GEOTECHNICAL INVESTIGATION
ORLEANS LEVEE DISTRICT
PONTCHARTRAIN BEACH FLOODWALLS AND LEVEES
NEW ORLEANS, LOUISIANA

FOR
BOARD OF LEVEE COMMISSIONERS
OF THE ORLEANS LEVEE DISTRICT

URS ENGINEERS
CONSULTING ENGINEERS
METAIRIE, LOUISIANA

By
Eustis Engineering Company
Metairie, Louisiana

6 December 1985

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6 December 1985

URS Engineers
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Attention Mr. Bruce Adams

Gentlemen:

Draft of Report
Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

Transmitted is a draft of our engineering report for a geotechnical investigation for the subject project.

Following your review and comments, we will issue the final report.

Yours very truly,

EUSTIS ENGINEERING COMPANY

By Lloyd A. Held, Jr.
Lloyd A. Held, Jr.

LAH:bh

Enclosures

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TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION

ORLEANS LEVEE DISTRICT

PONTCHARTRAIN BEACH FLOODWALLS AND LEVEES

NEW ORLEANS, LOUISIANA

INTRODUCTION

1. This report contains the results of a geotechnical investigation performed for the proposed Pontchartrain Beach floodwalls and levees located at Pontchartrain Beach in New Orleans, Louisiana. Authorization to proceed with the investigation was received on 20 November 1985 from Mr. C. E. Bailey, Chief Engineer, The Board of Levee Commissioners of the Orleans Levee District. URS Engineers, Metairie, Louisiana, are the consulting engineers for the project.

2. This report has been prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of The Board of Levee Commissioners of the Orleans Levee District and their representatives for specific application to the subject site. In the event that any changes in the nature, design or location of the proposed levees or floodwalls are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing.

3. The analyses and recommendations contained in this report are based in part on data obtained from the soil borings. The nature and extent of variations in the subsoil conditions may not become evident until construction. If variations then appear, it will be necessary to re-evaluate the recommendations contained in this report.

SCOPE

4. The scope of the investigation included the drilling of soil borings to determine subsoil conditions and stratification and to obtain samples of the various strata encountered. In situ Standard Penetration Tests and soil mechanics laboratory tests performed on undisturbed samples obtained from the borings were used to evaluate the physical properties of the subsoils. Engineering analyses, based on the boring and laboratory tests results, were made to determine allowable pile load capacities, slope stability analyses, sheetpile analyses, seepage analyses, and estimates of settlement. Additionally, the scope included the installation of piezometers to evaluate underseepage potential in the area.

SOIL BORINGS

5. A total of ten (10) undisturbed soil test borings were drilled during the period 15-22 November 1985 at the locations shown on Figure 1. Borings 1, 3, 4, 7, 8 and 10 were 3-in. diameter borings drilled to a depth of 55 feet below the existing ground surface. Borings 2, 5 and 9 were drilled to a depth of 80 feet below the existing ground surface at the proposed gate locations. Borings 2 and 9 were 3-in. diameter borings and Boring 5 was a 5-in. diameter boring. Boring 6 was drilled to a depth of 100 feet below the existing ground surface and was a 5-in. diameter boring required by the U.S. Army Corps of Engineers. Samples obtained from this boring were forwarded to the New Orleans District, U.S. Army Corps of Engineers for their evaluation. The results of the soil borings, whose samples were retained by Eustis Engineering Company, are shown in both tabular and graphical form on the detailed descriptive logs of the borings shown as Figures 2 through 10.

6. Cohesive and semi-cohesive samples from Boring 6 were obtained using a 5-in. diameter steel tube piston-type sampler.

The steel tubes were removed from the sampler, sealed and transported to the New Orleans District, U.S. Army Corps of Engineers. Cohesive and semi-cohesive samples obtained from the remaining borings were sampled using 3-in. or 5-in. diameter Shelby tube sampling barrels. Samples were obtained at close intervals or at changes in stratum. Samples were extruded from the sampling barrel, inspected and visually classified by Eustis Engineering Company's soil technician. Representative samples were placed in moisture proof containers and sealed for preservation.

7. Cohesionless soils, when encountered, were sampled during the performance of in situ Standard Penetration Tests. This test consists of driving a 2-in. diameter sampler one foot into the soil, after it is first seated 6 inches, using blows of a 140-lb weight dropped 30 inches. The number of blows required to drive the sampler one foot is recorded and is indicative of the relative density or approximate consistency of the subsoils encountered. The results of the Standard Penetration Test are recorded on the individual boring logs. Representative samples were placed in glass jars for preservation. The Boring 6 samples and field log with the results of the Standard Penetration Tests were given to the New Orleans District.

PIEZOMETER INSTALLATIONS

8. Piezometers have been installed in near surface sand strata at the depths and locations indicated in the tabulation below.

Piezometer	Location	Depth Below Existing Ground Surface
P-1	12' west of Boring 9	11'
P-2	8' west of Boring 7	16'
P-3	5' east of Boring 4	11'
P-4	12' northwest of Boring 2	11'

Details of a typical piezometer installation are shown on Figure 11. Piezometers should be sounded on a periodic basis in order to establish any correlation between stages in Lake Pontchartrain and piezometric heads in the near surface sand strata. Initial readings obtained subsequent to development of the piezometers are contained in a later paragraph of this report.

LABORATORY TESTS

9. Soil mechanics laboratory tests consisting of natural water content, unit weight and either unconfined compression shear or unconsolidated undrained triaxial compression shear were performed on undisturbed samples obtained from the borings. In addition, Atterberg liquid and plastic limits and grain size analyses were performed on representative samples obtained from the borings. The results of the laboratory tests are shown in tabular form on Figures 12 through 25.

10. Consolidation tests were performed on two samples obtained from Boring 5 in order to evaluate the consolidation characteristics and stress history of the compressible foundation strata. Results of these tests are shown on Figures 26 and 27.

11. Additional soil mechanics laboratory tests performed by the U.S. Army Corps of Engineers were performed for previous investigations within the project area. Tests considered pertinent to this investigation are shown in Appendix A.

DESCRIPTION OF SUBSOIL CONDITIONS

12. A topographic survey supplied to Eustis Engineering Company by URS Engineers indicates that the existing elevations generally vary between 5.0 and 7.0 NGVD. For purposes of this investigation, the existing ground surface is assumed to be at el 6.0.

13. Near surface fill materials at Borings 1 through 5 and Boring 10 are generally comprised of medium stiff to stiff gray and tan clay and silty clay with sand and shells and generally encountered to depths varying between el 3 and el 2. At Boring 5, this near surface fill material is underlain by a layer of soft gray clay with sand pockets and shell fragments to el -5.0. Beneath these materials and from the ground surface at Borings 7, 8 and 9, strata of very loose to medium dense and medium compact gray sand, silty sand, sandy silt, clayey sand and clayey silt with clay layers and shell fragments are interbedded to depths varying between el -20.0 and el -26.0. At these elevations and continuing to elevations varying between el -30 and el -35 are strata of soft to medium stiff gray clay and sandy clay with sand layers and shell fragments. This clay stratum is not encountered at Boring 8. Beneath this clay stratum and from approximately el -25.0 at Boring 8 continuing to depths ranging between el -41 and el -46 are strata of very loose to medium dense gray silty sand, clayey sand and sand with clay layers and shell fragments. These strata overlie a stratum of medium stiff to stiff gray clay and sandy clay with shell fragments and sand pockets encountered to the Pleistocene surface that varies between el -50 and el -55.

14. Surficial Pleistocene deposits are generally comprised of stiff to very stiff greenish-gray or tan clay, sandy clay and silty clay with sand pockets. These strata appear to be approximately 3 to 4 feet thick as indicated by Borings 2, 5 and 9 and are underlain by strata of very loose to medium dense greenish-gray, gray or tan silty sand. These strata continue to the ultimate depth of Borings 2, 5 and 9 of 80 feet.

Ground Water

15. As an indication of the depth to ground water at the time of the field investigation, an auger boring located near Boring 3 was drilled without the aid of drilling fluids. Ground water was initially encountered at a depth of 5 feet. After a 6-hour observation, the ground water level was noted to be at a depth of approximately 3 feet below the existing ground surface.

16. Piezometers installed for the purpose of evaluating underseepage potential in the area were placed in the pervious near surface strata and are indicative of the depth to ground water. Initial readings taken on 2 December 1985 subsequent to development of the piezometers are tabulated below.

Boring	Depth To Ground Water Below Existing Ground Surface
P-1	3.7'
P-2	5.1'
P-3	4.6'
P-4	3.5'

17. It is pointed out that the depth to ground water is sensitive to climatic variation and will be affected by the level of Lake Pontchartrain. If important to construction, the depth to ground water should be determined by those responsible for construction immediately prior to beginning work.

FOUNDATION ANALYSIS

Furnished Information

18. Survey Data. Topographic survey data has been provided by URS Engineers to Eustis Engineering Company. Elevations indicated on the topographic survey and all other elevations indicated in this report refer to the National Geodetic Vertical Datum (NGVD).

19. Proposed Flood Protection. Flood protection proposed for the Pontchartrain Beach area will be provided by either earthen levee or a combination levee and I-wall. Access ramps will be provided at three locations and gated flood structures will be provided at these ramps for flood protection. Ramps will also be provided at Lakeshore Drive and will be integral with earthen levees that will tie in to the existing protection.

20. The earthen levee will be constructed to el 20 (net grade) with 1 vertical to 5 horizontal side slopes and a 10-ft crown. The I-wall/levee combinations will be constructed to net elevations varying between 13.0 and 10.5 with 1 vertical to 3 horizontal side slopes and a 10-ft crown. The I-wall will be located at the centerline of the combination levees with the top of the I-wall varying between el 20.0 and 17.5. We understand the unsupported height of the I-wall will be maintained at 7.0 feet. A wave-runup berm extending approximately 100 feet from the combination I-wall levee section is required. In order to save existing facilities, it is proposed that this wave berm be shortened to 10 feet by a concrete retaining wall. The earthen levees at the Lakeshore Drive ramps will be constructed to a net elevation of 17.5.

21. Two access ramps will be constructed to a net grade of el 11.75. The remaining access ramp will be constructed to a net grade of el 13.0. The ramps at Lakeshore Drive will be constructed to a net grade of el 14.5. It is proposed that a gross grade of 15.5 be used at the road ramps.

22. Design Conditions. The design static water level (SWL) is el 11.5. Dynamic wave loads as furnished URS Engineers and in turn Eustis Engineering Company by the U.S. Army Corps of Engineers are tabulated below.

I-Wall Elevation In Feet	Levee Crown Elevation In Feet	Dynamic Wave Load Pounds/Foot	Elevation of Wave Load Resultant In Feet
17.5	10.5	5401	14.2
20.0	13.0	5362	16.2

23. Design Criteria. Levees and levee/I-wall combinations are to be designed for a factor of safety equal to 1.3 when evaluated by the LMVD Method of Planes Analyses.

24. Cantilever I-wall analyses are to be designed for two conditions. The static water level loading must be evaluated with a factor of safety of 1.5 factored into the soil shear strength parameters. The dynamic wave load must be evaluated with a factor of safety of 1.25 factored into the soil shear strength parameters considering floodside water at the static water level.

25. Gated flood structures must be evaluated by a "Deep Seated Stability Analyses." This method factors a 1.3 factor of safety into the soil shear strength parameters in order to evaluate any unbalanced load on a pile supported structure. Details of this method have been supplied to URS Engineers and in turn Eustis Engineering Company by the U.S. Army Corps of Engineers.

26. Steel sheetpile cutoff must be used beneath the gated flood structures in order to provide protection against possible piping during hurricane conditions. The sheetpile penetration should be based on an appropriate seepage analysis. Possible piping should also be evaluated at the I-wall sections.

27. Supplemental Information. Eustis Engineering Company has been supplied the results of laboratory test data

performed on samples obtained from borings taken by the U.S. Army Corps of Engineers for the draft of Design Memorandum No. 13, General Design, Orleans Parish Lakefront Levees, West of IHNC by the U.S. Army Engineer District, New Orleans, Louisiana. Also furnished were typical sections of flood control features proposed in this design memorandum.

Levee Analyses

28. Settlement Analyses. Eustis Engineering Company has estimated settlements of the proposed typical levee sections furnished by URS Engineers. Results of our analyses indicate that the full earthen section can be anticipated to settle approximately 11 to 13 inches considering a 12-in. overbuild.

29. Stability Analyses. The stability analyses for the earthen levee section are shown on Figure 28. This analysis indicates a minimum factor of safety above the required 1.30. The stability analyses are based on an assumed ground elevation at approximate el 6.0. An average shear strength trend was developed based on the results of in situ field and laboratory tests conducted by Eustis Engineering Company and on results of laboratory tests conducted by the U.S. Army Corps of Engineers. A general stratigraphy for the area was determined based on the results of the soil borings contained in this report.

30. Underseepage. Seepage beneath the proposed all earth levee section has been evaluated by Bligh's Method of Analysis. Based upon the proposed section, a creep ratio value of 27.3 was computed. This is a safe value considering the minimum required value of 18.5 for very fine or silty sand.

31. Piping analyses assume a uniform dissipation of hydrostatic pressures along the base of an impervious boundary and require that the piezometric heads within the foundation sand strata landward of the protected side levee toe be no greater than the existing ground surface. This requires a seepage exit near the protected side toe. Although borings taken for this

project indicate that such a seepage exit may not be available in some areas where near surface fill materials are relatively impermeable clay strata, total blockage over the entire project area is not likely. Additionally, piezometric data accumulated at other project areas along Lake Pontchartrain indicates the heads in the near surface sand strata are generally encountered below the existing ground surface even during high stages in Lake Pontchartrain. Therefore, Eustis Engineering Company does not recommend the installation of pressure relief measures such as relief wells or toe drains to control excess landside piezometric heads.

32. We do recommend that the piezometers installed at the project site be read on a periodic basis, a staff gage installed at the project site, and correlations between the piezometric levels in the foundation sand strata be established with levels in Lake Pontchartrain in order to project the piezometric levels during hurricane conditions and verify the assumptions contained in this report. Also, if the study would indicate the necessity for pressure relief measures, data accumulated would be valuable in minimizing the cost of installation of a system.

I-Wall Analyses

33. Cantilever I-Wall Analyses. Figure 30 indicates the critical "S" case cantilever I-wall analyses for the proposed floodwalls. Dynamic wave loadings with a factor of safety of 1.25 factored into the soil shear strength parameters governed the determination of the required penetration of sheeting. A factor of safety of 1.0 for the same loading conditions was used to determine the maximum anticipated bending moment. Figure 30 indicates the shear strength parameters and stratigraphy assumed for design and the critical net pressure and moment diagrams. The following table lists the required penetrations and corresponding bending moments for the levee/I-wall sections analyzed.

I-Wall Elevation In Feet	Levee Crown Elevation In Feet	Required Tip Elevation In Feet	Maximum Bending Moment In Ft-Lbs/Ft
17.5	10.5	-22.0	57,507
20.0	13.0	-14.0	47,912

34. Settlement Analyses. Eustis Engineering Company has estimated that the settlement of the proposed combination I-wall/levee section constructed to net el 13.0 will range between 5 and 7 inches. For the proposed section constructed to net el 10.5, the anticipated settlement will range between 3 and 5 inches. These settlement analyses include a 6-in. overbuild to compensate for the anticipated settlement.

35. Stability Analyses. Stability analyses assuming a failure of the sheetpile wall to the protected side toe of the levee are shown on Figure 28. These stability analyses assume the shear strengths and stratigraphy previously described for the all earth levee stability analysis. The results of these analyses indicate factors of safety greater than the minimum 1.3 factor of safety required for design.

36. Underseepage. Underseepage for the combination I-wall/levee section was evaluated based on Lane's Weighted Creep Ratio Method of Analysis. Weighted creep ratios varying between approximately 10.2 and 12.3 were determined for the sheetpile penetrations required for cantilever stability. These values exceed a safe value of 8.5 required in Lane's analyses for very fine or silty sand. These are safe values provided the piezometric heads within the foundation sand strata landward of the protected side toe of the levees do not exceed the existing ground surface elevation. As discussed above, this assumption should be verified by further evaluation of piezometer data.

Gated Structures

37. Deep Seated Stability Analyses. Based upon criteria supplied to Eustis Engineering Company, we have evaluated the potential for a deep seated stability failure of the T-wall and gated structures. The results of these analyses are indicated on Figure 31. These analyses indicate that the active driving forces for all failure surfaces analyzed do not exceed the summation of the resisting forces and the passive driving forces. Therefore, there is no potential for a deep seated stability failure beneath the gated structures.

38. Underseepage. Based on Lane's Weighted Creep Ratio of 8.5, it is recommended that the sheetpile cutoff beneath the gated structures be extended to el -11.0. As these sections are not required to carry any bending moment, these may be straight web or shallow arch sections.

39. Allowable Pile Load Capacities. The recommended allowable pile load capacities for various lengths and sizes of square precast prestressed concrete, steel H and steel pipe piles are shown on Figures 32 through 37. These allowable pile load capacities contain a factor of safety of 2 against actual failure of the pile through the soil and include a nominal 2.5-ft cutoff below the proposed net crown of the adjacent levee section. Both tension and compression load capacities are provided. We understand consideration is being given to using a factor of safety equal to 3.0 in order to compute allowable pile load capacities. If a factor of safety equal to 3.0 is used, a test pile program and a load test will not be required by the U.S. Army Corps of Engineers. Eustis Engineering Company believes this to be acceptable. In this regard, allowable pile load capacities for a factor of safety equal to 3.0 can be computed by multiplying the capacities indicated on Figures 32 through 37 by two-thirds. The vertical reactions to batter piles are indicated on Figures 32 through 37. Horizontal reactions should be determined by resolving the horizontal component of the vector polygon as determined by the pile batter.

40. Pile Driving. It is recommended that the concrete piles be driven with a steam or air hammer delivering approximately 19,500 ft-lb of energy per blow. Based upon the driving resistances encountered at the gated locations, it is anticipated that predrilling will not be required. However, given the extent and variability of the sand strata at the project site, predrilling may be necessary. If predrilling is required, it should be accomplished by a wet rotary method utilizing a fishtail bit. The diameter of the predrilled hole should not exceed 75 percent of the side dimension of the square pile or the diameter of a round pile. The depth of the predrilling operations should extend to no more than 5 feet below the bottom of the sand strata penetrated. Close field supervision must be maintained by experienced personnel to insure that proper procedures are followed and accurate records are kept on all piles.

41. Past experience indicates that pile driving operations may transmit vibrations to adjacent structures, particularly when piles are to be firmly seated or driven through a sand stratum with a high driving resistance. In addition, vibrations generated by pile driving operations may densify sand strata resulting in settlement of piles founded in these strata or surficial founded structures. A study should be made to determine the tolerance of existing structures to vibratory loads and settlements. Eustis Engineering Company is available to monitor vibrations during all pile driving operations and can provide consultation concerning the effect of vibrations on existing structures.

42. Lateral Loads. Eustis Engineering Company understands that batter piles will be used to resist lateral loads. Distribution of loads to the piles must be analyzed by the Hrenicoff Method of Analysis which requires the Coefficient of Horizontal Subgrade Reaction (k_h) as a design parameter. Based upon the results of in situ field tests and laboratory test data, we have computed k_h and have plotted its general variation with depth on Figure 38. Horizontal reactions to batter piles should be determined as indicated in Paragraph 39 above.

43. Group Efficiency and Spacing. Precast concrete piles, steel pipe and steel H piles tipped in the Recent and surficial Pleistocene deposits will derive the majority of their supporting capacity primarily through skin friction and should be investigated to determine the effects of group action if piles are driven in groups. These deposits are encountered to approximately el -53.0 at Ramps 1 and 3 and el -60.0 at Ramp 2. In this regard, the supporting value of steel or concrete piles driven in groups should be investigated on the basis of group perimeter shear by the expression shown on Figure 39. Pile tips embedded below the above elevations need not be investigated for group efficiency. The minimum center to center spacing of the pile should be as indicated by Figure 39, whichever is greater.

44. Test Piles and Pile Load Tests. If a factor of safety equal to 2.0 is used to estimated pile embedments, it is recommended that at least one test pile of the type anticipated for final design be driven at each gated location to give a general indication of the expected driving resistances throughout the project site. These test piles should be driven with the same type of equipment and techniques that will be used to drive the job piles. The test piles will provide valuable information regarding the expected driving resistances and vibrations that may be anticipated during the driving of the job piles. At least one pile should be load tested to verify the estimated design load capacities contained in this report. The pile showing the least resistance to driving should be the one selected for the pile load test. The pile should be load tested to failure in accordance with the New Orleans Building Code. Eustis Engineering Company recommends that the load increments past the design load be one-half the increments recommended by the Code.

45. Eustis Engineering Company will be available for discussions regarding the formulation of a test pile program, and can provide personnel for the logging of the test piles, application of the loads and evaluation of the results of the load tests. We can also log the driving of the job piles as well as evaluate the integrity of the job piles based on the driving logs.

46. Estimated Settlement. It is estimated that the settlement due to imposed structural loads on the pile lengths greater than 45 feet will be small and on the order of 0.5 to 0.75 of an inch. As these gates will be constructed at the proposed access ramps and adjacent to the levee sections, significant drag loads could be imparted to the pile foundations if the gates are constructed immediately after the ramp fill and levee fill are placed. We understand, however, that it is anticipated that the gates will be constructed several months following placement of fill. For planning purposes, it should be estimated that little or no drag loads will be imparted to pile founded gated structures provided these are built nine months after the placement of fill. Our settlement analyses indicate consolidation will essentially be complete between six and 12 months. Therefore, settlement of fill placed at the gate ramps should be monitored to ascertain whether or not consolidation is complete prior to construction of the gate monoliths.

Ramp Analyses

47. Estimated Settlement. The estimated settlement at the access ramps is anticipated to range between 4 and 6 inches at Ramps 1 and 3 and 10 to 12 inches at Ramp 2. Therefore, Eustis Engineering Company recommends that Ramps 1 and 3 be overbuilt approximately 6 inches and Ramp 2 be overbuilt 12 inches in order to compensate for this anticipated settlement. As discussed above, it is recommended that these ramps be preloaded in order to minimize drag effects on pile foundations.

48. The estimated settlement of the road ramps at Lakeshore Drive is anticipated to vary between 4 and 6 inches considering the proposed gross elevation of 15.50. Therefore, Eustis Engineering Company recommends these ramps be overbuilt to el 15.0 in lieu of proposed el 15.5 in order to compensate for settlement. Settlement of the proposed adjacent earthen levee section is anticipated to range between 4 and 6 inches considering a 6-in. overbuild.

49. Stability Analyses. The stability analyses for the earthen tie in levee at the Lakeshore Drive ramps are shown on Figure 29. These stability analyses incorporate the average shear strength trends described previously. Stratigraphy is generally based on data developed at Borings 1 and 10. The results of these analyses indicate factors of safety greater than the 1.3 factor of safety required for design.

50. Underseepage. Based on the ramp section provided Eustis Engineering Company, computations indicate the Bligh Ratio to be 21.8. This is a safe value considering a minimum safe value of 18.5 for very fine sand or silty sand. As recommended above, assumptions relative to piezometric heads in foundation strata should be verified by further evaluation of piezometric data.

Retaining Wall

51. Eustis Engineering Company recommends that, if the proposed retaining wall is surface founded, its stability be evaluated using a coefficient of active earth pressure of 0.44 and a coefficient of passive earth pressure of 2.3. The coefficient of friction along the base of the proposed retaining wall should be taken as 0.30. The unit weight of compacted fill behind the retaining wall should be assumed as 110 pcf. Structural design of the retaining wall should consider an at-rest coefficient of lateral earth pressure equal to 1.0, and, therefore, an equivalent fluid pressure of 110 psf per foot.

52. Erosion Control. It is anticipated that the retaining wall will be subjected to varying degrees of wave action. In this regard, Eustis Engineering Company highly recommends that a sheetpile cutoff used as a prevention against erosion and undermining of the structure be installed at the lakeside toe of the retaining wall. We recommend that the sheetpile extend to a depth of approximately 10 feet below the base of the retaining wall. The sheetpile may be either a straight web or shallow arch section.

53. Allowable Bearing Capacity. Based on the results of soil borings and laboratory tests, analyses have been made to determine the net allowable soil bearing value for a continuous retaining wall placed to bear on natural undisturbed subsoils at a depth of approximately 2 feet below the existing ground surface. The results of the analyses indicate a net allowable soil bearing value of approximately 800 psf. This net allowable soil bearing value provides a factor of safety of approximately 2.5 against failure of the underlying subsoils due to shear.

54. Estimated Settlement. Assuming a retaining wall based approximately 4 feet in width and loaded to its allowable soil bearing value, settlement analyses indicate settlement on the order of 1.5 to 1.75 inches may be experienced at the retaining wall. We understand this settlement is acceptable due to the rigidity inherent in the retaining wall structure.

Construction Recommendations

55. Levee. Eustis Engineering Company recommends that site preparation levee fill and compaction be accomplished in accordance with the Department of the Army, Mississippi River Commission, Lower Mississippi Valley Division, Corps of Engineers Standard Specifications for Levee Construction. The levee fill should be either a CH or CL material as classified by the Unified Soil Classification System and compacted by semi-compaction methods. Material for levee fill should be compacted within the following moisture content ranges.

Material	Moisture Content	
	Minimum	Maximum
CL	18	32
CH	20	50

56. It is the intent of these specifications to construct a relatively uniform embankment free of large gaps,

voids and loose materials. To accomplish this, the backfill should be spread in 8 to 10-in. lifts and each lift compacted with a minimum of three passes of a D-5 dozer, or equivalent. When proper compaction has been achieved, a D-5 dozer should be able to "walk-out" without fill material sticking to the treads or otherwise disturbing the lift. If this cannot be achieved, "moisture control," such as disking to dry back material or spraying to wet the material, may be required.

57. Existing Seawall. Typical proposed sections furnished to Eustis Engineering Company indicate that the proposed earthen levee section and I-wall/levee combination sections are to be constructed over and bury an existing pile supported seawall in the area. As indicated on Figure 28, the placement of the all earthen levee section with respect to the seawall will not have any detrimental effects on the levee stability if differential settlement occurs between the levee and the proposed seawall. Therefore, Eustis Engineering Company does not recommend the removal of this seawall. However, detailed drawings of the seawall indicate a drain pipe placed at regular intervals along the alignment. These pipes should be located and grouted. At the I-wall/levee combination section, the levee fill material straddles a substantial part of the existing seawall and detrimental effects due to differential settlement between the levee fill material and the existing seawall should be anticipated. In these areas, Eustis Engineering Company recommends the removal of the seawall. Piles supporting the seawall need not be removed.

58. Existing Pool. Eustis Engineering Company understands that, in areas where the proposed all earthen levee will cross the existing pool, the pool structure will be demolished and fill removed to the existing ground level. The remaining structure will be buried. This is acceptable provided the pool is not pile supported. If the pool or other appurtenant

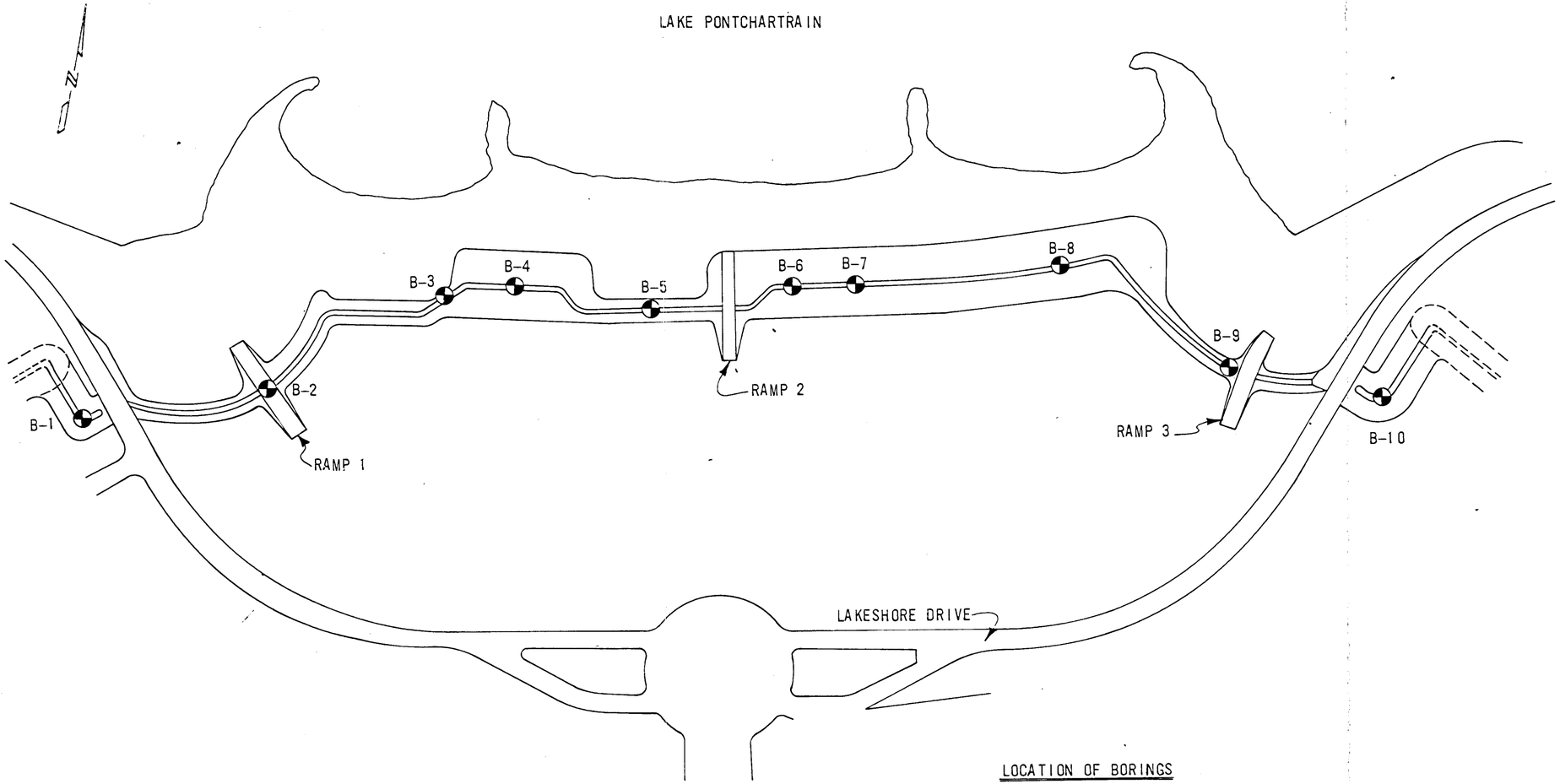
structures are pile supported, they should be removed. The supporting piles need not be removed.

EUSTIS ENGINEERING COMPANY

By_____
Lloyd A. Held, Jr.

W. W. Gwyn:bh

EEC No. 9271



LOCATION OF BORINGS

SCALE : 1"=200'

LEGEND

BORINGS DRILLED 15-21 NOVEMBER 1985
B-6 DRILLED FOR U.S. ARMY CORPS OF ENGINEERS, SAMPLES TRANSPORTED TO NEW ORLEANS DISTRICT.

GEOTECHNICAL INVESTIGATION
ORLEANS LEVEE DISTRICT
PONTCHARTRAIN BEACH FLOODWALLS AND LEVEES
NEW ORLEANS, LOUISIANA

LOCATION OF BORINGS

FOR
BOARD OF LEVEE COMMISSIONERS OF
THE NEW ORLEANS LEVEE DISTRICT
NEW ORLEANS, LOUISIANA

URS ENGINEERS
METAIRIE, LOUISIANA

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
DECEMBER 1985 METAIRIE, LA.

FIGURE 1

9271

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

Name of Project: Orleans Levee District
Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.

URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 1 **Soil Technician** A. J. Mayeux **Date** 22 November 1985

Ground Elev. _____ **Datum** _____ **Gr. Water Depth** See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.0	Medium stiff gray & tan silty clay		
					(fill)		
2	3.5	5.0	3.0	6.0	Medium dense tan fine sand	4	11
3	6.0	7.5	6.0		Very loose gray sand w/shell fragments	1	2
					& clay layers		
4	8.5	10.0			Very loose gray sand w/clay layers	0	2
5	11.0	12.5		14.0	Ditto	0	2
6	14.5	15.0	14.0	17.5	Very loose gray clayey sand		
7	19.0	19.5	17.5	21.0	Very loose gray sandy silt		
8	24.0	24.5	21.0		Very loose gray clayey sand w/silty		
					clay layers & shell fragments		
9	29.0	29.5		33.5	Very loose gray clayey sand		
10	34.0	34.5	33.5	37.0	Medium stiff gray clay w/sand pockets		
11	39.0	39.5	37.0	40.0	Soft gray sandy clay w/shell fragments		
12	40.0	41.5	40.0	43.0	Loose gray clayey sand w/shell	2	7
					fragments		
13	43.5	45.0	43.0	48.0	Medium dense gray sand w/shell	3	11
					fragments		
14	48.5	50.0	48.0	51.5	Loose gray sand w/shell fragments	1	5
					& clay layers		
15	54.5	55.0	51.5	55.0	Medium stiff gray clay w/sand pockets		
					& shell fragments		

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

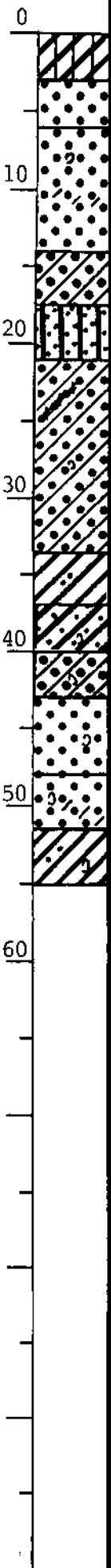


Fig. 2

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

Name of Project: Orleans Levee District

Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.

URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 2 **Soil Technician** A. J. Mayeux **Date** 21-22 November 1985

Ground Elev. _____ **Datum** _____ **Gr. Water Depth** See Text

Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	2.5	Medium stiff gray & tan clay w/sand		
					layers, shells, etc. (fill)		
2	3.5	5.0	2.5	5.0	Loose tan fine sand	2	7
3	6.0	7.5	5.0		Very loose gray sand w/shell fragments	1	4
					& clay layers		
4	8.5	10.0			Ditto	2	3
4	11.0	12.5			Ditto	1	3
6	13.5	15.0		16.5	Ditto	1	1
7	17.5	18.0	16.5	20.0	Loose gray sandy silt		
8	20.5	21.0	20.0	22.5	Very loose gray clayey silt w/silty		
					sand layers & shells		
9	23.5	24.0	22.5	26.0	Very loose gray clayey sand w/shell		
					fragments		
10	26.5	27.0	26.0		Very soft gray sandy clay w/sand		
					pockets & shell fragments		
11	29.5	30.0		31.0	Very soft gray sandy clay w/silty sand		
					layers & shells		
12	32.5	33.0	31.0	35.5	Medium stiff gray clay w/sand pockets		
					& shell fragments		
13	35.5	36.0	35.5		Soft gray sandy clay w/shell fragments		
14	38.5	39.0		40.0	Ditto		
15	40.0	41.5	40.0	43.5	Very loose gray clayey sand w/shell	0	3
					fragments		
16	43.5	45.0	43.5		Medium dense gray sand w/shell	3	11
					fragments & clay layers		
17	48.5	50.0		51.0	Ditto	4	13

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

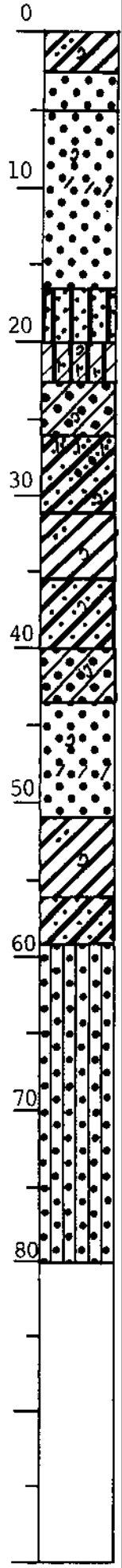


Fig. 3
(Sheet 1)

LOG OF BORING

EUSTIS ENGINEERING COMPANY Sheet 2 of 2
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

Name of Project: Orleans Levee District
Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.
URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 2 (Cont'd) **Soil Technician** A. J. Mayeux **Date** 21-22 November 1985
Ground Elev. _____ **Datum** _____ **Gr. Water Depth** See Text

Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
18	54.0	54.5	51.0	56.0	Medium stiff gray clay w/sand pockets		
					& shell fragments		
19	58.0	58.5	56.0	59.0	Very stiff greenish-gray & tan sandy		
					clay		
20	59.0	60.5	59.0		Medium dense greenish-gray & tan silty	3	13
					sand		
21	63.5	65.0			Ditto	3	11
22	68.5	70.0			Ditto	3	12
23	73.5	75.0			Ditto	4	21
24	78.5	80.0		80.0	Ditto	4	16

DEPTH IN FT.

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

Remarks: _____

Fig. 3
(Sheet 4

LOG OF BORING

EUSTIS ENGINEERING COMPANY

SOIL AND FOUNDATION CONSULTANTS

METAIRIE, LA.

Name of Project: Orleans Levee District

Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.

URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 3 Soil Technician A. J. Mayeux Date 15 November 1985

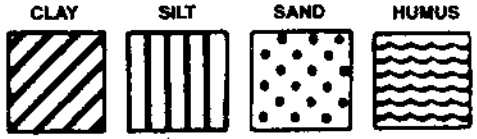
Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
			0.0	0.5	Loose tan fine sand		
1	2.0	2.5	0.5	3.5	Stiff gray & tan clay w/fill & organic matter		
2	3.5	5.0	3.5	5.0	Medium dense gray clayey sand & wood	3	22
3	6.0	7.5	5.0		Loose gray sand w/shell fragments	1	5
4	8.5	10.0			Ditto	1	5
5	11.0	12.5		13.0	Ditto	2	5
6	13.5	15.0	13.0	17.0	Very loose dark gray clayey sand w/shells	0	1
7	19.0	19.5	17.0		Loose gray clayey silt w/shell fragments & sand		
8	24.0	24.5		27.0	Ditto		
9	29.0	29.5	27.0	33.0	Very loose gray clayey sand w/shell fragments		
10	34.0	34.5	33.0	38.0	Medium stiff gray clay w/silty sand pockets & lenses		
11	38.5	40.0	38.0	41.0	Loose gray sand w/shell fragments	2	8
12	41.0	42.5	41.0	43.0	Medium dense gray sand w/shell fragments	4	13
13	43.5	45.0	43.0	46.5	Loose gray sand w/shell fragments & clay layers	2	5
14	49.0	49.5	46.5	54.0	Stiff gray clay w/sand pockets & shell fragments		
15	54.0	54.5	54.0	55.0	Stiff greenish-gray silty clay w/sandy silt pockets		

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____



Predominant type shown heavy. Modifying type shown light.

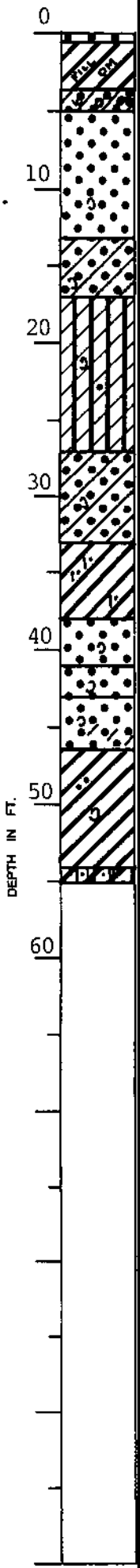


Fig. 4

LOG OF BORING

EUSTIS ENGINEERING COMPANY

SOIL AND FOUNDATION CONSULTANTS

METAIRIE, LA.

Name of Project: Orleans Levee District

Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.

URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 4 Soil Technician A. J. Mayeux Date 15 & 18 November 1985

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	0.5	2.0	0.0	2.0	Very loose tan sand	1	3
2	3.5	4.0	2.0	4.0	Stiff gray & tan clay w/sand pockets		
					& shells		
3	5.5	6.0	4.0	7.0	Very loose gray fine sand w/clay		
					pockets & shell fragments		
4	8.5	9.0	7.0	9.0	Very loose gray clayey sand w/shells		
5	9.0	10.5	9.0	11.0	Very loose gray sand w/shells	0	2
6	11.0	12.5	11.0	13.0	Medium dense gray sand w/shell	4	13
					fragments		
7	13.5	15.0	13.0	17.0	Loose gray clayey sand w/shells	2	6
8	19.0	19.5	17.0		Very loose gray clayey sand w/shells		
9	24.0	24.5		26.0	Ditto		
10	29.0	29.5	26.0		Very soft gray clay w/sand lenses &		
					pockets & shell fragments		
11	34.0	34.5		36.0	Ditto		
12	38.0	38.5	36.0	39.0	Very loose gray clayey sand w/shell		
					fragments		
13	39.0	40.5	39.0	41.0	Loose gray sand w/shell fragments	2	6
14	41.0	42.5	41.0		Medium dense gray sand w/shell	2	13
					fragments		
15	43.5	45.0		48.0	Ditto	1	11
16	48.5	50.0	48.0	51.0	Medium stiff gray sandy clay w/shell	1	4
					fragments		
17	52.0	52.5	51.0	54.0	Stiff gray clay w/sand pockets		
18	54.0	54.5	54.0	55.0	Stiff greenish-gray silty clay w/trace		
					of organic matter		

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____

Predominant type shown heavy. Modifying type shown light.

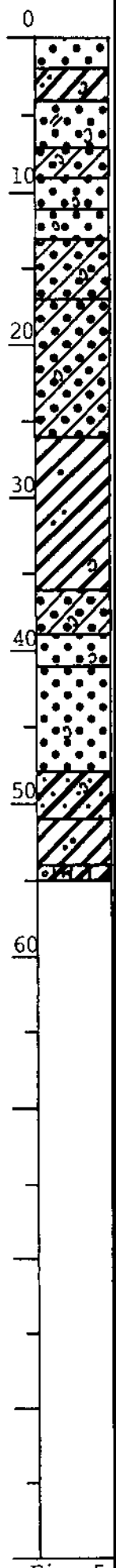


Fig. 5

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

Name of Project: Orleans Levee District

Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.

URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 5 **Soil Technician** A. J. Mayeux **Date** 18 & 19 November 1985

Ground Elev. _____ **Datum** _____ **Gr. Water Depth** See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
			0.0	0.5	Concrete		
			0.5	1.0	Shells & sand		
1	2.0	3.0	1.0	4.0	Medium stiff gray & tan clay w/sand		
					pockets & some shells & roots		
2	5.0	6.0	4.0	7.5	Soft gray clay w/shells & sand layers		
3	8.0	9.0	7.5	10.5	Soft gray clay w/sand pockets & lenses		
4	11.0	12.5	10.5	13.5	Very loose gray sand w/shell fragments	0	3
5	13.5	15.0	13.5	16.0	Medium dense gray sand w/shell	4	17
					fragments		
6	16.0	17.5	16.0	18.0	Very loose gray silty sand w/clay	1	3
					layers & shell fragments		
7	18.5	20.0	18.0	21.0	Loose gray clayey sand w/shell	3	4
					fragments		
8	21.0	22.5	21.0	23.0	Very soft gray sandy clay w/shell	0	2
					fragments		
			23.0	26.0	Wood w/some sandy clay & shells		
9	26.0	27.0	26.0		Loose gray clayey sand w/clay pockets		
					& shell fragments		
10	29.0	30.0		31.0	Ditto		
11	32.0	33.0	31.0		Soft gray clay w/sand layers, pockets		
					& shell fragments		
12	35.0	36.0		38.5	Ditto		
13	38.5	40.0	38.5	42.0	Loose gray sand w/shells	1	5
14	43.5	45.0	42.0		Medium dense gray sand w/shell	3	17
					fragments		
15	48.5	50.0		51.0	Ditto	2	9

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

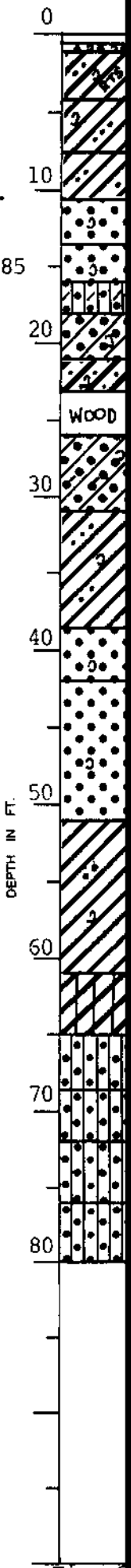


Fig. 6
(Sheet 1

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

Name of Project: Orleans Levee District
Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.

URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 5 (Cont'd) **Soil Technician** A. J. Mayeux **Date** 18 & 19 November 1985

Ground Elev. _____ **Datum** _____ **Gr. Water Depth** See Text

Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
16	54.0	55.0	51.0		Stiff gray clay w/sand pockets & shell		
					fragments		
17	59.0	60.0		61.0	Ditto		
18	64.0	65.0	61.0	65.0	Stiff greenish-gray silty clay		
19	67.0	68.0	65.0	68.5	Very loose greenish-gray silty sand		
20	68.5	70.0	68.5	72.0	Loose greenish-gray silty sand	2	7
21	73.5	75.0	72.0	76.0	Medium dense greenish-gray silty sand	6	21
22	78.5	80.0	76.0	80.0	Medium dense gray & tan silty sand	4	22

DEPTH IN FT.

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

Remarks: _____

Fig. 6
(Sheet 2

LOG OF BORING

EUSTIS ENGINEERING COMPANY

SOIL AND FOUNDATION CONSULTANTS

METAIRIE, LA.

Name of Project: Orleans Levee District

Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.

URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 7 Soil Technician A. J. Mayeux Date 19 November 1985

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
			0.0	0.5	Loose tan sand		
1	2.0	2.5	0.5	4.0	Medium compact gray & tan clay w/shells,		
					clay, gravel & wood		
2	5.0	5.5	4.0	7.5	Loose gray & tan clayey sand w/shell		
					fragments		
3	8.5	10.0	7.5		Medium dense gray sand w/shells	3	11
4	11.0	12.5			Ditto	3	17
5	13.5	15.0		16.0	Ditto	5	24
6	16.0	17.5	16.0	18.0	Loose gray sand w/shells	2	7
7	18.5	20.0	18.0		Very loose gray clayey silt	1	3
8	24.0	24.5		26.0	Very loose gray clayey silt w/silty		
					clay layers		
9	29.0	29.5	26.0	31.0	Loose gray clayey sand w/sandy silt		
					layers & shell fragments		
10	34.0	34.5	31.0		Medium stiff gray clay w/clayey sand		
					pockets & shell fragments		
11	37.5	38.0		38.0	Ditto		
12	38.5	40.0	38.0	41.0	Loose gray sand w/shell fragments	2	9
13	41.0	42.5	41.0	43.0	Medium dense gray sand w/shell	3	13
					fragments		
14	43.5	45.0	43.0	47.0	Loose gray sand w/shell fragments &	2	8
					clay layers		
15	48.5	50.0	47.0		Medium stiff gray clay w/clayey sand	1	4
					pockets & shell fragments		
16	54.0	54.5		55.0	Ditto		

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

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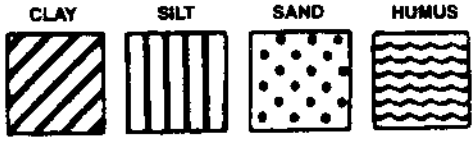
Remarks: _____



Predominant type shown heavy. Modifying type shown light.

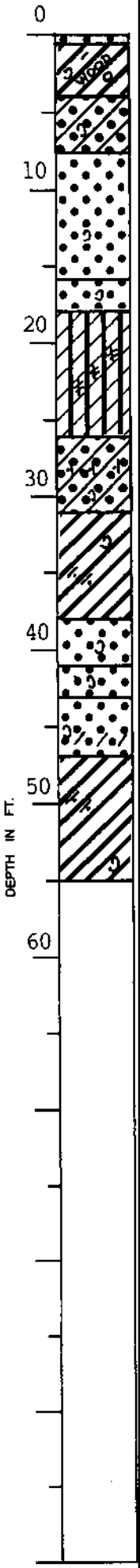


Fig. 7

LOG OF BORING

EUSTIS ENGINEERING COMPANY

SOIL AND FOUNDATION CONSULTANTS

METAIRIE, LA.

Orleans Levee District

Name of Project: Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

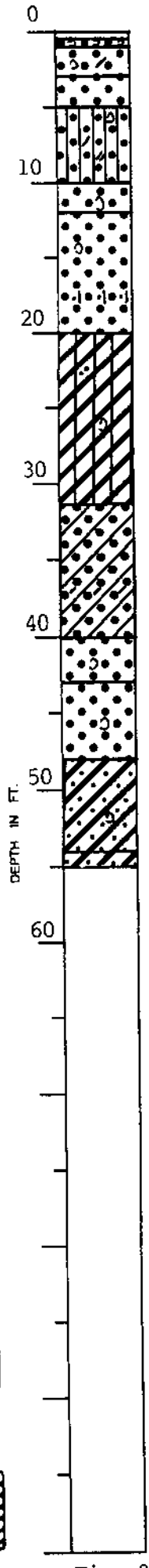
For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.

URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 8 **Soil Technician** A. J. Mayeux **Date** 20 November 1985

Ground Elev. _____ **Datum** _____ **Gr. Water Depth** See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
			0.0	0.5	Concrete		
			0.5	1.0	Shells & sand		
1	2.0	2.5	1.0	3.0	Loose tan sand w/shells & clay		
2	3.5	5.0	3.0	5.0	Very loose tan sand	0	2
3	8.0	8.5	5.0	10.0	Medium dense gray silty sand w/clay		
					lenses, pockets & shell fragments		
4	10.0	11.5	10.0	12.0	Very loose gray sand w/shell fragments	0	2
5	12.5	14.0	12.0		Medium dense gray sand w/shell	4	24
					fragments		
6	15.0	16.5			Ditto	6	22
7	18.5	20.0		20.0	Medium dense gray sand w/sandy silt	7	11
					layers		
8	24.0	24.5	20.0		Soft gray silty clay w/sand pockets &		
					decayed shells		
9	29.0	29.5		31.5	Ditto		
10	34.0	34.5	31.5		Loose gray clayey sand w/clay layers		
11	39.0	39.5		40.0	Ditto		
12	40.0	41.5	40.0	43.0	Very loose gray sand w/shell fragments	1	3
13	43.5	45.0	43.0	48.0	Medium dense gray sand w/shell	4	14
					fragments		
14	48.5	50.0	48.0	54.0	Medium stiff gray sandy clay w/shell	1	5
					fragments		
15	54.0	54.5	54.0	55.0	Stiff greenish-gray & tan sandy clay		



*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS

Remarks: _____

Predominant type shown heavy. Modifying type shown light.

Fig. 8

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

Name of Project: Orleans Levee District

Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.

URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 9 **Soil Technician** A. J. Mayeux **Date** 20-21 November 1985

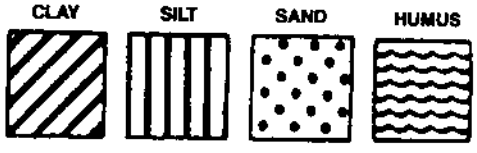
Ground Elev. _____ **Datum** _____ **Gr. Water Depth** See Text

Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.0	Medium dense brown & gray clayey sand		
					w/silty sand layers, roots & shells		
					(fill)		
2	3.5	5.0	3.0	6.0	Loose tan sand w/shell fragments	1	5
3	6.0	7.5	6.0		Very loose gray sand w/shell fragments	1	2
					& clay layers		
4	8.5	10.0			Ditto	0	2
5	11.0	12.5		13.0	Ditto	1	2
6	13.5	15.0	13.0	16.0	Very loose gray clayey sand w/shell	0	1
					fragments		
7	17.5	18.0	16.0	19.0	Soft gray clay w/sand pockets & shell		
					fragments		
8	20.5	21.0	19.0		Loose gray silty sand w/sandy clay		
					layers & shells		
9	23.5	24.0		25.0	Loose gray silty sand w/silty clay		
					lenses, layers & shell fragments		
10	26.5	27.0	25.0	29.0	Very loose gray clayey sand w/silty		
					clay layers & shell fragments		
11	29.5	30.0	29.0		Soft gray clay w/sand pockets, lenses		
					& layers & shell fragments		
12	32.5	33.0		35.0	Ditto		
13	35.5	36.0	35.0	38.5	Loose gray silty sand w/shell fragments		
14	38.5	40.0	38.5	41.0	Very loose gray clayey sand w/shell	0	1
					fragments		
15	41.0	42.5	41.0	43.5	Very loose gray sand w/shell fragments	1	3
16	43.5	45.0	43.5	47.0	Loose gray sand w/shell fragments	2	5

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____



Predominant type shown heavy. Modifying type shown light.

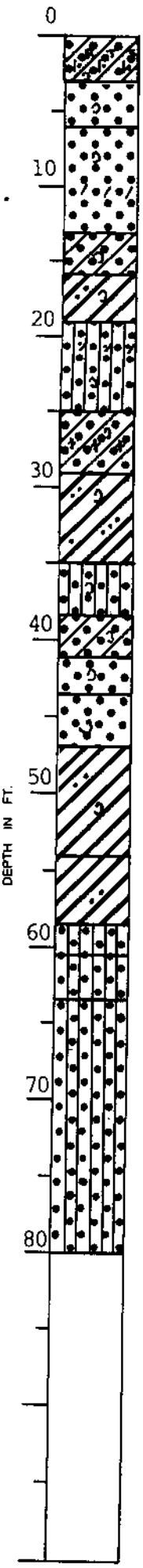


Fig. 9
(Sheet 1)

LOG OF BORING

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.

Name of Project: Orleans Levee District
Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.
URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 9 (Cont'd) **Soil Technician** A. J. Mayeux **Date** 20-21 November 1985
Ground Elev. _____ **Datum** _____ **Gr. Water Depth** See Text

Sample No.	SAMPLE Depth — Feet From	SAMPLE Depth — Feet To	DEPTH STRATUM Feet From	DEPTH STRATUM Feet To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
17	48.5	50.0	47.0	54.0	Medium stiff gray clay w/sand pockets	0	3
					& shell fragments		
18	54.0	54.5	54.0	58.5	Stiff greenish-gray & tan clay w/sand		
					pockets		
19	58.5	60.0	58.5	60.5	Very loose greenish-gray silty sand	1	3
20	61.0	62.5	60.5	63.5	Loose greenish-gray & tan silty sand	2	8
21	63.5	65.0	63.5		Medium dense greenish-gray & tan silty	2	13
					sand		
22	68.5	70.0			Ditto	3	18
23	73.5	75.0			Ditto	4	24
24	78.5	80.0		80.0	Ditto	4	26

DEPTH IN FT.

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

Remarks: _____

Fig. 9 (Sheet 2)

LOG OF BORING

EUSTIS ENGINEERING COMPANY

SOIL AND FOUNDATION CONSULTANTS

METAIRIE, LA.

Name of Project: Orleans Levee District

Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District, New Orleans, La.

URS Engineers, Consulting Engineers, New Orleans, Louisiana

Boring No. 10 Soil Technician A. J. Mayeux Date 21 November 1985

Ground Elev. _____ Datum _____ Gr. Water Depth See Text

Sample No.	SAMPLE Depth — Feet From	To	DEPTH STRATUM Feet From	To	VISUAL CLASSIFICATION	*STANDARD PENETRATION TEST	
1	2.0	2.5	0.0	3.0	Medium stiff gray & tan clay w/sand,		
					shells, gravel, etc. (fill)		
2	3.0	4.5	3.0	4.5	Medium dense gray & tan sand w/shell	3	14
					fragments		
3	6.0	7.5	4.5		Very loose gray sand w/clay layers &	0	3
					shell fragments		
4	8.5	10.0			Ditto	0	4
5	11.0	12.5		13.0	Ditto	1	4
6	13.5	15.0	13.0	16.5	Very loose gray silty sand	1	4
7	19.0	19.5	16.5		Loose gray silty sand w/many clay		
					layers & lenses		
8	24.0	24.5			Loose gray silty sand		
9	29.0	29.5		31.5	Loose gray silty sand w/alternating clay		
					layers & lenses		
10	34.0	34.5	31.5	35.0	Medium stiff gray clay w/sand pockets		
11	35.0	36.5	35.0	38.5	Very loose gray clayey sand w/shell	0	3
					fragments		
12	38.5	40.0	38.5		Loose gray sand w/shell fragments	2	7
13	43.5	45.0		47.0	Ditto	2	5
14	48.5	50.0	47.0	54.5	Soft gray clay w/sand pockets & shell	0	2
					fragments		
15	54.0	54.5	54.5	55.0	Stiff greenish-gray & tan sandy clay		

*Number in first column indicates number of blows of 140-lb. hammer dropped 30 in. required to seat 2-in. O. D. splitspoon sampler 6 in. Number in second column indicates number of blows of 140-lb. hammer dropped 30 in. required to drive 2-in. O. D. splitspoon sampler 1 ft. after seating 6 in.

WHILE THIS LOG OF BORING IS CONSIDERED TO BE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT ITS RESPECTIVE LOCATION ON THE DATE SHOWN, IT IS NOT WARRANTED THAT IT IS REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.

Remarks: _____

CLAY SILT SAND HUMUS

Predominant type shown heavy. Modifying type shown light.

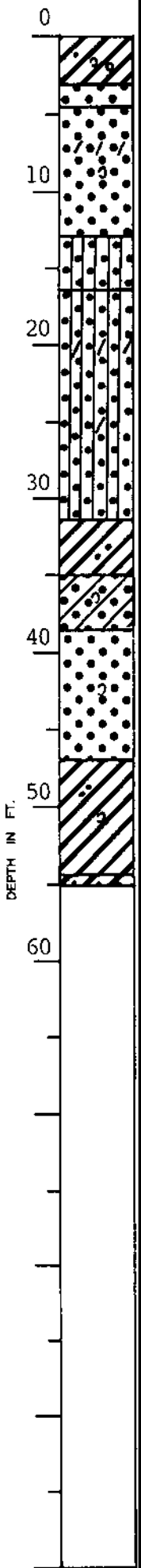
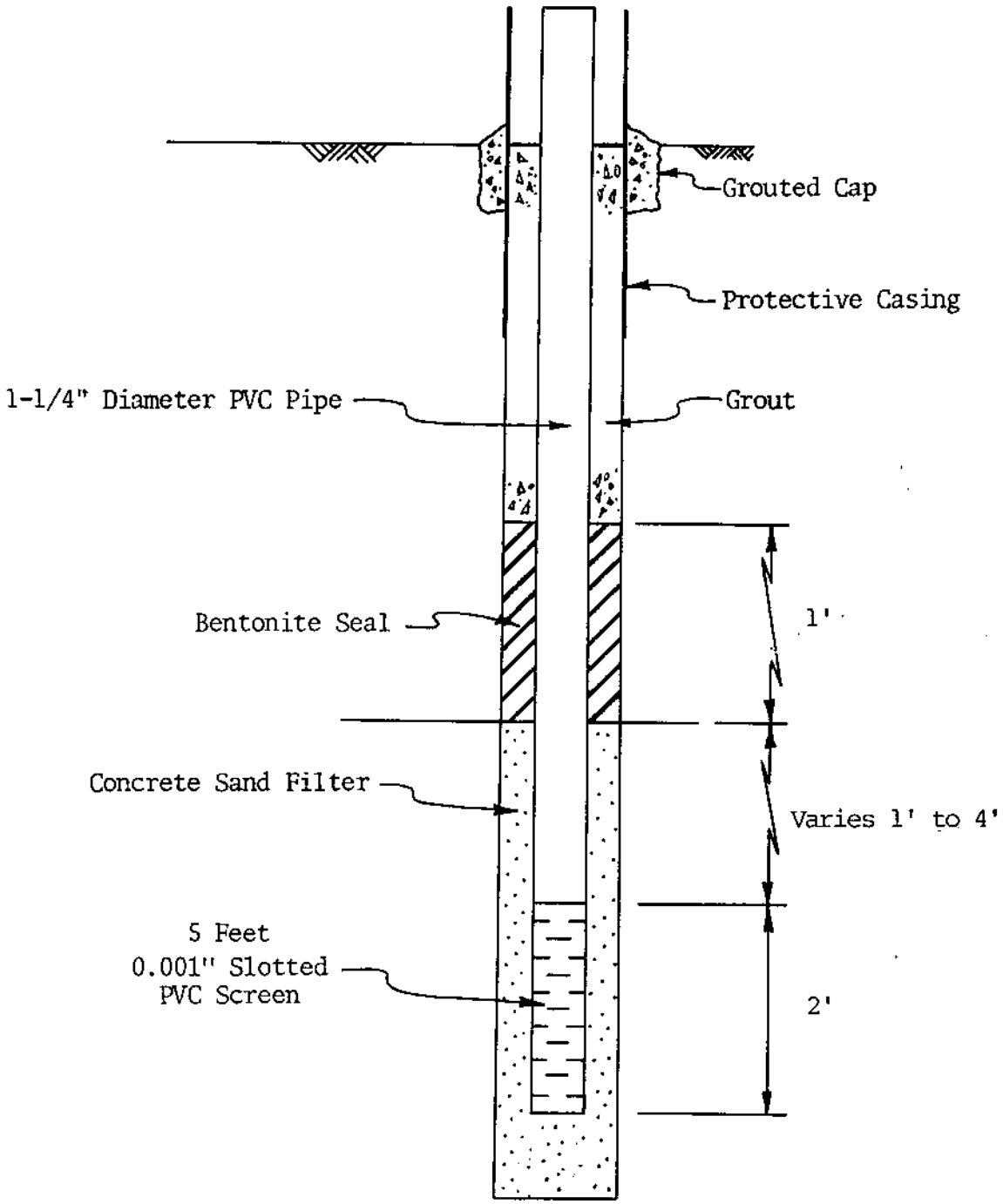


Fig. 10



NOT TO SCALE

TYPICAL PIEZOMETER DETAIL

Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana

URS Engineers, Consulting Engineers, Metairie, Louisiana

Fig. 11

Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana

URS Engineers, Consulting Engineers, Metairie, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 1

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI
8	24.0	Loose gray clayey sand w/silty clay layers & shell fragments	32.9	----	-----	----			
10	34.0	Medium stiff gray clay w/sand pockets	36.5	82.7	112.9	1065*			

BORING 2

8	20.5	Very loose gray clayey silt with silty sand layers & few shells	37.5	83.7	115.0	485*			
9	23.5	Very loose gray clayey sand w/shell fragments	30.6	88.5	115.5	360*			
11	29.5	Very soft gray sandy clay with silty sand layers & shells	26.5	96.7	122.3	435*			
12	32.5	Medium stiff gray clay w/sand pockets & shell fragments	48.2	----	-----	----	72	18	54

*Unconsolidated Undrained Triaxial Compression Test - One Specimen; Confined at the approximate overburden pressure.

