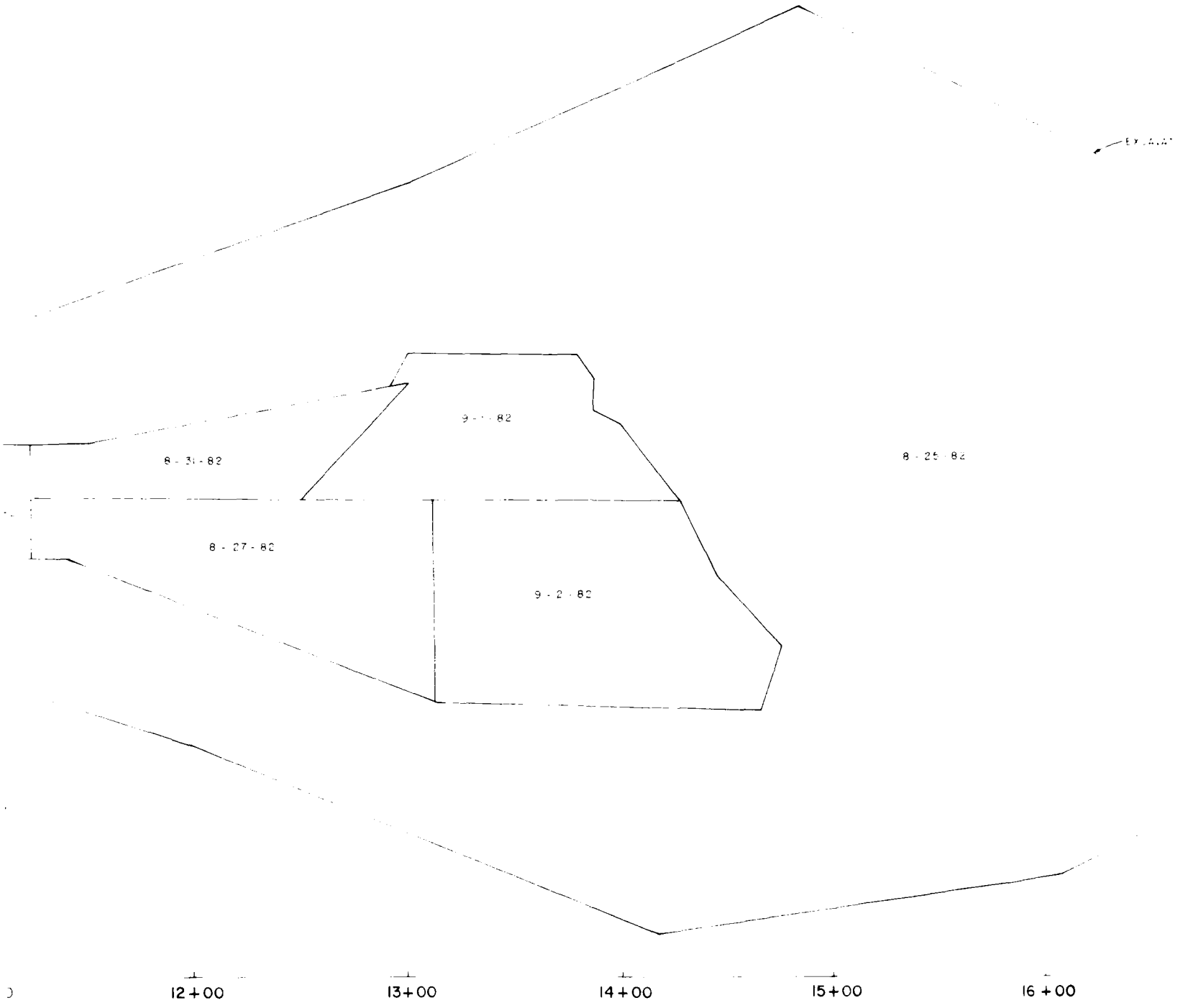
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

PLAN OF INSTRUMENTATION

DATED:
GRADING NUMBER:
SHEET NO. 33

TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
F
E
D
C
B
A
N
11 - 20 - 82
8 - 26 - 82
8 - 31 - 82
8 + 00
9 + 00
10 + 00
11 + 00
12 + 00
STATIONS

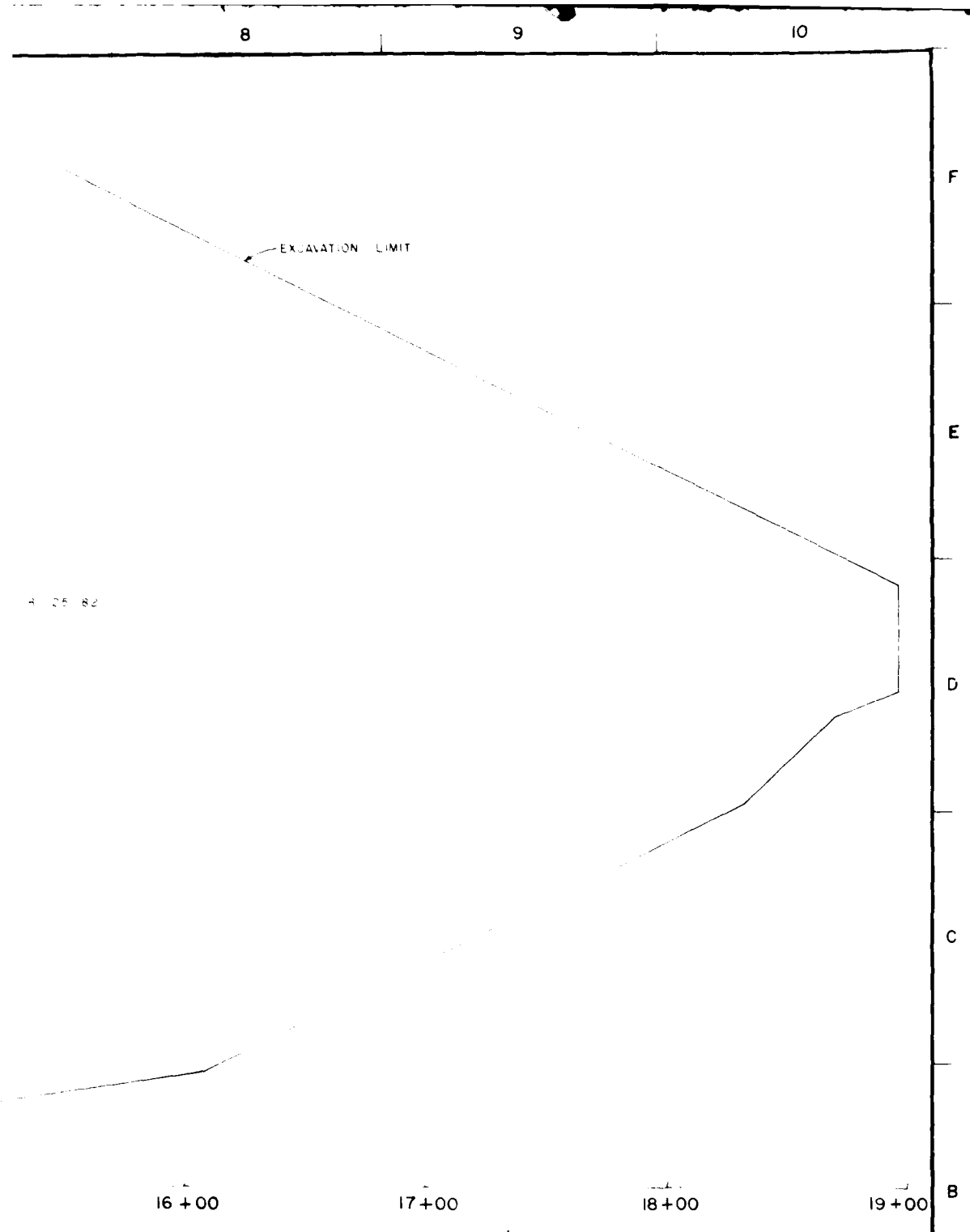


STATIONS IN FEET

NOTES

1. UNWEATHERED SHALE SURFACES MAPPED AND APPROVED IMMEDIATELY SUBSEQUENT TO EXCAVATION TO FINAL GRADE; ALL OTHER SURFACES MAPPED ON 8-25-82 AND APPROVED BY CONSTRUCTION REPRESENTATIVE PRIOR TO BACKFILL.

2. A DETAILED MAP OF THE EXCAVATION IS PRESENTED ON PLATE 15.



PED AND APPROVED
ATION TO FINAL GRADE,
8-25-82 AND APPROVED
IOR TO BACKFILL.

N IS PRESENTED ON

STM. LOG NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: A. MARR
DRAWN BY: C. DRYSDALE
REVIEWED BY: R. BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

DEEP INSPECTION TRENCH

RECORD OF FOUNDATION APPROVAL

SUBMITTED BY
ROBERT BEHM
ENGINEER

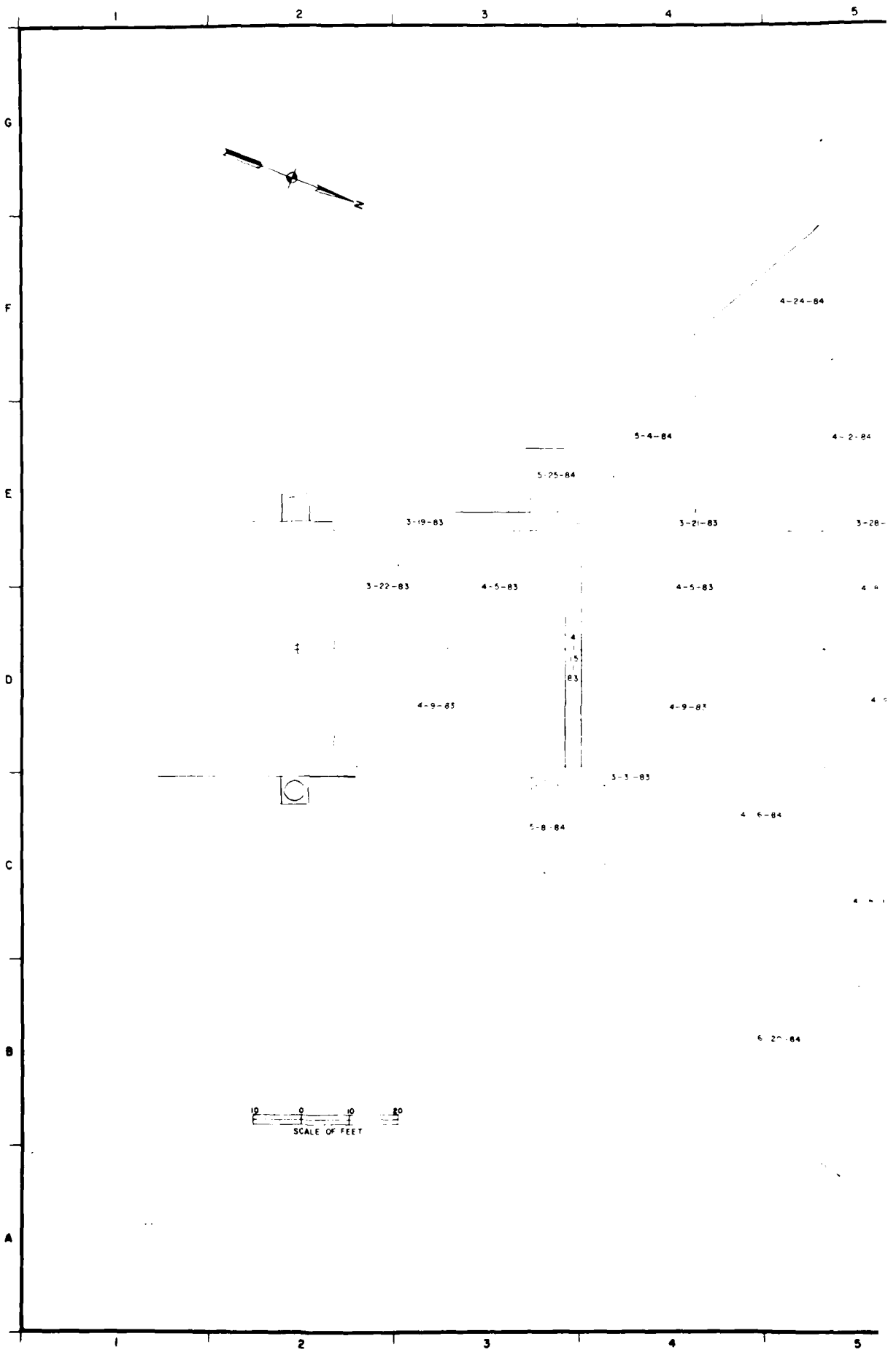
INVITATION NO. | DATE
CONTRACT NO
DRAWING NUMBER | SHEET NO OF

SEQUENCE NO 34

CONTRACT NO

8

ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
5
G
F
E
D
C
B
A
N
4-24-84
5-4-84
4-2-84
5-25-84
3-19-83
3-21-83
3-22-83
4-5-83
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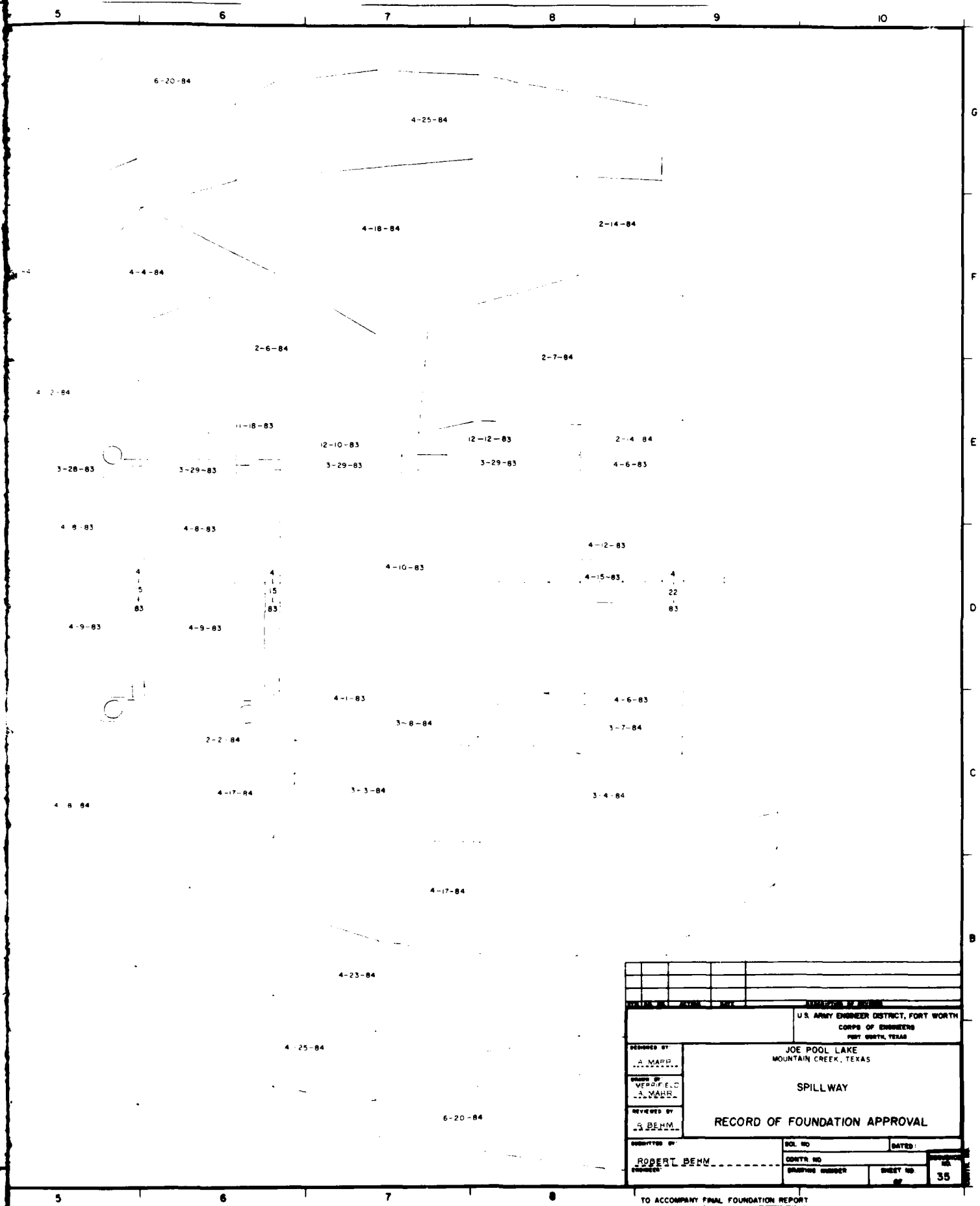
4-9-83
4-9-83
3-3-83
4-6-84
5-8-84
10 0 10 20
SCALE OF FEET



U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY A. MARR
DRAWN BY VERIFIED J. MARR
REVIEWED BY G. BENM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

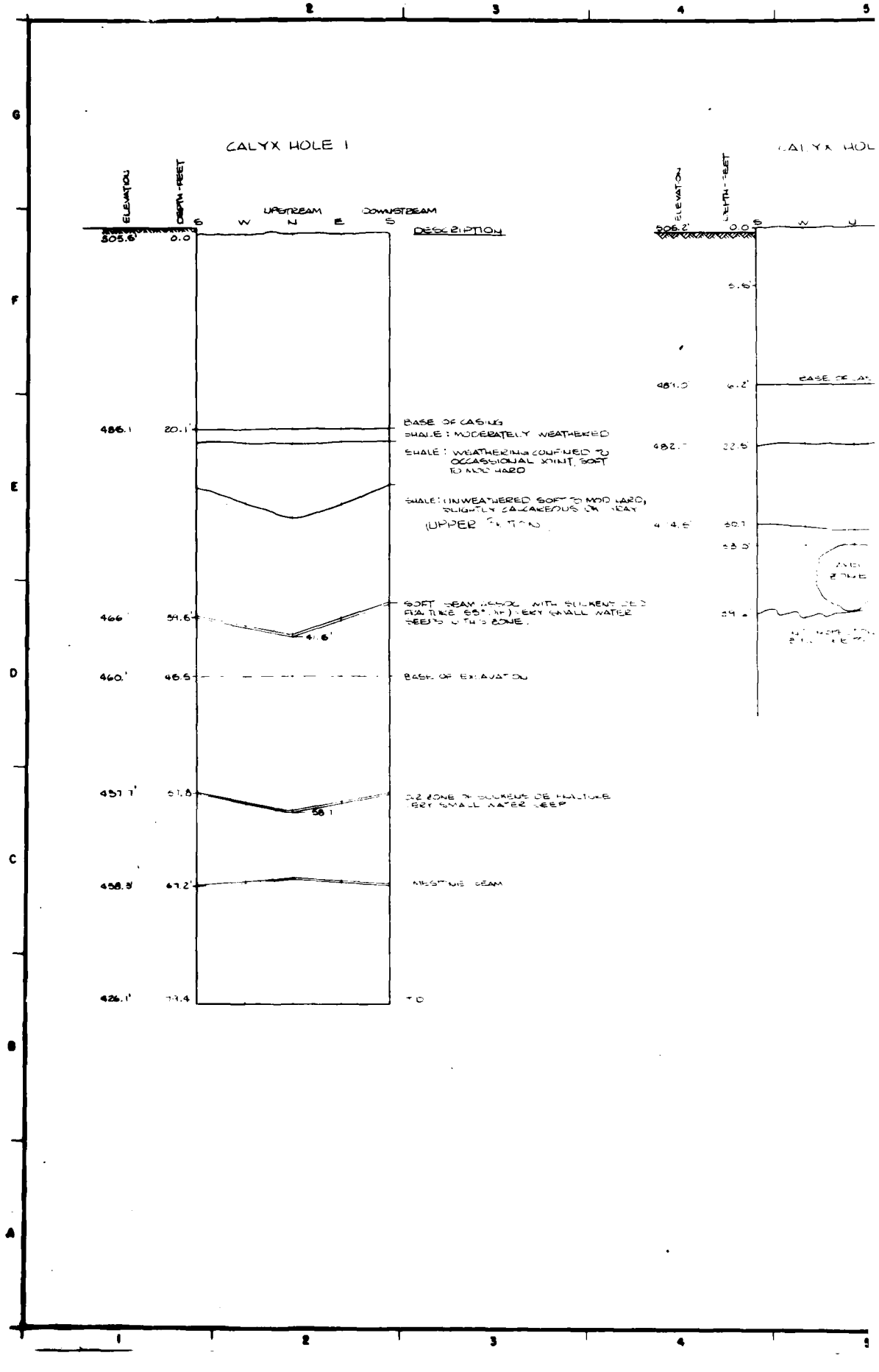
SPILLWAY

RECORD OF FOUNDATION APPROVAL

SUBMITTED BY ROBERT BENM
ENGINEER

SOL. NO
CONTR NO
DRAWING NUMBER
SHEET NO 35 OF
DRAWING NO.

TO ACCOMPANY FINAL FOUNDATION REPORT


CALYX HOLE 1
ELEVATION
DEPTH - FEET
UPSTREAM
DOWNSTREAM
S W N E S
DESCRIPTION
505.6'
0.0
BASE OF CASING
486.1
20.1'
SHALE : MODERATELY WEATHERED
SHALE : WEATHERING CONFINED TO OCCASIONAL JOINT, SOFT TO MOD HARD
SHALE : UNWEATHERED SOFT TO MOD HARD, SLIGHTLY CALCAREOUS IN PART
(UPPER PITTSBURGH)
466'
34.6'
41.6'
460'
46.5'
BASE OF EXCAVATION
457.7'
51.8'
58.1
458.3'
47.2'
426.1'
79.4
TD
CALYX HOL
ELEVATION
LENGTH - FEET
506.2'
0.0
5.6'
481.0
6.2'
BASE OF CA
482.
22.5
49.7
53.2
34
A
B
C
D
E
F
G
1
2
3
4
5

5 6 7 8 9 10

CALYX HOLE 2

	E	S	DESCRIPTION
			BASE OF OVERBURDEN
			SHALE : VERY HIGHLY WEATHERED (LAYEY), SOFT, CRUMBLY HIGHLY JOINTED, VERY LIGHT TAN (UPPER BRITTON)
			SHALE : MODERATELY WEATHERED, HIGHLY JOINTED & FRACTURED BEDDING PLANES, SLIGHT SEEPAGE WATER ALONG JOINT & FRACTURE PLANES
			SHALE : UNWEATHERED SOFT TO MODERATELY HARD, LIGHT TAN, FINE TO FLAGGY, THIN BEDDING PLANES, JOINTS 20° TO 25° SEEP WATER ALONG JOINT & FRACTURE PLANES (UPPER BRITTON)

CALYX HOLE 3

ELEVATION	DEPTH IN FEET	UPSTREAM S	UPSTREAM W	DOWNSTREAM N	DOWNSTREAM E	DOWNSTREAM S	DESCRIPTION
524.2'	0.0'						
513.4'	10.8'						TTOM OF CASING
511.5'	2.7'						SHALE : MODERATELY WEATHERED, HIGHLY JOINTED, TAN
510.0'	1.4.2'						SHALE : WEATHERING CONFINED TO JOINTS - FRACTURES
							: UNWEATHERED SOFT TO MODERATELY HARD, SLIGHTLY CALCAREOUS, WITH OCCASIONAL CLAYSTONE OR LIMESTONE NODULES OR SEAM (UPPER BRITTON MBR)
							31.4 = SMALL WATER SEEP
							45.6' = SMALL WATER SEEP ALONG FRACTURE
							68.1' = WATER SEEPS ALONG LIMESTONE SEAM
442.6'	81.6'						

FOR LOCATION & EXPLORATION SEE SHEET 4.

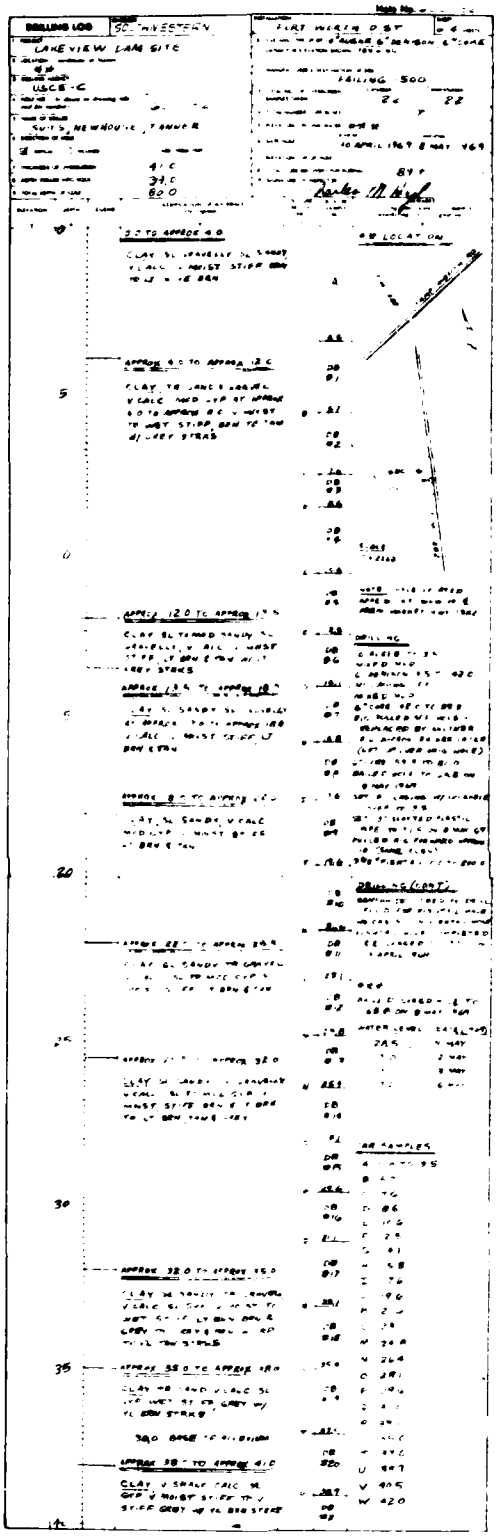
U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

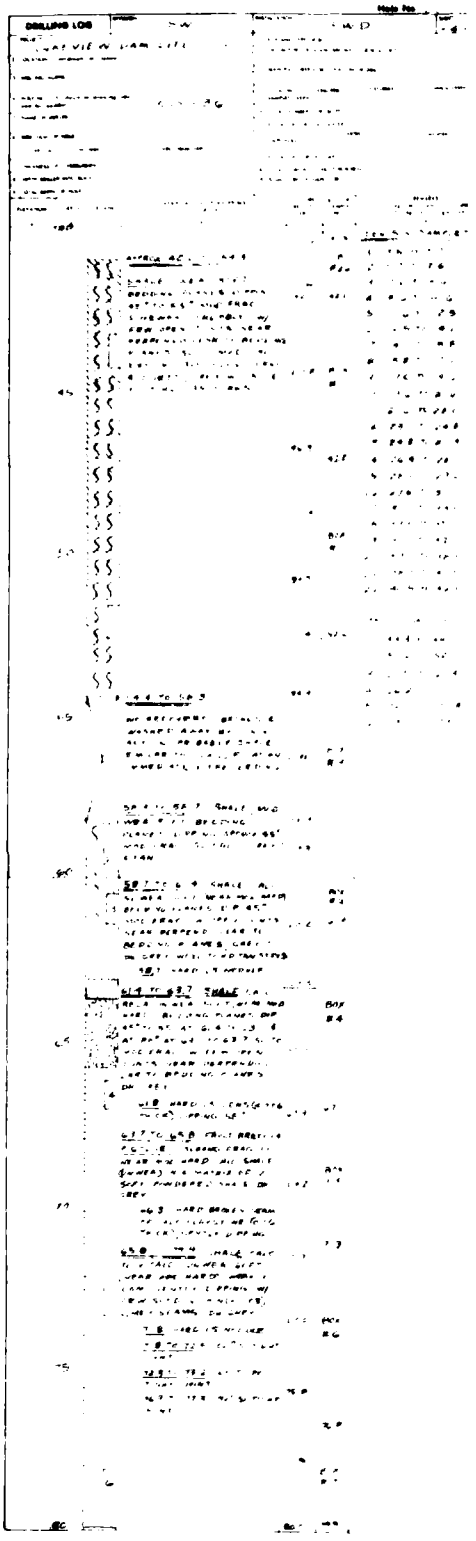
DESIGNED BY R.BEHM
DRAWN BY HLR/LLM
REVIEWED BY RCB
SUBMITTED BY ROBERT BEHM

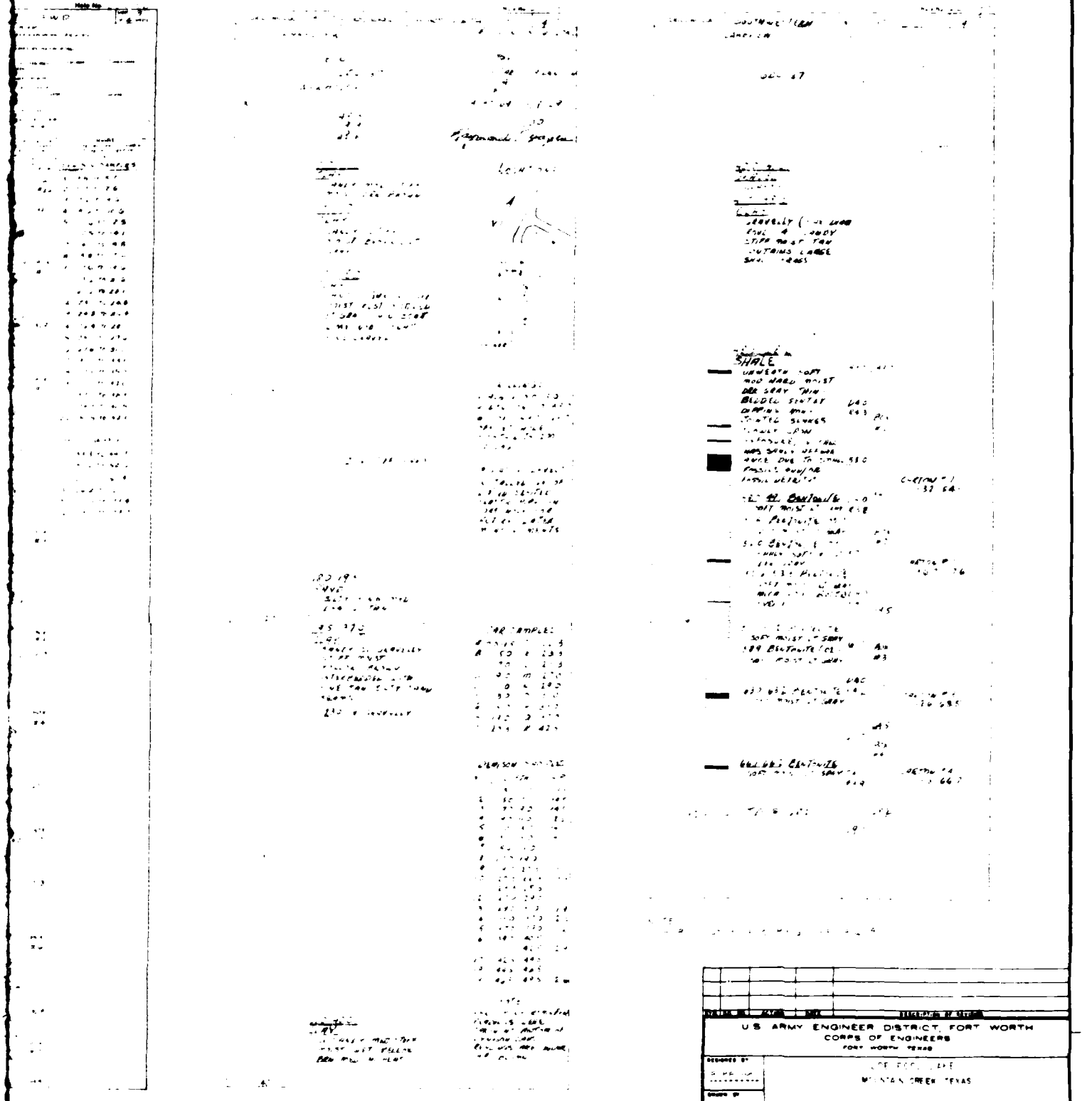
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS
EMBANKMENT, SPILLWAY, AND OUTLET WORKS
LOGS OF BORINGS
(CALYX HOLE 1, 2 & 3)

INV NO. DACW 63-81-C-0093
DATED JULY 1981
DRAWING NUMBER
SHEET NO 36

5 6 7 8 TO ACCOMPANY FINAL FOUNDATION REPORT







U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY
DRAWN BY
HLR
CHECKED BY

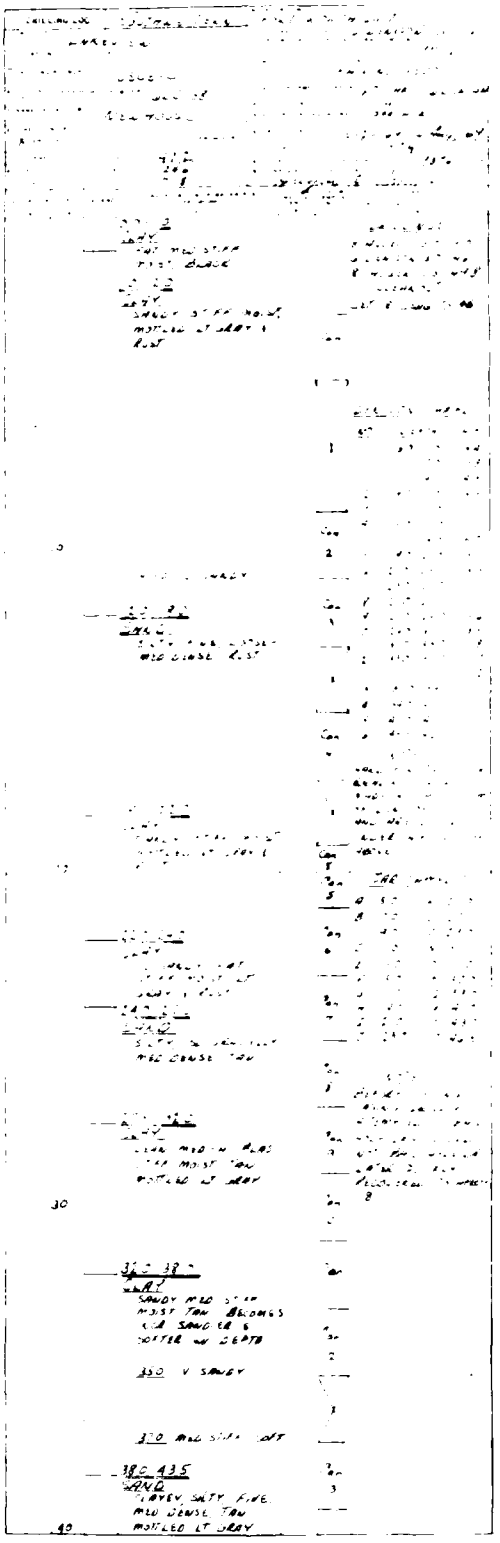
[illegible] LAKE
MOUNTAIN CREEK, TEXAS

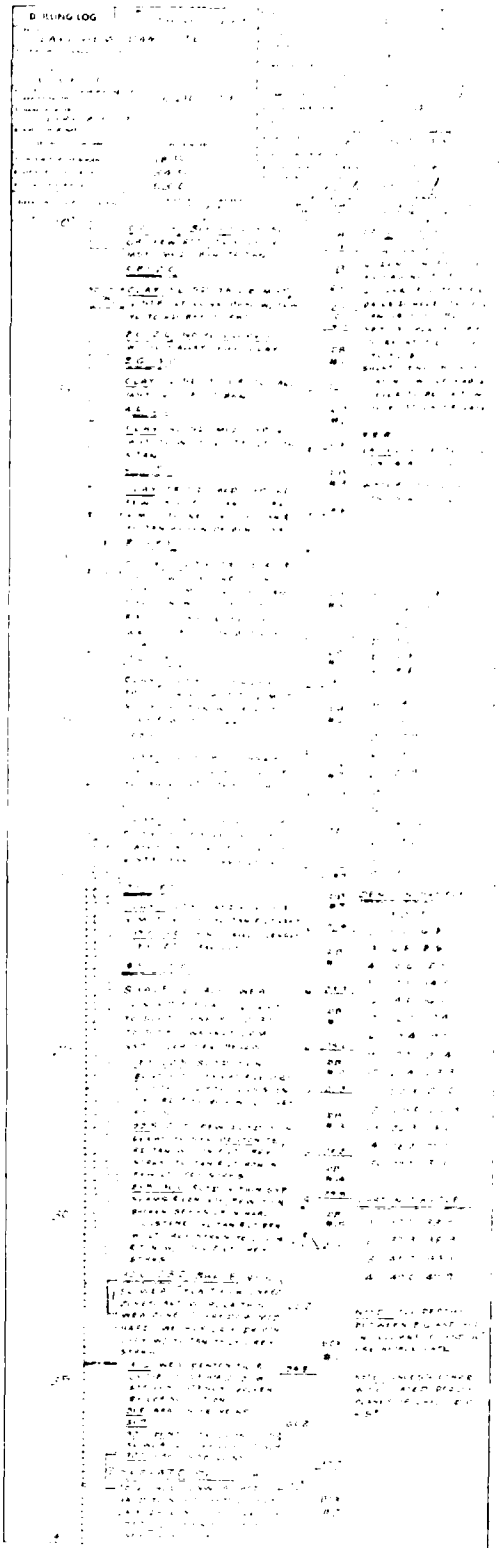
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

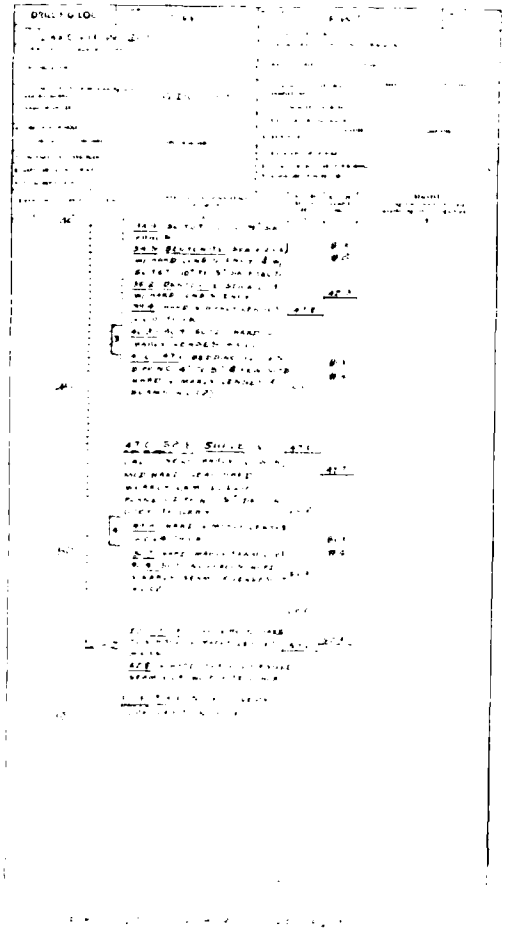
LOGS OF BORINGS
6DC-36 AND 6DC-37

SUBMITTED BY
H. HENRY BEHM

INV NO. [illegible]
DATED [illegible]
DRAWING NUMBER
SHEET NO.
DRAWING NO. 77







U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: H. BEHM
DRAWN BY: JLB
PREPARED BY: R. BEHM
SUBMITTED BY: ROBERT BEHM

JOE POOL LAKE
[illegible] CREEK, TEXAS

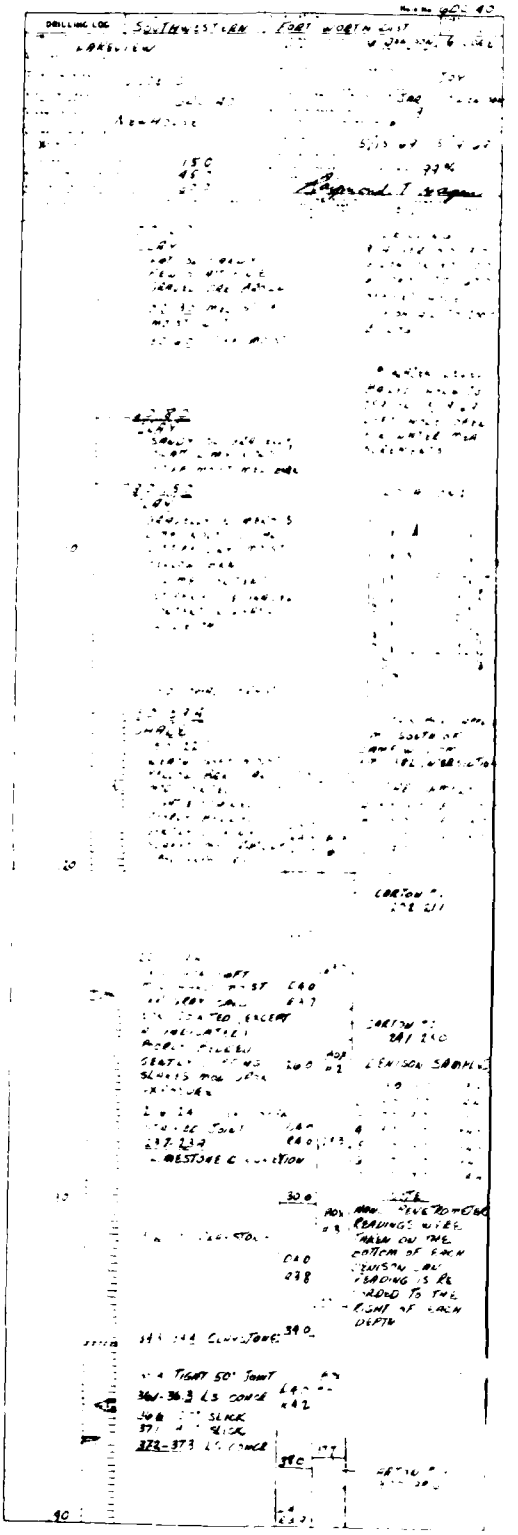
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

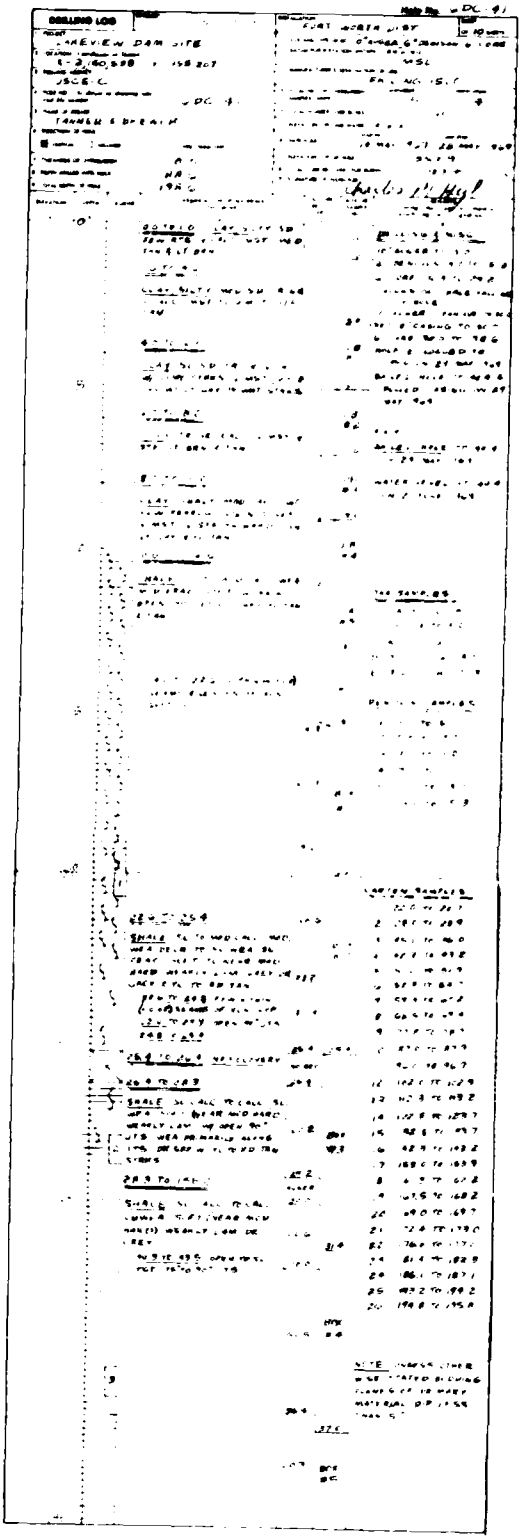
LOGS OF BORINGS
6DC-38 AND 6DC-39

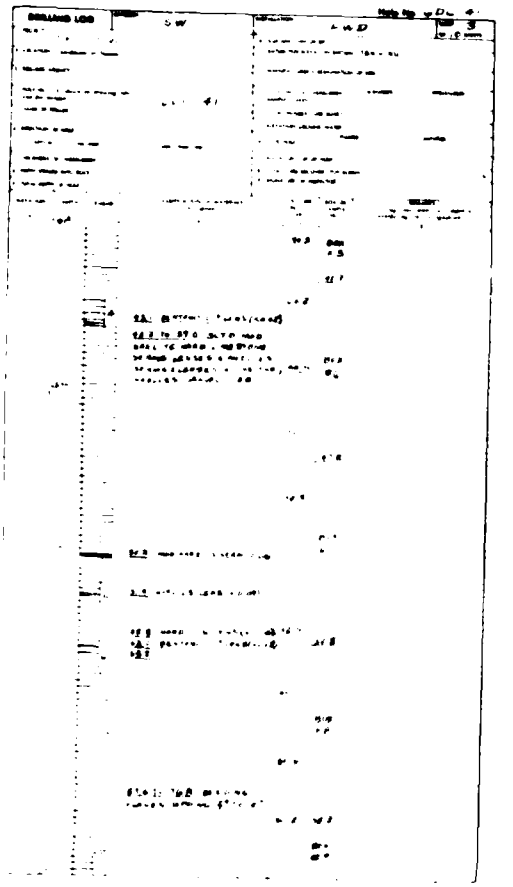
NV NO DACW63-81-C-0093
DATED JULY 1981
DRAWING NUMBER
SHEET NO
OF
SEQUENCE NO 38