Fig. 12

Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana

URS Engineers, Consulting Engineers, Metairie, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 3

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF	Atterberg Limits LL	PL	PI
6	13.5	Loose dark gray clayey sand w/few shells	37.0	----	-----	----	30	20	10
8	24.0	Loose gray clayey silt w/shell fragments & some sand	34.5	83.9	112.9	790*			
9	29.0	Very loose gray clayey sand w/shell fragments	28.0	95.8	122.7	360*			
10	34.0	Medium stiff gray clay w/silty sand lenses & pockets	52.7	68.8	105.0	1140	81	19	62
14	49.0	Stiff gray clay w/sand pockets & shell fragments	50.7	70.1	105.6	2010			
15	54.0	Stiff greenish-gray silty clay with sandy silt pockets	23.8	101.9	126.2	2365*			

*Unconsolidated Undrained Triaxial Compression Test - One Specimen; Confined at the approximate overburden pressure.

Fig. 13

Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana

URS Engineers, Consulting Engineers, Metairie, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 4

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI
3	5.5	Very sand w/clay pockets, layers & many shell fragments	18.0	103.2	121.8	455*	19	15	4
9	24.0	Very loose gray clayey sand w/shells	30.7	90.1	117.8	370*			
10	29.0	Very soft gray clay w/shells & many sand lenses & pockets	31.0	89.6	117.4	480			
17	52.0	Stiff gray clay w/sand pockets	41.0	79.3	111.9	2240			

*Unconsolidated Undrained Triaxial Compression Test - One Specimen; Confined at the approximate overburden pressure.

Fig. 14

Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana

URS Engineers, Consulting Engineers, Metairie, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 5

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI
1	2.0	Medium stiff gray & tan clay w/sand pockets, some shells & roots	25.1	86.5	108.2	1600*			
2	5.0	Soft gray clay with sand layers & shells	54.1	----	-----	----			
3	8.0	Very soft gray clay w/sand pockets & lenses	55.0	66.9	103.8	----	51	19	32
10	29.0	Loose gray clayey sand w/clay pockets & much shell	29.7	----	-----	----			

*Unconsolidated Undrained Triaxial Compression Test - One Specimen; Confined at the approximate overburden pressure.

Fig. 15

Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana

URS Engineers, Consulting Engineers, Metairie, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 7

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF
2	5.0	Loose gray & tan clayey sand w/many shells	22.7	----	-----	----
8	24.0	Very loose gray clayey silt w/silty clay layers	45.6	74.2	108.0	475*
9	29.0	Loose gray clayey sand w/sandy silt layers & shell fragments	30.3	89.9	117.1	720*
10	34.0	Medium stiff gray clay w/clayey silt & sand pockets	55.7	66.6	103.7	1040
16	54.0	Medium stiff gray clay w/clayey sand pockets & few shell fragments	43.6	76.1	109.3	1735

BORING 8

3	8.0	Medium dense gray silty sand w/clay lenses, pockets & shell fragments	22.2	103.0	125.9	1470*
9	29.0	Soft gray silty clay w/sand pockets & decayed shells	41.2	76.6	108.1	905*
11	39.0	Loose gray clayey sand w/clay layers	32.9	88.3	117.3	635*

*Unconsolidated Undrained Triaxial Compression Test - One Specimen; Confined at the approximate overburden pressure.

Fig. 16

Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana

URS Engineers, Consulting Engineers, Metairie, Louisiana

SUMMARY OF LABORATORY TEST RESULTS

BORING 9

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI
1	2.0	Medium dense brown & gray clayey sand w/silty sand layers, roots & shells (fill)	14.4	----	-----	----			
7	17.5	Soft gray clay w/sand pockets & shell fragments	49.1	71.4	106.5	575	32	21	11
8	20.5	Loose gray silty sand w/sandy clay layers & shells	31.2	----	-----	----			
10	26.5	Very loose gray clayey sand w/silty clay layers & shell fragments	35.5	84.4	114.3	330*			
11	29.5	Soft gray clay w/sand pockets & shell fragments	42.5	77.5	110.4	595*			
13	35.5	Loose gray silty sand w/shell fragments	25.3	----	-----	----			
18	54.0	Stiff greenish-gray clay w/sand pockets	21.0	104.4	126.4	3145			

*Unconsolidated Undrained Triaxial Compression Test - One Specimen; Confined at the approximate overburden pressure.

Fig. 17

Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana

URS Engineers, Consulting Engineers, Metairie, Louisiana

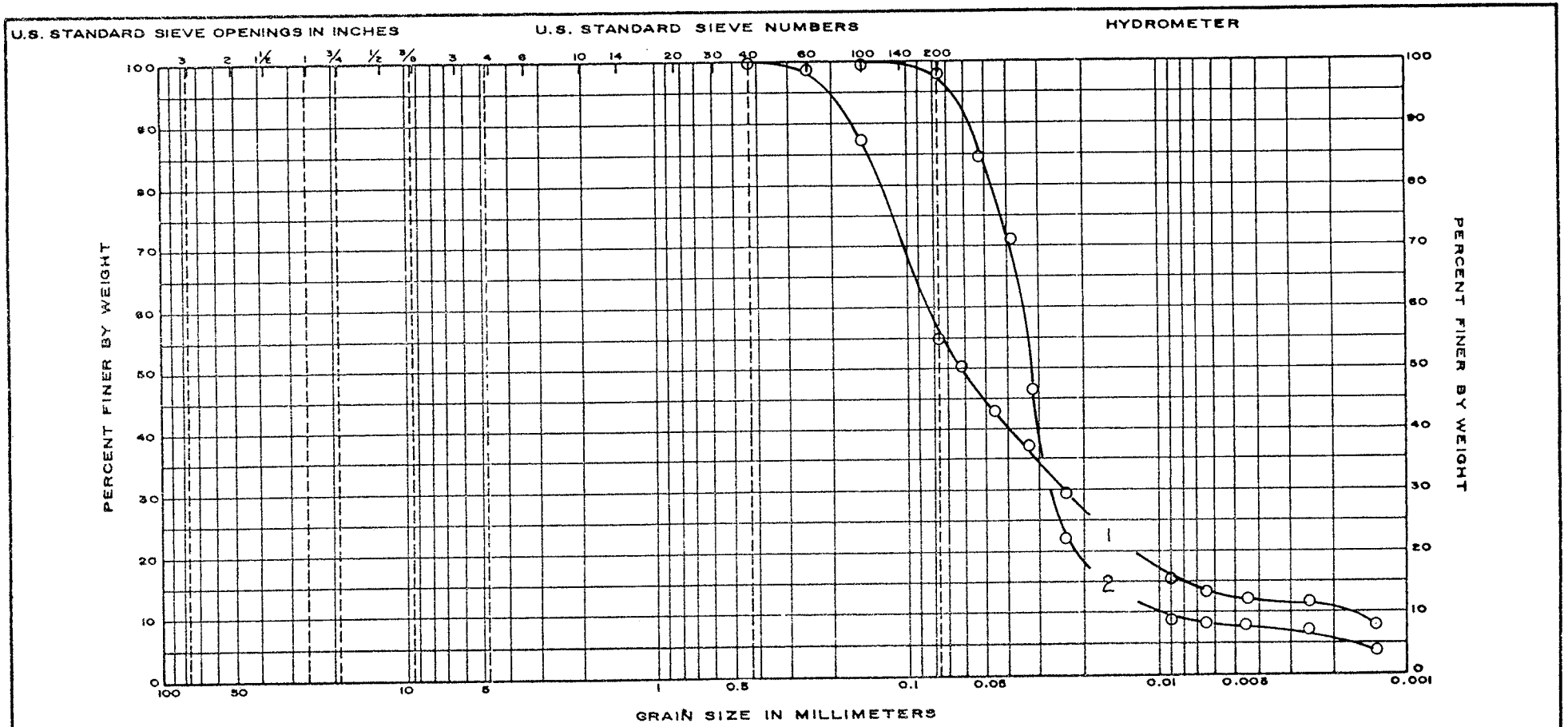
SUMMARY OF LABORATORY TEST RESULTS

BORING 10

Sample No.	Depth In Feet	Classification	Water Content Percent	Density PCF Dry	Density PCF Wet	Unconfined Compressive Strength PSF	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI
8	24.0	Loose gray silty sand w/trace of clay	30.6	91.6	119.7	320*			
10	34.0	Medium stiff gray clay w/sand pockets	45.6	74.6	108.7	1070	56	21	35
14	48.5	Soft gray clay w/shell fragments & sand pockets	44.4	----	------	----			

*Unconsolidated Undrained Triaxial Compression Test - One Specimen; Confined at the approximate overburden pressure.

Fig. 18



UNIFIED	GRAVEL			SAND			SILT OR CLAY	
	COARSE	FINE		COARSE	MEDIUM	FINE		
AASHO	GRAVEL			SAND			SILT	CLAY
	COARSE	MEDIUM	FINE	COARSE		FINE		

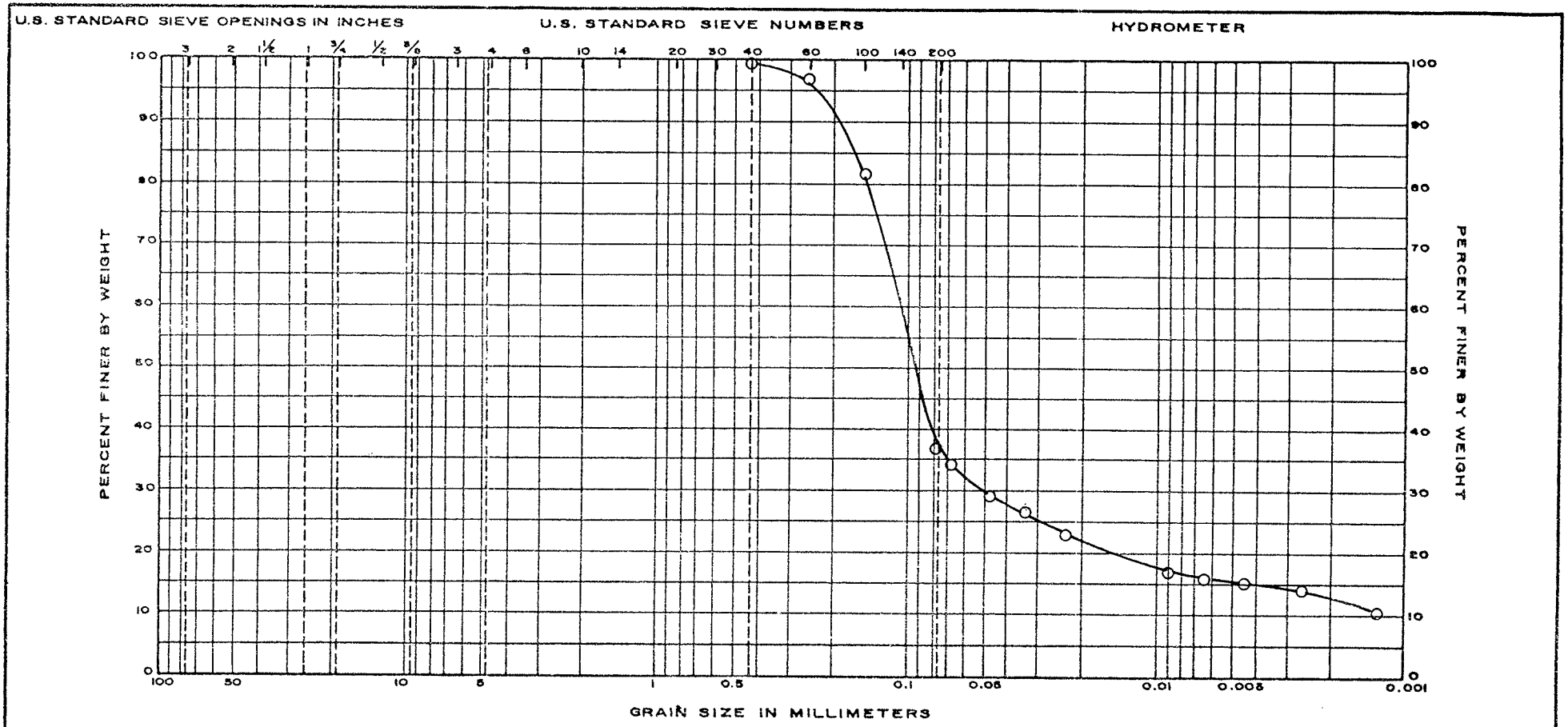
GRAIN SIZE ANALYSIS

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH IN FT.	NATURAL WATER CONTENT	ATTERBERG LIMITS LL	PL	PI
1	1	3	6.0	D_{10} Size = 0.0020 mm			
2	1	7	19.0	D_{10} Size = 0.0100 mm			

PROJECT Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwall & Levees, New Orleans, La.
For: Board of Levee Commissioners
of the Orleans Levee District, New Orleans, La.
URS Engineers, Consulting Engineers, Metairie, La.

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
METAIRIE, LA.

Fig. 19



UNIFIED	GRAVEL			SAND			SILT OR CLAY		
	COARSE		FINE	COARSE	MEDIUM	FINE			
AASHO	GRAVEL			SAND			SILT		CLAY
	COARSE	MEDIUM	FINE	COARSE		FINE			

GRAIN SIZE ANALYSIS

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH IN FT.	NATURAL WATER CONTENT	ATTERBERG LIMITS LL	PL	PI
	2	4	8.5	D_{10} Size = 0.0012 mm			

PROJECT Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwall & Levees, New Orleans, La.
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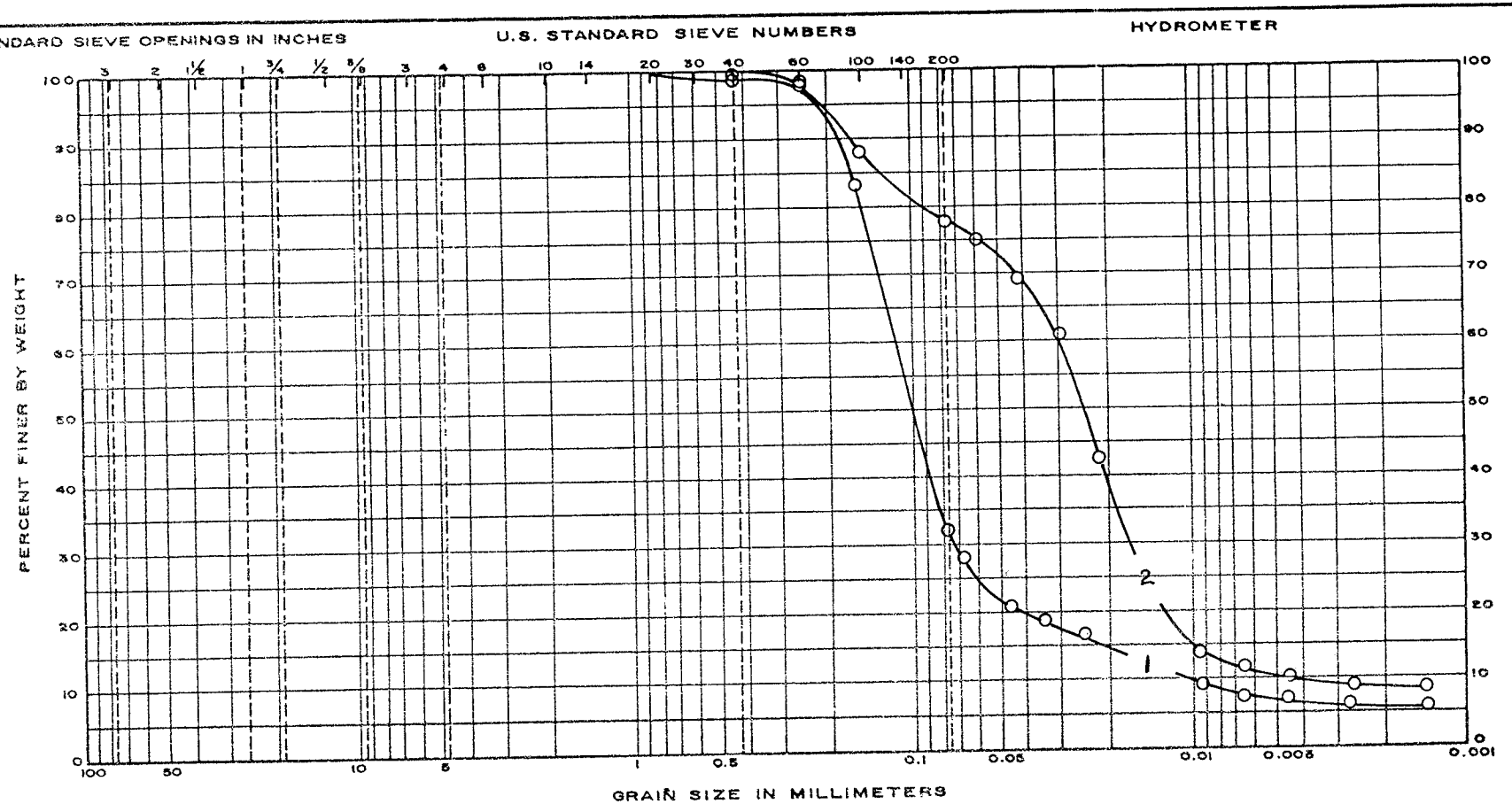
of the Orleans Levee District, New Orleans, La.
URS Engineers, Consulting Engineers, Metairie, La.

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
METAIRIE, LA.

Fig. 20



UNIFIED	GRAVEL			SAND			SILT OR CLAY	
	COARSE	FINE		COARSE	MEDIUM	FINE		
AASHO	GRAVEL			SAND			SILT	CLAY
	COARSE	MEDIUM	FINE		COARSE	FINE		

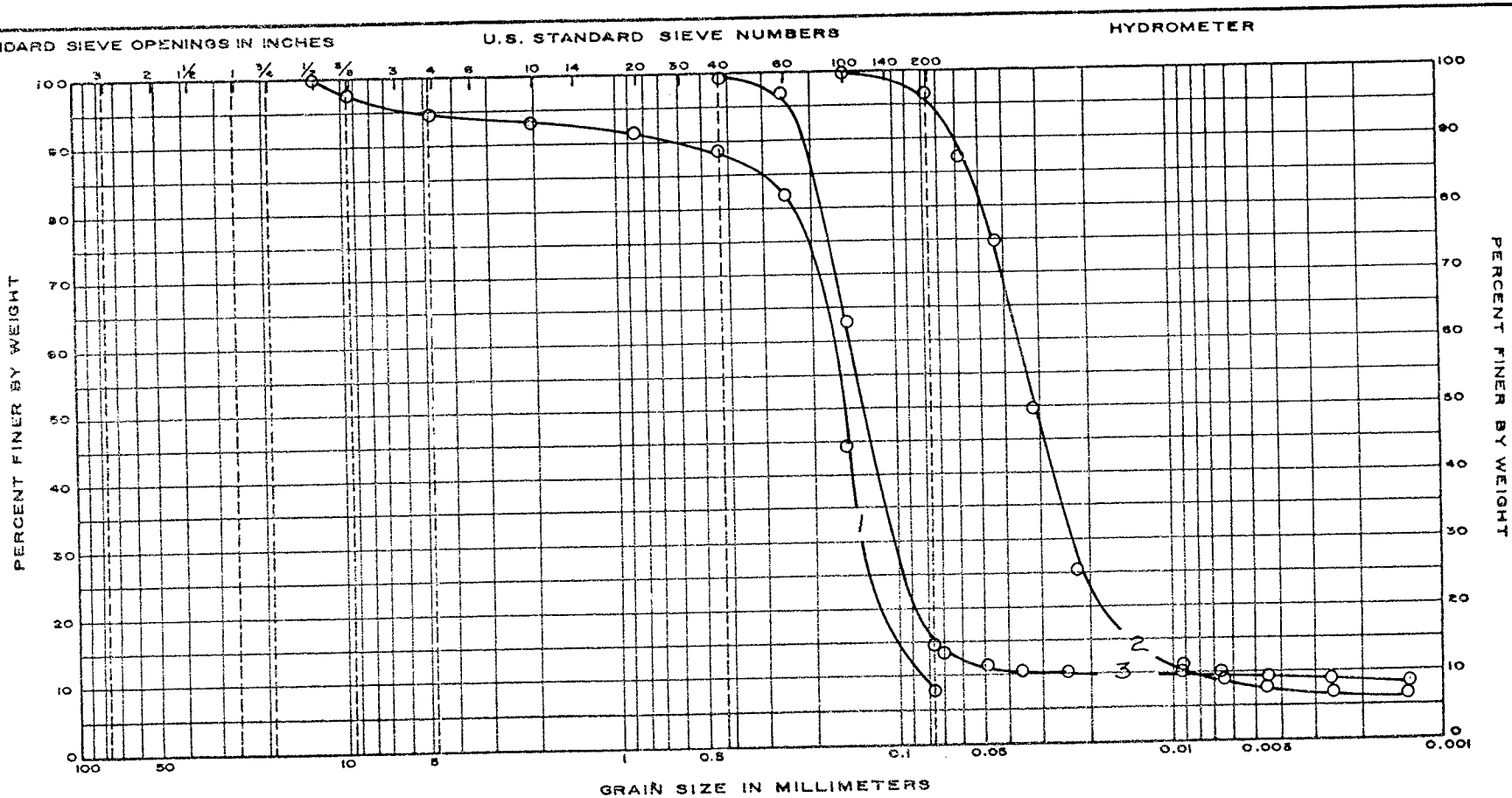
GRAIN SIZE ANALYSIS

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH IN FT.	NATURAL WATER CONTENT	ATTERBERG LIMITS LL	PL	PI
1	3	3	6.0	D_{10} Size = 0.0120 mm			
2	3	8	24.0	D_{10} Size = 0.0045 mm			

PROJECT Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwall & Levees, New Orleans, La.
For: Board of Levee Commissioners
of the Orleans Levee District, New Orleans, La.
URS Engineers, Consulting Engineers, Metairie, La.

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
METAIRIE, LA.

Fig. 21



UNIFIED	GRAVEL			SAND			SILT OR CLAY	
	COARSE	FINE		COARSE	MEDIUM	FINE		
AASHO	GRAVEL			SAND			SILT	CLAY
	COARSE	MEDIUM	FINE		COARSE	FINE		

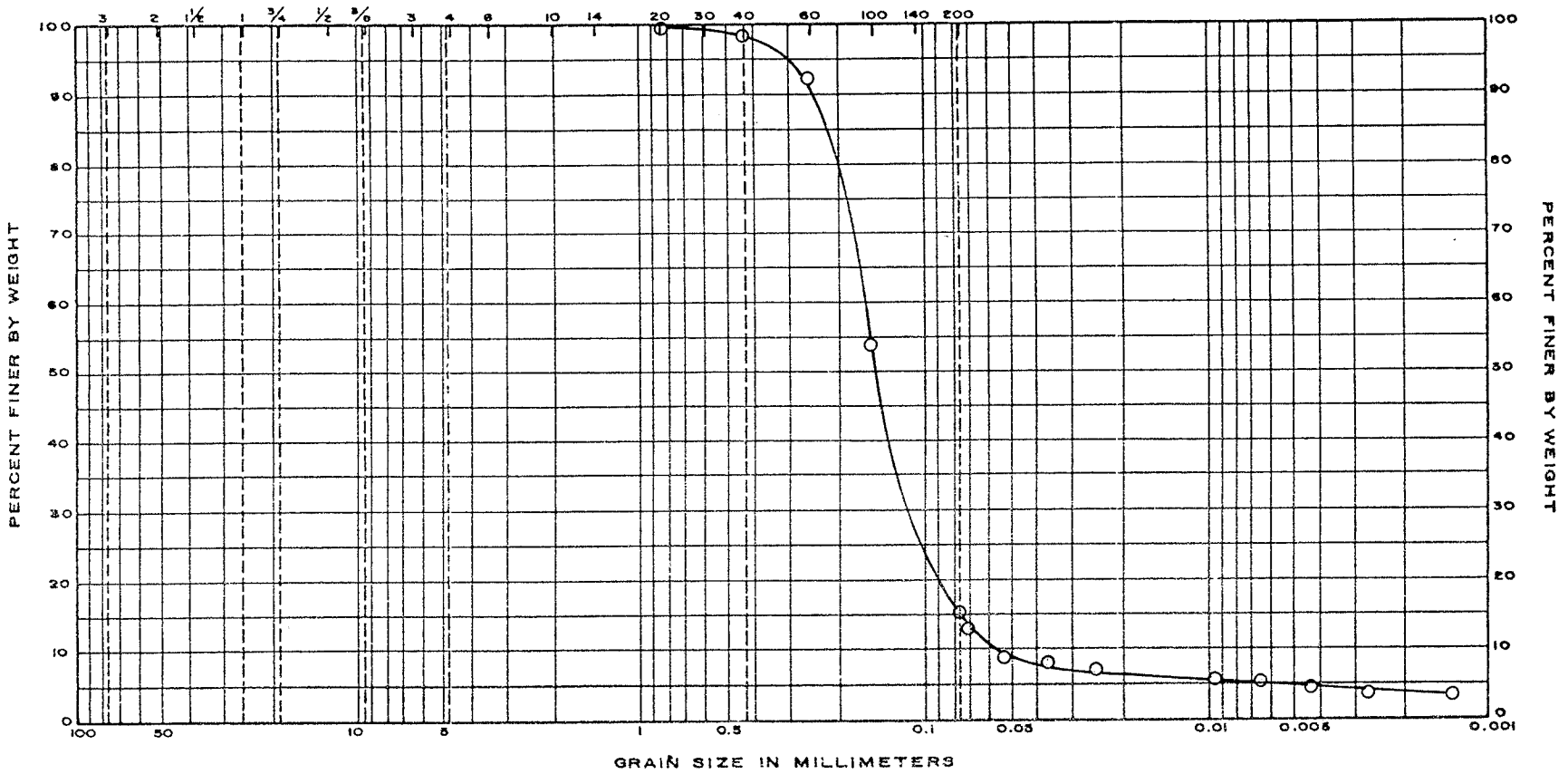
GRAIN SIZE ANALYSIS

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH IN FT.	NATURAL WATER CONTENT	ATTERBERG LIMITS LL	PL	PI
1	4	5	9.0	D_{10} Size	= 0.083 mm		
2	5	6	16.0	D_{10} Size	= 0.0080 mm		
3	5	13	38.5	D_{10} Size	= 0.0065 mm		

PROJECT Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwall & Levees, New Orleans, La.
For: Board of Levee Commissioners
of the Orleans Levee District, New Orleans, La.
URS Engineers, Consulting Engineers, Metairie, La.

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
METAIRIE, LA.

Fig. 22



UNIFIED	GRAVEL		SAND			SILT OR CLAY		
	COARSE	FINE	COARSE	MEDIUM	FINE			
AASHO	GRAVEL			SAND		SILT	CLAY	
	COARSE	MEDIUM	FINE	COARSE	FINE			

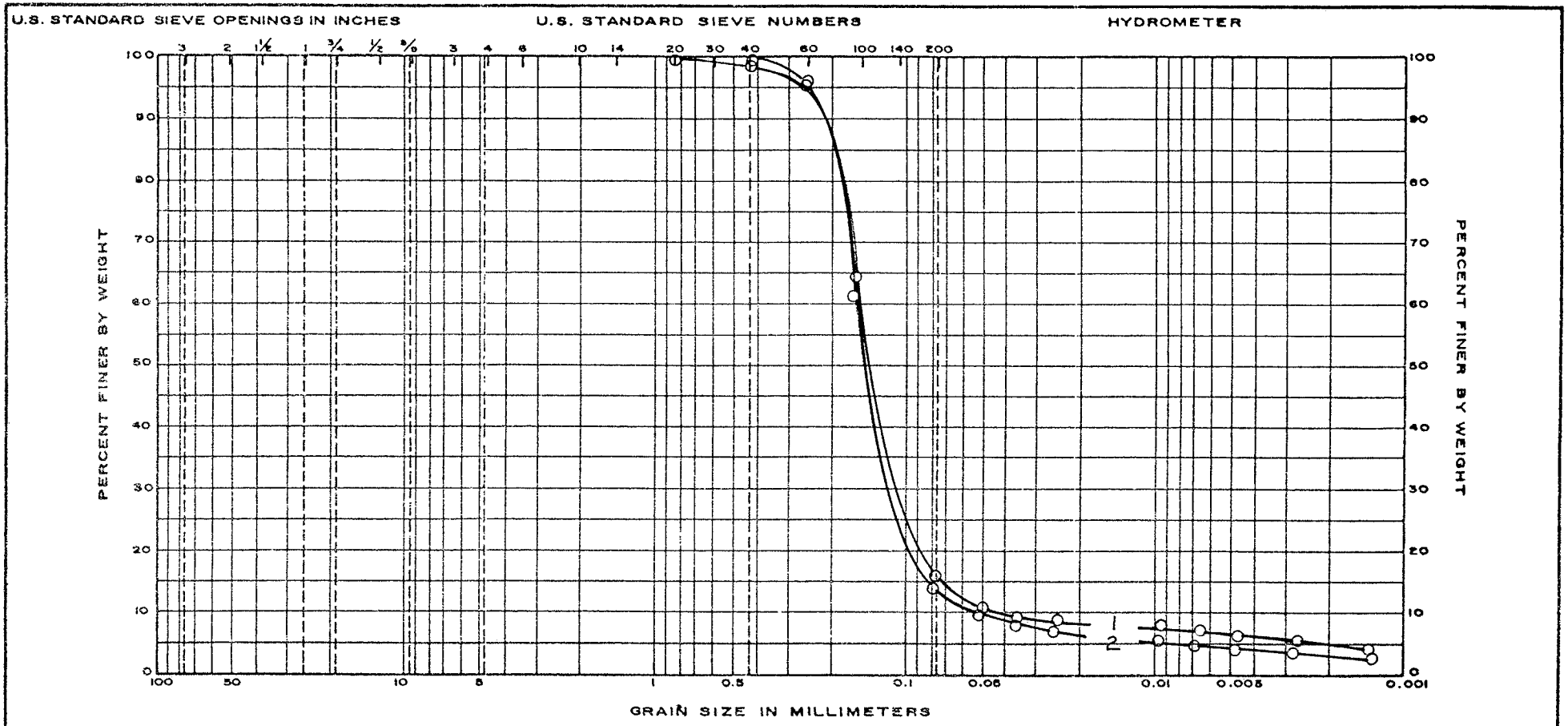
GRAIN SIZE ANALYSIS

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH IN FT.	NATURAL WATER CONTENT	ATTERBERG LIMITS LL	PL	PI
	7	3	8.5	D_{10} Size = 0.056 mm			

PROJECT Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwall & Levees, New Orleans, La
For: Board of Levee Commissioners
of the Orleans Levee District, New Orleans, La.
URS Engineers, Consulting Engineers, Metairie, La.

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
METAIRIE, LA.

Fig. 23



UNIFIED	GRAVEL			SAND			SILT OR CLAY	
	COARSE		FINE	COARSE	MEDIUM	FINE		
AASHO	GRAVEL			SAND			SILT	CLAY
	COARSE	MEDIUM	FINE	COARSE		FINE		

GRAIN SIZE ANALYSIS

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH IN FT.	NATURAL WATER CONTENT	ATTERBERG LIMITS LL	PL	PI
1	8	2	3.5	D_{10} Size = 0.047 mm			
2	8	5	12.5	D_{10} Size = 0.050 mm			

PROJECT Geotechnical Investigation

Orleans Levee District

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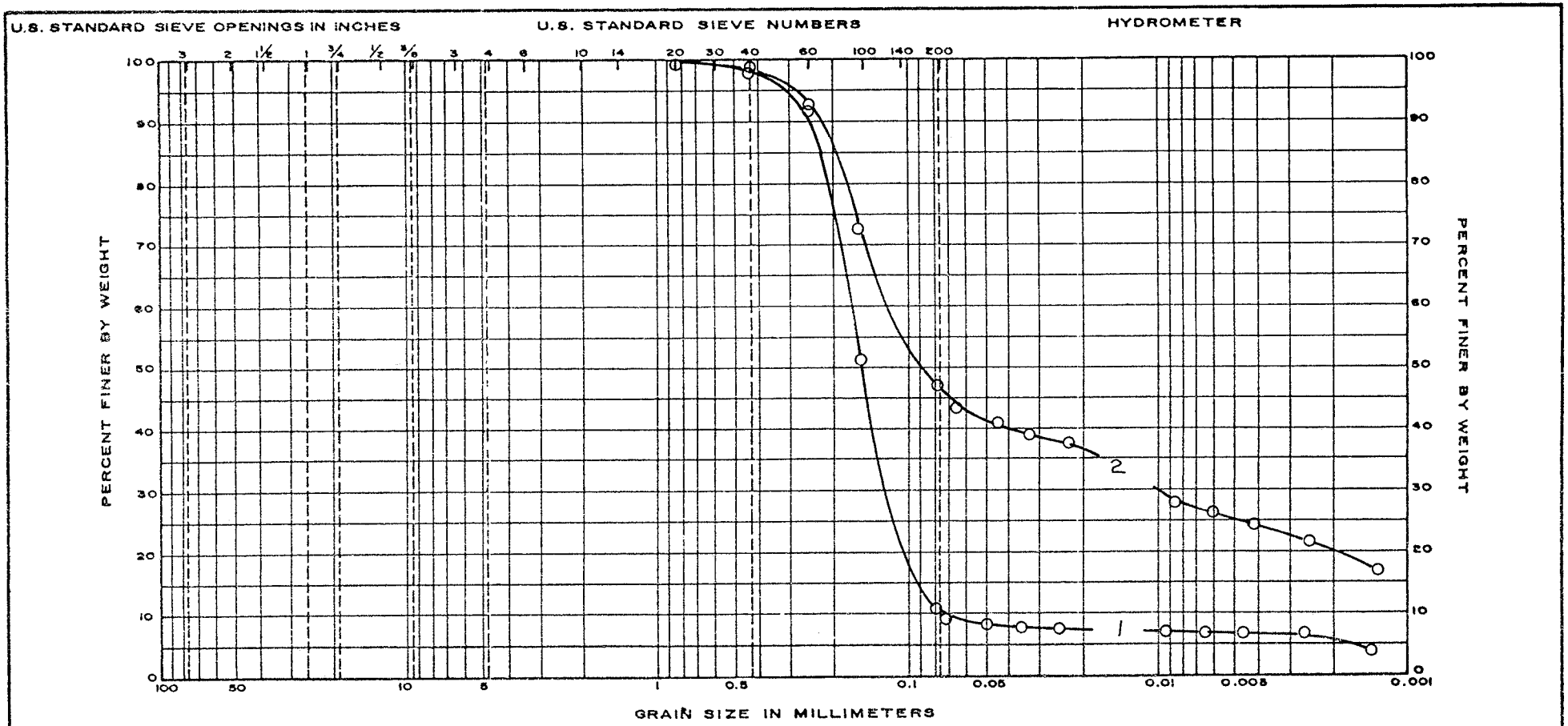
METAIRIE, LA.

Fig. 24



UNIFIED	GRAVEL		SAND			SILT OR CLAY		
	COARSE	FINE	COARSE	MEDIUM	FINE			
AASHO	GRAVEL			SAND		SILT	CLAY	
	COARSE	MEDIUM	FINE	COARSE	FINE			

GRAIN SIZE ANALYSIS

CURVE NO.	BORING NO.	SAMPLE NO.	DEPTH IN FT.	NATURAL WATER CONTENT	ATTERBERG LIMITS		
					LL	PL	PI
1	9	2	3.5	D_{10} Size = 0.072 mm			
2	10	3	6.0				

PROJECT Geotechnical Investigation

Orleans Levee District

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URS Engineers, Consulting Engineers, Metairie, La.

EUSTIS ENGINEERING COMPANY
CONSULTING FOUNDATION ENGINEERS
METAIRIE, LA.

Fig. 25

Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana
URS Engineers, Consulting Engineers, Metairie, Louisiana

CONSOLIDATION TEST RESULTS

BORING NO. 5 SAMPLE NO. 3 DEPTH IN FEET 8.0

CLASSIFICATION Very soft gray clay w/many silt & sand lenses

TEST CONDITION Specimen was inundated at the approximate overburden pressure.

Water Content Percent	Unit Weight Lb/cu ft Dry	Unit Weight Lb/cu ft Wet	Initial Percent Saturation	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Specific Gravity Est.	Initial Void Ratio
45.2	75.5	109.6	99	51	19	32	2.70	1.23

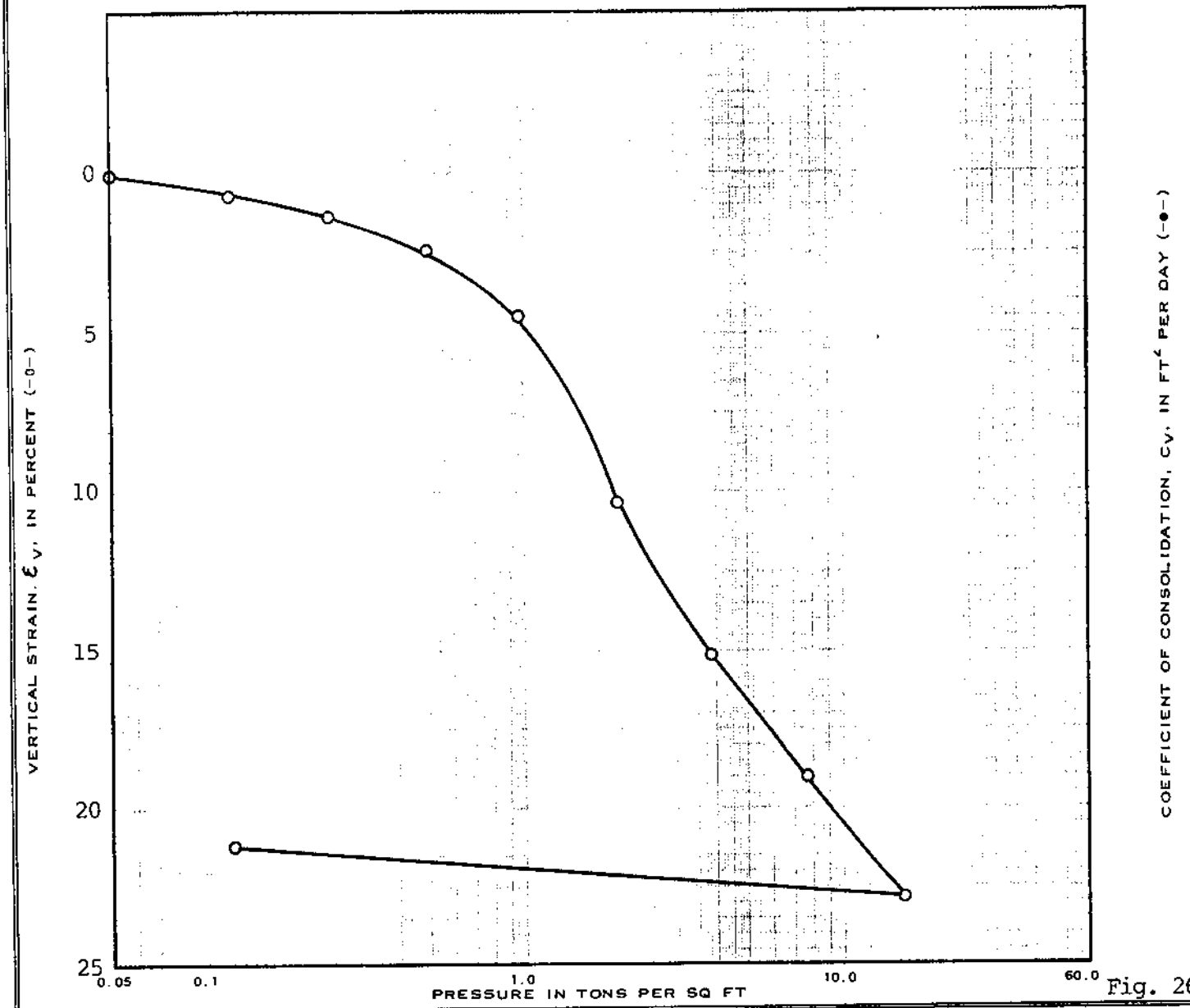

Fig. 26

EUSTIS ENGINEERING COMPANY
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METAIRIE, LOUISIANA

Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana
URS Engineers, Consulting Engineers, Metairie, Louisiana

CONSOLIDATION TEST RESULTS

BORING NO. 5 SAMPLE NO. 9 DEPTH IN FEET 26.0

CLASSIFICATION Soft gray silty clay w/clay layers, sand lenses, pockets & shell fragment

TEST CONDITION Specimen was inundated at the approximate overburden pressure.

Water Content Percent	Unit Weight Lb/cu ft Dry	Unit Weight Lb/cu ft Wet	Initial Percent Saturation	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Specific Gravity Est.	Initial Void Ratio
38.6	79.9	110.7	94	60	21	39	2.70	1.11

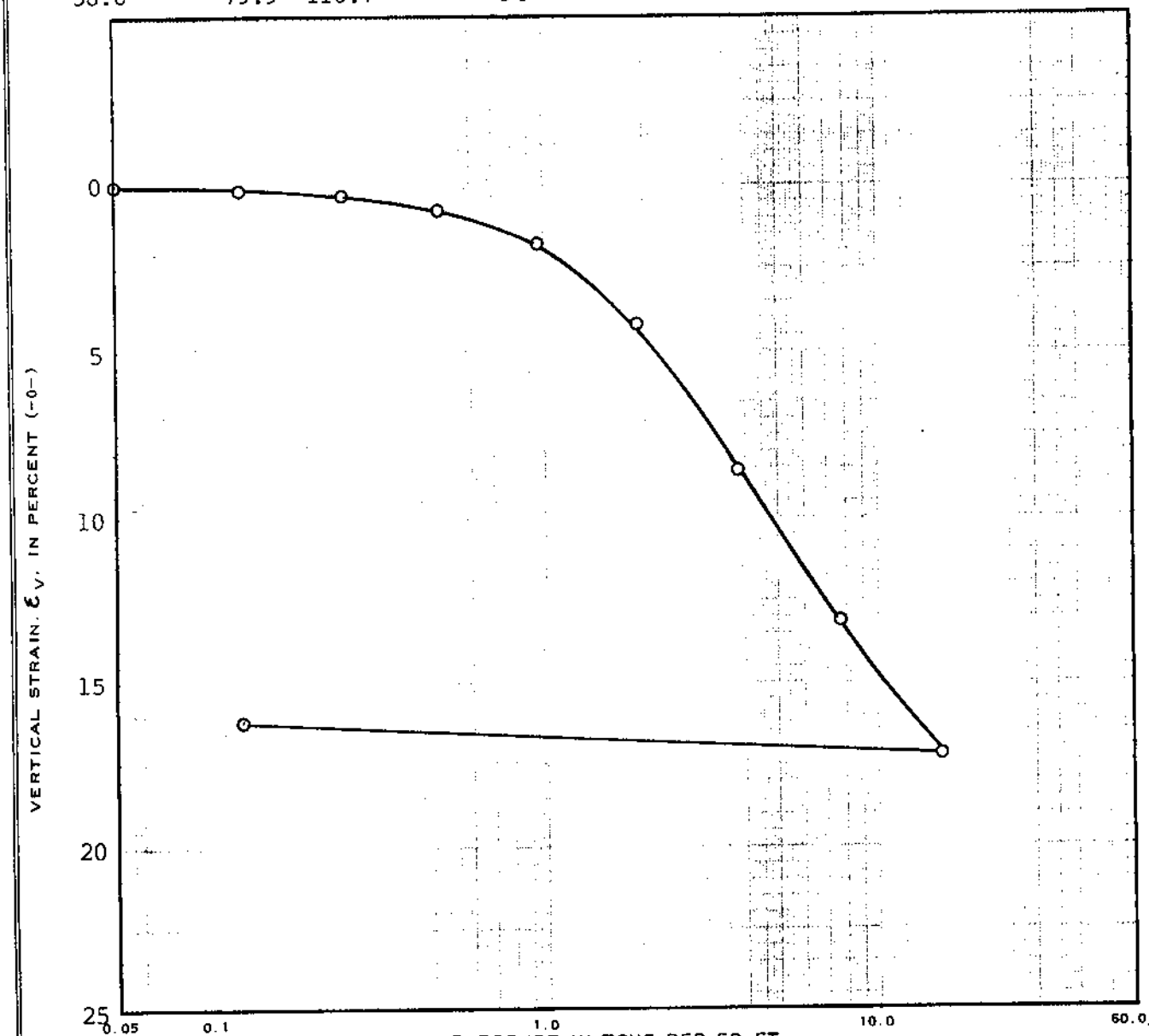
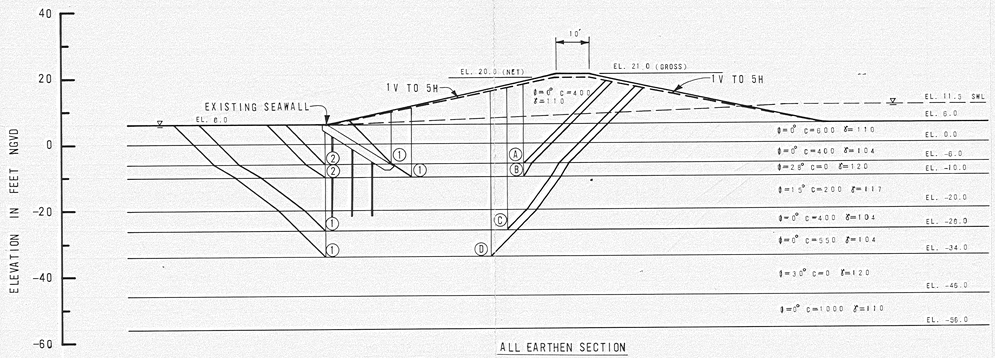


Fig. 27

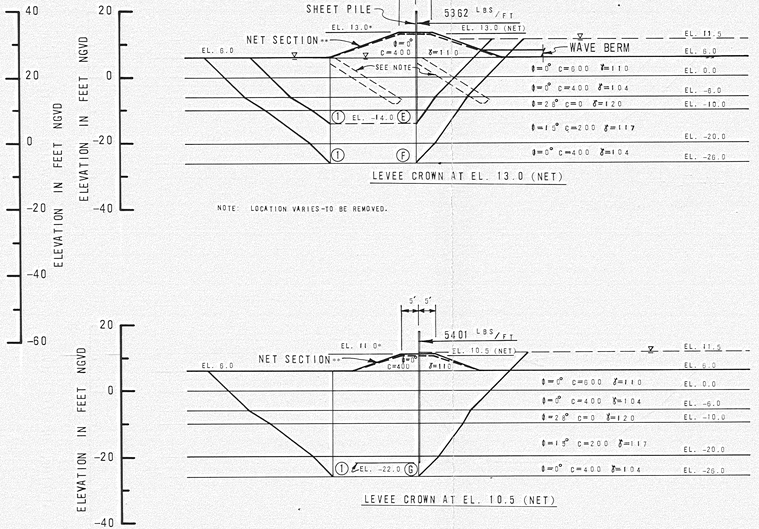
EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LOUISIANA



ALL EARTHEN SECTION

SLIP SURFACE			DRIVING FORCE			WAVE FORCE	RESISTING FORCE				FACTOR OF SAFETY
NUMBER		ELEV.	$+D_A$	$-D_P$	ΣD		$+R_A$	$+R_B$	$+R_P$	ΣR	$\Sigma R/\Sigma D$
A	1	-6	38336	11904	26432	———	230224	16000	0	390224	1.47*
A	2	-6	38336	7812	30524	———	230224	23483	12000	58507	1.92
B	1	-10	50324	19331	30993	———	280334	220933	9284	509551	1.65*
B	2	-10	50324	13908	36416	———	280334	356550	16594	802778	2.20
C	1	-26	111596.1	56874	50087	———	457447	220000	338466	1015913	1.72
D	1	-34	157963	88695	69268	———	544225	275000	426466	1245571	1.80
E	1	-14	39097	14824	29545	5362	205445	205885	15578	585889	1.98
F	1	-26	75581	50861	24092	5362	274442	104000	339668	718111	2.98
G	1	-26	71764	50861	20304	5401	265753	104000	339668	709422	3.49

* ASSUMES PASSIVE RESISTING FORCES (P_p) EQUAL TO ZERO DUE TO POTENTIAL DIFFERENTIAL SETTLEMENT AT EXISTING SEAWALL.



LEVEE / I WALL COMBINATION

LEGEND

γ=SATURATED UNIT WEIGHT IN POUNDS PER CU. FT.
C=COHESION IN POUNDS PER SQ. FT.
Φ=ANGLE OF INTERNAL FRICTION IN DEGREES.
R=HORIZONTAL FORCE DUE TO SOIL SHEAR STRENGTH.
D=HORIZONTAL COMPONENT OF SOIL WEIGHT IN WEDGE.
SUBSCRIPT A REFERS TO ACTIVE WEDGE.
SUBSCRIPT B REFERS TO CENTRAL BLOCK.
SUBSCRIPT P REFERS TO PASSIVE WEDGE.
PIEZOMETRIC SURFACE.
STABILITY BASED ON LMVD METHOD OF PLANES.

GEOTECHNICAL INVESTIGATION
ORLEANS LEVEE DISTRICT
PONTCHARTRAIN BEACH FLOODWALLS AND LEVEES
NEW ORLEANS, LOUISIANA

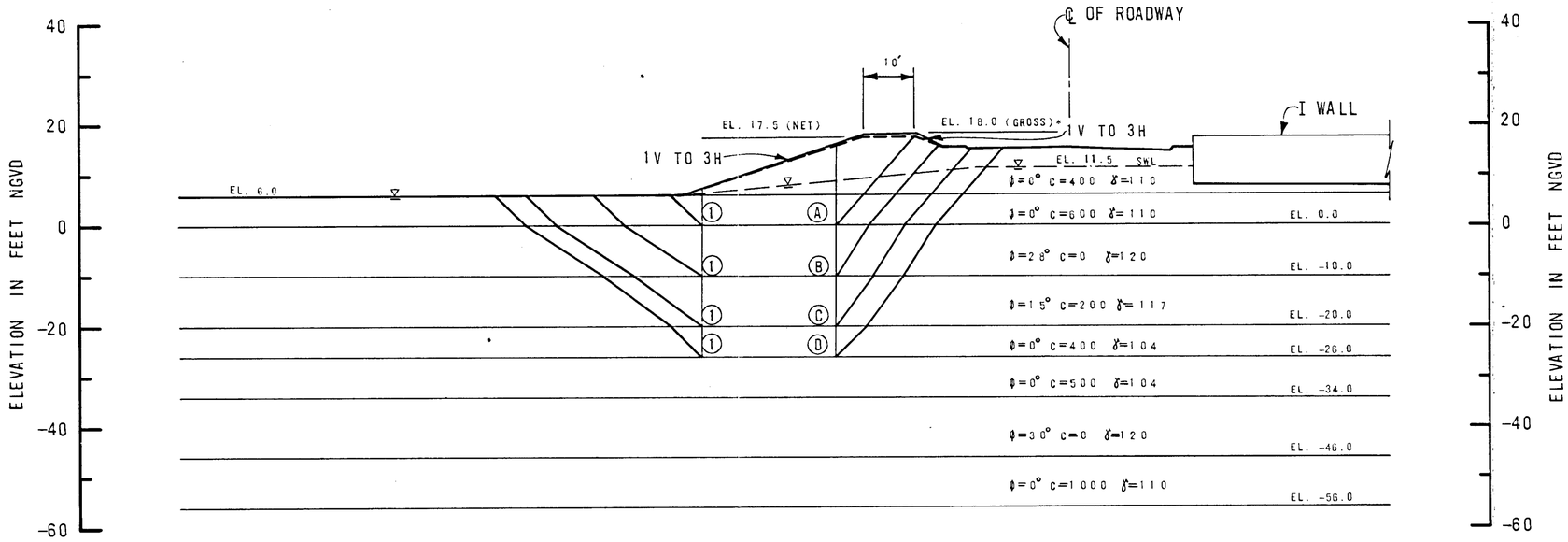
STABILITY ANALYSES

FOR
BOARD OF LEVEE COMMISSIONERS OF
THE NEW ORLEANS LEVEE DISTRICT
NEW ORLEANS, LOUISIANA

URS ENGINEERS
METAIRIE, LOUISIANA

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
DECEMBER 1985 METAIRIE, LA.

FIGURE 28



RAMPS AT LAKESHORE DRIVE

* GROSS SECTION ANALYZED.

SLIP SURFACE			DRIVING FORCE			RESISTING FORCE				FACTOR OF SAFETY
NUMBER		ELEV.	$+D_A$	$-D_P$	ΣD	$+R_A$	$+R_B$	$+R_P$	ΣR	$\Sigma R/\Sigma D$
A	1	0	17191	2252	14939	16319	7200	9391	32910	2.20
B	1	-10	418466	14473	27373	24693	15319	17014	57026	2.08
C	1	-20	77710	39237	38473	36153	12000	30359	78512	2.04
D	1	-26	103993	59353	44640	40916	12000	35253	88159	1.97

LEGEND

SEE FIGURE 28 FOR DEFINITION OF DESIGN PARAMETERS.

GEOTECHNICAL INVESTIGATION
ORLEANS LEVEE DISTRICT
PONTCHARTRAIN BEACH FLOODWALLS AND LEVEES
NEW ORLEANS, LOUISIANA

STABILITY ANALYSES

FOR
BOARD OF LEVEE COMMISSIONERS OF
THE NEW ORLEANS LEVEE DISTRICT
NEW ORLEANS, LOUISIANA

URS ENGINEERS
METAIRIE, LOUISIANA

EUSTIS ENGINEERING COMPANY
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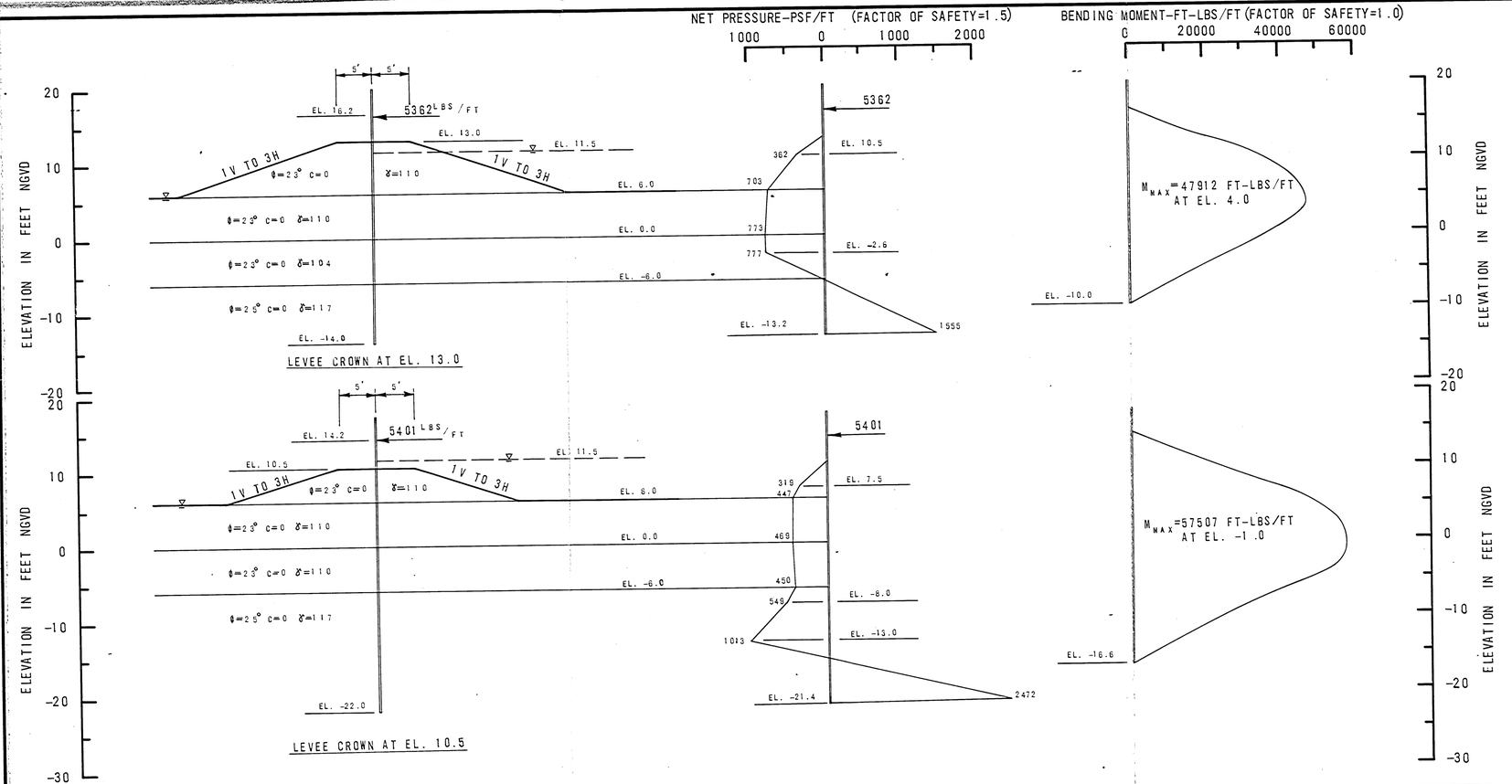
DECEMBER 1985 METAIRIE, LA.

FIGURE 29



LEGEND

γ=SATURATED UNIT WEIGHT IN POUNDS PER CU. FT.
C=COHESION IN POUNDS PER SQ. FT.
Φ=ANGLE OF INTERNAL FRICTION IN DEGREES.
R=HORIZONTAL FORCE DUE TO SOIL SHEAR STRENGTH.
D=HORIZONTAL COMPONENT OF SOIL WEIGHT IN WEDGE.
SUBSCRIPT A REFERS TO ACTIVE WEDGE.
SUBSCRIPT B REFERS TO CENTRAL BLOCK.
SUBSCRIPT P REFERS TO PASSIVE WEDGE.
▽ PIEZOMETRIC SURFACE
STABILITY BASED ON LMVD METHOD OF PLANES.

GEOTECHNICAL INVESTIGATION
ORLEANS LEVEE DISTRICT
PONTCHARTRAIN BEACH FLOODWALLS AND LEVEES
NEW ORLEANS, LOUISIANA

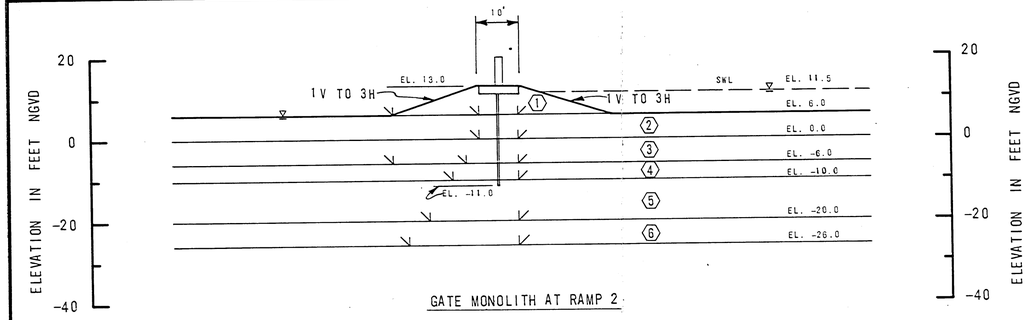
CANTILEVER SHEETPILE ANALYSES

FOR
BOARD OF LEVEE COMMISSIONERS OF
THE NEW ORLEANS LEVEE DISTRICT
NEW ORLEANS, LOUISIANA

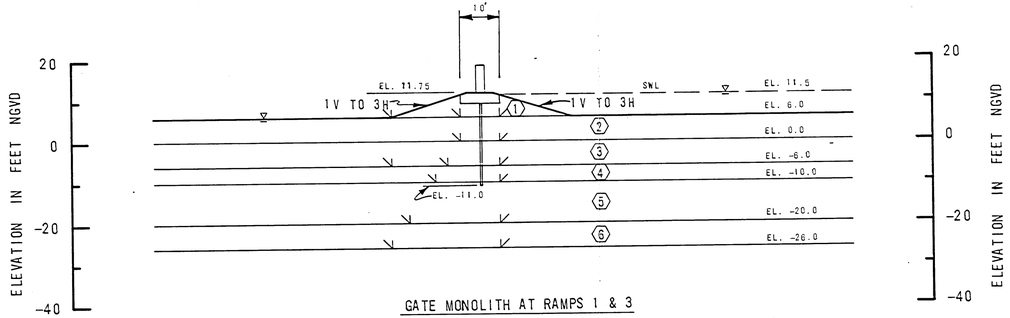
URS ENGINEERS
METAIRIE, LOUISIANA

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
DECEMBER 1985 METAIRIE, LA.