CONTR NO DACW63-81-C-0041

ACCOMPANY FINAL FOUNDATION REPORT







BCR No. [illegible] 6DC 4 CONTINUED ON PLATE 4

[illegible] 6DC 4

U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY P. BEHM

DRAWN BY ULR

REVIEWED BY P. BEHM

SUBMITTED BY ROBERT BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
6DC - 40 AND 6DC - 41

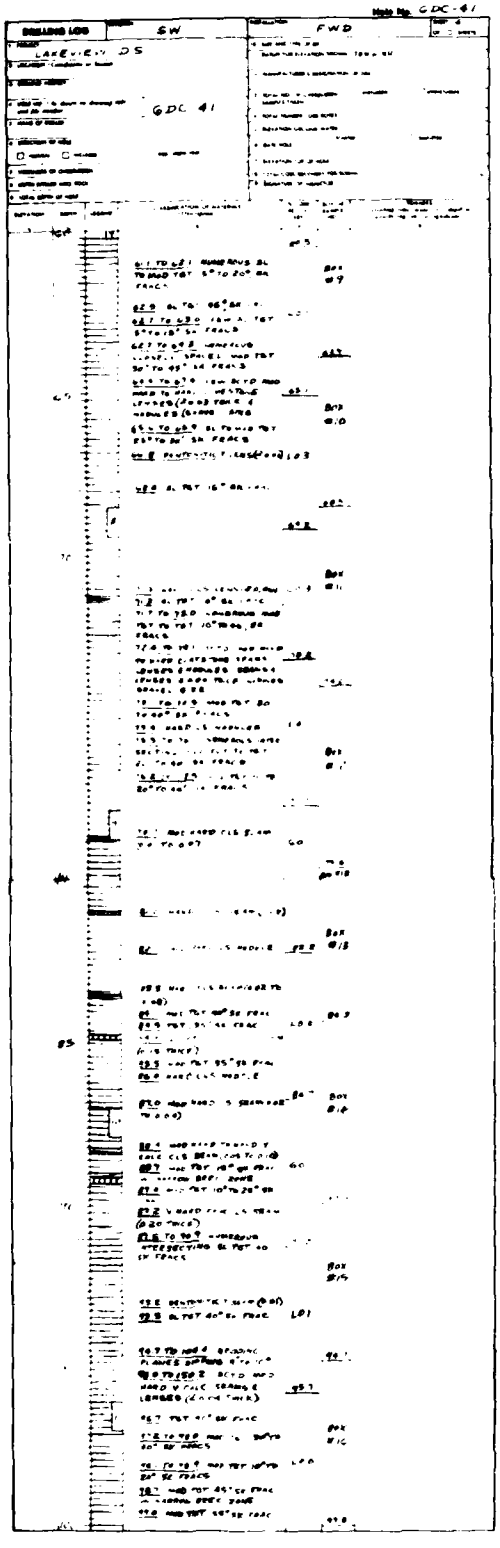
CONTRACT NO. DACW63-81-C-0093

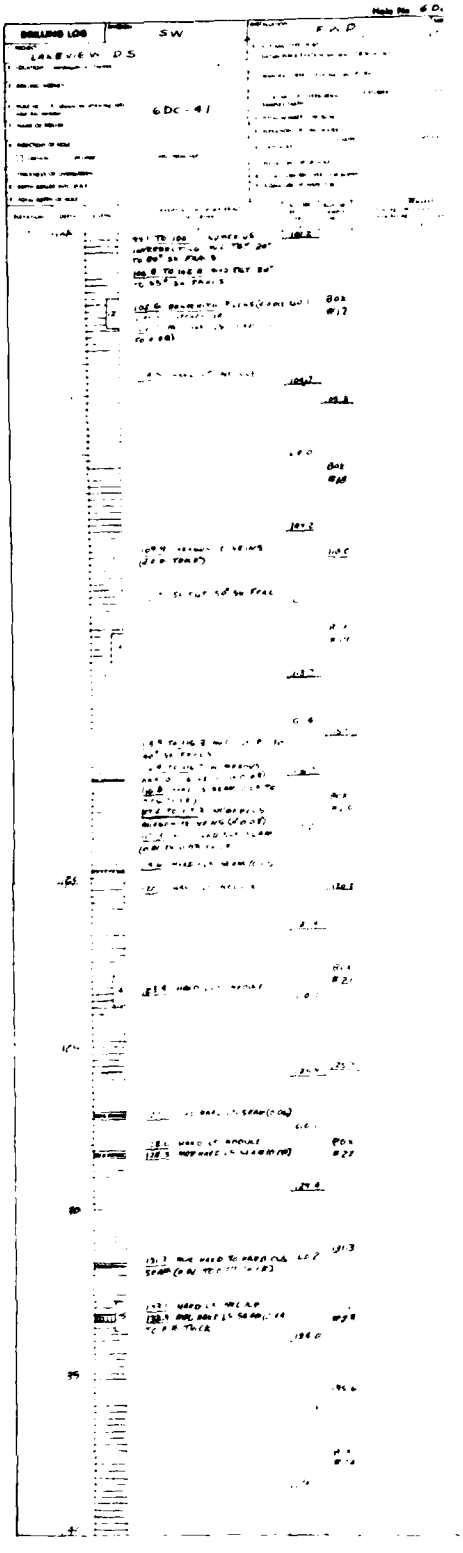
DATED JULY 1981

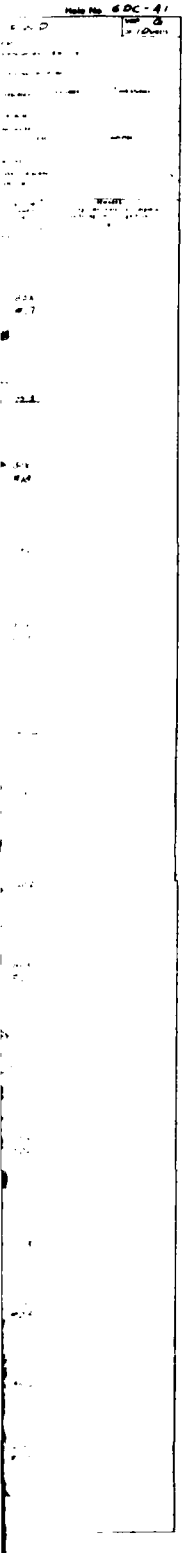
DRAWING NUMBER

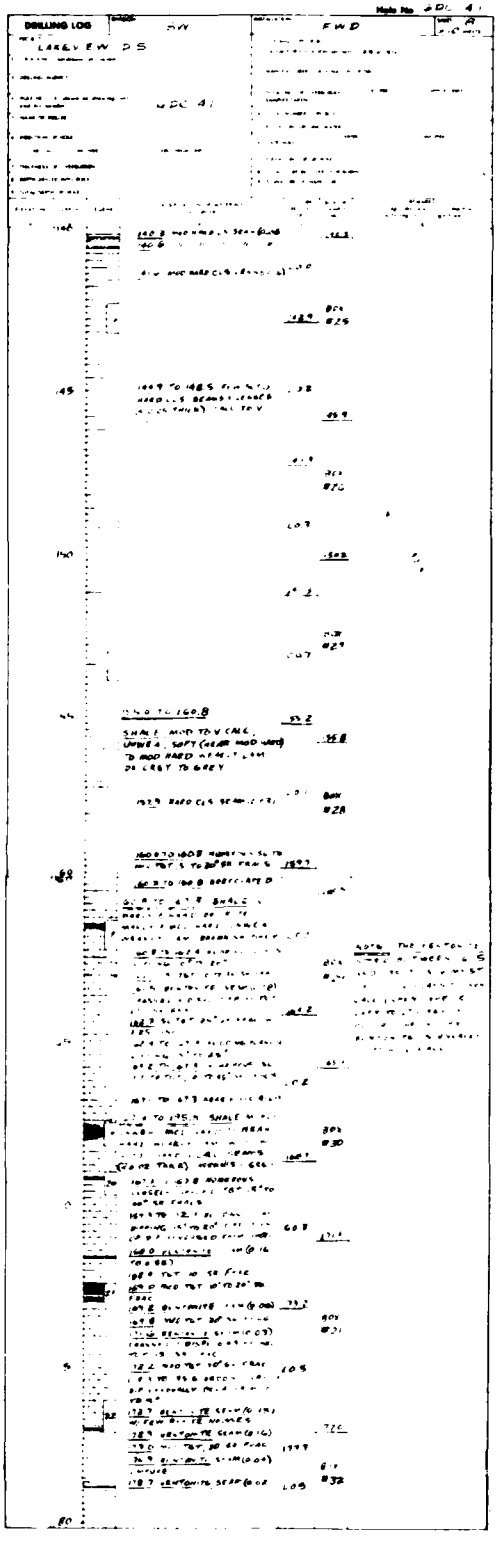
SHEET NO. 39

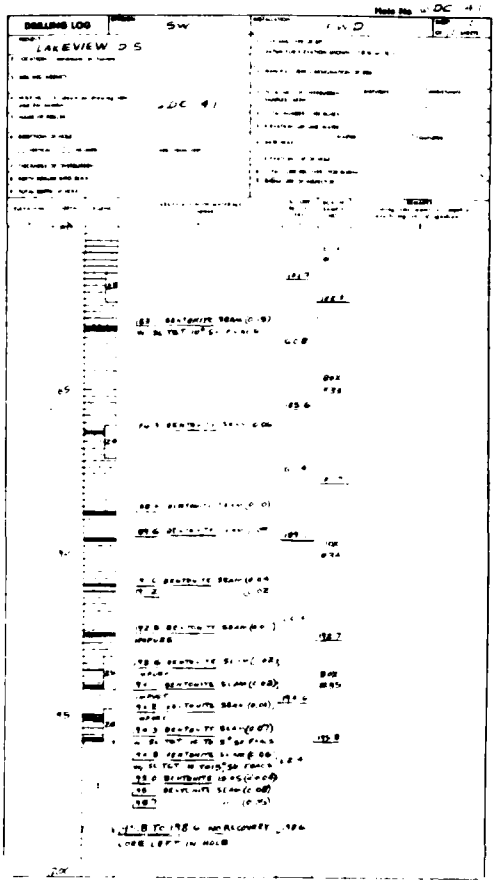
ACCOMPANY FINAL FOUNDATION REPORT


DRILLING LOG
SW
FWD
LAKEVIEW DS
GDC 41


DRILLING LOG
SW
FWD
LAKEVIEW DS
GDC-41







U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: P. PFEIFFER
DRAWN BY: HLB
REVIEWED BY: E. PEEBLES
SUBMITTED BY: P. PFEIFFER PFHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
6 DC - 41

IRV NO DACW63-81-C-0053
DATED JULY 1981
DRAWING NUMBER
SHEET NO
SEQUENCE NO 40

FORM NO DACW63-81-C-0041

TO ACCOMPANY FINAL FOUNDATION REPORT

CORPS OF ENGINEERS

Hole No. BAG-42

DRILLING LOG — Division: SOUTHWESTERN — Installation: FORT WORTH DIST. — Sheet 1 of 3 sheets

Project: LAKEVIEW DAM SITE

Datum for elevation shown: MSL

Drilling agency: USCE

Manufacturer's designation of drill: FAILING 1500

Hole No.: BAG-42

Name of driller: NEWHOUSE & HARTNER

Total no. of undisturbed samples taken: 5 — NONE

Total number core boxes: 4

Date hole: Started 2 JUNE 1969 — Completed 4 JUNE 1969

Direction of hole: Vertical

Thickness of overburden: 7.0

Depth drilled into rock: 38.7

Total depth of hole: 45.7

Signature of inspector: [illegible]

0.0–5.0 CLAY, silt, tr. sand, mst, stiff, brn

5.0–7.0 CLAY, sl. mod. sd., calc, mst, stf brn

7.0–9.0 CLAY, tr. sand, calc, mst, stf, lt brn

9.0–12.5 CLAY, sl. sd., calc, mst, stf, tan & lt brn

12.5–17.0 CLAY, SANDY, calc, mst, stf, tan & brn w/ few gry strks

17.0–20.0 SHALE, wea., frac.

20.0–22.0 SHALE, mod. wea.

22.0–25.5 SHALE, mod. hard, sl. wea.

25.5–[illegible] SHALE

DRILLING & MISC.:

0 AUGER TO 20.0

SET 4" CASING TO 20.0

CORED 20.0–45.9

BAILED HOLE TO 45.8

PULLED CASING ON 4 JUNE 1969

HOLE LEFT OPEN FOR WTR LEVEL CHECKS

BAILED HOLE TO 45.8 ON 4 JUNE 1969

WATER LEVEL AT 30.8 ON 5 JUNE 1969

WATER LEVEL AT 30.5 ON 7 JUNE 1969

JAR SAMPLES:

A 0.0–5.0

B 5.0–7.0

C 7.0–9.0

D 9.0–12.5

E 12.5–17.0

F 17.0–20.0

G 18.0–20.0

BOX #1

BOX #2

BOX #3

BOX #4

NOTE: BEDDING PLANES OF [illegible] DIP [illegible]

Hole No. BAG-42

DRILLING LOG

LAKEVIEW DAM SITE

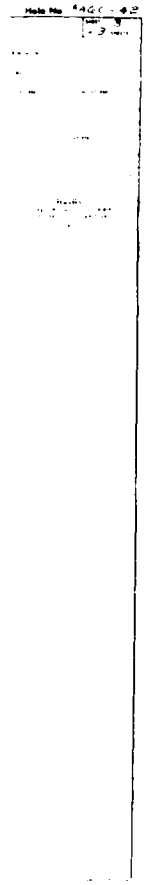
BAG-42

BOX #4

SHALE

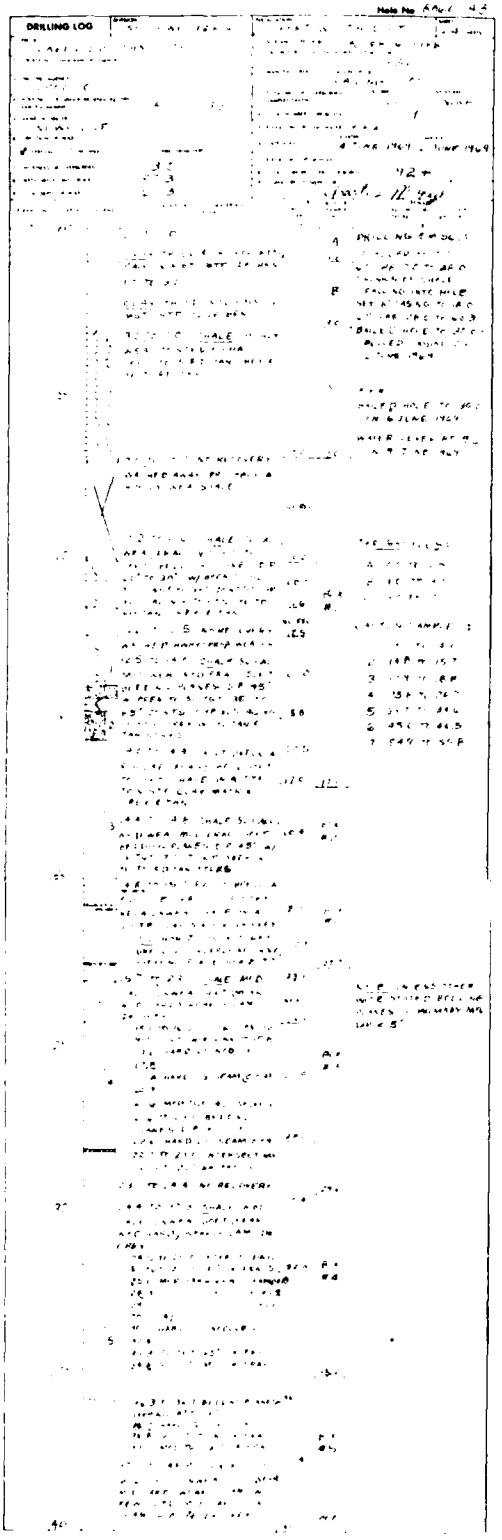
Hole No 8AGC-42

DRILLING LOG



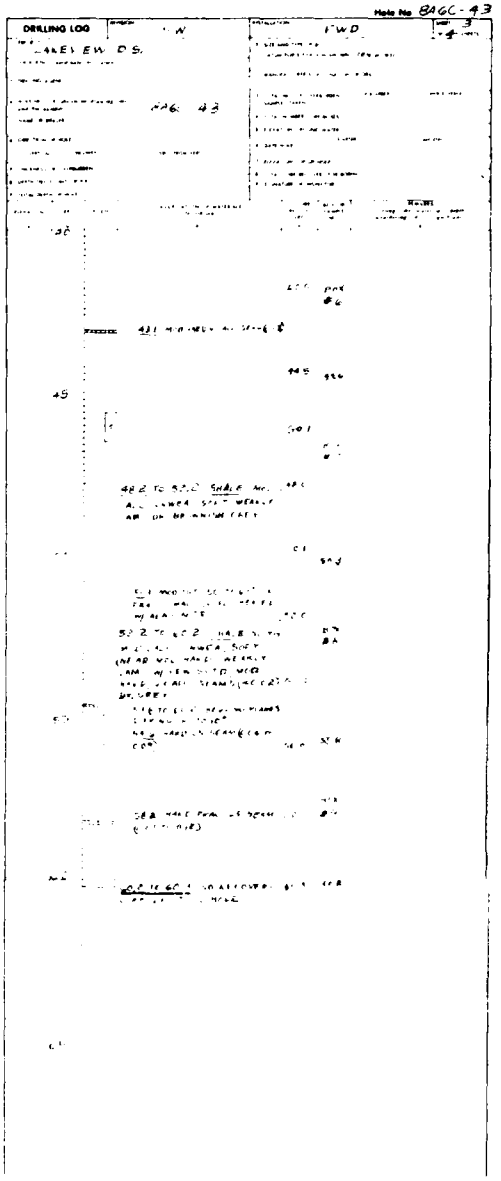
Hole No 8AGC-42

DRILLING LOG



Hole No 8AGC-43

DRILLING LOG



NUMBER	REVISION	DATE	DESCRIPTION OF REVISION

US ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: [illegible]
DRAWN BY: HLR
REVIEWED BY: R HEIM
SUBMITTED BY: ROBERT BOHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
8AGC-42 AND 8AG3-43

INV NO DACW 63-81-B-0093
DATED MAY 1981
DRAWING NUMBER
SHEET NO
SEQUENCE NO 41

COUNT NO DACW63-81-C-0191

TO ACCOMPANY FINAL FOUNDATION REPORT

Hole No. BAGC-44

DRILLING LOG — SOUTHWESTERN — FORT WORTH DIST — Page 1 of 3 sheets

LAKEVIEW ANNEX SITE

VOCE-C

BAGC-44

NEWHOUSE

4

5.5
54.5
60.0

10" AUGER
MSL
FAILING 1500
2
10
NONE
4 4 8
9 JUNE 1969 TO 16 JUNE 1969
95'
(1,240 m) NW

0.0-3.5 CLAY, SL CR TR SD, MOD STF TO 2.0 CALC., V MST TO WET STF, DK TO LT BRN.

3.5-6.5 CLAY, SL SHALY CALC, V MST, STF, LT BRN & TAN

6.5-7.0 SHALE NON-TO MOD CALC, HIGHLY WEA, JOINTED & FRAC, V SOFT TO SOFT, TAN & GREY W/ YL TO RD TAN STREAKS.

7.0-8.5 NO RECOVERY - PROBABLY HIGHLY WEA SHALE

8.5-17.0 SHALE NON-TO SL CALC, HIGHLY WEA, FRAC; W/ NUMEROUS, OPEN TO MOD TGT, 30° TO 90° JOINTS; V SOFT TO SOFT, BEDDING PLANES DIP 15° TO 30°, W/ GYP FLS ALONG JOINTS & FRACS, GREY & TAN W/ YL TO RD TAN STREAKS

8.5-11.5 V "CRUMBLY"
11.5-17.0 "CRUMBLY"

17.0-21.0 SHALE NON-TO SL CALC, WEA, FRAC, MOD "CRUMBLY" W/ OPEN TO SL TGT, 75° TO 90° JOINTS; V SOFT TO SOFT, BEDDING PLANES DIP 15° TO 20° W/ PERP GYP FLS ALONG JOINTS & (1 TO 4" THICK SEAMS OF SLN GYP TAN & GREY W/ RD TO YL TAN STRKS

18.7 SOFT WEA CLS NODULE

21.0-30.0 SHALE NON-TO MOD CALC, WEA FRAC, MOD "CRUMBLY" V SOFT TO SOFT, BEDDING PLANES DIP 20° TO 35°, W/ GYP FLS ALONG FRACS & JOINTS TAN & GREY W/ RD TO YL TAN STRKS

21.0 MOD HARD LS LENS (0.08)
21.0-24.4 NUMEROUS WEA TO SL TGT, 10° TO 60° FRACS & JOINTS SEALED W/ GYP
22.3 MOD HARD LS LENS (0.18)
24.4 200 V NUMEROUS OPEN TO SL TGT, 45° TO 90° FRACS & JOINTS SEALED W/ GYP
28.2 HARD FRAC LS SEAM @ 0.08 TO 0.80 THICK
29.9 MOD HARD LS SEAM (0.02) (0.04)
26.0

30.0-32.4 SHALE NON-TO MOD CALC, SL WEA, W/ NUMEROUS OPEN TO MOD TGT, 45° TO 90° FRACS & JOINTS SEALED W/ GYP FLS; SOFT, V WEAKLY LAM, BEDDING PLANES DIP 20° DK GREY W/ TAN TO RD TAN STRKS
30.7 SL TGT 60° FRAC W/ BRECCIATED ZONE (0.08 THK)
30.9-32.2 WEAK BRECCIATED APPEARANCE
32.2 SL TGT, 35° EN FRAC (WAS D OVER FLS W/ HIGHLY BRECCIATED ZONE (0.10 TO 0.25 THICK)

32.4-45.8 SHALE SL TO MED CALC, REL LAMINEA BUT JOINTED & FRAC (SEE BELOW), SOFT (NEAR MOD HARD) ETC. FOR BREC ZONES, WEAKLY LAM, DS PDINTS, PLANES DIP 25° GRADUALLY DECR TO 10° DK GREY
36.7-39.9 MOD TGT 45° TO 80° JOINTS
33.8 MOD TGT 80° EN FRAC
32.5 HARD LS SEAM 0.08
33.1 MOD TGT 75° EN FRAC

DRILLING & MISC:
10" AUGER TO 7.0
NO CASING SET
6" CORE 7.0 TO 60.0
MOVED RIG FORWARD APPROX 5'
3½" FISHTAIL TO 40.0
SHALE FALLING INTO HOLE
6" AUGER (CLEAN OUT) TO 39.0
SET 4" CASING TO 39.0
3⅜" FISHTAIL 40.0 TO 200.0
FISHTAIL WAS E-LOGGED TO 200.0 ON 13 JUNE 1969
IN CORE HOLE SET 3" CASING TO 32.0 & 3" PERF PIPE TO 32.0 ON 16 JUNE 1969
4 4 8
BAILED CORE HOLE TO 36.2 ON 13 JUNE 1969
WATER LEVEL AT 22.0 ON 6 JUNE 1969

JAR SAMPLES:
A 0.0-3.5
B 3.5-5.5
C 5.5-7.0

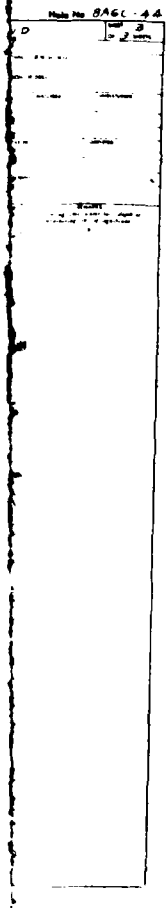
CARTON SAMPLES:
1 13.3-14.1
2 18.0-18.9
3 29.6-29.9
4 35.6-36.5
5 39.2-40.1
6 42.6-43.4
7 48.1-49.0
8 57.1-58.0

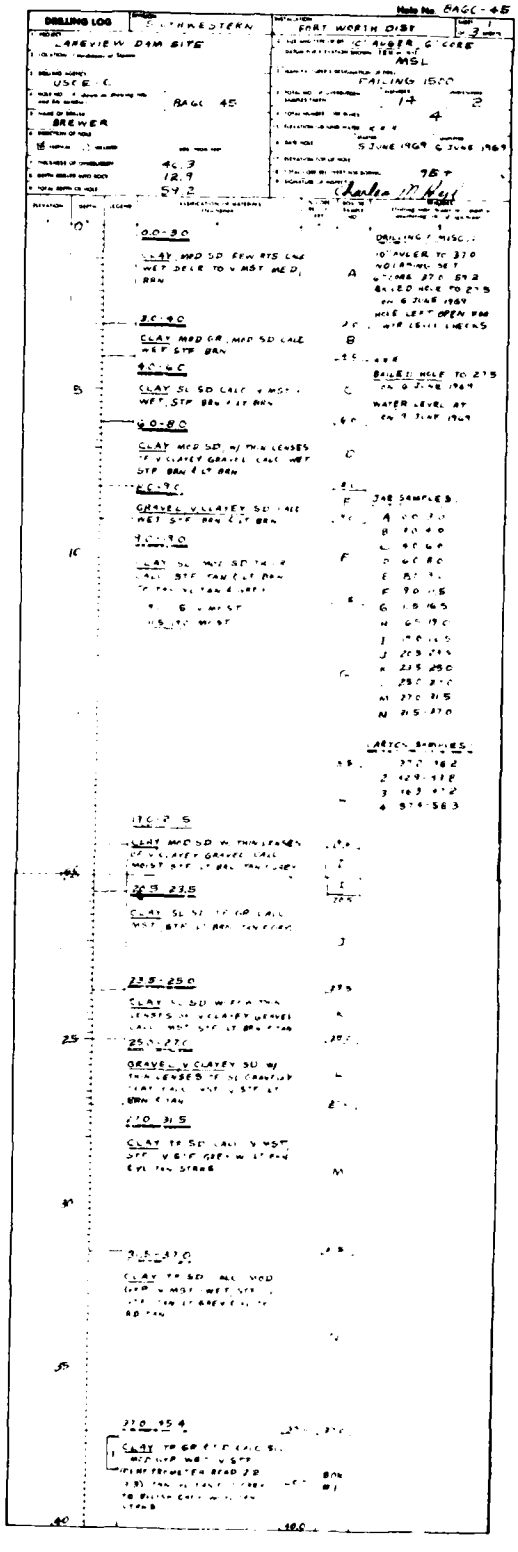
NOTE: NO CARTON SAMPLE POSSIBLE BET. 43 AND 13.3' - MTL NATURALLY FRACTURED & "CRUMBLY"

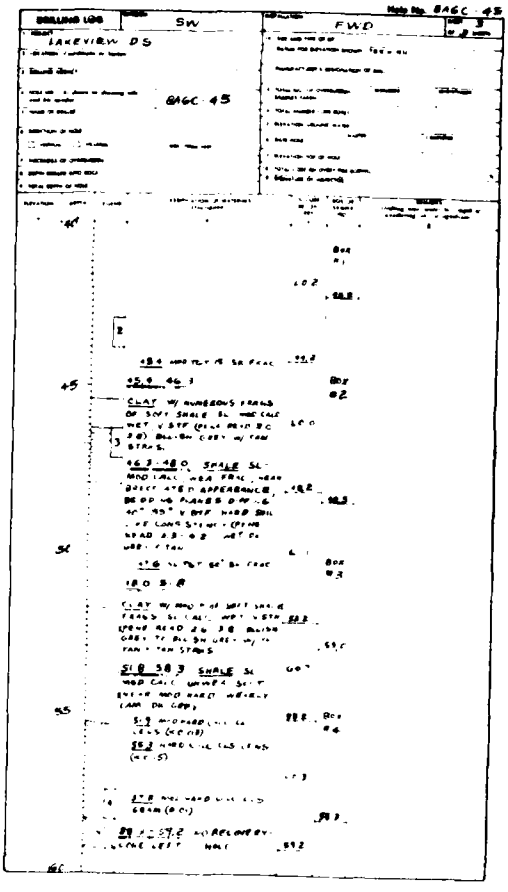
NOTE: NO CARTON SAMPLE 40.8-41.8 BET. 18.9 AND 29.0 - MTL NATURALLY FRACTURED & "CRUMBLY." BROKE APART UPON EXTRACTION FROM CORE BARREL.

DRILLING LOG — SW — FWD — BAGC 44 — LAKEVIEW D.S.

40
34.5 38.8 NUMEROUS SL TO MOD TGT 45° TO 90° JOINTS & FRAC
38.8 SL TGT 20° TO 60° FRAC
38.5-38.7 FAULT BRECCIA & DOUBLE FRACS OF SOFT SHALE IN V STF CLAY MATRIX (IN GRET
38.8 SL TGT 30° TO 60° FRAC (WITHIN BRECCIA ZONE)
38.7 SL TGT 35° TO 60° FRAC
38.7-42.6 NUMEROUS SL TO MOD TGT 45° TO 90° JOINTS & FRACS (NEAR BRECCIATED APPEARANCE
42.6-42.1 FAULT BRECCIA & DOUBLE FRACS OF SOFT SHALE IN V STF CLAY MATRIX (IN GRET
42.1-43.0 NUMEROUS SL TO MOD TGT, 60° TO 90° JOINTS & FRACS (NEAR BREC APPEAR
43.5-45.5 BRECCIATED ZONE (± 80 AVG THICKNESS) ALONG MOD TGT 35° TO 70° FRACS (SHALE W/ ARAGONITE BELOW 44.9')
44.7 45.2 MOD TGT 45° TO 65° SL FRACS
45.8-45.8 MOD TGT 60° SL FRACS HEALED W/ ARAGONITE
45.8-59.2 SHALE SL TO MED CALC, LAMEA SOFT (NEAR MOD HARD), WEAKLY LAM W/ FEW MOD HARD V CALC SEAMS & LENSES (0.02 THICK BEDDING PLANES DIP APPROX 15°, DK GREY
50.6 HARD LS SEAM (0.08)
51.8
55.6 MOD HARD V CALC LENS (0.03)
59.2-60.0 NO RECOVERY CORE LEFT IN HOLE







FOR ... SEE SHEET 4

U.S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY R. BEHM
DRAWN BY HLR
REVIEWED BY R BEHM
SUBMITTED BY R. BEHM

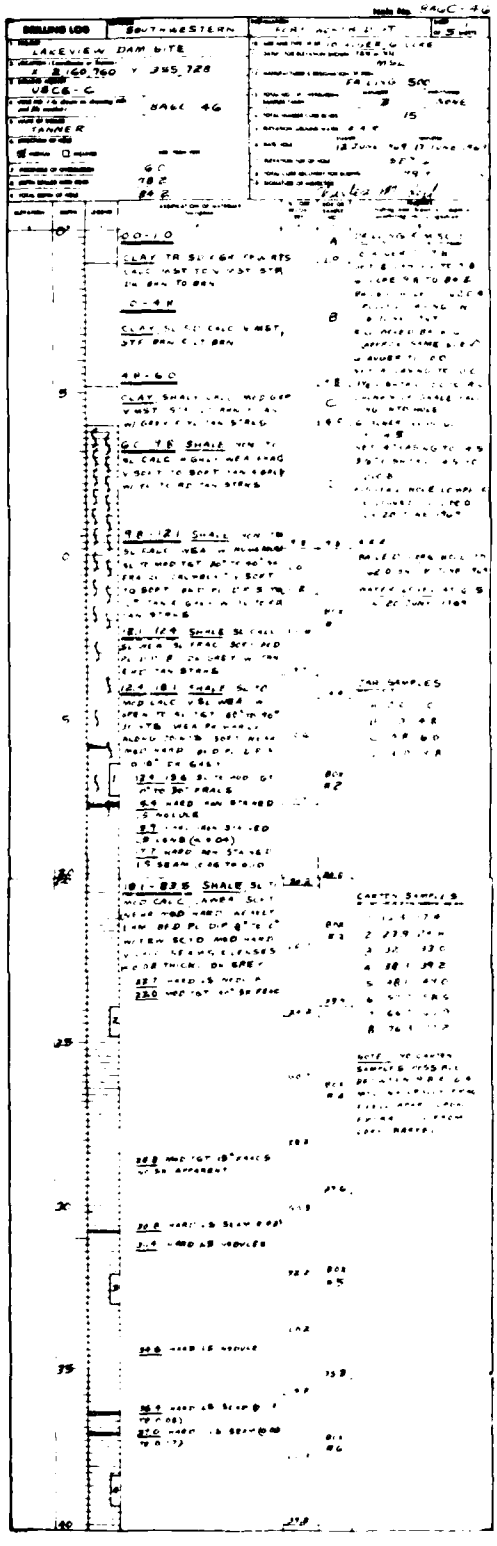
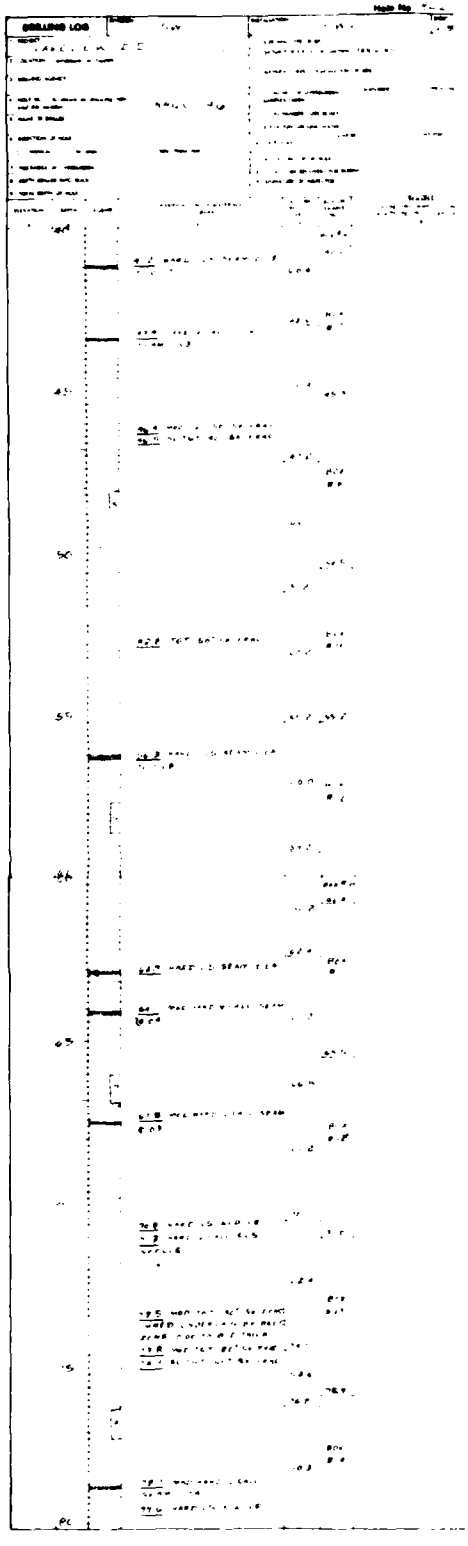
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

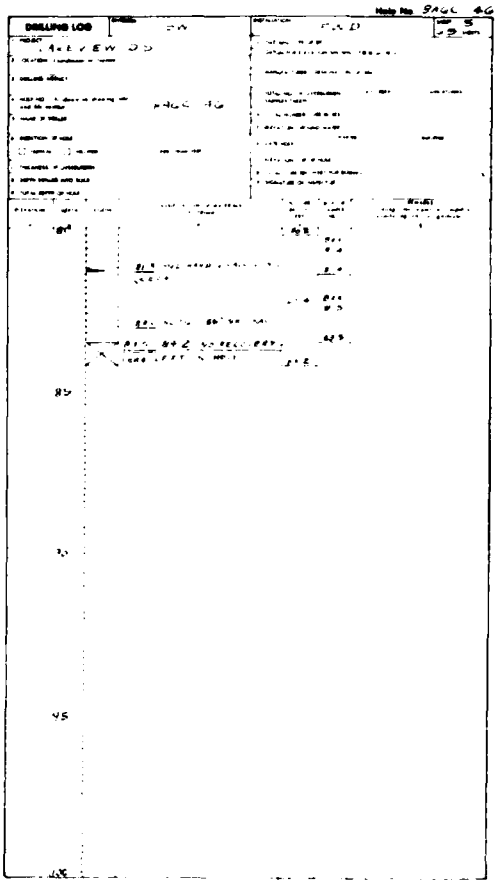
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

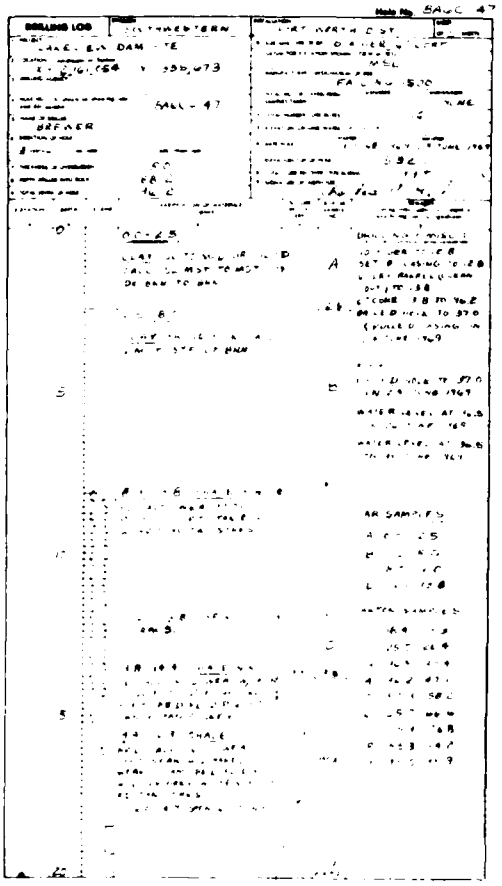
LOGS OF BORINGS
BAGC-44 AND BAGC-45

I&W NO. SWD-63-81-C-0093
DATED JULY 1981
DRAWING NUMBER
SHEET NO
RESUBMITTED NO.
42

TO ACCOMPANY FINAL FOUNDATION REPORT


DRILLING LOG
SOUTHWESTERN
LAKEVIEW DAM SITE
USCE - C
TANNER
BASE 46
0.0 - 1.0
CLAY TR SILICEOUS FRAGTS
1.0 - 4.8
CLAY SL SILTY CALC V MST,
4.8 - 6.0
CLAY SHALY CALC MOD CEM
6.0 TO 8.8 SHALE
8.8 - 12.1 SHALE
12.1 - 12.4 SHALE SL CALC
12.4 - 18.1 SHALE SL
12.4 - 13.6 SL TO MOD GY
6.0 HARD TAN STAINED
5.7 HARD TAN SILICIFIED
1.8 SEAM (4.0 DIP)
1.7 HARD TAN STAINED
18.1 - 23.5 SHALE SL
23.8 HARD LT GY SS FRAGS
30.8 HARD LS SEAM @ DIP
31.4 HARD LS NODULES
34.8 HARD LS NODULE
36.4 HARD LS SEAM @
37.0 HARD LS SEAM @ 90
TAN SAMPLES
CARTN SAMPLES

DRILLING LOG

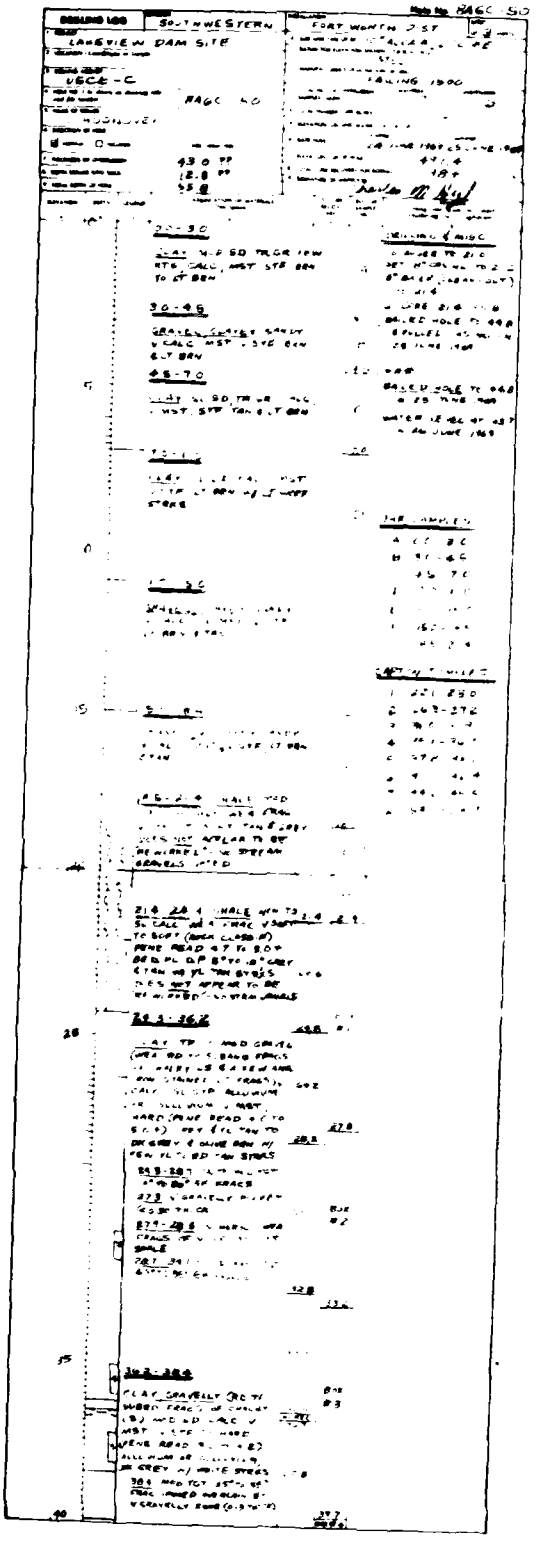




BORING LOG BA6C-47 CONTINUED ON SEQ 44

U S ARMY ENGINEER DISTRICT, FORT WORTH CORPS OF ENGINEERS FORT WORTH, TEXAS			
DESIGNED BY	JOE POOL LAKE MOUNTAIN CREEK, TEXAS		
DRAWN BY	EMBANKMENT, SPILLWAY, AND OUTLET WORKS		
REVIEWED BY	**LOGS OF BORINGS** BA6C-46 AND BA6C-47		
SUBMITTED BY			
ROBERT BEHM			
	DRAWING NUMBER	SHEET NO	SEQUENCE NO 43

TC ACCOMPANY FINAL FOUNDATION REPORT



DRILLING LOG — SOUTHWESTERN — FORT WORTH, TEX.

LAKEVIEW DAM SITE

USCE-C

HAGC-50

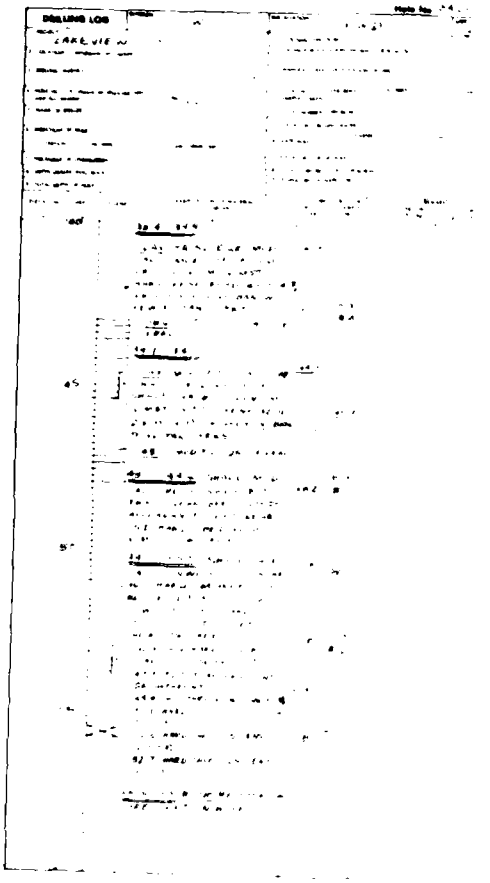
43.0 FT
12.8 FT
55.8

DRILLING 1960

DRILLING & MISC

SAMPLES

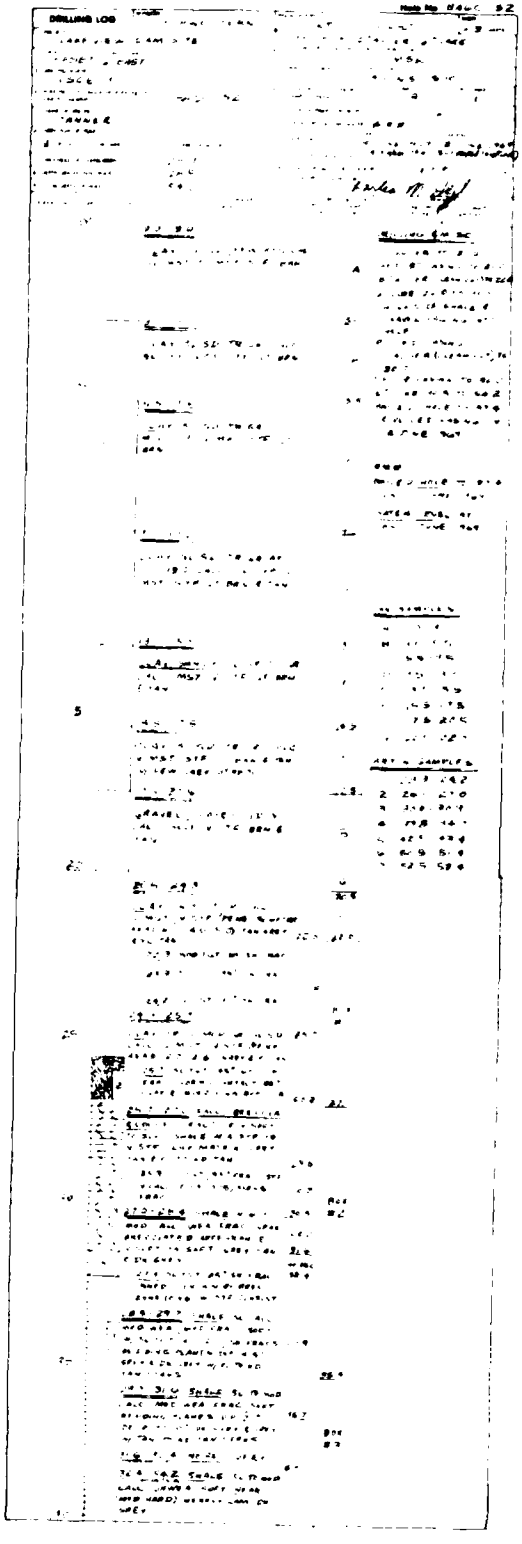
CORE RECOVERY & RQD

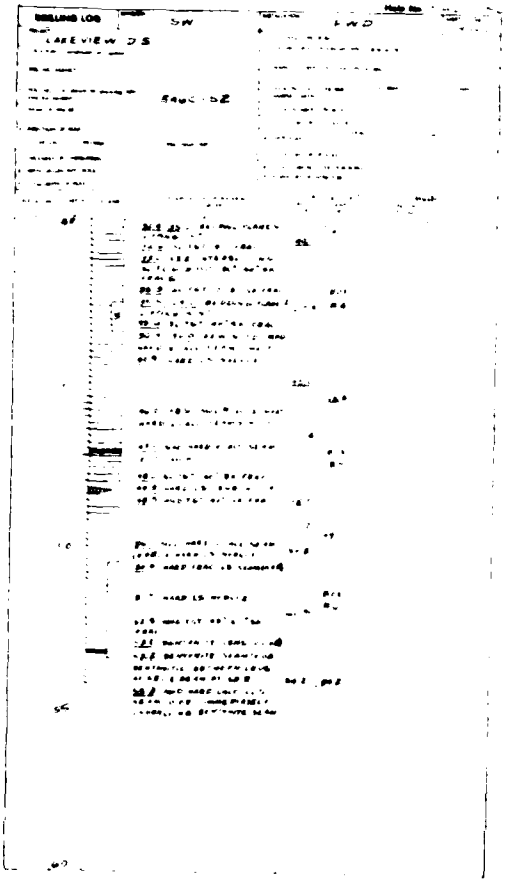


DRILLING LOG

LAKEVIEW

HAGC-50





U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: R. PEHM
DRAWN BY: JLE
REVIEWED BY: J. PEHM
SUBMITTED BY: ROBERT BEHM

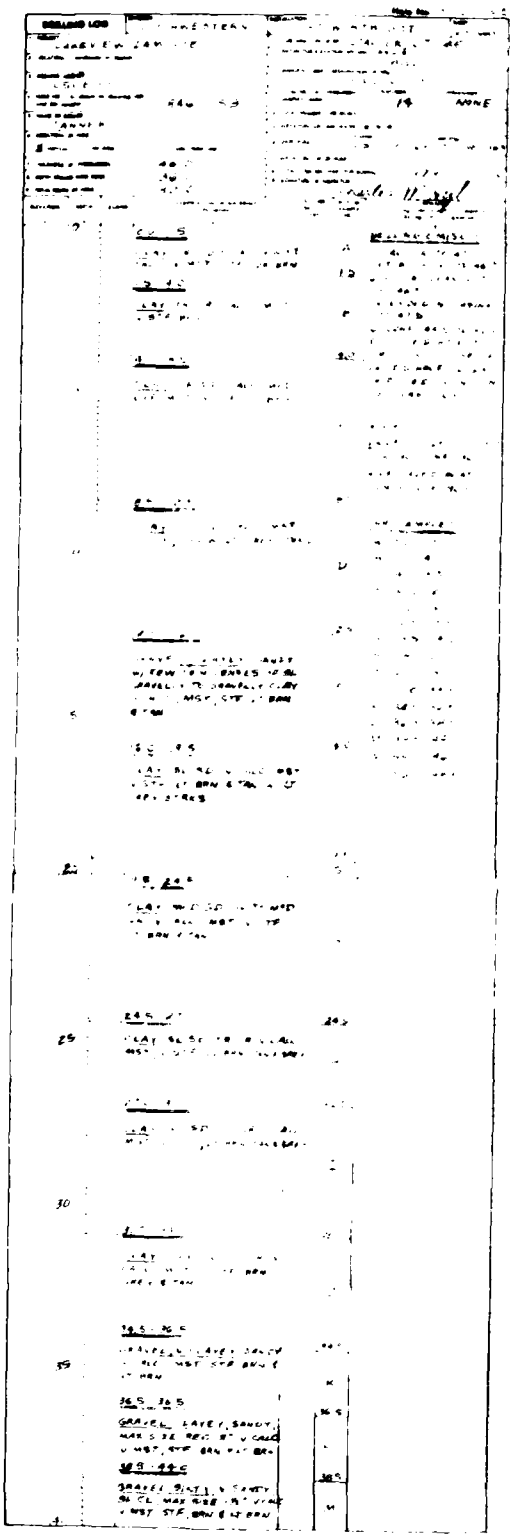
JOE POOL LAKE
TRINITY RIVER, TEXAS

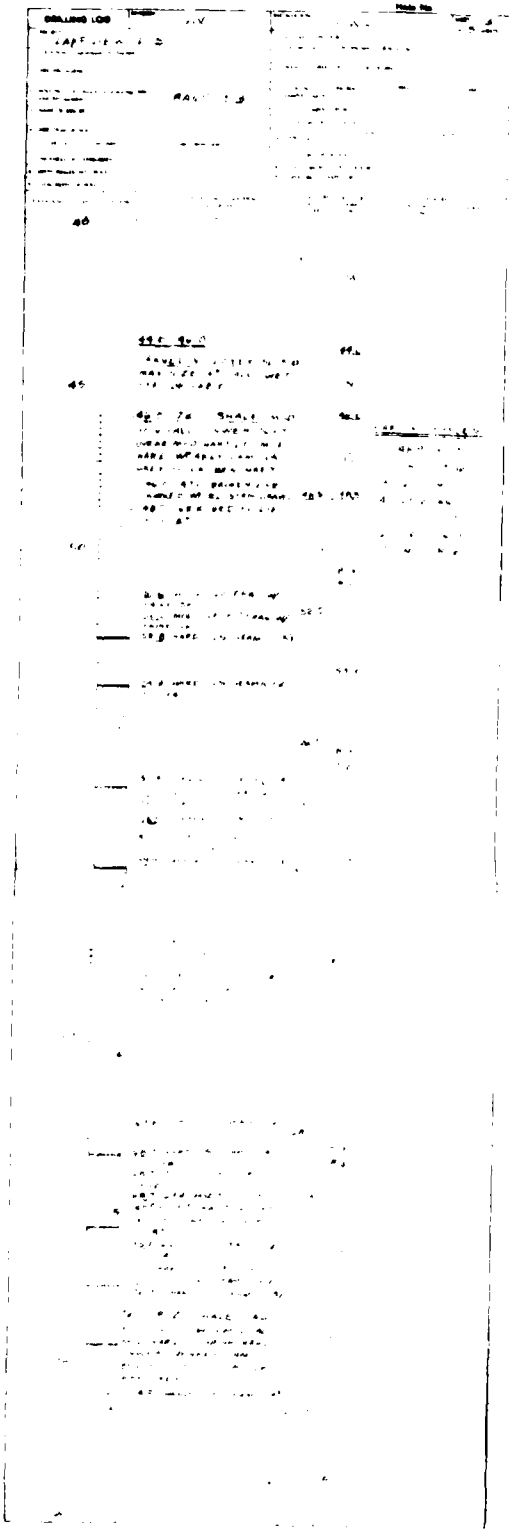
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

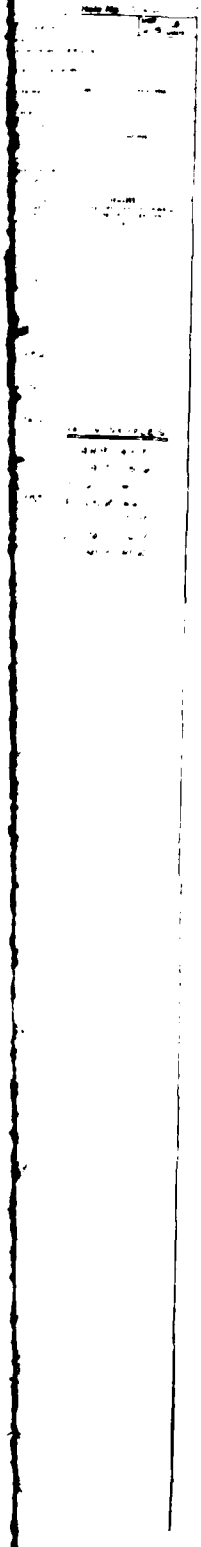
LOGS OF BORINGS
BA6C-50 AND BA6C-52

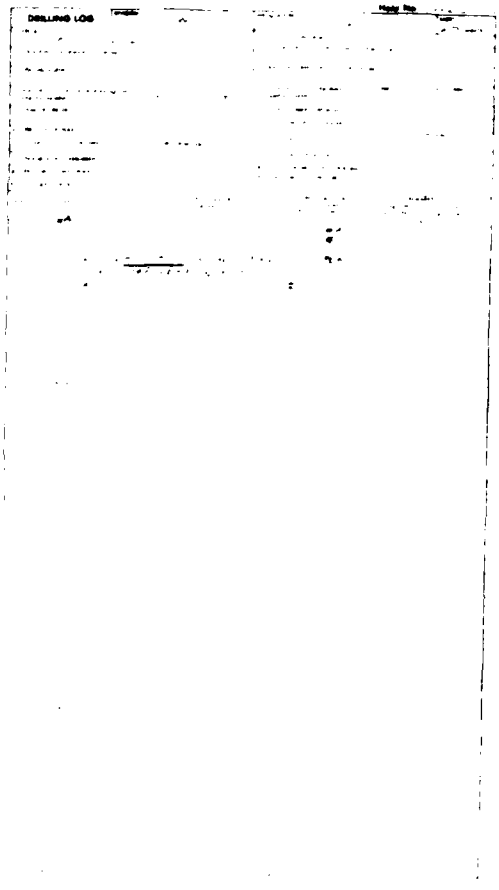
DRAWING NO. 44

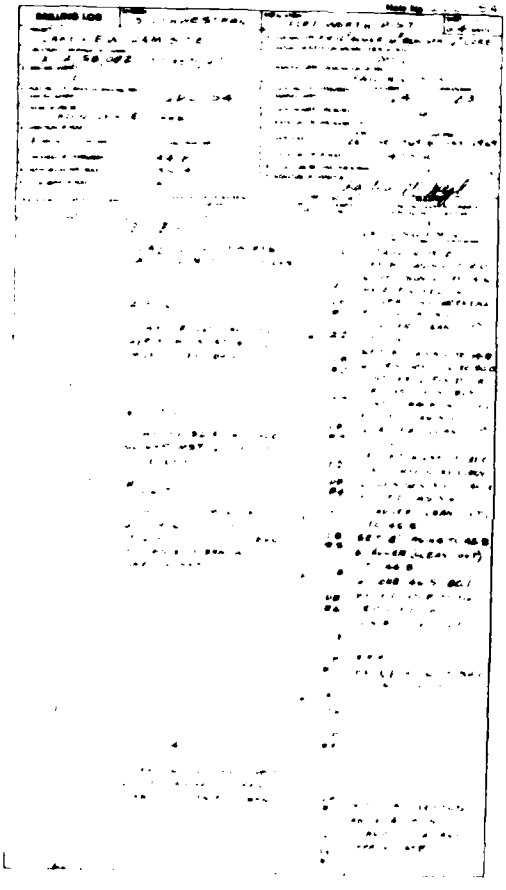
TO ACCOMPANY FINAL FOUNDATION REPORT











U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH TEXAS

DESIGNED BY: [illegible]

DRAWN BY: HLR

REVIEWED BY: [illegible]

SUBMITTED BY: [illegible]

[illegible] POOL, LAKE
[illegible] CREEK TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
BASIC - 53 AND BASIC - 54

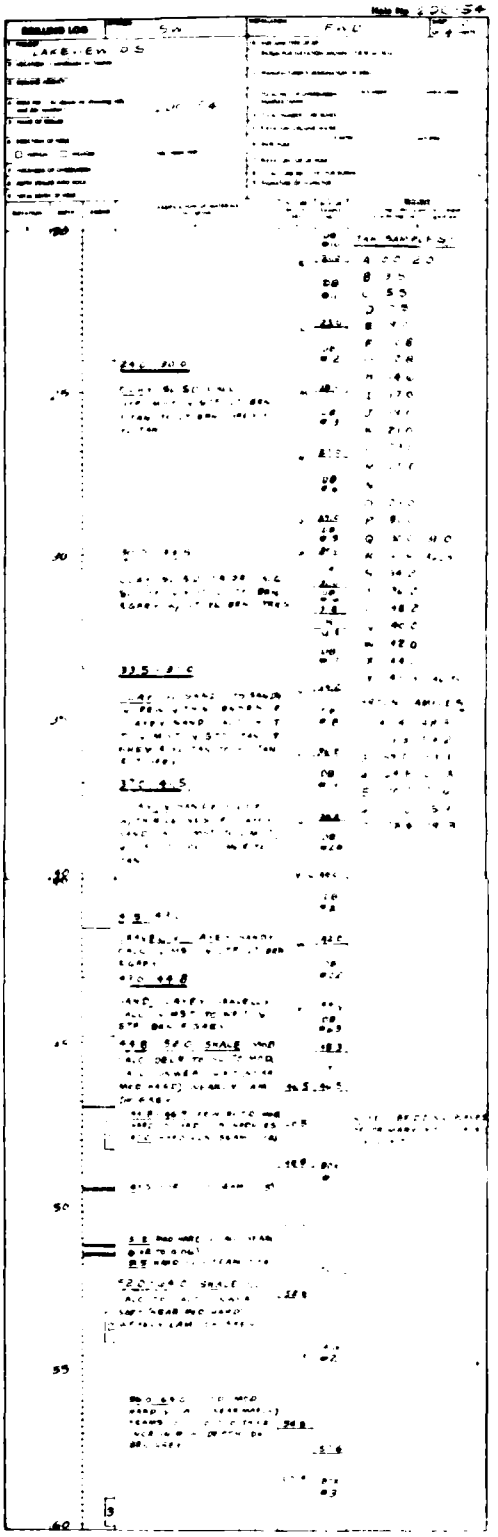
DATED [illegible]

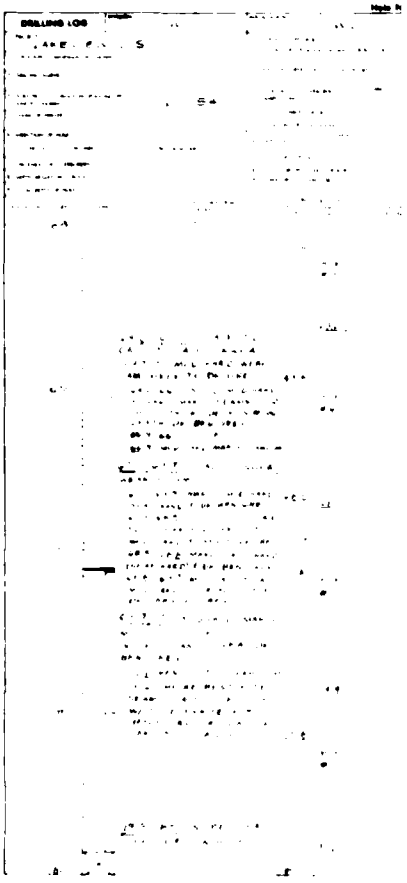
DRAWING NUMBER

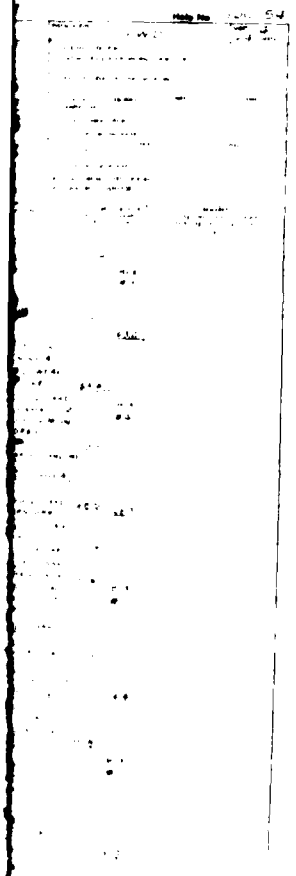
SHEET NO 07

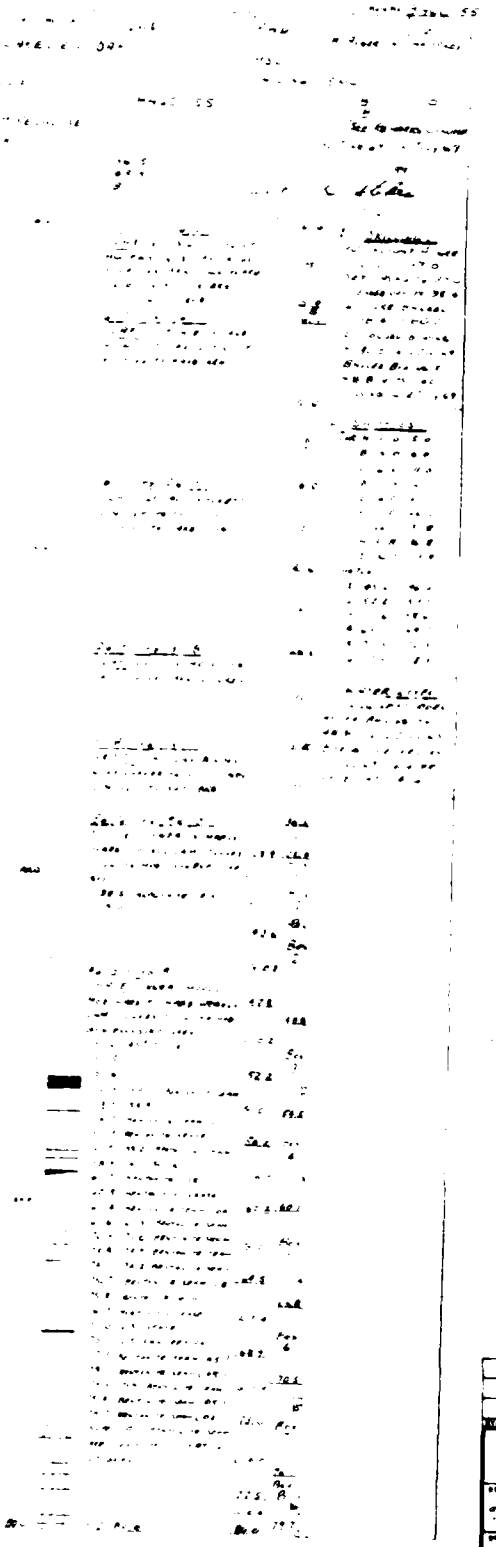
SEQUENCE NO 45

ACCOMPANY FINAL FOUNDATION REPORT


DRILLING LOG
LAKEVIEW OS
TAN SAMPLES
24.5 - 27.0
33.5 - 37.5
37.5 - 41.5
44.8 - 47.0 SHALE
52.0 - 54.0 SHALE
60


DRILLING LOG





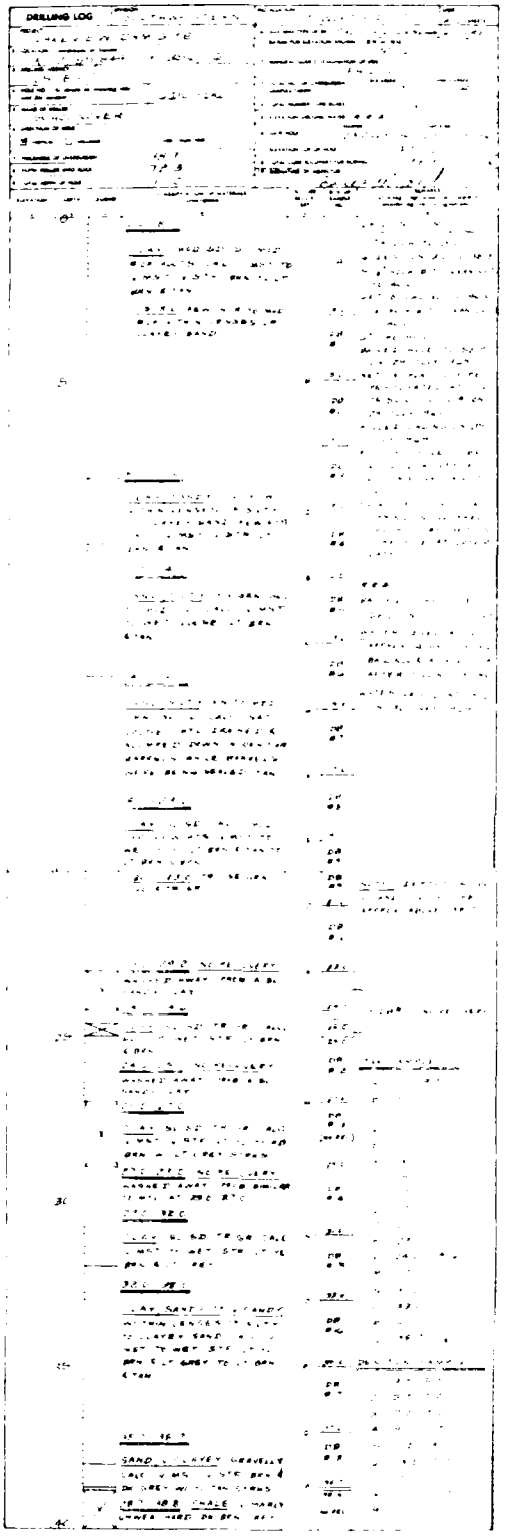
U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

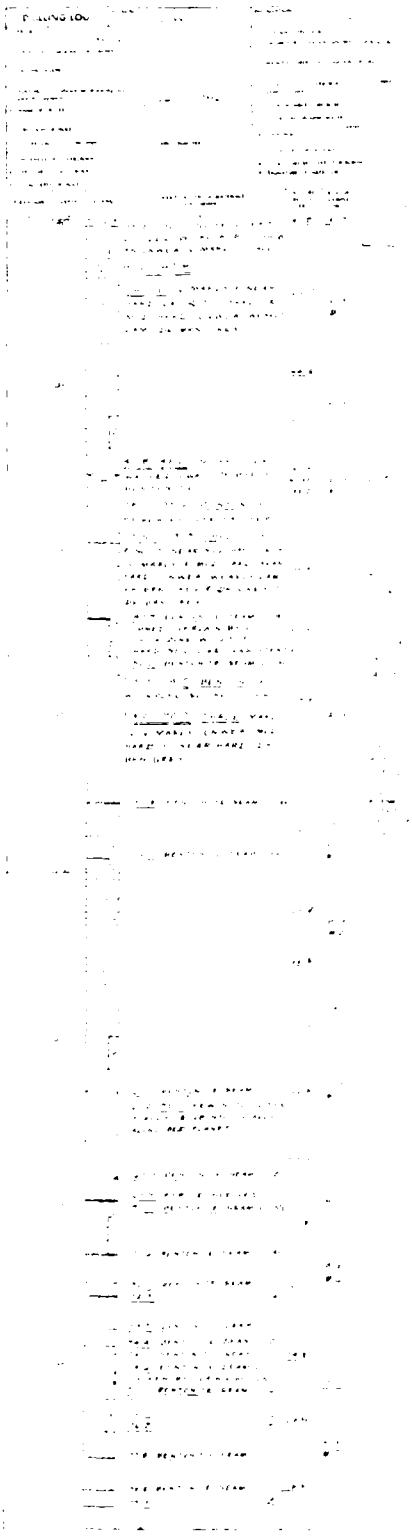
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

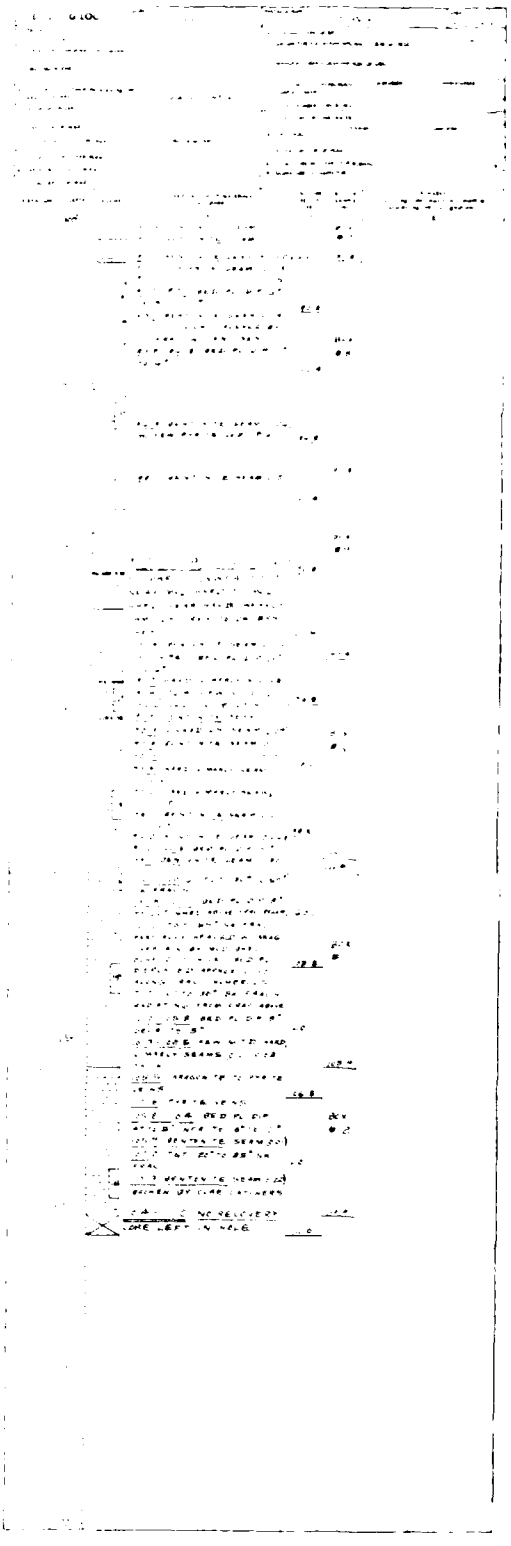
LOGS OF BORINGS

BORING 54 AND BORING 55

SEQUENCE NO. 46


DRILLING LOG





U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY

DRAWN BY HLB

CHECKED BY R BEHM

SUBMITTED BY R BERT BEHM

JOE POOL LAKE
MC KINNEY CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS

60C-56

INV NO [illegible] B-0093

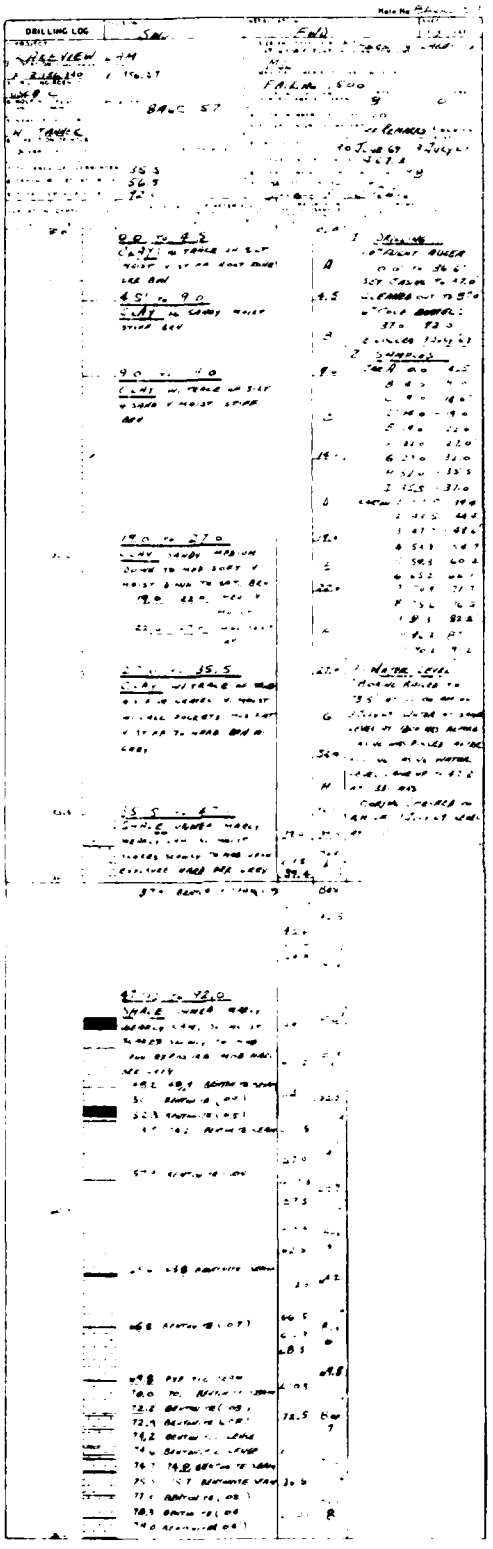
DATED [illegible] 78

DRAWING NUMBER

SHEET NO OF

SEQUENCE NO 47

TO ACCOMPANY FINAL FOUNDATION REPORT


DRILLING LOG

REVISION NO.	ACTION	DATE	DESCRIPTION OF REVISION

U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY

DRAWN BY HLR

RECOMMD BY

CHECKED BY ROBERT BEHM

JOE POOL LAKE
[illegible] VIAN CREEK TEXAS

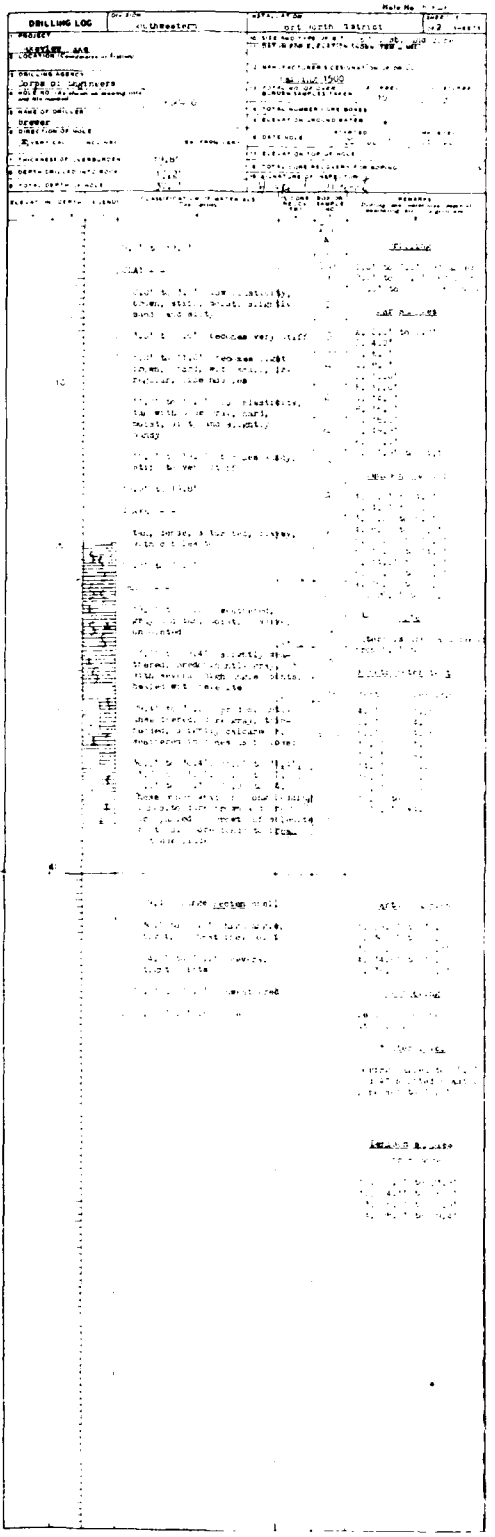
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

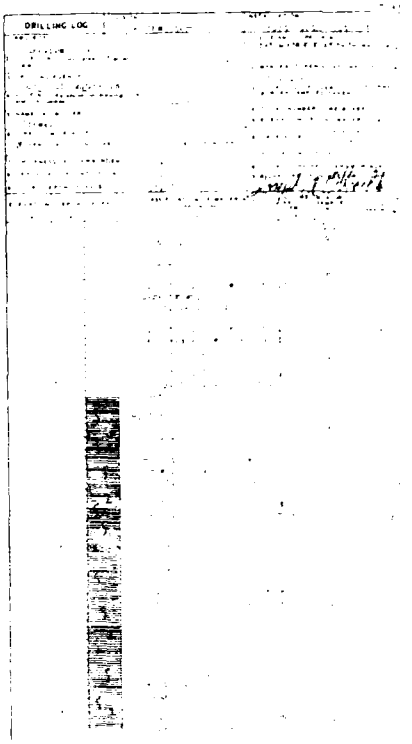
LOGS OF BORINGS
8A6C-57

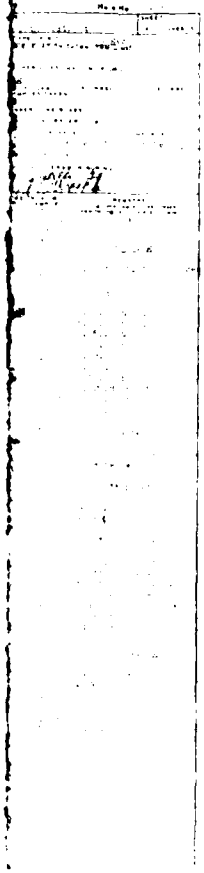
INV NO [illegible]
DATED [illegible]
DRAWING NUMBER
SHEET NO OF

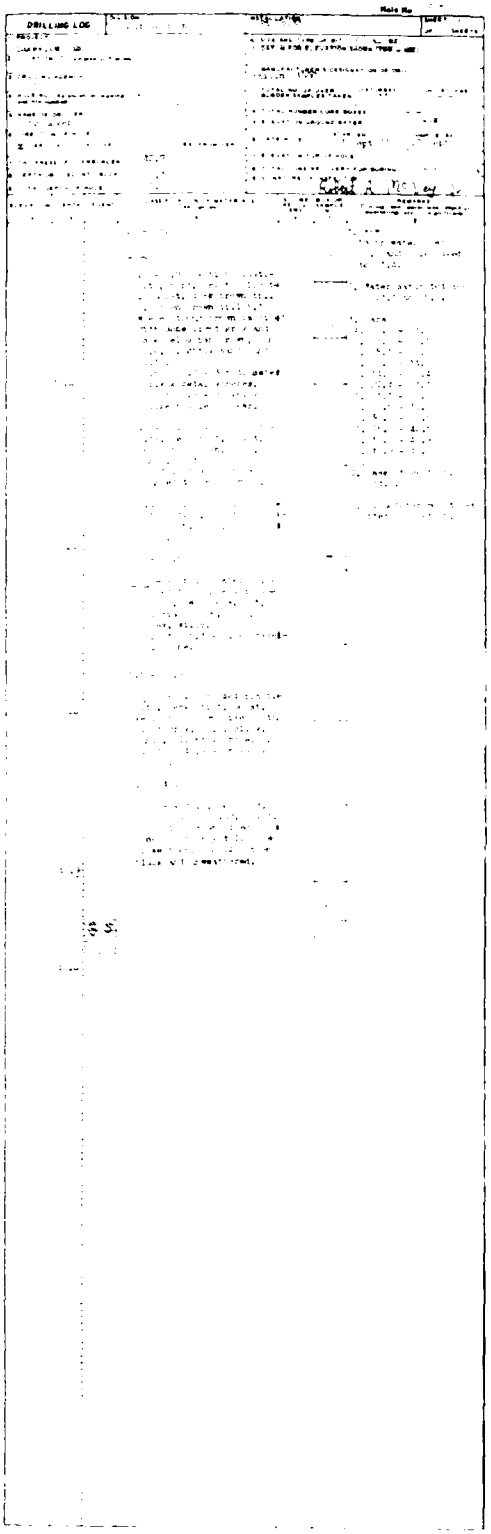
SEQUENCE NO 48

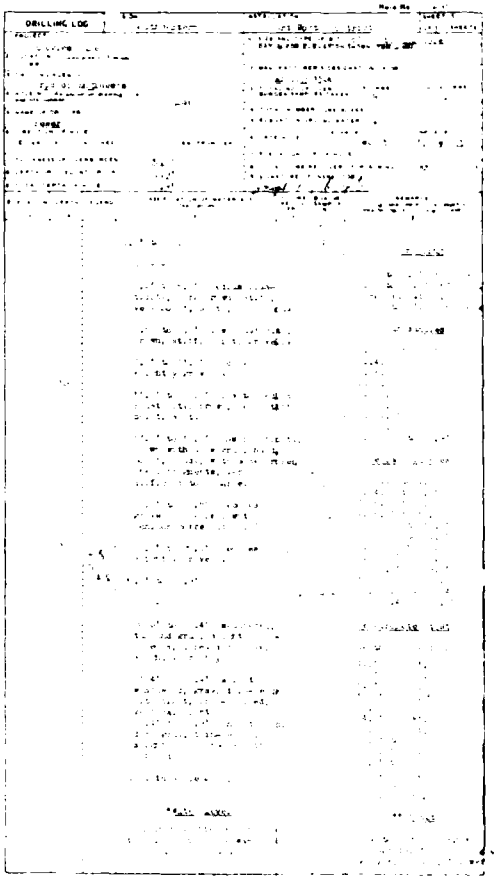
TO ACCOMPANY FINAL FOUNDATION REPORT


DRILLING LOG


DRILLING LOG







U.S. ARMY ENGINEER DISTRICT FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

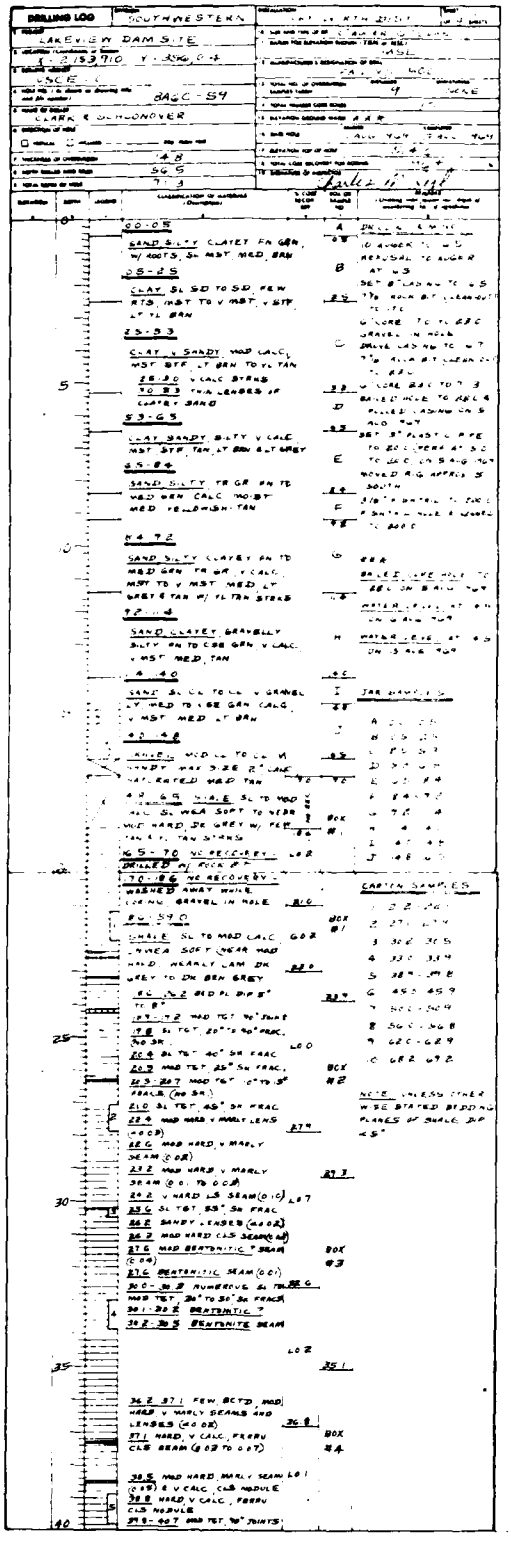
LOGS OF BORINGS

DESIGNED BY
DRAWN BY
QUANTITIES BY
CHECKED BY
ROBERT BEHM

DATED
DRAWING NUMBER
SHEET NO
OF

SEQUENCE NO
49

ACCOMPANY FINAL FOUNDATION REPORT



DRILLING LOG — SOUTHWESTERN

LAKEVIEW DAM SITE

USCE

SAGC-59

CLARK & RICHMOND VER

40

56.5

7.3

CHAT OF 4TH ZONE

SAGC-59

ALL 4¼"

7¾"

4

SCALE

Feb 15 1946

00-05 SAND SILTY CLAYEY FN GRN, W/ ROOTS, SL MST, MED, BRN

05-25 CLAY, SL SD TO SD, FEW RTS, MST TO V MST, V STF, LT YL BRN

25-53 CLAY & SANDY MOD CALC, MST STF, LT BRN TO YL TAN

26-30 V CALC STRKS

50-53 THIN LEADERS OF CLAYEY SAND

53-65 CLAY SANDY SILTY V CALC MST STF, TAN, LT BRN & LT GREY

65-84

SAND SILTY TR GR FN TO MED GRN CALC MOIST MED YELLOWISH-TAN

84-92

SAND SILTY CLAYEY FN TO MED GRN TR GR, V CALC, MST TO V MST, MED, LT GREY & TAN W/ YL TAN STKS

92-94 SAND CLAYEY GRAVELLY SILTY FN TO CSE GRN V CALC, V MST MED TAN

94-140

SAND SL CLY TO CLY V GRAVEL LY MED TO V CSE GRN CALC, V MST MED LT BRN

140-148

SHALE MOD CLY TO CLY M SNDY MAS 3.2E 2° LAM CALCAREOUS MED TAN

148-165 V.A.E SL TO MOD V CALC SH MEA SOFT TO MOD HARD DK GREY W/ FEW TAN & YL TAN STRKS

165-170 NO RECOVERY

DRILLED W/ ROCK BIT

170-186 NO RECOVERY - WASHED AWAY WHILE CORING GRAVEL IN HOLE

186-190 SHALE SL TO MOD CALC LAMEA SOFT NEAR MOD HARD WEAKLY LAM DK GREY TO DK BRN GREY

190-192 MOD PL DIP 5° TO 8°

192-198 MOD TGT 90° JTS E

198-200 SL TGT 20°-30° FRAC, NO SR

200-204 SL TGT 40° SR FRAC

204-209 MOD TGT 25° SR FRAC, FRACS (NO SR)

209-210 SL TGT 45° SR FRAC

210-224 MOD HARD V MARLY LENS (<0.05)

224-226 MOD HARD V MARLY SEAM (0.02)

232 MOD HARD V MARLY SEAM (0.1 TO 0.05)

240 V HARD LS SEAM (0.1C)

236-238 SL TGT 35° SR FRAC

238-242 SANDY LEADER (0.02)

242-244 MOD HARD CLS SEAM(0.02)

244-246 MOD BENTONITIC ? SEAM (0.02)

246 BENTONITIC SEAM (0.01)

300-302 NUMEROUS SL TO MOD TGT, 30° TO 35° SR FRACS

301-302 BENTONITIC ?