FIGURE 30



GATE MONOLITH AT RAMP 2



GATE MONOLITH AT RAMPS 1 & 3

STRATUM	Φ_D *	γ_{SAT}	C_D *
1	0	110	307
2	0	110	461
3	0	104	307
4	22.2	120	0
5	11.6	117	154
6	0	104	307

* SUBSCRIPT "D" INDICATES DEVELOPED SHEAR STRENGTH PARAMETERS FACTORED BY A FACTOR OF SAFETY OF 1.3.

FAILURE SURFACE ELEVATION	DISTANCE TO FACE OF PASSIVE WEDGE (FT)	AT RAMPS 1 & 3			AT RAMP 2		
		D_A	$D_P + \Sigma R$	ΔE_c	D_A	$D_P + \Sigma R$	ΔE_c
6	10	1484	9382	-7898	2864	10971	-8107
0	10	6489	22812	-16323	7356	25102	-17746
-6	12.5	14918	34618	-19700	16106	37684	-21578
-10	15	22806	44823	-22017	24316	48600	-24284
-20	22	50096	77482	-27386	51917	79216	-27299
-26	26	71514	104758	-33244	73288	105577	-32289
6	27	1484	10822	-9338	———	———	———
-6	27	14918	34483	-19565	———	———	———
6	31	———	———	———	2864	12742	-9878
-6	31	———	———	———	16106	36214	-20108

LEGEND

δ=SATURATED UNIT WEIGHT IN POUNDS PER CU. FT.
C=COHESION IN POUNDS PER SQ. FT.
Φ=ANGLE OF INTERNAL FRICTION IN DEGREES.
R=HORIZONTAL FORCE DUE TO SOIL SHEAR STRENGTH.
D=HORIZONTAL COMPONENT OF SOIL WEIGHT IN WEDGE.
ΔE_c=SUMMATION OF HORIZONTAL FORCES = $D_A - (R_A + R_B + R_P)$
SUBSCRIPT A REFERS TO ACTIVE WEDGE.
SUBSCRIPT B REFERS TO CENTRAL BLOCK.
SUBSCRIPT P REFERS TO PASSIVE WEDGE.
▽ PIEZOMETRIC SURFACE
STABILITY BASED ON LMVD METHOD OF PLANES.

GEOTECHNICAL INVESTIGATION
ORLEANS LEVEE DISTRICT
PONTCHARTRAIN BEACH FLOODWALLS AND LEVEES
NEW ORLEANS, LOUISIANA

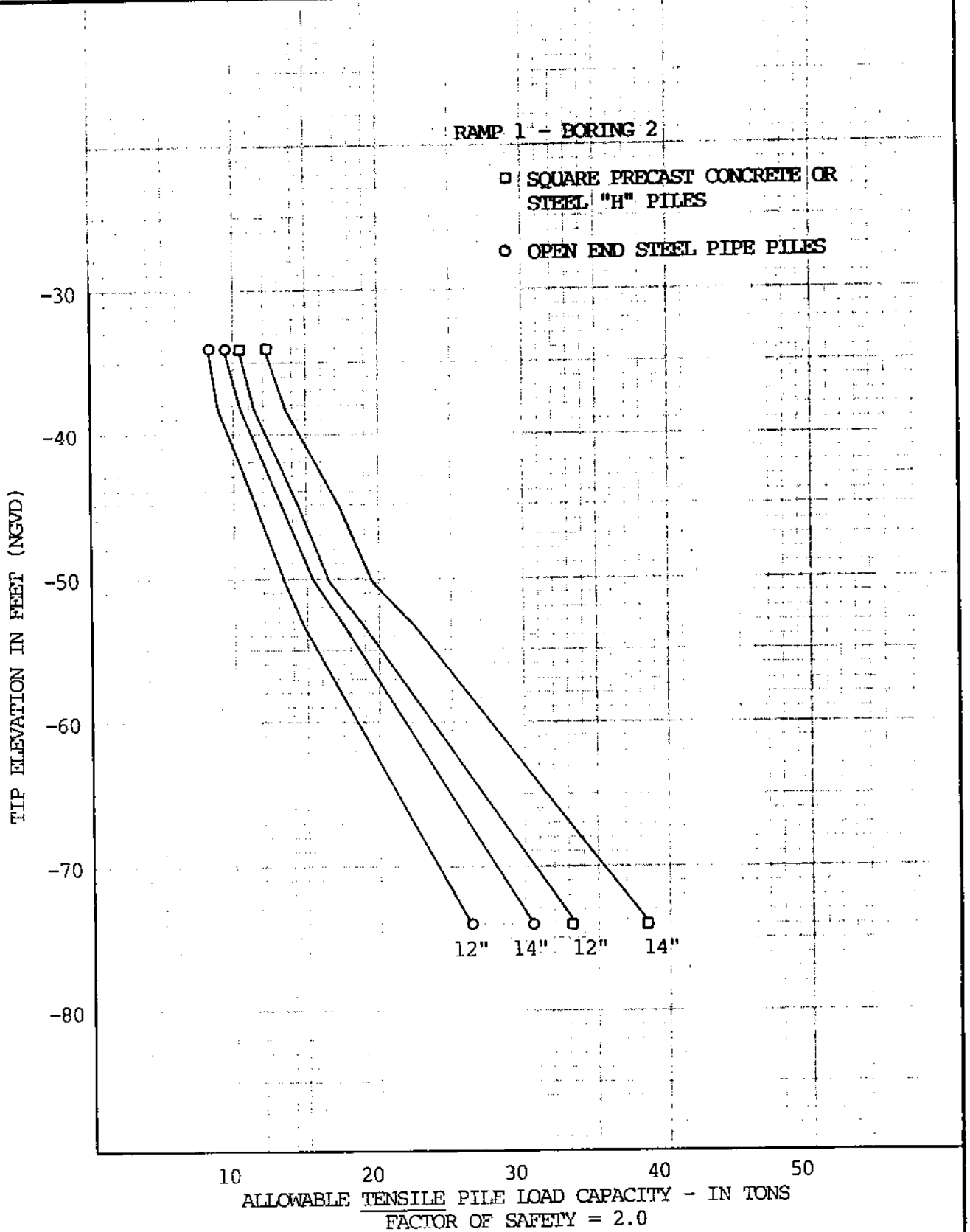
DEEP SEATED STABILITY ANALYSES
AT GATE MONOLITHS

FOR
BOARD OF LEVEE COMMISSIONERS OF
THE NEW ORLEANS LEVEE DISTRICT
NEW ORLEANS, LOUISIANA

URS ENGINEERS
METAIRIE, LOUISIANA

EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
DECEMBER 1985 METAIRIE, LA.

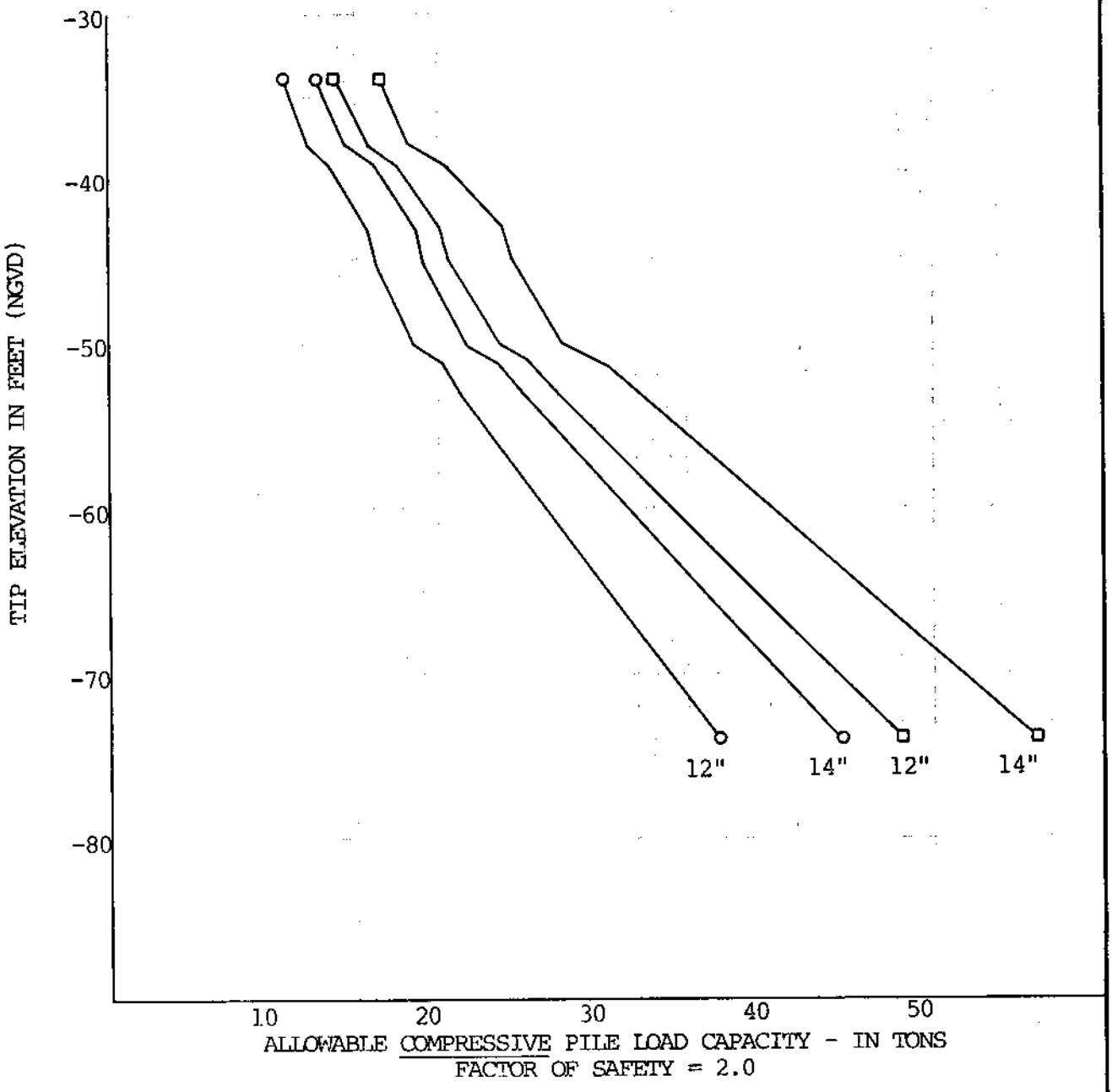
FIGURE 31



Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
URS Engineers, Consulting Engineers, Metairie, Louisiana

Fig. 32

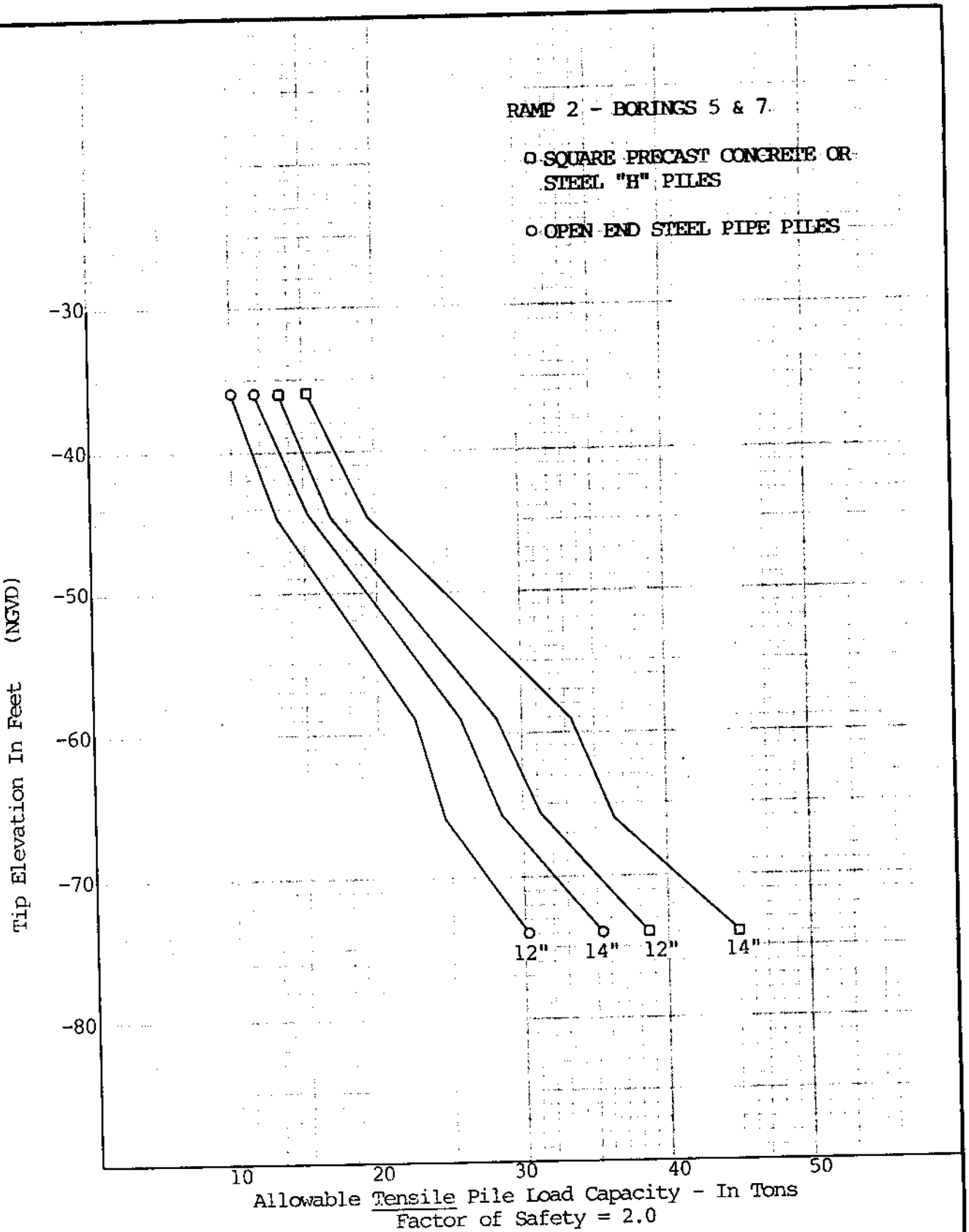


Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District

URS Engineers, Consulting Engineers, Metairie, Louisiana

Fig. 33

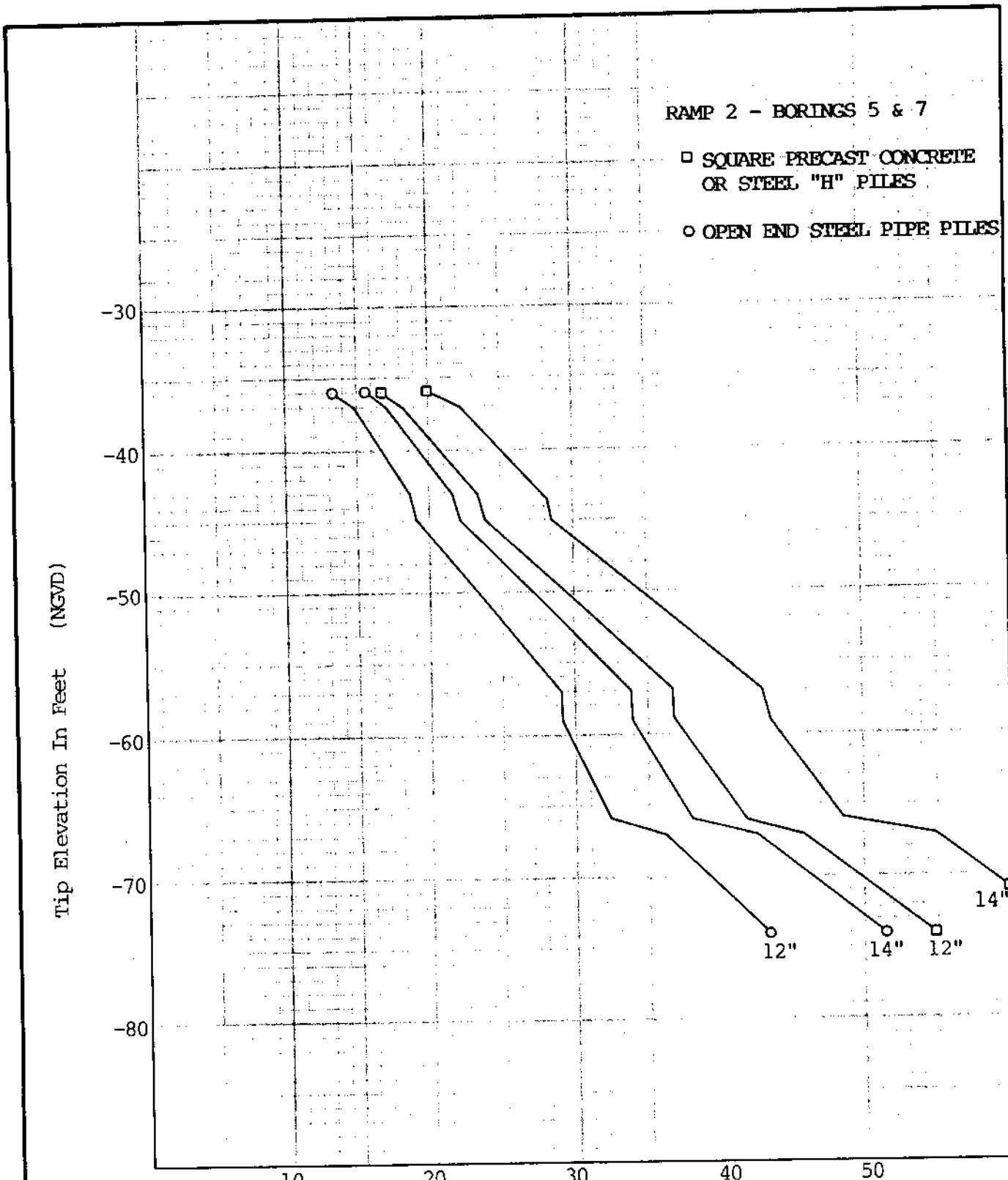


Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana
URS Engineers, Consulting Engineers, Metairie, Louisiana

Fig. 34

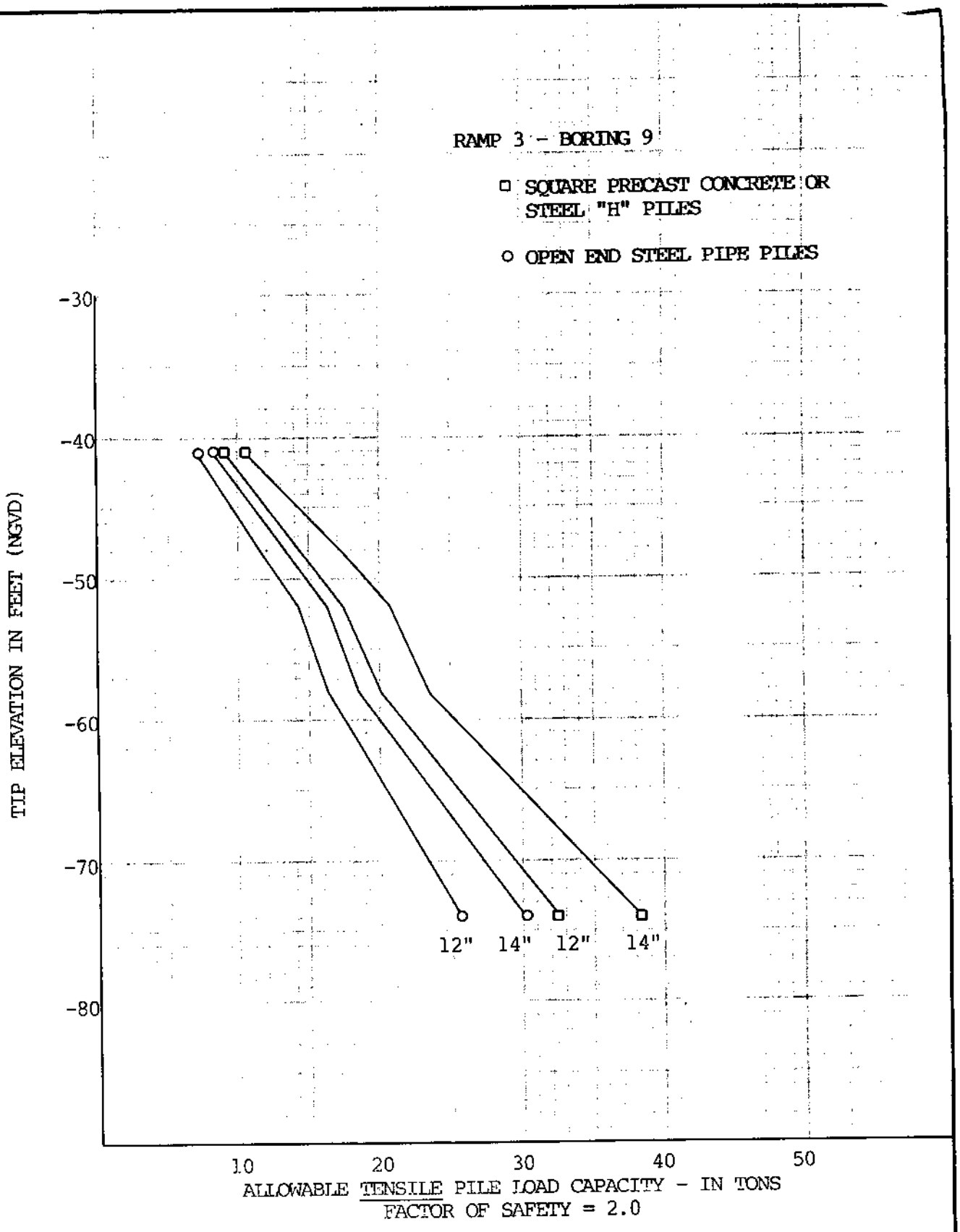
EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.



Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana
URS Engineers, Consulting Engineers, Metairie, Louisiana

Fig. 35

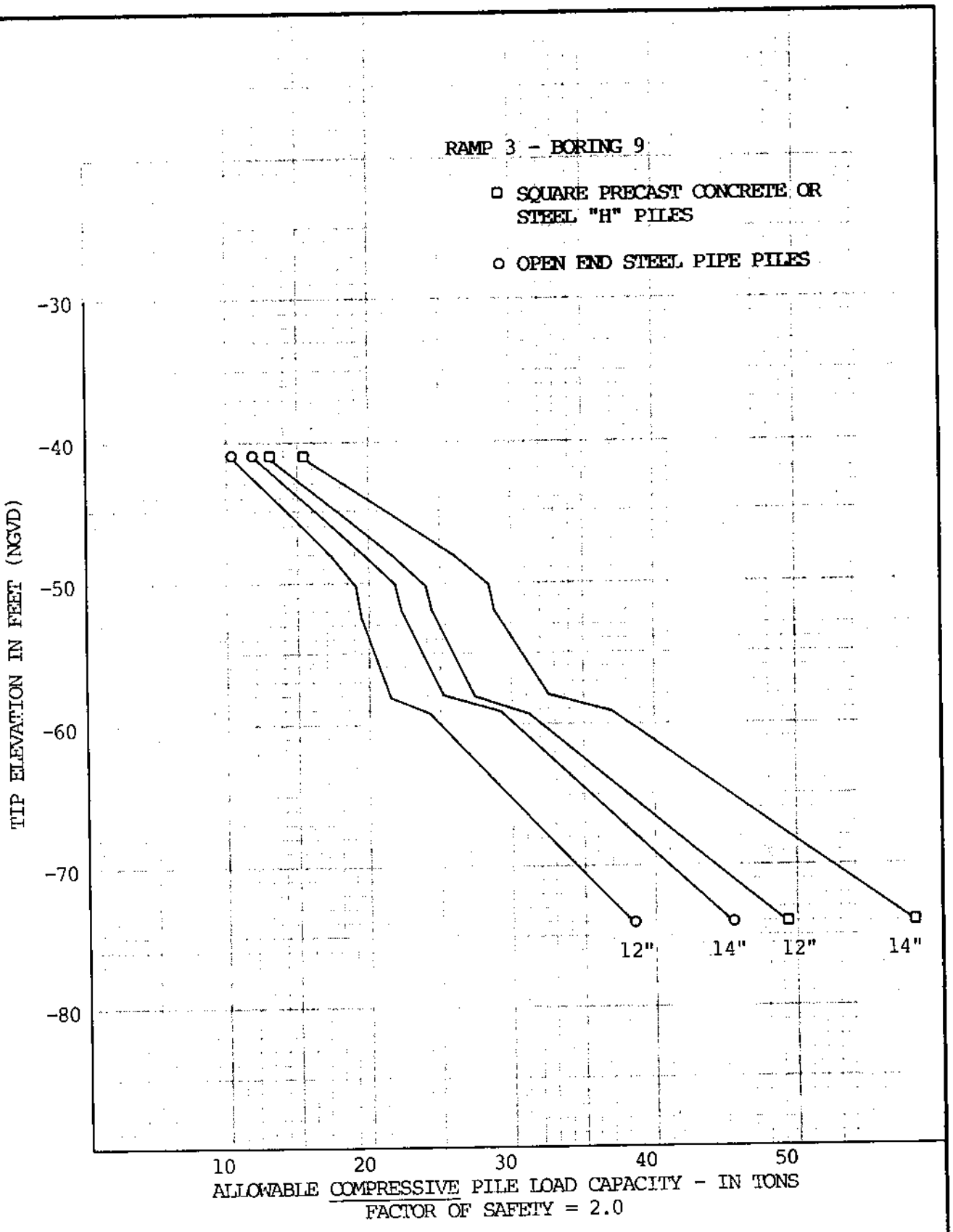


Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
URS Engineers, Consulting Engineers, Metairie, Louisiana

Fig. 36

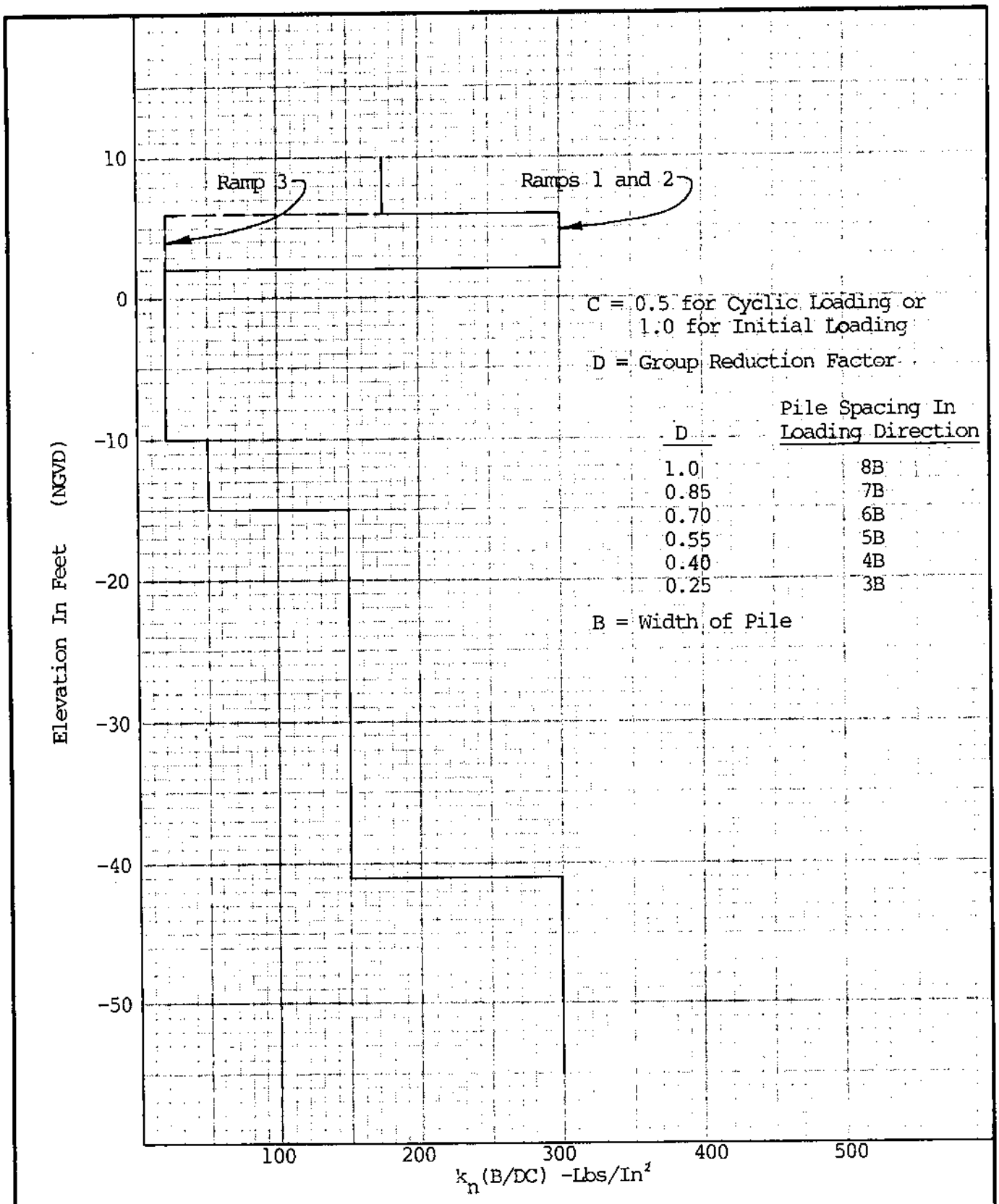
EUSTIS ENGINEERING COMPANY
SOIL AND FOUNDATION CONSULTANTS
METAIRIE, LA.



Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees, New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
URS Engineers, Consulting Engineers, Metairie, Louisiana

Fig. 37



Geotechnical Investigation
Orleans Levee District
Pontchartrain Beach Floodwalls and Levees
New Orleans, Louisiana

For: Board of Levee Commissioners of the Orleans Levee District
New Orleans, Louisiana
URS Engineers, Consulting Engineers, Metairie, Louisiana

Fig. 38

CAPACITY OF PILE GROUPS

$$Q_a = \frac{P \times L \times c}{(FSF)} + \frac{2.6\ q_u\ (1 + 0.2\ \frac{w}{b})\ A}{(FSB)}$$

In Which:

Q_a = Allowable load carrying capacity of pile group, lb

P = Perimeter distance of pile group, ft

L = Length of pile, ft

c = Average (weighted) cohesion or shear strength of material between surface and depth of pile tip, psf (c = one-half the unconfined compressive strength)

q_u = Average unconfined compressive strength of material in the zone immediately below pile tips, psf

w = Width of base of pile group, ft

b = Length of base of pile group, ft

A = Base area of pile group, sq ft

(FSF) = Factor of safety for the friction area = 2

(FSB) = Factor of safety for the base area = 3

The values of c and q_u used in this formula should be based on applicable soil data shown on the Summary of Laboratory Test Results tabulations and logs of soil borings for this report. In the application of this formula, the weight of the piles, pile caps and mats, considering the effect of buoyancy, should be included.

SPACING OF PILE GROUPS

$$SPAC = 0.05\ (L_1) + 0.025\ (L_2) + 0.0125\ (L_3)$$

In Which:

SPAC = Center to center of piles, ft

L_1 = Pile penetration up to 100 feet

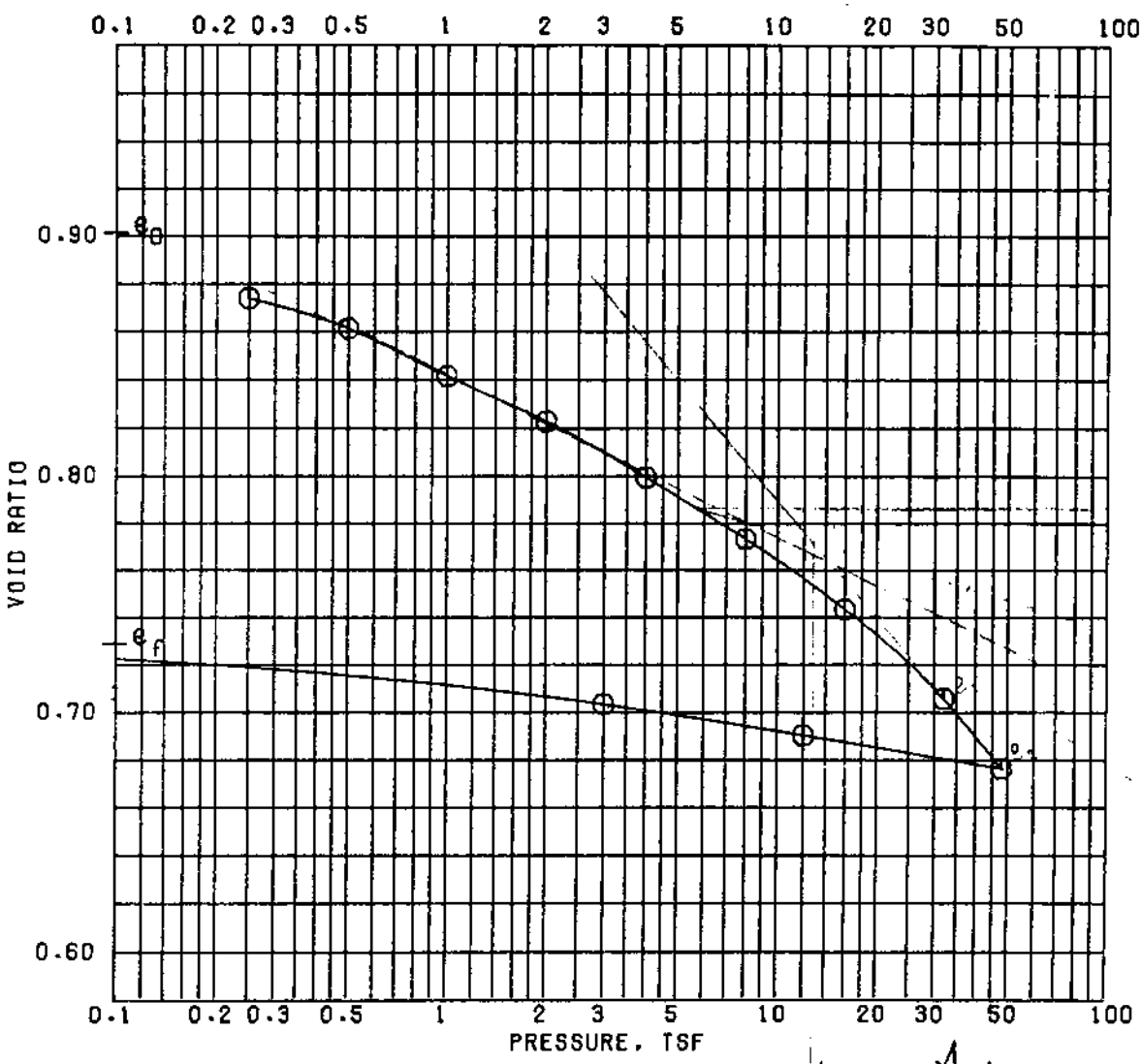
L_2 = Pile penetration from 101 to 200 feet

L_3 = Pile penetration beyond 200 feet

Note: Minimum pile spacing = 3 pile diameters (center to center)

Fig. 39

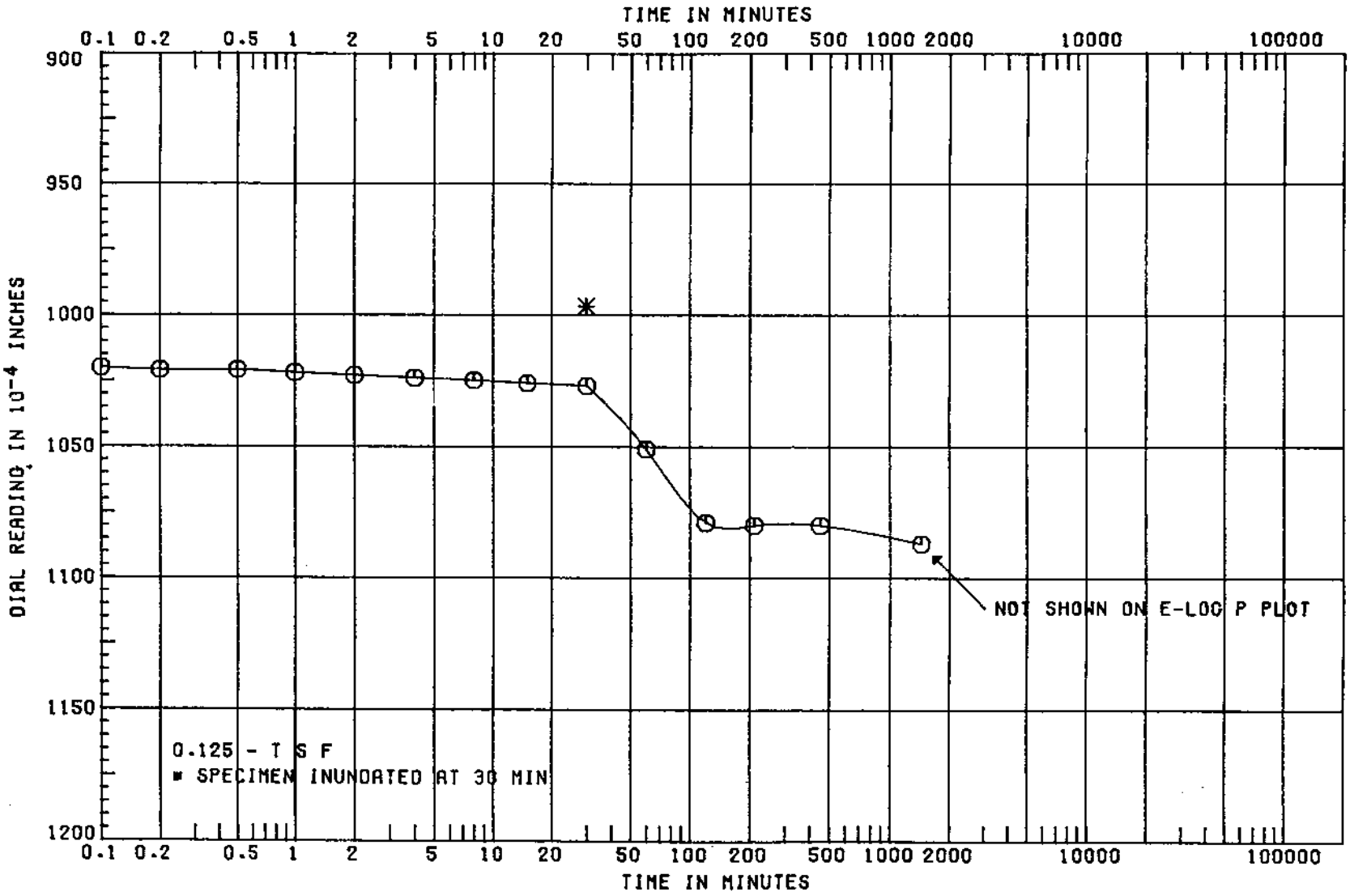
APPENDIX



σ'_p BEFORE TEST

γ_{sat}: 114.1 AFTER TEST

OVERBURDEN PRESSURE, TSF		WATER CONTENT, %	16.5	21.9
PRECONSOL. PRESSURE, TSF	13.0	DRY DENSITY, PCF	87.7	96.5
COMPRESSION INDEX	0.23	SATURATION, %	48.9	80.4
TYPE SPECIMEN: UNDISTURBED		VOID RATIO	0.901	0.728
DIA. IN 4.44	HT. IN 1.133	BACK PRESSURE, TSF		
CLASSIFICATION: SILTY SAND (SM), GRAY; SHELL PARTICLES				
LL / PL / PI		PROJECT: LK. PONT. LA. & VIC-HURR. PROT.(83)		
GS 2.67 (EST)	D_{10}	ORLEANS LAKEFRONT LEVEE-WEST OF IHNC		
REMARKS		BORING NO. 3-U	SAMPLE NO. 3-C	
		DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83	
		CONSOLIDATION TEST REPORT		



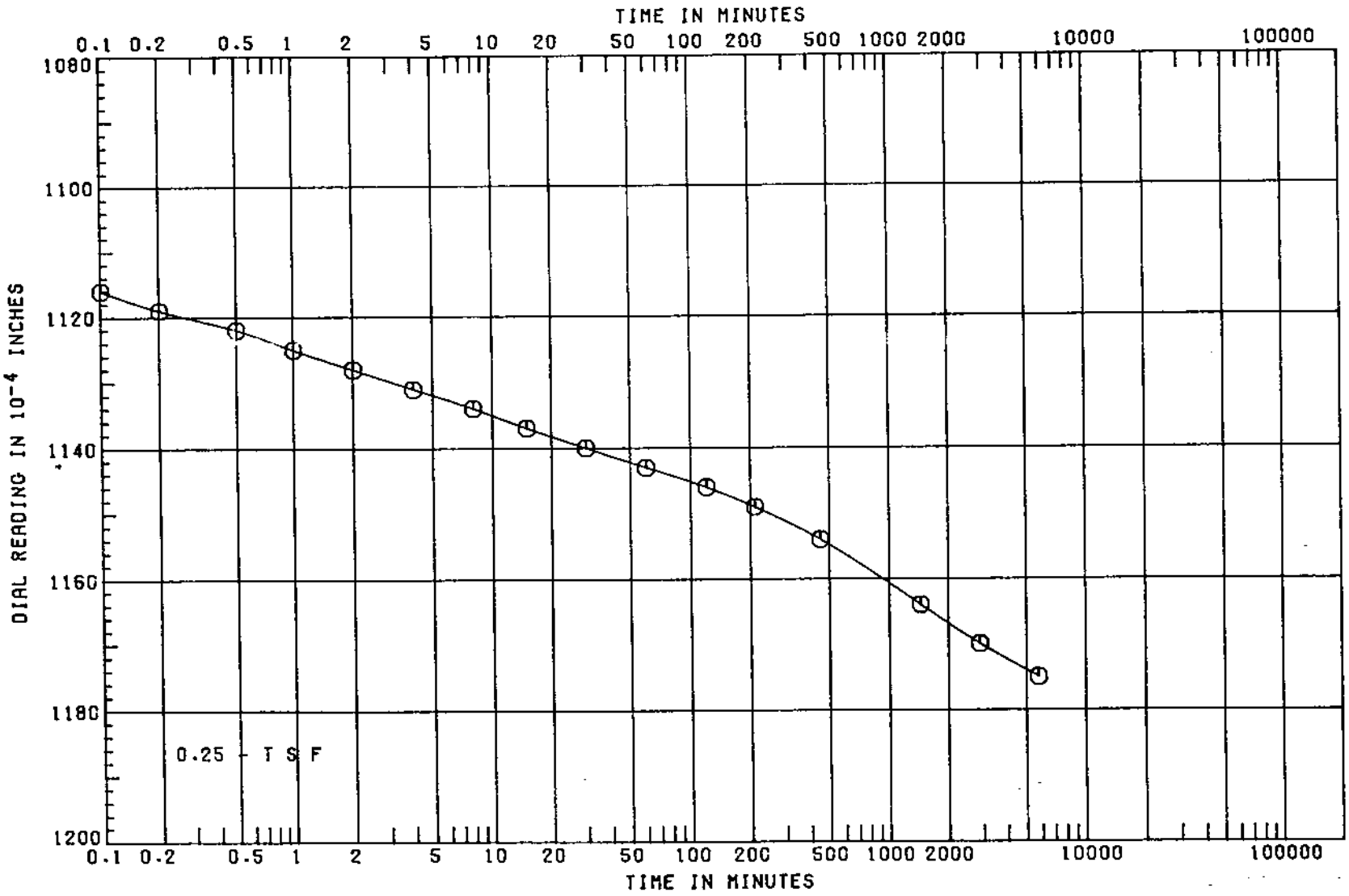
ADVANCE COPY

SUBJECT TO CORRECTION

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

CONSOLIDATION TEST

TIME CURVES



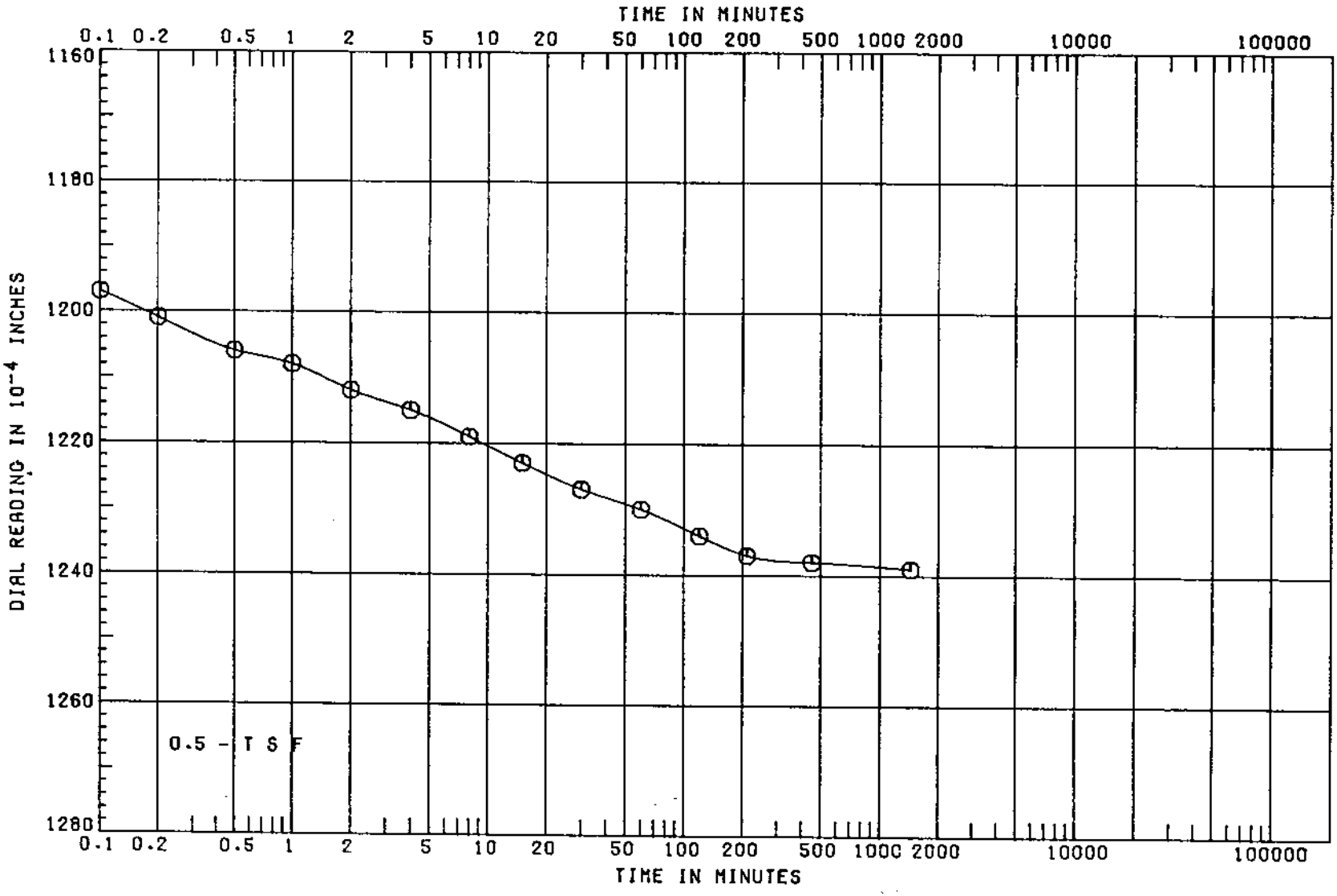
ADVANCE COPY

SUBJECT TO CORRECTION

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

CONSOLIDATION TEST

TIME CURVES



ADVANCE COPY

SUBJECT TO CORRECTION

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

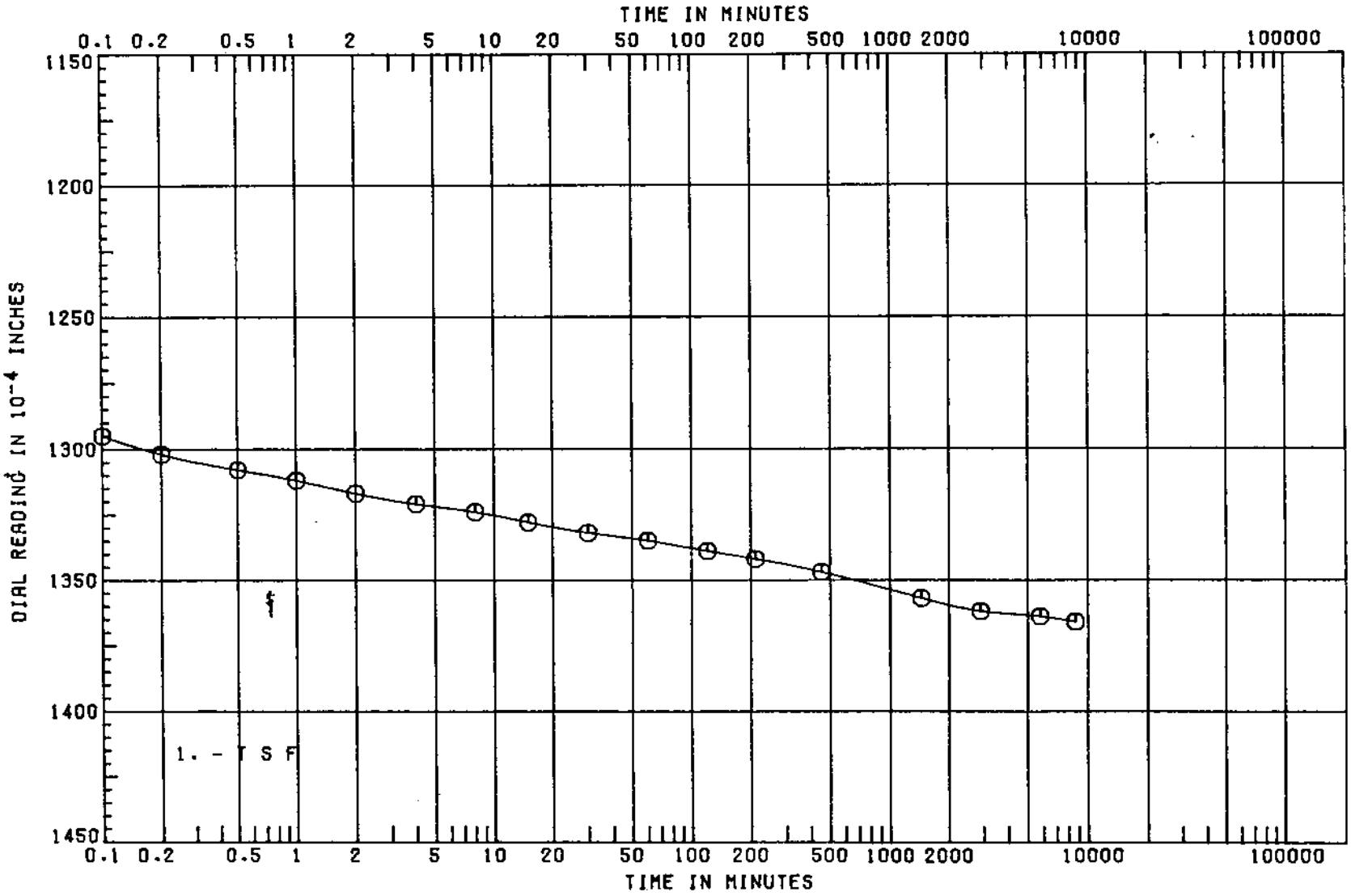
CONSOLIDATION TEST

TIME CURVES

SHEET 4 OF 14

ADVANCE COPY

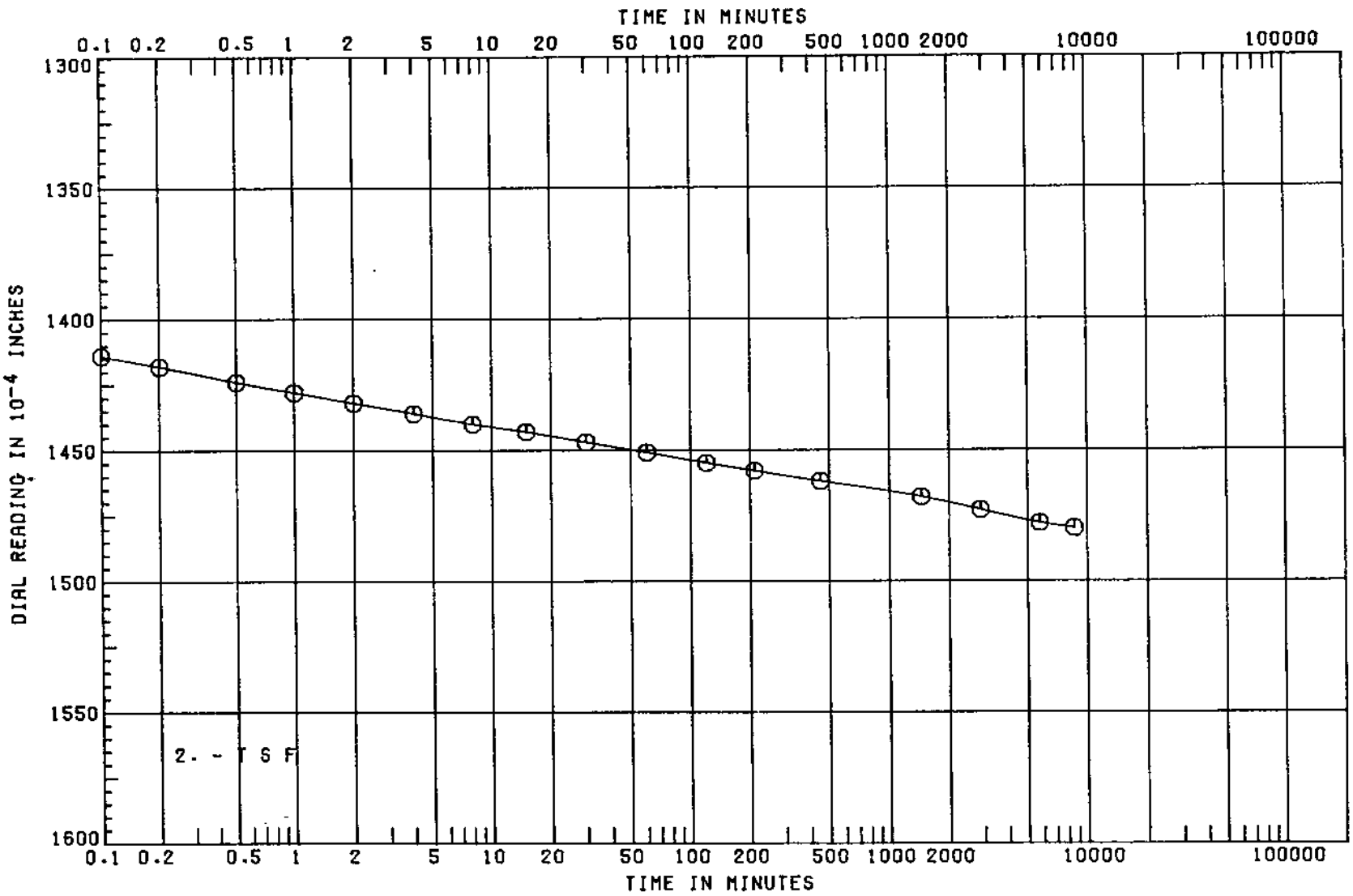
SUBJECT TO CORRECTION



PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

CONSOLIDATION TEST

TIME CURVES



ADVANCE COPY

SUBJECT TO CORRECTION

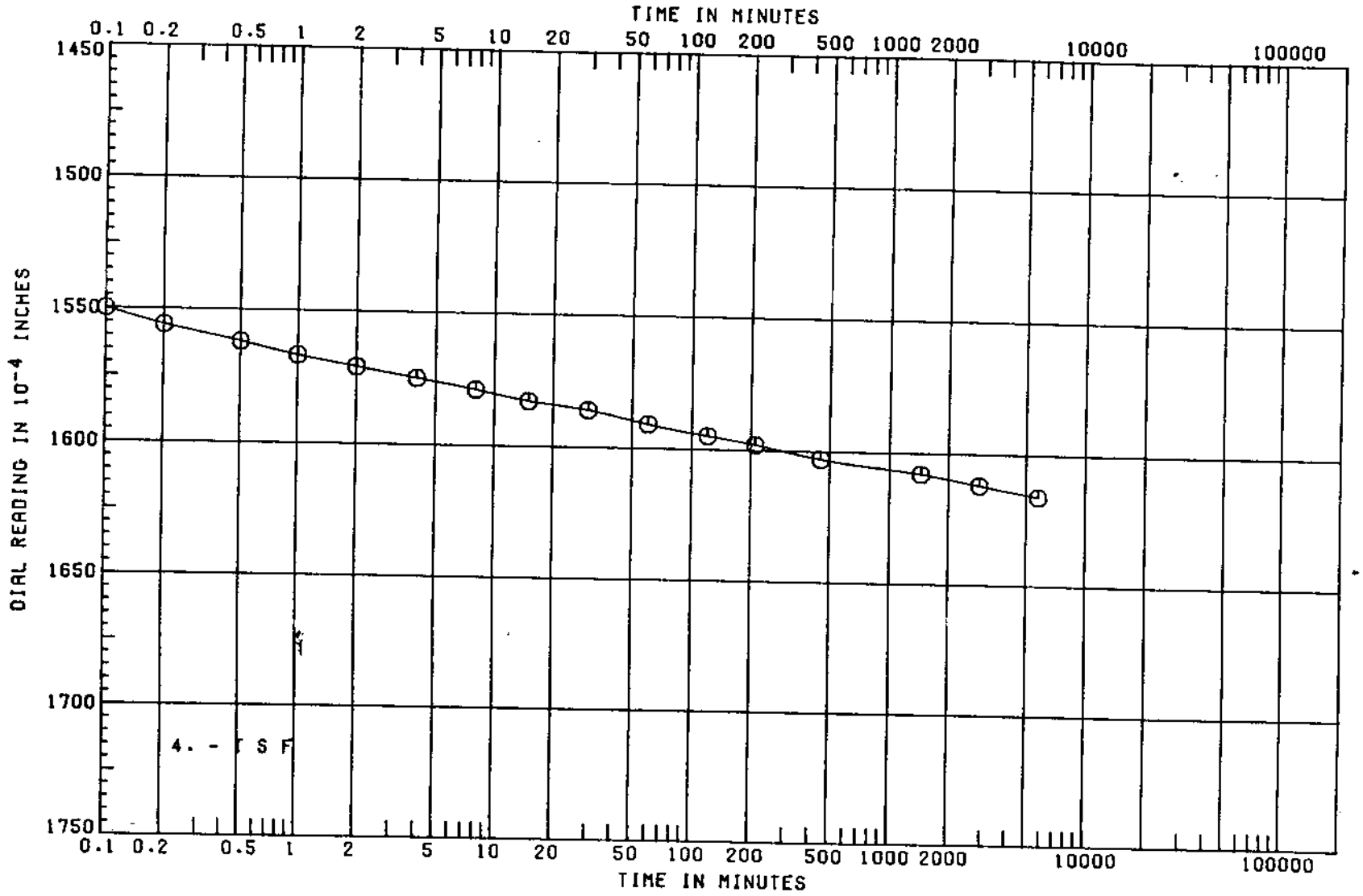
PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