302-305 BENTONITE SEAM

342-371 FEW SCTD MOD HARD V MARLY SEAMS AND LENSES (<0.05)

371 HARD V CALC, FEW CLS SEAM (0.02 TO 0.07)

385 MOD HARD MARLY SEAM (0.18) & V CALC CLS NODULE

398 HARD V CALC, FEW CLS NODULE

399-407 MOD TGT 90° JOINTS

A 0-10 BLD PL DIP 5° TO 6°

B 10-45 V HARD CALC PEBBL LTD LENS (0.10)

C 45-49.6 FEW SCTD MOD HARD V MARLY SEAMS AND LEADERS (0.05)

D 49.6-50 MOD HARD V MARLY SEAM (0.08 TO 0.18)

E 50-53 MOD HARD V CALC SEAM

F 53-54 MOD HARD V CALC SEAM

G 54-55 MOD HARD V CALC SEAMS (3)

H 55-56 V HARD CALC PEBBL

I 56-57 SEAM (0.4)

J 57-58 MOD HARD V CALC SEAMS (3)

CAPTAIN SAMPLES

1	22	26
2	27	29
3	30.5	31.5
4	33.5	34.9
5	38.9 - 39.8	
6	45.5	45.9
7	50.5 - 50.9	
8	56.5 - 56.8	
9	62.5 - 62.9	
10	68.2	68.5

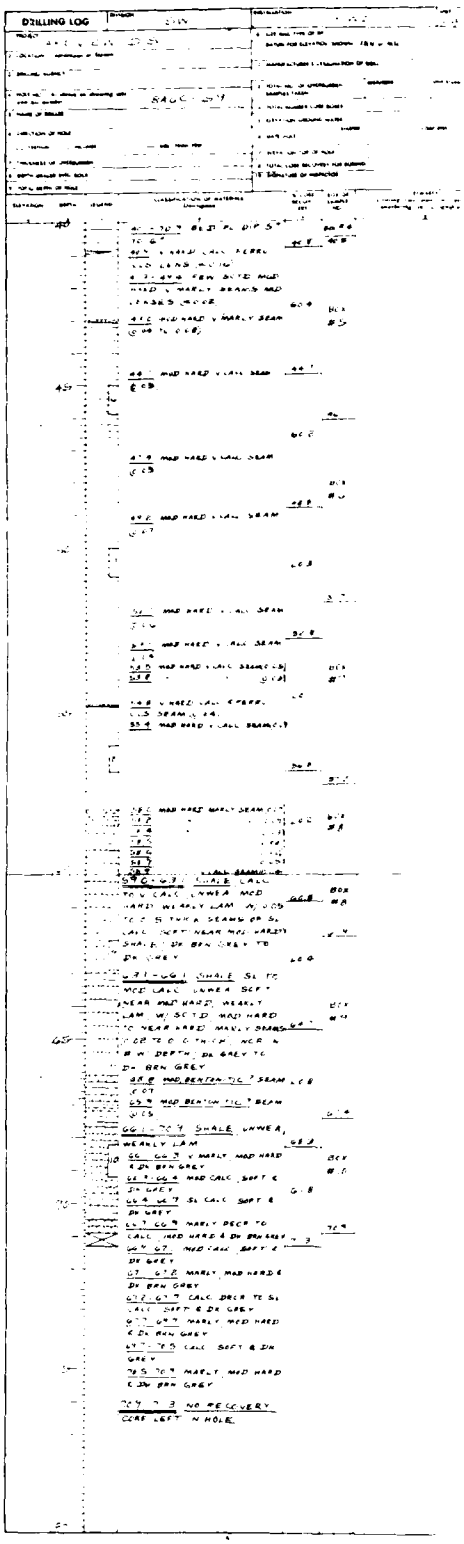
NOTE UNLESS OTHERWISE STATED BEDDING PLANES OF SHALE DIP <5°

BOX #1

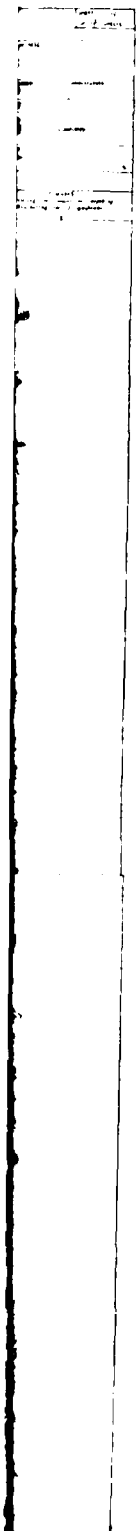
BOX #2

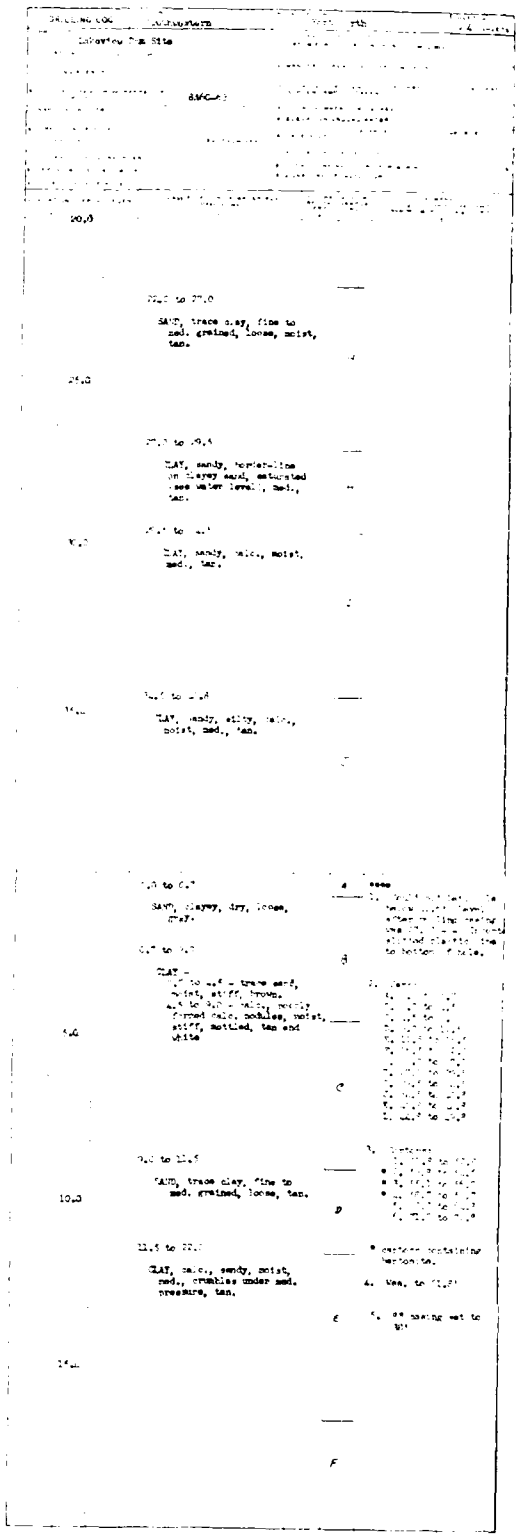
BOX #3

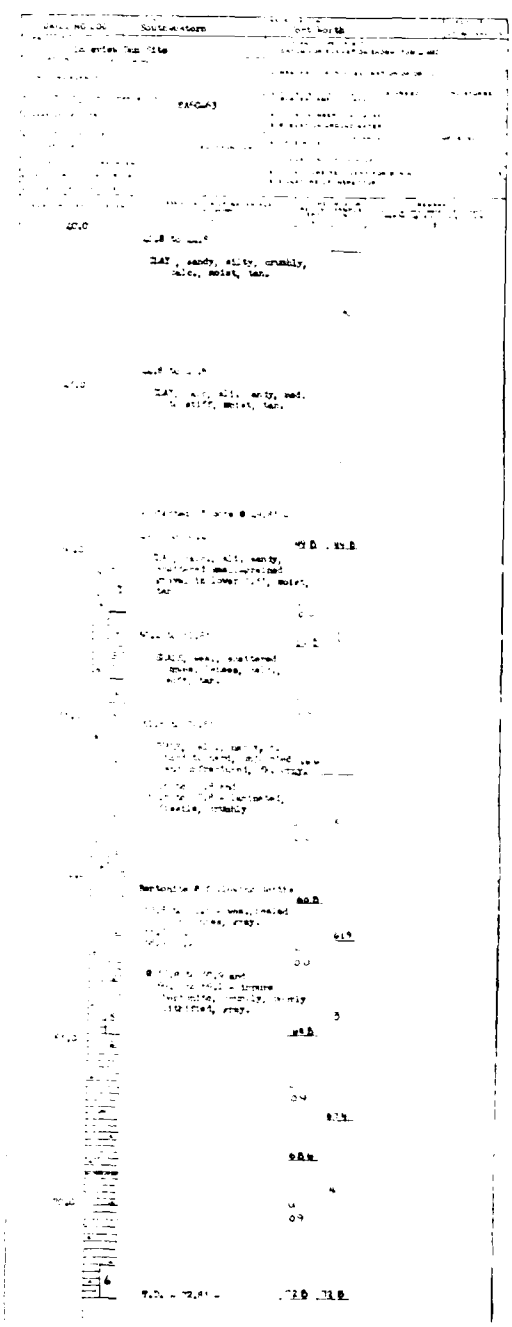
BOX #4



DRILLING LOG — SAGC-59







U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: E. PERRY
DRAWN BY: HLR
TRACED BY:
CHECKED BY: E. PERRY
SUBMITTED BY: E. PERRY, BEHM

LCE POOL LAKE
MOUNTAIN CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
BASC-59 AND BASC-63

INV NO. [illegible]
DATED [illegible]
DRAWING NUMBER
SHEET NO. [illegible] OF
SEQUENCE NO. 50

TO ACCOMPANY FINAL FOUNDATION REPORT

DRILLING LOG

DRILLING LOG	SOUTHWESTERN	FORT WORTH DIST — 6
1. PROJECT: LAKEVIEW DAM SITE		
2. LOCATION: X - 2,155,205 Y - 355,555		
3. DRILLING AGENCY: USCE - C		
4. HOLE NO.: BAGC 58		
5. NAME OF DRILLER: CLARK		
6. DIRECTION OF HOLE: VERTICAL		
7. THICKNESS OF OVERBURDEN: 38.7		
8. DEPTH DRILLED INTO ROCK: 56.3		
9. TOTAL DEPTH OF HOLE: 95.0		
ELEV. TOP OF HOLE: 470	TOTAL CORE RECOVERY: 99	

0.0 - 3.0
CLAY, SL TO MOD SD, FEW RTS, CALC, MST, STF, BRN — Sample A

3.0 - 5.5
SAND, SILTY, FN TO MED GRN, W/ THIN LENSES OF V SILTY MOD CLAYEY SAND & SANDY CLAY, MOIST, MED, TAN TO LT BRN — Sample B

5.5 - 10.5
SAND, CLAYEY TO V CLAYEY, FN TO MED GRN, SILTY, W/ THIN LENSES OF SILTY SAND & MOD SANDY TO SANDY CLAY, FEW RTS, CALC, V MOIST TO WET, MED, BRN TO TAN — Sample C

10.5 - 14.5
CLAY, SL SD, W/ FEW ORGANIC STRKS, CALC, MST TO V MST, V STF, BRN & LT BRN — Sample D

14.5 - 18.0
CLAY, SL SD, CALC, WET, STF, BRN & LT BRN — Sample E

18.0 - 23.0
CLAY, SL SD, TR GR, CALC, SL GYP, V MST, V STF, LT BRN W/ TAN STRKS — Sample F

23.0 - 28.5
CLAY, SL SD, TR GR, CALC, V MST TO WET, STF TO V STF, LT BRN, TAN & YL TAN W/ FEW LT GREY STRKS — Sample G

28.5 - 29.5
CLAY, MOD SD, TR GR, W/ FEW ORGANIC STRKS, CALC, WET, STF, LT BRN & GREY W/ YL TAN STRKS — Sample H

29.5 - 31.0
SAND, CLAYEY TO V CLAYEY, FN TO MED GRN, W/ THIN GRAVELLY LENSES & V THIN LENSES OF SILTY SAND, CALC, SAT, MED, LT BRN — Sample I

31.0 - 34.0
SAND, CLAYEY, FN TO CSE GRN, GRAVELLY, CALC, SAT, MED, LT BRN & TAN — Sample J

34.0 - 38.7
CLAY, SL SD, TR GR, CALC, V MST, STF, LT BRN, TAN & LT GREY — Sample K

38.7 - 38.9
SHALE, V MARLY, UNWEA, NEAR HARD, DK BRN GREY

38.9 - 40.4 NO RECOVERY; DRILLED W/ ROCK BIT

Remarks: ... BAILED HOLE ... WATER LEVEL AT ... AFTER BAILING ... WATER LEVEL AT ...

TAR SAMPLES

A	[illegible]
B	[illegible]
C	[illegible]
D	[illegible]
E	[illegible]
F	[illegible]
G	[illegible]
H	[illegible]
I	[illegible]
J	[illegible]
K	34.0 - 38.7

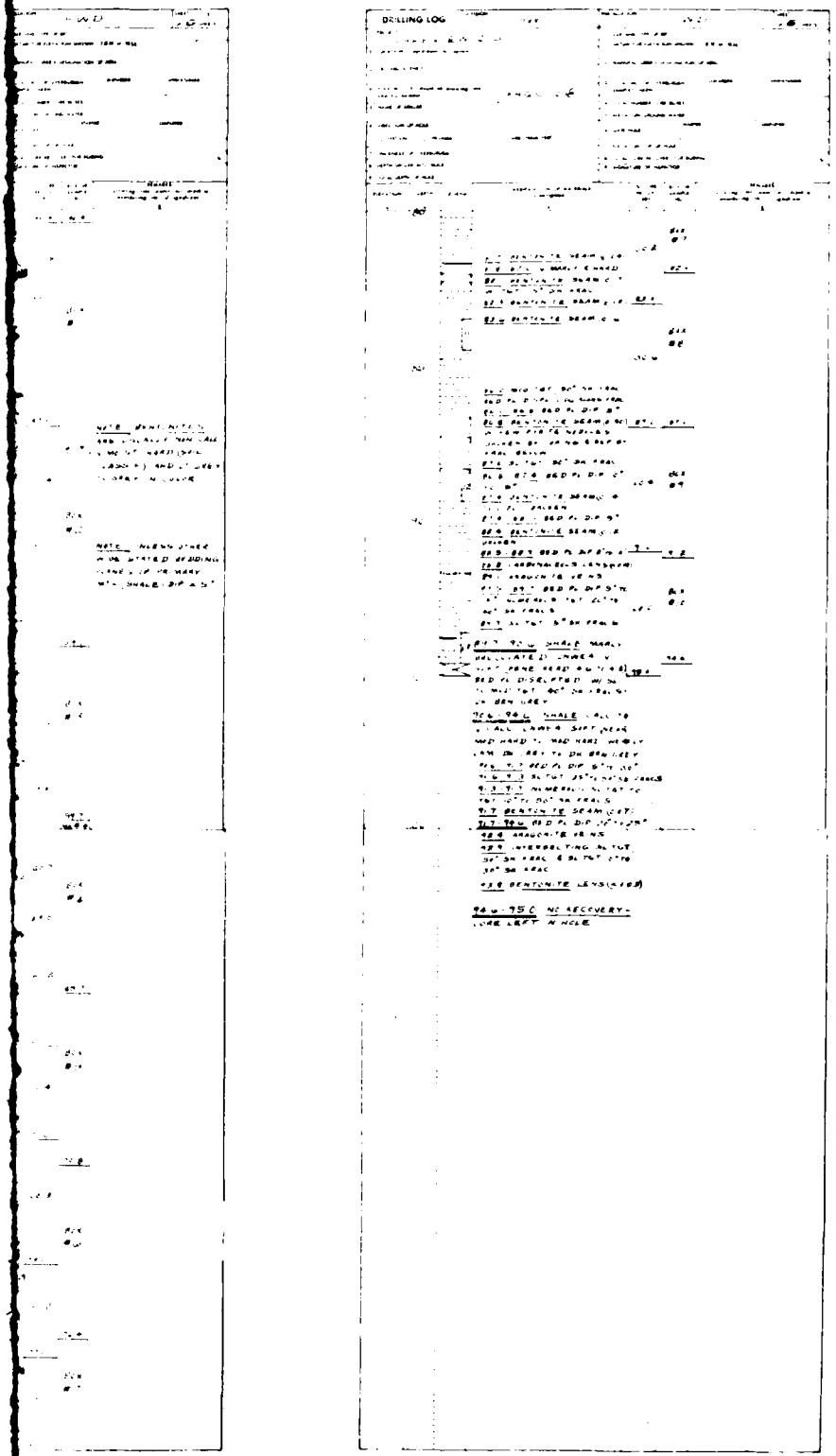
CARTON SAMPLES

1	40.4 - 4_.4
2	45.2 - 46.0
3	46.9 - 47.9
4	48.7 - 49.7
5	53.1 - 54
6	55.5 - 56.5
7	6_.4 - 62.4
8	66.9 - 67.9
9	72.8 - 73.2
10	78.2 - 79.2
11	83.5 - 84.5
12	88.5 - 89.4
13	93.6 - 94.6

DRILLING LOG (continued)

BAGC 58

54.0 - 69.7 SHALE, MARLY ... HARD TO NEAR HARD, WEAKLY LAM ... — Box #3
BROKEN BY CORING ACTION
BENTONITE SEAM — Box #4
BENTONITE SEAM (0.03) TO 0.20 THICK
BENTONITE SEAM — Box #5
69.5 BENTONITE SEAM ... W/ MOD ... 5° SE FRACS
70.2 BENTONITE SEAM
71.7 BENTONITE SEAM
71.9 BENTONITE SEAM — Box #6
74.2 BENTONITE SEAM
74.7 BENTONITE LENS
74.9 BENTONITE SEAM
75.4 - 77 BED PL DIP 3°
75.5 BENTONITE SEAM
77.0 - 79.0 FEW ... V THIN ARAGONITE VEINS — Box #7
78.5 BENTONITE SEAM
79.2 BENTONITE SEAM



U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY
DRAWN BY HLR
TRACED BY
CHECKED BY

LOG POOL LANE
MOUNTAIN CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS

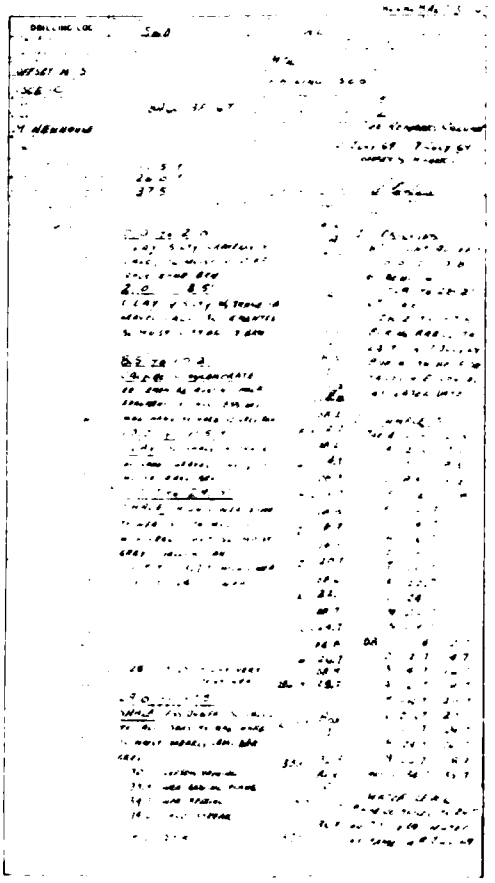
6DC-58

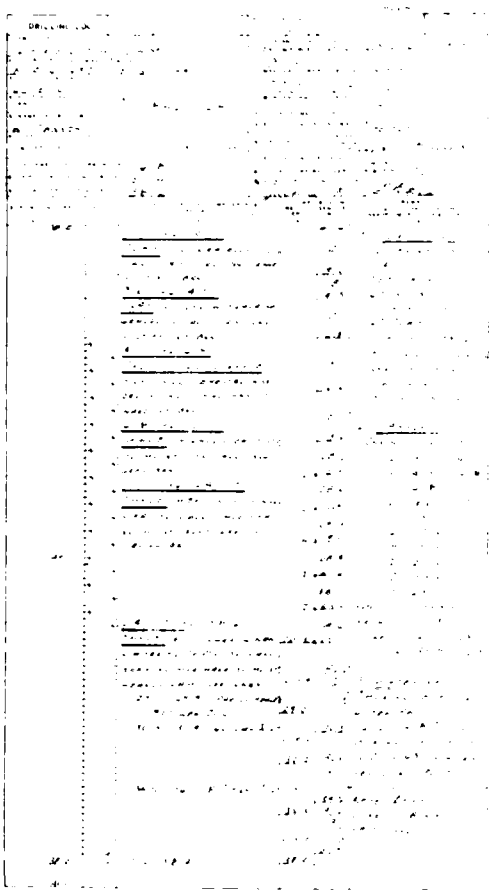
SUBMITTED BY

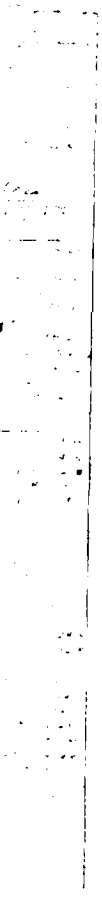
INV NO
DATED
DRAWING NUMBER
SHEET NO

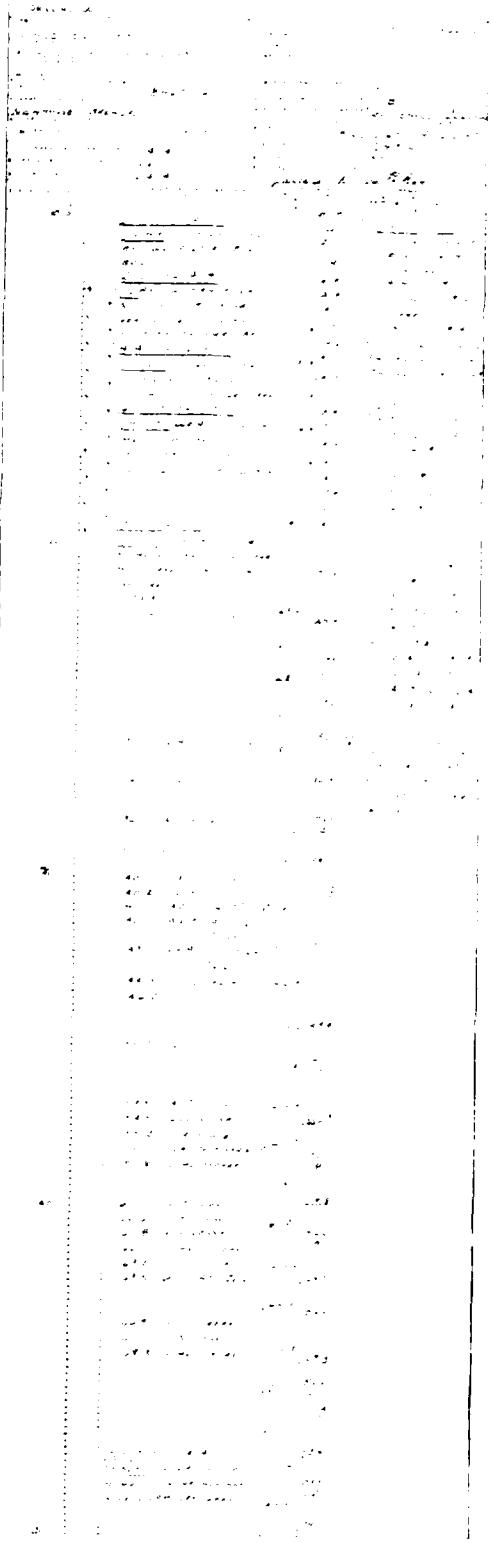
REFERENCE NO. 51

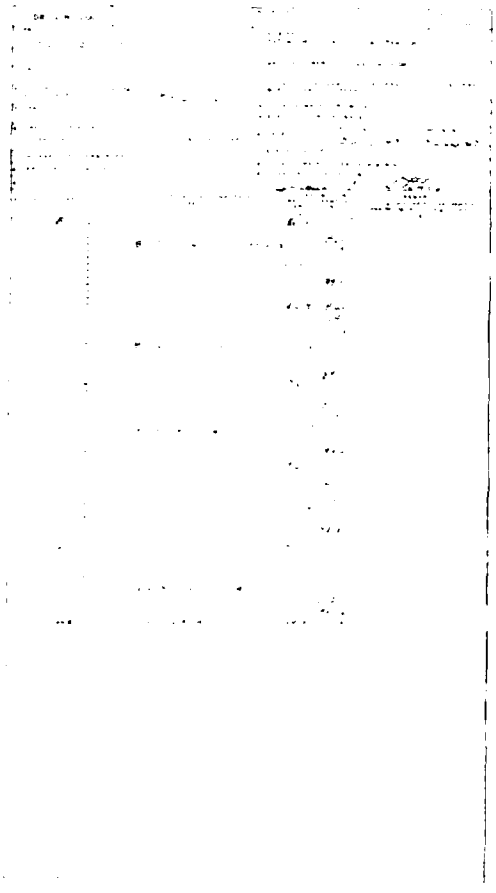
TO ACCOMPANY FINAL FOUNDATION REPORT











U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: W. FRENCH
DRAWN BY: JLB
SUBMITTED BY: P. REPP
CHECKED BY: P. REPP, BEMA

R. [illegible] LAKE
[illegible] STAN CREEK, TEXAS

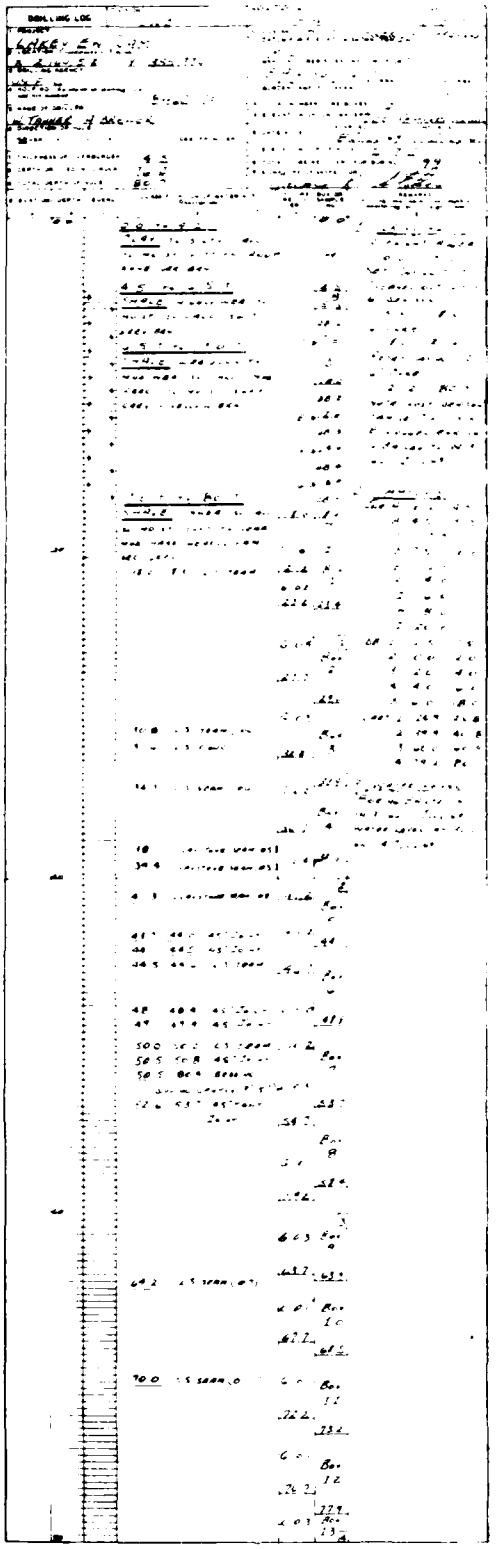
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

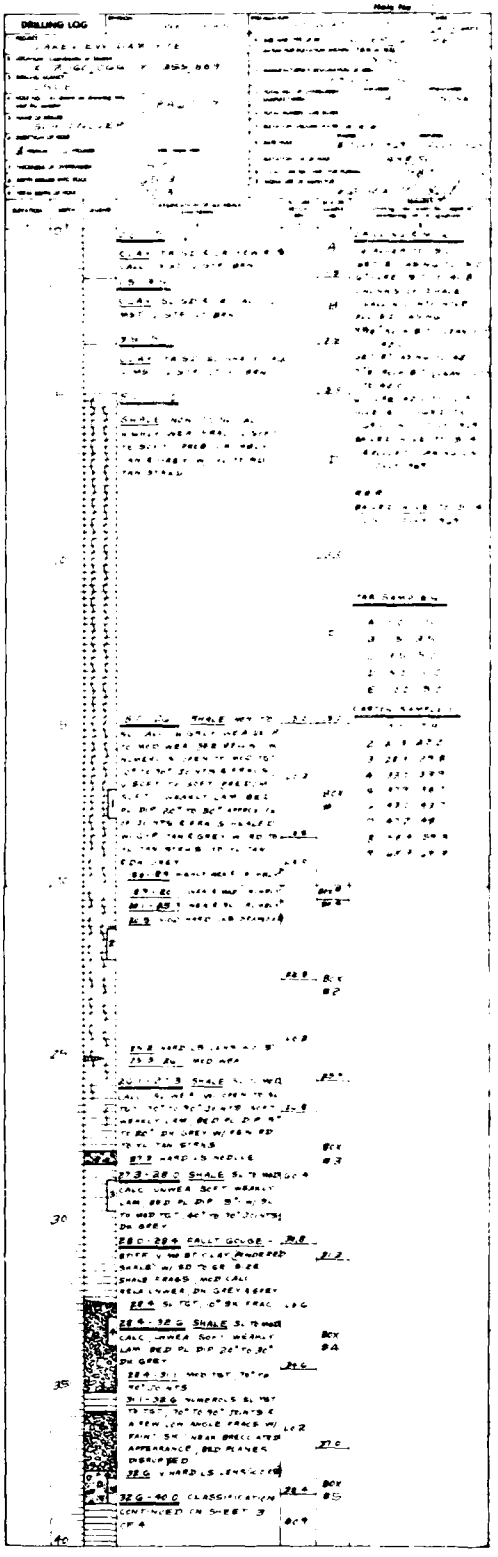
LOGS OF BORINGS
BA6[illegible] 3[illegible] 67, BA6C 68 AND BA6[illegible]69

REV NO [illegible] 8-8-[illegible]
DATED [illegible]
DRAWING NUMBER
SHEET NO [illegible]

SEQUENCE NO. 52

TO ACCOMPANY FINAL FOUNDATION REPORT





BORING LOG BA6C-7 CONTINUED ON [illegible]

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY [illegible]

DRAWN BY HLR

CHECKED BY P PEHM

SUBMITTED BY ROBERT REHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
BA6C-70 AND BA6C-71

INV NO DACW63-[illegible]-D-[illegible]

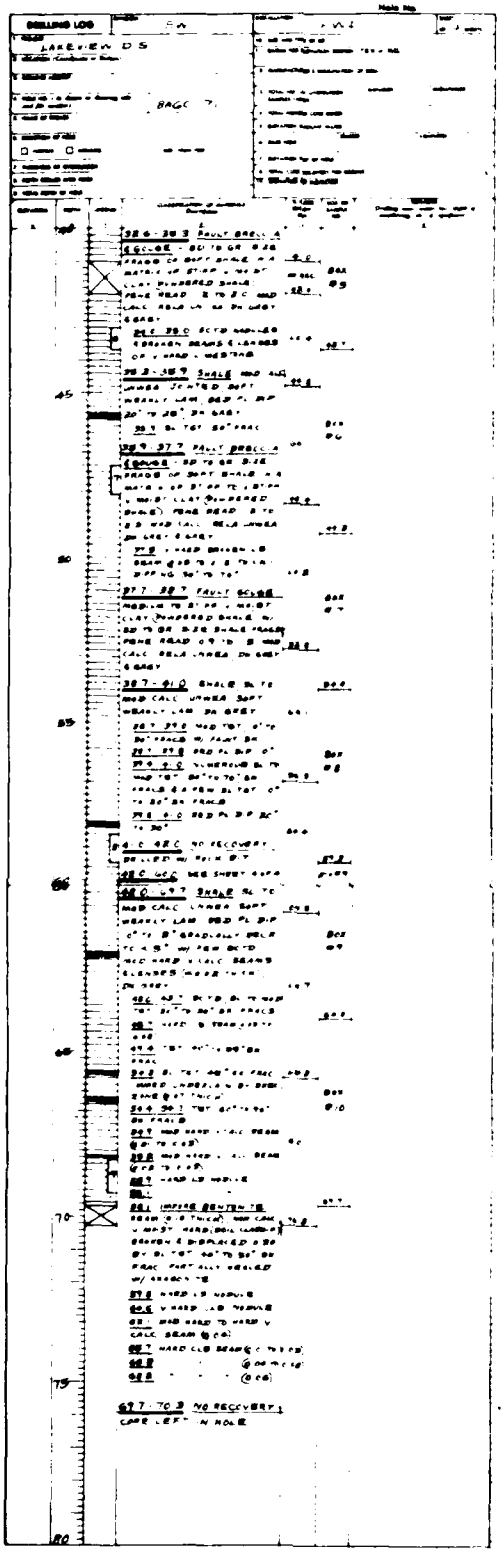
DATED [illegible]

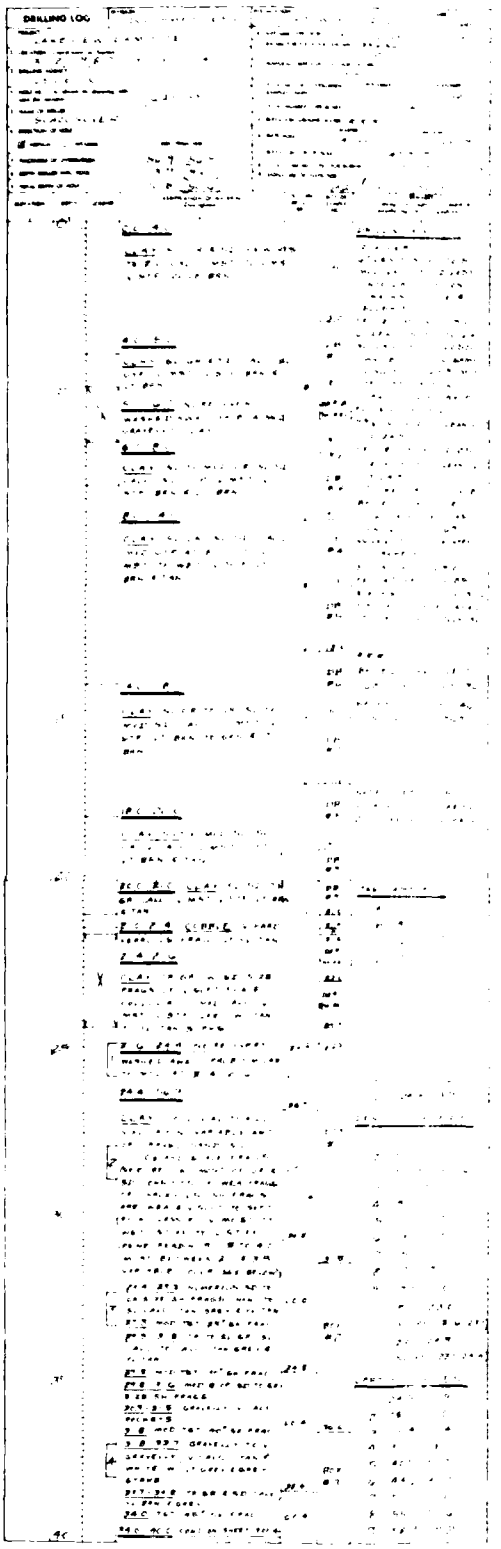
DRAWING NUMBER

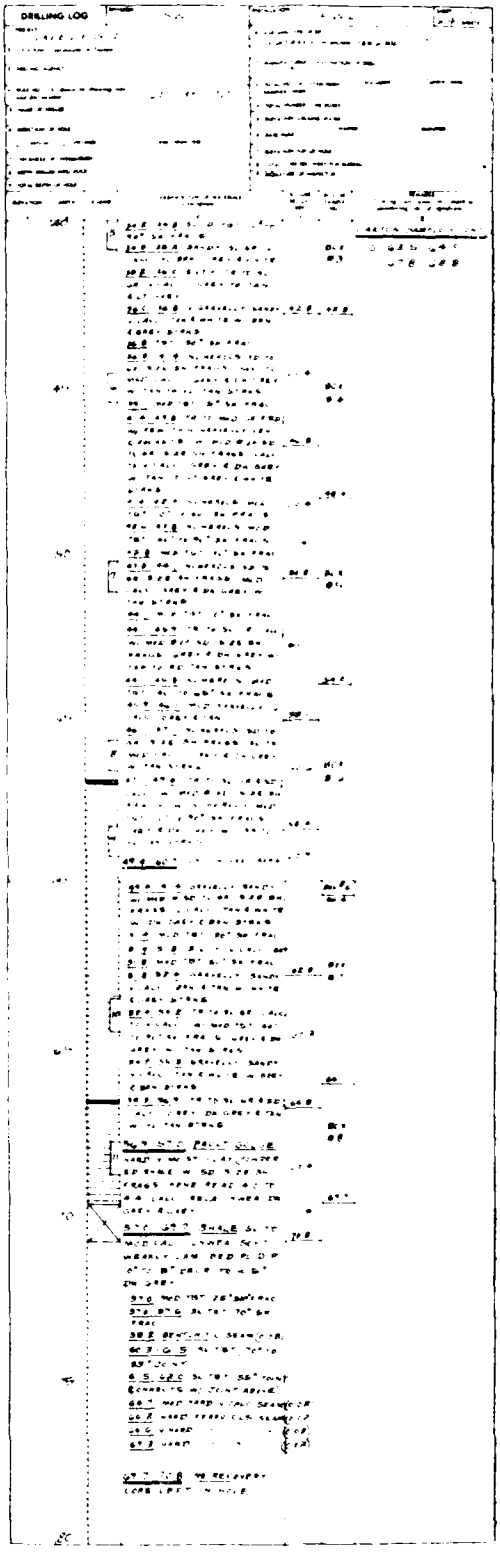
SHEET NO [illegible] OF

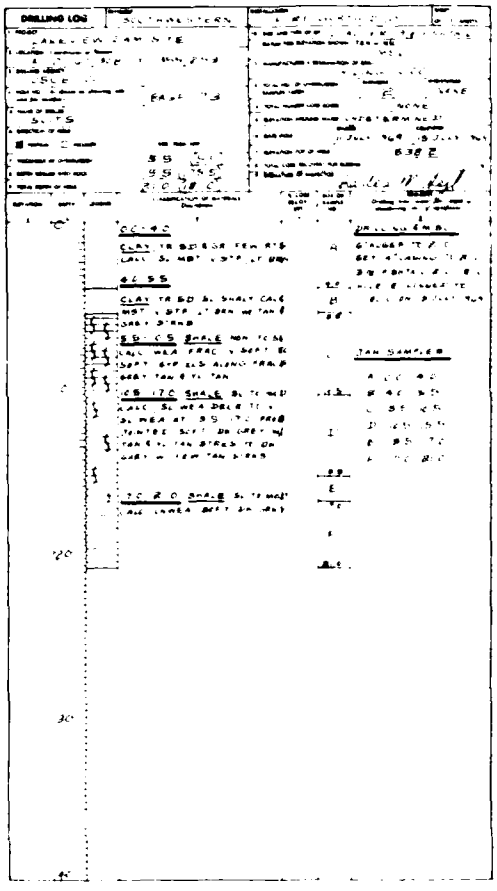
REFERENCE NO. 53

TO ACCOMPANY FINAL FOUNDATION REPORT


DRILLING LOG
LAKEVIEW DS
45
50
55
60
65
70
75
80


DRILLING LOG





U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: P. PEHM
DRAWN BY: HLB
REVIEWED BY: P. PEHM
SUBMITTED BY: P. PEHM

LEE POOL LAKE
MOUNTAIN CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
8A6C-71, 6DC3F-72 AND 8A3F-73

I&W NO. DACW63-81-B-0295
DATED: 1981
DRAWING NUMBER:
SHEET NO. 82

DRAWING NO. 54

ACCOMPANY FINAL FOUNDATION REPORT

DRILLING LOG — SOUTHWESTERN

1. PROJECT: LAKEVIEW DAM SITE

USCE

BAGC

CLARK

Overburden	14.0
Depth drilled into rock	24.8
Total depth of hole	38.8

Total number core boxes: 4

Elevation top of hole: APPROX. 564.0

Total core recovery for boring: 94 %

0.0 - 3.0

CLAY, SL GR & SD, FEW RTS, CALC, SL MST TO MST, STF, BRN

3.0 - 8.0

CLAY, TR GR & SD, CALC, SL GYP, MST TO V MST, V STF, LT GY TO BRN TO TAN & LT BRN

8.0 - 12.0

CLAY, SL GR & SD, CALC, V MST, V STF, TAN & LT BRN

12.0 - 14.0

CLAY, TR GR, W/ NUMEROUS SD ... SHALE ... LT BRN & TAN

14.0 - ... SHALE ...

... - 20.0 SHALE ...

20.0 - 23.0 SHALE ...

23.0 - 25 ... SHALE ...

24.8 V HARD ... SEAM (LS)

25.0 - 37.8 SHALE ... MED CALC, UNWEA, SOFT, WEAKLY LAM, DK GREY

37.8 - 38.8 NO RECOVERY - CORE LEFT IN HOLE

DRILL NOTES

... SET ... CASING ... BAILED HOLE ... AND PULLED CASING ON 28 JULY ...

RELOCATION

HOLE LOCATED ON ... DAM APPROX ... EAST OF HOLE ...

JAR SAMPLES

A, B, C, D, E, F

BOX #1, BOX #2, BOX #3, BOX #4

0.0 to 4.0

CLAY, calc., scattered calc. nodules, hard and dry to 4.0', with moisture increase from 4.0' to 5.0', brown.

5.0 to 7.0

CLAY, (reworked primary), calc., ... nodule, moist, medium, tan.

7.0 to 20.0

SHALE, ... weathered, ... calc., thin-bedded, ... dip, weakly healed, ... stained joints ... planes ... along bedding planes ... tan and gray.

20.0 to 23.0

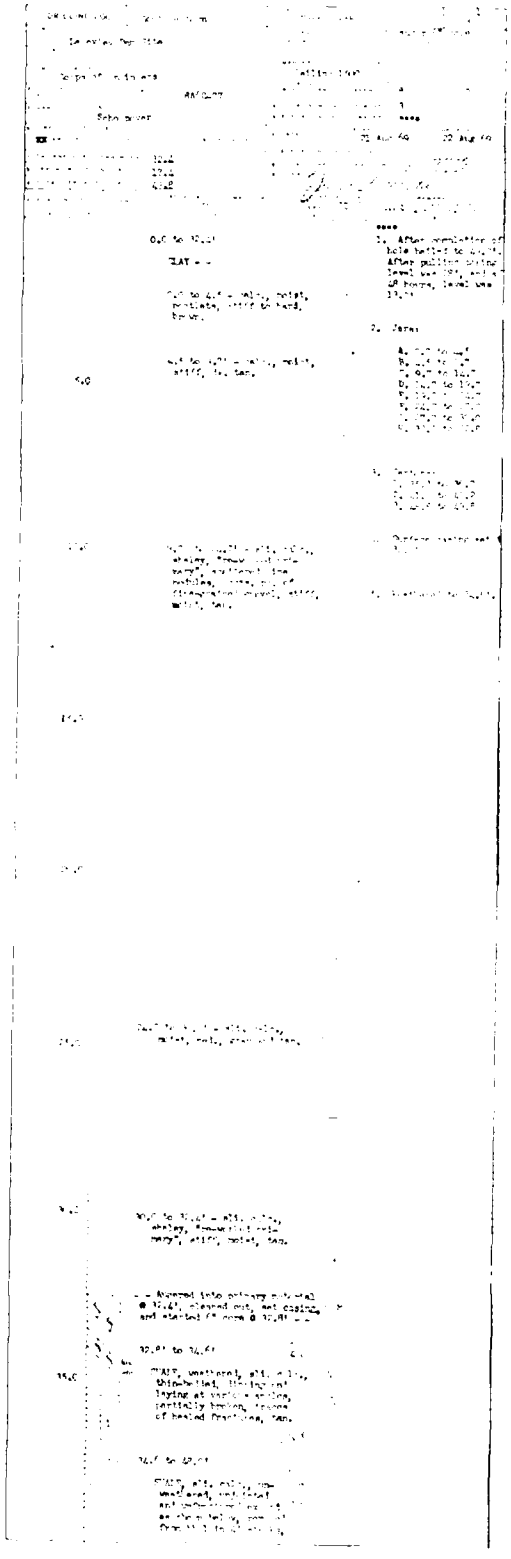
SHALE, silt, calc., mod. weathered, thin-bedded and horizontal, several ... noted in upper ... along horizontal bedding planes, ... tan and gray.

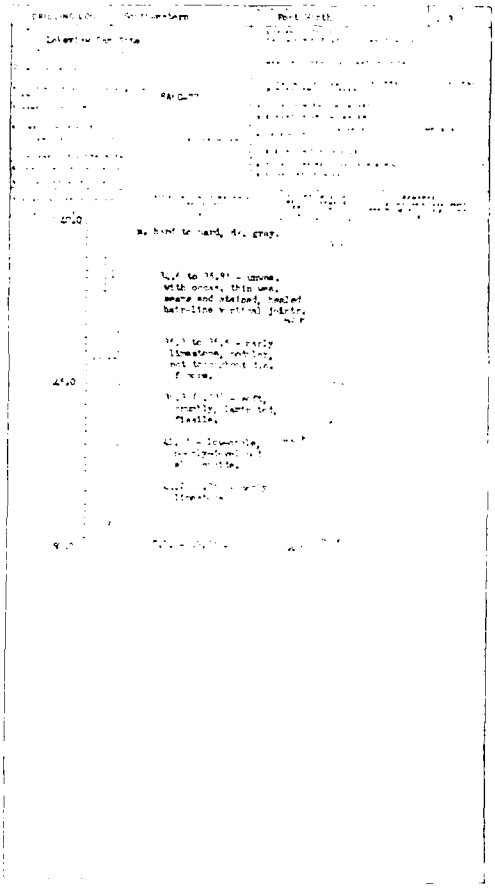
23.0 to 40.0

SHALE, unweathered, calc., ... thin-bedded, unfractured and unjointed, ... gray.

• 31.0 - lowermost fracture with ... clay ...

35.0 to 35.3 - nearly limestone, ... hard.





U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY
J. P. E.

DRAWN BY
HLR

TRACED BY
J. P. E.

MOUNTAIN CREEK, TEXAS

EMBANKMENT, SPILLWAY AND OUTLET WORKS

LOGS OF BORINGS

DATED

DRAWING NUMBER

SHEET NO.
27

SUBMITTED

RECOMMENDED

APPROVED

DATE

SUBMITTED BY

APPROVED BY

DATE

CHIEF, ENGINEERING DIVISION

CHIEF, CONSTRUCTION DIVISION

DISTRICT ENGINEER

DATE

SUPERSEDES DRAWING NO.

SUPERSEDED BY DRAWING NO.

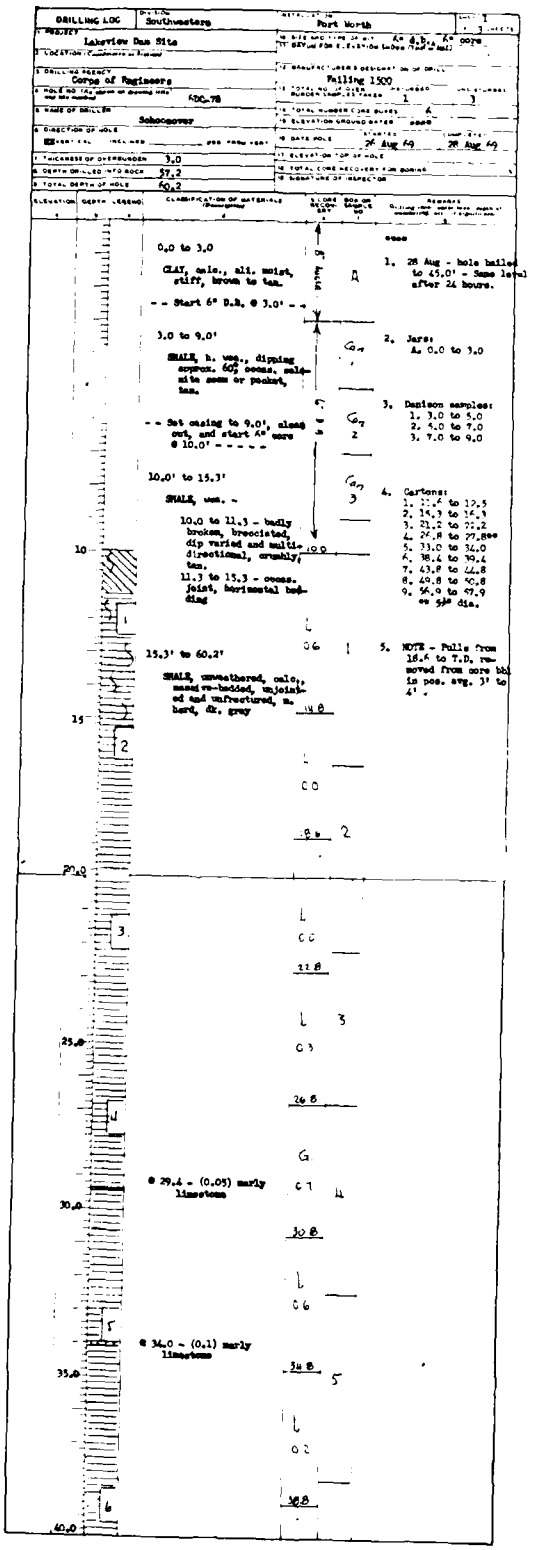
AS-BUILT

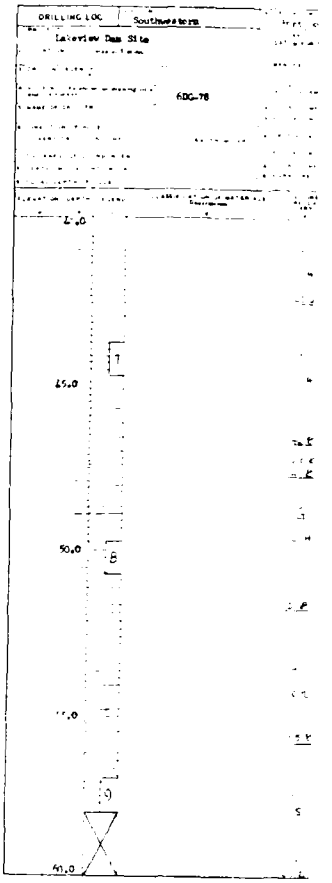
REVISED

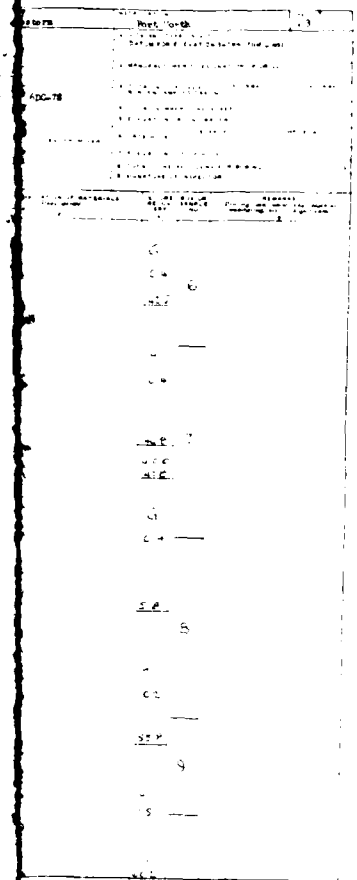
DRAWING NO.

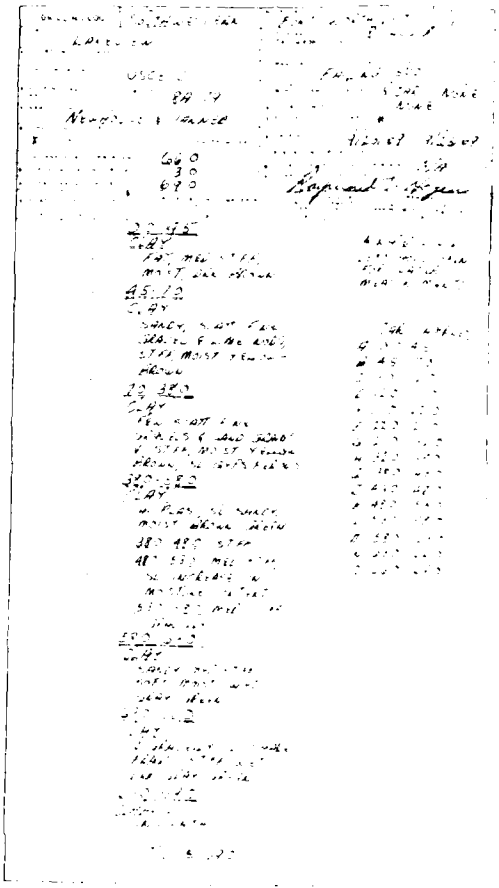
SUBSEQUENT NO.

COMPANY FINAL EXAMINATION, 19


DRILLING LOG
Southwestern
Fort Worth
Lakeview Dam Site
Corps of Engineers
6DC-78
Schoonover
Pulling 1500
26 Aug 49
28 Aug 49
3.0
57.2
60.2
0.0 to 3.0
CLAY, calc., sli. moist, stiff, brown to tan.
- - Start 6" D.B. @ 3.0' - -
3.0 to 9.0'
SHALE, h. weg., dipping approx. 60° coons. calcite seam or pocket, tan.
- - Set casing to 9.0', clean out, and start AX core @ 10.0' - - - - -
10.0' to 15.3'
SHALE, vwn. -
10.0 to 11.3 - badly broken, brecciated, dip varied and multi-directional, crumbly, tan.
11.3 to 15.3 - coons. joint, horizontal bedding
15.3' to 60.2'
SHALE, unweathered, calc., massive-bedded, unjointed and unfractured, m. hard, dk. grey
@ 29.4 - (0.05) marly limestone
@ 34.0 - (0.1) marly limestone
Core
1. 26 Aug - hole bailed to 45.0' - Same level after 24 hours.
2. Jars: A. 0.0 to 3.0
3. Denison samples: 1. 3.0 to 5.0 2. 5.0 to 7.0 3. 7.0 to 9.0
4. Cartons: 1. 12.6 to 13.5 2. 14.3 to 15.3 3. 21.2 to 22.2 4. 26.8 to 27.8** 5. 33.0 to 34.0 6. 38.4 to 39.4 7. 43.8 to 44.8 8. 49.8 to 50.8 9. 56.9 to 57.9 ** 5½" dia.
5. NOTE - Pulls from 18.6 to T.D. removed from core bbl in pos. avg. 3' to 4'.
10
15
20.0
25.0
30.0
35.0
40.0


DRILLING LOG
Southwestern
Lakeview Dam Site
6DC-78
45.0
50.0



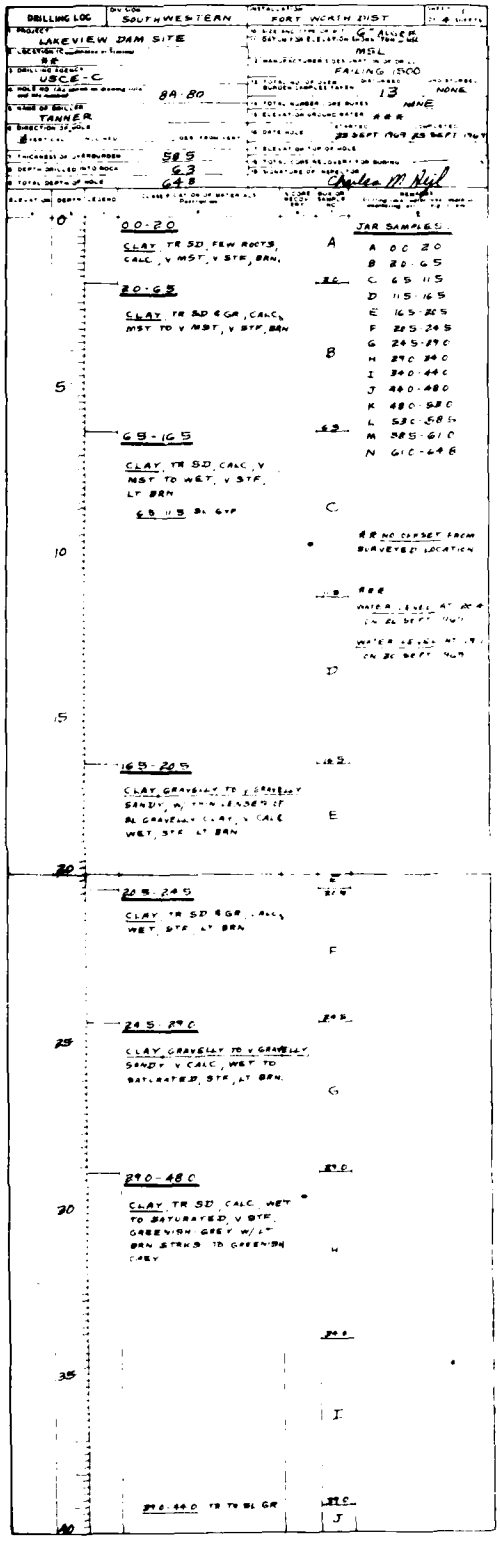


REVISION NO.	ACTION	DATE	DESCRIPTION OF REVISION

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY R. REHM	JOE POOL LAKE MOUNTAIN CREEK, TEXAS
DRAWN BY HLB	EMBANKMENT, SPILLWAY, AND OUTLET WORKS
REVIEWED BY R. REHM	**LOGS OF BORINGS** 6DC-78 AND 8A-79
SUBMITTED BY ROBERT REHM	INV NO DA-[illegible]-ENG-[illegible] DATED [illegible]-1978 DRAWING NUMBER SHEET NO [illegible] OF SEQUENCE NO. 5E

TO ACCOMPANY FINAL FOUNDATION REPORT



DRILLING LOG — SOUTHWESTERN — INSTALLATION: FORT WORTH DIST — SHEET 1 OF 4 SHEETS

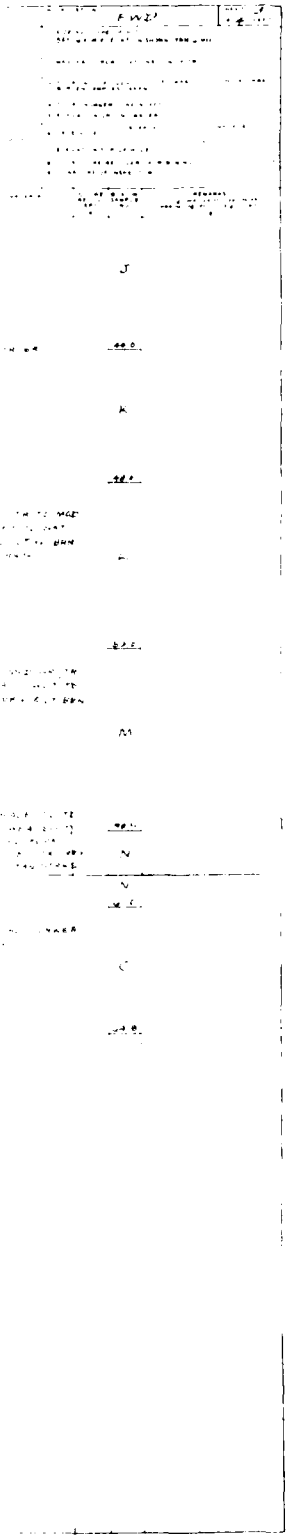
PROJECT: LAKEVIEW DAM SITE
DRILLING AGENCY: USCE-C
HOLE NO. (As shown on drawing title): BA-80
NAME OF DRILLER: TANNER
DIRECTION OF HOLE: VERT
THICKNESS OF OVERBURDEN: 58.5
DEPTH DRILLED INTO ROCK: 6.3
TOTAL DEPTH OF HOLE: 64.8
COORDINATES: N 6,[illegible] ALLEN; E [illegible]
DATUM FOR ELEVATION SHOWN: MSL
MANUFACTURER'S DESIGNATION OF DRILL: FAILING 1500
TOTAL NUMBER CORE BOXES: 13
TOTAL NUMBER SAMPLES: NONE
DATE HOLE: STARTED 22 SEPT 1949; COMPLETED 23 SEPT 1949
ELEVATION GROUND WATER: ± 8 FT
ELEVATION TOP OF HOLE:
TOTAL CORE RECOVERY FOR BORING:
SIGNATURE OF INSPECTOR: Charles M Nyl

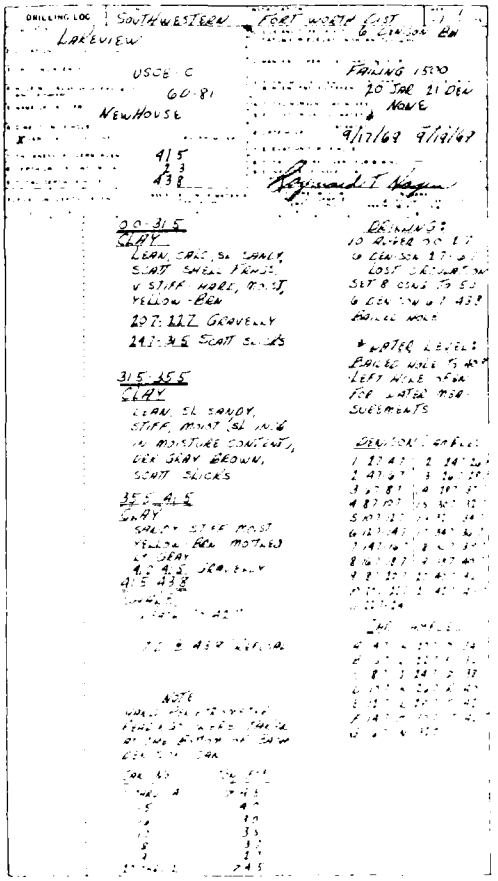
ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIAL	SAMPLE NO.	REMARKS
0	0.0-2.0		CLAY, TR SD, FEW ROOTS, CALC, V MST, V STF, BRN.	A	JAR SAMPLES: A 0.0-2.0; B 2.0-6.5; C 6.5-11.5; D 11.5-16.5; E 16.5-22.5; F 22.5-24.5; G 24.5-29.0; H 29.0-34.0; I 34.0-44.0; J 44.0-48.0; K 48.0-53.0; L 53.0-58.5; M 58.5-61.0; N 61.0-64.8
	2.0-6.5		CLAY, TR SD & GR, CALC, MST TO V MST, V STF, BRN	B	
5	6.5-16.5		CLAY, TR SD, CALC, V MST TO WET, V STF, LT BRN. 6.5-11.5 SL GYP	C	
					AR NO CORE FROM SURVEYED LOCATION
10					WATER LEVEL AT 8.0 FT ON 26 SEPT 1949
					WATER LEVEL AT 7.9 FT ON 26 SEPT 1949
15				D	
	16.5-20.5		CLAY, GRAVELLY TO V GRAVELLY SANDY, W, TR-LESS THAN 5% OF SL GRAVELLY CLAY, V CALC WET, STF, LT BRN	E	
20					
	20.5-24.5		CLAY, TR SD & GR, CALC, WET, STF, LT BRN	F	
25	24.5-29.0		CLAY, GRAVELLY TO V GRAVELLY SANDY, V CALC, WET TO SATURATED, STF, LT BRN.	G	
	29.0-48.0		CLAY, TR SD, CALC, WET TO SATURATED, V STF, GREENISH GREY W/ LT BRN STRKS TO GREENISH GREY	H	
30					
35				I	
	44.0-44.8		TR TO SL GR	J	
40					

DRILLING LOG — SW — LAKEVIEW DAM

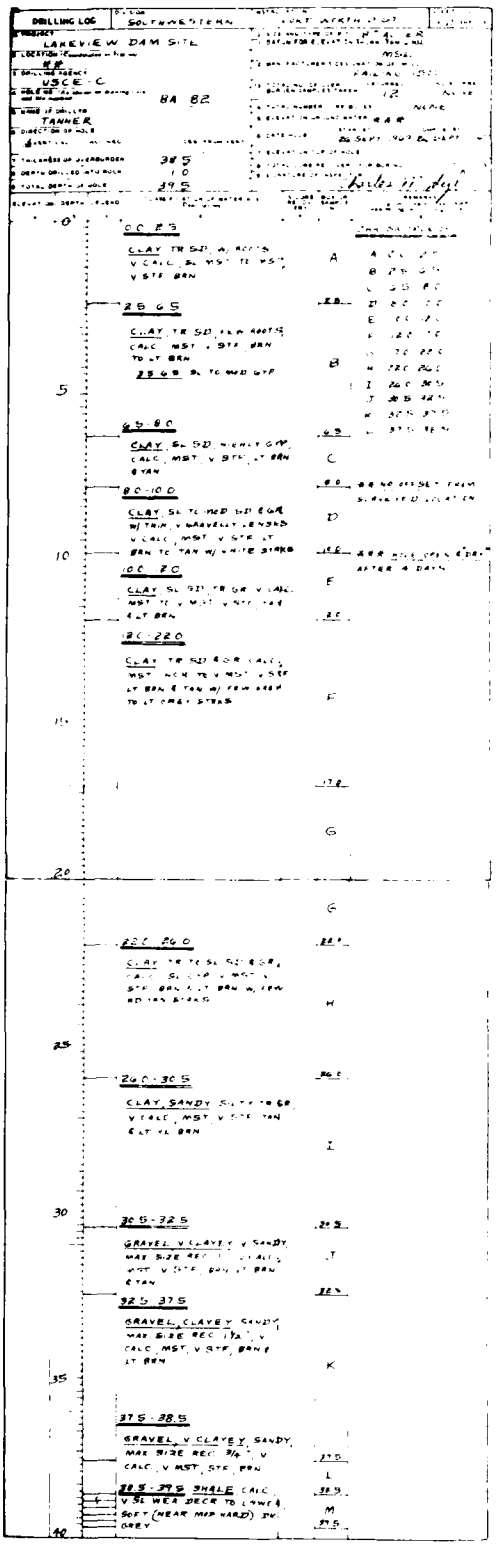
BA-80

ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIAL	SAMPLE NO.	REMARKS
40					
	44.0-48.0		TR GR		
45					
	48.0-53.0		CLAY, SL SD, TR TO MOD CR, CALC, WET TO SAT, STF, GREY W/ LT YL BRN TO LT BRN STRKS		
50					
	53.0-58.5		CLAY, TR TO MOD CR, TR TO SL SD, CALC, WET TO SAT, STF, GREY & LT BRN		
55					
	58.5-61.0		SHALE, MOD CR, CALC, W, FEW TO MOD HARD PARTS, CLAYEY AT BOTTOM, SL OPN, W FEW TO TR BL TAN STRKS		
60					
	61.0-64.8		SHALE, MOD CR, ALL LOWER 3.8 FT HARD		
65					
70					
75					
80					





TO ACCOMPANY FINAL FOUNDATION REPORT



DRILLING LOG

SOUTHWESTERN

LAKEVIEW DAM SITE

USCE-C

8A 82

TANNER

385

10

395

0'

0.0 2.5

CLAY TR SD W/ ROOTS V CALC SL MST TR WST V STF BRN

2.5 6.5

CLAY TR SD FEW ROOTS CALC MST + STF BRN TO LT BRN

2.5 6.5 SL TO MOD GYP

5

6.5 8.0

CLAY SL SD NEARLY GYP CALC MST V STF LT BRN & TAN

8.0 10.0

CLAY SL TO MOD SD EGR W/ TRACE GRAVELLY LENSES V CALC MST V STF LT BRN TO TAN W/ WHITE STRKS

10

10.0 12.0

CLAY SL SD TR GR V CALC MST TO V MST V STF TAN & LT BRN

12.0 22.0

CLAY TR SD & GR CALC MST NOR TO V MST V STF LT BRN & TAN W/ FEW GREY TO LT GREY STRKS

15

20

22.0 26.0

CLAY TR TO SL SDY & GR CALC SL SLP V MST V STF BRN & LT BRN W/ FEW RED IRON STRKS

25

26.0 30.5

CLAY SANDY SLTY TO GR V CALC MST V STF TAN & LT YL BRN

30

30.5 32.5

GRAVEL V CLAYEY V SANDY MAX SIZE REC 1" CALC MST V STF BRN LT BRN & TAN

32.5 37.5

GRAVEL CLAYEY SANDY MAX SIZE REC 1½" V CALC MST V STF BRN & LT BRN

35

37.5 38.5

GRAVEL V CLAYEY SANDY MAX SIZE REC ¾" V CALC V MST STF BRN

38.5 39.5 SHALE CALC V SL WEA DECR TO LOWER SOFT (NEAR MOD HARD) DK GREY

40

A

B

C

D

E

F

G

H

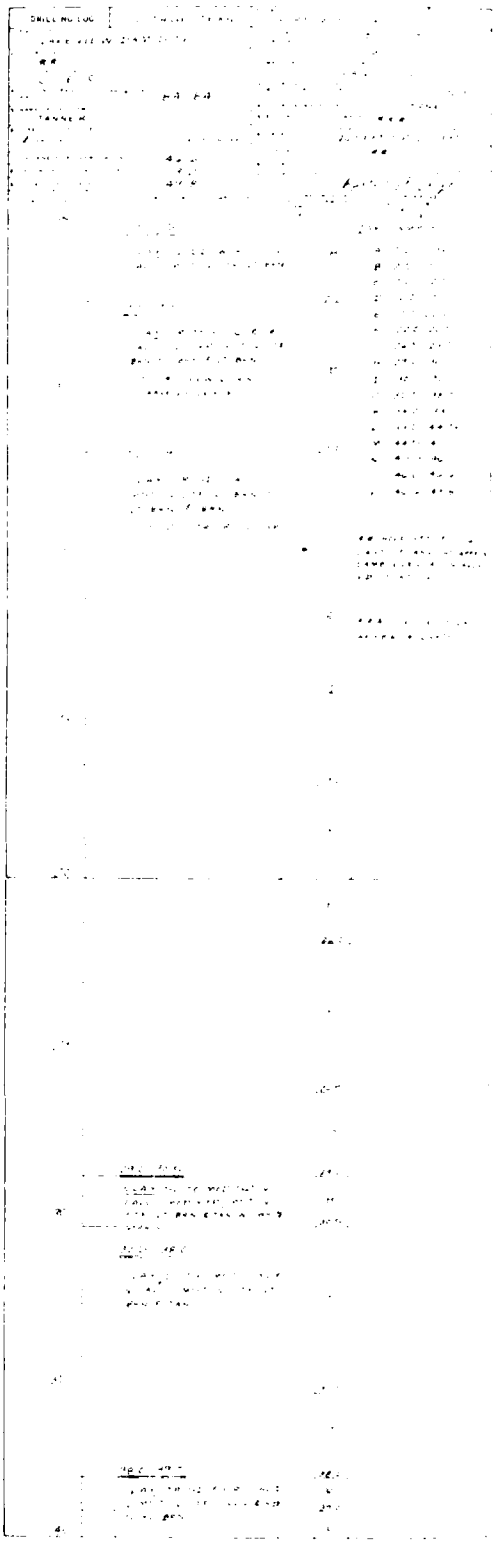
I

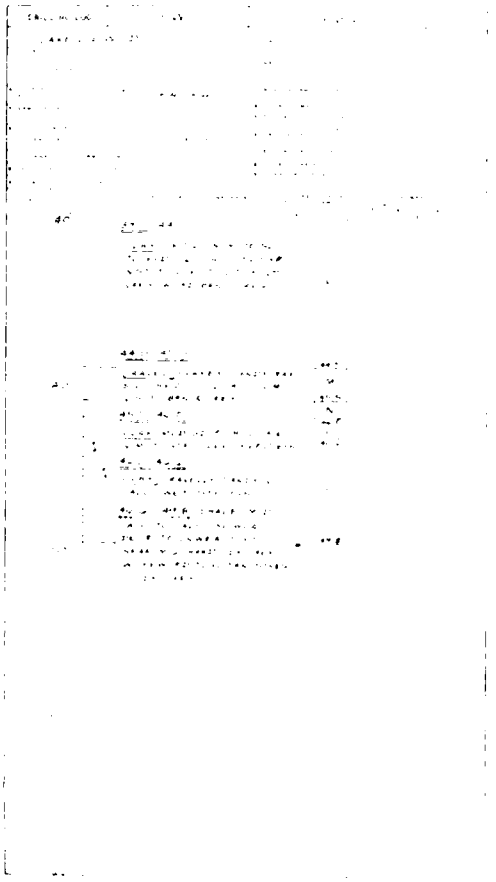
J

K

L

M





U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY

DRAWN BY HLR

CHECKED BY

SUBMITTED BY ROBERT BEHM

JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
BA-82, 83, AND BA-84

INV NO DA-[illegible]-[illegible]

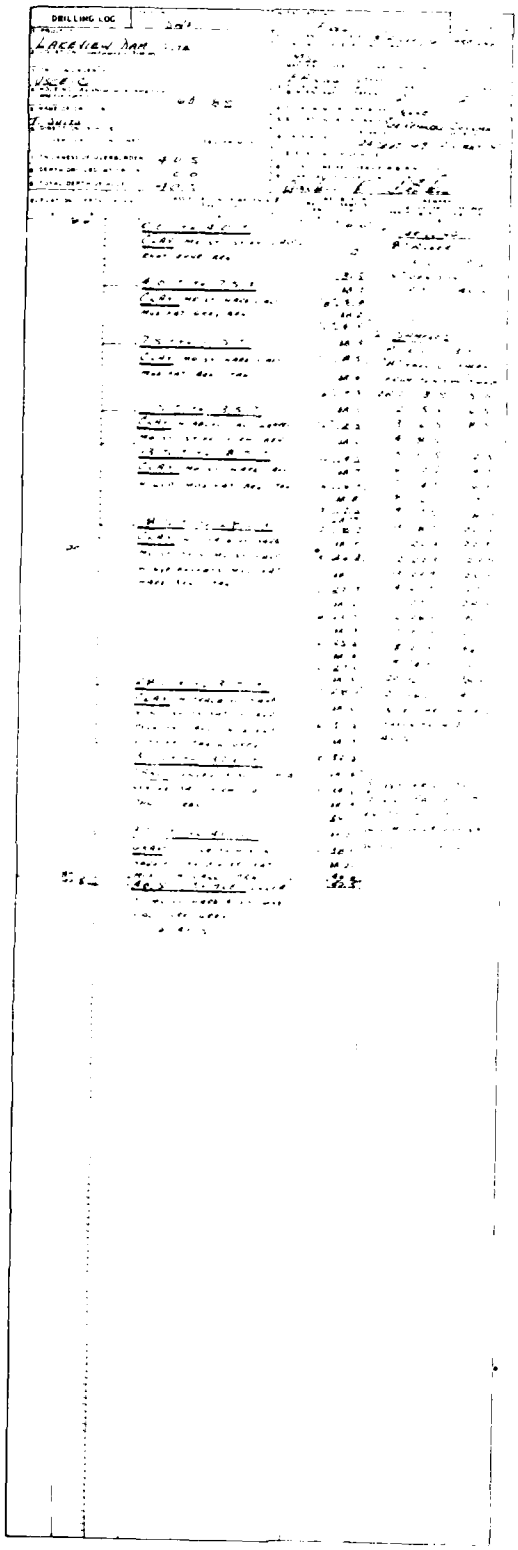
DATED

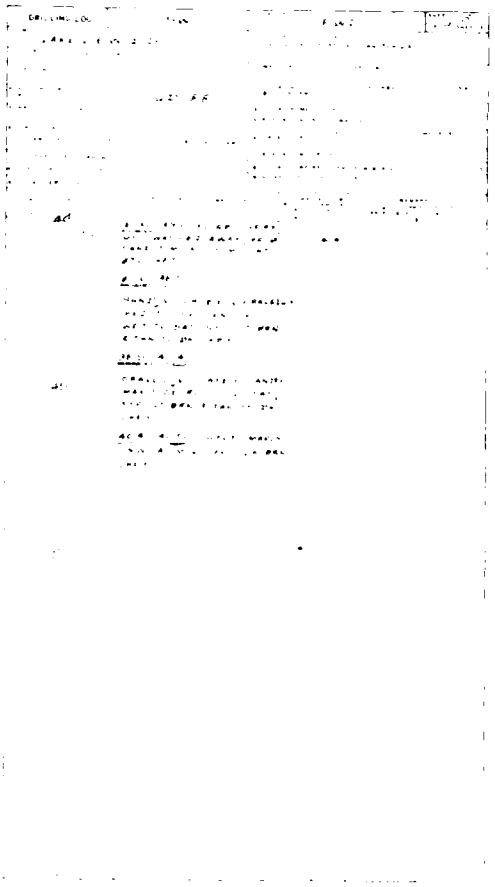
DRAWING NUMBER

SHEET NO 07

SEQUENCE NO. 58

ACCOMPANY FINAL FOUNDATION REPORT


DRILLING LOG
LAKEVIEW DAM



U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: R. BEHM
DRAWN BY: HLR
REVIEWED BY: R. BEHM
SUBMITTED BY: ROBERT BEHM

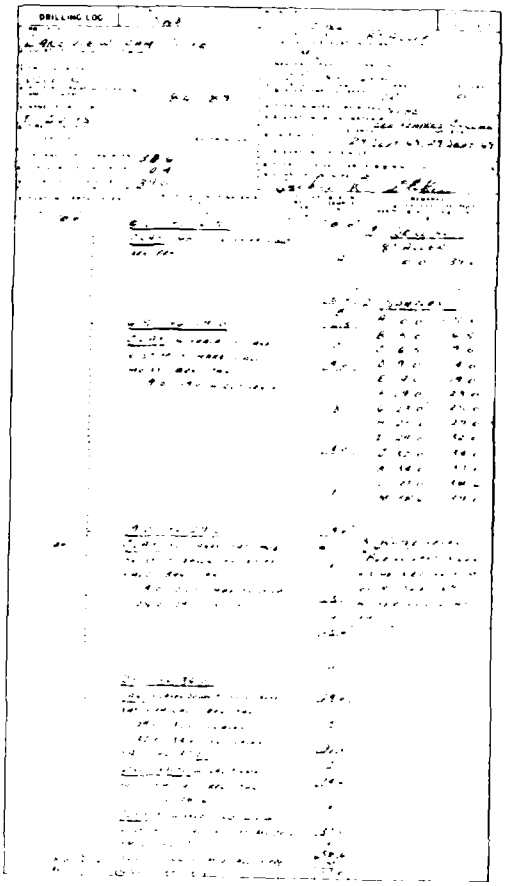
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
60-85, 8A-87 AND 6D-88

INV NO DACW63-8-C-0041
DATED 1 38
DRAWING NUMBER
SHEET NO 07
SEQUENCE NO 59

TO ACCOMPANY FINAL FOUNDATION REPORT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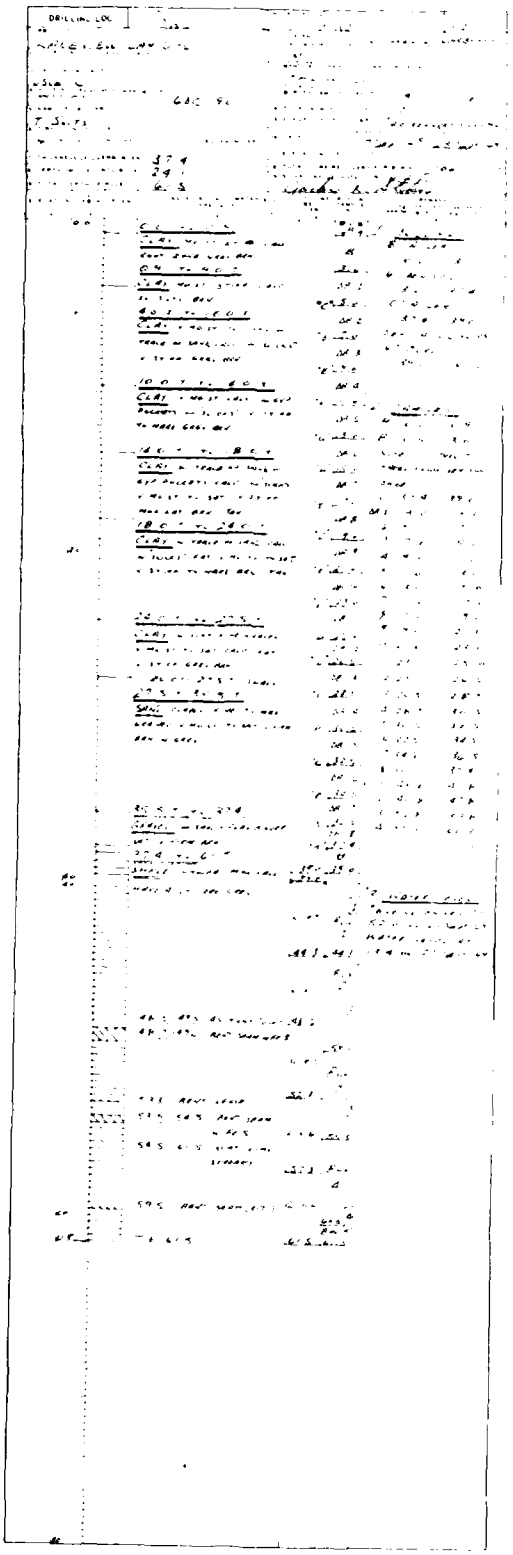
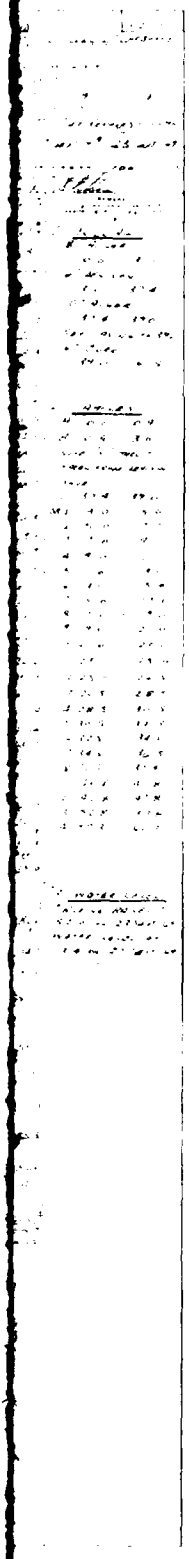
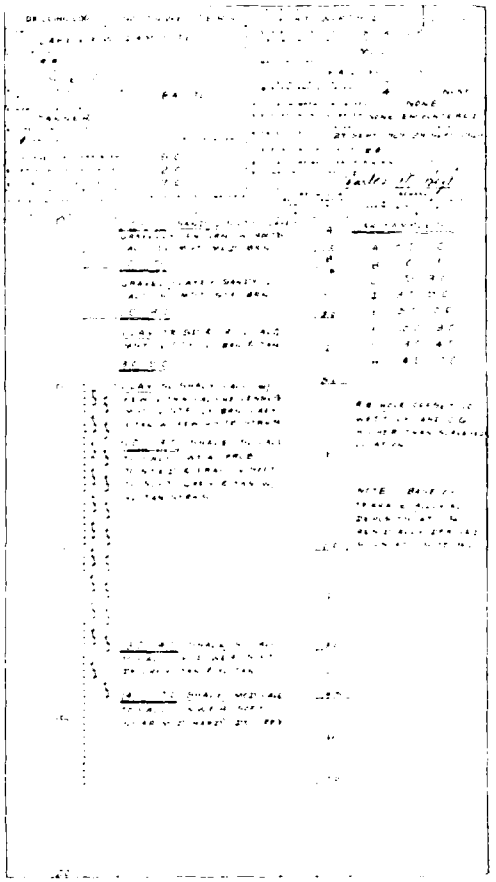
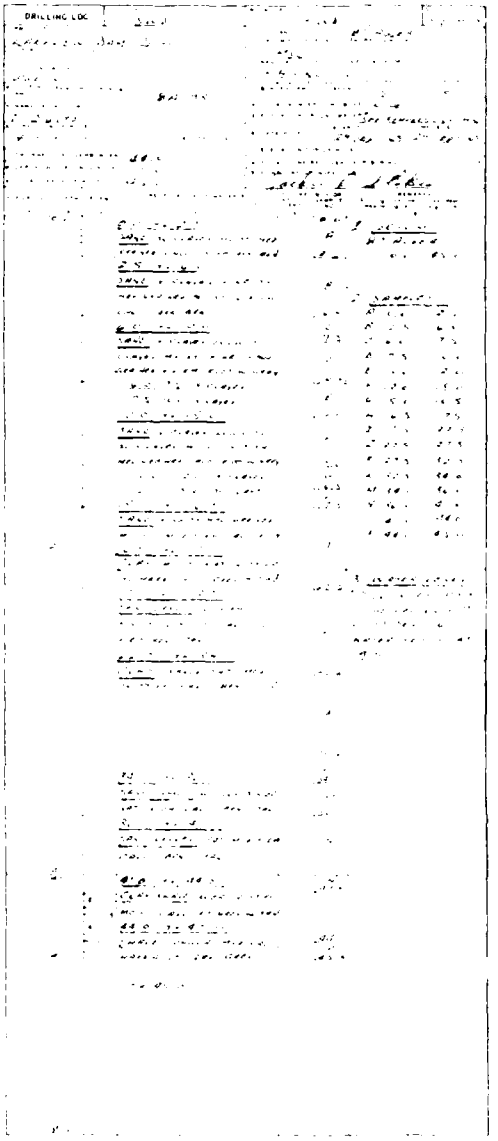

DRILLING LOG







U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: [illegible]
DRAWN BY: HLR
REVIEWED BY: [illegible]
SUBMITTED BY: ROBERT REHM

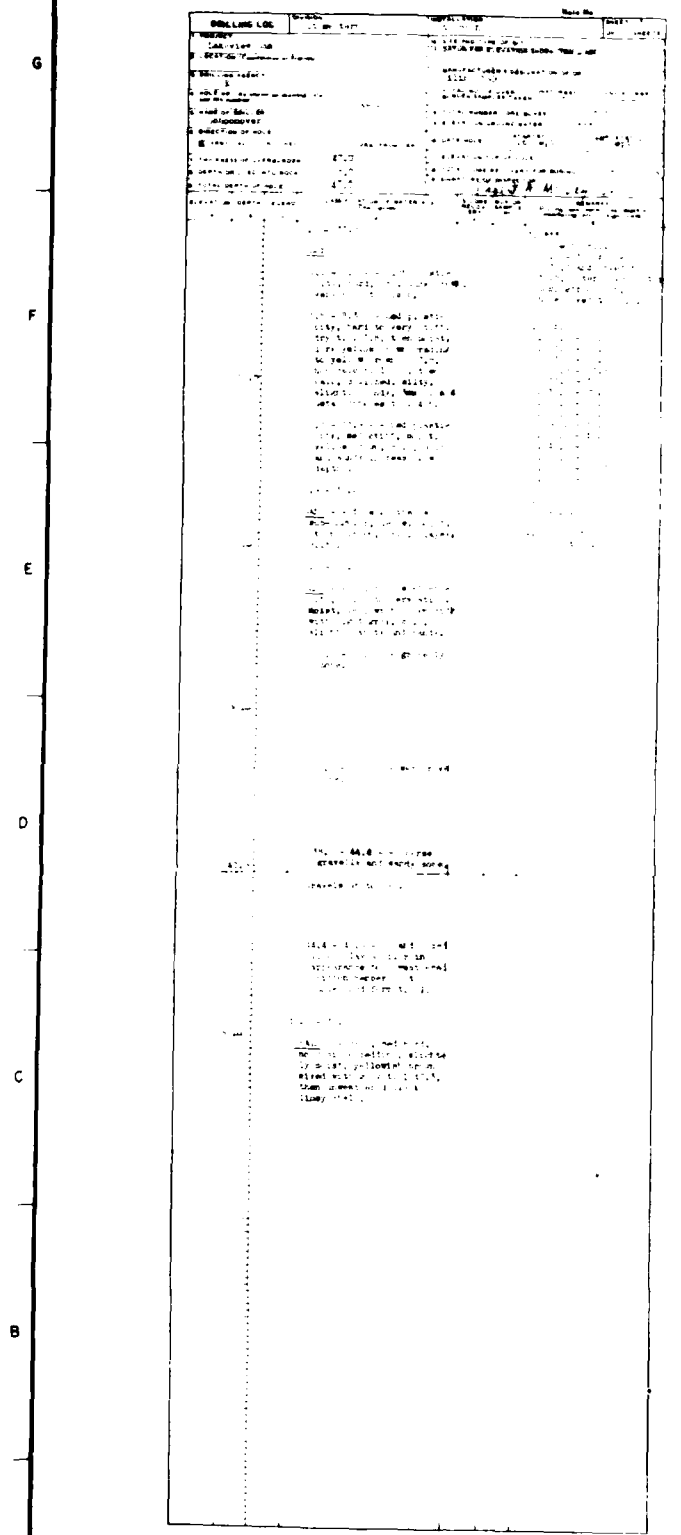
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

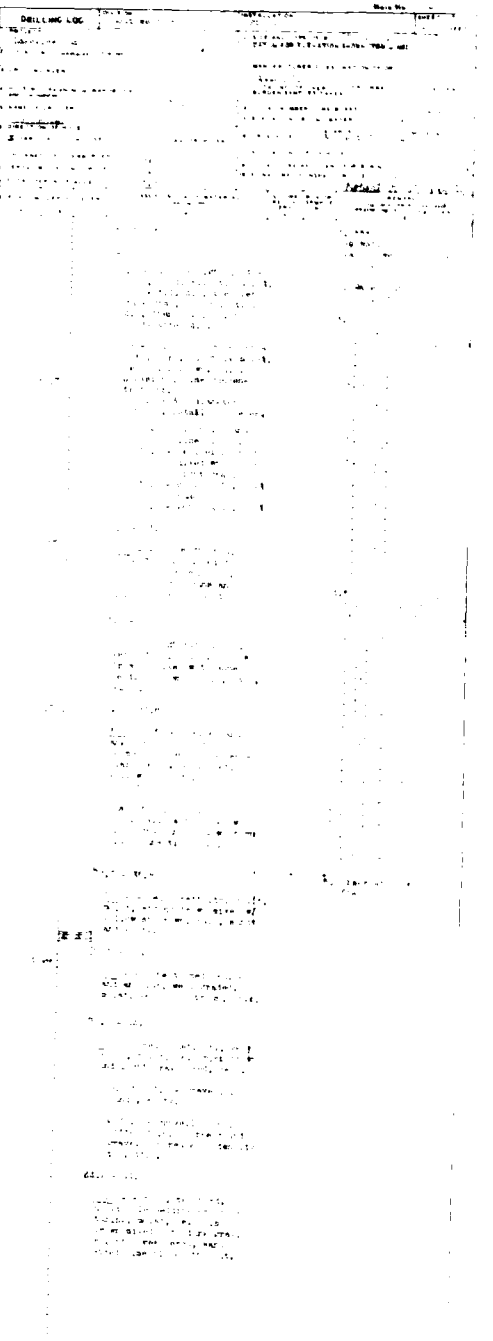
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

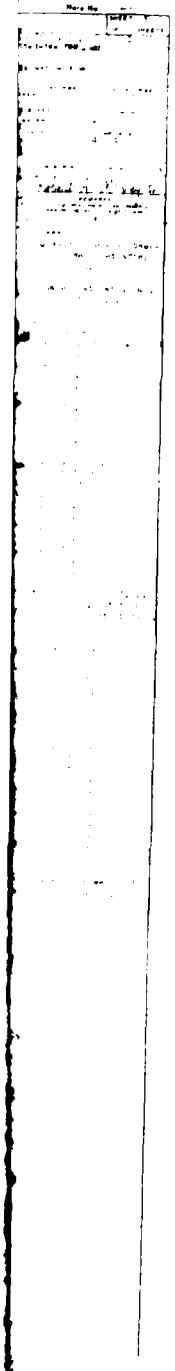
LOGS OF BORINGS
BA-89, 60C-90 AND BA-92, 93