CONSOLIDATION TEST

TIME CURVES

ADVANCE COPY

SUBJECT TO CORRECTION

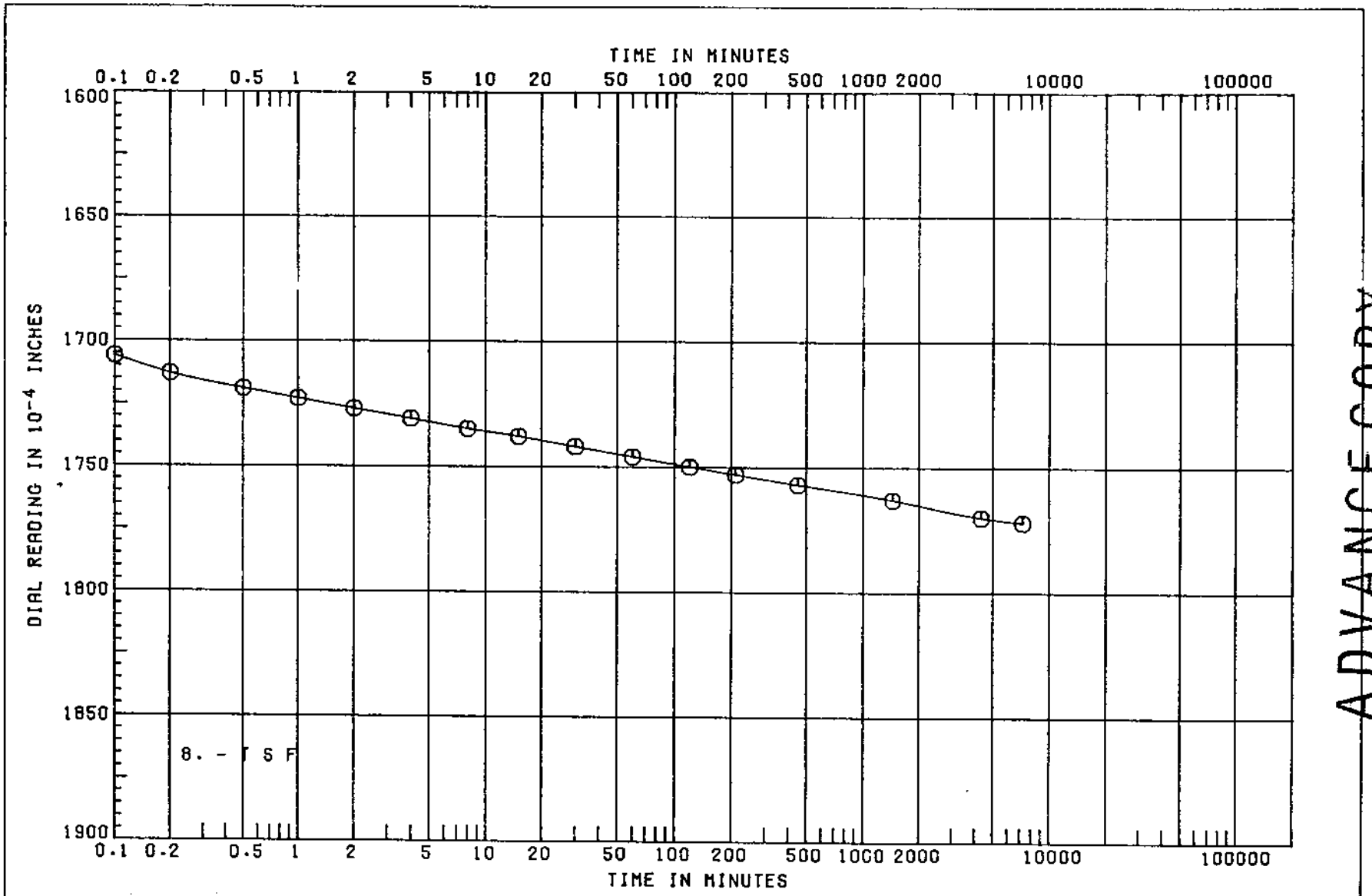


PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

CONSOLIDATION TEST

TIME CURVES

SHEET 7 OF 14



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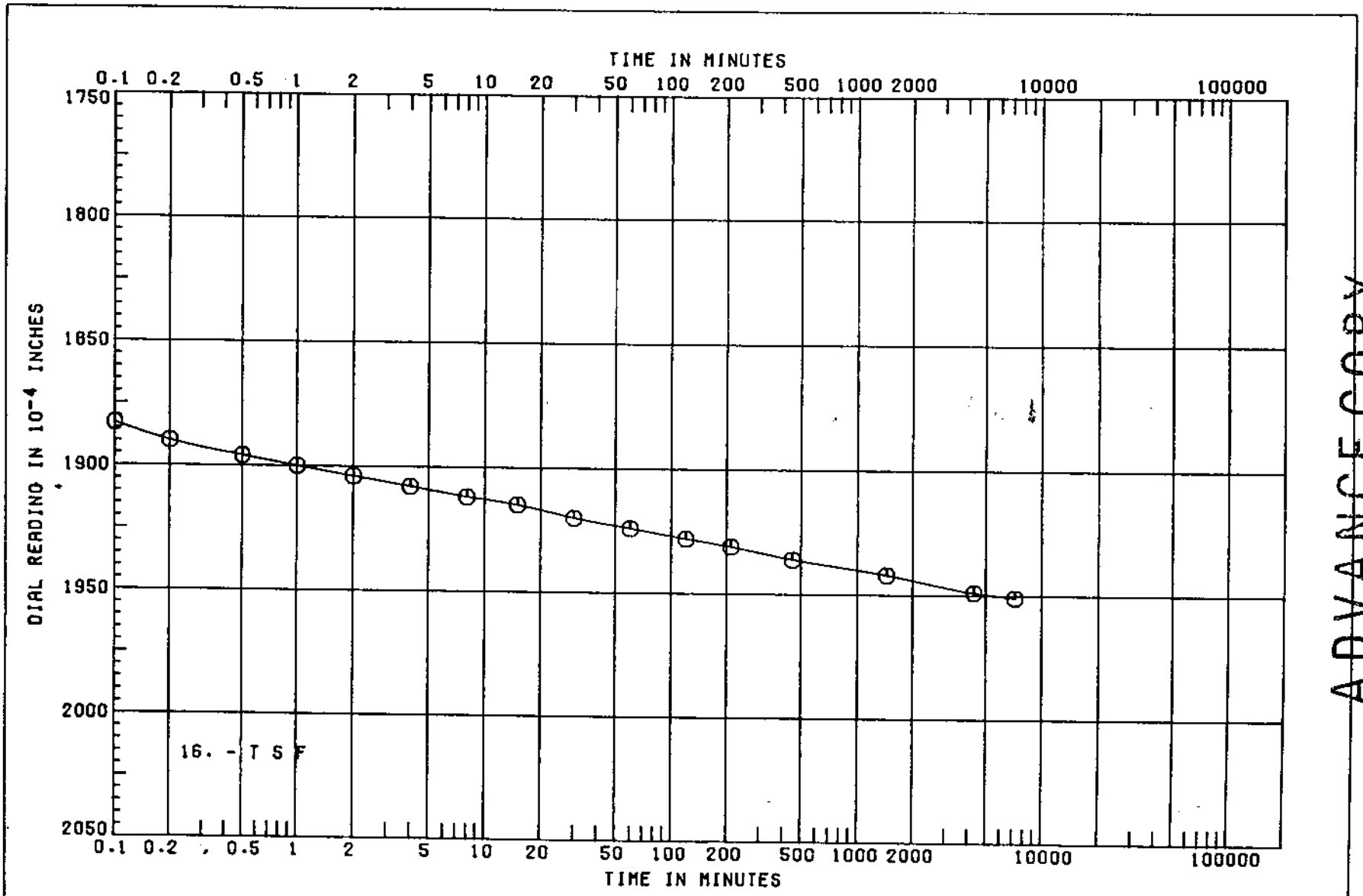
SUBJECT TO CORRECTION

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

CONSOLIDATION TEST

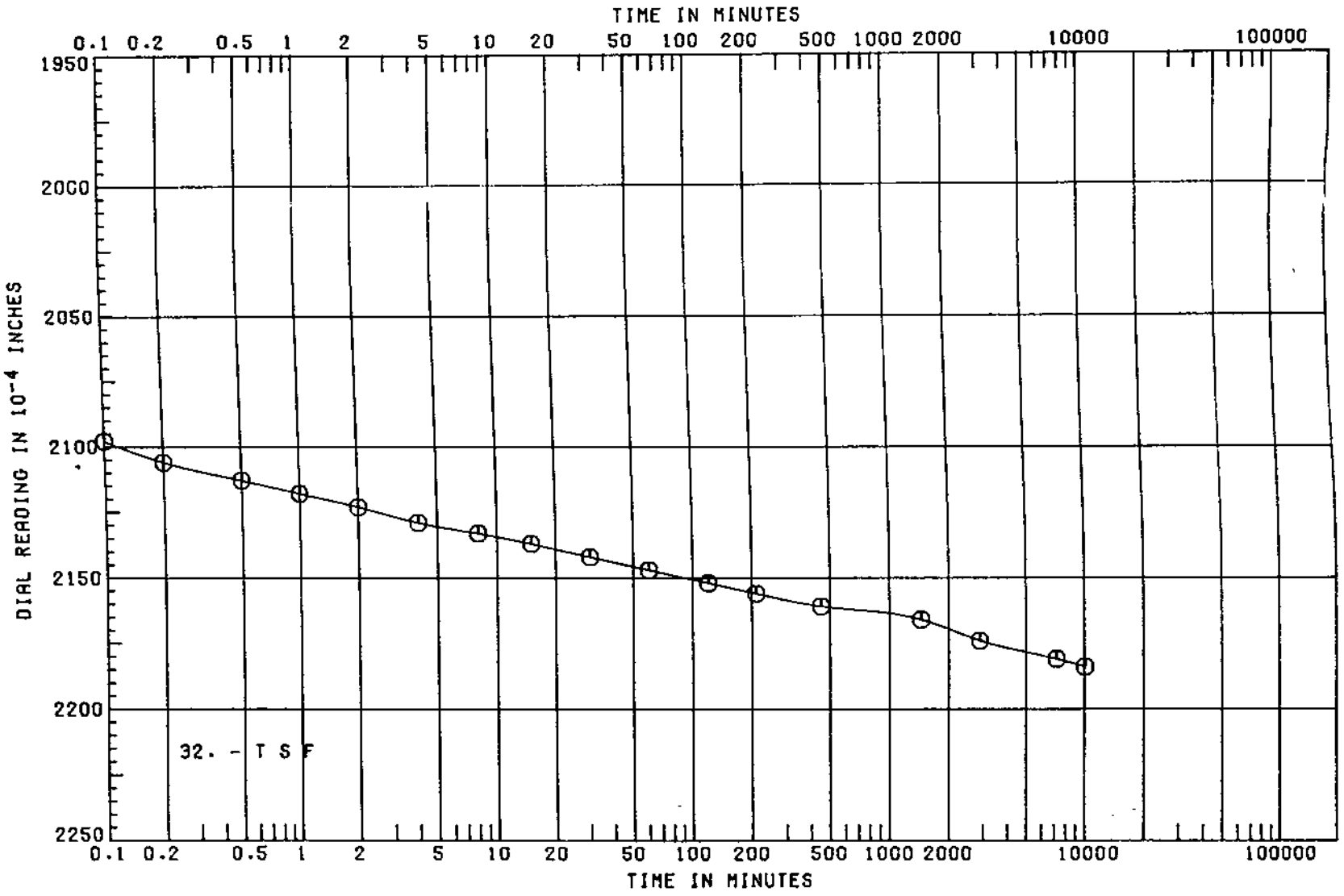
TIME CURVES



PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

CONSOLIDATION TEST
TIME CURVES

SHEET 9 OF 14



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SUBJECT TO CORRECTION

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

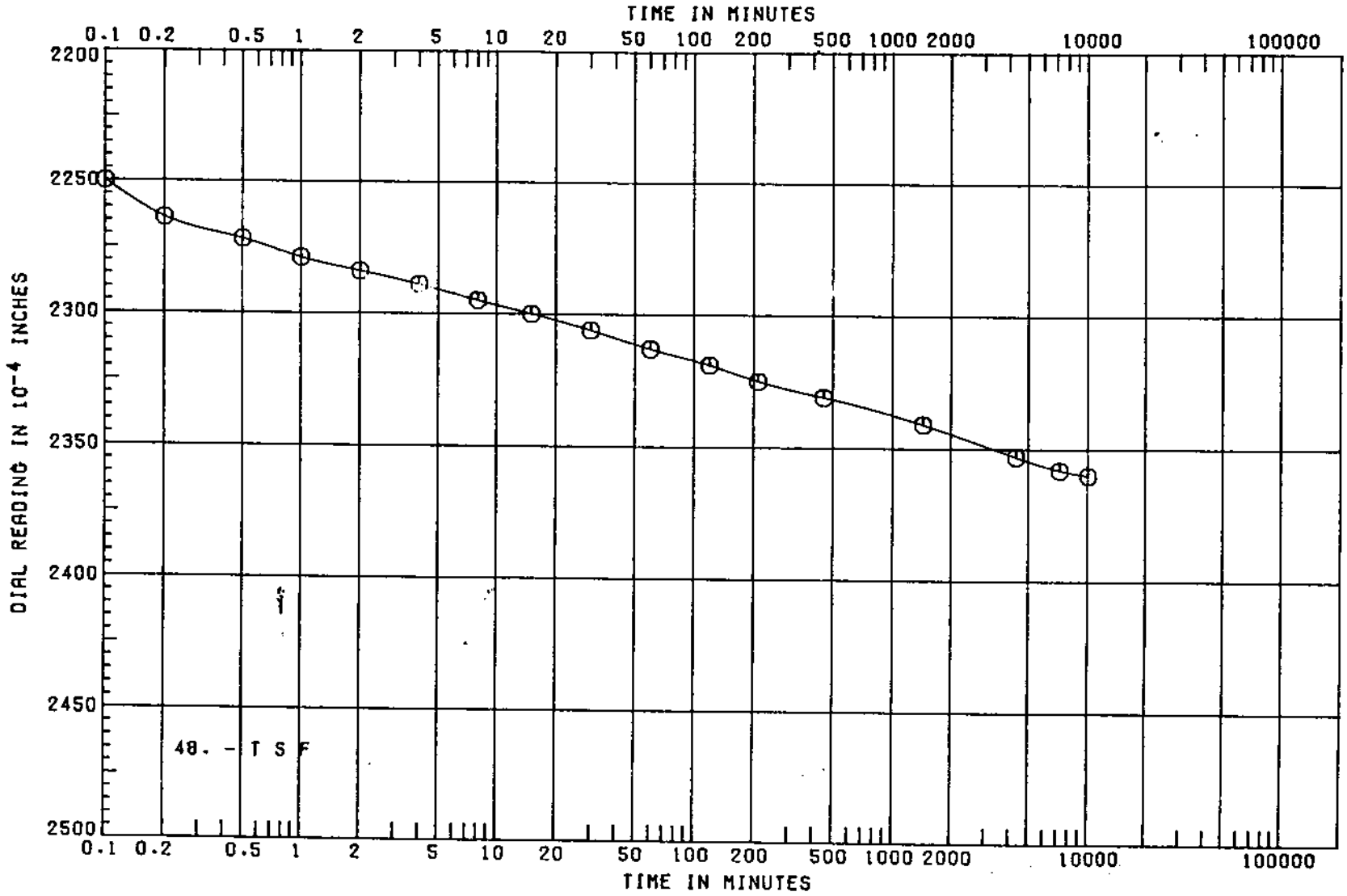
CONSOLIDATION TEST

TIME CURVES

SHEET 10 OF 14

ADVANCE COPY

SUBJECT TO CORRECTION



PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

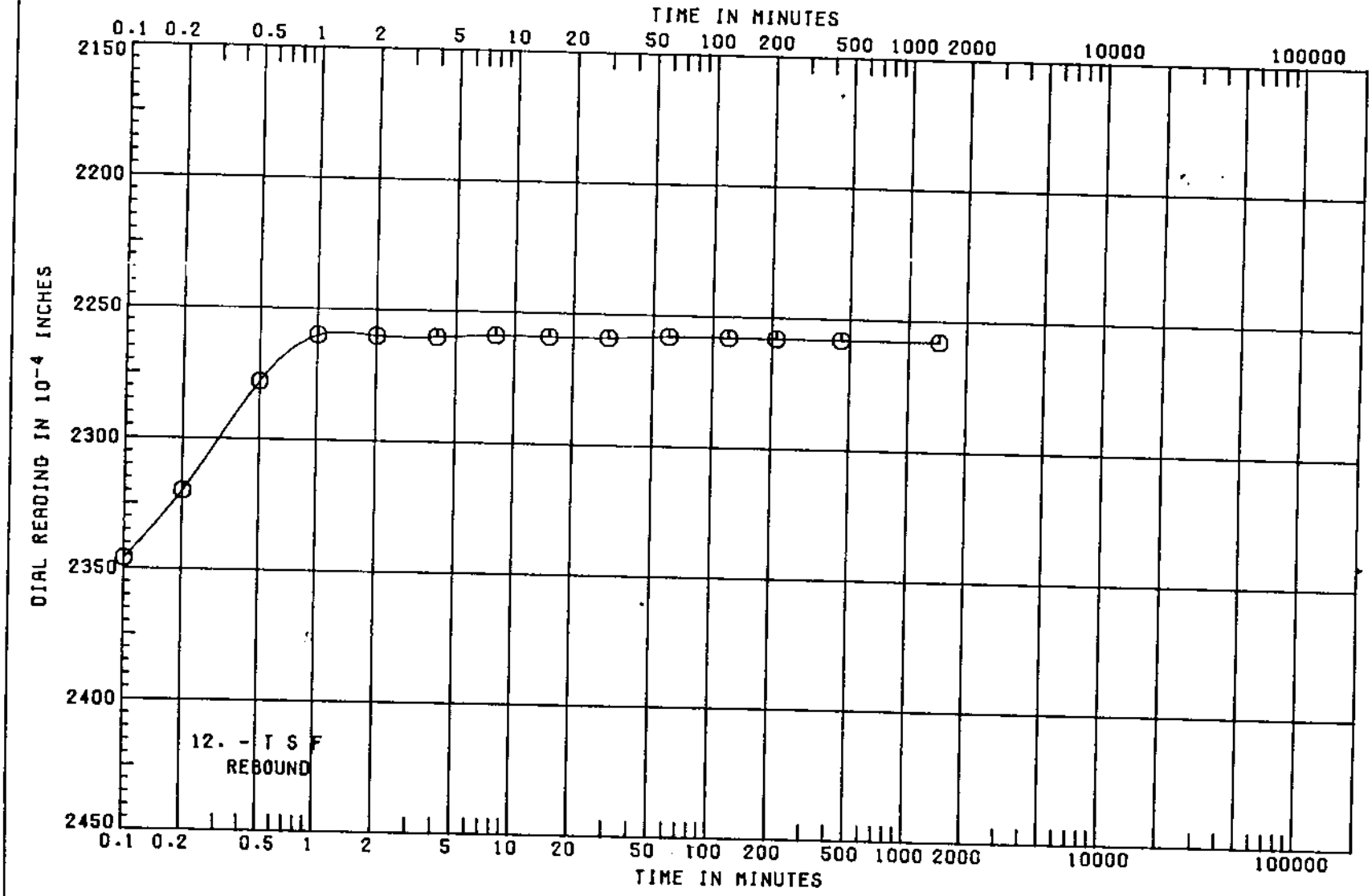
CONSOLIDATION TEST

TIME CURVES

SHEET 11 OF 14

ADVANCE COPY

SUBJECT TO CORRECTION

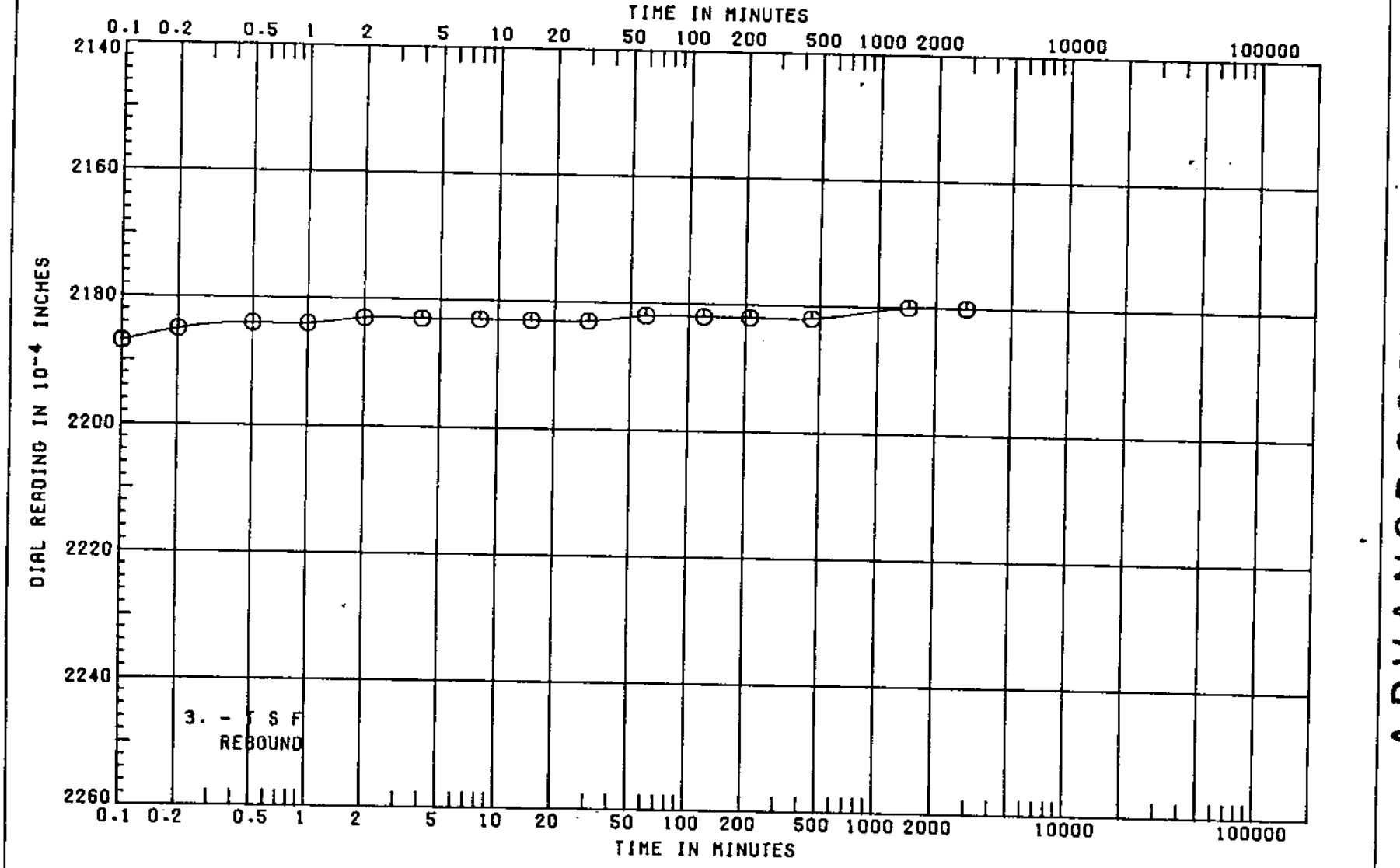


PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

CONSOLIDATION TEST

TIME CURVES

SHEET 12 OF 14



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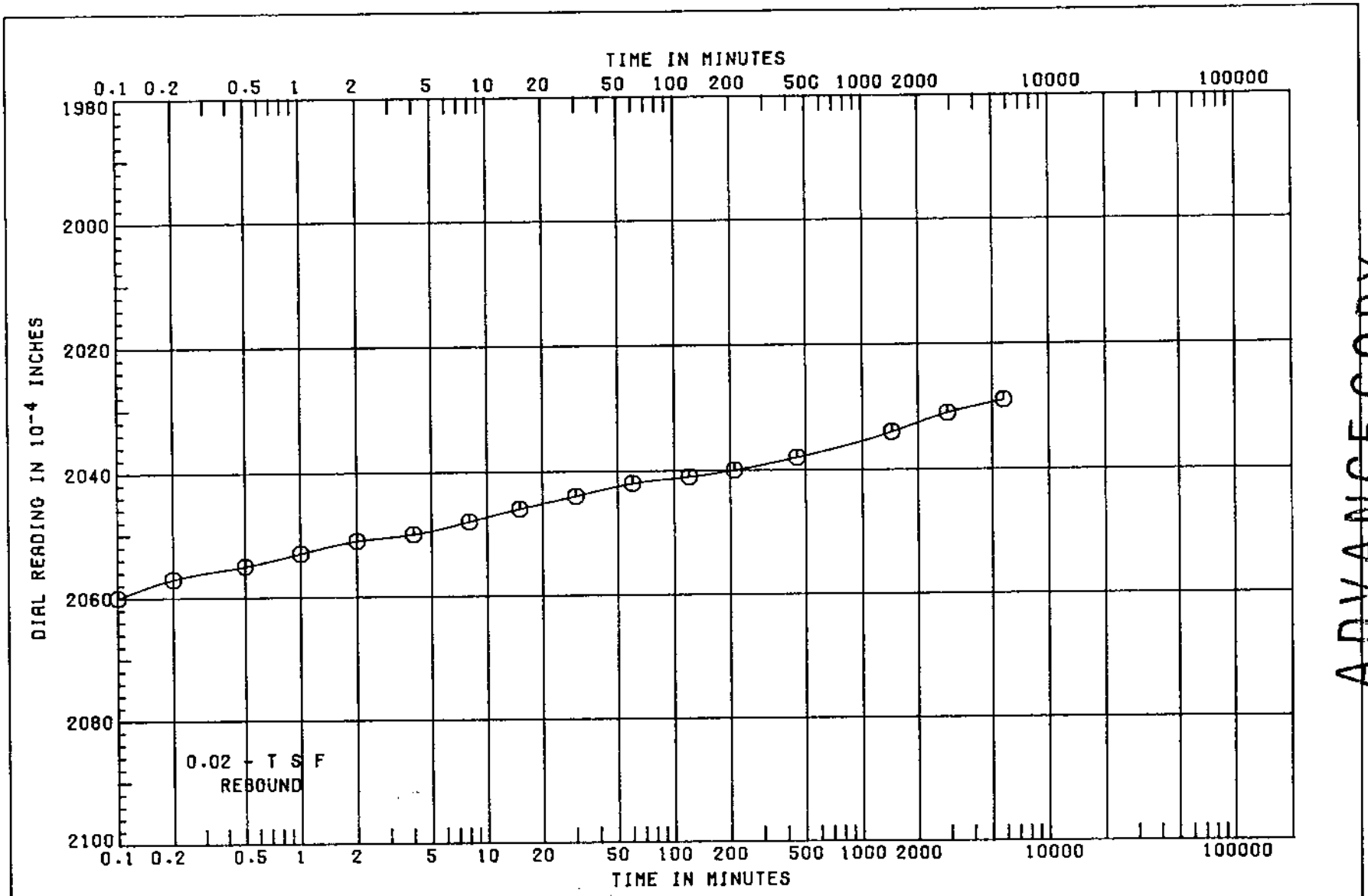
SUBJECT TO CORRECTION

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

CONSOLIDATION TEST

TIME CURVES



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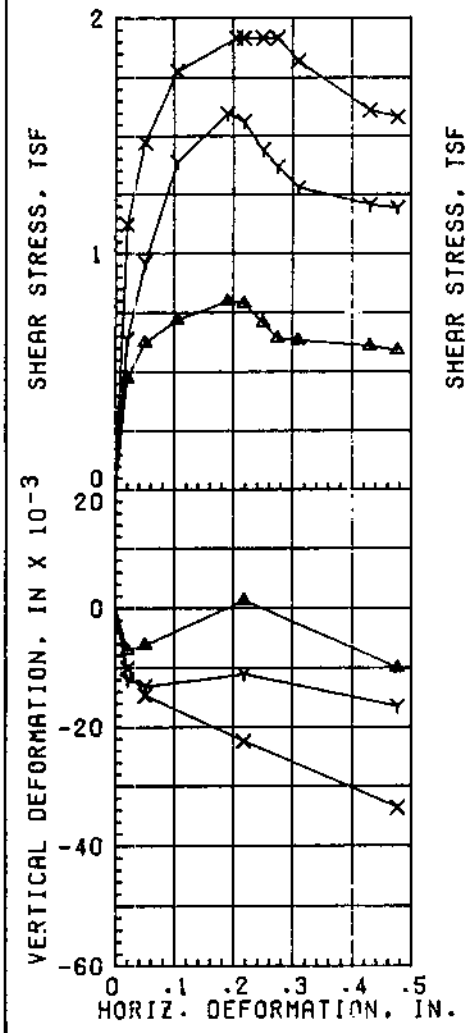
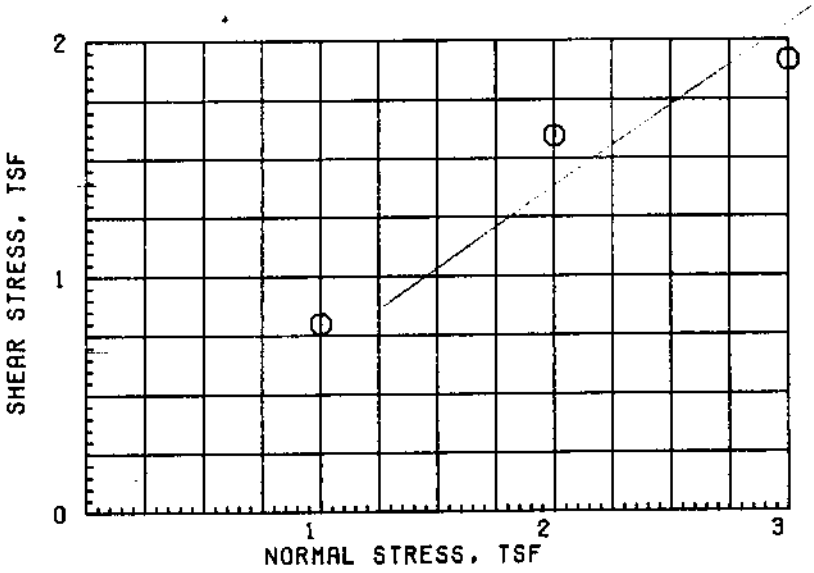
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 3-U	SAMPLE NO. 3-C
DEPTH/ELEV 7.9/+8.3	DATE 23 JUN 83

CONSOLIDATION TEST
TIME CURVES

SHEET 14 OF 14





ϕ = 36.8

TAN ϕ = 0.748

C = -

γsat = 123.2

TEST NO.		1 ▲	2 Y	3 X	AVG.
INITAL	WATER CONTENT, %	25.7	30.7	26.0	27.5
	VOID RATIO	0.695	0.766	0.711	
	SATURATION, %	98.5	100 +	97.1	985
	DRY DENSITY, PCF	97.9	94.0	97.0	96.3
VOID RATIO AFTER CONSOL					
FIFTY PERCENT CONSOL., MIN		< 1	< 1	< 1	
FINAL	WATER CONTENT, %	27.3	26.3	29.7	
	VOID RATIO				
	SATURATION, %				
NORMAL STRESS, TSF		1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, TSF		0.80	1.60	1.92	
TIME TO FAILURE, MIN		1099	1099	1180	
RATE OF STRAIN, IN/MIN		.00017	.00017	.00017	
ULTIMATE SHEAR STRESS, TSF					

TYPE SPECIMEN UNDISTURBED | 3.00 IN. SQUARE | 0.744 IN. THICK

CLASSIFICATION SANDY SILT (ML), GRAY

LL	PL	PI		GS 2.66 (EST)

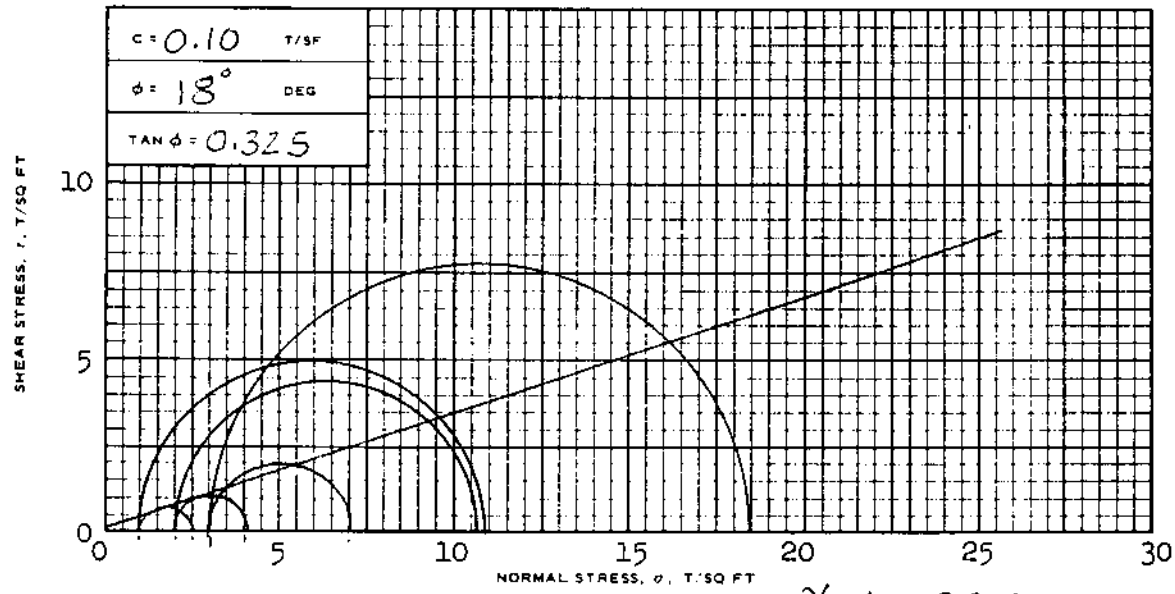
REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

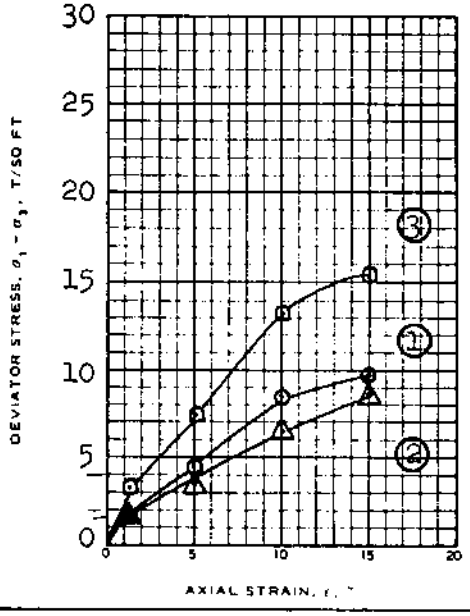
BORING NO. 3-U | SAMPLE 6-C

DEPTH/ELEV 21.0/-4.8 | DATE 10 OCT 83

DIRECT SHEAR TEST REPORT



$\gamma_{sat} = 120.0$



SPECIMEN NO.			1	2	3	AVG.
INITIAL	WATER CONTENT, %	w_o	29.4	29.7	30.4	29.8
	DRY DENSITY LB/CU FT	γ_{d_o}	92.7	92.5	91.8	92.3
	SATURATION, %	s_o	98.9	99.4	99.9	99.4
	VOID RATIO	e_o	0.791	0.795	0.809	
BEFORE SHEAR	WATER CONTENT, %	w_c	29.6	29.0	28.5	
	DRY DENSITY LB/CU FT	γ_{d_c}	94.4	95.0	93.6	
	SATURATION, %	s_c	100+	100+	98.0	
	VOID RATIO	e_c	0.760	0.748	0.773	
	FINAL BACK PRESSURE, T/SQ FT	u_o	7.20	7.20	7.20	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	1.0	2.0	3.0	
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	9.96	8.61	15.44	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	536	536	536	
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$	1.5	2.0	4.0	
INITIAL DIAMETER, IN.		D_o	1.40	1.37	1.43	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

CONTROLLED- STRAIN TEST

DESCRIPTION OF SPECIMENS CLAYEY SILT (ML), GRAY: SHELL PARTICLES

LL 28 | PL 23 | PI 5 | G_s 2.66(EST) | TYPE OF SPECIMEN UNDISTURBED | TYPE OF TEST $\overline{R}$

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 3-U | SAMPLE NO. 8-B

DEPTH/ELEV 28.2/-12.0

LABORATORY USAEWES | DATE 10 NOV 1983

SHEET 1 OF 2 | PJR | TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089
REV JUNE 1970

GPO : 1982 0 - 375-356

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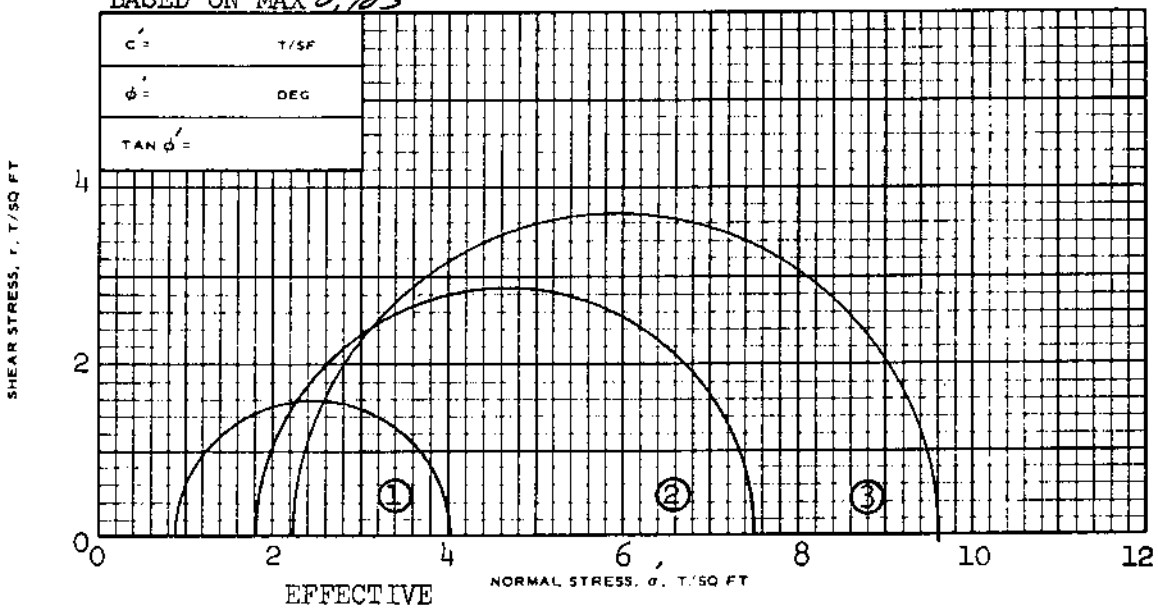
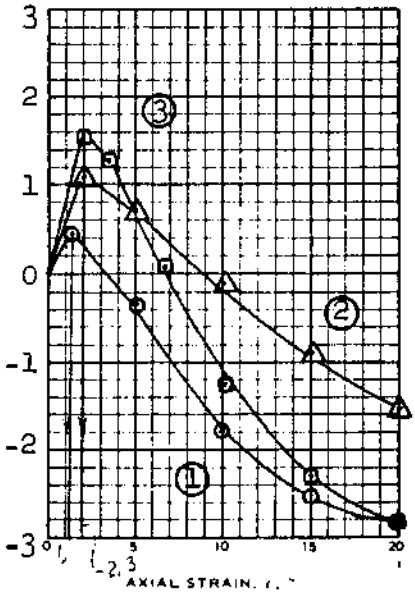
SUBJECT TO CORRECTION

BASED ON MAX σ_1/σ_3





SPECIMEN NO.			1	2	3	
INITIAL	WATER CONTENT, %	w_o				
	DRY DENSITY LB/CU FT	γ_{d_o}				
	SATURATION, %	S_o				
	VOID RATIO	e_o				
BEFORE SHEAR	WATER CONTENT, %	w_c				
	DRY DENSITY LB/CU FT	γ_{d_c}				
	SATURATION, %	S_c				
	VOID RATIO	e_c				
	FINAL BACK PRESSURE, T/SQ FT	u_b				
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.90	1.81	2.26	
MAXIMUM DEVIATOR STRESS, T/SQ FT	$(\sigma_1 - \sigma_3)_{MAX}$		3.12	5.67	7.36	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f				
ULTIMATE DEVIATOR STRESS, T/SQ FT	$(\sigma_1 - \sigma_3)_{ULT}$					
INITIAL DIAMETER, IN.		D_o				
INITIAL HEIGHT, IN.		H_o				

CONTROLLED- TEST

DESCRIPTION OF SPECIMENS

LL	PL	PI	G_s

TYPE OF SPECIMEN

TYPE OF TEST

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)

ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 3-U SAMPLE NO. 8-B

DEPTH/ELEV 28.2/-12.0

LABORATORY USAEWES DATE 10 NOV 1983

SHEET 2 OF 2

PJR TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089
REV JUNE 1970

GPO : 1982 0 - 375-356

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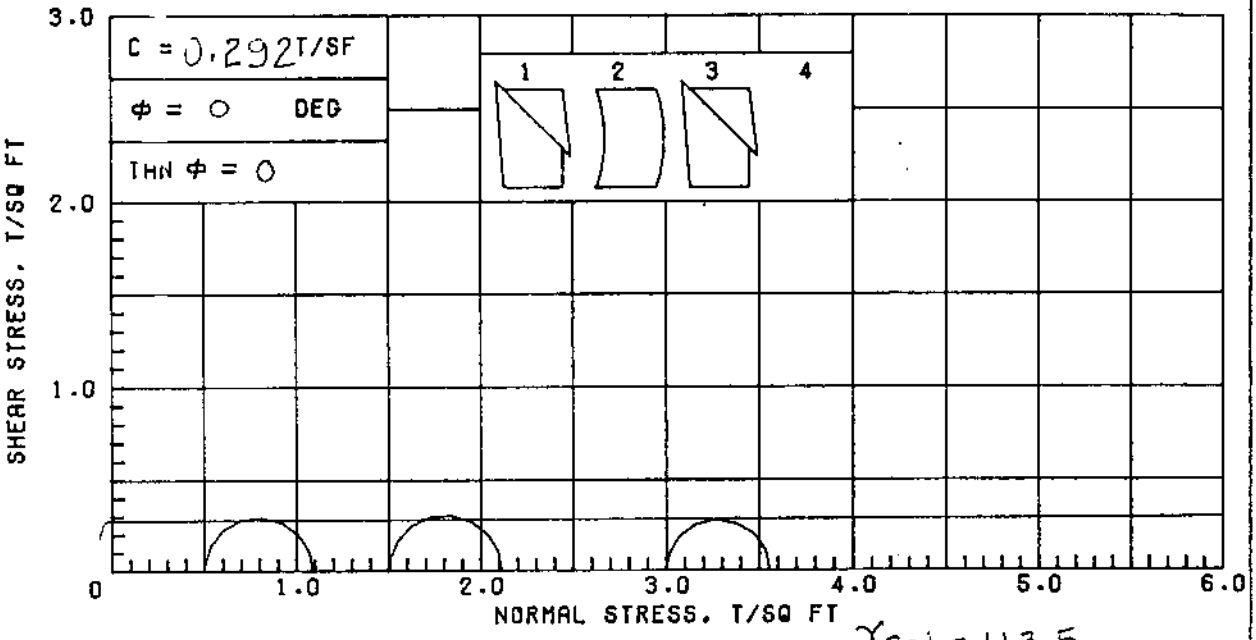
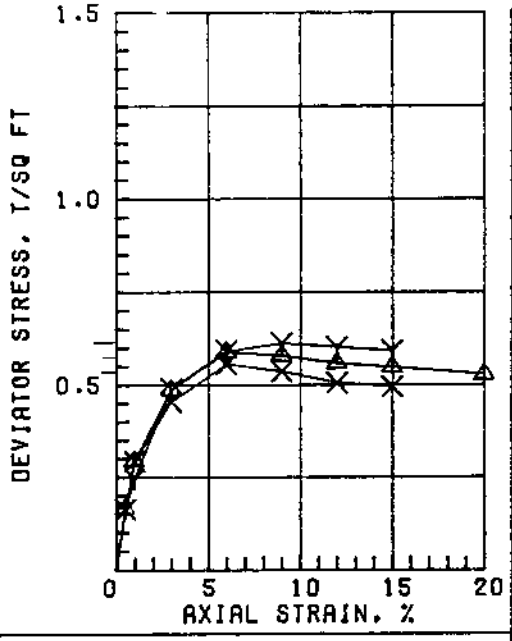
SUBJECT TO

ADVANCE COPY

SUBJECT TO CORRECTION



γ_{sat} = 113.5 AVG



SPECIMEN NO.		Δ1	Y2	X3	4
INITIAL	WATER CONTENT, %	39.8	36.9	42.3	39.7
	DRY DENSITY, PCF	80.5	84.0	78.6	81.0
	SATURATION, %	98.3	98.9	99.9	99.0
	VOID RATIO	1.093	1.007	1.143	
BEFORE SHEAR	WATER CONTENT, %				
	DRY DENSITY, PCF				
	SATURATION, %				
	VOID RATIO				
	BACK PRESS., TSF				
MIN PRIN. STRESS, TSF		0.5	1.5	3.0	
MAX. DEV. STRESS, TSF		0.59	0.61	0.55	
TIME TO FAILURE, MIN.		16	13	9	
RATE OF STRAIN INCR.%					
INITIAL DIAMETER, IN.		1.39	1.39	1.39	
INITIAL HEIGHT, IN.		3.00	3.00	3.00	

CONTROLLED-STRAIN TEST

DESCRIPTION OF SPECIMENS: CLAY (CL), GRAY; FINE SAND LENSES

LL 42	PL 12	PI 30	GS 2.70 (ESTIMATED)	UNDISTURBED SPECIMEN	Q TEST

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 3-U | SAMPLE NO. 12-B

DEPTH/ELEV 44.1/-27.9 | TECH. LRC

LABORATORY USAE WES | DATE 17 JUN 83

TRIAXIAL COMPRESSION TEST REPORT

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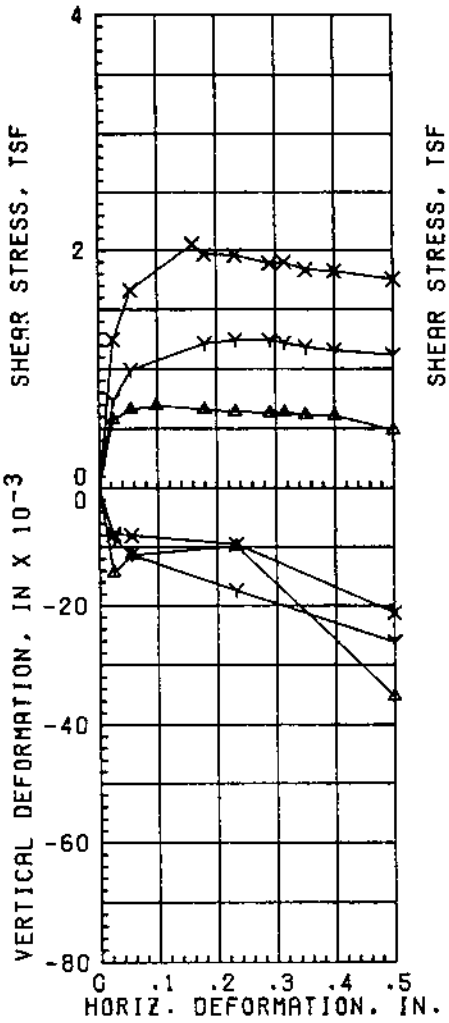
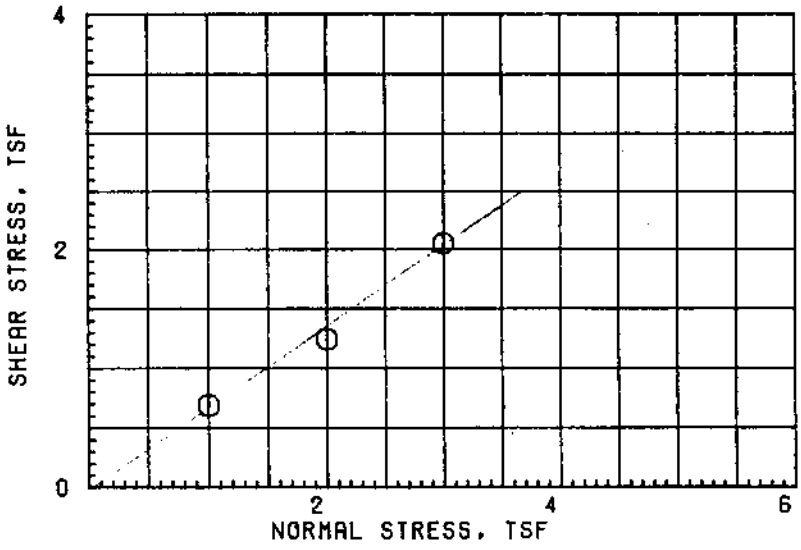




ϕ = 33.7

TAN ϕ = 0.667

C = -

γ_{sat} = 127.8

	TEST NO.	1 △	2 Y	3 X	AVG
INITIAL	WATER CONTENT, %	21.8	21.8	20.6	21.4
	VOID RATIO	0.597	0.581	0.574	
	SATURATION, %	97.3	99.7	95.5	97.5
	DRY DENSITY, PCF	103.9	105.0	105.5	104.8
VOID RATIO AFTER CONSOL					
FIFTY PERCENT CONSOL, MIN		< 1	< 1	< 1	
FINAL	WATER CONTENT, %	24.8	24.3	19.3	
	VOID RATIO				
	SATURATION, %				
NORMAL STRESS, TSF		1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, TSF		0.69	1.25	2.05	
TIME TO FAILURE, MIN		538	1270	878	
RATE OF STRAIN, IN/MIN		.00018	.00018	.00018	
ULTIMATE SHEAR STRESS, TSF					

TYPE SPECIMEN UNDISTURBED | 3.00 IN. SQUARE | 0.744 IN. THICK

CLASSIFICATION SAND (SP), GRAY

LL	PL	PI		GS 2.66 (EST)

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)

ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

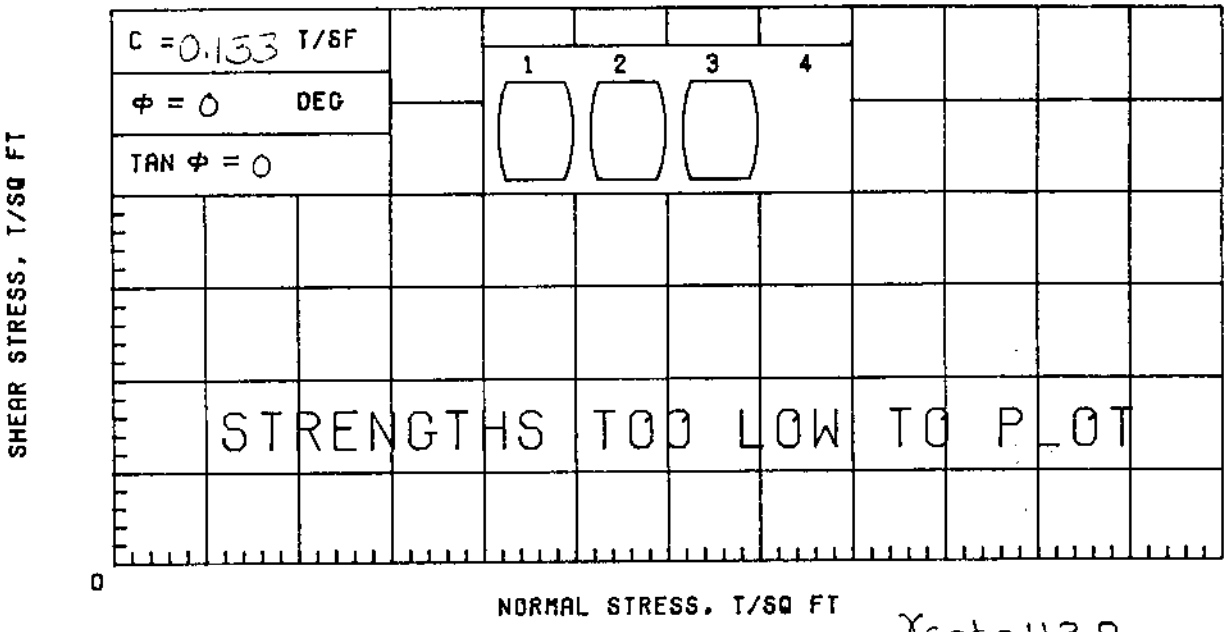
BORING NO. 3-U | SAMPLE 14-C

DEPTH/ELEV 52.6/-36.4 | DATE 12 OCT 83

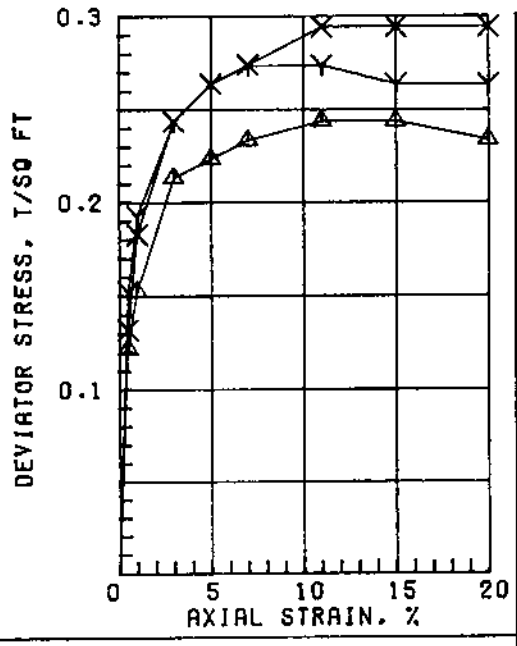
DIRECT SHEAR TEST REPORT

ADVANCE COPY

SUBJECT TO CORRECTION



$\gamma_{sat} = 112.8$ AVG.