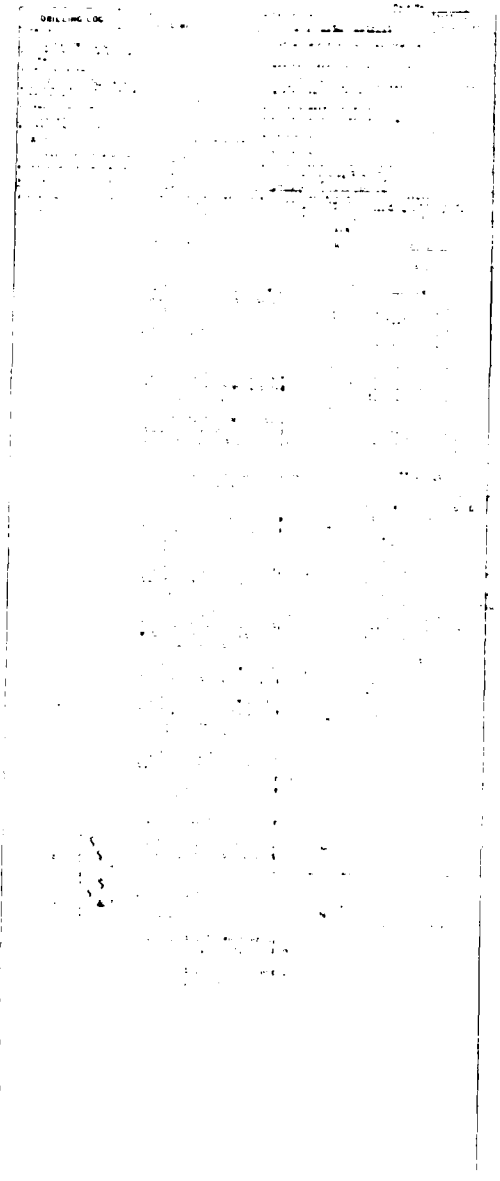
INV NO [illegible]
DATED [illegible]
DRAWING NUMBER
SHEET NO
REFERENCE NO. 60

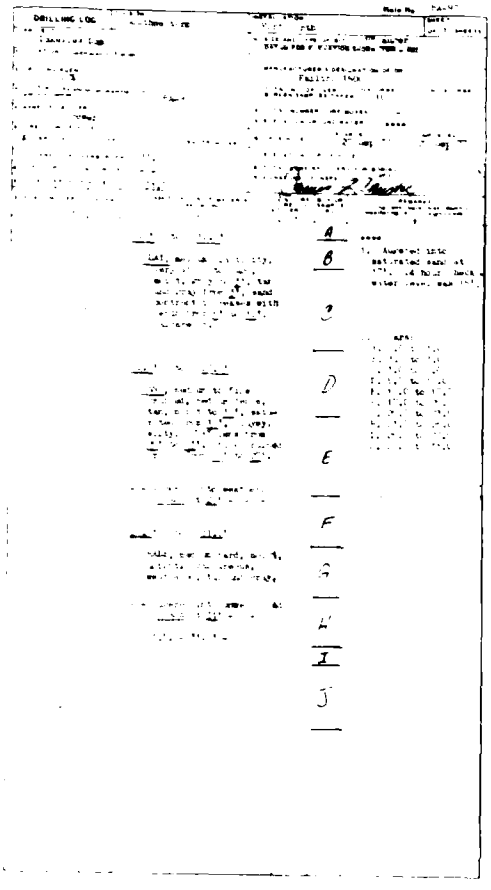
TO ACCOMPANY FINAL FOUNDATION REPORT











U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

CE COOL LAKE

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
8A-94, 6D-95, 8A-96 AND 8A-97

SUBMITTED BY: ROBERT REHM

INV. NO. DACW-63-8-B-0093

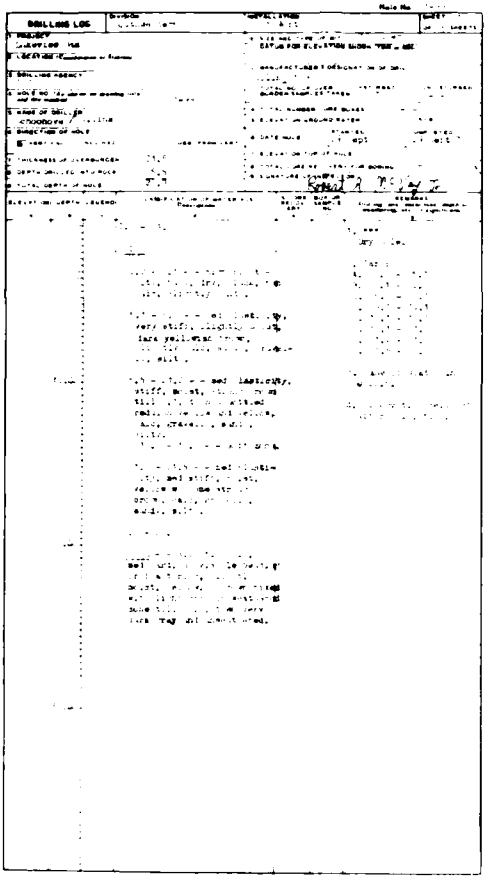
DATED: 98

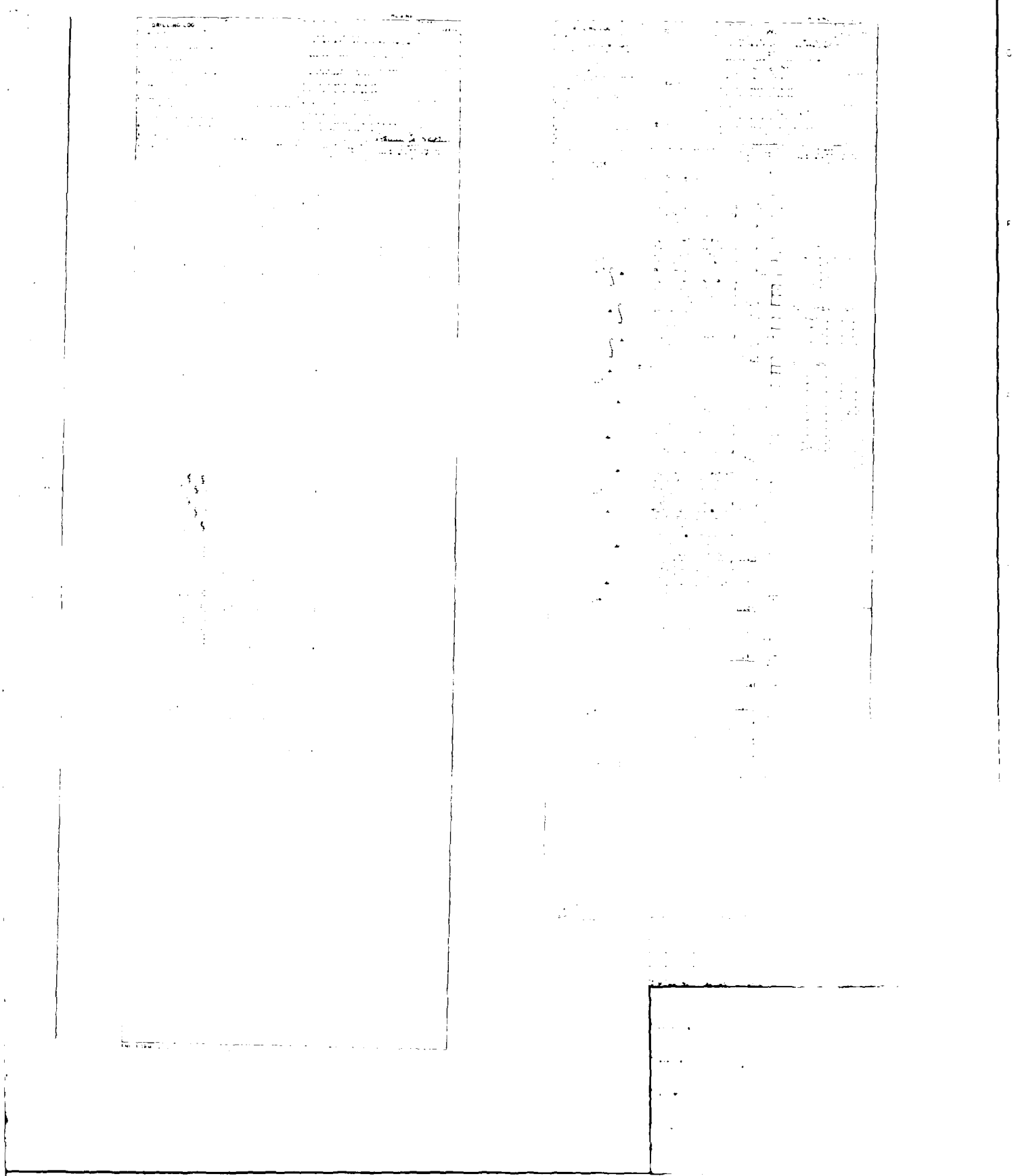
DRAWING NUMBER

SHEET NO. OF

SEQUENCE NO. 61

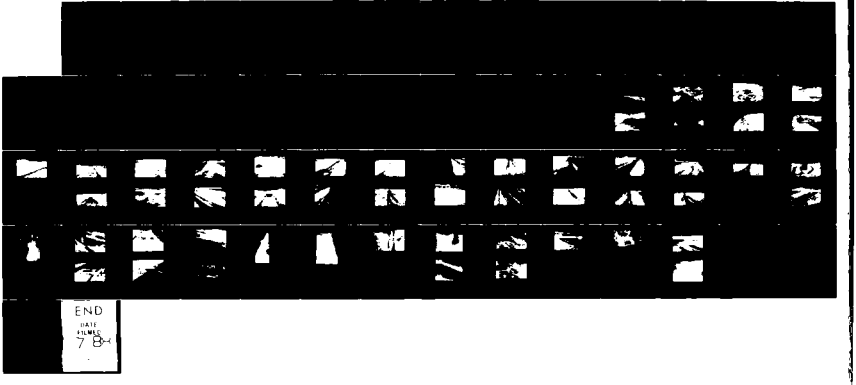
ACCOMPANY FINAL FOUNDATION REPORT



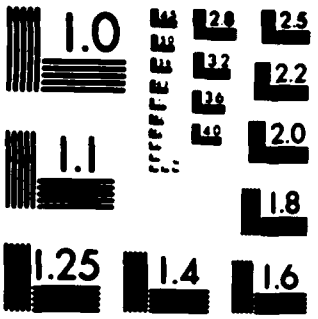


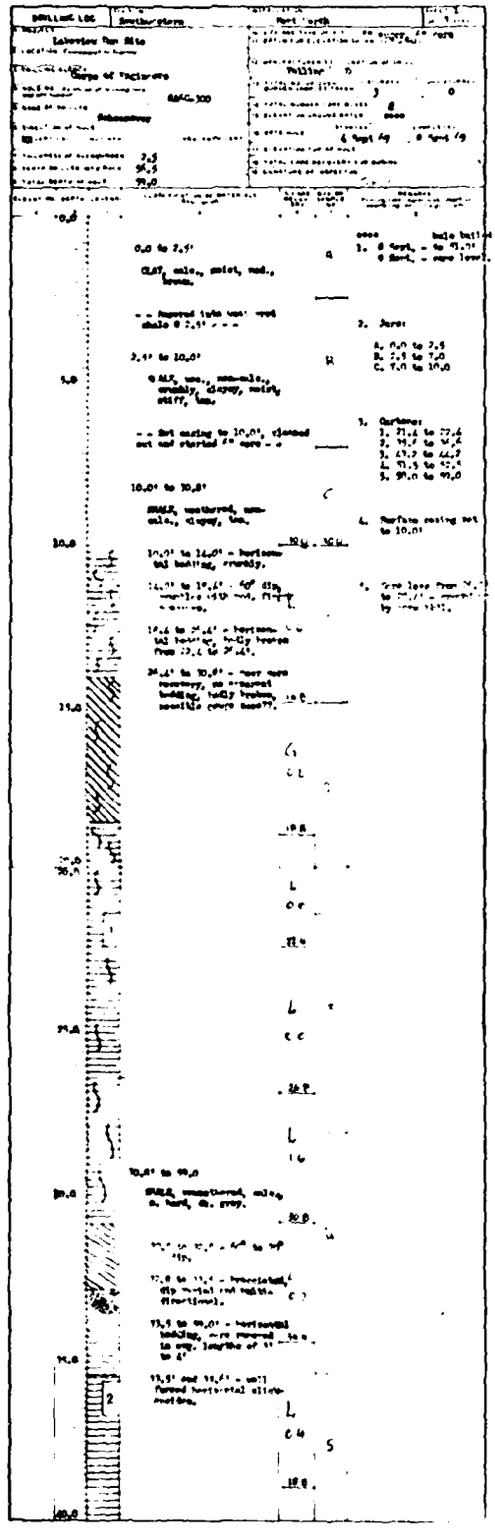
AD-A193 342 COMPLETION OF EMBANKMENT AND SPILLWAY JOE POOL LAKE MOUNTAIN CREEK TEXAS(U) ARMY ENGINEER DISTRICT FORT WORTH TX A J MARR FEB 88 3/3

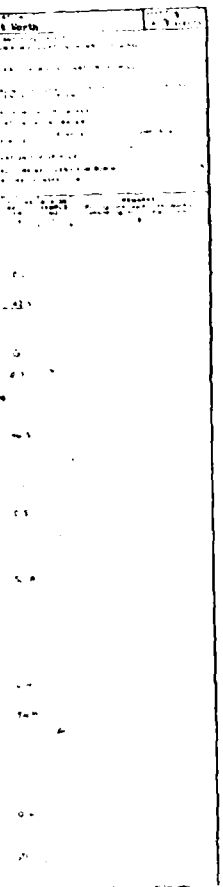
UNCLASSIFIED F/G 13/2 NL

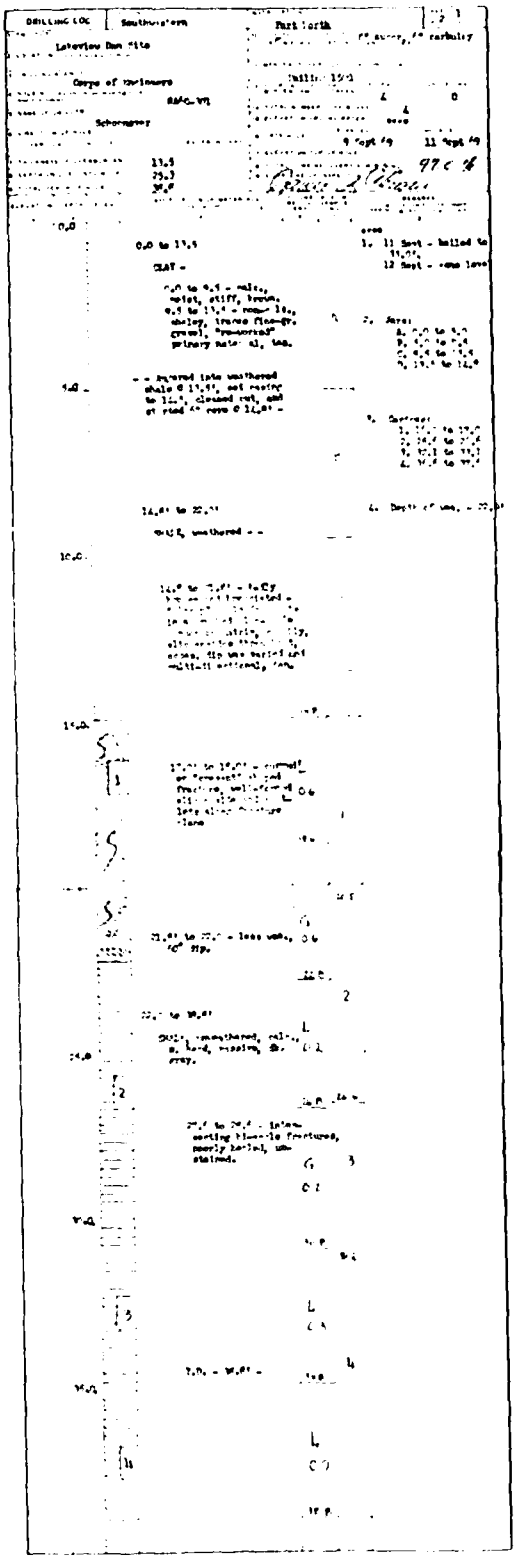


END
DATE FILMED
7-88




DRILLING LOG
Southwestern
Port North
Laboratory Plan Site
Corps of Engineers
0,0 to 2,5'
CLAY, sandy, moist, red., brown.
2,5' to 10,0'
SILT, san., non-calc., crumbly, clayey, moist, stiff, tan.
10,0' to 10,8'
SHALE, weathered, non-calc., clayey, tan.
10,8' to 14,0' - horizontal bedding, crumbly.
14,0' to 19,6' - 60° dip, [illegible]
19,6 to 24,6' - horizontal bedding, highly broken from 22,6 to 24,6'.
24,6' to 30,8' - near vert. recovery, no apparent bedding, highly broken, [illegible]
30,8' to 99,0
SHALE, unweathered, calc., m. hard, dk. grey.
99,0' to 99,5' - horizontal bedding, core recovered in [illegible] to dry, lowering of [illegible] to 6"
99,5' and 99,6' - well formed horizontal slickensides.
1. Water:
A. 0,0 to 2,5
B. 2,5 to 7,0
C. 7,0 to 10,0
3. Cavities:
1. 21,6 to 22,6
2. 44,7 to 45,6
3. 63,2 to 64,2
4. 91,5 to 92,1
5. 95,0 to 99,0
4. Surface casing set to 10,0'
DRILLING LOG
Southwestern
Port North
Laboratory Plan Site
Hvily limestone at the following depths:
Low angle (0° to 45°) fractures at [illegible] slickensides on fracture planes.





U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: F. BEHM
DRAWN BY: WLB
REVIEWED BY: F. BEHM
SUBMITTED BY: ROBERT BEHM

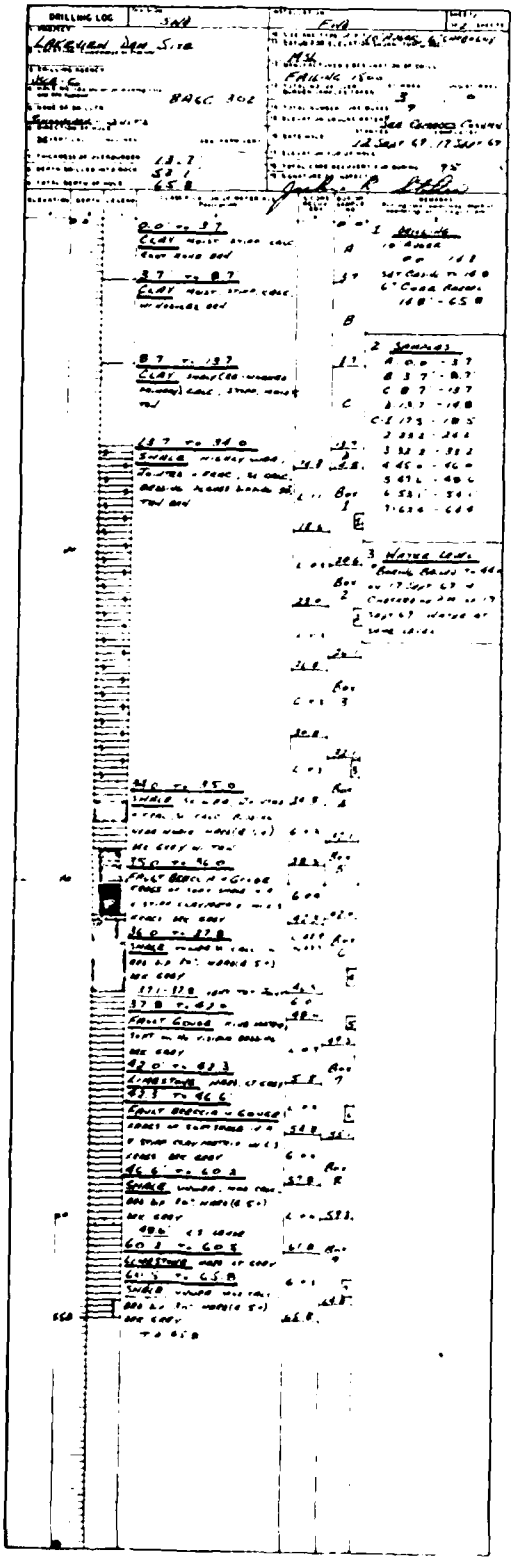
JOE POOL LAKE
MOUNTAIN CREEK, TEXAS

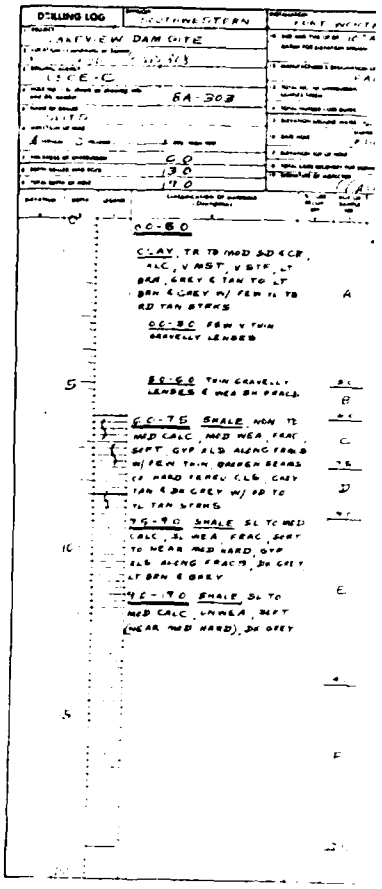
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

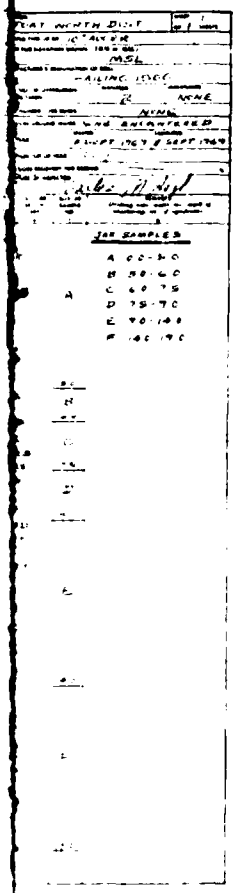
LOGS OF BORINGS
BASC-300 AND BASC-301

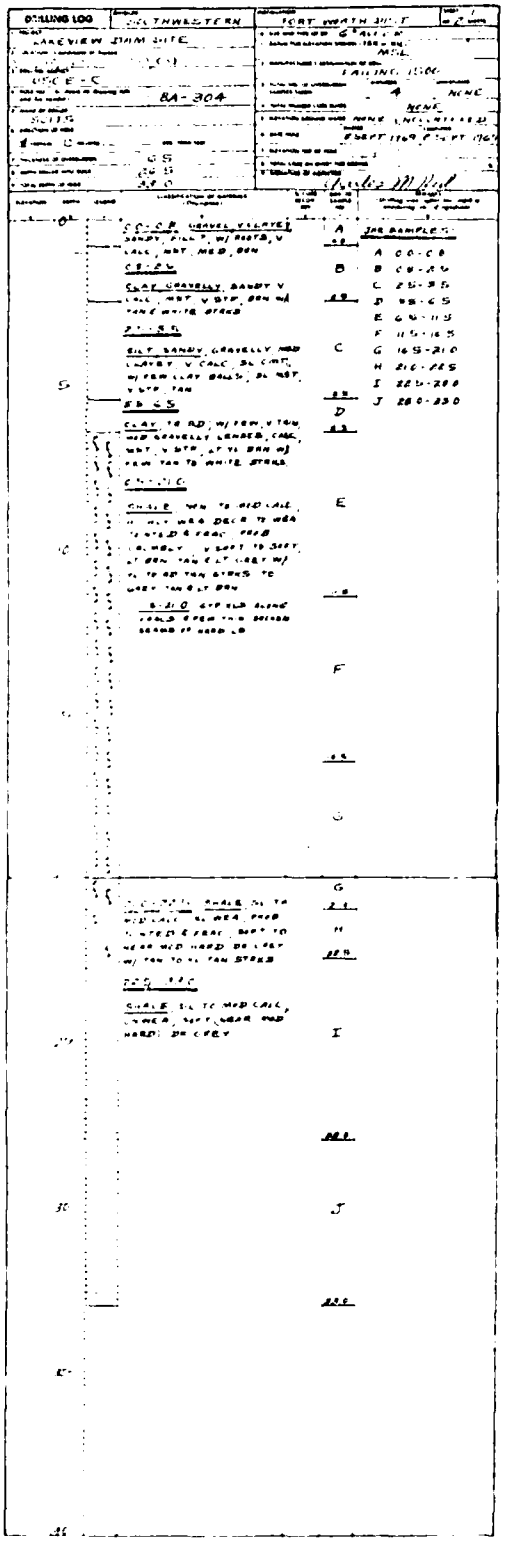
CONTRACT NO. DACW63-81-C-0093
DATED JULY 81
DRAWING NUMBER
SHEET NO.
SEQUENCE NO. 63

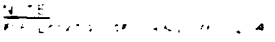
TO ACCOMPANY FINAL FOUNDATION REPORT


DRILLING LOG
LAKEVIEW DAM SITE
BAGG 302
0.0 - 3.7
CLAY
3.7 - 8.7
CLAY
8.7 - 13.7
CLAY
13.7 - 34.0
SHALE
34.0 - 37.8
SHALE
37.8 - 42.0
FAULT GOUGE
42.0 - 42.3
LIMESTONE
42.3 - 46.6
FAULT BRECCIA + GOUGE
46.6 - 60.2
SHALE
60.2 - 60.5
LIMESTONE
60.5 - 65.8
SHALE
T.D. 65.8
1 Rock
2 Samples
3 Water Level


DRILLING LOG
LAKEVIEW DAM SITE
LCCE-C
BA-303
CC-60
CLAY, TR TO MOD SD & CB, ALC, V MST, V STF, LT BRN, GREY & TAN TO LT BRN & GREY W/ FEW TO RD TAN STRKS
CC-GC FEW V THN GRAVELLY LENSES
GC-75 SHALE, NON TO MOD CALC, MOD WEA, FRAC, SFFT, GYP ALG ALONG FRACS W/ FEW THN GREEN BEDS & HARD TO RELL CLG, GREY TAN & DK GREY W/ RD TO YL TAN STRKS
75-90 SHALE SL TO MOD CALC, SL WEA, FRAC, SFFT TO NEAR MOD HARD, GYP ALG ALONG FRACS, DK GRY TO BRN & GREY
90-TD SHALE SL TO MOD CALC, UNWEA, MFT (NEAR MOD HARD), DK GREY







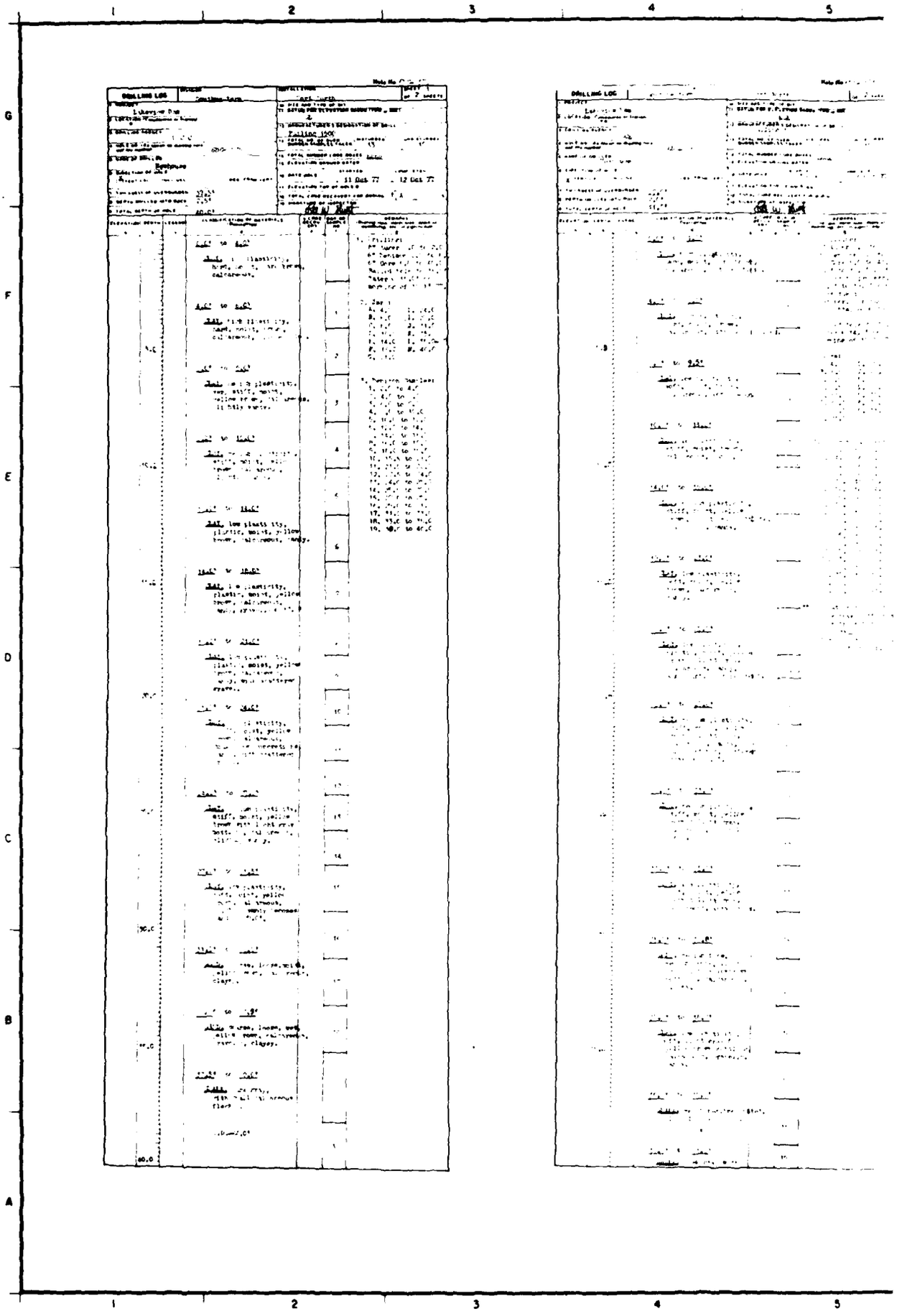
U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

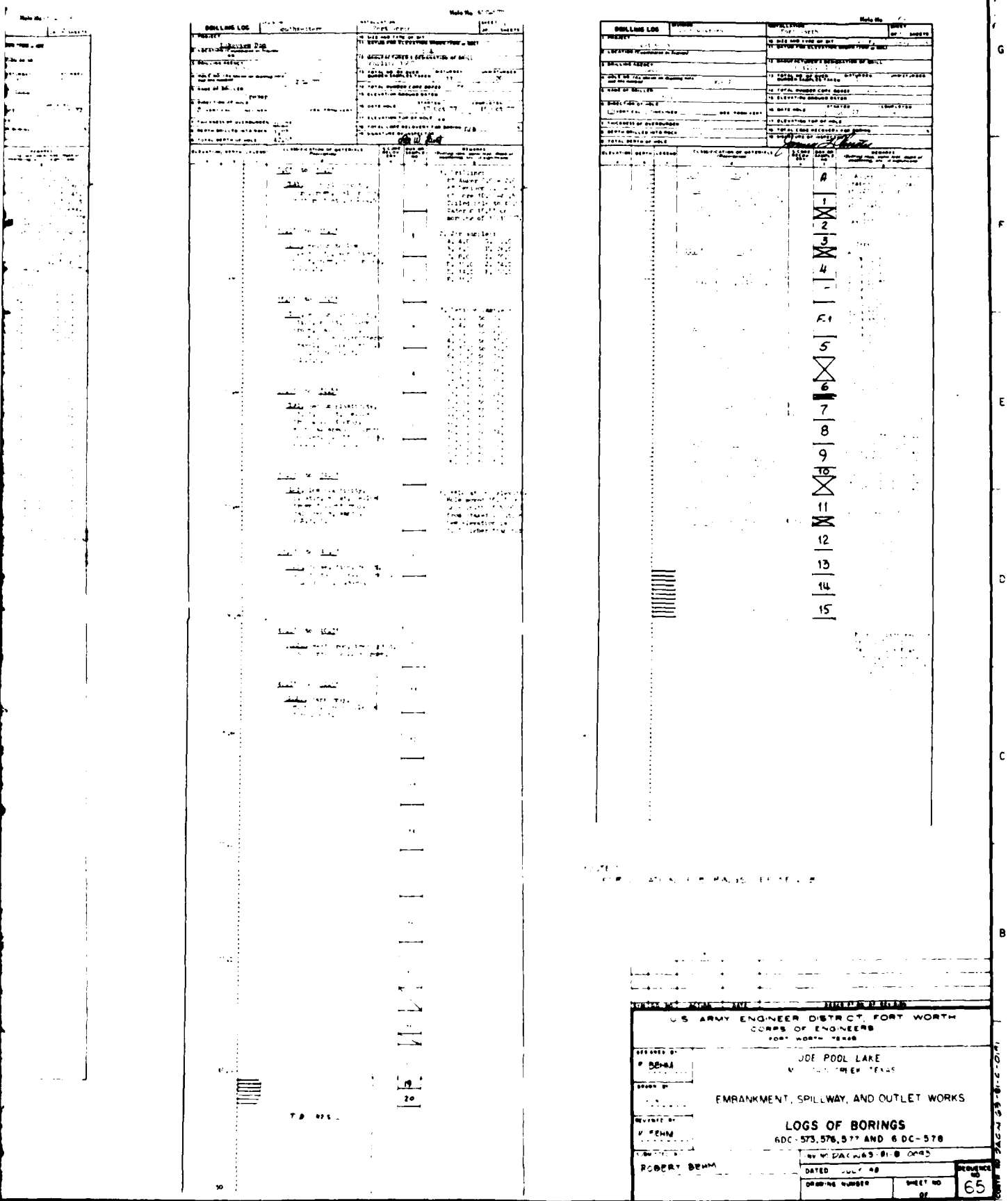
JOE POOL LAKE
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
BA6C-302, BA-303 AND BA-304

DRAWN BY: H.L.B.
SUBMITTED BY: ROBERT REHM
I.D. NO. DACW63-B-R-0093
DATED: JULY 61
DRAWING NUMBER
SHEET NO. 64

TO ACCOMPANY FINAL FOUNDATION REPORT





US ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: P. BEHM
DRAWN BY:
REVISED BY: P. BEHM
CHECKED BY: ROBERT BEHM

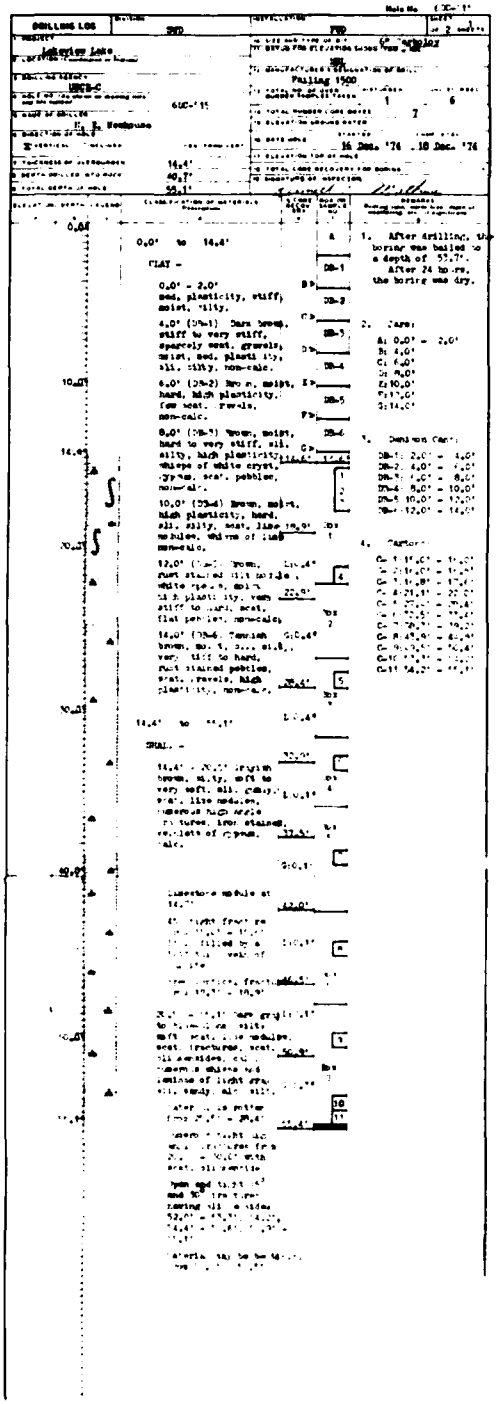
JOE POOL LAKE
[illegible] TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
6DC-573, 576, 577 AND 6DC-578

W.O. DACW63-81-B-0065
DATED [illegible] 68

DRAWING NUMBER: 65
SHEET NO. [illegible] OF



DRILLING LOG

Laverlan Lake

USCS-C

Falling 1500

16 Dec. '76 - 18 Dec. '76

0.0' to 14.4'

CLAY -

0.0' - 2.0' med. plasticity, stiff, moist, silty.

4.0' (DB-1) Dark brown, stiff to very stiff, sparsely vest. gravels, moist, med. plasti ity, sli. silty, non-calc.

6.0' (DB-2) Brown, moist, hard, high plasticity, few vest. pebbles, non-calc.

8.0' (DB-3) Brown, moist, hard to very stiff, sli. silty, high plasticity, whisps of white cryst. gypsum, vest. pebbles, non-calc.

10.0' (DB-4) Brown, moist, high plasticity, hard, sli. silty, vest. like 10.0' nodules, whisps of lime, non-calc.

12.0' (DB-5) Brown, rust stained silt nodule, white calc. moist, high plasticity, very stiff to hard, vest. pebbles, flat pebbles, nonscale.

14.0' (DB-6 Tan)ish brown, mo. t, v.., sli., very stiff to hard, rust stained pebbles, vest., revels, high plasticity, non-calc.

14.4' to 55.7'

SHALE -

14.4' - 20.0' Grayish brown, moist, soft to very soft, sli. silty, vest. like medium, numerous high angle fractures, iron stained, veinlets of gypsum, calc.

Limestone nodule at 14.7'

At right fract re ... filled by a ... vein of ...

Iron stained fract... at 19.5' - 19.9'

20.0' - 21.0' Dark grayish brown to olive, soft, sli. silty, vest. like nodules, vest. fractures, vest. 50.0' sli. wavy sides, calc.

Numerous whisps to 4" thick of light gray, sli. silty, very stiff, calc.

After ... minute from 21.0' - 29.4' ... 21.4'

Numerous light ... whisps, fractures from ... 30.0' with vest. slickensides

Iron and gypsum ... and 30° to ... fracturing all ... sides.

52.0' - ...

54.4' - ...

55.7'

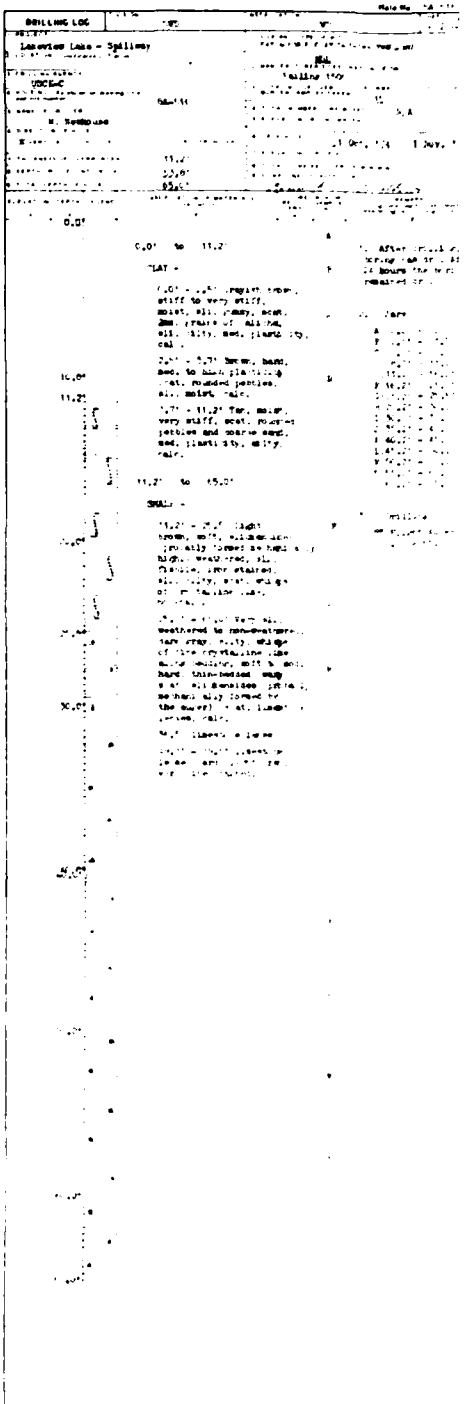
Material ... to be ...

1. After drilling, the borine was bailed to a depth of 55.7'. After 24 hours, the boring was dry.

2. Core:
A: 0.0' - 2.0'
B: 4.0'
C: 6.0'
D: 8.0'
E: 10.0'
F: 12.0'
G: 14.0'

3. Dension Cont:
DB-1: 2.0' - 4.0'
DB-2: 4.0' - 6.0'
DB-3: 6.0' - 8.0'
DB-4: 8.0' - 10.0'
DB-5: 10.0' - 12.0'
DB-6: 12.0' - 14.0'

4. Factors:
C: 1.0' - 11.0'
C: 11.0' - 11.2'
C: 1.0' - 17.0'
C: 8.21.0' - 22.0'
C: 22.0' - 30.0'
C: 30.0' - 55.7'
C: 8.43.0' - 44.0'
C: 44.0' - 52.0'
C: 52.0' - 54.4'
C: 54.4' - 55.7'



DRILLING LOG

Laverlan Lake - Spillway

USCS-C

Falling 1500

0.0'

0.0' to 11.2'

CLAY -

0.0' - 4.0' ... stiff to very stiff, moist, sli. silty, med. ... Dark ... of all ... sli. silty, med. plasti city, cal.

4.0' - 9.7' Brown, hard, med. to high plasticity, vest. rounded pebbles, sli. moist, calc.

9.7' - 11.2' Tan, moist, very stiff, vest. rounded pebbles and coarse sand, med. plasti ity, silty, calc.

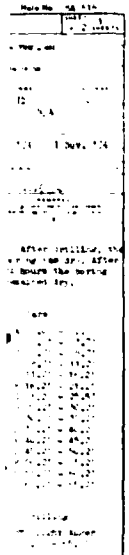
11.2' to 45.0'

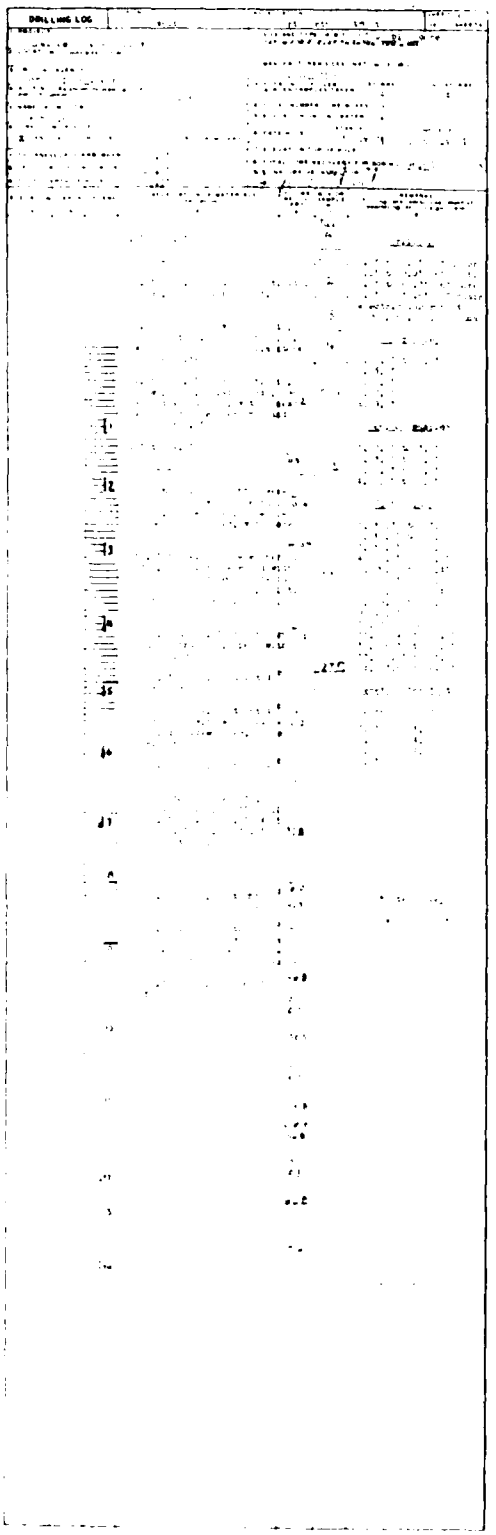
SHALE -

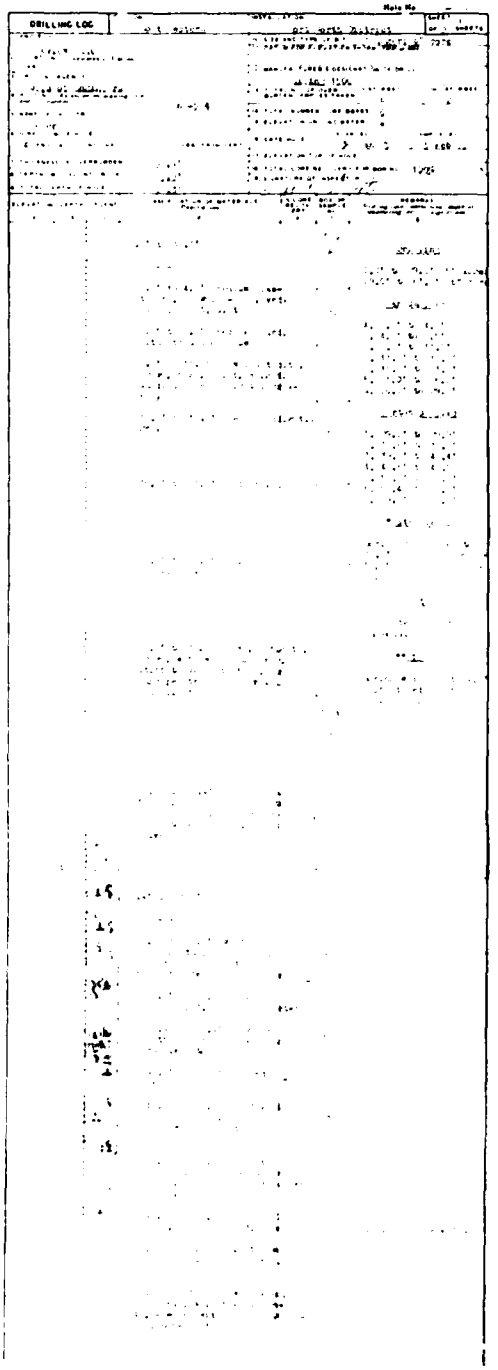
11.2' - 21.0' Light brown, soft, sli. calcareous, silty clayey to high, weathered, sli. fissile, iron stained, sli. silty, vest. whisps of ... calcite, ...