SPECIMEN NO.		Δ1	Y2	X3	4
INITIAL	WATER CONTENT, %	40.2	39.9	39.8	40.0
	DRY DENSITY, PCF	80.0	79.9	80.0	80.0
	SATURATION, %	98.1	97.2	97.2	97.5
	VOID RATIO	1.106	1.109	1.106	
BEFORE SHEAR	WATER CONTENT, %				
	DRY DENSITY, PCF				
	SATURATION, %				
	VOID RATIO				
	BACK PRESS., TSF				
MIN PRIN. STRESS, TSF		0.5	1.5	3.0	
MAX. DEV. STRESS, TSF		0.24	0.27	0.29	
TIME TO FAILURE, MIN.		46	28	46	
RATE OF STRAIN INCR.%					
INITIAL DIAMETER, IN.		1.39	1.39	1.39	
INITIAL HEIGHT, IN.		3.00	3.00	3.00	

CONTROLLED-STRAIN TEST

DESCRIPTION OF SPECIMENS: CLAY (CL), GRAY; SILT POCKETS; SHELL PARTICLES

LL 44	PL 15	PI 29	GS 2.70 (ESTIMATED)	UNDISTURBED SPECIMEN	Q TEST

REMARKS:	PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)
	ORLEANS LAKEFRONT LEVEE-WEST OF IHNC
	BORING NO. 3-U / SAMPLE NO. 17-B
	DEPTH/ELEV 64.1/-47.9 / TECH. TES
	LABORATORY USAE WES / DATE 16 JUN 83
	TRIAXIAL COMPRESSION TEST REPORT

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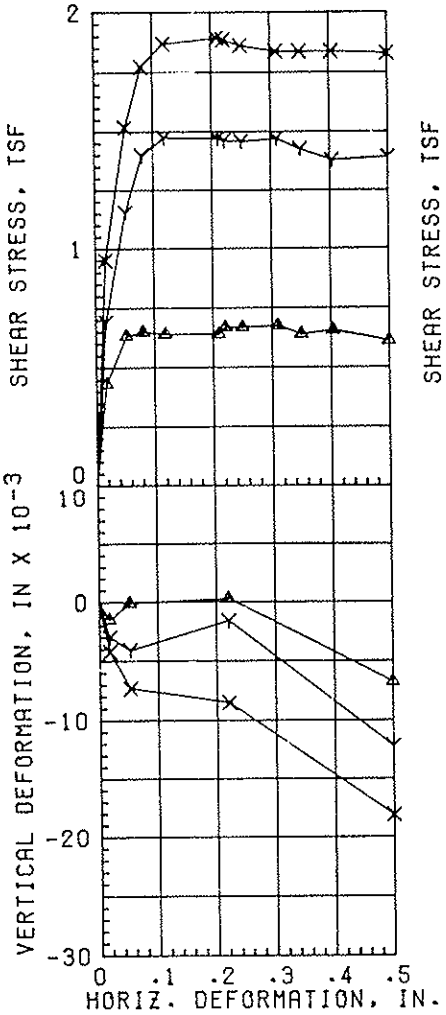
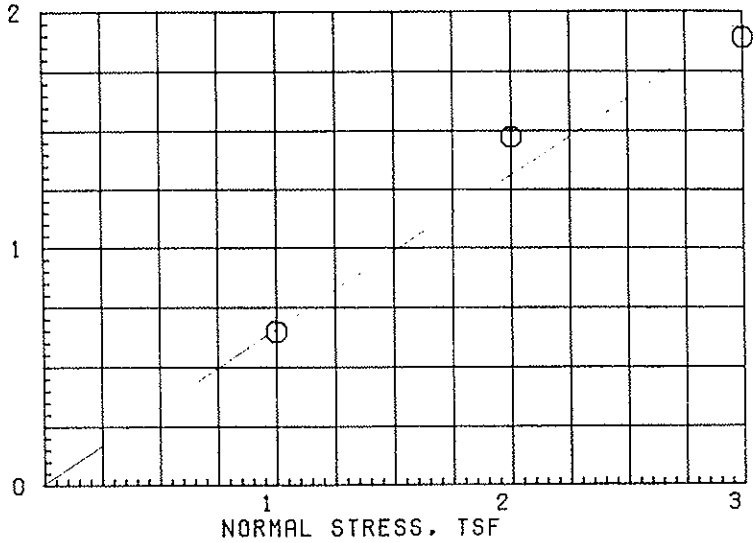
SUBJECT TO CORRECTION





$\gamma_{sat} = 124.2$

	TEST NO.	1 △	2 Y	3 X	AVG.
INITAL	WATER CONTENT, %	24.8	26.2	24.2	25.1
	VOID RATIO	0.686	0.694	0.658	
	SATURATION, %	96.4	100 +	97.8	98.1
	DRY DENSITY, PCF	98.5	98.0	100.1	98.9
VOID RATIO AFTER CONSOL					
FIFTY PERCENT CONSOL, MIN		< 1	< 1	< 1	
FINAL	WATER CONTENT, %	23.3	22.6	22.4	
	VOID RATIO				
	SATURATION, %				
NORMAL STRESS, TSF		1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, TSF		0.65	1.47	1.89	
TIME TO FAILURE, MIN		443	650	1148	
RATE OF STRAIN, IN/MIN		.00018	.00018	.00018	
ULTIMATE SHEAR STRESS, TSF					

$\Phi = 33.9^{\circ}$

TAN $\Phi = 0.672$

C = -

TYPE SPECIMEN UNDISTURBED | 3.00 IN. SQUARE | 0.553 IN. THICK

CLASSIFICATION SILTY SAND (SM), GRAY

LL | PL | PI | | GS 2.66 (EST)

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)

ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

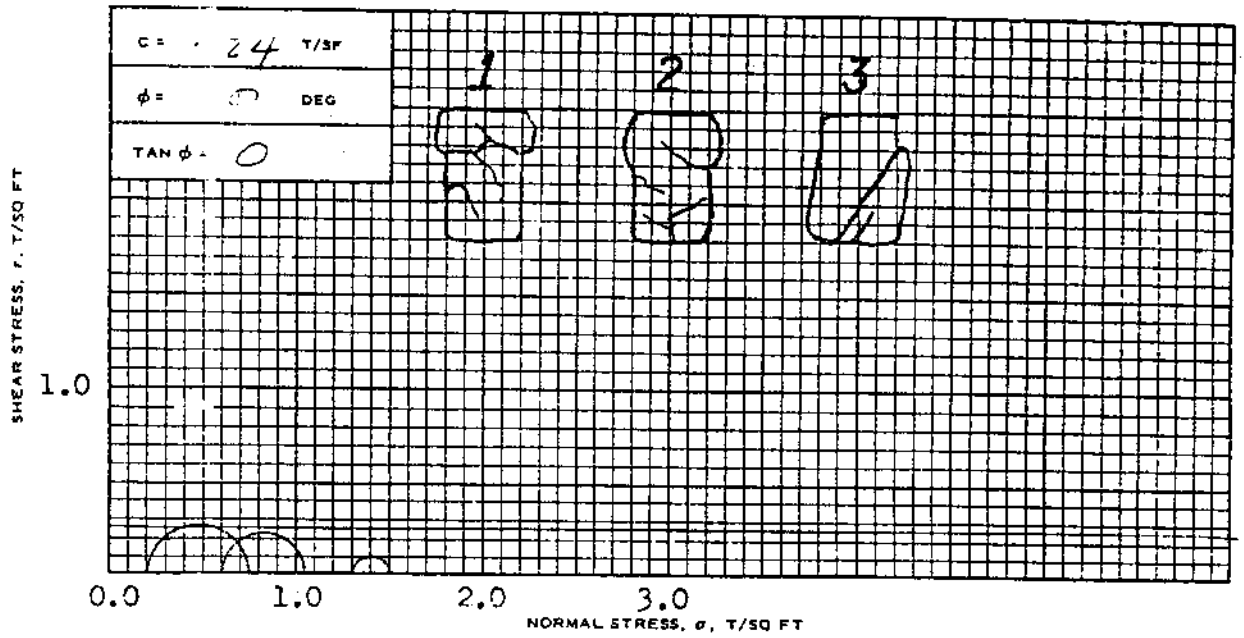
BORING NO. 3-U | SAMPLE 19-C

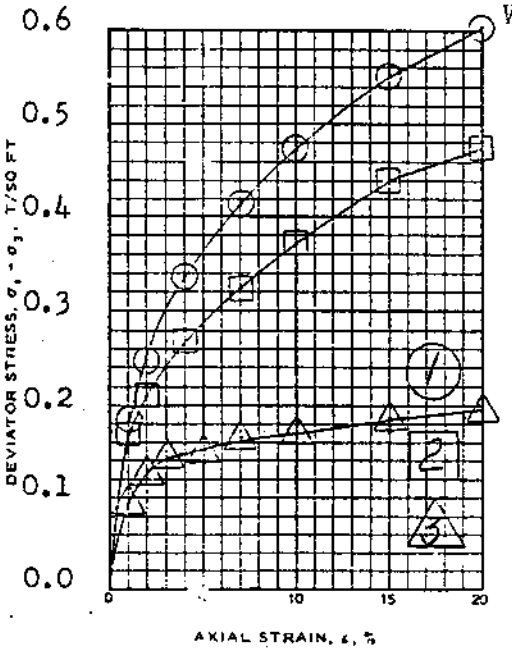
DEPTH/ELEV 72.7/-56.5 | DATE 13 OCT 83

DIRECT SHEAR TEST REPORT

ADVANCE COPY

SUBJECT TO CORRECTION





Wet Density(#/CF) 119.71 119.21 116.46

SPECIMEN NO.			1	2	3	
INITIAL	WATER CONTENT, %	w_o	27.15	27.80	37.17	
	DRY DENSITY LB/ CU FT	γ_{d_o}	94.14	93.28	84.91	
	SATURATION, %	S_o	94.36	94.58	100	
	VOID RATIO	e_o	0.767	0.784	0.960	
BEFORE SHEAR	WATER CONTENT, %	w_c				
	DRY DENSITY LB/CU FT	γ_{d_c}				
	SATURATION, %	S_c				
	VOID RATIO	e_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.2	0.6	1.3	
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	0.55	0.44	0.19	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	24.88	24.53	24.53	
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$				
INITIAL DIAMETER, IN.		D_o	1.4	1.4	1.4	
INITIAL HEIGHT, IN.		H_o	3.0	3.0	3.0	

CONTROLLED- STRAIN TEST

DESCRIPTION OF SPECIMENS VSo (Gr) CL6-S; sl & slf thru-out

30

LL 45 | PL 15 | PI ~~31~~ | G_s 2.6663

TYPE OF SPECIMEN 5" Undis. | TYPE OF TEST "Q"

REMARKS:

PROJECT Lk. Pont. La. & Vic. Orleans Parish
Lakefront Levee- West of IHNC

BORING NO. 3-ULO | SAMPLE NO. 2-C

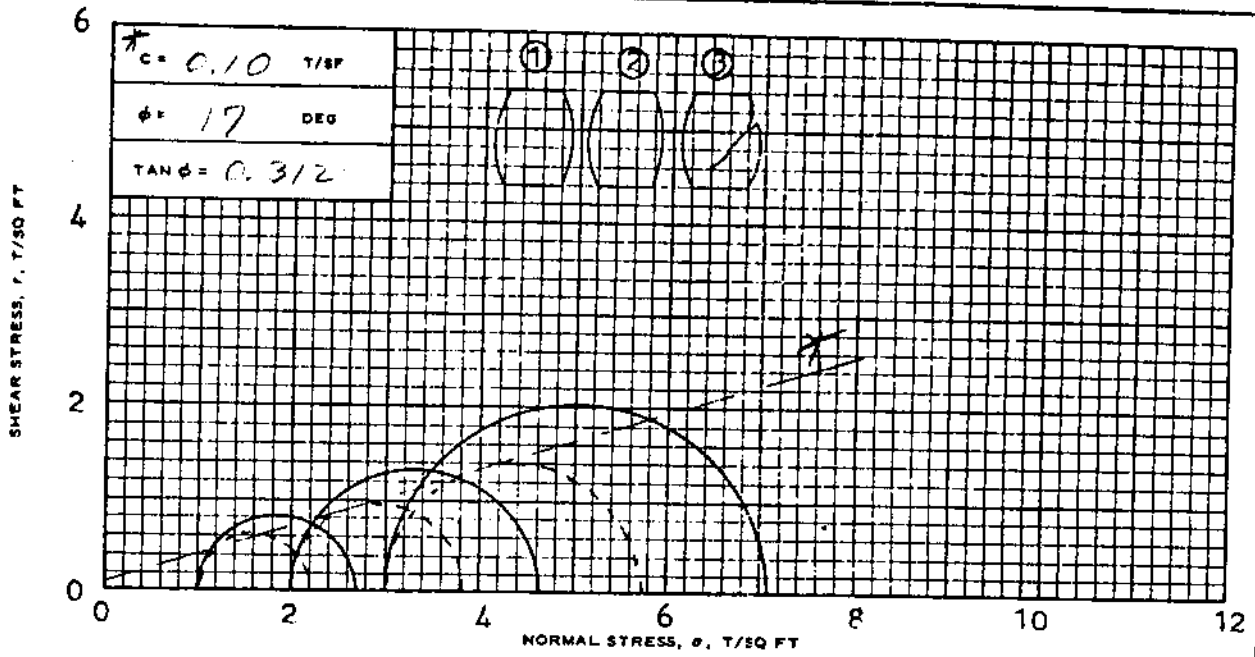
DEPTH/ELEV 5.4 / 0.0

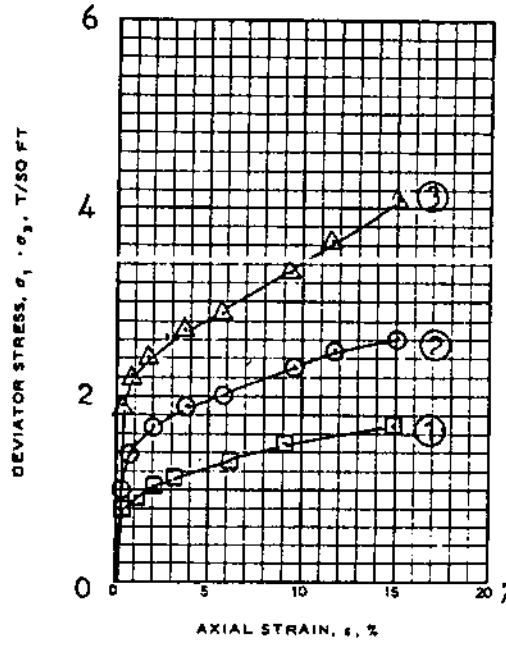
LABORATORY NOD | DATE 11 Dec 72

TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089 REV JUNE 1970 PREVIOUS EDITION IS OBSOLETE TRANSLUCENT (EM 1110-2-1906)

ADVANCE COPY
SUBJECT TO CORRECTION





110.4 110.5 112.8

SPECIMEN NO.			1	2	3	
INITIAL	WATER CONTENT, %	w_o	48.0	46.8	42.2	45.7
	DRY DENSITY LB/CU FT	γ_{d_o}	74.6	75.3	79.3	
	SATURATION, %	S_o	100+	100+	100+	
	VOID RATIO	e_o	1.21	1.19	1.08	
BEFORE SHEAR	WATER CONTENT, %	w_c	27.9	24.5	24.0	
	DRY DENSITY LB/CU FT	γ_{d_c}	82.2	86.3	86.9	
	SATURATION, %	S_c	100	100	100	
	VOID RATIO	e_c	1.00	0.910	0.897	
	FINAL BACK PRESSURE, T/SQ FT	u_o	3.38	4.82	4.82	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	1.0	2.0	3.0	
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	1.68	2.63	4.09	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	104	103	104	
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$	1.2	1.8	2.7	
INITIAL DIAMETER, IN.		D_o	1.37	1.37	1.38	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

CONTROLLED- Strain TEST

DESCRIPTION OF SPECIMENS SILT(ML),gray

LL 44 | PL 31 | PI 13 | Gs 2.64

TYPE OF SPECIMEN UNDISTURBED | TYPE OF TEST R

REMARKS: See attached plot for effective values

PROJECT LK. PONT.,LA.& VIC., ORLEANS PARISH
LK. FRONT LEVEE,WEST OF IHNC,GDM#2,SUPP.#5

BORING NO. 3-ULC | SAMPLE NO. 5-C

DEPTH/ELEV -10.5

LABORATORY USAEWES | DATE 25 August,1972

Sheet 1 of 2

TRIAXIAL COMPRESSION TEST REPORT

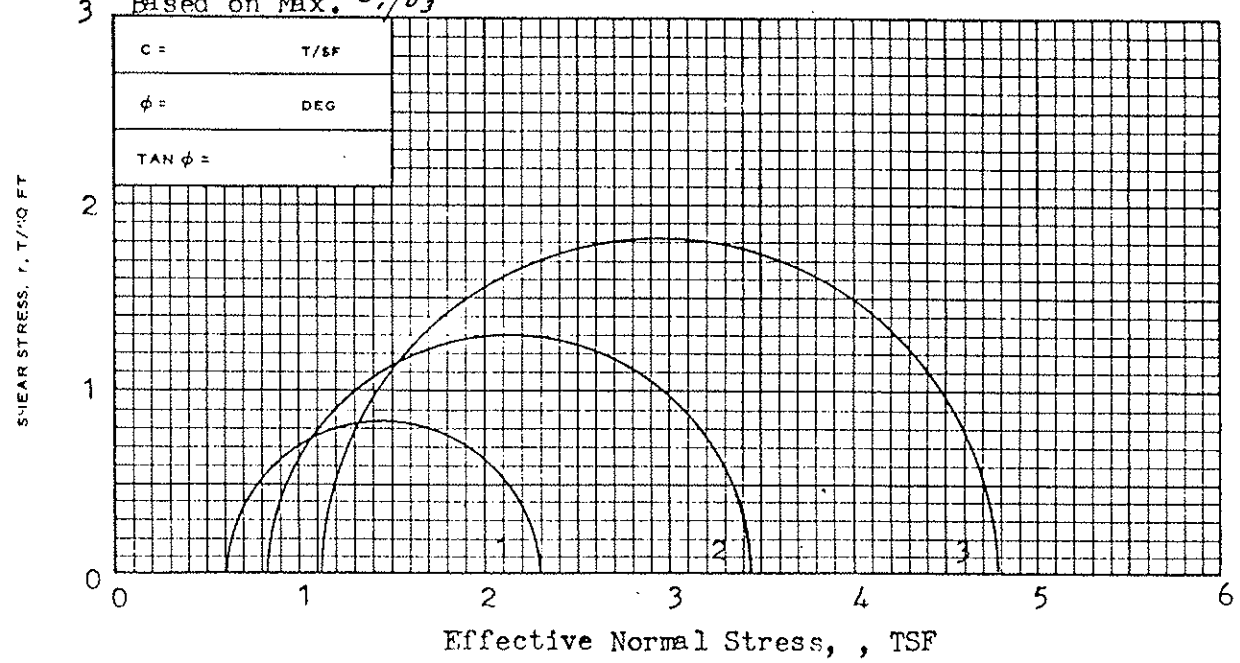
ENG FORM NO. 2089 REV JUNE 1970 PREVIOUS EDITION IS OBSOLETE TRANSLUCENT (EM 1110-2-1906)

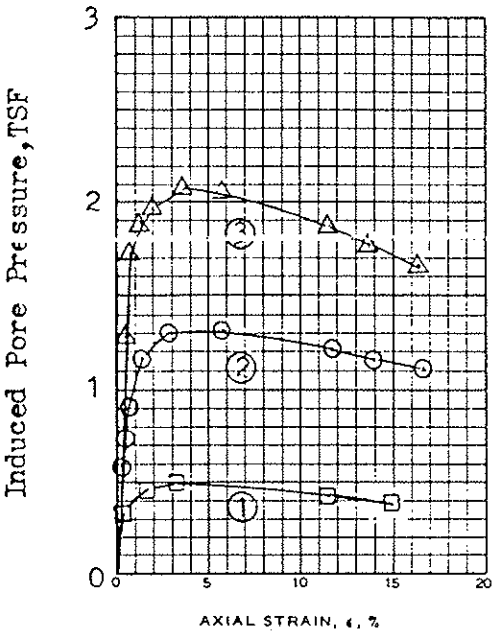
Sheet 1 of 2

ADVANCE COPY
SUBJECT TO CORRECTION

Based on Max. σ_1'/σ_3'

C =	T/SF
ϕ =	DEG
TAN ϕ =	





CONTROLLED- TEST

SPECIMEN NO.						
INITIAL	WATER CONTENT, %	w_o				
	DRY DENSITY LB/ CU FT	γ_{d_o}				
	SATURATION, %	S_o				
	VOID RATIO	e_o				
BEFORE SHEAR	WATER CONTENT, %	w_c				
	DRY DENSITY LB/CU FT	γ_{d_c}				
	SATURATION, %	S_c				
	VOID RATIO	e_c				
	FINAL BACK PRESSURE, T/SQ FT	U_o				
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3				
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$				
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f				
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$				
INITIAL DIAMETER, IN.		D_o				
INITIAL HEIGHT, IN.		H_o				

DESCRIPTION OF SPECIMENS

LL	PL	PI	Gs

TYPE OF SPECIMEN | TYPE OF TEST R

REMARKS:

PROJECT LK. PONT.,LA. & VIC.,-ORLEANS PARISH
LK. FRONT LEVEE,WEST OF IHNC,GDM#2,SUPP.#5

BORING NO. 3-ULO | SAMPLE NO. 5-C

~~DEPTH~~ ELEV -10.5

LABORATORY USAEWES | DATE 25 August,1972

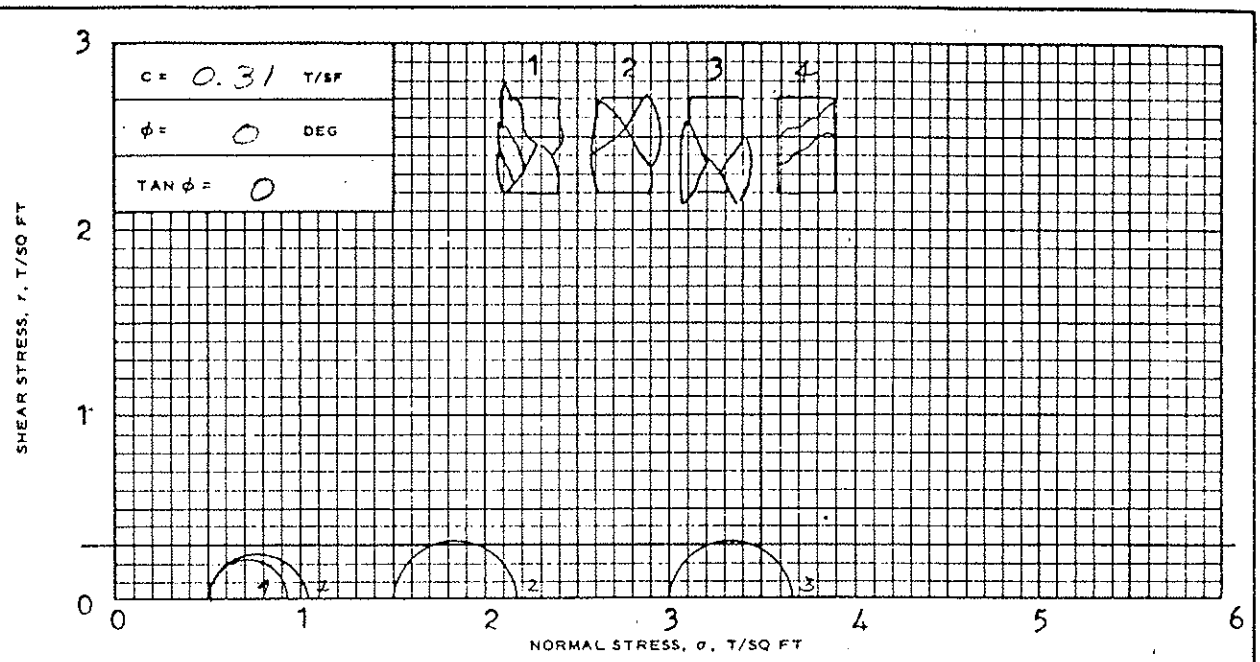
Sheet 2 of 2

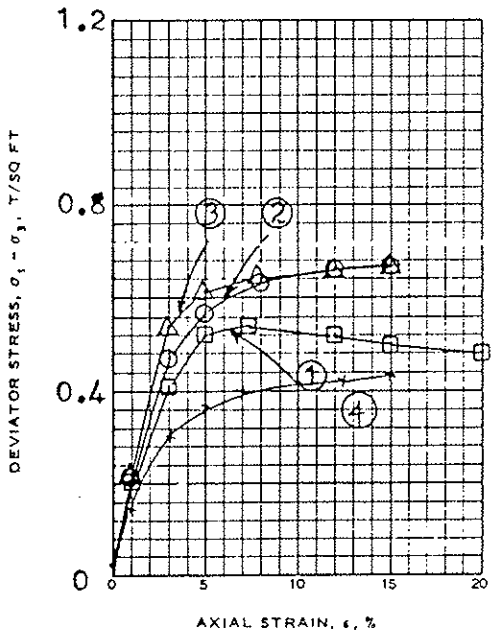
TFS TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089 REV JUNE 1970 PREVIOUS EDITION IS OBSOLETE TRANSLUCENT (EM 1110-2-1906)

Sheet 2 of 2

ADVANCE COPY
SUBJECT TO CORRECTION





SPECIMEN NO.			1	2	3	4
INITIAL	WATER CONTENT, %	w_o	43.4	31.7	31.2	41.7
	DRY DENSITY LB/ CU FT	γ_{d_o}	76.8	88.9	90.3	78.3
	SATURATION, %	S_o	99.0	96.7	98.5	98.5
	VOID RATIO	e_o	1.17	0.875	0.846	1.13
BEFORE SHEAR	WATER CONTENT, %	w_c				
	DRY DENSITY LB/CU FT	γ_{d_c}				
	SATURATION, %	S_c				
	VOID RATIO	e_c				
	FINAL BACK PRESSURE, T/SQ FT	U_o				
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.5	1.5	3.0	0.5
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	0.54	0.67	0.66	0.43
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	16	75	32	35
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$				
INITIAL DIAMETER, IN.		D_o	1.39	1.39	1.39	1.41
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	3.00

110.5 118. 118.9 111.4

CONTROLLED- Strain TEST

DESCRIPTION OF SPECIMENS LEAN CLAY(CL),gray;few Sandy Silt lenses and few shells up to 1/2" size

LL 35 | PL 18 | PI 17 | G_s 2.67

TYPE OF SPECIMEN UNDISTURBED | TYPE OF TEST Q

REMARKS:

PROJECT LK.PONT.,LA,& VIC.-ORLEANS PARISH
LK. FRONT LEVEES,WEST OF IHNC,GDM#2,SUPP#5

BORING NO. 3-ULO | SAMPLE NO. 7-B

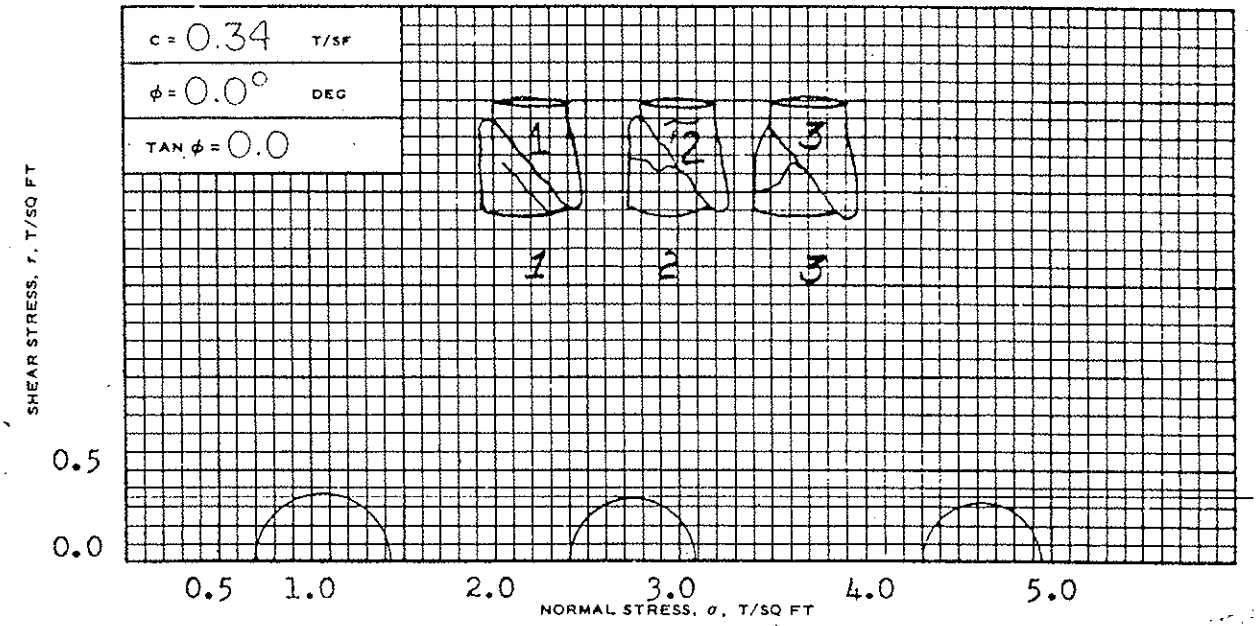
~~DEPTH~~/ELEV -19.0

LABORATORY USAEWES | DATE 30 Oct.,1972

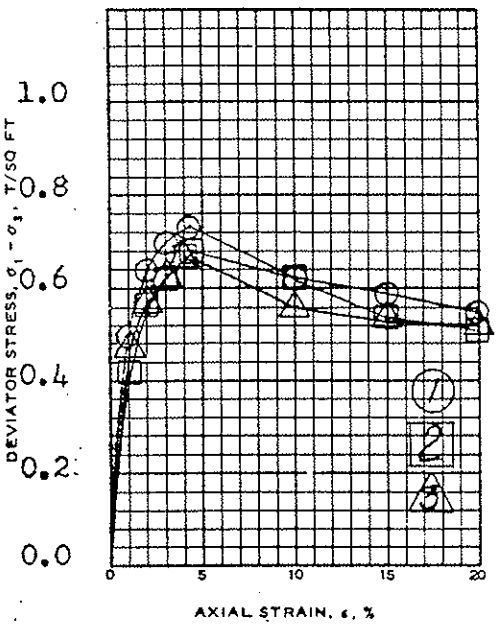
FAM TRIAXIAL COMPRESSION TEST REPORT

ADVANCE COPY

SUBJECT TO CORRECTION



Wet Density (#/CF) 101.94 102.20 103.19



SPECIMEN NO.			1	2	3	
INITIAL	WATER CONTENT, %	w_o	59.26	59.42	57.40	.7
	DRY DENSITY LB/ CU FT	γ_{d_o}	64.01	64.11	65.56	
	SATURATION, %	S_o	99.14	99.65	99.88	
	VOID RATIO	e_o	1.584	1.581	1.524	
BEFORE SHEAR	WATER CONTENT, %	w_c				
	DRY DENSITY LB/CU FT	γ_{d_c}				
	SATURATION, %	S_c				
	VOID RATIO	e_c				
	FINAL BACK PRESSURE, T/SQ FT	U_o				
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.7	2.4	4.3	
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	0.731	0.675	0.651	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	6.65	16.44	14.81	
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$				
INITIAL DIAMETER, IN.		D_o	1.4	1.4	1.4	
INITIAL HEIGHT, IN.		H_o	3.0	3.0	3.0	

CONTROLLED- STRAIN TEST

DESCRIPTION OF SPECIMENS M (Gr) CH4: lns lys & ars Sp; few lyrs ML; sl & slf. org strks.

LL 76	PL 22	PI 54	G_s 2.6512	TYPE OF SPECIMEN 5" Undis.	TYPE OF TEST "Q"

REMARKS:

PROJECT Lk. Pont. La. & Vic.-Orleans Parish Lakefront Levees, West of IHNC

BORING NO. 3-ULO SAMPLE NO. 9-B

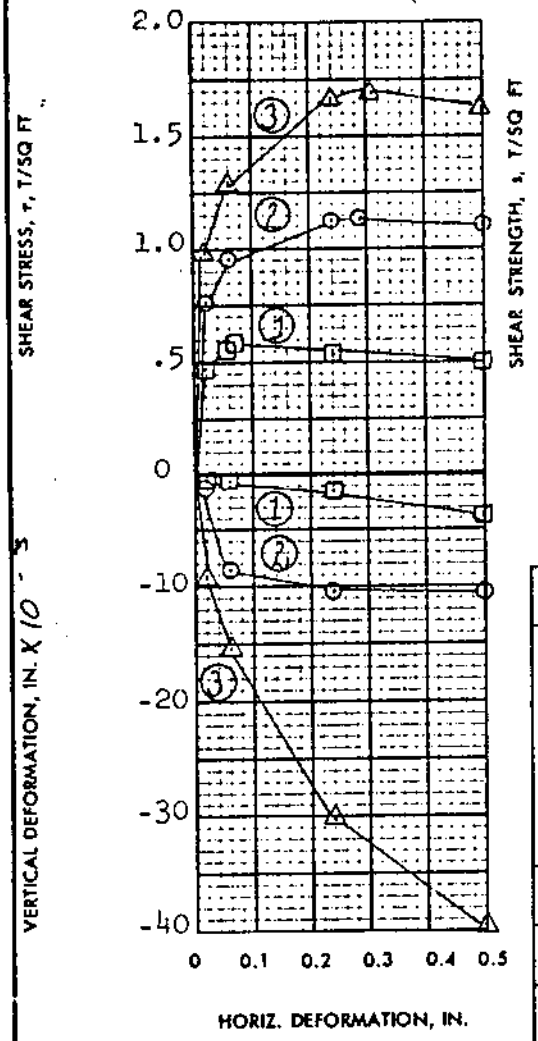
DEPTH/ELEV 31.9 / -26.5

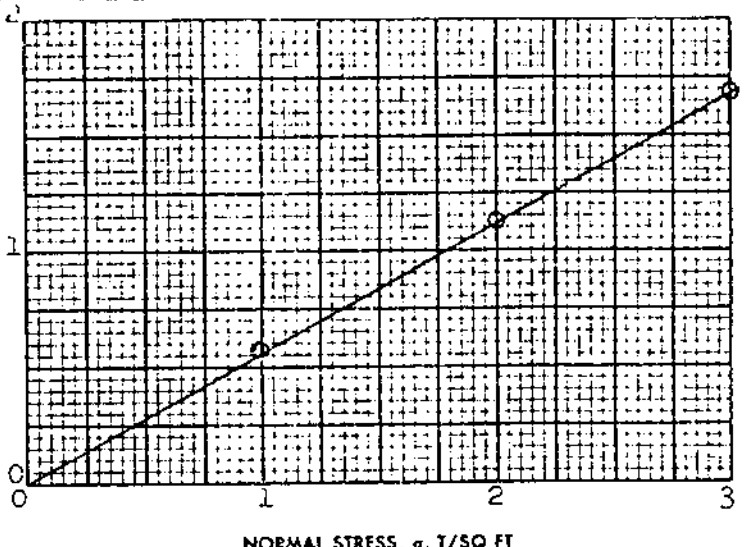
LABORATORY NOD DATE 8 June 73

F.W. TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089 REV JUNE 1970 PREVIOUS EDITION IS OBSOLETE TRANSLUCENT (EM 1110-2-1906)

ADVANCE COPY
SUBJECT TO CORRECTION





118.3 115.1 118.6

TEST NO.			1	2	3	
INITIAL	WATER CONTENT	w_o	31.4%	34.1%	32.9%	30.3%
	VOID RATIO	e_o	0.841	0.904	1.00	
	SATURATION	S_o	100+ %	100+%	88.5%	%
	DRY DENSITY, LB/CU FT	γ_d	91.2	88.2	83.9	
VOID RATIO AFTER CONSOLIDATION		e_c				
TIME FOR 50 PERCENT CONSOLIDATION, MIN		t_{50}	< 1	< 1	< 1	
FINAL	WATER CONTENT	w_f	26.7%	26.0%	27.7%	%
	VOID RATIO	e_f				
	SATURATION	S_f	%	%	%	%
NORMAL STRESS, T/SQ FT		σ	1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, T/SQ FT		τ_{max}	0.57	1.13	1.69	
ACTUAL TIME TO FAILURE, MIN		t_f	360	1620	1680	
RATE OF STRAIN, IN./MIN			.00019	.00019	.00019	
ULTIMATE SHEAR STRESS, T/SQ FT		τ_{ult}				

SHEAR STRENGTH PARAMETERS

ϕ' = 30°

TAN ϕ' = 0.57

c' = 0 T/SQ FT

☐ CONTROLLED STRESS
☒ CONTROLLED STRAIN

TYPE OF SPECIMEN UNDISTURBED — 3.00 IN. SQUARE — 0.538 IN. THICK

CLASSIFICATION PLASTIC CLAY(CH),gray;numerous pockets of fine sand and a few*

LL 51 | PL 22 | PI 29 | G_s 2.69

REMARKS *shell fragments

PROJECT LK. PONT. LA. & VIC., -ORLEANS PARISH LK. FRONT LEVEES, WEST OF IHNC NO. 2, SUPP. NO. 5

AREA

BORING NO. 3-ULO | SAMPLE NO. 9-D

DEPTH EL ~~-38.5~~ -28.5 | DATE 28 Sept. 1972

RCH

DIRECT SHEAR TEST REPORT

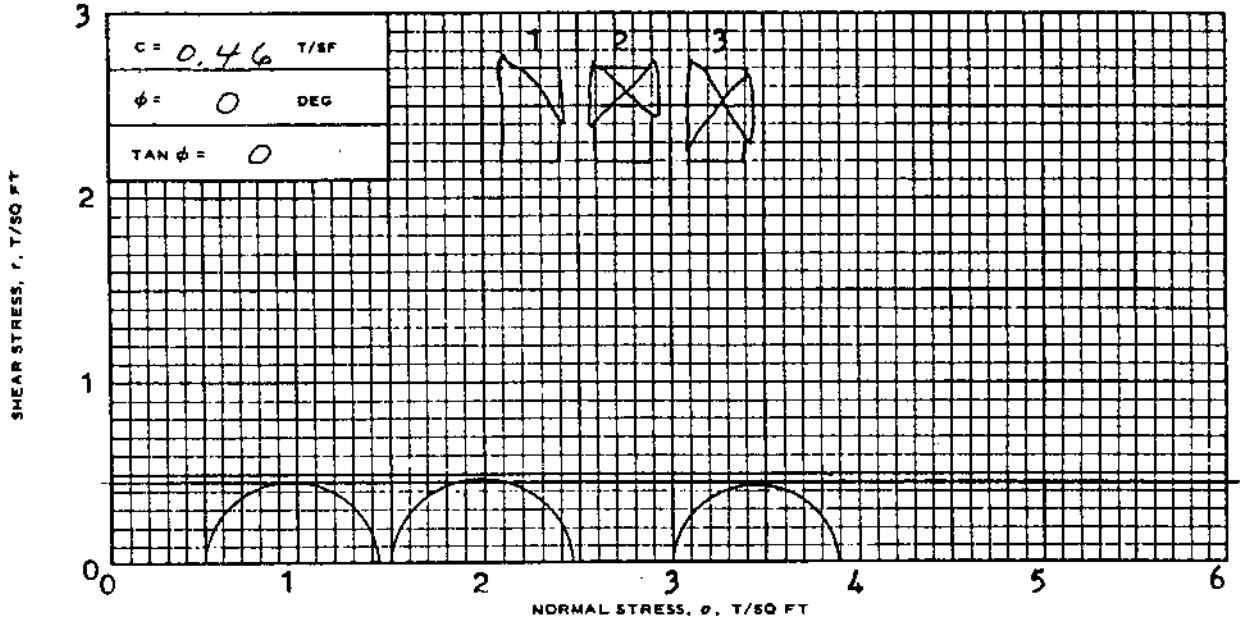
ENG FORM 1 JUN 65 **2092** (EM 1110-2-1906) PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT)

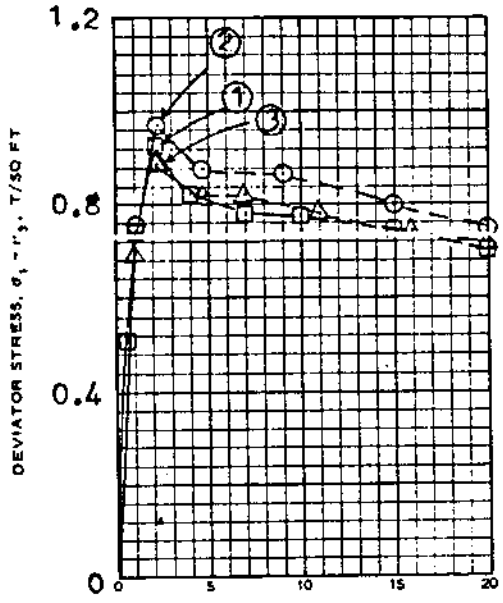
GPO : 1966 O-214-945

PLATE IX-3

ADVANCE COPY

SUBJECT TO CORRECTION





SPECIMEN NO.			1	2	3	
INITIAL	WATER CONTENT, %	w_o	55.9	52.4	55.4	54.4
	DRY DENSITY LB/CU FT	γ_{d_o}	67.5	69.5	67.2	
	SATURATION, %	S_o	100+	99.3	98.8	
	VOID RATIO	e_o	1.50	1.43	1.52	
BEFORE SHEAR	WATER CONTENT, %	w_c				
	DRY DENSITY LB/CU FT	γ_{d_c}				
	SATURATION, %	S_c				
	VOID RATIO	e_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.5	1.5	3.0	
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	0.93	0.97	0.89	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	8	26	36	
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$				
INITIAL DIAMETER, IN.		D_o	1.39	1.39	1.39	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

CONTROLLED- Strain TEST

DESCRIPTION OF SPECIMENS PLASTIC CLAY(CH),gray;trace of fine sand

LL 72	PL 24	PI 48	G_s 2.71	TYPE OF SPECIMEN UNDISTURBED	TYPE OF TEST Q

REMARKS: --- Rate of Strain Increased

PROJECT LK.PONT.LA. & VIC.-ORLEANS PARISH LK. FRONT LEVEES,WEST OF IHNC, GDM #2, SUPP. #5

BORING NO. 3-ULO SAMPLE NO. 13-C

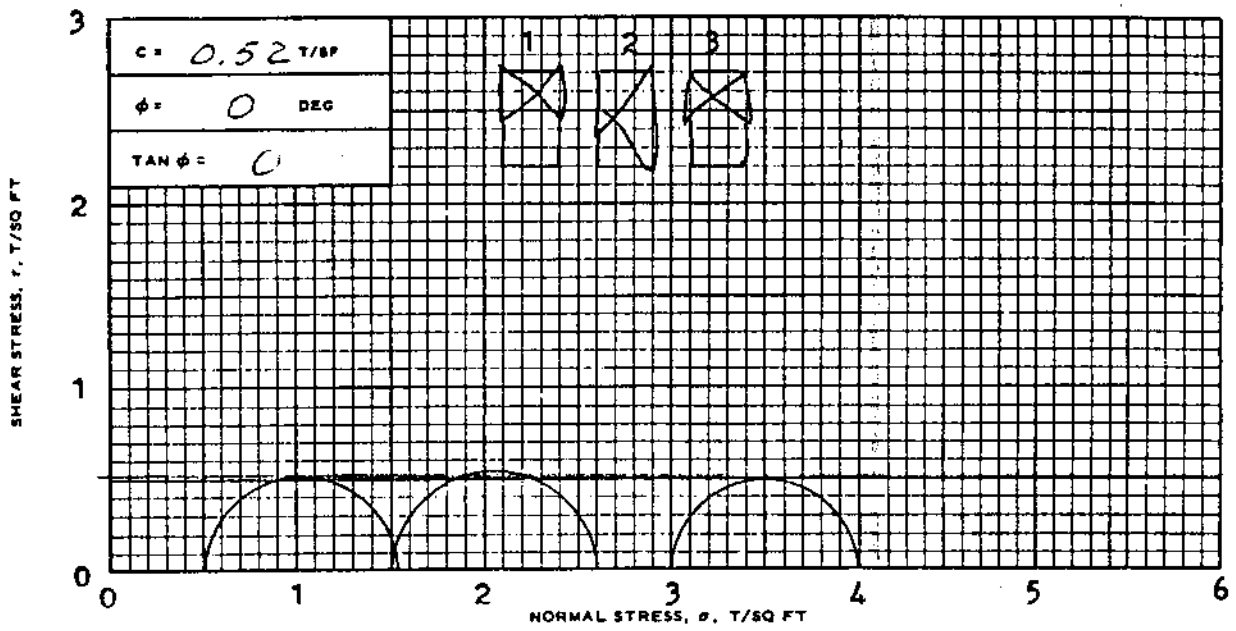
~~DEPTH~~/ELEV -43.5

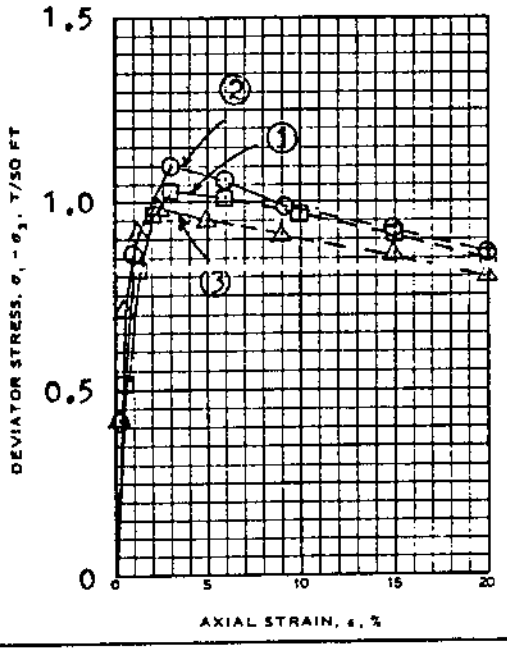
LABORATORY USAEWES DATE 26 Oct.,1972

GDA TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089 REV JUNE 1970 PREVIOUS EDITION IS OBSOLETE TRANSLUCENT (EM 1110-2-1906)

ADVANCE COPY
SUBJECT TO CORRECTION





SPECIMEN NO.			1	2	3	
			113.8	113.4	112.2	113.5
INITIAL	WATER CONTENT, %	w_o	39.2	38.8	41.5	39.6
	DRY DENSITY LB/CU FT	γ_{d_o}	81.4	81.7	78.8	
	SATURATION, %	S_o	98.4	98.3	97.8	
	VOID RATIO	e_o	1.08	1.07	1.15	
BEFORE SHEAR	WATER CONTENT, %	w_c				
	DRY DENSITY LB/CU FT	γ_{d_c}				
	SATURATION, %	S_c				
	VOID RATIO	e_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.5	1.5	3.0	
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	1.03	1.10	0.99	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	18	20	20	
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$				
INITIAL DIAMETER, IN.		D_o	1.39	1.39	1.39	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

CONTROLLED- Strain TEST

DESCRIPTION OF SPECIMENS PLASTIC CLAY(CH),gray;1/16 silty sand seams

LL 56	PL 18	PI 38	G_s 2.71

TYPE OF SPECIMEN UNDISTURBED TYPE OF TEST Q

REMARKS: - - - Rate of strain increased

PROJECT LK.PONT.,LA.&VIC.-ORLEANS PARISH LK. FRONT LEVEES,WEST OF IHNC,GDM#2,SUPP. #5

BORING NO. 3-ULO SAMPLE NO. 14-B

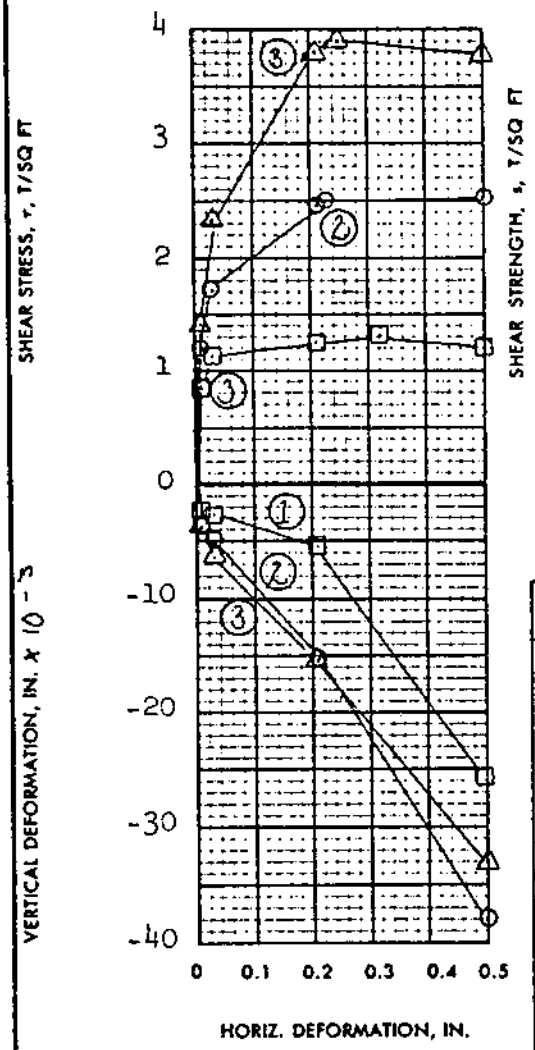
DEPTH/ELEV -46.9

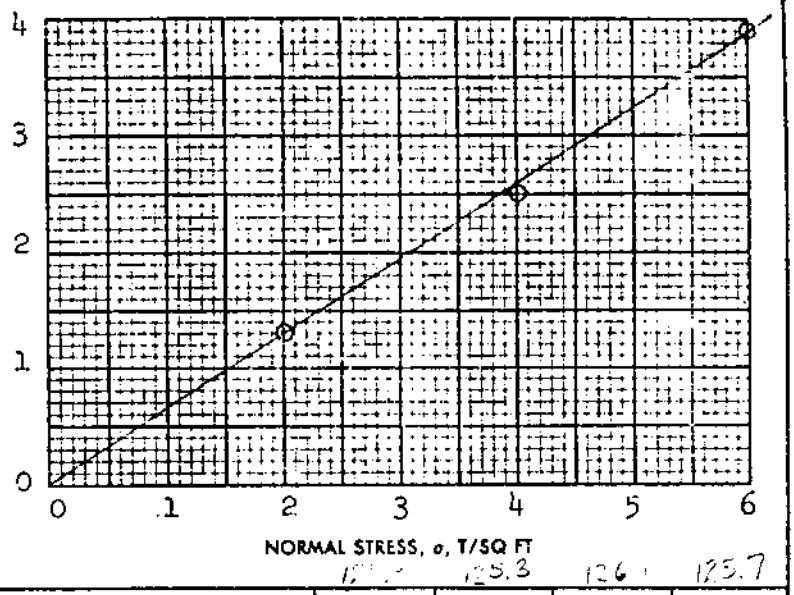
LABORATORY USAEWES DATE 27 Oct.,1972

GDA TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089 REV JUNE 1970 PREVIOUS EDITION IS OBSOLETE TRANSLUCENT (EM 110-2-1906)

ADVANCE COPY
SUBJECT TO CORRECTION





125.3 126 125.7

TEST NO.			1	2	3	
INITIAL	WATER CONTENT	w_o	23.2 %	23.9%	23.6%	23.6 %
	VOID RATIO	e_o	0.636	0.647	0.628	
	SATURATION	S_o	97.0%	98.2%	100 %	%
	DRY DENSITY, LB/CU FT	γ_d	101.5	100.8	102.0	
VOID RATIO AFTER CONSOLIDATION		e_c				
TIME FOR 50 PERCENT CONSOLIDATION, MIN		t_{50}				
FINAL	WATER CONTENT	w_f	25.3 %	24.6%	23.3%	%
	VOID RATIO	e_f				
	SATURATION	S_f	%	%	%	%
NORMAL STRESS, T/SQ FT		σ	2.0	4.0	6.0	
MAXIMUM SHEAR STRESS, T/SQ FT		τ_{max}	1.30	2.50	3.90	
ACTUAL TIME TO FAILURE, MIN		t_f	1830	1380	1470	
RATE OF STRAIN, IN./MIN			.00018	.00018	.00018	
ULTIMATE SHEAR STRESS, T/SQ FT		τ_{ult}				

SHEAR STRENGTH PARAMETERS

$\phi' =$ 33°

TAN $\phi' =$ 0.65

$c' =$ 0 T/SQ FT

☐ CONTROLLED STRESS
☒ CONTROLLED STRAIN

TYPE OF SPECIMEN UNDISTURBED — 3.00 IN. SQUARE — 0.563 IN. THICK

CLASSIFICATION SAND(SP),light gray

LL — PL — PI — G_s 2.66

REMARKS

PROJECT LK.PONT.LA.,&VIC.-ORLEANS PARISH LK.FR. LEVEES, WEST OF IHNC,GDM NO.2,SUPP. NO.5

AREA

BORING NO. 3-ULO SAMPLE NO. 16-C

DEPTH EL -55.8 DATE 4 October 1972

BWG

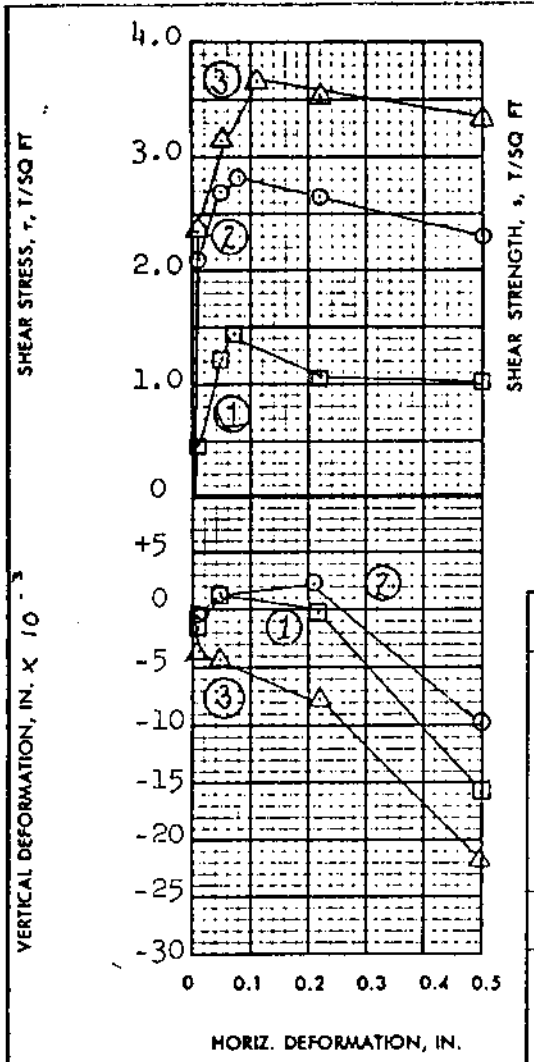
DIRECT SHEAR TEST REPORT

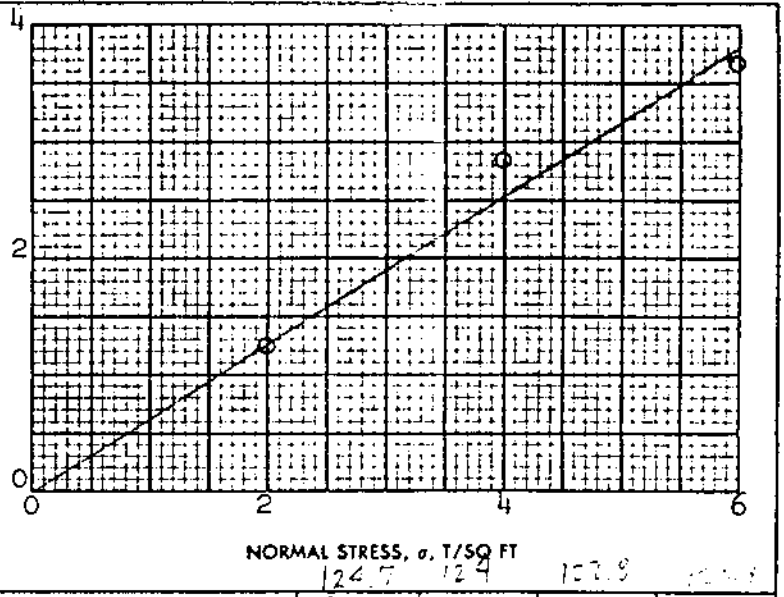
ENG FORM 1 JUN 65 **2092** (EM 1110-2-1906) PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT)

GPO : 1966 OP—214-945

PLATE IX-3

ADVANCE COPY
SUBJECT TO CORRECTION





124.7 129 [illegible]

TEST NO.			1	2	3	
INITIAL	WATER CONTENT	w_o	25.1%	24.9%	24.4%	24.8 %
INITIAL	VOID RATIO	e_o	0.666	0.684	0.688	
INITIAL	SATURATION	S_o	100+%	96.8%	94.3%	%
INITIAL	DRY DENSITY, LB/CU FT	γ_d	99.7	98.6	98.4	
VOID RATIO AFTER CONSOLIDATION		e_c				
TIME FOR 50 PERCENT CONSOLIDATION, MIN		t_{50}				
FINAL	WATER CONTENT	w_f	21.0%	21.7%	21.2%	%
FINAL	VOID RATIO	e_f				
FINAL	SATURATION	S_f	%	%	%	%
NORMAL STRESS, T/SQ FT		σ	2.0	4.0	6.0	
MAXIMUM SHEAR STRESS, T/SQ FT		τ_{max}	1.23	2.82	3.67	
ACTUAL TIME TO FAILURE, MIN		t_f	480	540	660	
RATE OF STRAIN, IN./MIN			.00018	.00018	.00018	
ULTIMATE SHEAR STRESS, T/SQ FT		τ_{ult}				

SHEAR STRENGTH PARAMETERS

$\phi' =$ 32°

TAN $\phi' =$ 0.615

$c' =$ 0 T/SQ FT

☐ CONTROLLED STRESS
☒ CONTROLLED STRAIN

TYPE OF SPECIMEN: UNDISTURBED — 3.00 IN. SQUARE — 0.538 IN. THICK

CLASSIFICATION: SAND(SP),gray;trace of shell fragments

LL — PL — PI — G_s 2.66

REMARKS

PROJECT: LK. PONT. LA. & VIC.-ORLEANS PARISH LK.FR. LEVEES, WEST OF IHNC, GDM NO.2, SUPP. NO.5

AREA

BORING NO. 3-UL0 — SAMPLE NO. 19-D

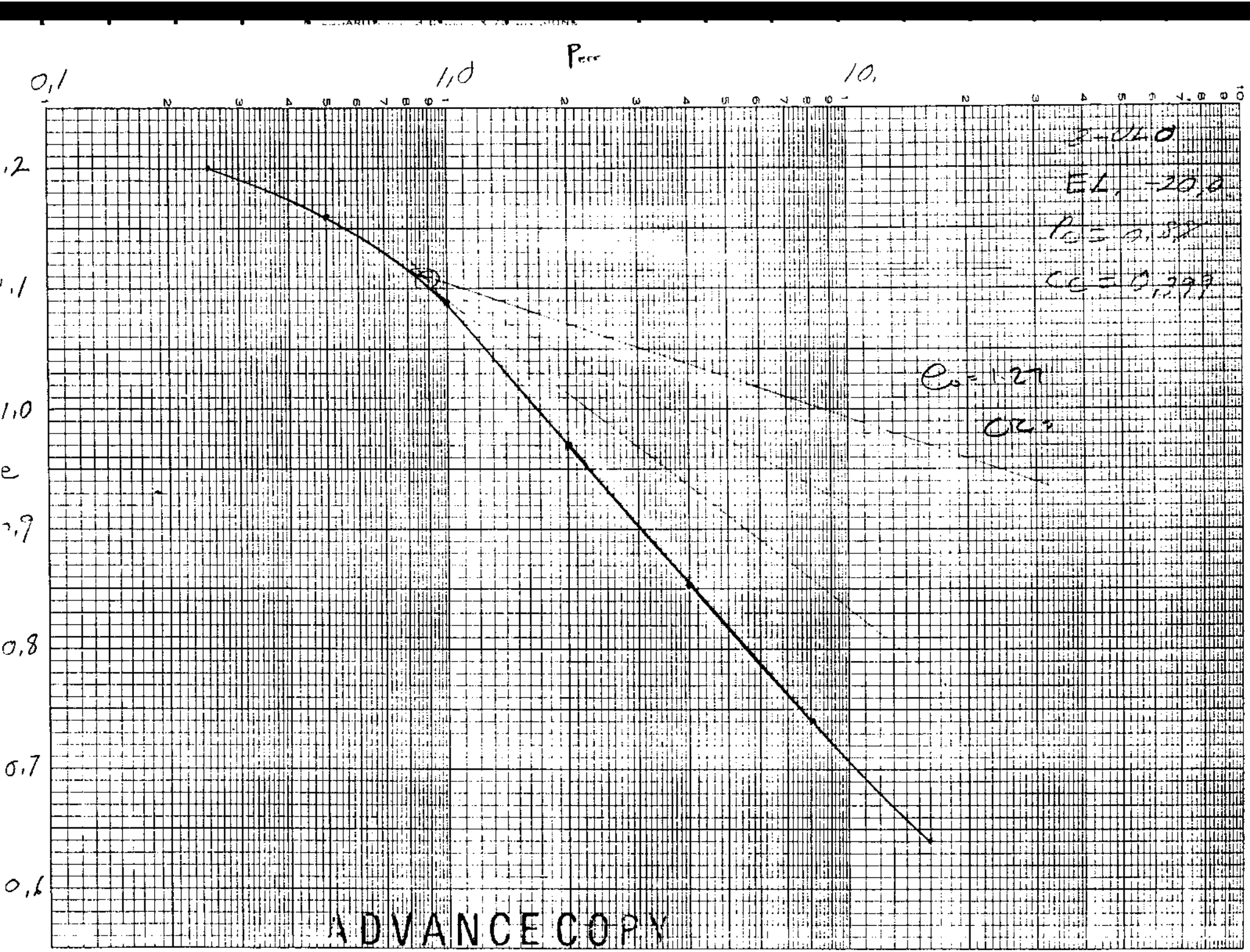
DEPTH EL -68.2 — DATE 3 October 1972

RCH

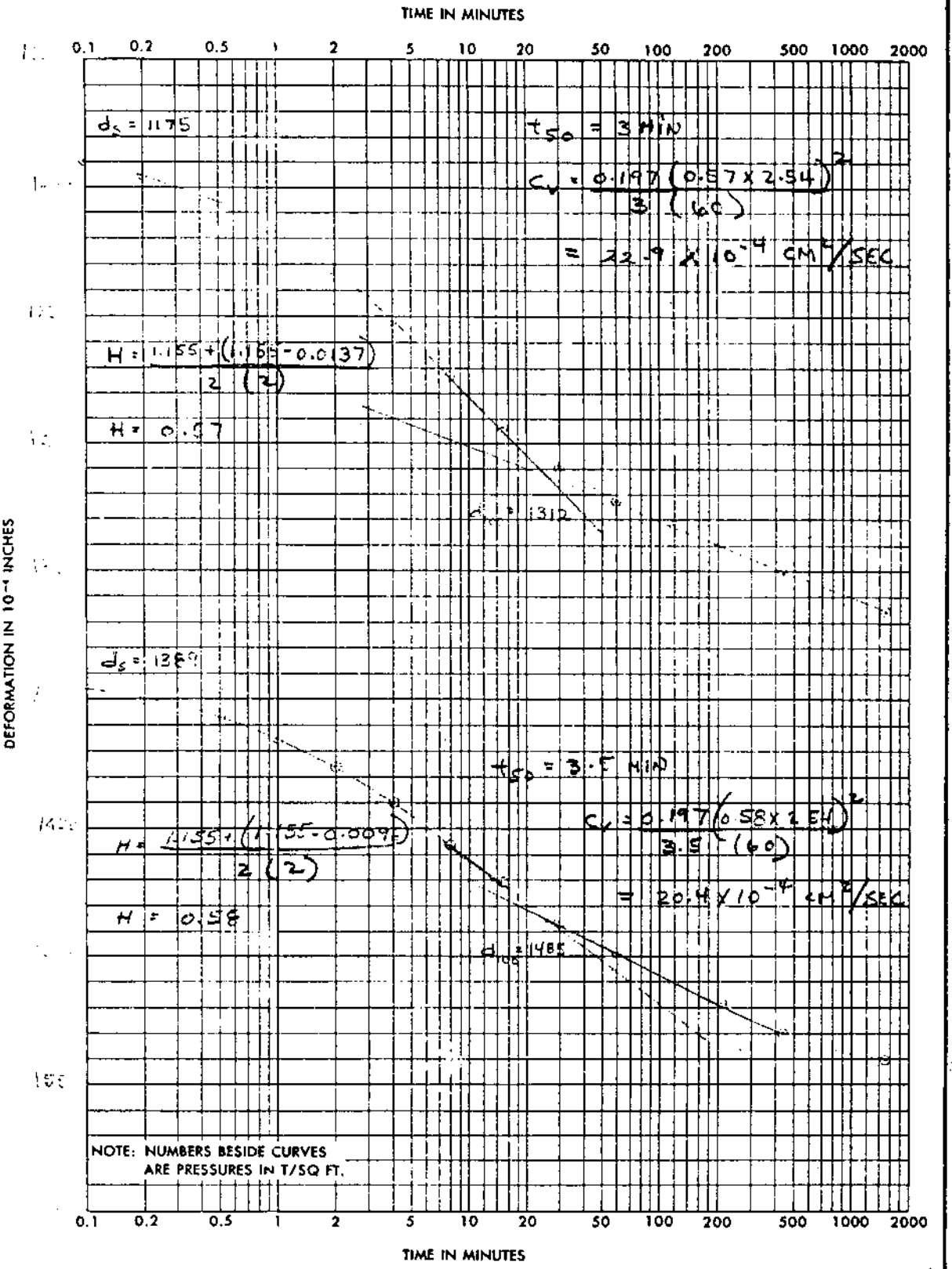
DIRECT SHEAR TEST REPORT

ENG FORM 2092 1 JUN 65 (EM 1110-2-1906) PREVIOUS EDITIONS ARE OBSOLETE (TRANSLUCENT) GPO : 1966 OP—214-945

PLATE IX-3



ADVANCE COPY
SUBJECT TO CORRECTION



PROJECT	LAKE PONT., LA. & VIC.-ORLEANS PARISH LAKE FRONT LEVEES, WEST OF			
AREA	IHNC, GDM NO.2, SUPP.NO. 5			
BORING NO. 3-ULO	SAMPLE NO. 7-C	DEPTH EL -20	DATE 27 Nov., 1972	

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O—715-965

ADVANCE COPY

SUBJECT TO CORRECTION

TIME IN MINUTES

0.1 0.2 0.5 1 2 5 10 20 50 100 200 500 1000 2000

$d_0 = 1582$

$t_{50} = 4\ H(N)$

$C_v = \frac{0.197\ (0.57 \times 2.54)^2}{4\ (60)}$

$C_v = 17.2 \times 10^{-4}$ CM/SEC

$H = \frac{1.155 - (1.155 - 0.023)}{2\ (2)}$

$H = 0.57$

$d_{100} = 1795$

1.0

DEFORMATION IN 10^{-1} INCHES

NOTE: NUMBERS BESIDE CURVES ARE PRESSURES IN T/SQ FT.