... weathered to non-weathered, very ... silty whisps of fine crystalline ... calcite, soft to ... hard thin-bedded ... 9.4° sli. slickensides ... joints, no ... sli. ... to the ... sli. ... ... calc.

... slickensides ...







U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

JOE POOL LAKE
[illegible]

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS

6DC-515, BA-516, 6DC-517 AND BA6C-524

DRAWN BY: KENNETH REHM

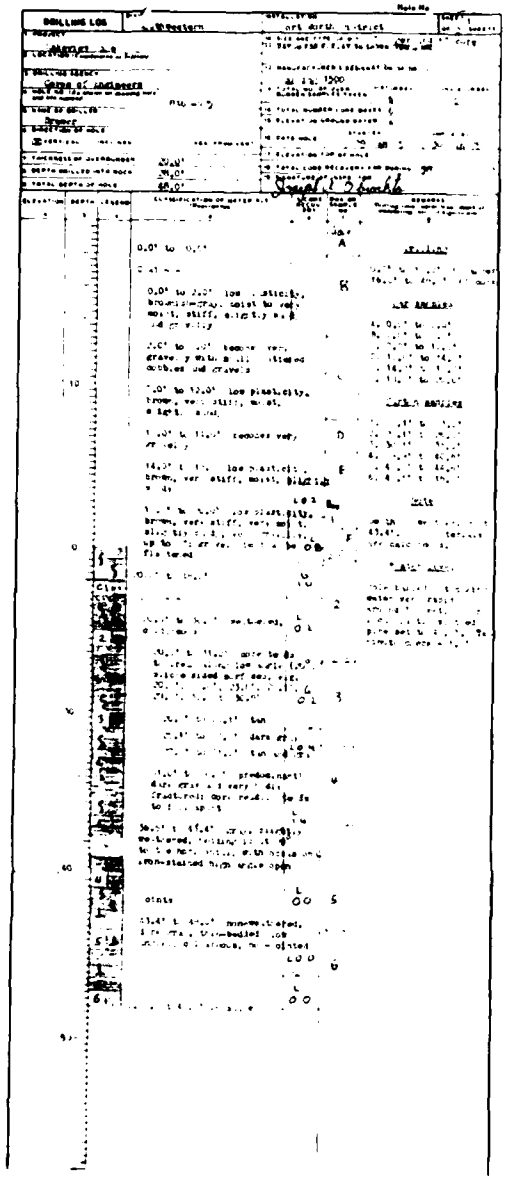
DATED: JULY [illegible]

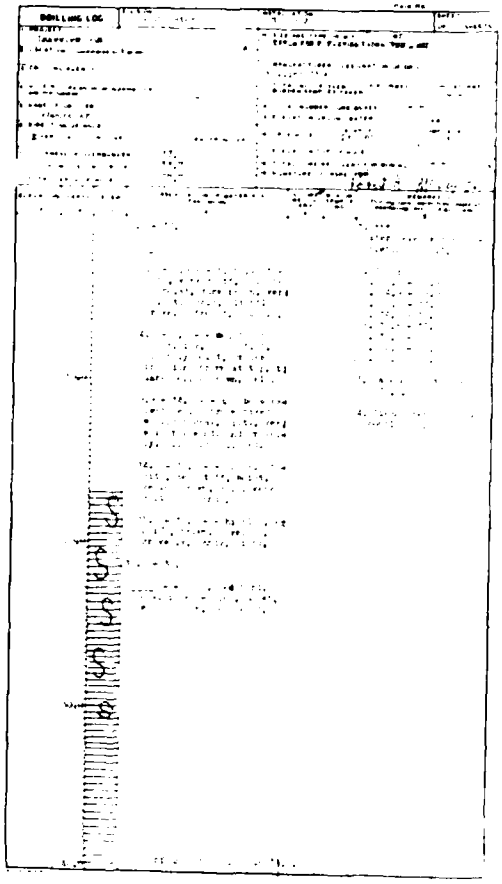
DRAWING NUMBER:

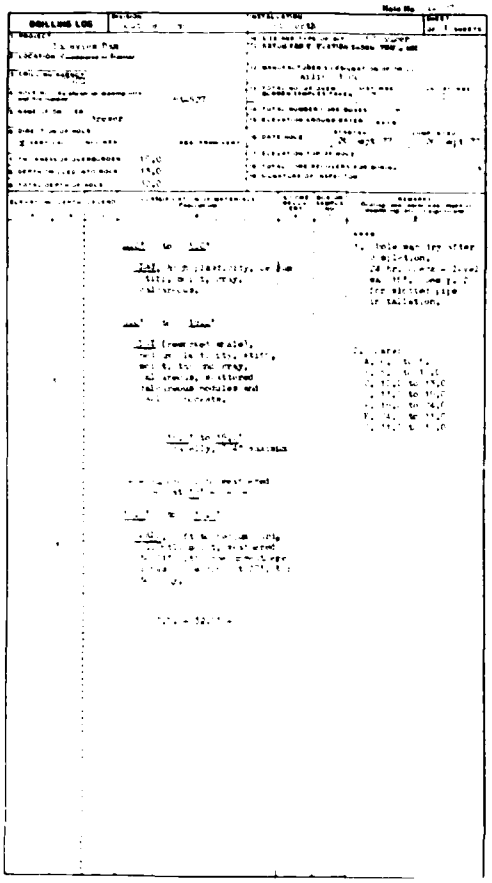
SHEET NO: [illegible] OF [illegible]

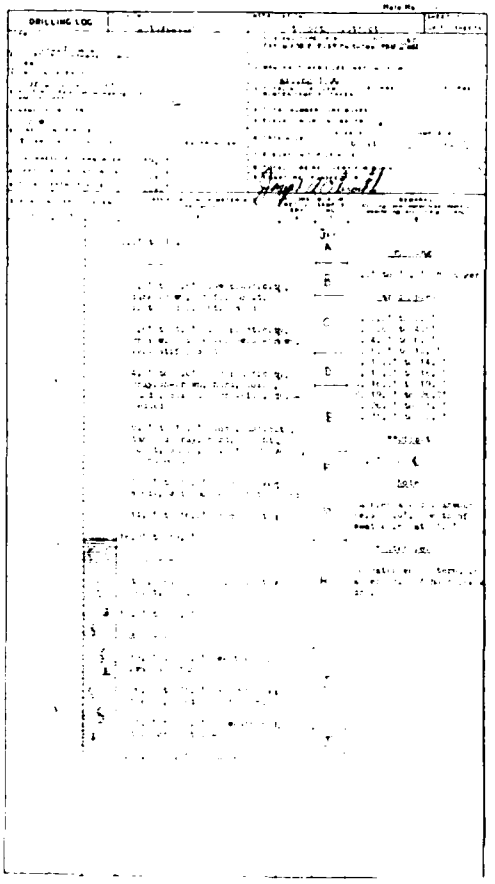
SEQUENCE NO: 66

TO ACCOMPANY FINAL FOUNDATION REPORT









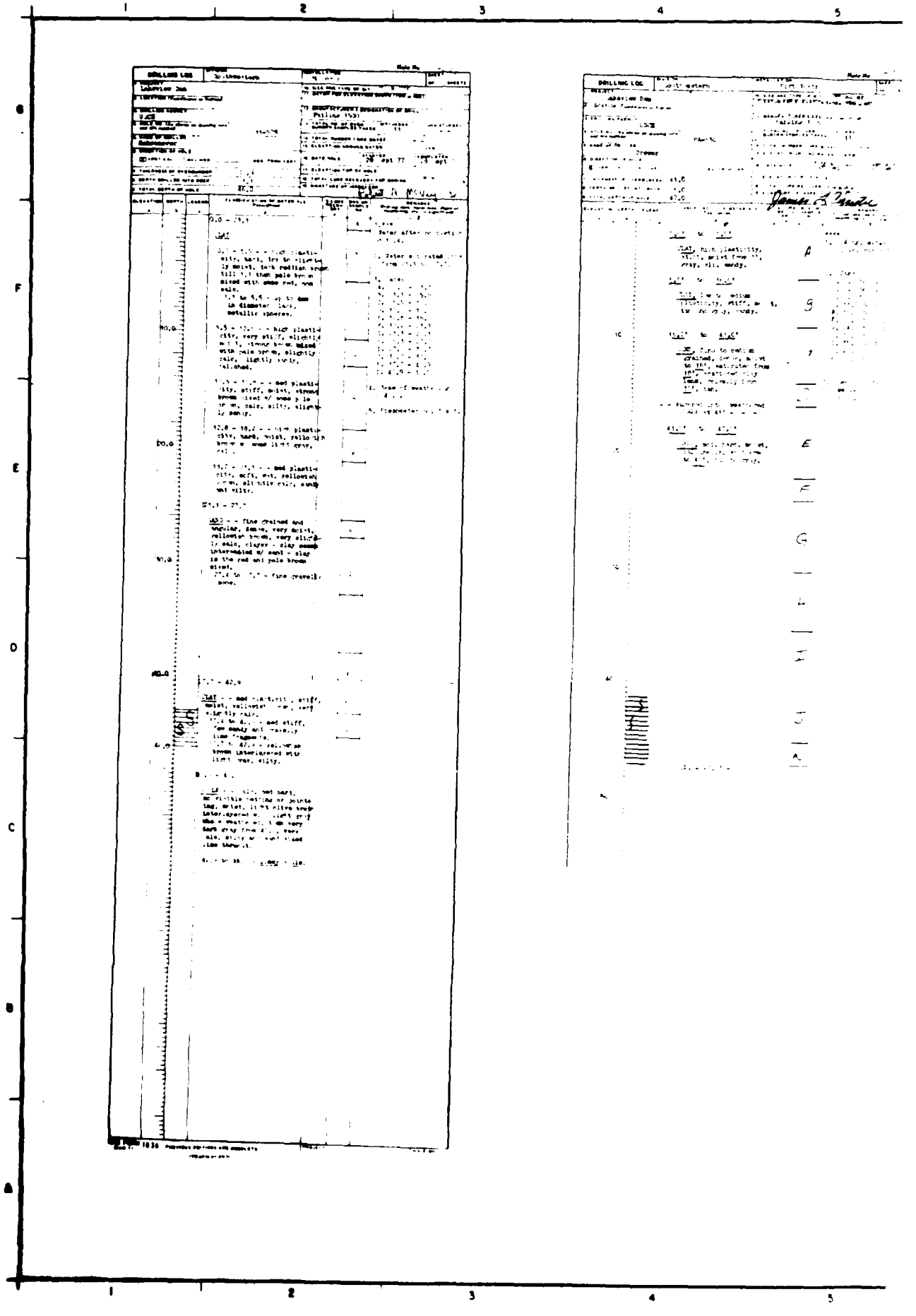
U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

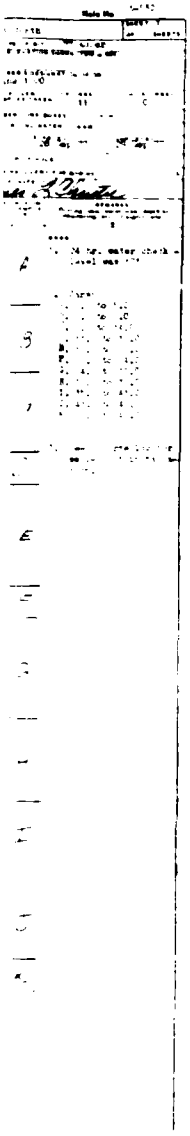
JOE POOL LAKE
[illegible] TEXAS

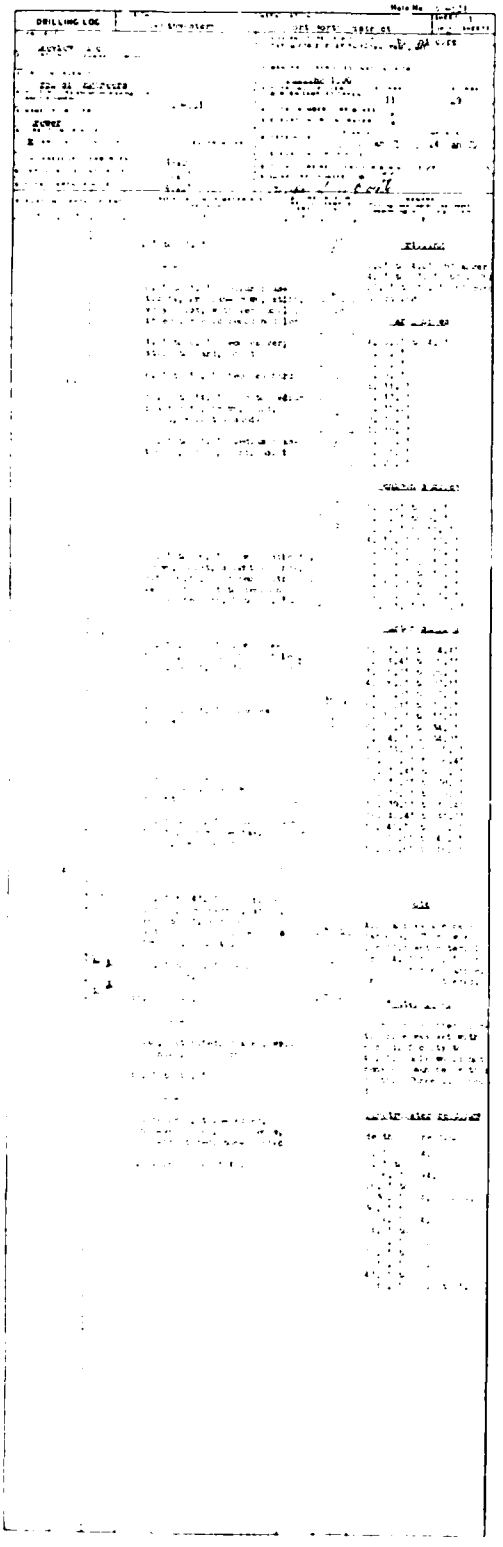
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

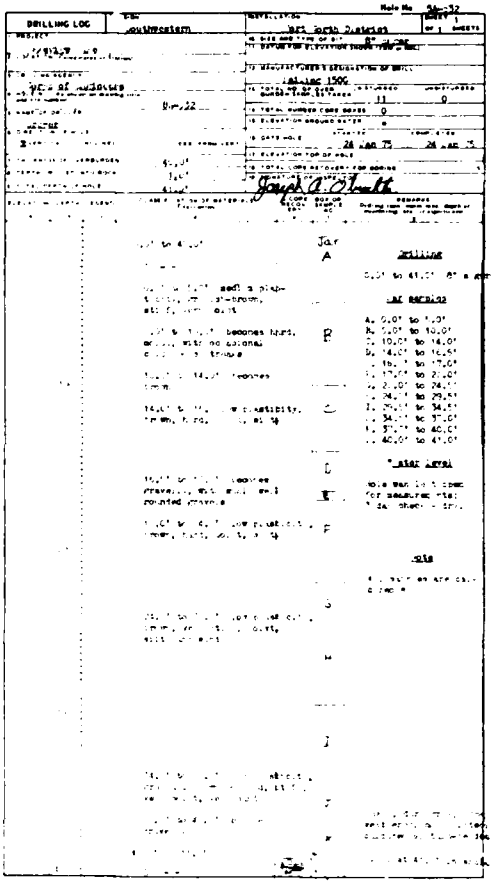
LOGS OF BORINGS
BA6C-525, BA-526, 527 AND BA-528

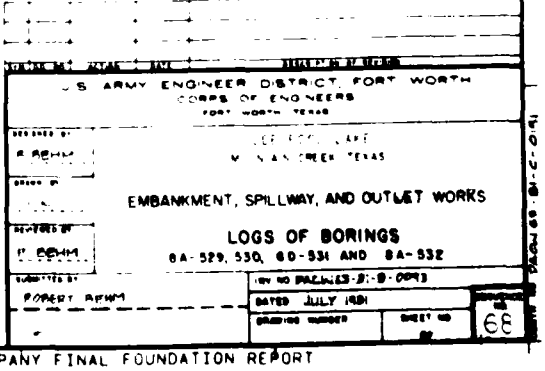
DESIGNED BY P PEHM
DRAWN BY
TRACED BY P PEHM
SUBMITTED BY R.P.E.H.T. P.P.E.H.M.
CONTR NO DACW63-B-B 0093
DATED JULY 1961
DRAWING NUMBER
SHEET NO OF
SEQUENCE NO 67

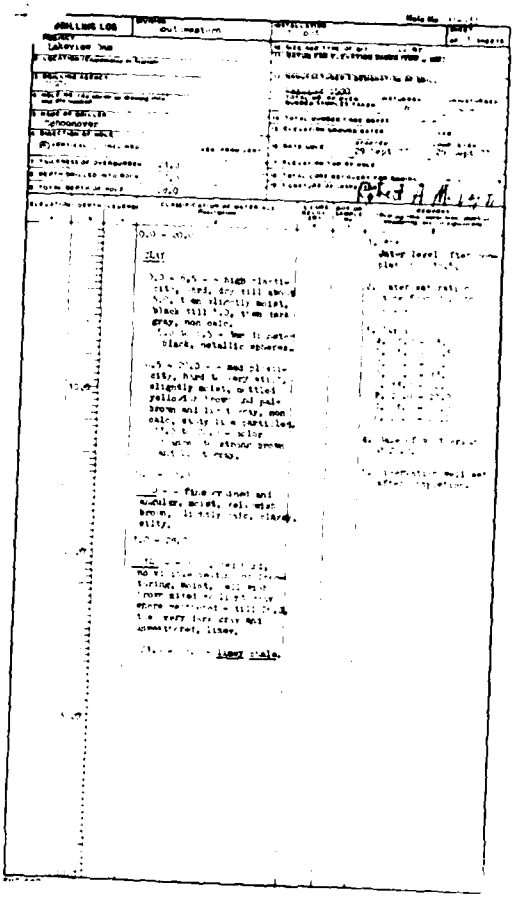


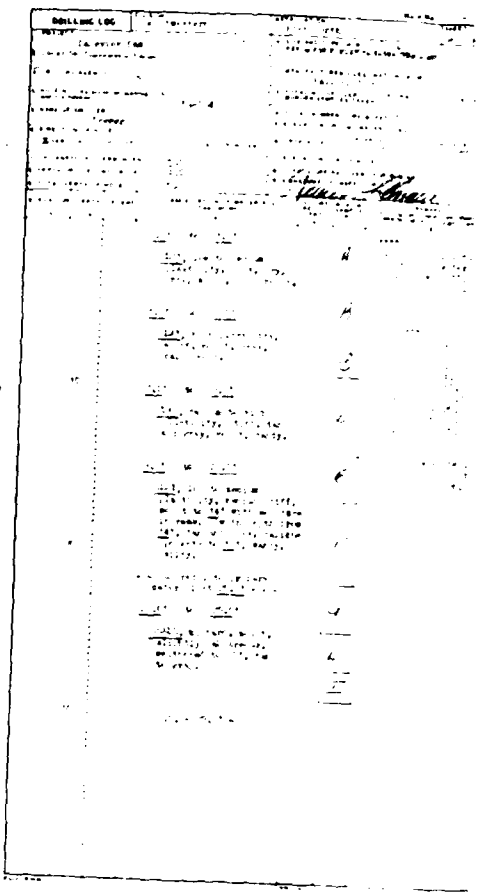


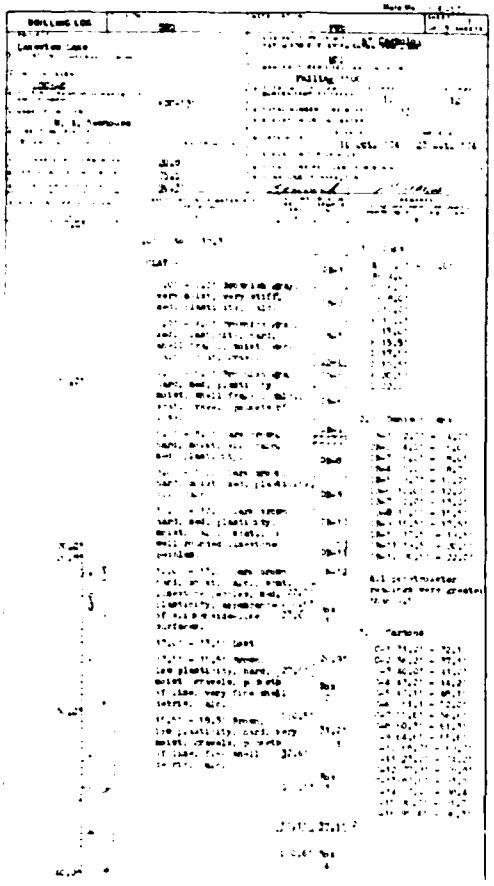


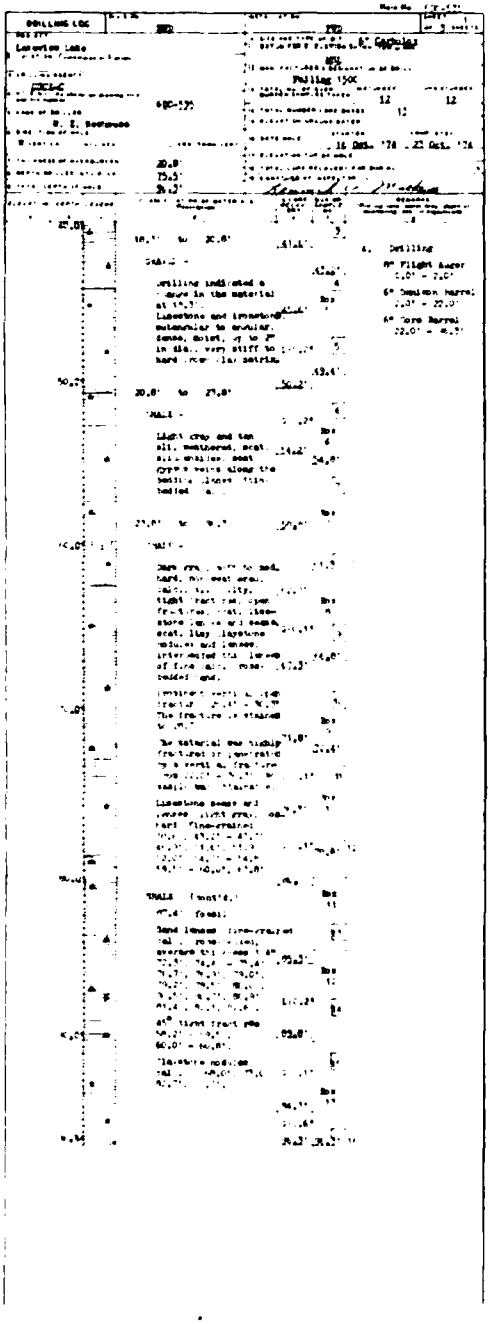



U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS
EMBANKMENT, SPILLWAY, AND OUTLET WORKS
LOGS OF BORINGS
BA-529, 530, 60-531 AND BA-532
DATED JULY 1961
68









U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

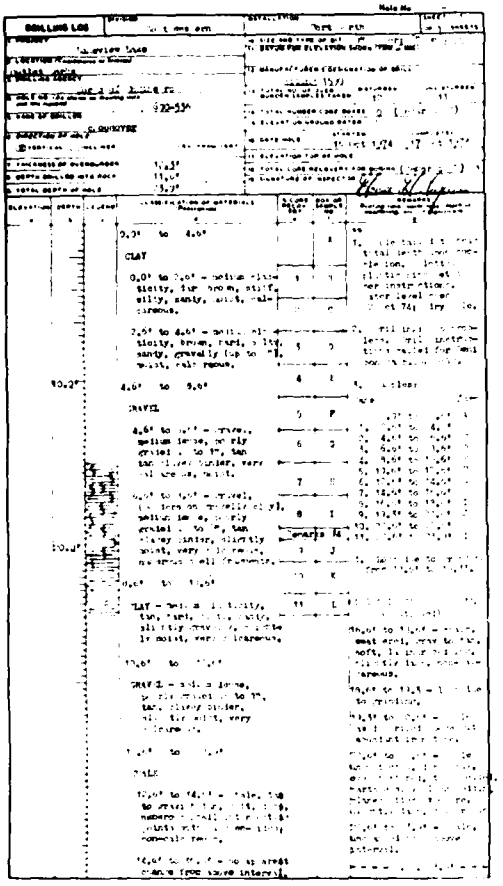
JOE POOL LAKE
[illegible] CREEK, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
RA 533,534 AND 6DC-535

DESIGNED BY: W. PELTIER
DRAWN BY:
REVIEWED BY: W. PELTIER
SUBMITTED BY: [illegible]

DATED: JULY 68
DRAWING NUMBER:
SHEET NO.: 69



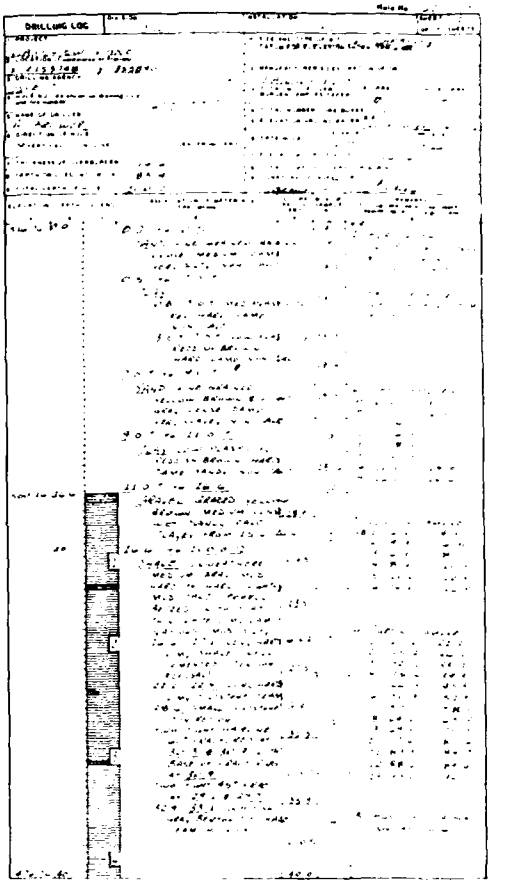
DRILLING LOG

0.0' to 4.6'

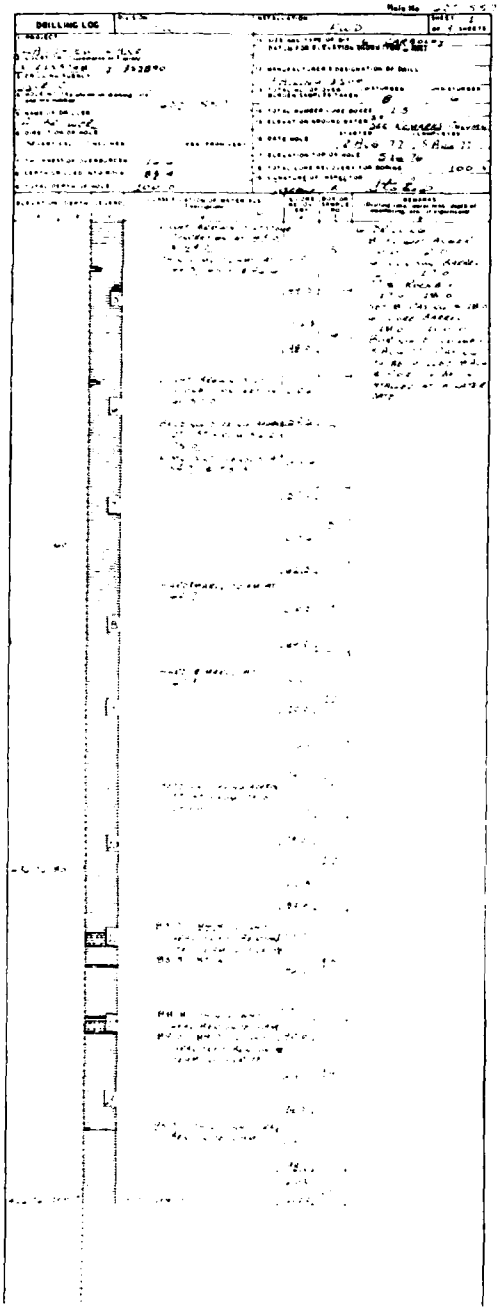
CLAY

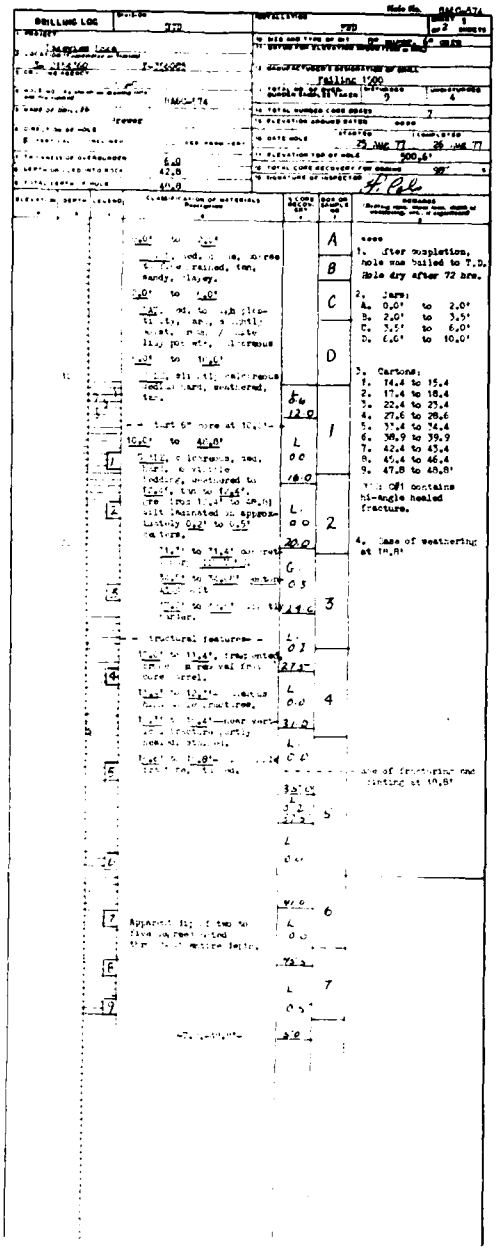
4.6' to 9.0'

GRAVEL



DRILLING LOG

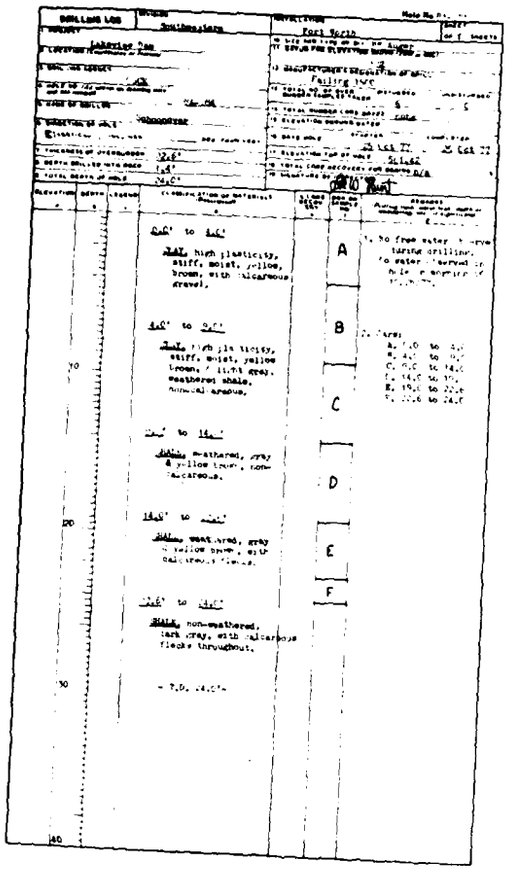




NOTE:
FOR LOCATION OF BORINGS SEE SEQ. ___ *___

U S ARMY ENGINEER DISTRICT, FORT WORTH CORPS OF ENGINEERS FORT WORTH TEXAS	
DESIGNED BY: R. BEHM	LOF POOL LAKE W[illegible] CREEK TEXAS
DRAWN BY:	EMBANKMENT, SPILLWAY, AND OUTLET WORKS
REVIEWED BY: R. BEHM	LOGS OF BORINGS 6DC-536,537 AND 8A6C-574
SUBMITTED BY: ROBERT BEHM	I&V NO. DACW63-81-B-0093 DATED JULY 1981 DRAWING NUMBER SHEET NO. OF DRAWING NO. 70

TO ACCOMPANY FINAL FOUNDATION REPORT



DRILLING LOG

Fort Worth

Failing Inc.

0.0' to 6.0'

CLAY, high plasticity, stiff, moist, yellow, brown, with calcareous gravel.

6.0' to 9.0'

Shale, high plasticity, stiff, moist, yellow brown, & light grey, weathered shale, numerous gravels.

9.0' to 14.0'

Shale, weathered, grey & yellow brown, non-calcareous.

14.0' to 17.0'

Shale, weathered, grey & yellow brown, with calcareous flecks.

17.0' to 19.0'

Shale, non-weathered, dark grey, with calcareous flecks throughout.

- T.D. 19.0'-

A

B

C

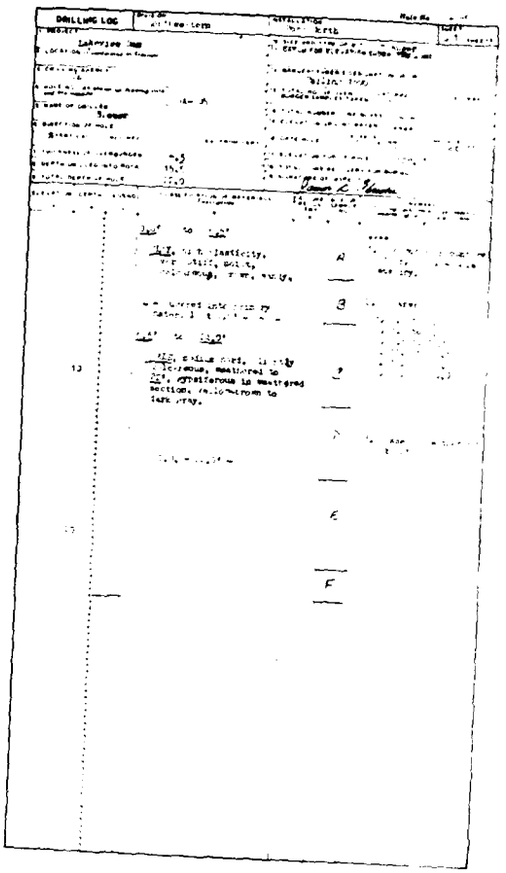
D

E

F

1. No free water observed during drilling.
No water observed in hole upon completion.

2. Cores:
A. 1.0 to 3.0'
B. 3.0' to 6.0'
C. 9.0' to 14.0'
D. 14.0' to 17.0'
E. 17.0' to 19.0'
F. 19.0 to 24.0'



DRILLING LOG

Fort Worth

Failing Inc.

0.0' to 3.0'

CLAY, high plasticity, stiff, moist, yellow brown, & light grey, weathered shale, numerous gravels.

3.0' to 13.2'

CLAY, extremely hard, highly calcareous, weathered to 12', argillaceous to unweathered section, yellow-brown to dark grey.

A

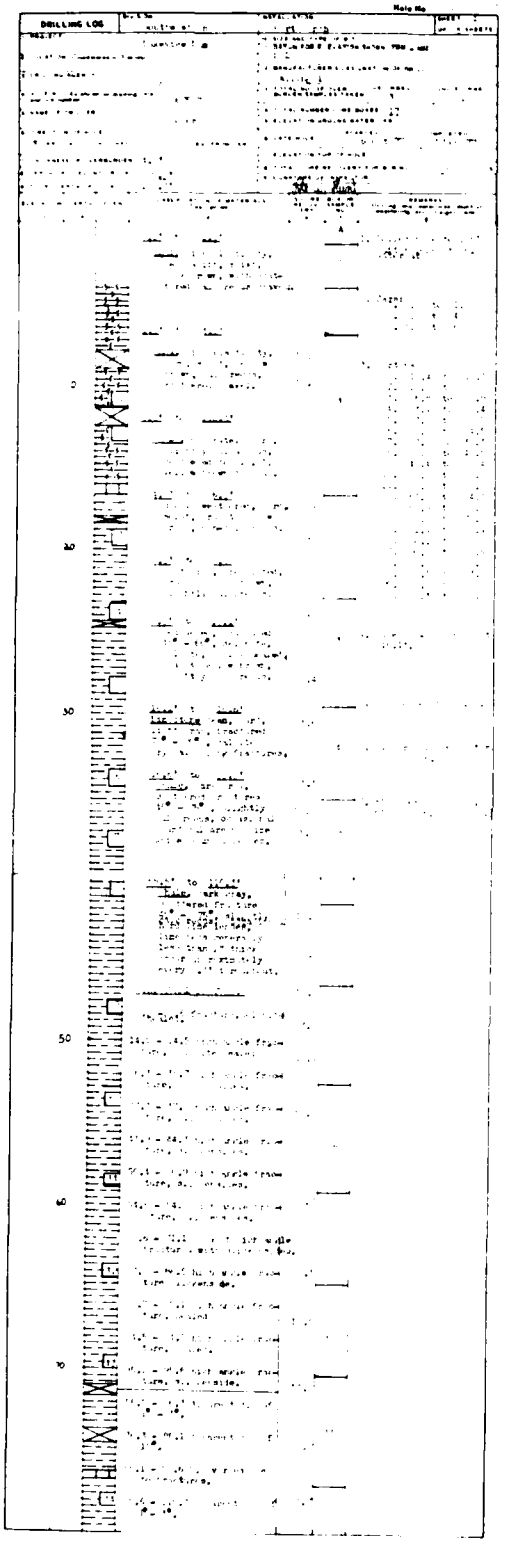
B

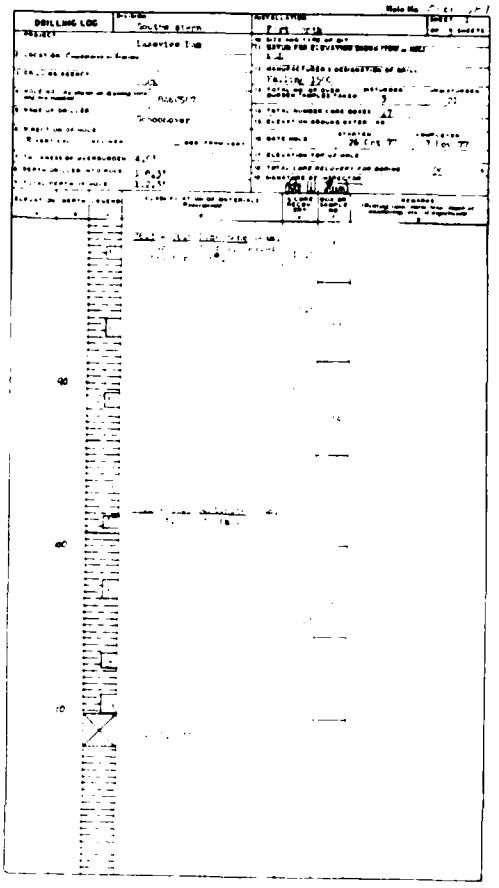
C

D

E

F





US ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

JOE POOL LAKE
[illegible] AREA, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

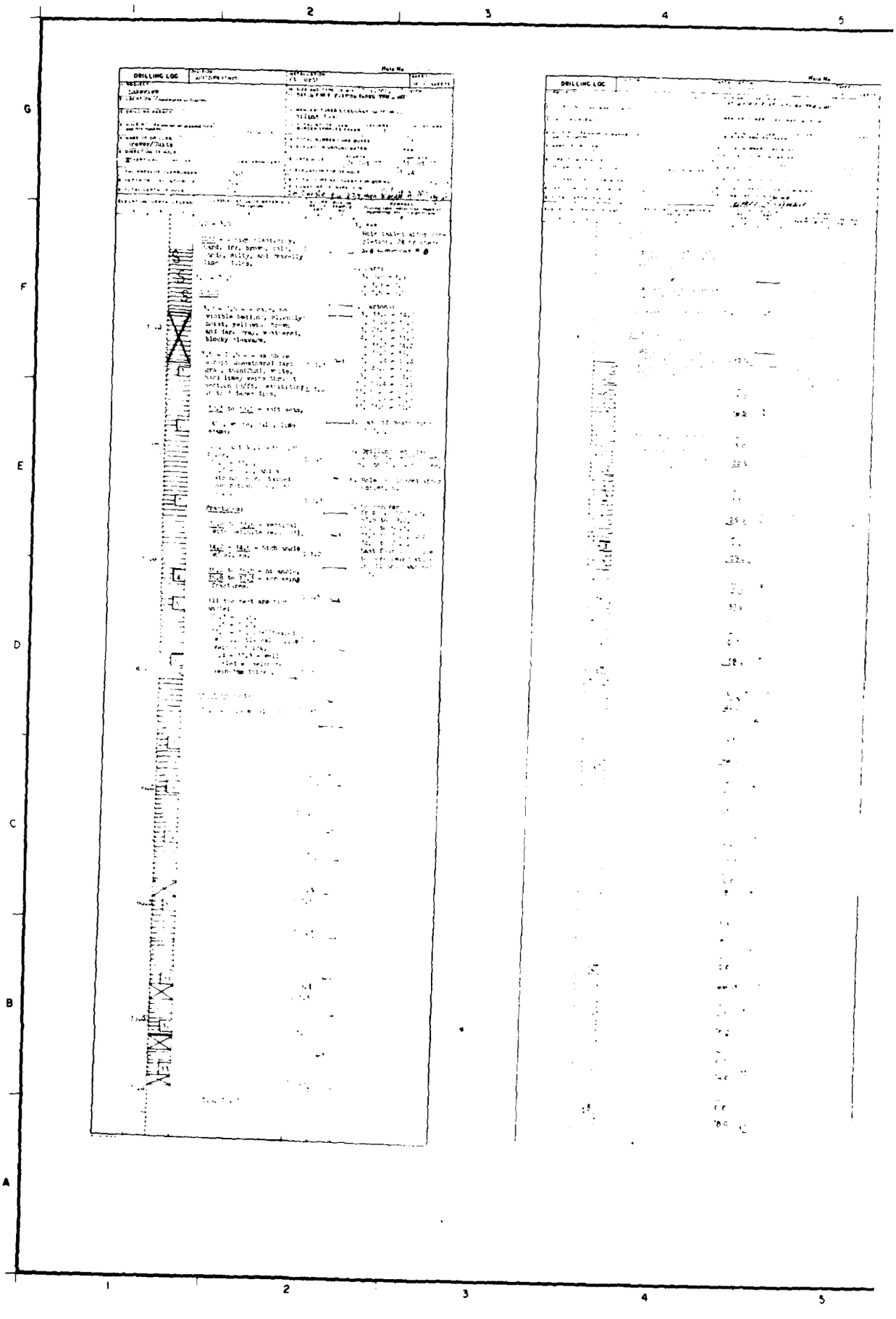
LOGS OF BORINGS
8A-584, 585 AND 8A6C-587