0.1 0.2 0.5 1 2 5 10 20 50 100 200 500 1000 2000

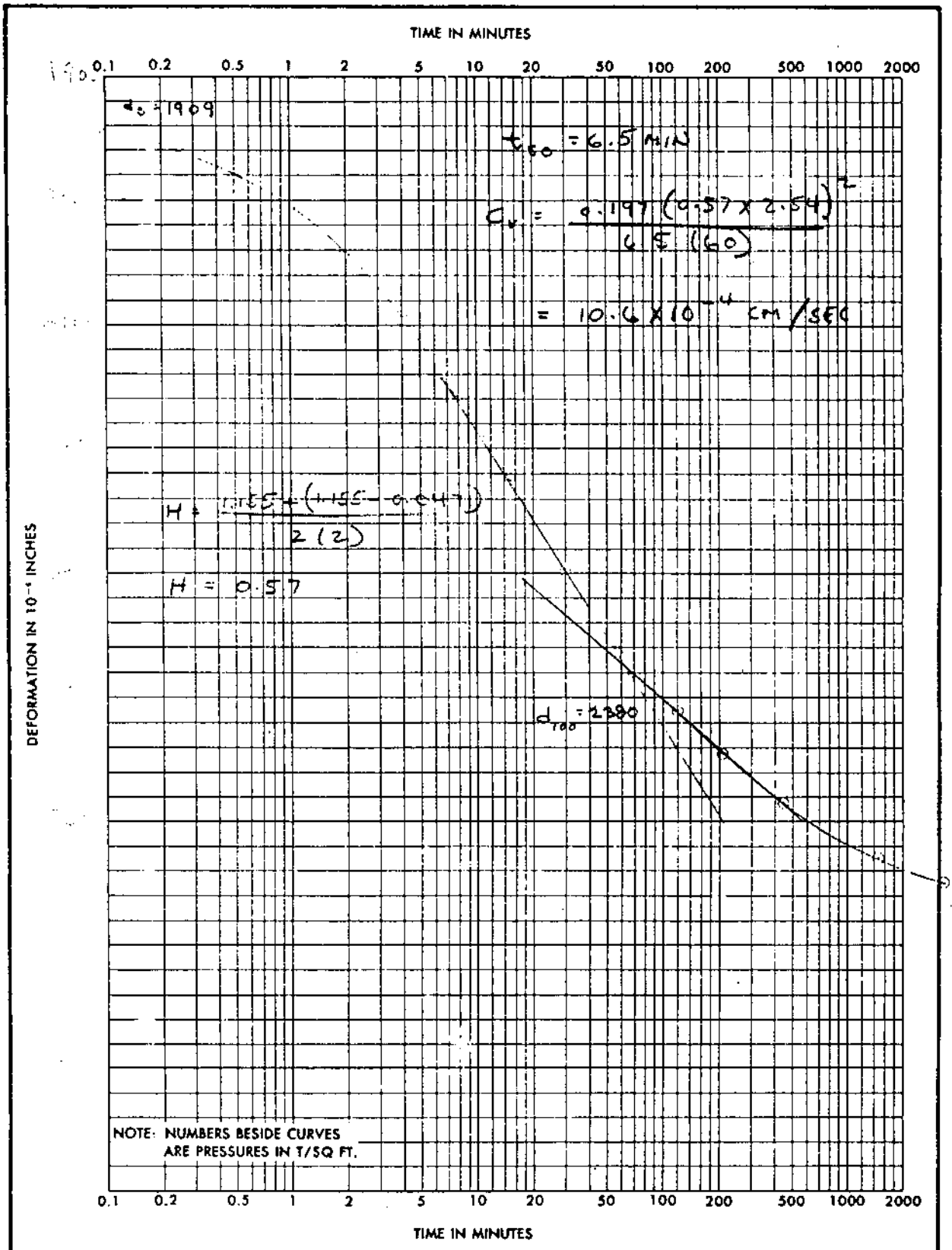
TIME IN MINUTES

PROJECT	LAKE PONT.,LA. & VIC.-ORLEANS PARISH LAKE FRONT LEVEES, WEST OF			
AREA	IHNC, GDM NO.2, SUPP. NO.5			
BORING NO. 3-ULO	SAMPLE NO. 7-C	DEPTH EL -20.0	DATE 27 Nov.,1972	

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

GPO : 1964 OP—715-965



PROJECT	LAKE PONT.,LA. & VIC- ORLEANS PARISH, LAKE FRONT LEVEES, WEST OF			
AREA	IHNC, GDM NO.2, SUPP. NO.5			
BORING NO. 3-ULO	SAMPLE NO. 7-C	DEPTH EL -20.0	DATE 27 Nov.,1972	

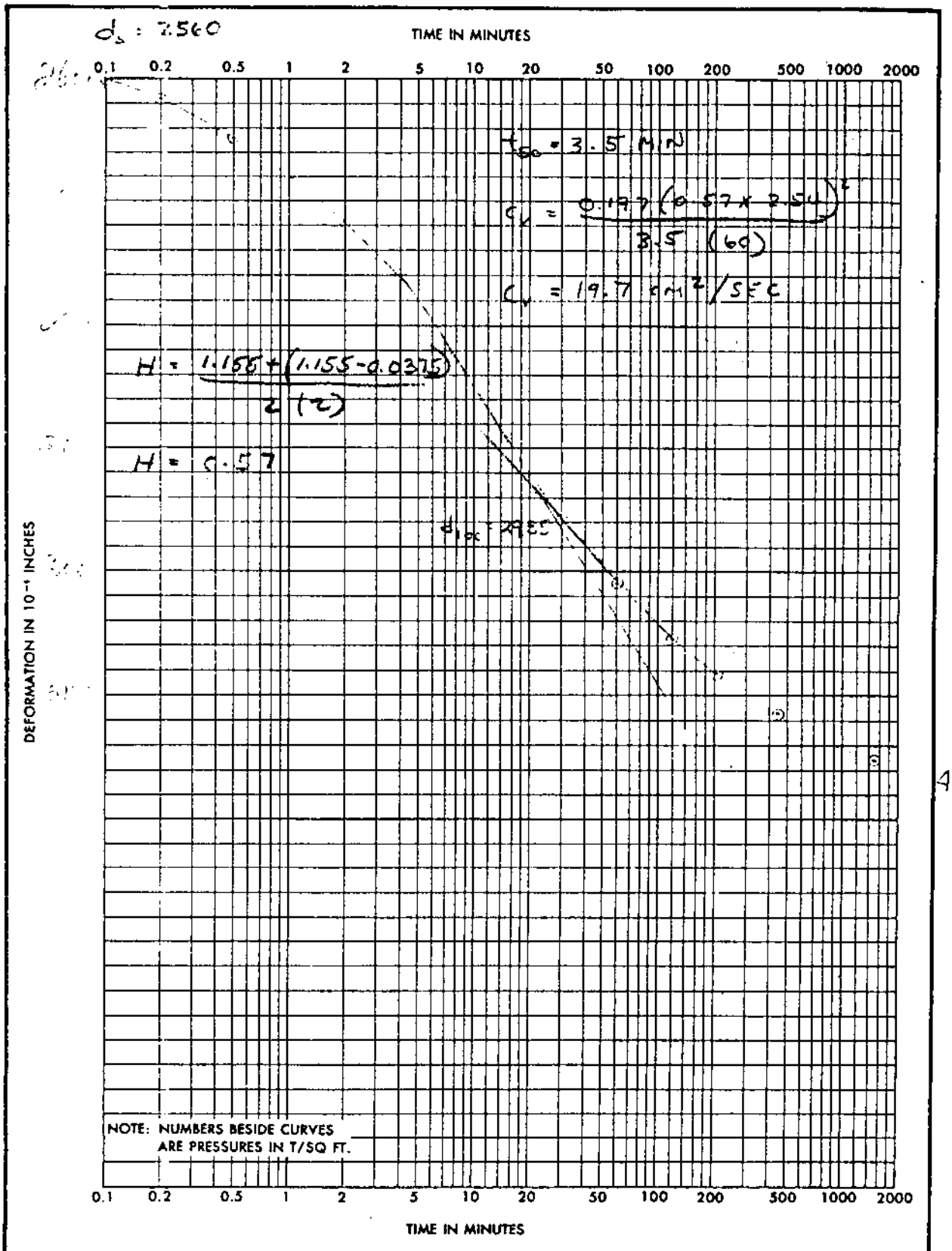
ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—715-965

ADVANCE COPY

SUBJECT TO CORRECTION



4.0

PROJECT	LAKE. PONT.,LA. & VIC.-ORLEANS PARISH LAKE FRONT LEVEES, WEST OF			
AREA	IHNC, GDM NO.2, SUPP. NO.5			
BORING NO. 3-ULO	SAMPLE NO. 7-C	DEPTH EL -20.0	DATE 27 Nov.,1972	

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O—715-965

ADVANCE COPY

SUBJECT TO CORRECTION

$d_s = .3155$

TIME IN MINUTES

0.1 0.2 0.5 1 2 5 10 20 50 100 200 500 1000 2000

$t_{50} = 2.50$ MIN

$C_v = \frac{0.197 (0.57 \times 2.54)^2}{2.5 (60)}$

$C_v = 27.5 \times 10^{-4}$ cm²/sec

$H = \frac{1.155 + (1.155 - 0.037)}{2 (2)}$

$H = 0.57$

$d_{100} = .958$

DEFORMATION IN 10^{-4} INCHES

NOTE: NUMBERS BESIDE CURVES ARE PRESSURES IN T/SQ FT.

0.1 0.2 0.5 1 2 5 10 20 50 100 200 500 1000 2000

TIME IN MINUTES

PROJECT LAKE PONT.,LA. & VIC.-ORLEANS PARISH LAKE FRONT LEVEES, WEST OF

AREA IHNC, GDM NO.2, SUPP, NO.5

BORING NO.	SAMPLE NO.	DEPTH EL	DATE
3-ULO	7-C	-20.0	27 Nov.,1972

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—718-968

ADVANCE COPY

SUBJECT TO CORRECTION

TIME IN MINUTES

0.1 0.2 0.5 1 2 5 10 20 50 100 200 500 1000 2000

$D_3 = 3720$

$t_{50} = 2$ MIN

$C_v = \frac{0.197\,(0.57 \times 2.54)^2}{2\,(60)}$

$C_v = 34.4 \times 10^{-4}$ CM²/SEC

$H = \frac{1.155 + (1.155 - 0.038)}{2\,(2)}$

$H = 0.57$

$d_{100} = 4100$

DEFORMATION IN 10^{-4} INCHES

NOTE: NUMBERS BESIDE CURVES ARE PRESSURES IN T/SQ FT.

0.1 0.2 0.5 1 2 5 10 20 50 100 200 500 1000 2000

TIME IN MINUTES

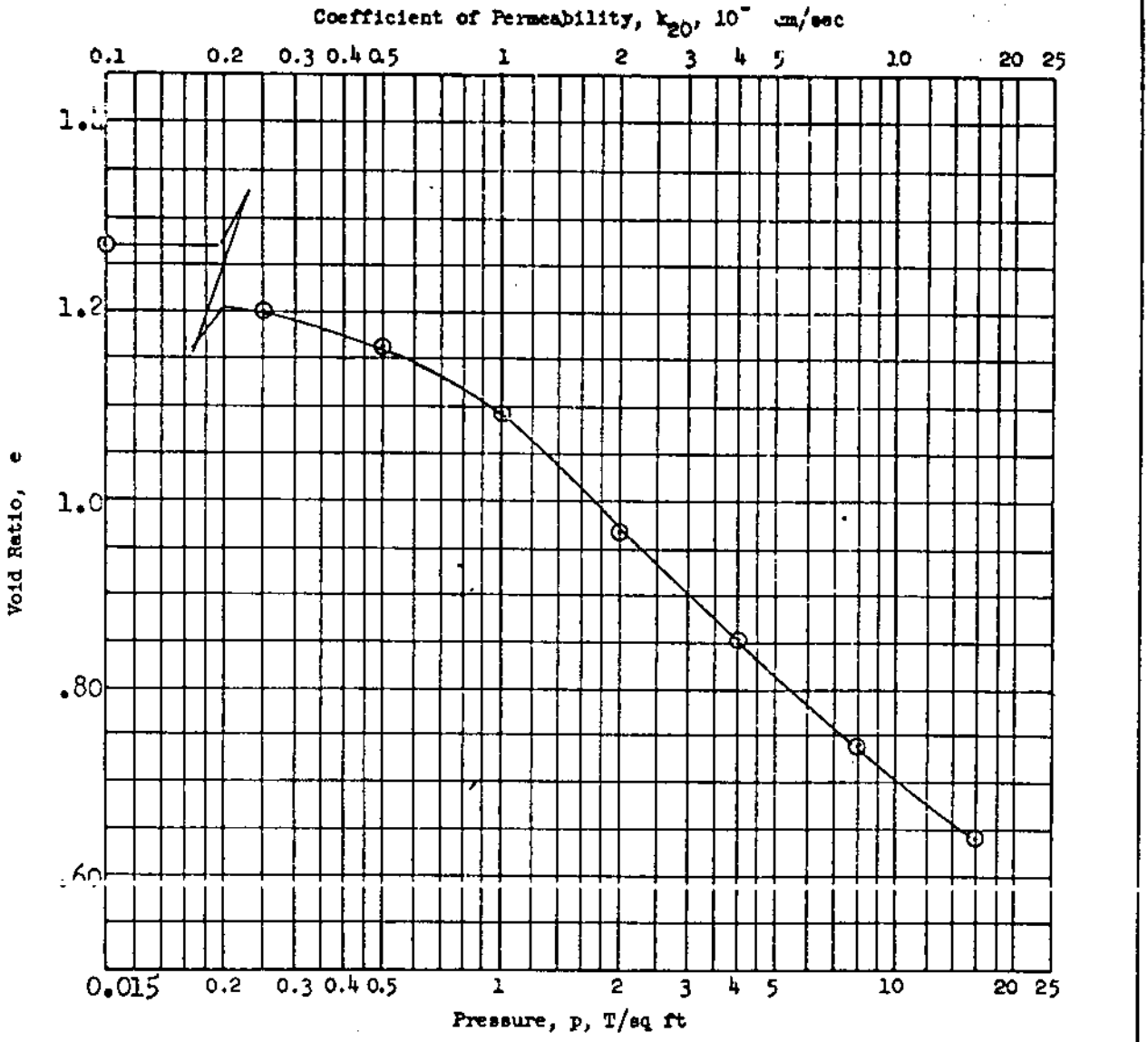
PROJECT	LAKE PONT.,LA. & VIC.-ORLEANS PARISH, LAKE FRONT LEVEES, WEST OF			
AREA	IHNC, GDM NO.2, SUPP. NO.5			
BORING NO. 3-ULO	SAMPLE NO. 7-C	DEPTH EL -20.0	DATE 27 Nov.,1972	

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O-715-965

ADVANCE COPY
SUBJECT TO CORRECTION

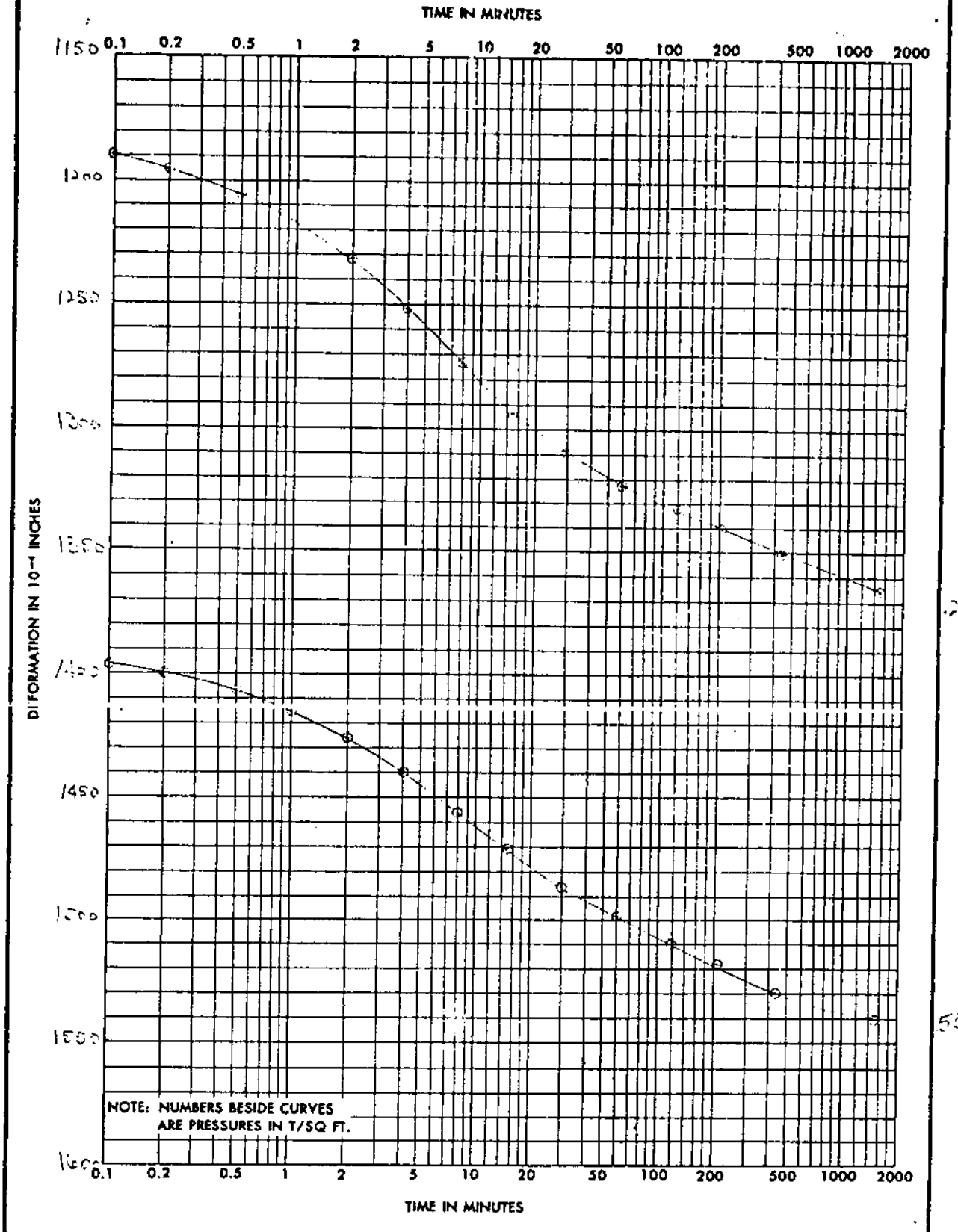


Type of Specimen UNDISTURBED		Before Test 105.1		After Test	
Diam 4.25 in.	Ht 1.155 in.	Water Content, w_o	46.1 %	w_f	%
Overburden Pressure, p_o T/sq ft		Void Ratio, e_o	1.27	e_f	
Preconsol. Pressure, p_c T/sq ft		Saturation, S_o	95.8 %	S_f	%
Compression Index, C_c		Dry Density, γ_d	73.0 lb/ft^3		
Classification PLASTIC CLAY(CH),*		k_{20} at e_o =	$\times 10^{-}$ cm/sec		
LL 58	G_s 2.66	Project LK. PONT.,LA.&VIC.-ORLEANS PARISH LK.			
PL 25	D_{10}	FT. LEVEES, WEST OF IHNC, GDM #2,SUPP. #5			
Remarks * gray; sand lenses and a few shells		Area			
		Boring No. 3-ULO		Sample No. 7-C	
		Depth El -20.0		Date 27 Nov.,1972	
		JAL CONSOLIDATION TEST REPORT			

ENG FORM 1 MAY 63 2090 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) 0 3424

ADVANCE COPY

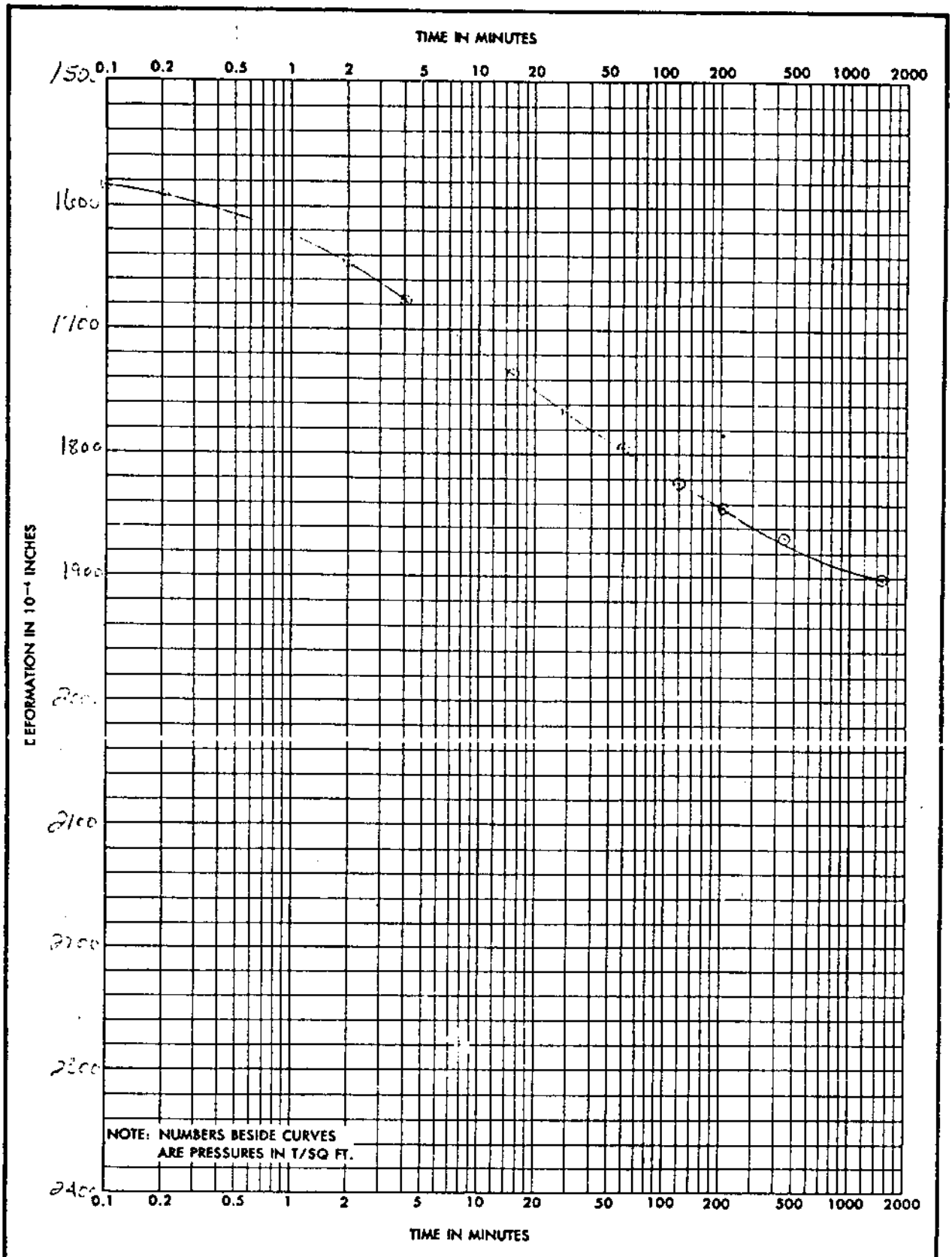
SUBJECT TO CORRECTION



PROJECT	LAKE PONT., LA. & VIC.-ORLEANS PARISH LAKE FRONT LEVEES, WEST OF				
AREA	IHNC, GDM NO.2, SUPP.NO. 5				
BORING NO.	3-ULO	SAMPLE NO.	7-C	DEPTH EL	-20
DATE	27 Nov., 1972				

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST--TIME CURVES (TRANSLUCENT)

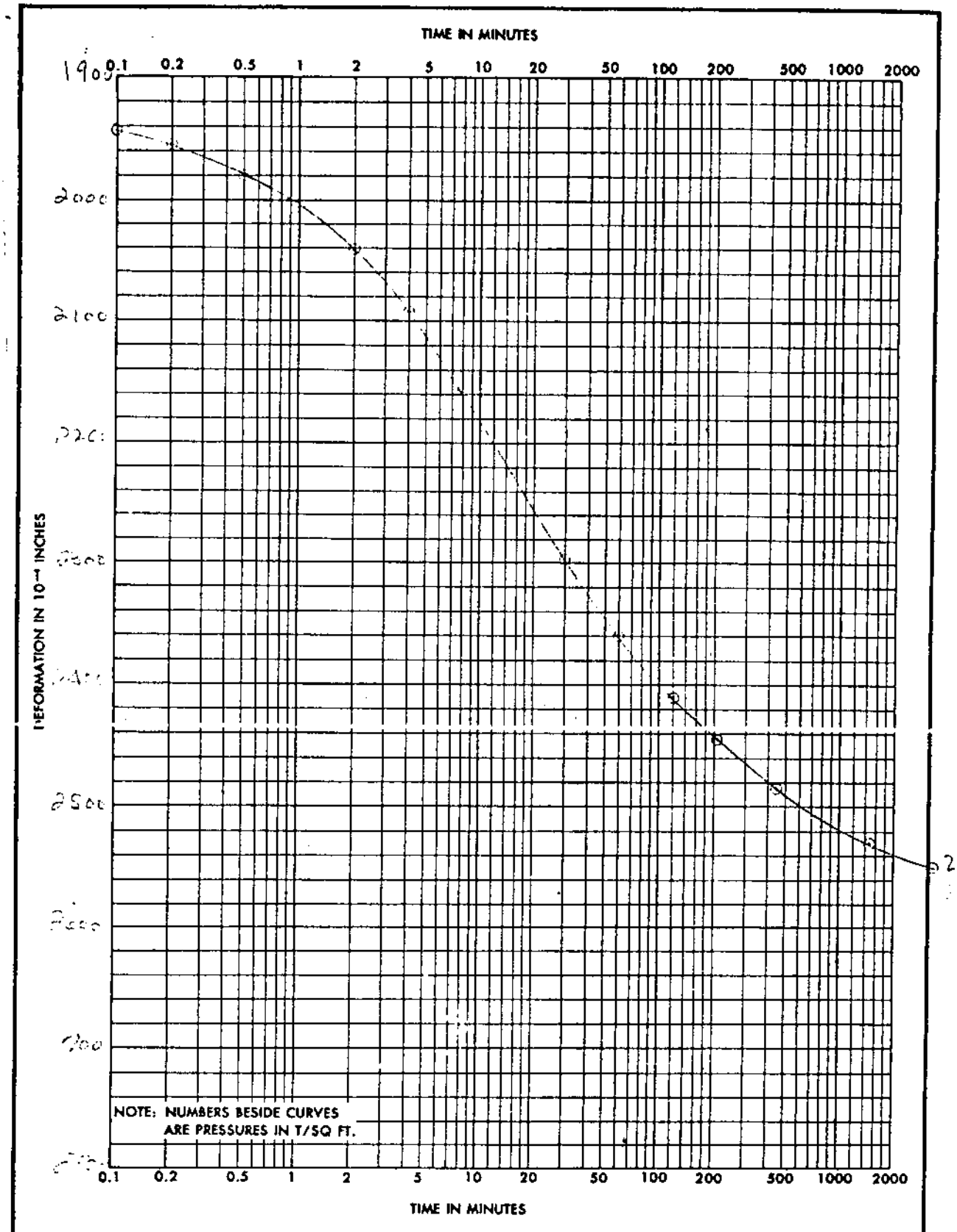


PROJECT	LAKE PONT.,LA. & VIC.-ORLEANS PARISH LAKE FRONT LEVEES, WEST OF			
AREA	IHNC, GDM NO.2, SUPP. NO.5			
BORING NO. 3-ULO	SAMPLE NO. 7-C	DEPTH EL -20.0	DATE 27 Nov.,1972	
ENG FORM 2088 1 MAY 63	PREVIOUS EDITIONS ARE OBSOLETE.	CONSOLIDATION TEST—TIME CURVES	(TRANSLUCENT)	

* GPO : 1964 O—713-965

ADVANCE COPY

SUBJECT TO CORRECTION



PROJECT	LAKE PONT.,LA. & VIC- ORLEANS PARISH, LAKE FRONT LEVEES, WEST OF			
AREA	IHNC, GDM NO.2, SUPP. NO.5			
BORING NO. 3-ULO	SAMPLE NO. 7-C	DEPTH EL -20.0	DATE 27 Nov.,1972	

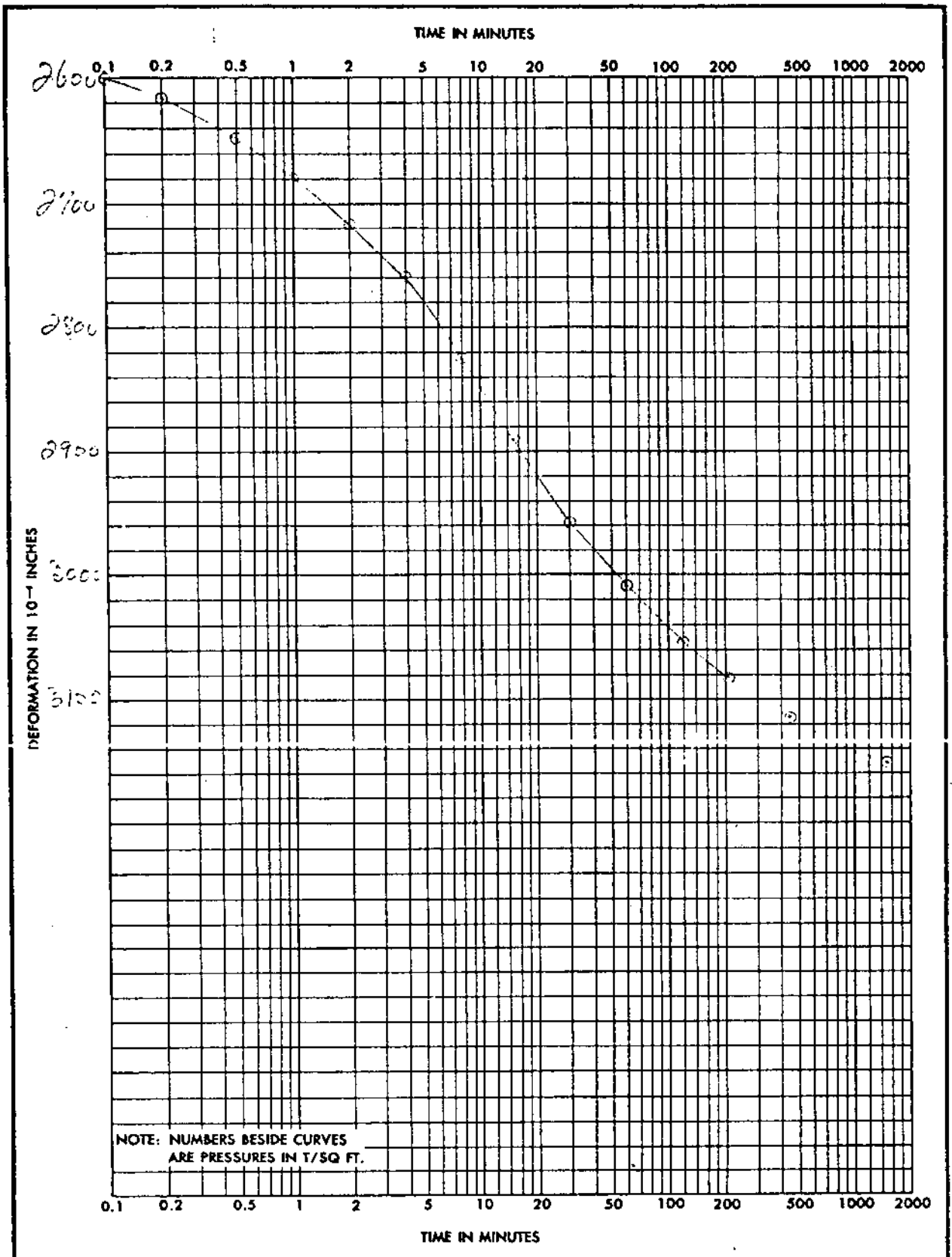
ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 O-715-963

ADVANCE COPY

SUBJECT TO CORRECTION



PROJECT	LAKE. PONT.,LA. & VIC.-ORLEANS PARISH LAKE FRONT LEVEES, WEST OF			
AREA	IHNC, GDM NO.2, SUPP. NO.5			
BORING NO. 3-ULO	SAMPLE NO. 7-C	DEPTH EL -20.0	DATE 27 Nov.,1972	

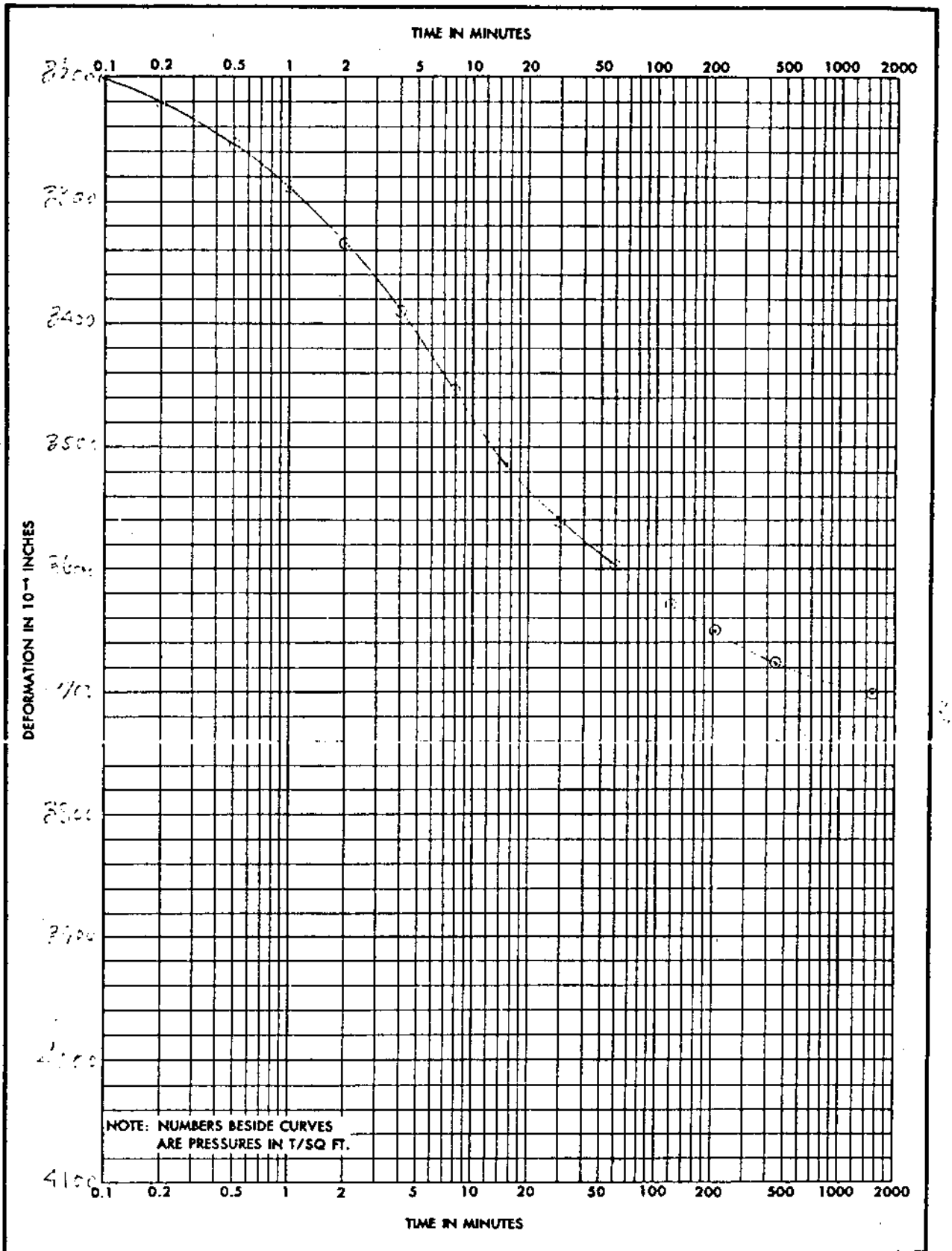
ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE.

CONSOLIDATION TEST—TIME CURVES (TRANSLUCENT)

* GPO : 1964 OF—716-965

ADVANCE COPY

SUBJECT TO CORRECTION



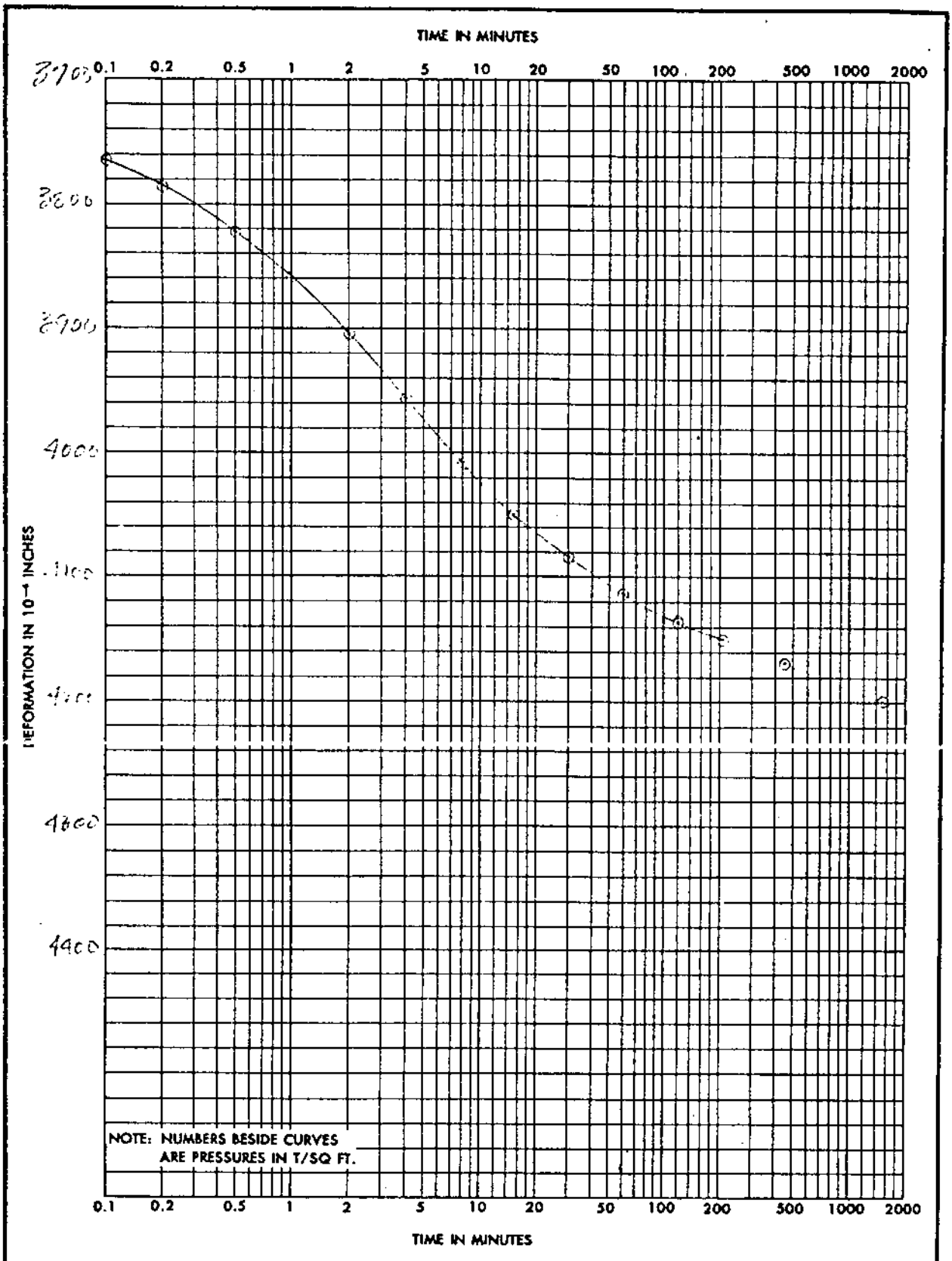
PROJECT	LAKE PONT.,LA. & VIC.-ORLEANS PARISH LAKE FRONT LEVEES, WEST OF			
AREA	IHNC, GDM NO.2, SUPP, NO.5			
BORING NO. 3-ULO	SAMPLE NO. 7-C	DEPTH EL -20.0	DATE 27 Nov.,1972	

ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE. **CONSOLIDATION TEST—TIME CURVES** (TRANSLUCENT)

* GPO : 1964 O—715-965

ADVANCE COPY

SUBJECT TO CORRECTION



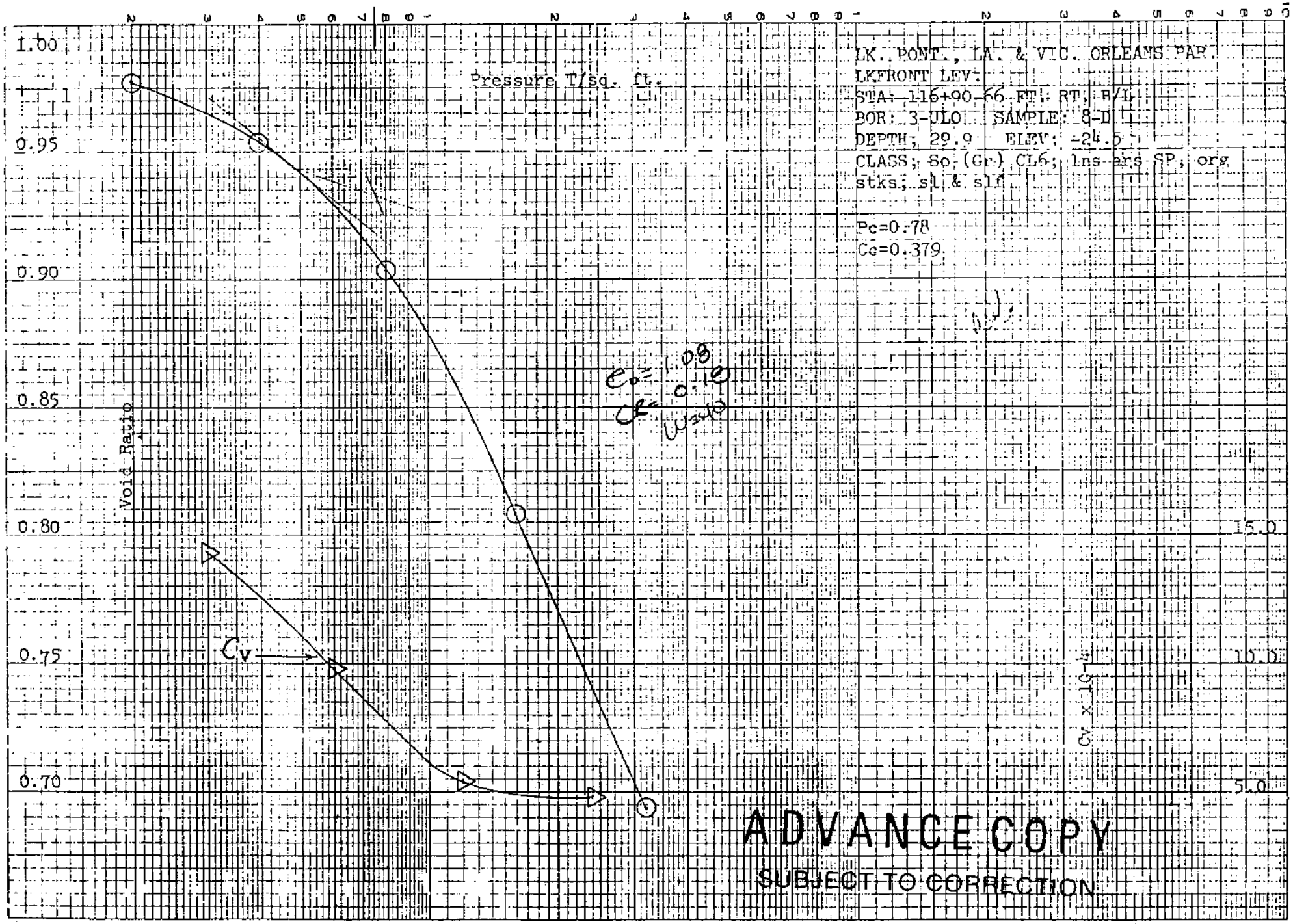
PROJECT	LAKE PONT.,LA. & VIC.-ORLEANS PARISH, LAKE FRONT LEVEES, WEST OF			
AREA	IHNC, GDM NO.2, SUPP. NO.5			
BORING NO. 3-ULO	SAMPLE NO. 7-C	DEPTH EL -20.0	DATE 27 Nov.,1972	

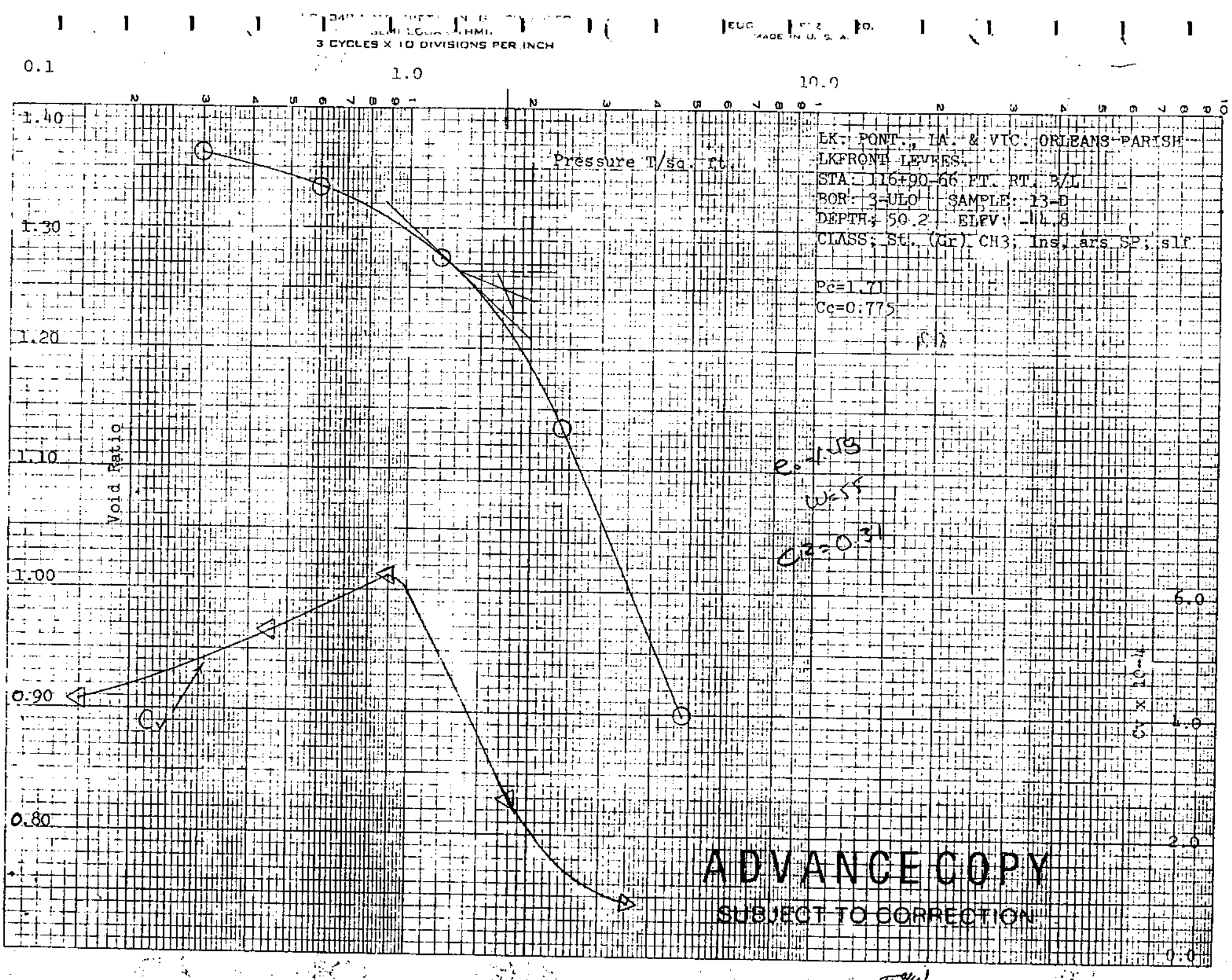
ENG FORM 2088 1 MAY 63 PREVIOUS EDITIONS ARE OBSOLETE. **CONSOLIDATION TEST--TIME CURVES** (TRANSLUCENT)

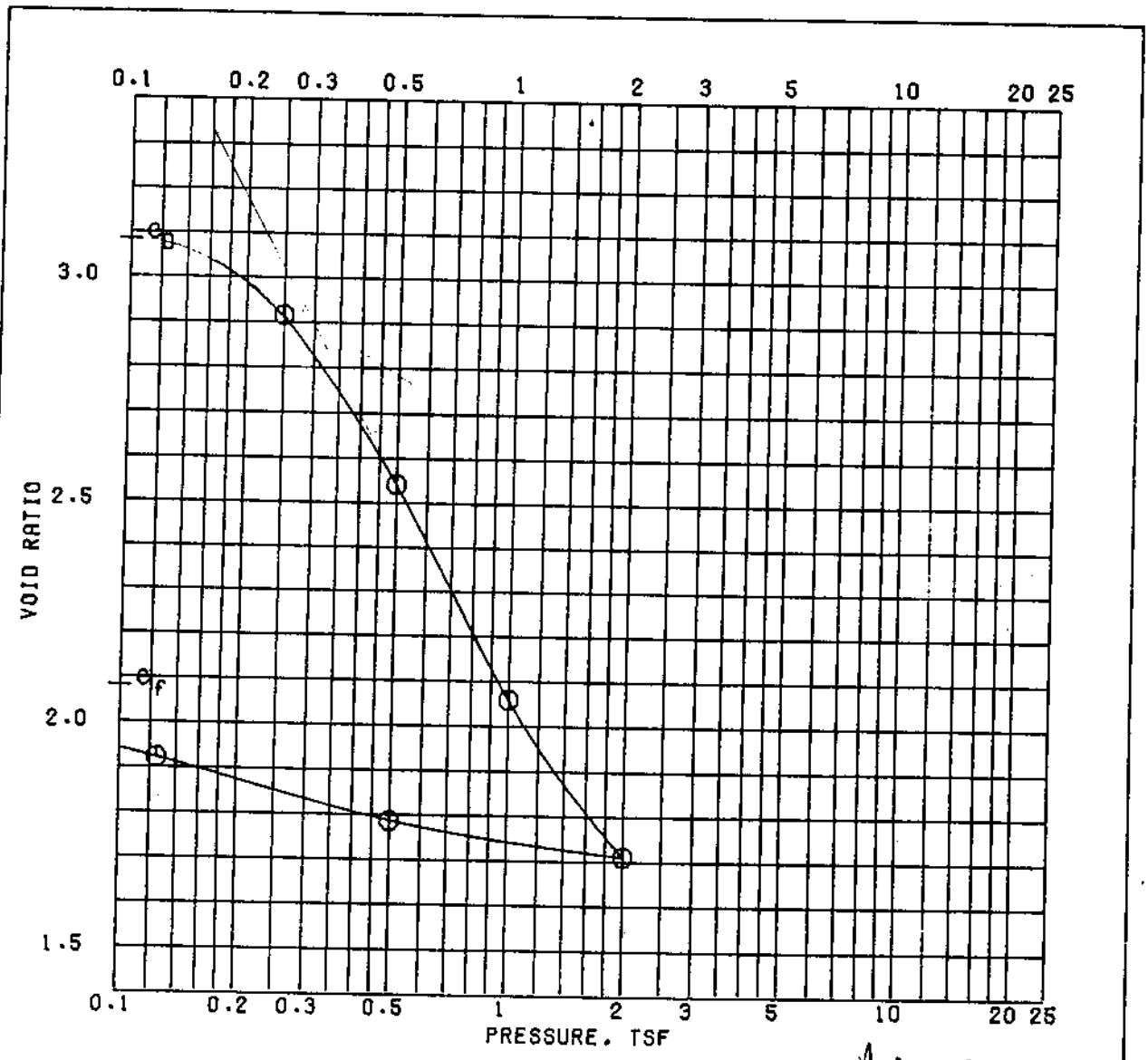
* GPO : 1964 OF-715-965

ADVANCE COPY

SUBJECT TO CORRECTION


SEMI-LOGARITHMIC
0.1
1.0
1.00
0.95
0.90
0.85
0.80
0.75
0.70
Void Ratio
Pressure T/sq. ft.
LK. PONT., LA. & VIC. ORLEANS PAR.
LKFRONT LEV:
STA: 116+90-66 FT; RT; B/L
BOR: 3-ULO SAMPLE: 8-D
DEPTH: 29.9 ELEV: -24.5
CLASS; So (Gr) CL6; lns ars SP; org stks; sl & slf
Pc=0.78
Cc=0.379
Cv
15.0
10.0
5.0
ADVANCE COPY
SUBJECT TO CORRECTION

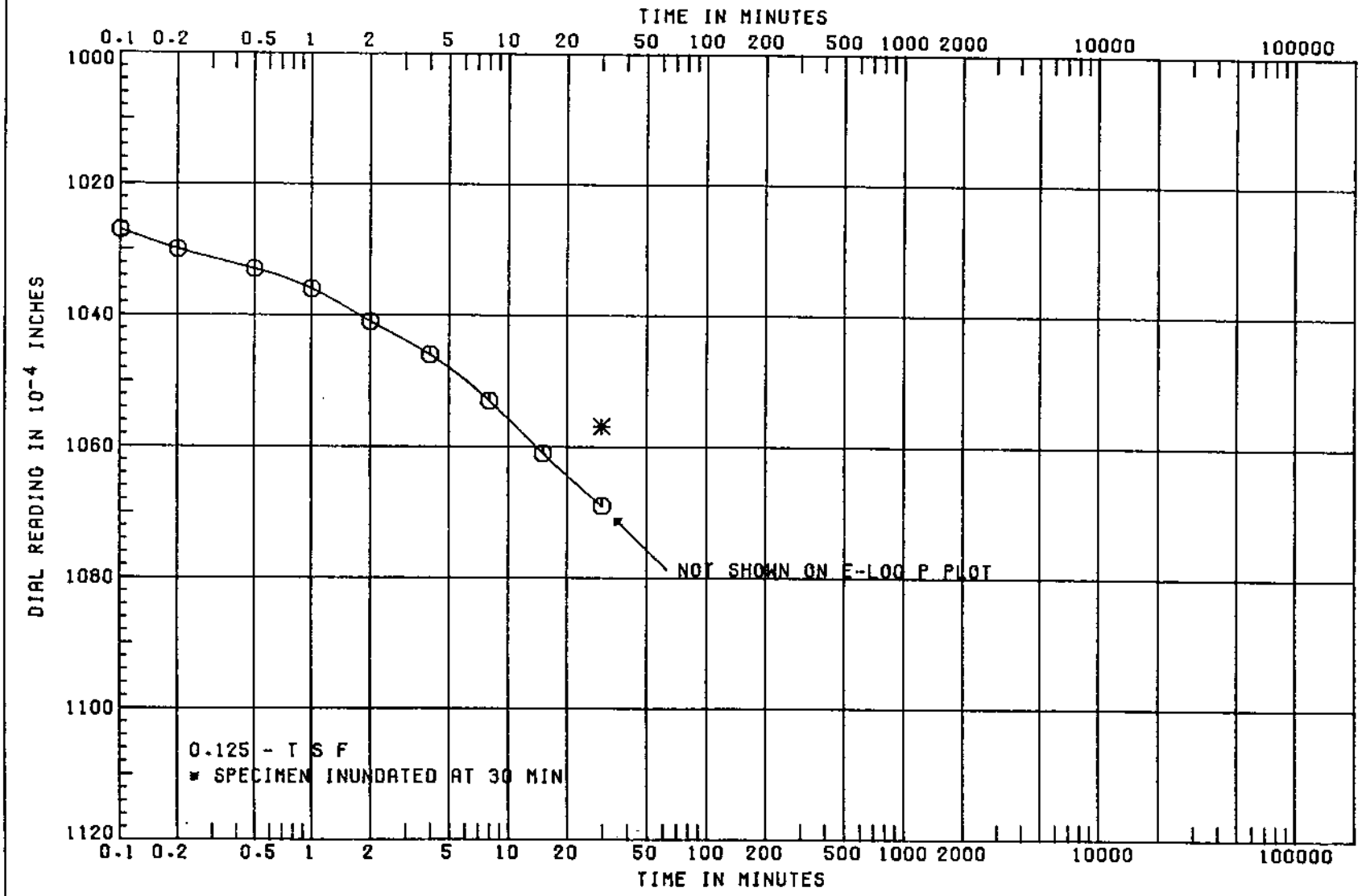

3 CYCLES X 10 DIVISIONS PER INCH
0.1
1.0
10.0
Pressure T/sq. ft.
Void Ratio
1.40
1.30
1.20
1.10
1.00
0.90
0.80
LK. PONT., LA. & VIC. ORLEANS PARISH
LKFRONT LEVEES.
STA: 116+90-66 FT. RT. B/L
BOR: 3-ULO SAMPLE: 13-D
DEPTH: 50.2 ELEV: -14.8
CLASS: St. (Gr) CH3; ins. ars SP; slf
Pc=1.71
Cc=0.775
e₀=1.15
w=55
Cv=0.31
Cv x 10⁻⁴ sq. cm/sec
6.0
4.0
2.0
0.0
ADVANCE COPY
SUBJECT TO CORRECTION



σ_p

$S_{at} = 91.5$

			BEFORE TEST	AFTER TEST
OVERBURDEN PRESSURE, TSF		WATER CONTENT, %	109.4	75.0
PRECONSOL. PRESSURE, TSF		DRY DENSITY, PCF	41.3	54.8
COMPRESSION INDEX C_c	1.44	SATURATION, %	95.9	97.5
TYPE SPECIMEN	UNDISTURBED	VOID RATIO	3.080	2.078
DIA. IN 4.44	HT. IN 1.133	BACK PRESSURE, TSF		
CLASSIFICATION PLASTIC CLAY (CH), GRAY				
LL 106 / PL 27 / PI 79		PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)		
GS 2.70 (EST)	D_{10}	ORLEANS LAKEFRONT LEVEE-WEST OF HNC		
REMARKS		BORING NO. 4-U	SAMPLE NO. 5-C	
		DEPTH/ELEV 17.4/-0.8	DATE 24 JUN 83	
		CONSOLIDATION TEST REPORT		



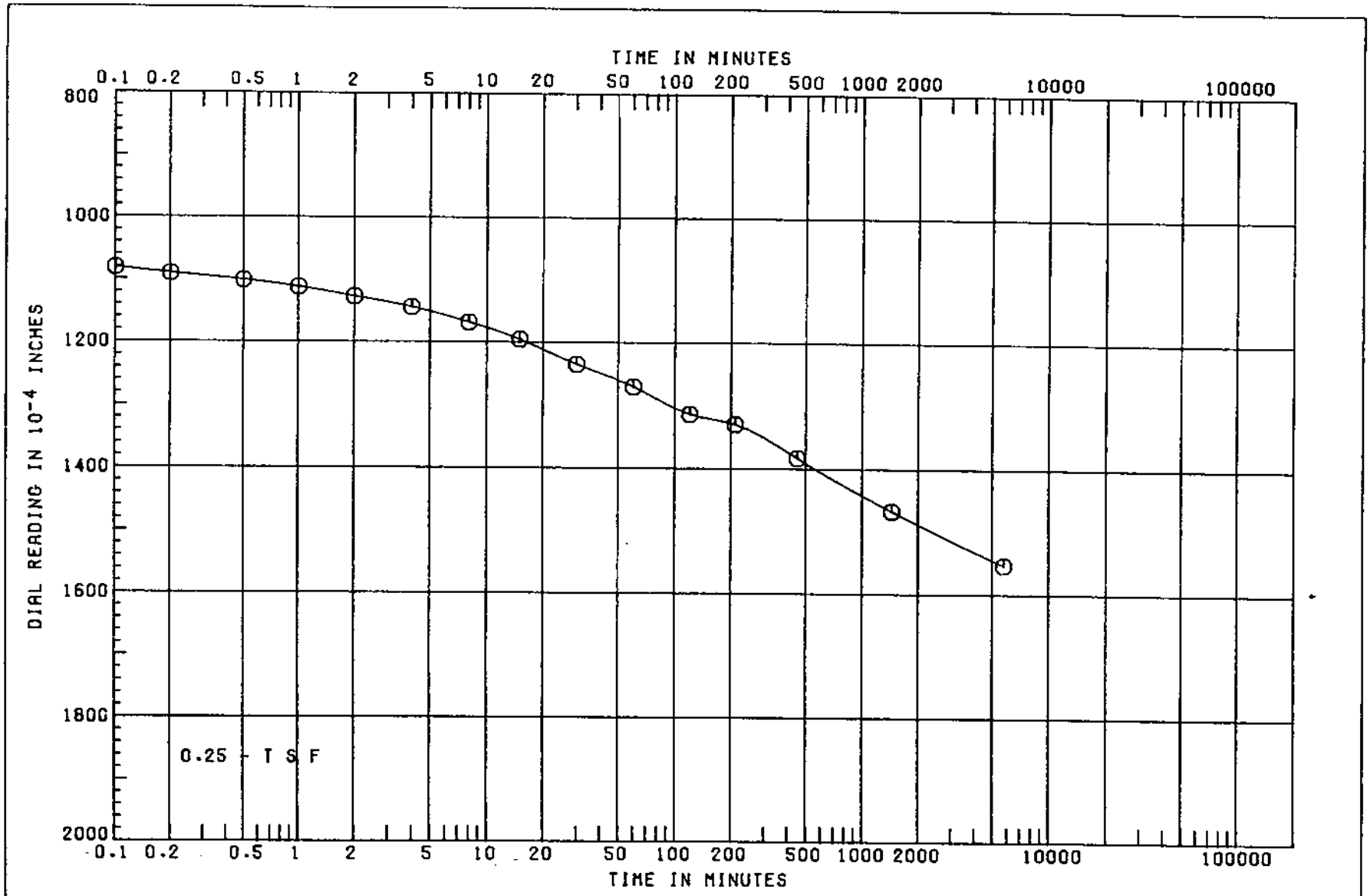
PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 4-U	SAMPLE NO. 5-C
DEPTH/ELEV 17.4/-0.8	DATE 24 JUN 83

CONSOLIDATION TEST

TIME CURVES

SHEET 2 OF 9

ADVANCE COPY



PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 4-U	SAMPLE NO. 5-C
DEPTH/ELEV 17.4/-0.8	DATE 24 JUN 83

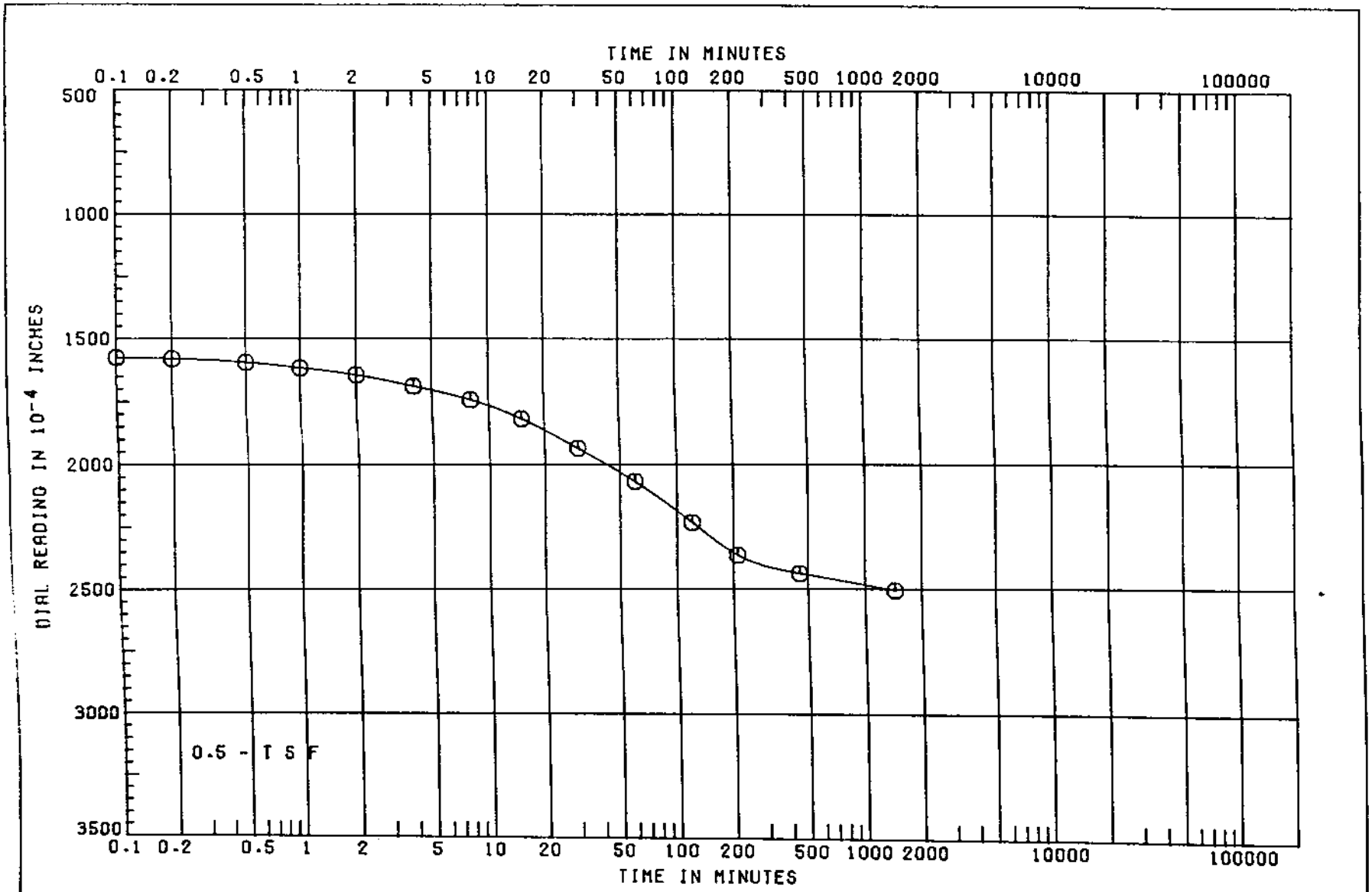
CONSOLIDATION TEST

TIME CURVES

SHEET 3 OF 9

ADVANCE COPY

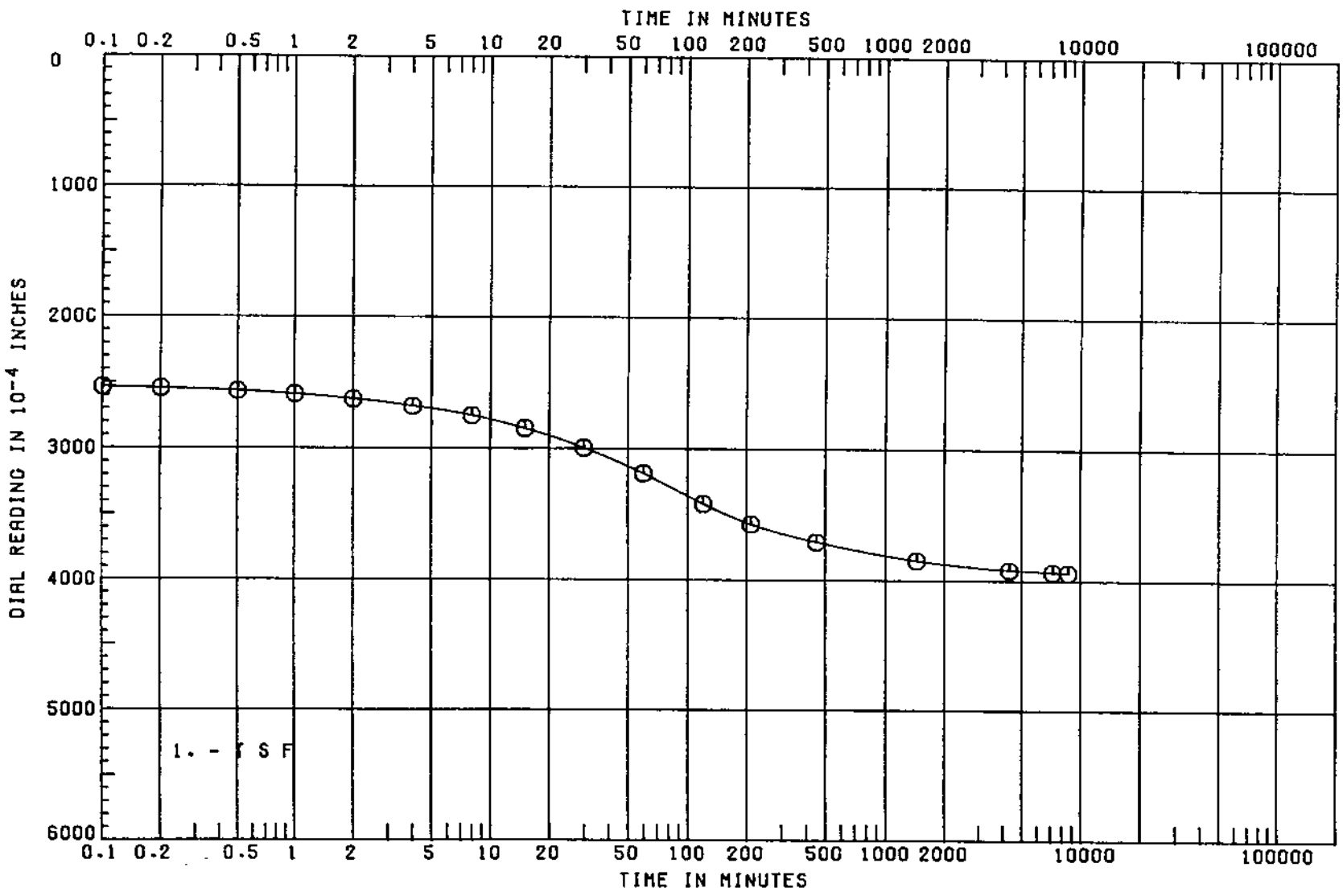
SUBJECT TO CORRECTION



PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 4-U	SAMPLE NO. 5-C
DEPTH/ELEV 17.4/-0.8	DATE 24 JUN 83

CONSOLIDATION TEST
TIME CURVES

SHEET 4 OF 9



PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 4-U	SAMPLE NO. 5-C
DEPTH/ELEV 17.4/-0.8	DATE 24 JUN 83

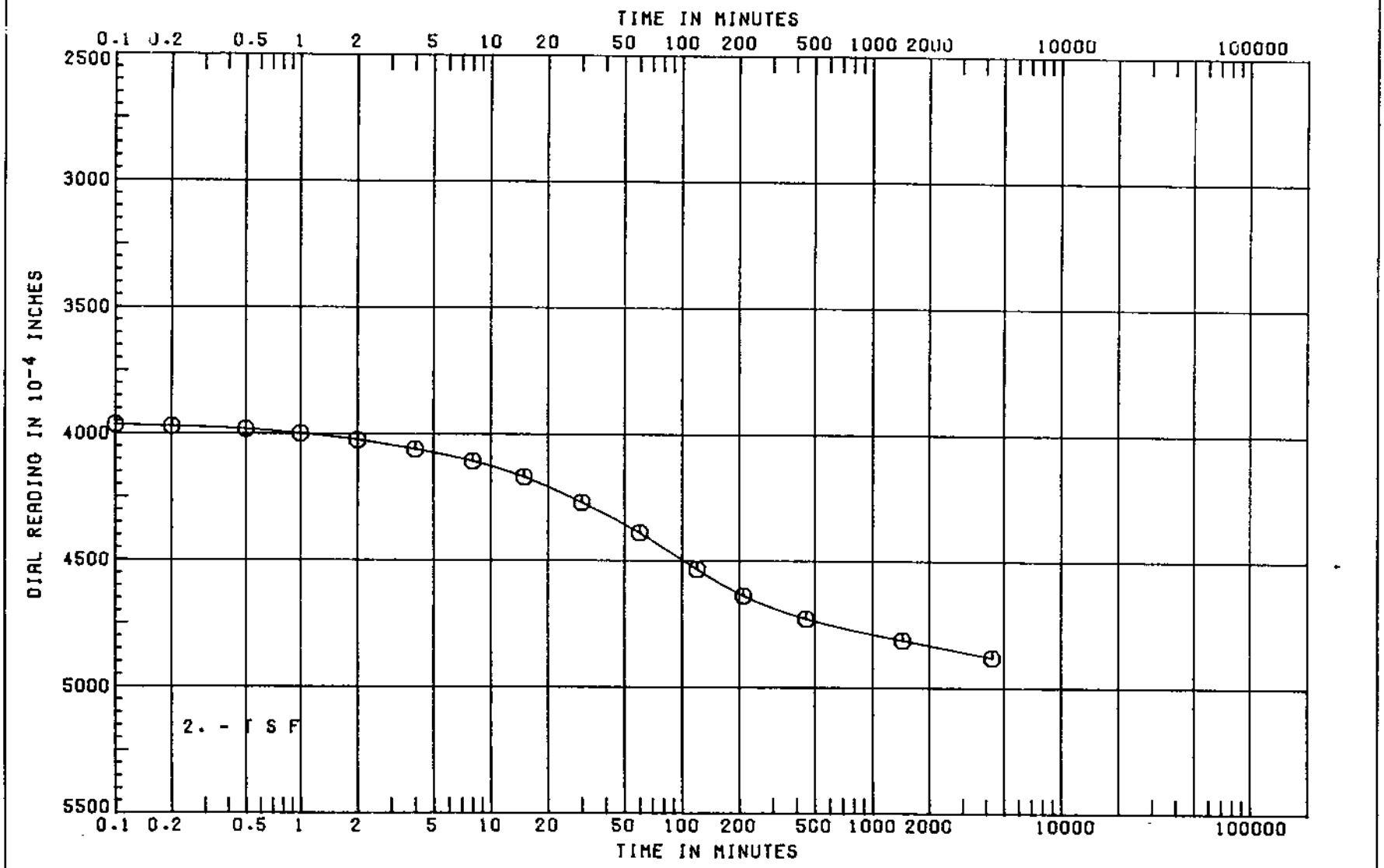
CONSOLIDATION TEST

TIME CURVES

SHEET 5 OF 9

ADVANCE COPY

SUBJECT TO CORRECTION



PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 4-U	SAMPLE NO. S-C
DEPTH/ELEV 17.4/-0.8	DATE 24 JUN 83

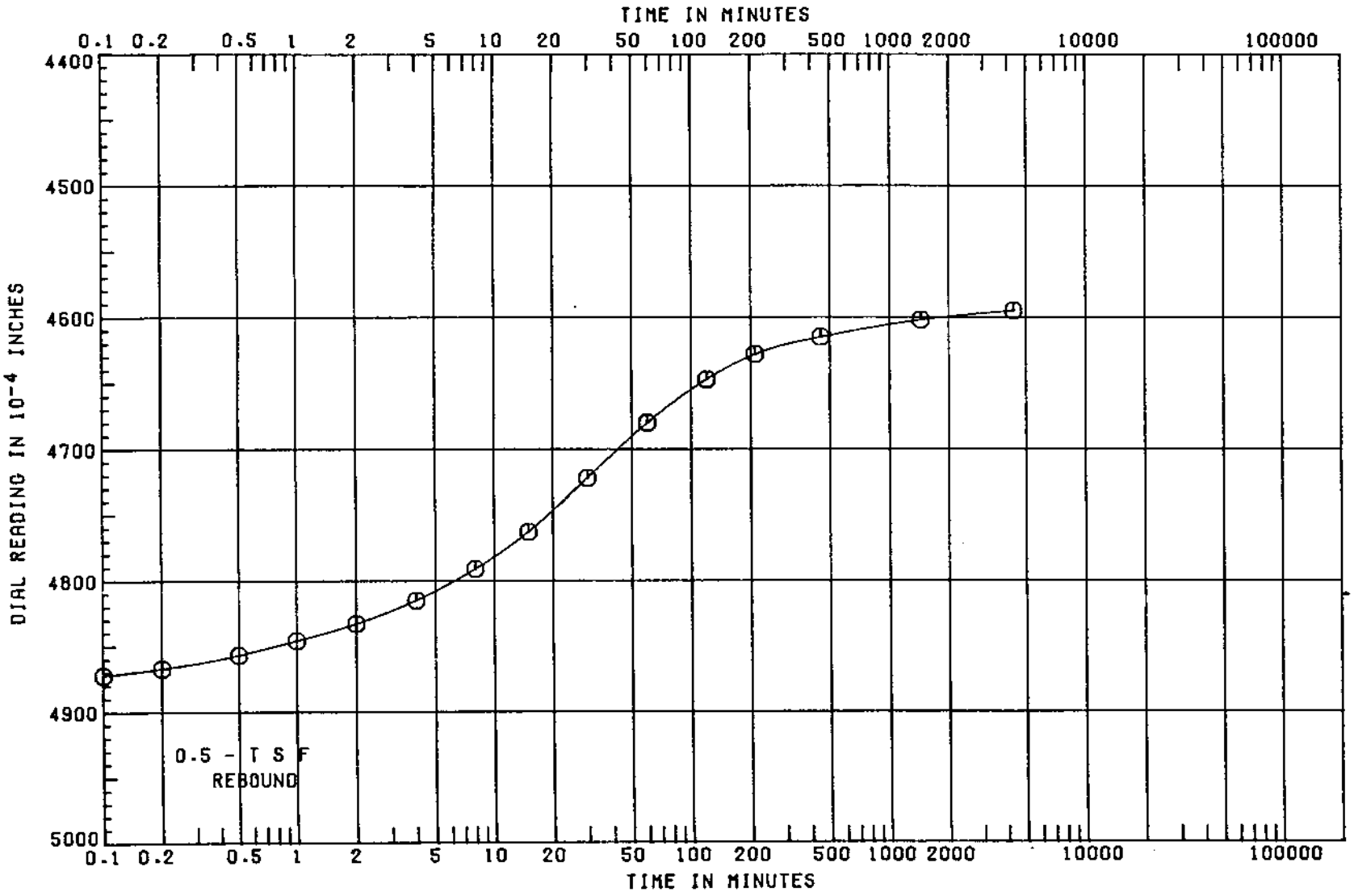
CONSOLIDATION TEST

TIME CURVES

SHEET 6 OF 9

ADVANCE COPY

SUBJECT TO CORRECTION



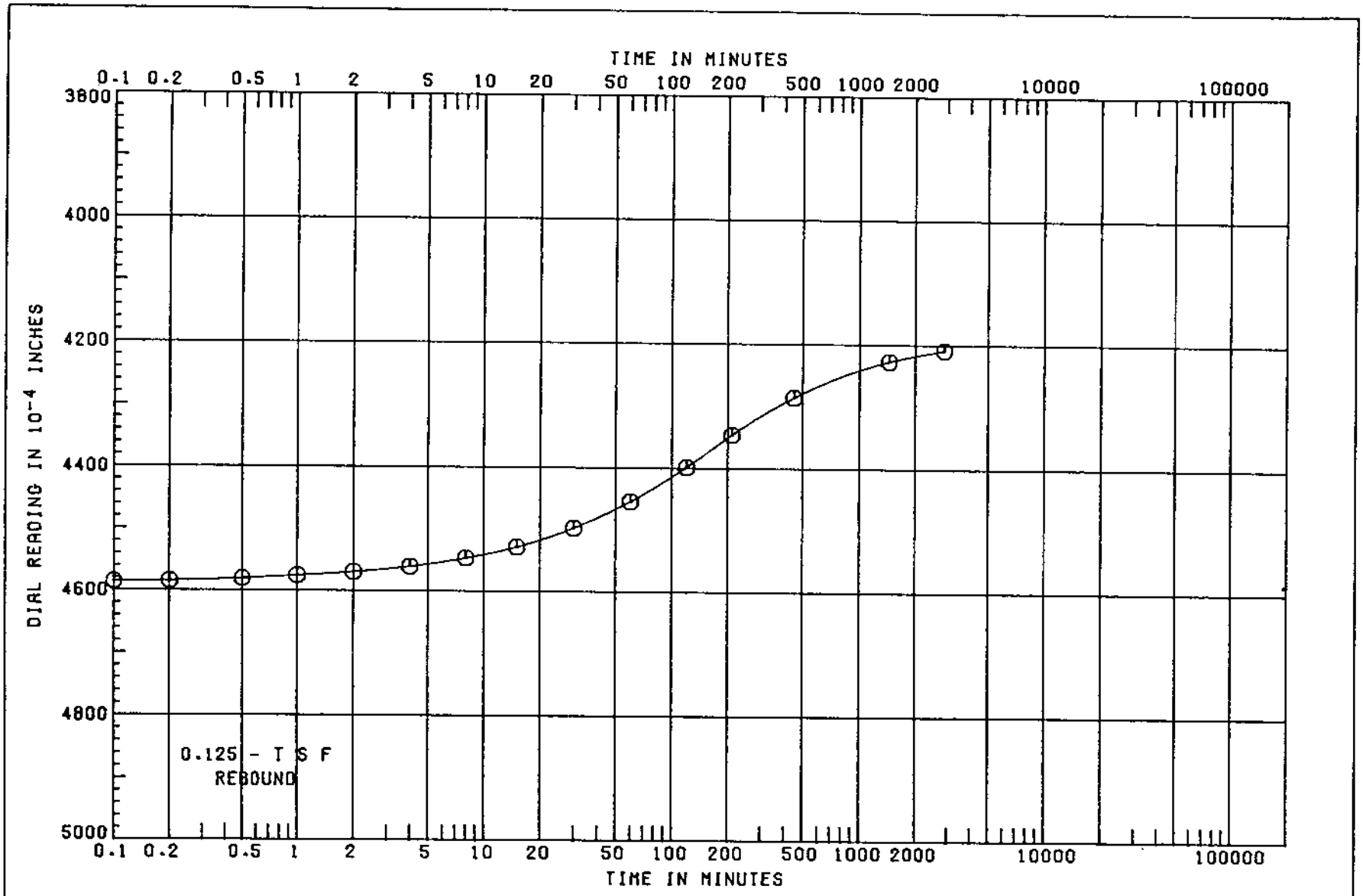
PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 4-U	SAMPLE NO. 5-C
DEPTH/ELEV 17.4/-0.8	DATE 24 JUN 83

CONSOLIDATION TEST
TIME CURVES

SHEET 7 OF 9

ADVANCE COPY

SUBJECT TO CORRECTION

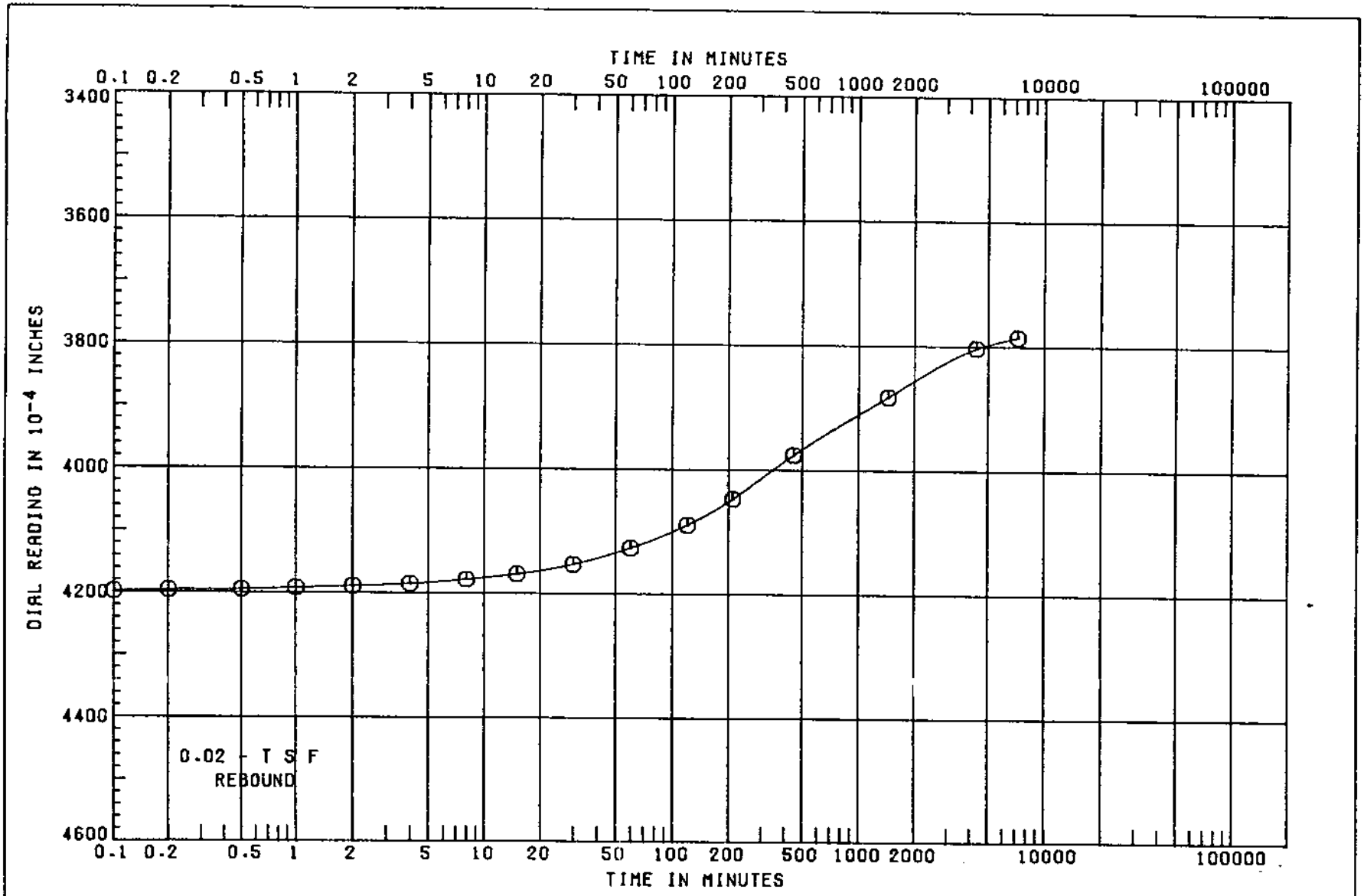


PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 4-U	SAMPLE NO. 5-C
DEPTH/ELEV 17.4/-0.8	DATE 24 JUN 83

CONSOLIDATION TEST
TIME CURVES

SHEET 8 OF 9

ADVANCE COPY



PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)	
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
BORING 4-U	SAMPLE NO. 5-C
DEPTH/ELEV 17.4/-0.8	DATE 24 JUN 83

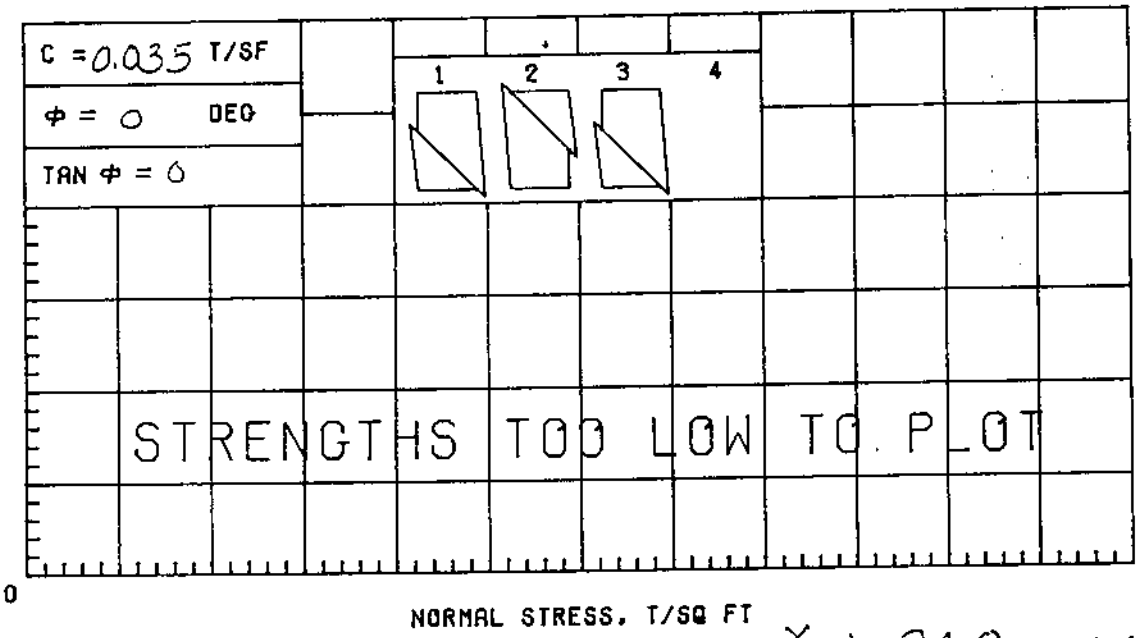
CONSOLIDATION TEST

TIME CURVES

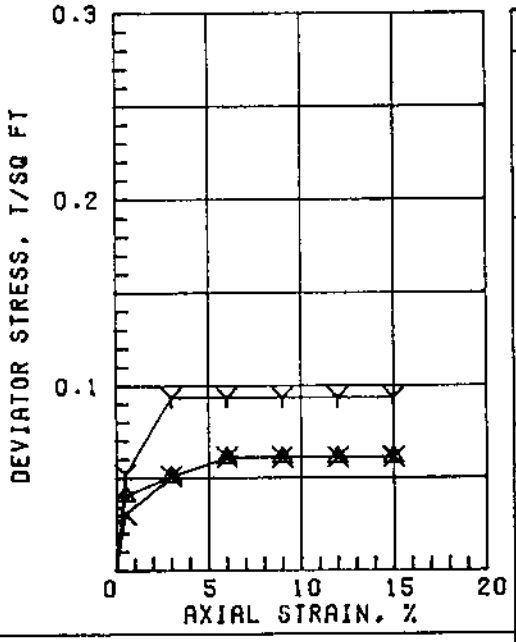
SHEET 9 OF 9

ADVANCE COPY

SUBJECT TO CORRECTION



γ_{sat} = 84.0



SPECIMEN NO.		Δ1	Y2	X3	4 (AVG.)
INITIAL	WATER CONTENT, %	146.4	143.6	141.6	143.9
	DRY DENSITY, PCF	33.5	34.6	34.6	34.2
	SATURATION, %	98.0	100.0	98.8	98.9
	VOID RATIO	4.032	3.878	3.870	
BEFORE SHEAR	WATER CONTENT, %				
	DRY DENSITY, PCF				
	SATURATION, %				
	VOID RATIO				
	BACK PRESS., TSF				
MIN PRIN. STRESS, TSF		0.5	1.5	3.0	
MAX. DEV. STRESS, TSF		0.06	0.09	0.06	
TIME TO FAILURE, MIN.		16	4	8	
RATE OF STRAIN INCR.%					
INITIAL DIAMETER, IN.		1.39	1.37	1.39	
INITIAL HEIGHT, IN.		3.00	3.00	3.00	

CONTROLLED-STRAIN TEST

DESCRIPTION OF SPECIMENS: PLASTIC CLAY (CH), GRAY

LL 119	PL 30	PI 89	GS 2.70 (ESTIMATED)	UNDISTURBED SPECIMEN	Q TEST

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 4-U — SAMPLE NO. 5-8

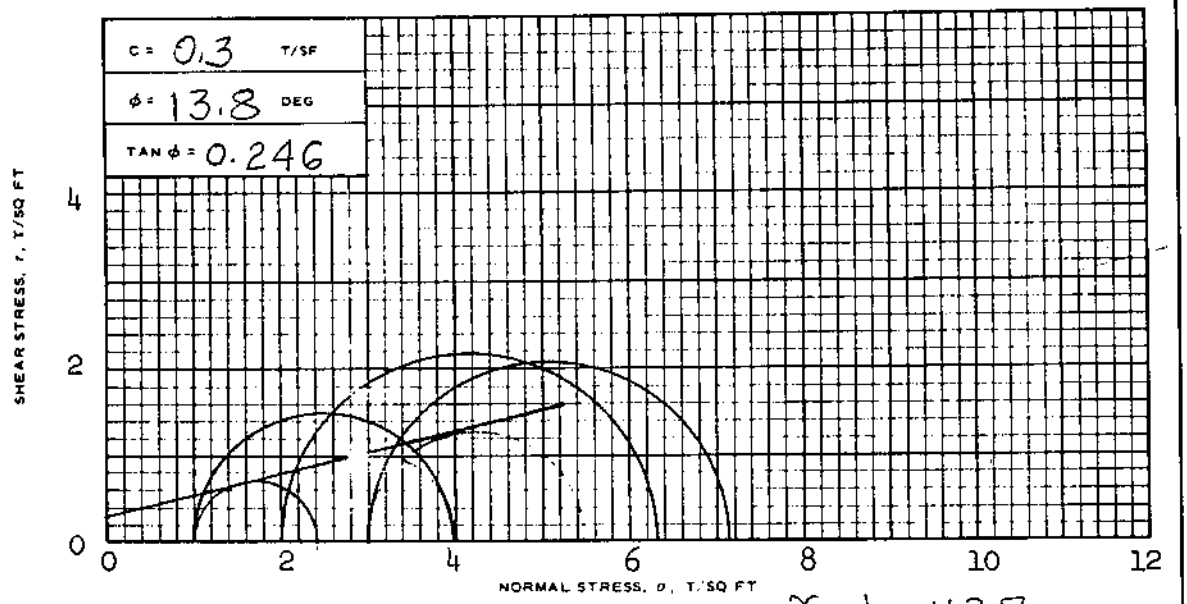
DEPTH/ELEV 16.3/+0.3 — TECH. LRC

LABORATORY USAE WES — DATE 20 JUN 89

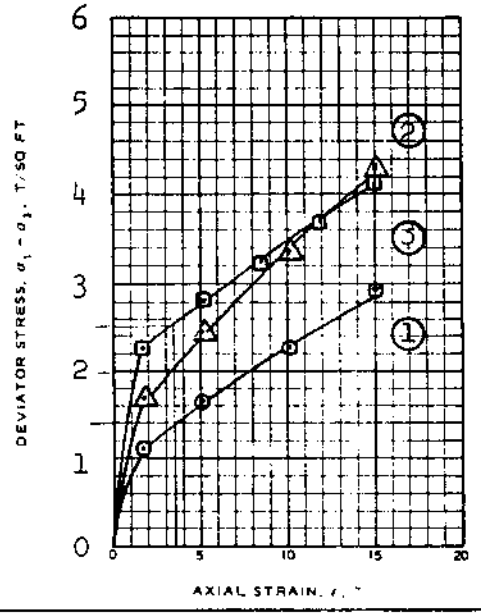
TRIAXIAL COMPRESSION TEST REPORT

ADVANCE COPY

SUBJECT TO CORRECTION



$\gamma_{sat} = 112.7$



SPECIMEN NO.			1	2	3	AVG.
INITIAL	WATER CONTENT, %	w_o	39.0	38.8	41.1	39.6
	DRY DENSITY LB/CU FT	γ_{d_o}	80.8	80.8	79.5	80.4
	SATURATION, %	S_o	98.0	97.5	100+	98.5
	VOID RATIO	e_o	1.062	1.063	1.096	
BEFORE SHEAR	WATER CONTENT, %	w_c	38.1	36.4	37.1	
	DRY DENSITY LB/CU FT	γ_{d_c}	82.7	83.9	84.5	
	SATURATION, %	S_c	100+	98.6	100+	
	VOID RATIO	e_c	1.015	0.986	0.973	
	FINAL BACK PRESSURE, T/SQ FT	u_o	7.20	7.20	7.20	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	1.0	2.0	3.0	
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	2.95	4.30	4.11	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	454	454	454	
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$	1.4	2.0	2.5	
INITIAL DIAMETER, IN.		D_o	1.39	1.39	1.38	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

CONTROLLED- STRAIN TEST

DESCRIPTION OF SPECIMENS CLAYEY SILT (ML), GRAY; SHELL PARTICLES

LL 38 | PL 27 | PI 11 | G_s 2.67(EST) | TYPE OF SPECIMEN UNDISTURBED | TYPE OF TEST R

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 4-U | SAMPLE NO. 8-C

DEPTH/ELEV 28.7/-12.1

LABORATORY USAEWES | DATE 7 NOV 1983

SHEET 1 OF 2 | PJR | TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089
REV JUNE 1970

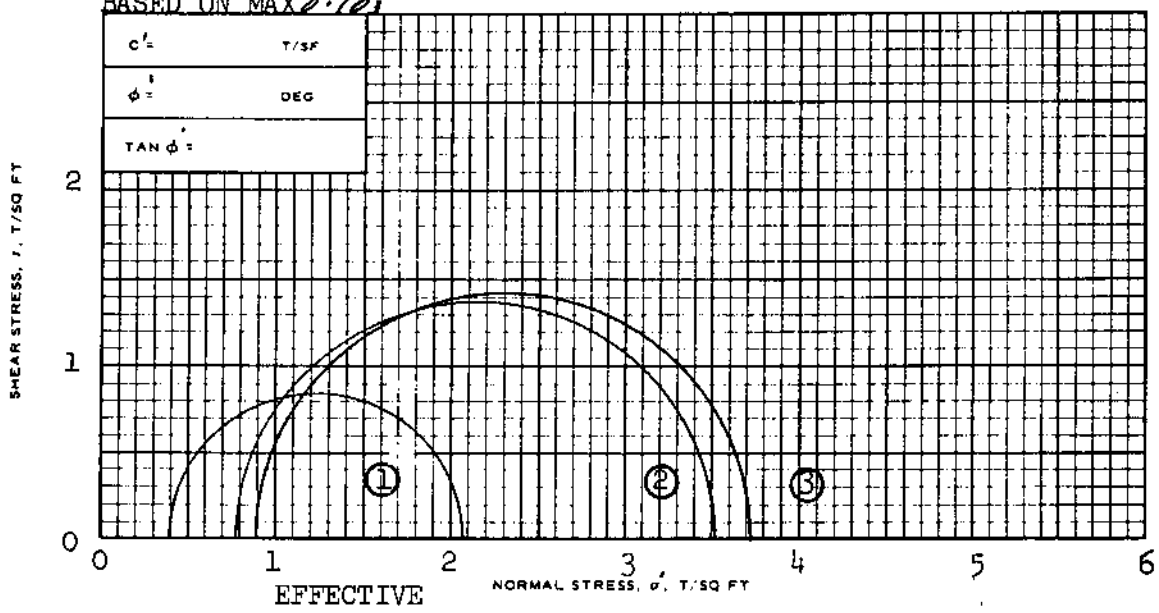
GPO : 1982 0 - 375-356

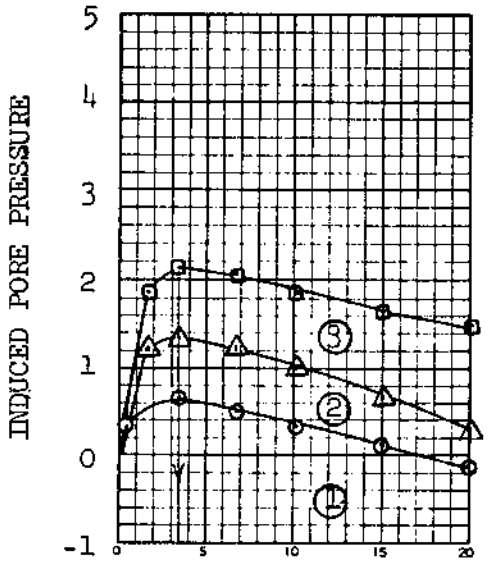
ADVANCE COPY

SUBJECT TO CORRECTION

BASED ON MAX σ_1/σ_3

c' =	T/SF
ϕ' =	DEG
TAN ϕ' =	





SPECIMEN NO.			1	2	3	
INITIAL	WATER CONTENT, %	w_o				
	DRY DENSITY LB/CU FT	γd_o				
	SATURATION, %	S_o				
	VOID RATIO	e_o				
BEFORE SHEAR	WATER CONTENT, %	w_c				
	DRY DENSITY LB/CU FT	γd_c				
	SATURATION, %	S_c				
	VOID RATIO	e_c				
	FINAL BACK PRESSURE, T/SQ FT	u_b				
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.39	0.78	0.89	
MAXIMUM DEVIATOR STRESS, T/SQ FT	$(\sigma_1 - \sigma_3)_{MAX}$		1.66	2.72	2.81	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f				
ULTIMATE DEVIATOR STRESS, T/SQ FT	$(\sigma_1 - \sigma_3)_{ULT}$					
INITIAL DIAMETER, IN.		D_o				
INITIAL HEIGHT, IN.		H_o				

CONTROLLED- TEST

DESCRIPTION OF SPECIMENS

LL	PL	PI	G.	TYPE OF SPECIMEN	TYPE OF TEST

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 4-U SAMPLE NO. 8-C

DEPTH/ELEV 28.7/-12.1

LABORATORY USAEWES DATE 7 NOV 1983

SHEET 2 OF 2

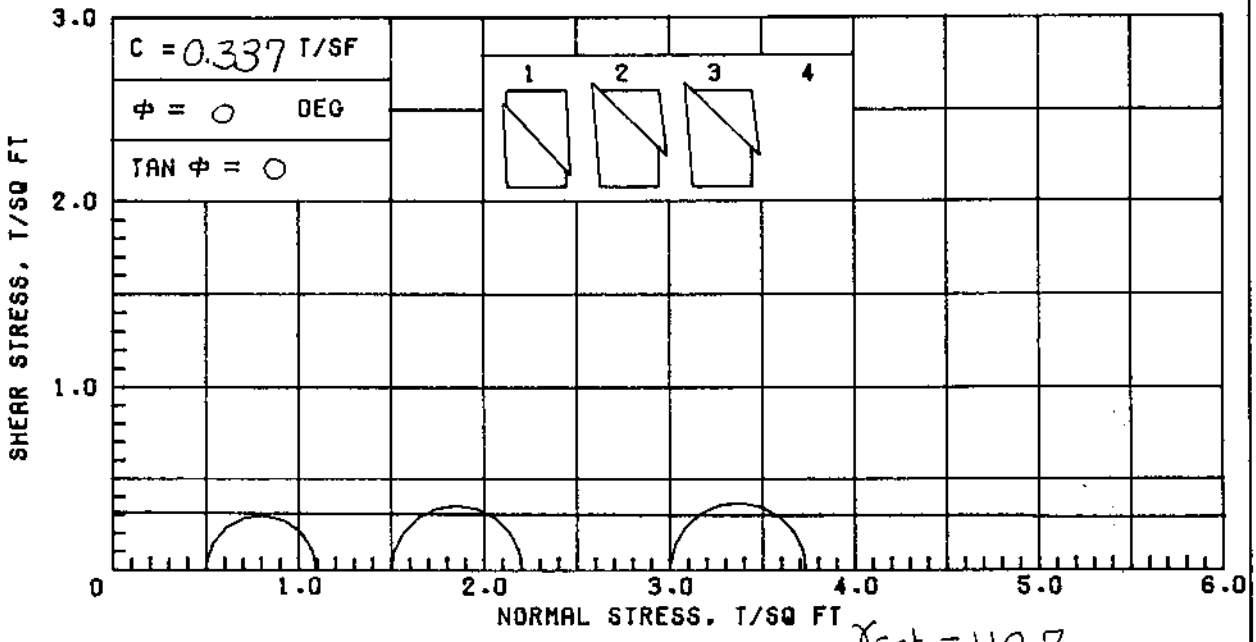
PJR TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089
REV JUNE 1970

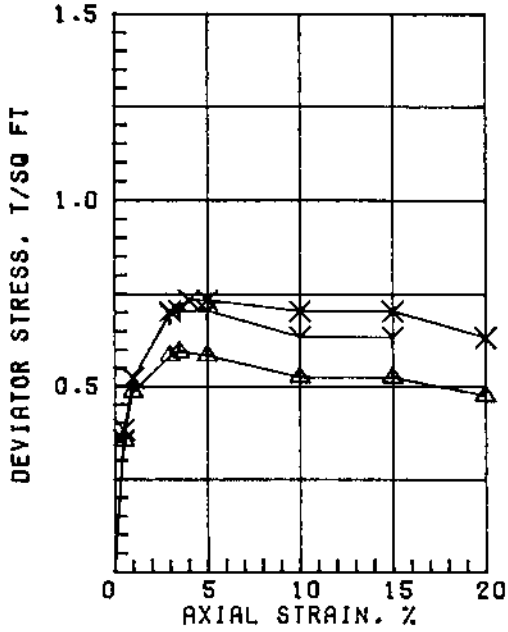
GPO : 1982 0 - 375-356

ADVANCE COPY

SUBJECT TO CORRECTION



$\gamma_{sat} = 110.7$



SPECIMEN NO.		Δ1	Y2	X3	AVG. 4
INITIAL	WATER CONTENT, %	50.0	43.2	41.2	44.8
	DRY DENSITY, PCF	72.0	77.7	79.3	76.3
	SATURATION, %	100+	99.7	98.9	99.5
	VOID RATIO	1.341	1.170	1.125	
BEFORE SHEAR	WATER CONTENT, %				
	DRY DENSITY, PCF				
	SATURATION, %				
	VOID RATIO				
	BACK PRESS., TSF				
MIN PRIN. STRESS, TSF		0.5	1.5	3.0	
MAX. DEV. STRESS, TSF		0.59	0.70	0.73	
TIME TO FAILURE, MIN.		22	12	15	
RATE OF STRAIN INCR.%					
INITIAL DIAMETER, IN.		1.39	1.40	1.40	
INITIAL HEIGHT, IN.		3.00	3.00	3.00	

CONTROLLED-STRAIN TEST

DESCRIPTION OF SPECIMENS: PLASTIC CLAY (CH), GRAY; SILT POCKETS

LL 54	PL 17	PI 37	GS 2.70 (ESTIMATED)	UNDISTURBED SPECIMEN	Q TEST

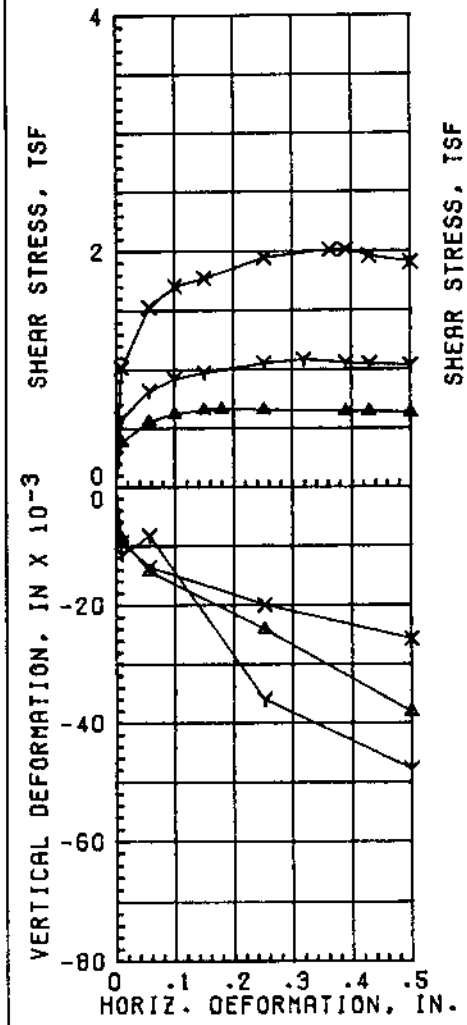
REMARKS:	PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)	
	ORLEANS LAKEFRONT LEVEE-WEST OF IHNC	
	BORING NO. 4-U	SAMPLE NO. 11-C
	DEPTH/ELEV 41.3/-24.7	TECH. TES
	LABORATORY USAE WES	DATE 20 JUN 83
	TRIAXIAL COMPRESSION TEST REPORT	

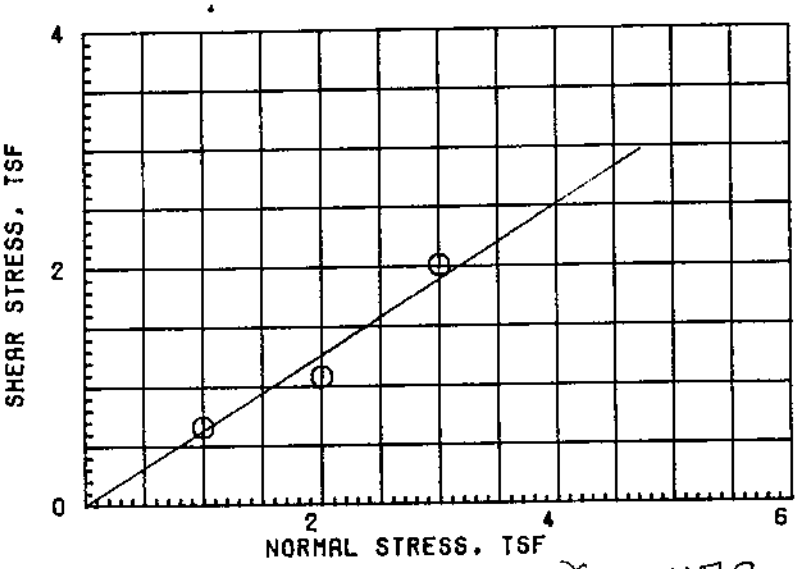
ADVANCE COPY

SUBJECT TO CORRECTION

ADVANCE COPY

SUBJECT TO CORRECTION





$\gamma_{sat} = 117.9$

TEST NO.		1 ▲	2 Y	3 X	AVG.
INITAL	WATER CONTENT, %	35.2	32.5	30.9	32.9
	VOID RATIO	0.925	0.879	0.853	
	SATURATION, %	100 +	98.8	96.7	98.5
	DRY DENSITY, PCF	86.6	88.7	89.9	88.4
VOID RATIO AFTER CONSOL.					
FIFTY PERCENT CONSOL, MIN		< 1	< 1	< 1	
FINAL	WATER CONTENT, %	29.4	26.7	29.6	
	VOID RATIO				
	SATURATION, %				
NORMAL STRESS, TSF		1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, TSF		0.66	1.08	2.01	
TIME TO FAILURE, MIN		912	1615	1838	
RATE OF STRAIN, IN/MIN		.00020	.00020	.00020	
ULTIMATE SHEAR STRESS, TSF					

$\Phi = 31.9$

TAN $\Phi = 0.622$

C = -

TYPE SPECIMEN UNDISTURBED | 3.00 IN. SQUARE | 0.744 IN. THICK

CLASSIFICATION SANDY SILT (ML), GRAY

LL | PL | PI | | GS 2.67 (EST)

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT.(83)

ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

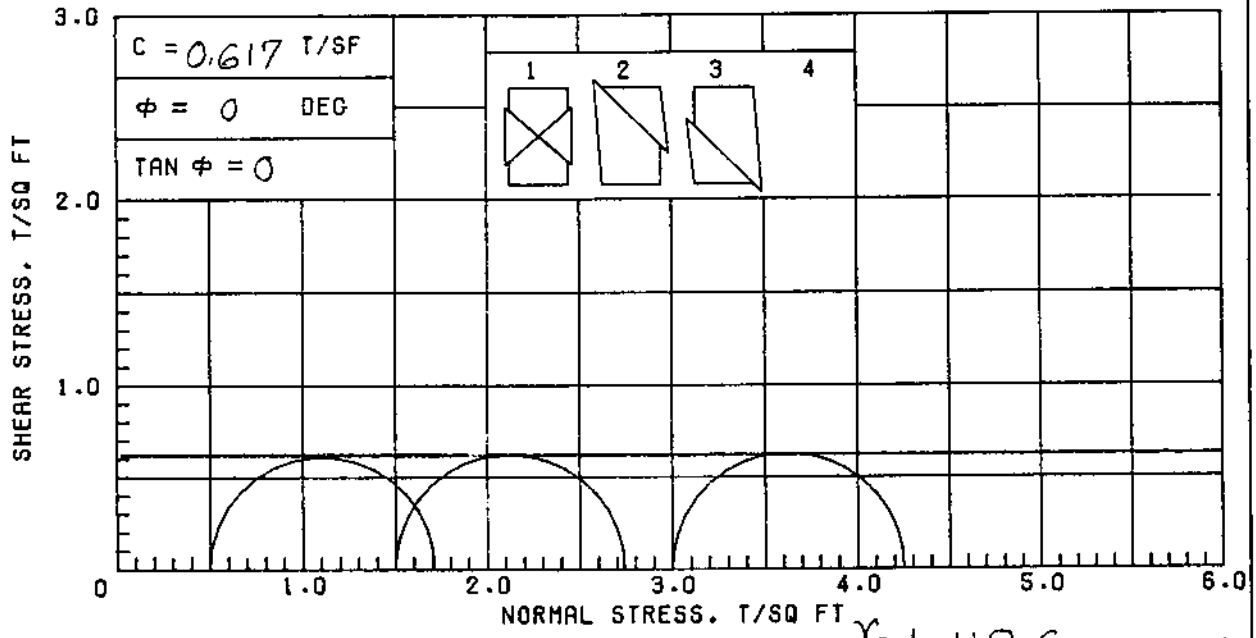
BORING NO. 4-U | SAMPLE 15-C

DEPTH/ELEV 56.4/-39.8 | DATE 13 OCT 83

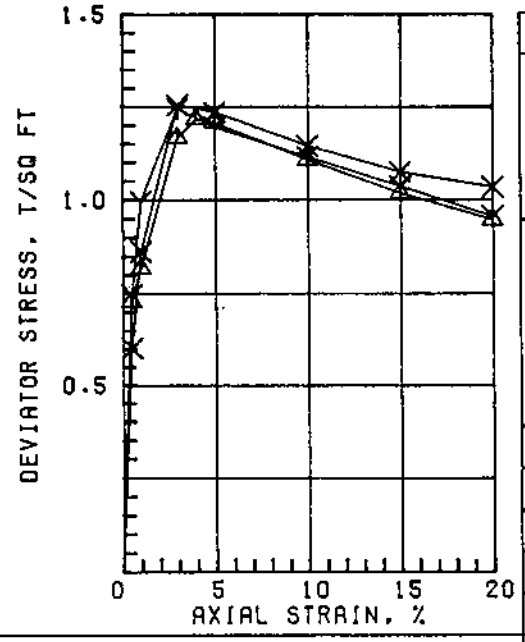
DIRECT SHEAR TEST REPORT

ADVANCE COPY

SUBJECT TO CORRECTION



$\gamma_{sat} = 118.6$ AVG.



SPECIMEN NO.		Δ1	Y2	X3	4
INITIAL	WATER CONTENT, %	31.6	33.0	31.4	32.0
	DRY DENSITY, PCF	89.9	87.1	90.7	89.2
	SATURATION, %	97.6	95.3	98.8	97.2
	VOID RATIO	0.874	0.935	0.858	
BEFORE SHEAR	WATER CONTENT, %				
	DRY DENSITY, PCF				
	SATURATION, %				
	VOID RATIO				
	BACK PRESS., TSF				
MIN PRIN. STRESS, TSF		0.5	1.5	3.0	
MAX. DEV. STRESS, TSF		1.21	1.24	1.25	
TIME TO FAILURE, MIN.		14	11	11	
RATE OF STRAIN INCR.%					
INITIAL DIAMETER, IN.		1.40	1.40	1.40	
INITIAL HEIGHT, IN.		3.00	3.00	3.00	

CONTROLLED-STRAIN TEST

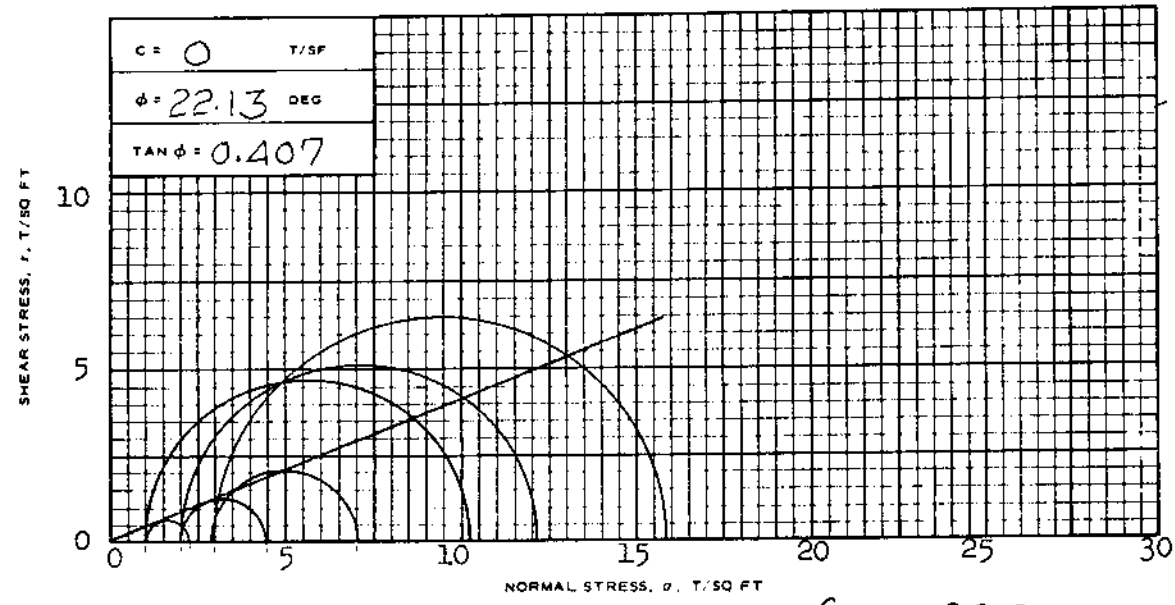
DESCRIPTION OF SPECIMENS: CLAY (CL), GRAY; SILT POCKETS; SHELL PARTICLES

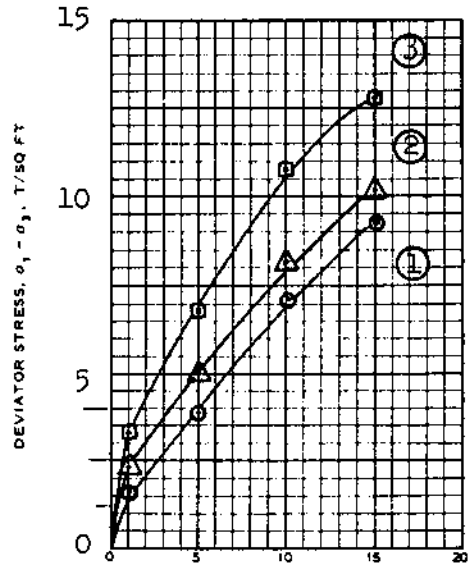
LL 45	PL 15	PI 30	GS 2.70 (ESTIMATED)	UNDISTURBED SPECIMEN	Q TEST

REMARKS:	PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83
	ORLEANS LAKEFRONT LEVEE-WEST OF IHNC
	BORING NO. 4-U / SAMPLE NO. 17-C
	DEPTH/ELEV 65.0/-48.4 / TECH. TES
	LABORATORY USAE WES / DATE 20 JUN 83
	TRIAXIAL COMPRESSION TEST REPORT

ADVANCE COPY

SUBJECT TO CORRECTION





γsat = 126.5

SPECIMEN NO.			1	2	3	AVG
INITIAL	WATER CONTENT, %	w_o	23.6	24.4	23.3	23.8
	DRY DENSITY LB/CU FT	γ_{d_o}	102.1	101.2	103.4	102.2
	SATURATION, %	s_o	99.6	100+	100+	99.9
	VOID RATIO	e_o	0.632	0.647	0.612	
BEFORE SHEAR	WATER CONTENT, %	w_c	25.3	25.4	23.6	
	DRY DENSITY LB/CU FT	γ_{d_c}	104.3	104.2	105.7	
	SATURATION, %	s_c	100+	100+	100+	
	VOID RATIO	e_c	0.599	0.600	0.578	
	FINAL BACK PRESSURE, T/SQ FT	u_o	5.76	5.76	5.76	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	1.0	2.0	3.0	
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	9.26	10.05	12.87	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	1071	1071	1071	
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$	1.25	2.5	4.0	
INITIAL DIAMETER, IN.		D_o	1.39	1.39	1.36	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

CONTROLLED- STRAIN TEST

DESCRIPTION OF SPECIMENS SILTY CLAY (CL), GRAY

LL 26 | PL 18 | PI 8 | G_s 2.67(EST)

TYPE OF SPECIMEN UNDISTURBED | TYPE OF TEST $\bar{R}$

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 4-U | SAMPLE NO. 18-C

DEPTH/ELEV 68.5/-51.9

LABORATORY USAEWES | DATE 8 NOV 1983

SHEET 1 OF 2

JMS TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089
REV JUNE 1970

GPO : 1982 0 - 375-356

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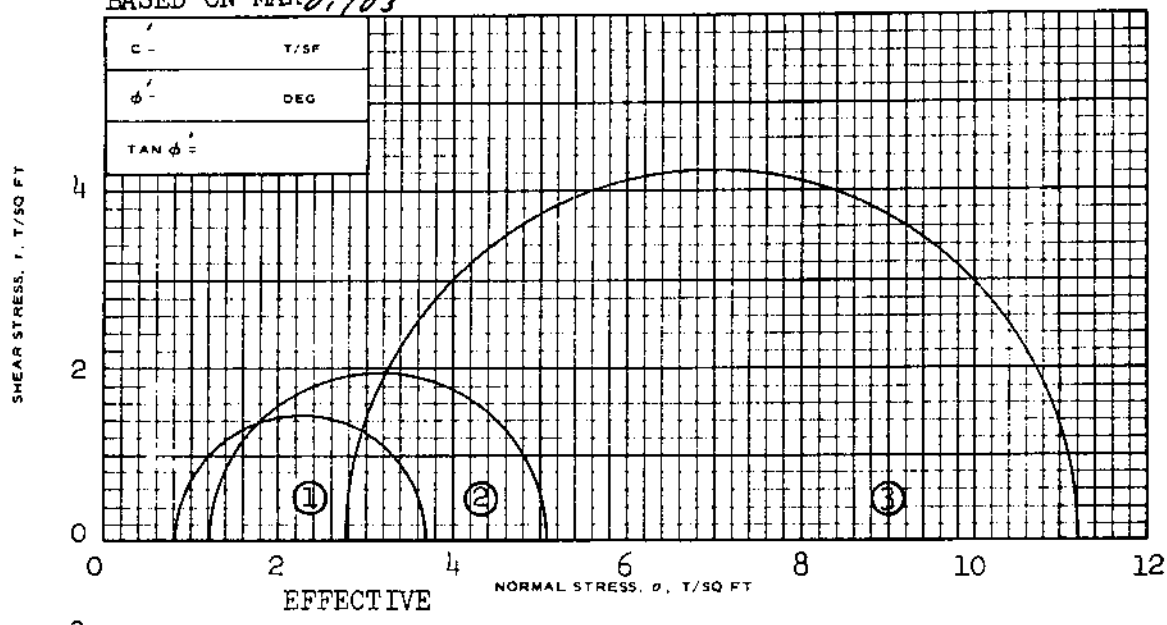
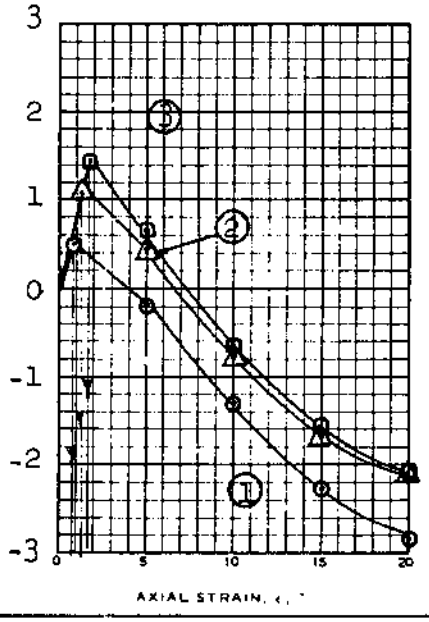
SUBJECT TO CORRECTION