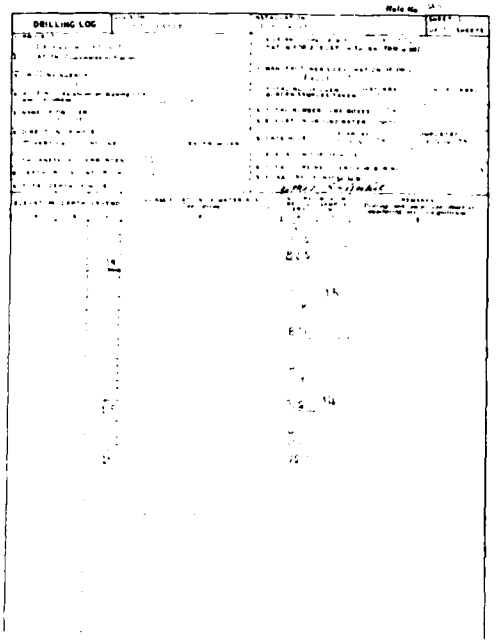
DESIGNED BY: W. BEHM
DRAWN BY:
REVIEWED BY:
SUBM. TO BY: ROBERT BEHM

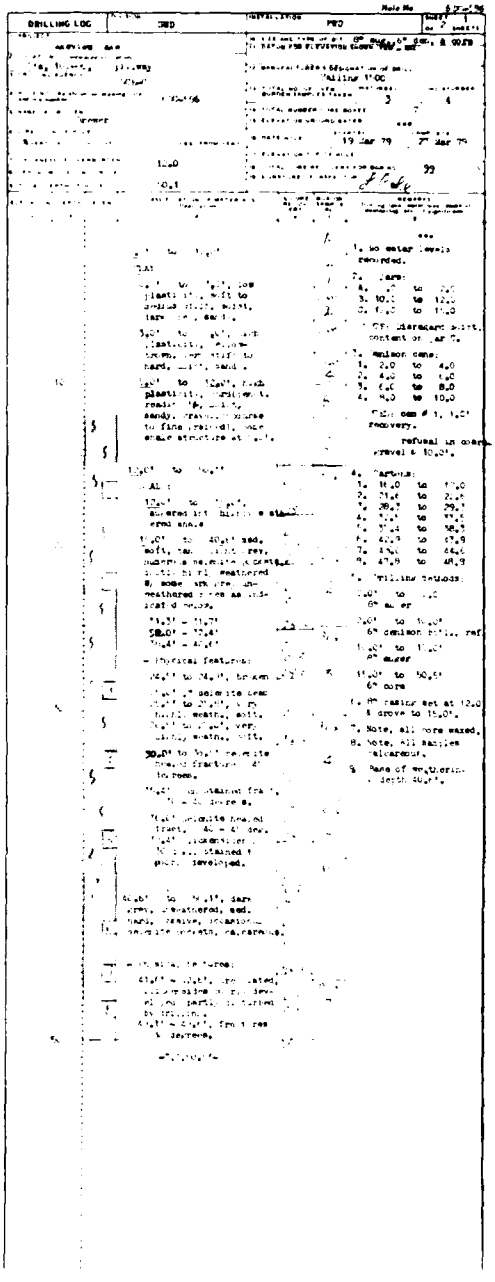
REV. NO. [illegible]
DATED JULY 68
DRAWING NUMBER
SHEET NO. OF
SEQUENCE NO. 71

FORM NO. DACW 63-68-C-0141

TO ACCOMPANY FINAL FOUNDATION REPORT


1
2
3
4
5
G
F
E
D
C
B
A
DRILLING LOG
DRILLING LOG





U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

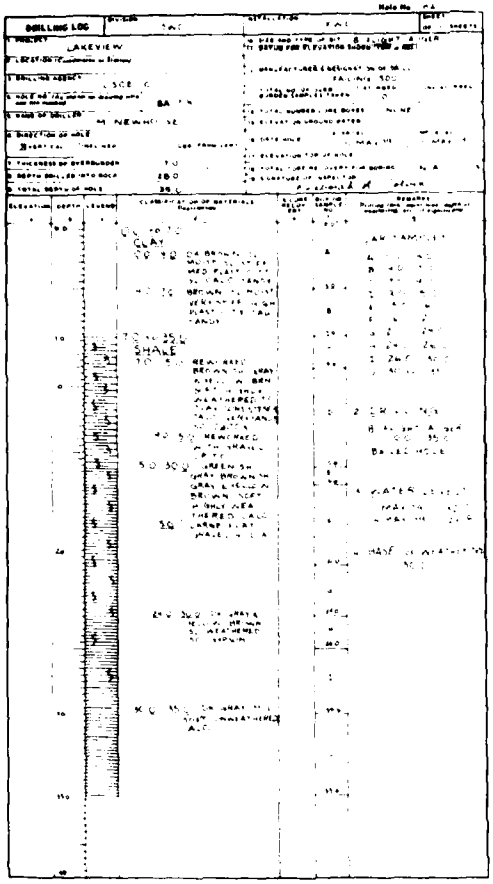
JOE POOL LAKE
TRINITY RIVER, TEXAS

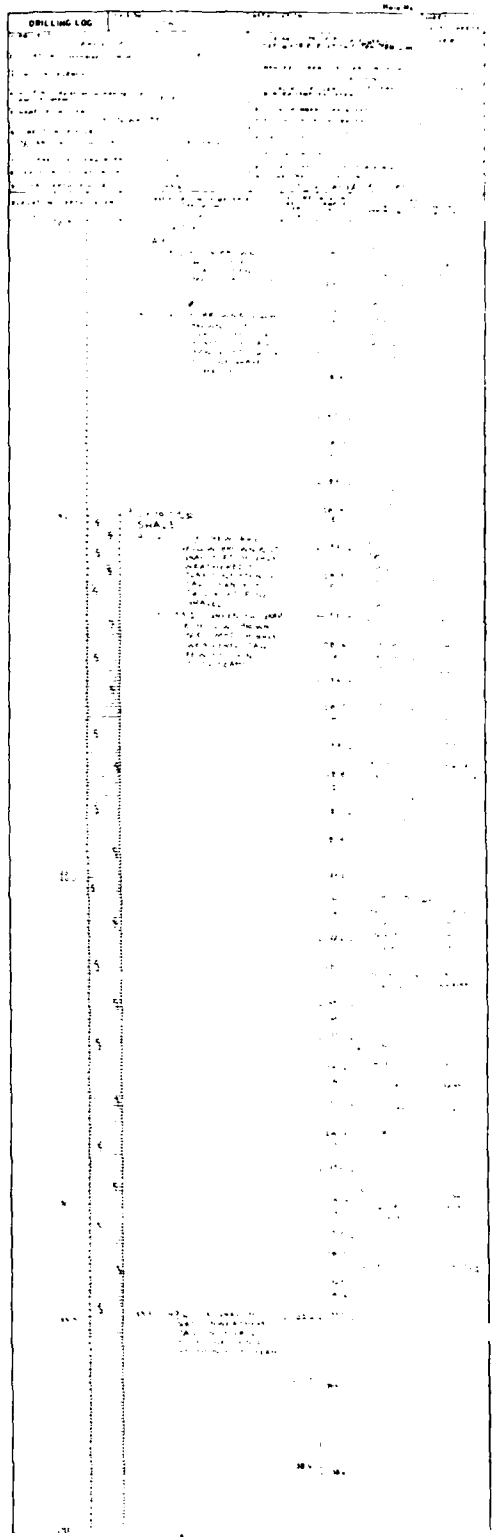
EMBANKMENT, SPILLWAY, AND OUTLET WORKS

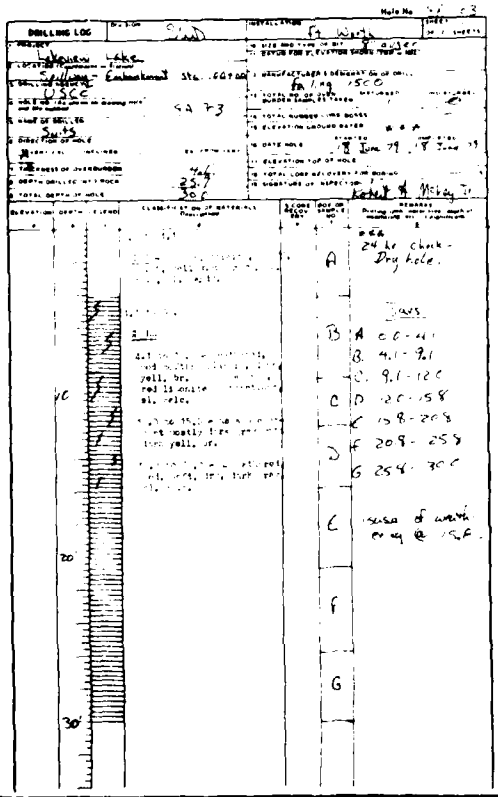
LOGS OF BORINGS
BA6C-588, 590 AND 6DC-596

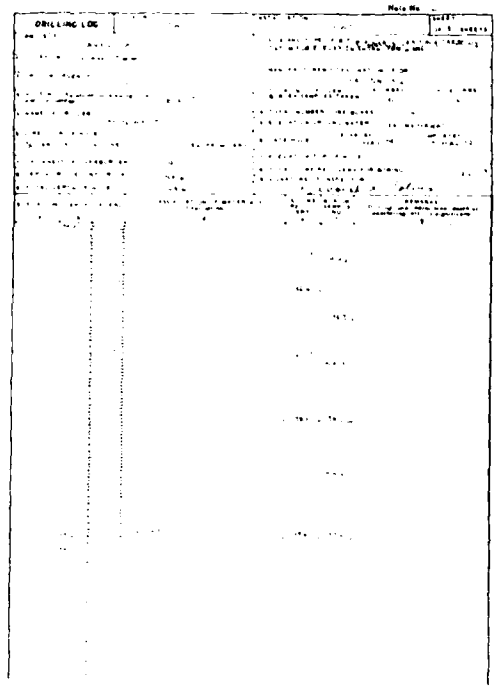
SEQUENCE NO 72

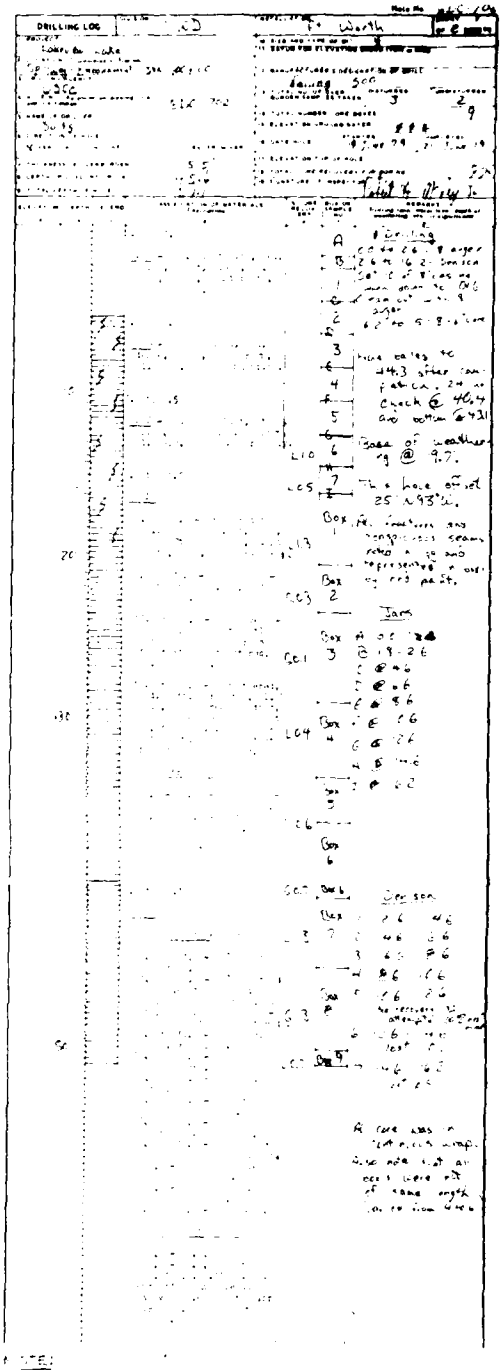
TO ACCOMPANY FINAL FOUNDATION REPORT


DRILLING LOG
LAKEVIEW
CLAY
SHALE


DRILLING LOG
SHALE


DRILLING LOG
Lakeview Lake
Embankment
USCC
Smith
24 hr check - Dry hole.
Days
A 0.0 - 4.0
B 4.1 - 9.0
C 9.1 - 12.0
D 12.0 - 15.8
E 15.8 - 20.8
F 20.9 - 25.9
G 25.9 - 30.0
Sieve & wash anal @ 15.5'.





FOR LOCATION OF BORINGS SEE SEQ. 4 & 5

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

DESIGNED BY: R. REHM
DRAWN BY:
REVIEWED BY: R. REHM
SUBMITTED BY: R. REHM

JOE POOL LAKE
[illegible] TRIBUTARY, TEXAS

EMBANKMENT, SPILLWAY, AND OUTLET WORKS

LOGS OF BORINGS
BA-700, BDC-701 AND BDC-702

CONTRACT NO. DACW63-81-C-0093
DATED JULY 1981
DRAWING NUMBER
SHEET NO. 73 OF

DACW63-81-C-0093

TO ACCOMPANY FINAL FOUNDATION REPORT

Figure 7. Excavation slope being prepared for backfill. Right (north) side of right abutment deep inspection trench. 27 August 1982.

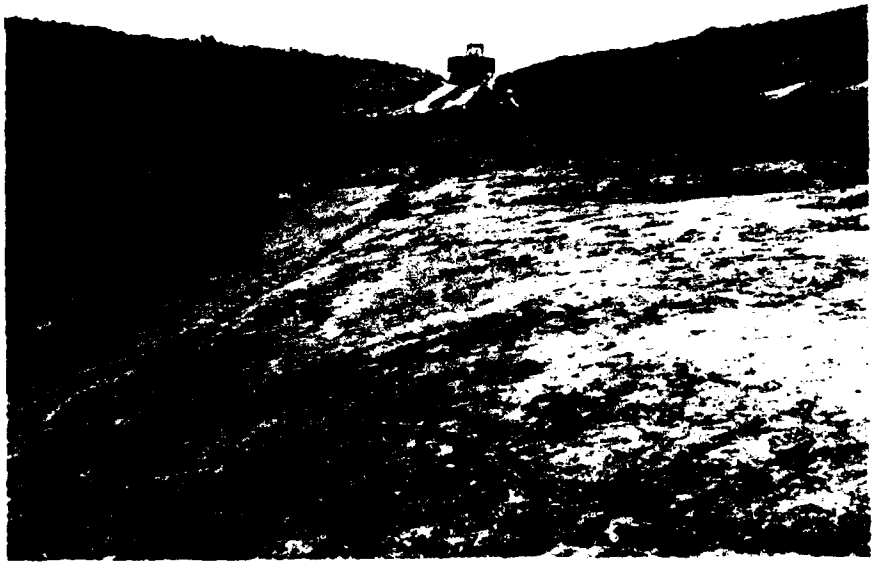


Figure 8. Excavation slope being prepared for backfill. Left (south) side of right abutment deep inspection trench. 31 August 1982.

Figure 9. Excavation slope being prepared for backfill. Left (south) side of right abutment deep inspection trench. 1 September 1982.

Figure 10. Excavation slope being prepared for backfill. Right (north) side of right abutment deep inspection trench. 2 September 1982.

Figure 11. Excavation slope being cut to final grade. 20 November 1982. Photo taken at ℄ right abutment deep inspection trench, station 10+50, looking west.

Figure 12. Excavation slope being cut to final grade. 20 November 1982. Photo taken near ℄ right abutment deep inspection trench, station 11+50, looking east.

Figure 13. Excavation in area of stream channel. (Embankment centerline station 54+50 to 61+00) January 1983. Note seepage areas in photo at center and lower right. Photo taken at embankment centerline station 54+00, looking west.

Figure 14. Excavation in area of stream channel. (Embankment centerline station 54+50 to 61+00) January 1983. Note seepage area left side of photo on downstream slope of trench. Photo taken at embankment centerline station 60+00, looking east.

Figure 15. Backfill compaction in area of stream channel, January 1983. Photo taken at embankment & station 60+00, looking south (upstream).

Figure 16. Embankment inspection trench ready for impervious backfill. 29 May 1980. Photo taken at station 36+00, looking east.

Figure 17. Embankment inspection trench ready for impervious backfill. 29 May 1980. Photo taken at station 43+00, looking west.

Figure 18. Embankment inspection trench ready for impervious backfill. 14 September 1984. Photo taken at station 51+50, looking east.

Figure 19. Embankment inspection trench ready for impervious backfill. 14 September 1984. Photo taken at station 53+50, looking east.

Figure 20. Embankment inspection trench being prepared for impervious backfill. 1 March 1983. Photo taken at station 61+00, looking east.

Figure 21. Embankment inspection trench ready for impervious backfill. 17 January 1983. Photo taken at station 65+00 looking at downstream slope.

Figure 22. Embankment inspection trench. Clayey gravel zone exposed in inspection trench along embankment centerline at station 71+CO.

Figure 23. Embankment inspection trench ready for impervious backfill. 28 April 1983. Photo taken at station 71+25, looking east.

Figure 24. Embankment inspection trench ready for impervious backfill. 26 October 1983. Photo taken at station 85+00, looking east.

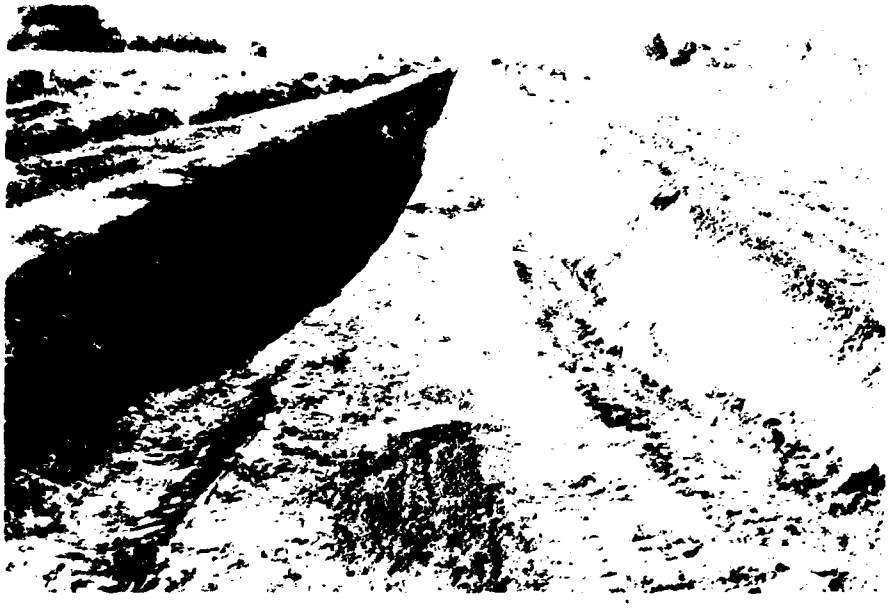


Figure 25. Embankment inspection trench ready for impervious backfill. 17 November 1983. Photo taken at station 88+00, looking west.

Figure 26. Embankment inspection trench ready for impervious backfill. 26 October 1983. Photo taken at station 88+50, looking east.

Figure 27. Embankment inspection trench ready for impervious backfill. 6 January 1981. Photo taken at station 95+00, looking west.

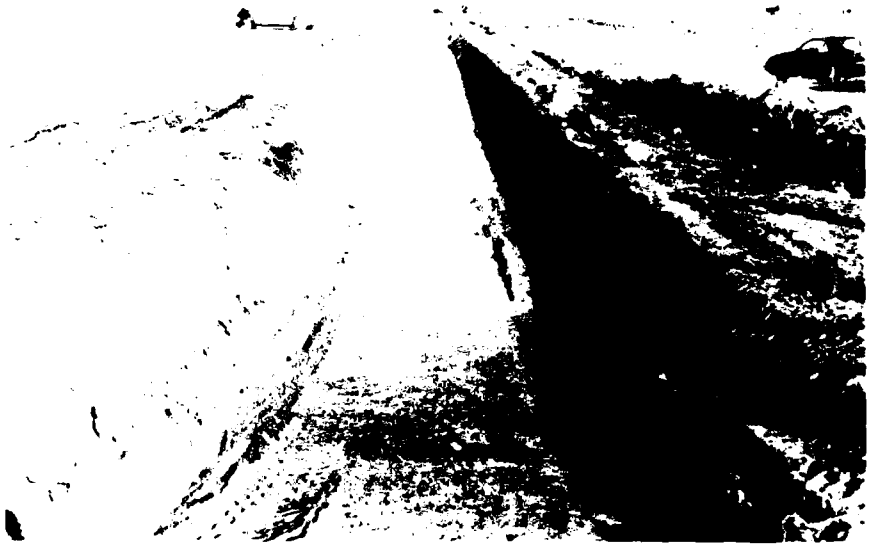


Figure 28. Embankment inspection trench ready for impervious backfill. 17 November 1983. Photo taken at station 95+50, looking east.

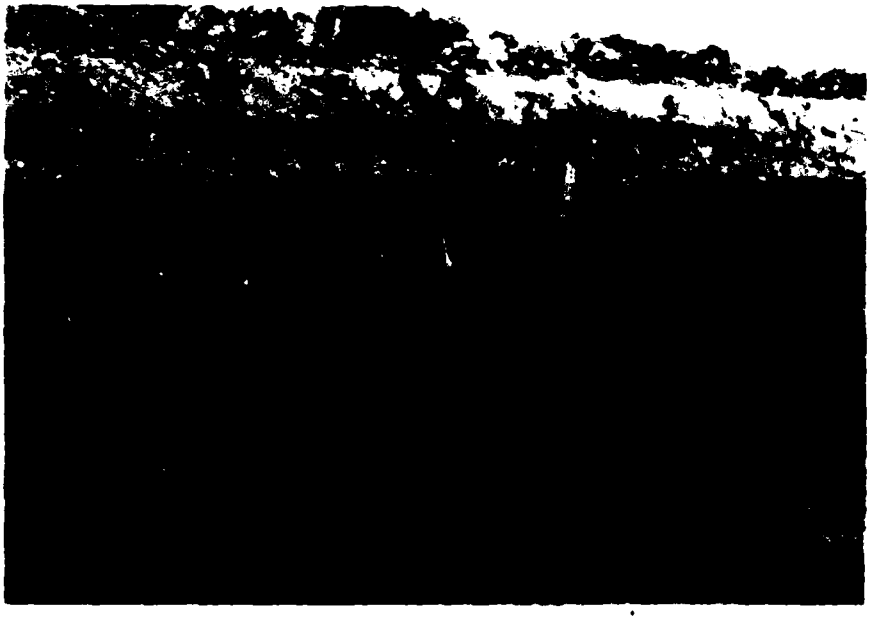


Figure 29. Embankment inspection trench. Contact between previously placed impervious fill and natural ground exposed in side of inspection trench.

Figure 30. Embankment inspection trench ready for impervious backfill. 10 December 1983. Photo taken at station 130+00, looking west.

Figure 31. Embankment inspection trench ready for impervious backfill. 10 December 1983. Photo taken at station 132+00, looking west.

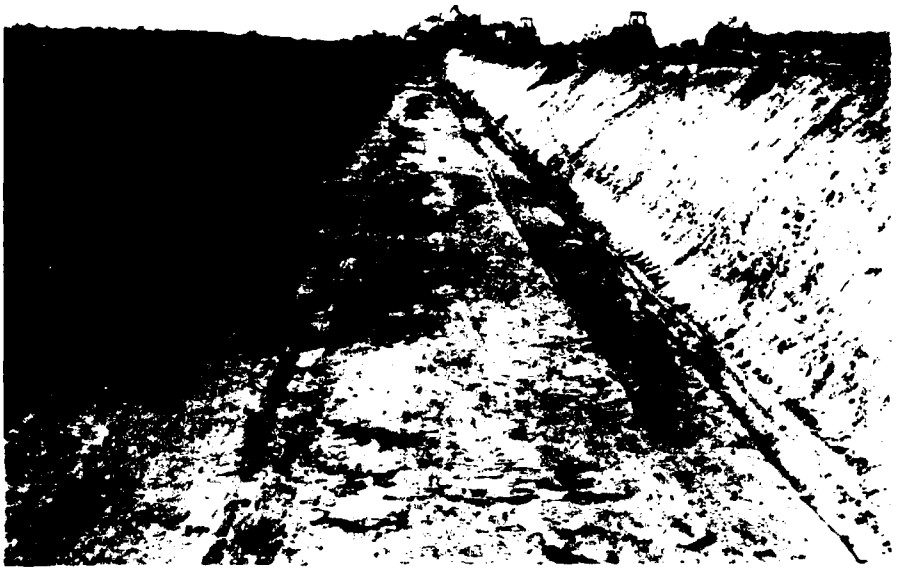


Figure 32. Embankment inspection trench ready for impervious backfill. 16 November 1983. Photo taken at station 147+00, looking west.

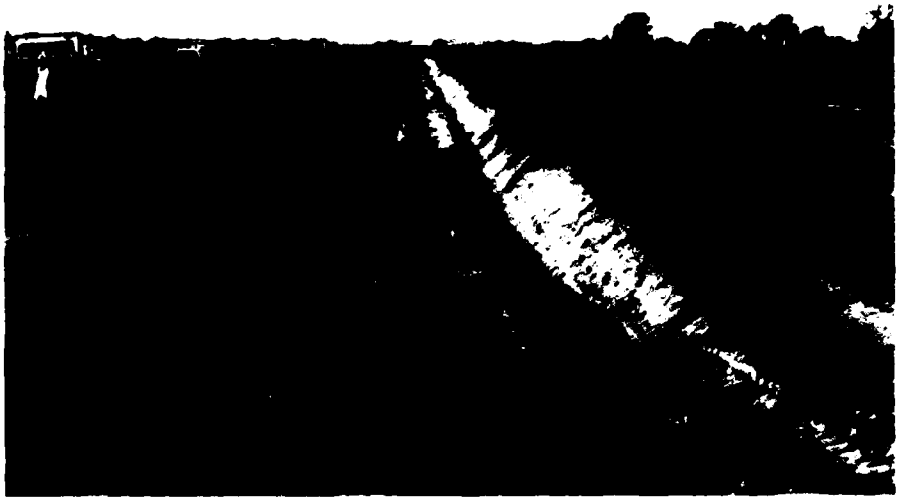


Figure 33. Embankment inspection trench ready for impervious backfill. 28 October 1983. Photo taken at station 150+50, looking west.

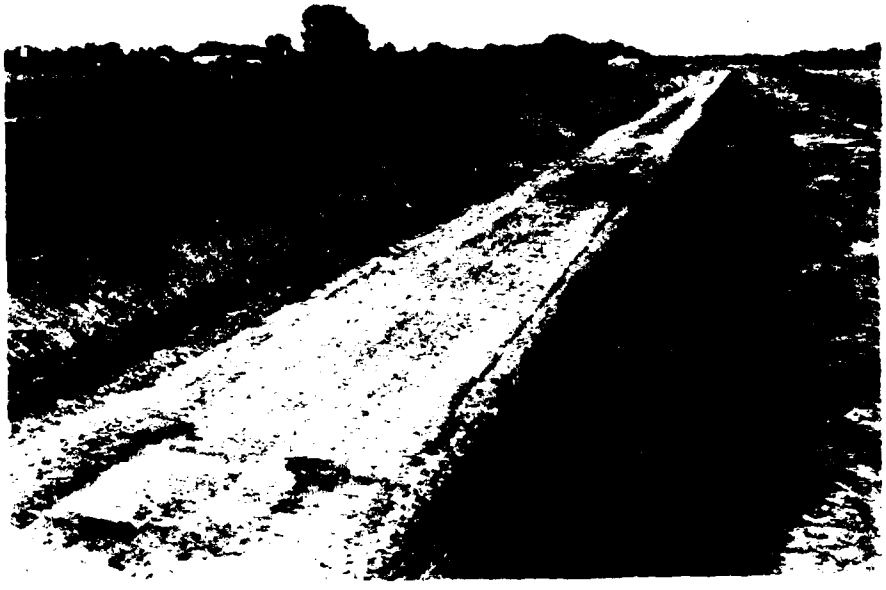


Figure 34. Embankment inspection trench ready for impervious backfill. 16 September 1983. Photo taken at station 172+00, looking east.

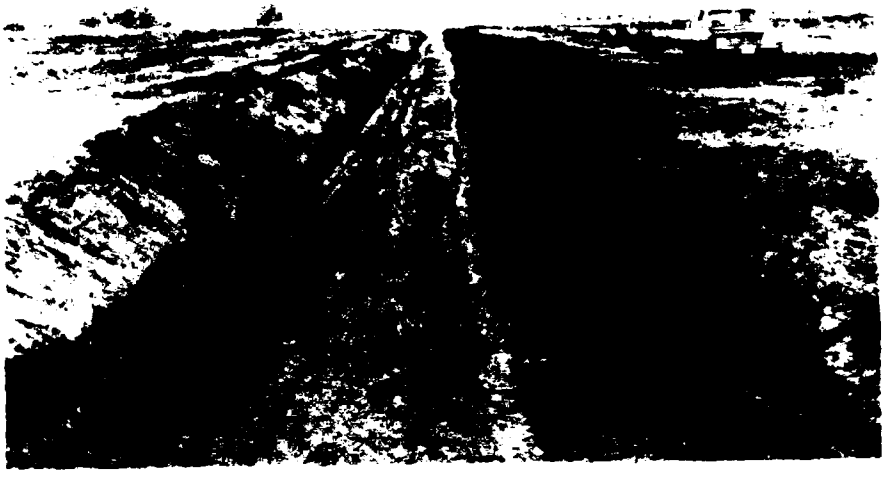


Figure 35. Embankment inspection trench ready for impervious backfill. 16 September 1986. Photo taken at station 186+00, looking east.

Figure 36. Embankment inspection trench ready for impervious backfill. 25 July 1983. Photo taken at station 191+00, looking west.

Figure 37. Embankment inspection trench ready for impervious backfill. 20 July 1983. Photo taken at station 209+50, looking east.

Figure 38. Embankment inspection trench ready for impervious backfill. 20 July 1983. Photo taken at station 210+00, looking west.

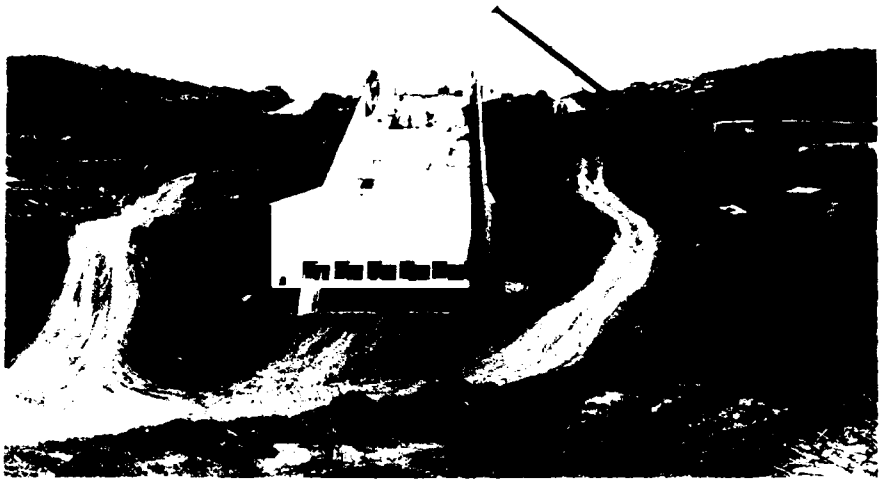


Figure 39. Spillway during construction. Spillway crest perched in the embankment.

Figure 40. Spillway foundation being prepared for backfill with sand filter blanket and protective slab. 9 April 1983.

Figure 41. Spillway wall footing excavation on right side of stilling basin ready for protective coating with pneumatic concrete. 6 April 1983. Spillway training wall footings in-place.

Figure 42. Spillway foundation being prepared for backfill with filter blanket and protective concrete. 5 April 1983.

Figure 43. Spillway foundation being prepared for backfill with filter blanket and protective concrete. 8 April 1983.

Figure 44. Spillway foundation ready for backfill with filter blanket and protective concrete. 9 April 1983.

Figure 45. Spillway foundation being prepared for backfill with filter blanket and protective concrete. 9 April 1983.

Figure 46. Spillway stilling basin foundation being prepared for backfill with filter blanket and protective concrete. 11 April 1983.

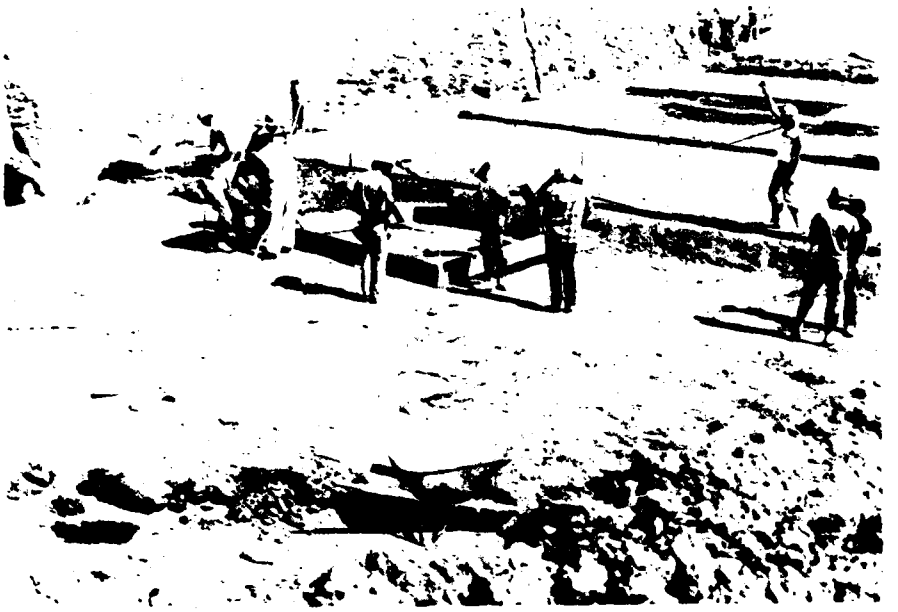


Figure 47. Spillway stilling basin foundation being prepared for backfill with filter blanket and protective concrete. 12 April 1983.

Figure 48. Spillway foundation. Key trench at spillway station 12+82 being prepared for backfill with reinforced concrete. 15 April 1983.

Figure 49. Spillway foundation. End sill excavation ready for protective coating with gunite.

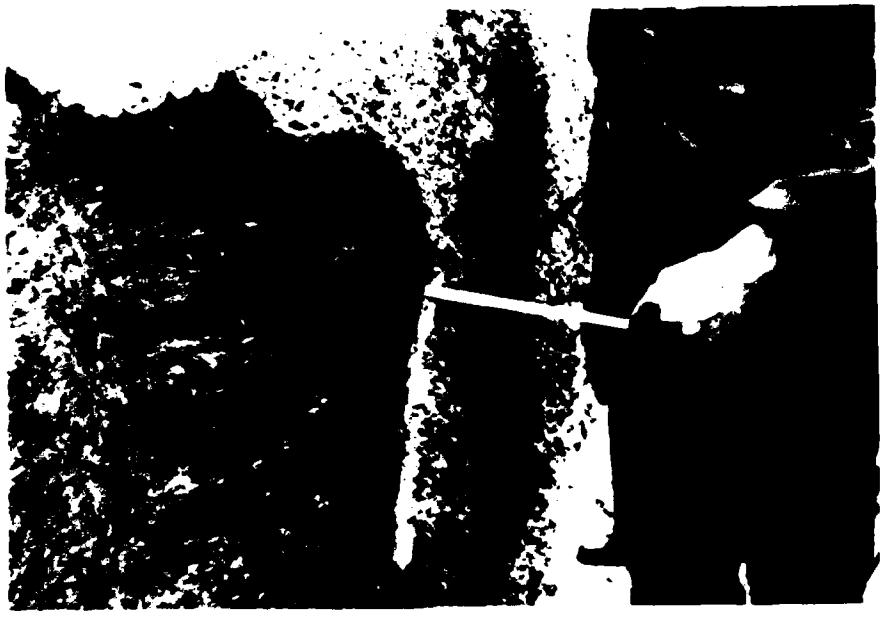


Figure 50. Spillway foundation - end sill trench. Void space observed behind pneumatic concrete resulted in deterioration of clay shale. Pneumatic concrete less than 1½-inch required thickness.

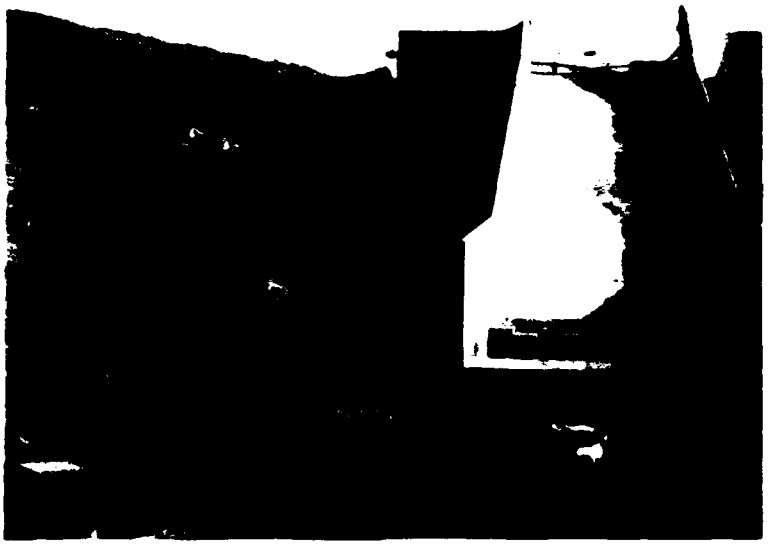


Figure 51. Excavation adjacent to right spillway training wall being prepared for backfill with select impervious fill. 3 March 1984.

Figure 52. Foundation adjacent to right spillway training wall ready for backfill with select impervious fill. 3 March 1984.

Figure 53. Excavation adjacent to right spillway training wall being prepared for backfill with select impervious fill. 18 April 1984.

Figure 54. Foundation adjacent to right spillway training wall being prepared for backfill with select impervious fill. 18 April 1984.

Figure 55. Foundation adjacent to left spillway training wall ready for backfill with select impervious fill. 7 February 1984.

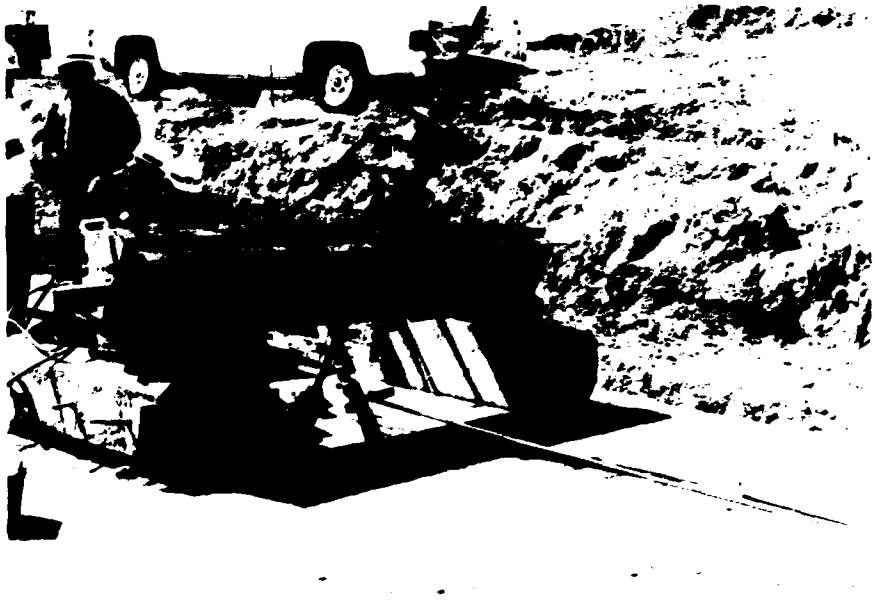


Figure 56. Foundation anchor pull-out test in progress. Test was conducted on 15 April 1983 at spillway station 11+70.

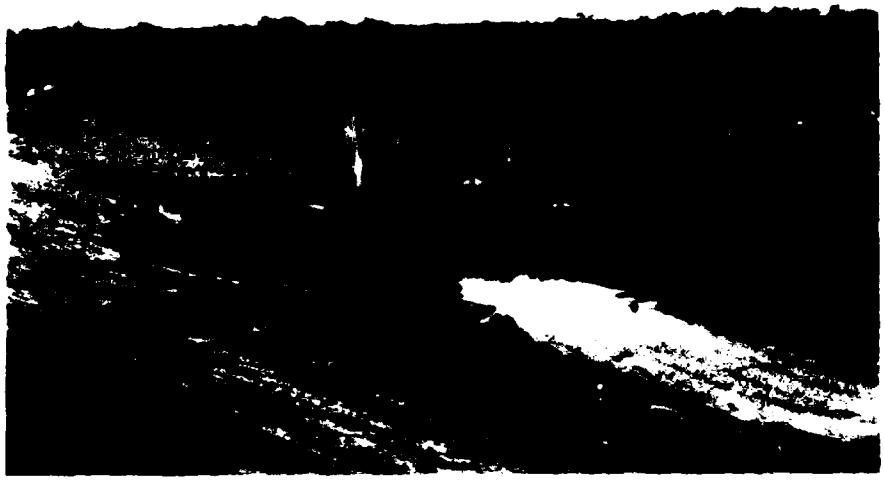


Figure 57. Drop structure constructed in diversion channel adjacent to spillway discharge channel. Photo looking east.

Figure 58. Drop structure foundation being prepared for backfill with protective concrete. 7 December 1982.

FINAL FOUNDATION REPORT

JOE POOL LAKE

APPENDIX I

FOUNDATION ANCHOR PULL-OUT TEST DATA

Joe Pool Spillway - Anchor Pull-Out Test - 15 April 1983

Location of Test: Spillway Station 11+70 offset 20 ft left of centerline.

Description of Anchor: No. 11 rebar grouted in 6-inch diameter hole, 15 feet deep, at 59° from horizontal.

Results of Test:

			GAGE NO. 1		GAGE NO. 2	
PSI	TONS	TIME	READING	ACCUM MOVEMENT(IN.)	READING	ACCUM MOVEMENT(IN.)
0	0	1029	0.114	0	0.137	0
467	5	1029	0.129	0.015	0.152	0.015
467	5	1034	0.125	0.011	0.149	0.012
934	10	1035	0.151	0.037	0.177	0.040
934	10	1040	0.152	0.038	0.176	0.039
1457	15.6	1041	0.187	0.073	0.212	0.075
1457	15.6	1101	0.202	0.088	0.226	0.089
0	0	1101	0.129	0.015	0.153	0.016
0	0	1106	0.128	0.014	0.152	0.015
467	5	1106	0.163	0.049	0.189	0.052
467	5	1111	0.165	0.051	0.189	0.052
934	10	1111	0.186	0.072	0.210	0.073
934	10	1116	0.185	0.071	0.210	0.073
1401	15	1117	0.204	0.090	0.228	0.091
1401	15	1126	0.211	0.097	0.236	0.099
1868	20	1127	0.236	0.122	0.262	0.125
1868	20	1132	0.241	0.127	0.266	0.129
2335	25	1132	0.269	0.155	0.296	0.159
2335	25	1137	0.281	0.167	0.307	0.170
2802	30	1138	0.330	0.216	0.358	0.221
2802	30	1143	0.350	0.236	0.378	0.241
3269	35	1144	0.396	0.282	0.422	0.285
Crack appeared in work slab						
3269	35	1150	0.426	0.312	0.452	0.315
3736	40	1151	0.500	0.386	0.526	0.389
3736	40	1156	0.543	0.429	0.570	0.433
4050	43.4	1157	0.770	0.656	0.793	0.656
4050	43.4	1200	0.778	0.664	0.802	0.665
2802	30	1201	0.745	0.631	0.768	0.631
2802	30	1206	0.746	0.632	0.770	0.633
1401	15	1206	0.684	0.570	0.706	0.569
1401	15	1211	0.683	0.569	0.704	0.567
0	0	1211	0.597	0.483	0.619	0.482
0	0	1214	0.574	0.460	0.597	0.460

END OF TEST

Joe Pool Drop Structure - Anchor Pull-Out Test - 17 January 1983

Location of Test: Drop structure Station 8+06.5 offset 12 ft left of centerline.

Description of Anchor: No. 11 rebar grouted in 6-inch diameter hole, 15 feet deep, at 60° from horizontal.

Results of Test:

PSI	TONS	TIME	GAGE READING	ACCUM MOVEMENT(IN.)
0	0	1250	0	0
467	5	1251	0.012	0.012
934	10	1256	0.024	0.024
1457	15.6	1301	0.041	0.041
1457	15.6	1316	0.043	0.043
1868	20	1316	0.054	0.054
1868	20	1321	0.056	0.056
2802	30	1326	0.079	0.079
3269	35	1331	0.090	0.090
3736	40	1346	0.101	0.101
3736	40	1351	0.104	0.104
4203	45	1351	0.119	0.119
4203	45	1406	0.129	0.129
2802	30	1406	0.111	0.111
1457	15.6	1411	0.087	0.087
0	0	1426	0.050	0.050
0	0	1435	0.046	0.046
Reset gage to 0.000				
467	5	1435	0.011	0.057
467	5	1440	0.013	0.059
934	10	1440	0.025	0.071
934	10	1455	0.027	0.073
1457	15	1455	0.048	0.094
1457	15	1507	0.052	0.098
0	0	1507	0.009	0.055
1457	15	1508	0.049	0.095
1457	15	1509	0.051	0.097
2803	30	1509	0.111	0.157
4204	45	1510	0.180	0.226

END OF TEST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