BASED ON MAX σ_1'/σ_3'





SPECIMEN NO.			1	2	3	
INITIAL	WATER CONTENT, %	w_o				
	DRY DENSITY LB/CU FT	γ_{d_o}				
	SATURATION, %	S_o				
	VOID RATIO	e_o				
BEFORE SHEAR	WATER CONTENT, %	w_c				
	DRY DENSITY LB/CU FT	γ_{d_c}				
	SATURATION, %	S_c				
	VOID RATIO	e_c				
	FINAL BACK PRESSURE, T/SQ FT	u_b				
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.82	1.21	2.76	
MAXIMUM DEVIATOR STRESS, T/SQ FT	$(\sigma_1 - \sigma_3)_{MAX}$		2.91	3.88	8.44	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f				
ULTIMATE DEVIATOR STRESS, T/SQ FT	$(\sigma_1 - \sigma_3)_{ULT}$					
INITIAL DIAMETER, IN.		D_o				
INITIAL HEIGHT, IN.		H_o				

CONTROLLED- TEST

DESCRIPTION OF SPECIMENS

LL	PL	PI	G_s	TYPE OF SPECIMEN	TYPE OF TEST

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 4-U SAMPLE NO. 18-C

DEPTH/ELEV 68.5/-51.9

LABORATORY USAEWES DATE 8 NOV 1983

SHEET 2 OF 2

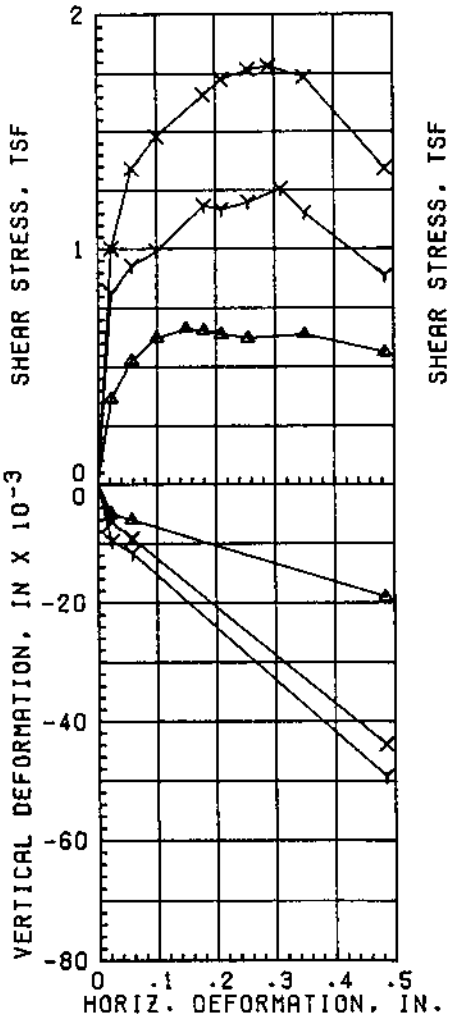
JMS TRIAXIAL COMPRESSION TEST REPORT

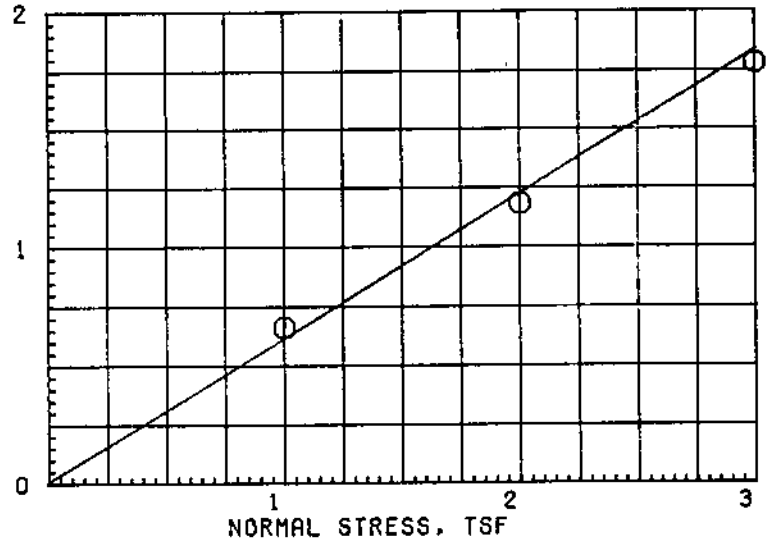
ENG FORM NO. 2089
REV JUNE 1970

GPO : 1982 0 - 375-356

ADVANCE COPY

SUBJECT TO CORRECTION





$\gamma_{sat} = 124.9$

TEST NO.		1 ▲	2 Y	3 X	AVG.
INITAL	WATER CONTENT, %	23.9	24.3	24.2	24.1
	VOID RATIO	0.652	0.667	0.656	
	SATURATION, %	97.4	96.9	98.0	97.4
	DRY DENSITY, PCF	100.5	99.6	100.3	100.1
VOID RATIO AFTER CONSOL					
FIFTY PERCENT CONSOL, MIN		< 1	< 1	< 1	
FINAL	WATER CONTENT, %	25.7	25.7	25.6	
	VOID RATIO				
	SATURATION, %				
NORMAL STRESS, TSF		1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, TSF		0.66	1.18	1.78	
TIME TO FAILURE, MIN		853	1024	1650	
RATE OF STRAIN, IN/MIN		.00018	.00018	.00018	
ULTIMATE SHEAR STRESS, TSF					

Φ = 31.6

TAN Φ = 0.615

C = -

TYPE SPECIMEN UNDISTURBED | 3.00 IN. SQUARE | 0.744 IN. THICK

CLASSIFICATION SAND (SP), GRAY: WITH SILT

LL	PL	PI		GS 2.66 (EST)

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. PLAN

ORLEANS LAKEFRONT LEVEE-WEST TO IHNC

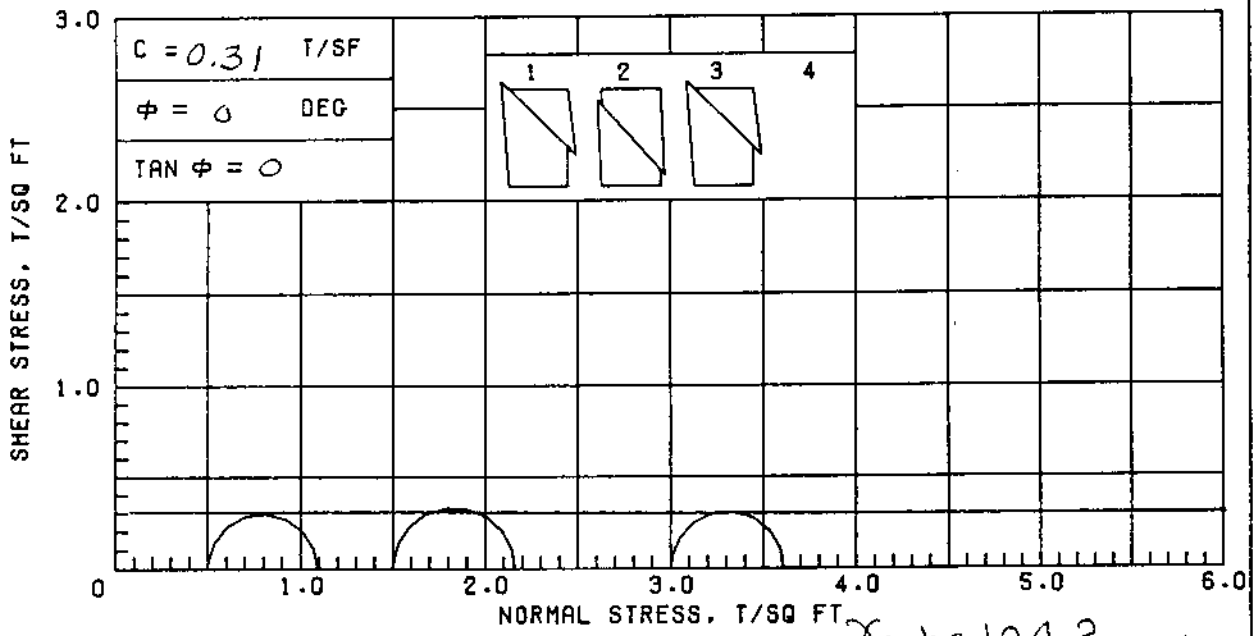
BORING NO. S-U | SAMPLE S-C

DEPTH/ELEV 21.0/-13.5 | DATE 15 OCT 83

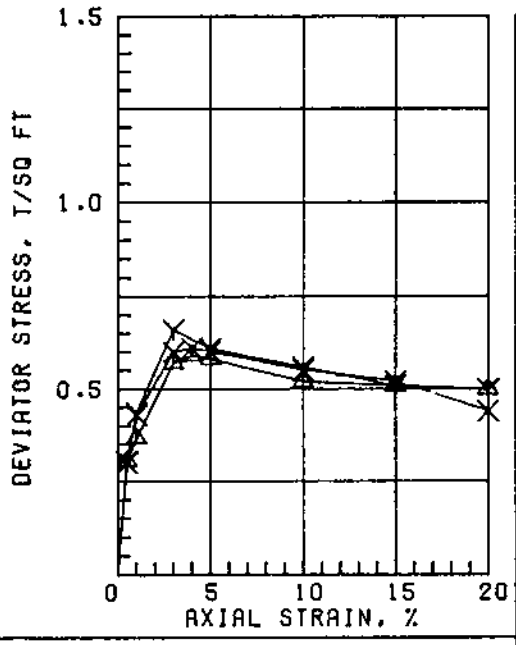
DIRECT SHEAR TEST REPORT

ADVANCE COPY

SUBJECT TO CORRECTION



γ_{sat} = 104.2 Avg.



SPECIMEN NO.		Δ1	Y2	X3	4
INITIAL	WATER CONTENT, %	55.2	55.7	59.6	56.8
	DRY DENSITY, PCF	67.4	67.0	64.4	66.3
	SATURATION, %	99.4	99.3	99.6	99.4
	VOID RATIO	1.500	1.514	1.616	
BEFORE SHEAR	WATER CONTENT, %				
	DRY DENSITY, PCF				
	SATURATION, %				
	VOID RATIO				
	BACK PRESS., TSF				
MIN PRIN. STRESS, TSF		0.5	1.5	3.0	
MAX. DEV. STRESS, TSF		0.59	0.66	0.61	
TIME TO FAILURE, MIN.		10	4	19	
RATE OF STRAIN INCR.%			5	6	
INITIAL DIAMETER, IN.		1.39	1.39	1.40	
INITIAL HEIGHT, IN.		3.00	3.00	3.00	

CONTROLLED-STRAIN TEST

DESCRIPTION OF SPECIMENS: PLASTIC CLAY (CH), GRAY; FINE SAND POCKETS

LL 68	PL 18	PI 50	GS 2.70 (ESTIMATED)	UNDISTURBED SPECIMEN	Q TEST

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)

ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 5-U | SAMPLE NO. 9-C

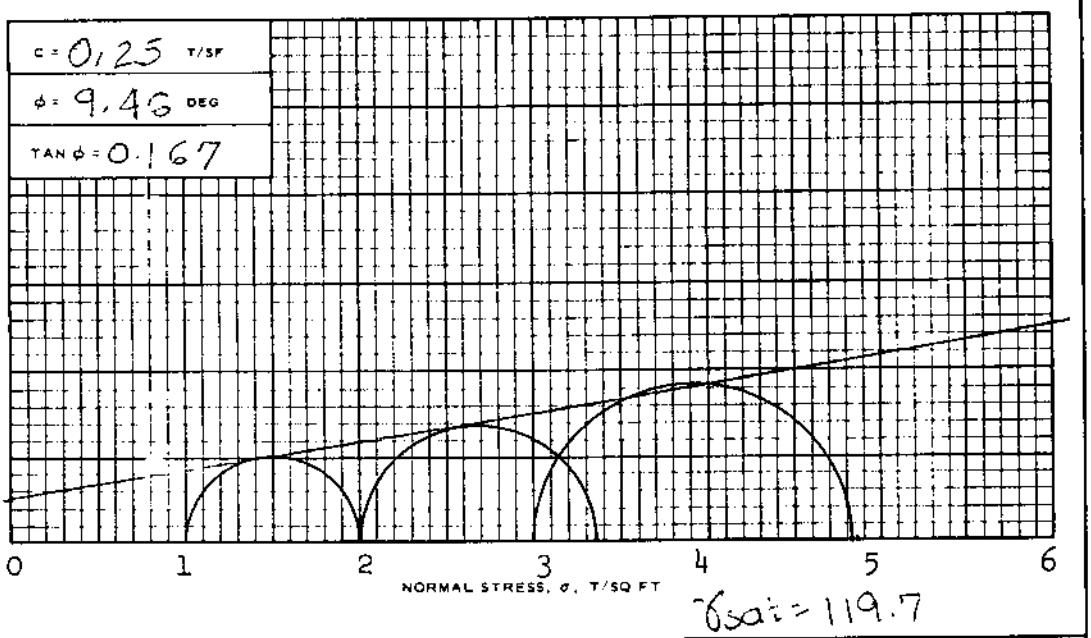
DEPTH/ELEV 33.0/-25.5 | TECH. LRC

LABORATORY USAE WES | DATE 20 JUN 83

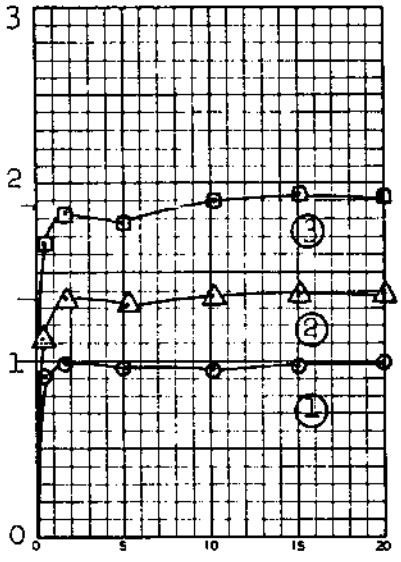
TRIAXIAL COMPRESSION TEST REPORT

ADVANCE COPY

SUBJECT TO CORRECTION



γ_{sat} = 119.7



SPECIMEN NO.			1	2	3	AVG.
INITIAL	WATER CONTENT, %	w_o	31.1	31.0	31.5	31.2
	DRY DENSITY LB/CU FT	γ_{d_o}	92.1	89.6	90.6	90.8
	SATURATION, %	S_o	100+	94.9	98.8	97.9
	VOID RATIO	e_o	0.830	0.882	0.861	
BEFORE SHEAR	WATER CONTENT, %	w_c	29.2	28.1	27.2	
	DRY DENSITY LB/CU FT	γ_{d_c}	95.9	93.9	96.4	
	SATURATION, %	S_c	100+	94.7*	98.1	
	VOID RATIO	e_c	0.757	0.801	0.749	
	FINAL BACK PRESSURE, T/SQ FT	u_b	5.76	5.76	5.76	
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	1.0	2.0	3.0	
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{MAX}$	1.00	1.36	1.83	
TIME TO $(\sigma_1 - \sigma_3)_{MAX}$, MIN		t_f	106	113	106	
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1 - \sigma_3)_{ULT}$	1.0	1.35	1.85	
INITIAL DIAMETER, IN.		D_o	1.36	1.37	1.36	
INITIAL HEIGHT, IN.		H_o	3.00	3.00	3.00	

CONTROLLED- STRAIN TEST

DESCRIPTION OF SPECIMENS SANDY CLAY (CL), GRAY

LL 27 | PL 18 | PI 9 | G 2.70 (EST) | TYPE OF SPECIMEN UNDISTURBED | TYPE OF TEST $\bar{R}$

REMARKS: *PORE PRESSURE RESPONSE INDICATED 100% SATURATION

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 5-U | SAMPLE NO. 7-B

DEPTH/ELEV 24.4/-26.9

LABORATORY USAEWES | DATE 4 NOV 1983

SHEET 1 OF 2 | JMS | TRIAXIAL COMPRESSION TEST REPORT

ENG FORM NO. 2089
REV JUNE 1970

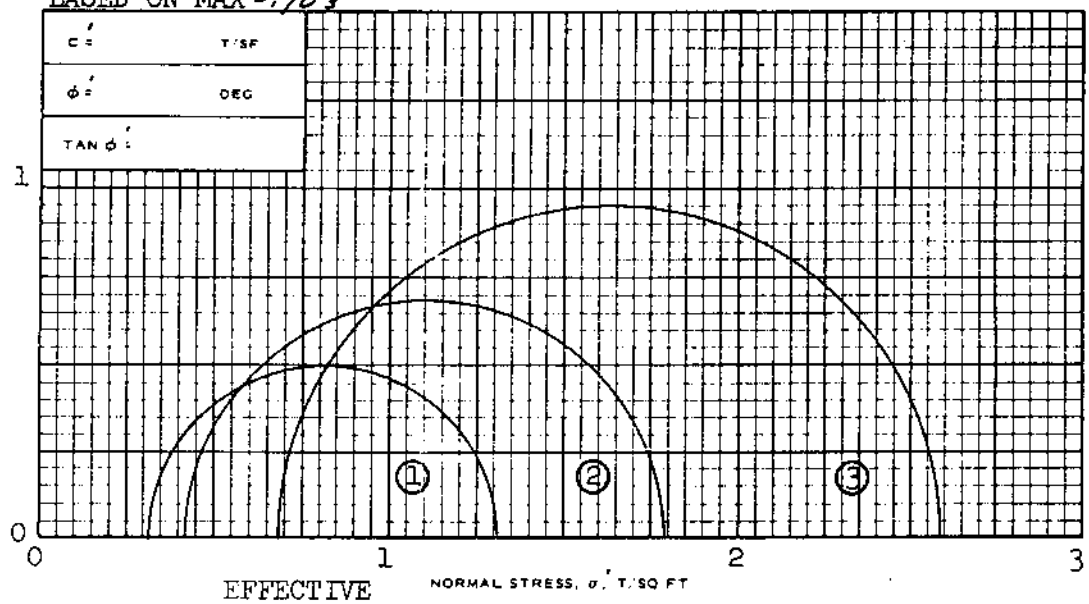
GPO : 1982 0 - 375-356

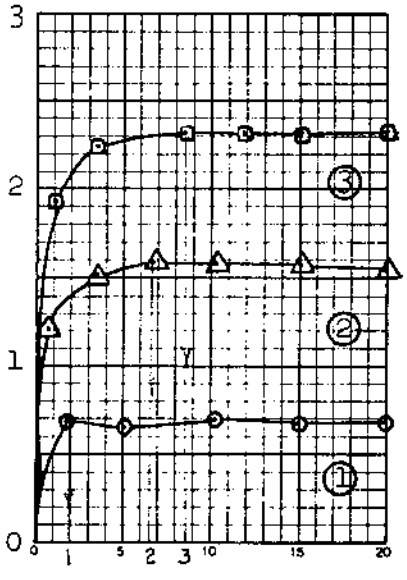
ADVANCE COPY

SUBJECT TO CORRECTION

BASED ON MAX σ_1'/σ_3'

C' =	T/SF
ϕ' =	DEG
TAN ϕ' =	





SPECIMEN NO.			1	2	3	
INITIAL	WATER CONTENT, %	w_o				
	DRY DENSITY LB/CU FT	γ_{d_o}				
	SATURATION, %	S_o				
	VOID RATIO	e_o				
BEFORE SHEAR	WATER CONTENT, %	w_c				
	DRY DENSITY LB/CU FT	γ_{d_c}				
	SATURATION, %	S_c				
	VOID RATIO	e_c				
	FINAL BACK PRESSURE, T/SQ FT	u_o				
MINOR PRINCIPAL STRESS, T/SQ FT		σ_3	0.32	0.42	0.68	
MAXIMUM DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{MAX}$	1.00	1.38	1.91	
TIME TO $(\sigma_1-\sigma_3)_{MAX}$, MIN		t_f				
ULTIMATE DEVIATOR STRESS, T/SQ FT		$(\sigma_1-\sigma_3)_{ULT}$				
INITIAL DIAMETER, IN.		D_o				
INITIAL HEIGHT, IN.		H_o				

CONTROLLED- TEST

DESCRIPTION OF SPECIMENS

LL	PL	PI	Gs	TYPE OF SPECIMEN	TYPE OF TEST

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)
ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. S-U SAMPLE NO. 7-B

DEPTH/ELEV 24.4/-26.9

LABORATORY USAEWES DATE 4 NOV 1983

SHEET 2 OF 2

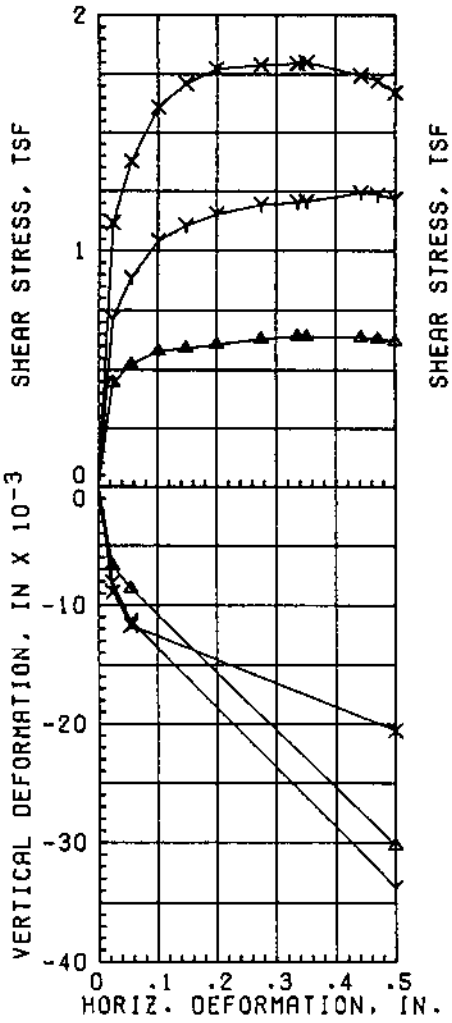
JMS TRIAXIAL COMPRESSION TEST REPORT

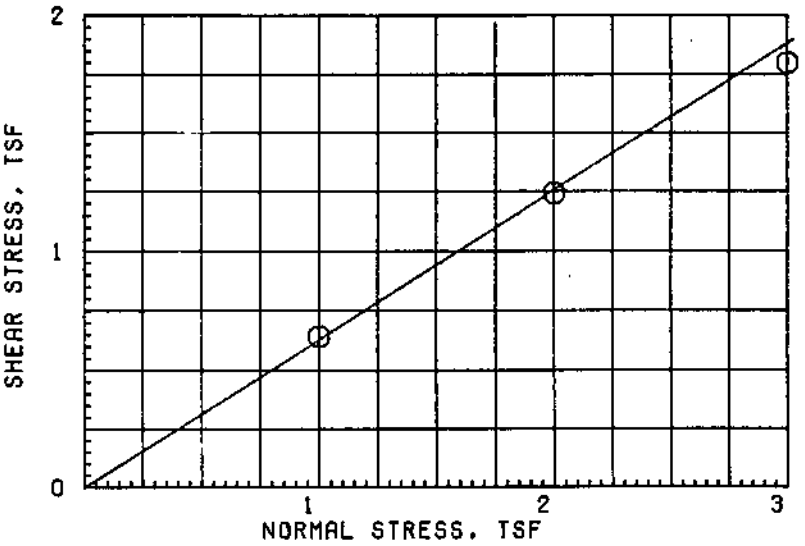
ENG FORM NO. 2089
REV JUNE 1970

GPO : 1982 O - 375-356

ADVANCE COPY

SUBJECT TO CORRECTION





ϕ = 31.80

TAN ϕ = 0.62

C = -

γ_{sat} = 115.3

TEST NO.		1 ▲	2 Y	3 X	AVG.
INITIAL	WATER CONTENT, %	31.8	33.1	32.9	32.6
	VOID RATIO	0.955	0.964	0.951	
	SATURATION, %	88.5	91.3	92.1	90.6
	DRY DENSITY, PCF	84.9	84.5	85.1	84.8
VOID RATIO AFTER CONSOL					
FIFTY PERCENT CONSOL, MIN		< 1	< 1	< 1	
FINAL	WATER CONTENT, %	25.6	26.5	25.5	
	VOID RATIO				
	SATURATION, %				
NORMAL STRESS, TSF		1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, TSF		0.64	1.24	1.80	
TIME TO FAILURE, MIN		1845	2428	1928	
RATE OF STRAIN, IN/MIN		.00018	.00018	.00018	
ULTIMATE SHEAR STRESS, TSF					

TYPE SPECIMEN UNDISTURBED | 3.00 IN. SQUARE | 0.553 IN. THICK

CLASSIFICATION SILTY SAND (SM), GRAY

LL	PL	PI		GS 2.66 (EST)

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. PLAN

ORLEANS LAKEFRONT LEVEE-WEST TO IHNC

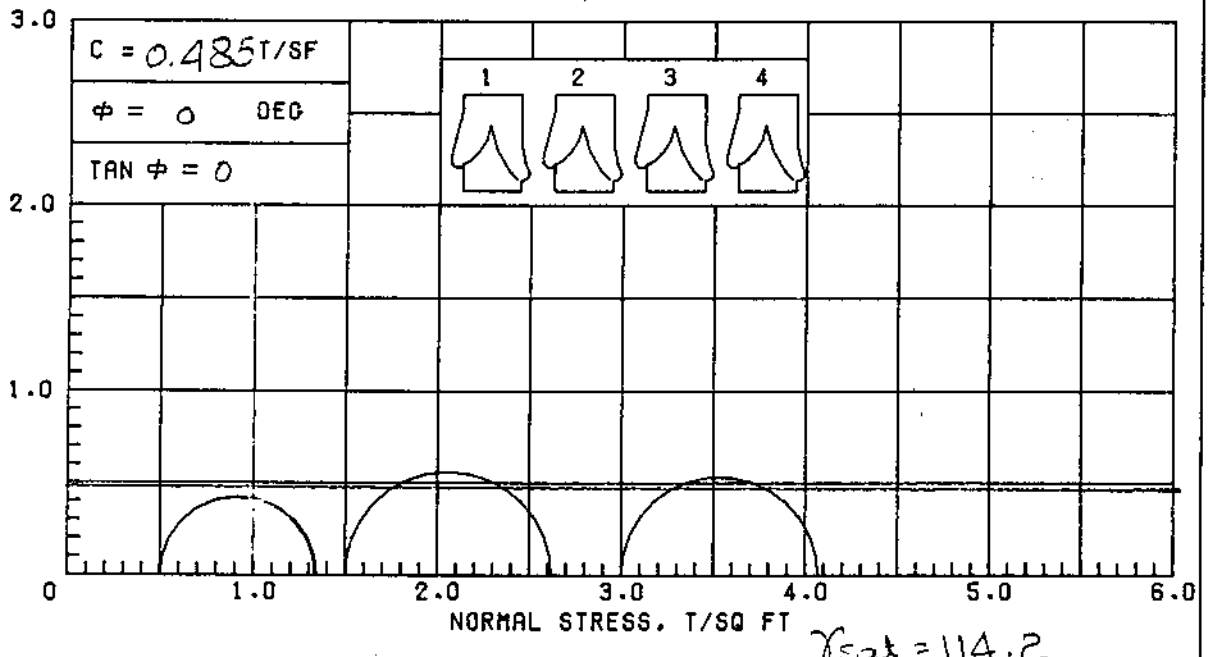
BORING NO. 5-U | SAMPLE 13-C

DEPTH/ELEV 48.8/-41.3 | DATE 15 OCT 83

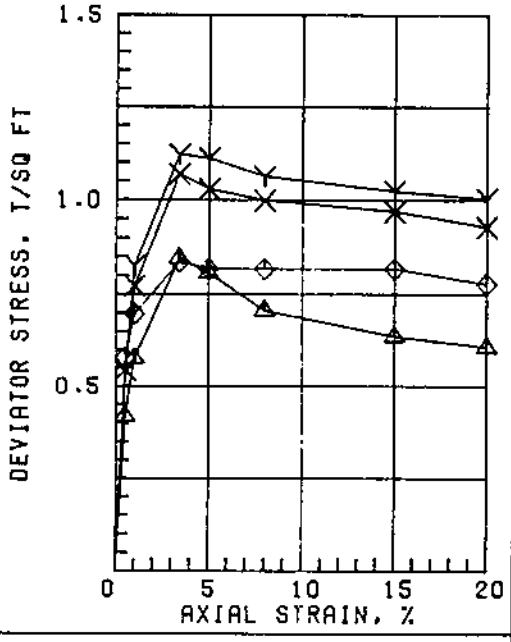
DIRECT SHEAR TEST REPORT

ADVANCE COPY

SUBJECT TO CORRECTION



$\gamma_{sat} = 114.2$



SPECIMEN NO.		△1	Y2	X3	◇4	
INITIAL	WATER CONTENT, %	41.0	36.1	37.2	39.8	38.5
	DRY DENSITY, PCF	80.0	84.2	83.5	80.9	82.2
	SATURATION, %	100+	97.2	98.6	99.3	98.8
	VOID RATIO	1.107	1.003	1.018	1.082	
BEFORE SHEAR	WATER CONTENT, %					
	DRY DENSITY, PCF					
	SATURATION, %					
	VOID RATIO					
	BACK PRESS., TSF					
MIN PRIN. STRESS, TSF		0.5	1.5	3.0	0.5	
MAX. DEV. STRESS, TSF		0.85	1.12	1.07	0.84	
TIME TO FAILURE, MIN.		8	19	27	32	
RATE OF STRAIN INCR.%			8	5	4	
INITIAL DIAMETER, IN.		1.40	1.41	1.41	1.40	
INITIAL HEIGHT, IN.		3.00	3.00	3.00	3.00	

CONTROLLED-STRAIN TEST

DESCRIPTION OF SPECIMENS: CLAY (CL), DARK GRAY

LL 47	PL 15	PI 32	GS 2.70 (ESTIMATED)	UNDISTURBED SPECIMEN	Q TEST

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. (83)

ORLEANS LAKEFRONT LEVEE-WEST OF IHNC

BORING NO. 5-U | SAMPLE NO. 15-B

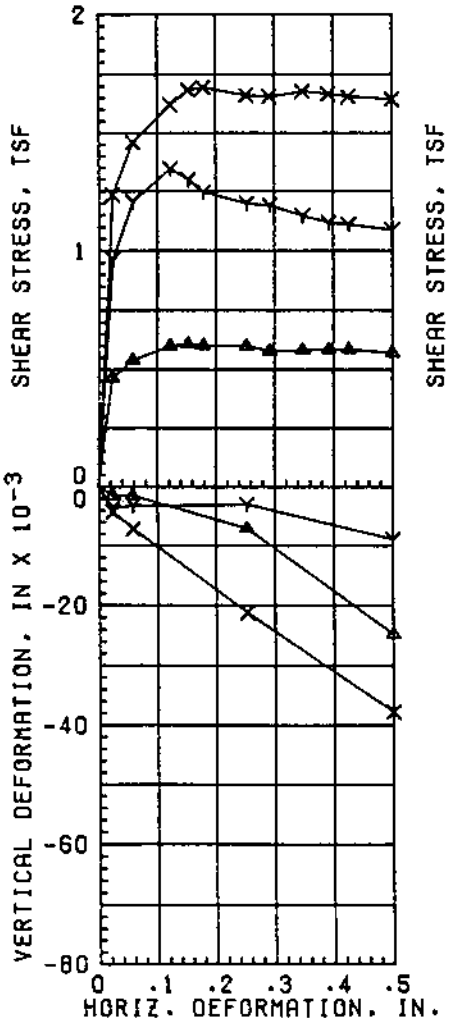
DEPTH/ELEV 56.4/-48.9 | TECH. PJR

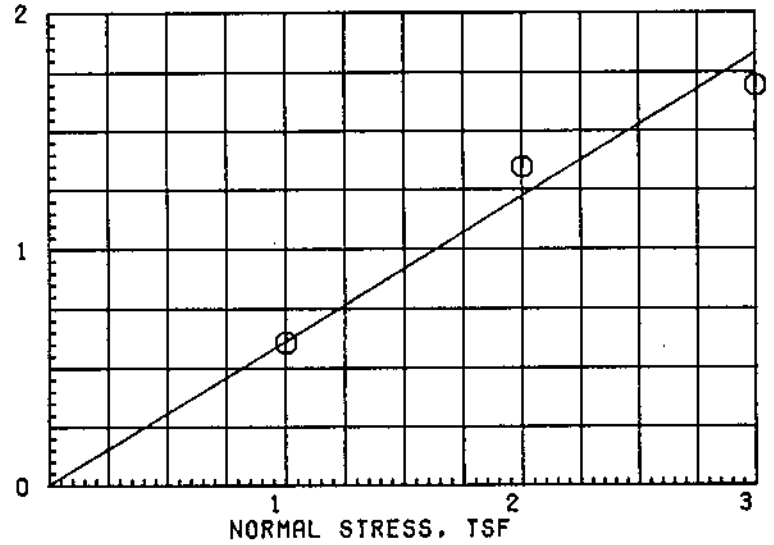
LABORATORY USAE WES | DATE 21 JUN 83

TRIAXIAL COMPRESSION TEST REPORT

ADVANCE COPY

SUBJECT TO CORRECTION





$\gamma_{sat} = 122.0$

TEST NO.		1 ▲	2 Y	3 X	AVG
INITIAL	WATER CONTENT, %	27.1	26.9	25.9	26.6
	VOID RATIO	0.717	0.741	0.748	
	SATURATION, %	100 +	96.4	92.2	96.2
	DRY DENSITY, PCF	96.7	95.3	94.9	95.6
VOID RATIO AFTER CONSOL					
FIFTY PERCENT CONSOL, MIN		< 1	< 1	< 1	
FINAL	WATER CONTENT, %	22.8	24.2	22.3	
	VOID RATIO				
	SATURATION, %				
NORMAL STRESS, TSF		1.0	2.0	3.0	
MAXIMUM SHEAR STRESS, TSF		0.61	1.35	1.69	
TIME TO FAILURE, MIN		840	670	983	
RATE OF STRAIN, IN/MIN		.00018	.00018	.00018	
ULTIMATE SHEAR STRESS, TSF					

$\Phi = 31.6$

TAN $\Phi = 0.615$

C = –

TYPE SPECIMEN UNDISTURBED | 3.00 IN. SQUARE | 0.553 IN. THICK

CLASSIFICATION SILTY SAND (SM), GRAY

LL	PL	PI		GS 2.66 (EST)

REMARKS:

PROJECT LK. PONT. LA. & VIC-HURR. PROT. PLAN

ORLEANS LAKEFRONT LEVEE-WEST TO IHNC

BORING NO. 5-U | SAMPLE 17-C

DEPTH/ELEV 65.0/-57.5 | DATE 17 OCT 83

DIRECT SHEAR TEST REPORT

ADDENDUM NO. 4
Pontchartrain Beach
Flood Protection Improvement Project
Phase II
Proposal No. 2040-0375
Lakefront Capital Improvement Program
The Board of Levee Commissioners
of the
Orleans Levee District
January 28, 1987

The plans and specifications for the construction of the Pontchartrain Beach Flood Protection Improvement Project - Phase II for which sealed bids are to be received by the Board of Levee Commissioners of the Orleans Levee District at Suite 202, Administration Building, New Orleans Lakefront Airport, New Orleans, LA until 2:00 p.m., local time, on Tuesday, February 3, 1987, are hereby modified as follows:

1. Refer to Addendum No. 3 dated January 23, 1987 and Addendum No. 1 dated January 22, 1987. Disregard Item No. 2 of Addendum No. 3, and concerning Item No. 10 of Addendum No. 1, replace Sheet 21 - Revised by Addendum No. 1 - January 22, 1987, with the enclosed Sheet 21 - Revised by Addendum No. 4 - January 28, 1987 and Revised by Addendum No. 1 - January 22, 1987.

2. A. Refer to Addendum No. 3 dated January 23, 1987. Disregard Item Nos. 4 and 5 of Addendum No. 3 as well as page E-4 of the Bid Schedule as revised by Addendum No. 3.

   B. Refer to Section 5, Prestressed Concrete Piles, Part 5-4, Measurement and Payment (page 5-7) of the Specifications. In part 5-4.B (page 5-8), Basis of Payment, after:

   "Payment will be made under:",

   Delete Pay Item No. 6 shown therein and replace it with the following:

   "Pay Item No. 6: Piling, Concrete, Precast, Prestressed, 14 inch square - per Linear Foot.

   a. Vertical Piling
   b. Batter Piling"

   C. Replace page E-4 of the Bid Schedule within the Form of Proposal of the Specifications and replace it with the enclosed page E-4 as Revised by Addendum No. 4.

3. Refer to the project drawings. Change any references therein regarding the Prestressed Precast Concrete Piles or Piling from 12" square or 12" x 12" to 14" square or 14" x 14".

4. Refer to Section 5, Prestressed Concrete Piles, of the Specifications.

   A. In the first sentence of paragraph 5.2.A.1 (page 5-2), change "... 12-inch by 12-inch.", to "... 14-inch x 14-inch."

   B. Change the third sentence of paragraph 5.2.B.7.a (page 5-4), to read, "The piling may be removed from the casting bed to nearby storage anytime after transfer of stress provided the maximum length does not exceed 83 feet for 2-point pickup or 58 feet for 1-point pickup."

   C. In paragraph 5-4.B.1 (page 5-7), change the reference '..."Piling, Concrete, Precast, Prestressed, 12-inch,"...', to '..."Piling, Concrete, Precast, Prestressed, 14-inch," for either Vertical Piling or Batter Piling,...'

END OF ADDENDUM NO. 4

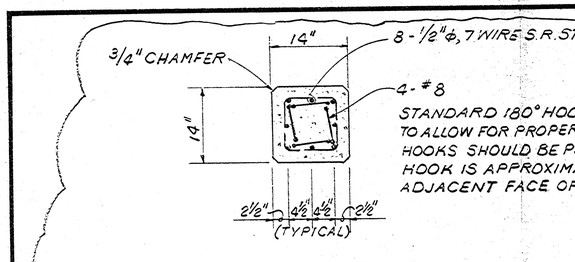
Enclosures: Page E-4 of the Specifications (Revised by Addendum No. 4).
Sheet No. 21 of the Project Drawings (Revised by Addendum Nos. 1 and 4).

Distribution: All Plan Holders

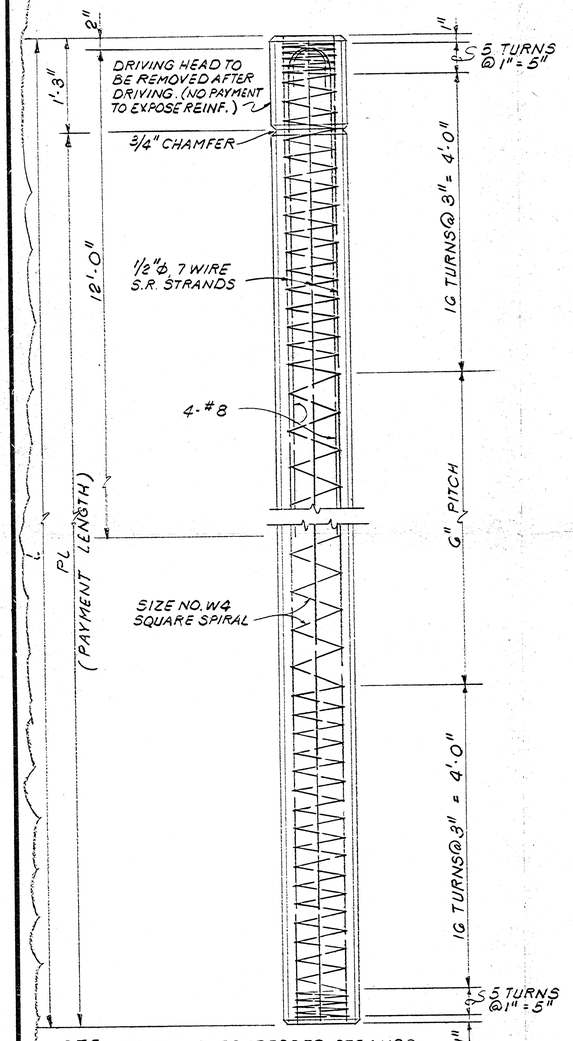
BID SCHEDULE

No	Item	Unit	Unit Price	Approx. Quantity	Amount
1.	Mobilization	L.S.	$ _____	Lump Sum	$ _____
2.	Clearing & Grubbing	L.S.	_____	Lump Sum	_____
3.	Removal of Structures and Obstructions	L.S.	_____	Lump Sum	_____
4.	Removal of Pavement (Non Roadway)	S.Y.	_____	888	_____
5.	Compacted Clay Backfill	C.Y.	_____	200	_____
6.	Piling, Concrete, Precast, Prestressed, 14 inch Sq. a) Vertical Piling	L.F.	_____	820	_____
	b) Batter Piling	L.F.	_____	1,754	_____
7.	Concrete	C.Y.	_____	1,688	_____
8.	Structural Steel Gates, Miscellaneous Metals and Specialty Items	L.S.	_____	Lump Sum	_____
9.	Excavation	C.Y.	_____	100	_____
10.	Embankment - Compacted	C.Y.	_____	2,045	_____
11.	Asphaltic Concrete Wearing Course (Type 1)	Ton	_____	142	_____
12.	Asphaltic Concrete Base Course (Type 1)	Ton	_____	236	_____
13.	Sand-Shell Base (6")	S.Y.	_____	1,711	_____
14.	Geotextile Fabric	S.Y.	_____	295	_____
15.	Fertilizing, Seeding and Mulching	Acre	_____	2	_____
16.	Tree Relocation	L.S.	_____	Lump Sum	_____
17.	12" diameter Restrained Joint Ductile Iron Pipe, Class 52	L.F.	_____	140	_____
18.	Fittings (Cast Iron)	Lbs.	_____	1,215	_____

Revised by Addendum No. 4
January 28, 1987

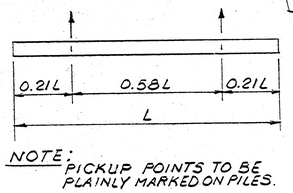


STANDARD 180° HOOK ON REINFORCING (4-#8) TO ALLOW FOR PROPER PLACEMENT OF CONCRETE, HOOKS SHOULD BE PLACED SO THAT BEND OF HOOK IS APPROXIMATELY PARALLEL TO ADJACENT FACE OF PILE AS SHOWN.



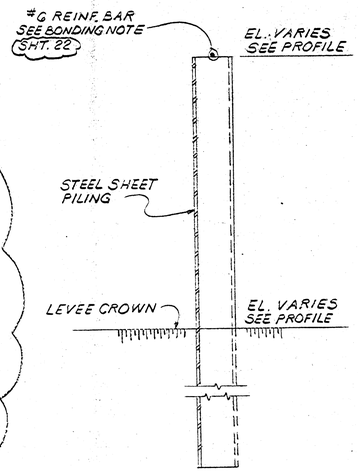
NOTE: GRIND PRESTRESSED STRANDS FLUSH WITH PILE HEAD AND PILE TIP.

PRESTRESSED PRECAST CONCRETE PILE 14"x14"
SCALE: 1" = 1'-0"

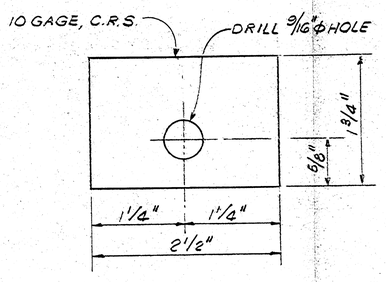


NOTE: PICKUP POINTS TO BE PLAINLY MARKED ON PILES.

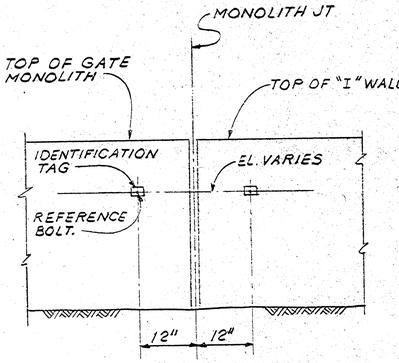
2 POINT PICKUP (58' < L ≤ 83')
14"x14" PILES



CORROSION PROTECTION DETAIL
STEEL SHEET PILING ⚠1
SCALE: NONE

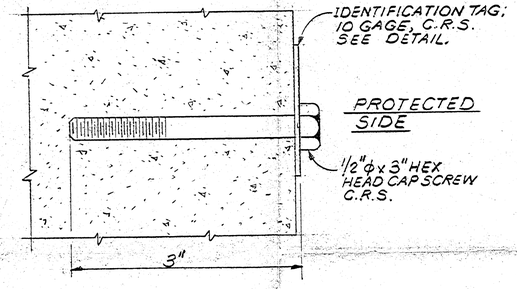


IDENTIFICATION TAG
SCALE: NONE



PROTECTED SIDE

TYPICAL ELEVATION OF SETTLEMENT REFERENCE MARKER
SCALE: 3/4" = 1'-0"



REFERENCE BOLT
SCALE: NONE

PILE SCHEDULE

GATE NO.	NUMBER OF PILES	PILE BATTER	TIP ELEVATION	PAYMENT LENGTH: FLOOD SIDE	PAYMENT LENGTH: PROTECTED SIDE	PILE NUMBER
1 & 3	4	1H. ON 2V.	- 50.34	69'		(7) (8) (11) (12) (33) (34) (37) (38)
	2	VERTICAL	- 59.75	71'		(9) (10) (35) (36)
	4	1H. ON 2V.	- 50.34		69'	(1) (2) (5) (6) (27) (28) (31) (32)
	2	VERTICAL	- 59.75		71'	(3) (4) (29) (30)
2	4	1H. ON 2V.	- 46.76	65'		(21) (22) (25) (26)
	2	VERTICAL	- 51.75	63'		(23) (24)
	6	1H. ON 2V.	- 46.76		65'	(13) (14) (15) (16) (19) (20)
	2	VERTICAL	- 51.75		63'	(16) (17)

TOTAL PILES REQ'D. = 38

NOTES:

1. THE CONTRACTOR SHALL TAKE FINAL ELEVATIONS OF ALL SETTLEMENT REFERENCE MARKERS AND SHALL SUBMIT THIS DATA TO THE CONTRACTING OFFICER REPRESENTATIVE.
2. THE CONTRACTOR SHALL PREDRILL PILE PILOT HOLES ONLY TO THE ELEVATIONS REQUIRED BY THE SPECIFICATIONS. ANY ADDITIONAL PREDRILLING BEYOND THAT REQUIRED BY THE SPECIFICATIONS SHALL ONLY BE PERFORMED UPON THE ENGINEER'S APPROVAL.

⚠2 REVISED BY ADDENDUM NO.4 JANUARY 28, 1987

⚠1 REVISED BY ADDENDUM NO.1 JANUARY 22, 1987

NO	DATE	REVISION	BY
⚠2	1/28/87	CHANGED CONC. PILES, PILE SCHEDULE AND 2 POINT PICKUP.	T.R.E.
⚠1	1/20/87	CHANGED CORROSION PROTECTION DETAIL	T.R.E.

DESIGNED BY: T.T.C.
DRAWN BY: T.R.E.
CHECKED BY: B.H.A.
REVIEWED BY: G.M.K.
DATE: DECEMBER 31, 1986

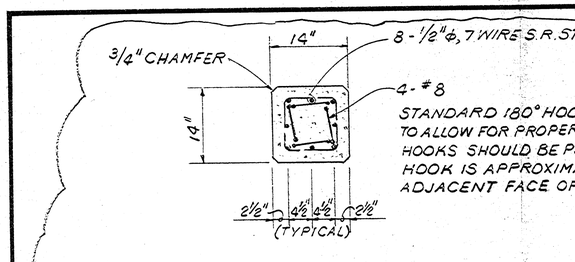
STATE OF LOUISIANA — ELLIOT H. ADAMS — REG. NO. 18792 — PROFESSIONAL ENGINEER

URS New Orleans 3500 N. Causeway Blvd. -- Metairie, Louisiana 70002

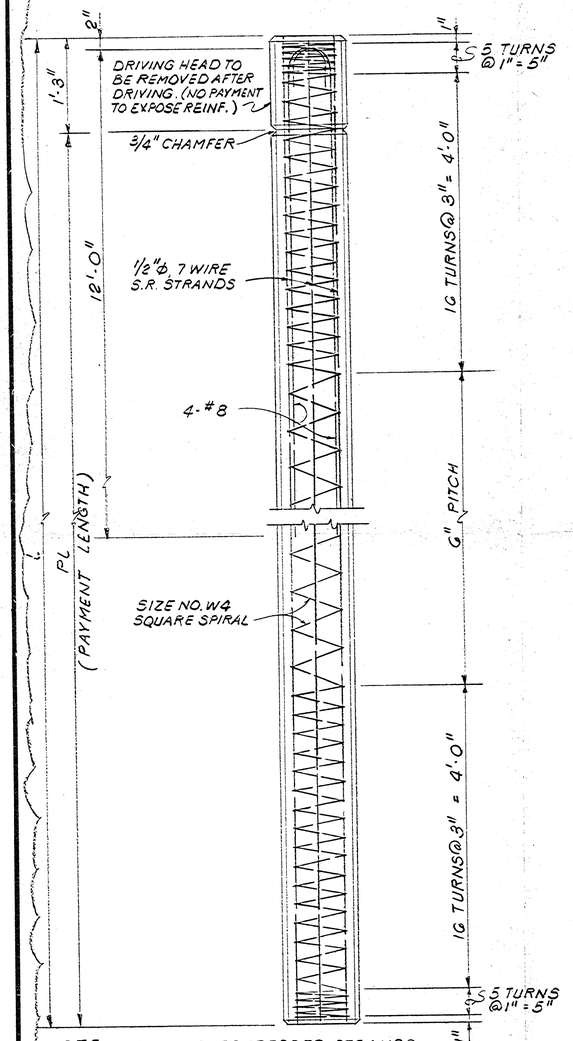
PONTCHARTRAIN BEACH
FLOOD PROTECTION IMPROVEMENT PROJECT
ORLEANS PARISH PHASE II LOUISIANA

PRESTRESSED CONCRETE PILES AND MISCELLANEOUS DETAILS

SHEET NO. 21
OF 24 SHEETS
FILE NO. 46021.00
565-04-73

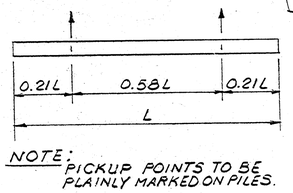


STANDARD 180° HOOK ON REINFORCING (4-#8) TO ALLOW FOR PROPER PLACEMENT OF CONCRETE, HOOKS SHOULD BE PLACED SO THAT BEND OF HOOK IS APPROXIMATELY PARALLEL TO ADJACENT FACE OF PILE AS SHOWN.



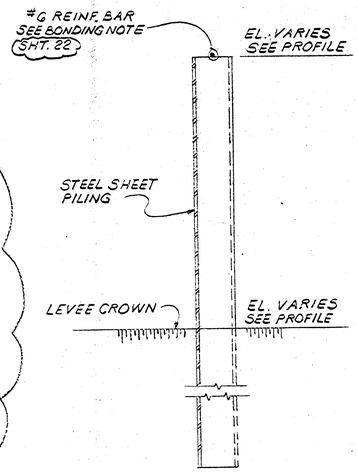
NOTE: GRIND PRESTRESSED STRANDS FLUSH WITH PILE HEAD AND PILE TIP.

PRESTRESSED PRECAST CONCRETE PILE 14"x14"
SCALE: 1" = 1'-0"

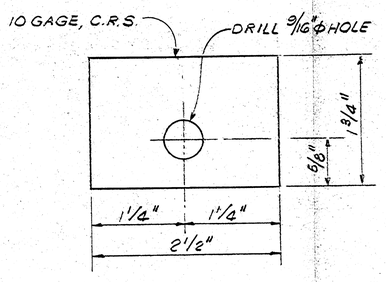


NOTE: PICKUP POINTS TO BE PLAINLY MARKED ON PILES.

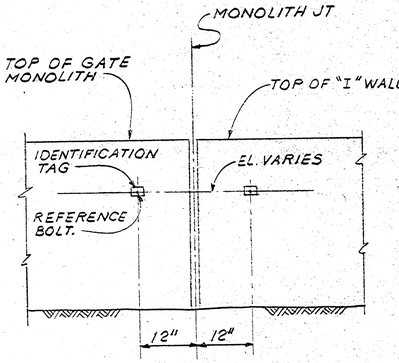
2 POINT PICKUP (58' < L ≤ 83')
14"x14" PILES



CORROSION PROTECTION DETAIL
STEEL SHEET PILING ⚠1
SCALE: NONE

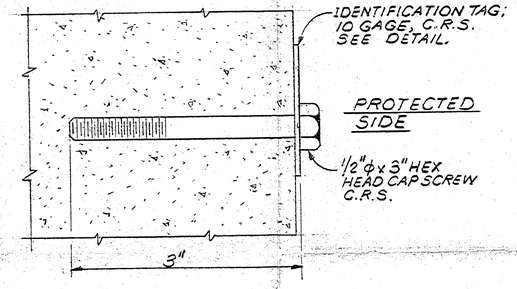


IDENTIFICATION TAG
SCALE: NONE



PROTECTED SIDE

TYPICAL ELEVATION OF SETTLEMENT REFERENCE MARKER
SCALE: 3/4" = 1'-0"



REFERENCE BOLT
SCALE: NONE

PILE SCHEDULE

GATE NO.	NUMBER OF PILES	PILE BATTER	TIP ELEVATION	PAYMENT LENGTH: FLOOD SIDE	PAYMENT LENGTH: PROTECTED SIDE	PILE NUMBER
1 & 3	4	1H. ON 2V.	- 50.34	69'		(7) (8) (11) (12) (33) (34) (37) (38)
	2	VERTICAL	- 59.75	71'		(9) (10) (35) (36)
	4	1H. ON 2V.	- 50.34		69'	(1) (2) (5) (6) (27) (28) (31) (32)
	2	VERTICAL	- 59.75		71'	(3) (4) (29) (30)
2	4	1H. ON 2V.	- 46.76	65'		(21) (22) (25) (26)
	2	VERTICAL	- 51.75	63'		(23) (24)
	6	1H. ON 2V.	- 46.76		65'	(13) (14) (15) (16) (19) (20)
	2	VERTICAL	- 51.75		63'	(16) (17)

TOTAL PILES REQ'D. = 38

NOTES:

1. THE CONTRACTOR SHALL TAKE FINAL ELEVATIONS OF ALL SETTLEMENT REFERENCE MARKERS AND SHALL SUBMIT THIS DATA TO THE CONTRACTING OFFICER REPRESENTATIVE.
2. THE CONTRACTOR SHALL PREDRILL PILE PILOT HOLES ONLY TO THE ELEVATIONS REQUIRED BY THE SPECIFICATIONS. ANY ADDITIONAL PREDRILLING BEYOND THAT REQUIRED BY THE SPECIFICATIONS SHALL ONLY BE PERFORMED UPON THE ENGINEER'S APPROVAL.

⚠2 REVISED BY ADDENDUM NO.4 JANUARY 28, 1987

⚠1 REVISED BY ADDENDUM NO.1 JANUARY 22, 1987

NO	DATE	REVISION	BY
⚠2	1/28/87	CHANGED CONC. PILES, PILE SCHEDULE AND 2 POINT PICKUP.	T.R.E.
⚠1	1/20/87	CHANGED CORROSION PROTECTION DETAIL	T.R.E.

DESIGNED BY: T.T.C.
DRAWN BY: T.R.E.
CHECKED BY: B.H.A.
REVIEWED BY: G.M.K.
DATE: DECEMBER 31, 1986

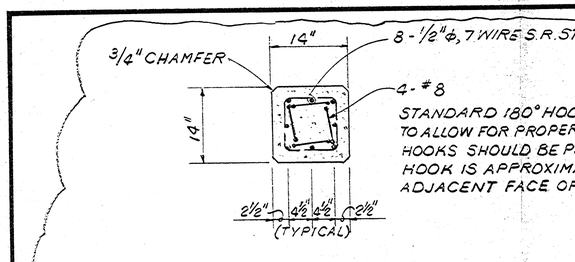
STATE OF LOUISIANA — ELLIOT H. ADAMS — REG. NO. 18792 — PROFESSIONAL ENGINEER

URS New Orleans 3500 N. Causeway Blvd. -- Metairie, Louisiana 70002

PONTCHARTRAIN BEACH
FLOOD PROTECTION IMPROVEMENT PROJECT
ORLEANS PARISH PHASE II LOUISIANA

PRESTRESSED CONCRETE PILES AND MISCELLANEOUS DETAILS

SHEET NO. 21
OF 24 SHEETS
FILE NO. 46021.00
565-04-73



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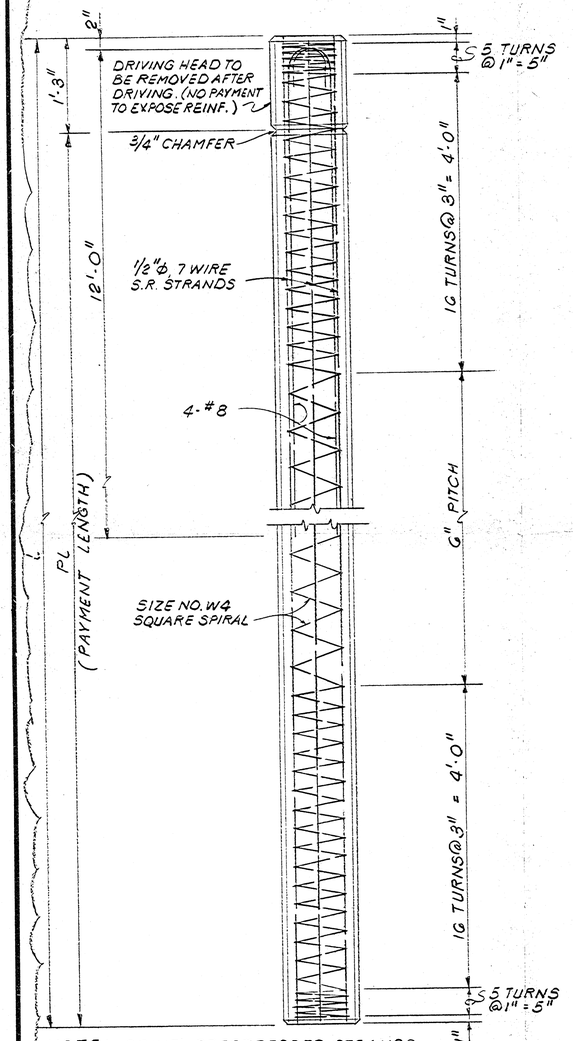

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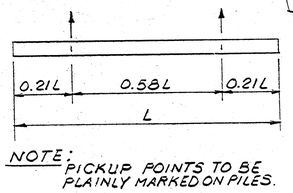
PRESTRESSED PRECAST CONCRETE PILE 14"x14"
SCALE: 1" = 1'-0"



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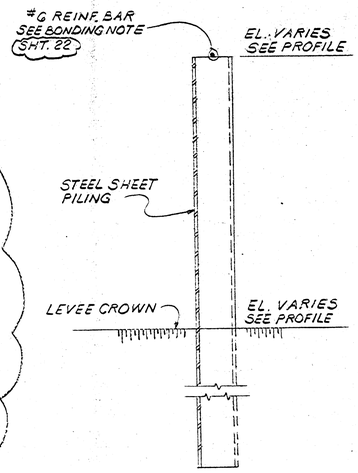
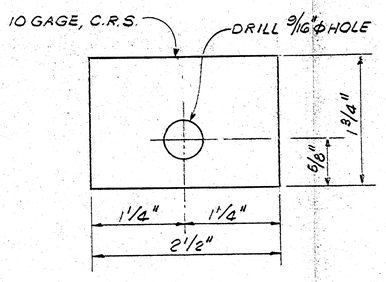
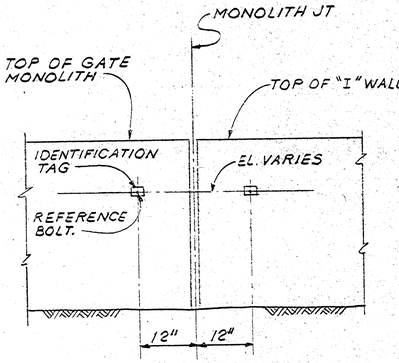


CORROSION PROTECTION DETAIL
STEEL SHEET PILING ⚠1
SCALE: NONE



IDENTIFICATION TAG
SCALE: NONE



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TYPICAL ELEVATION OF SETTLEMENT REFERENCE MARKER
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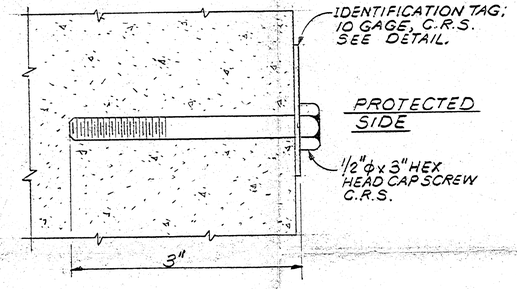

REFERENCE BOLT
SCALE: NONE

PILE SCHEDULE

GATE NO.	NUMBER OF PILES	PILE BATTER	TIP ELEVATION	PAYMENT LENGTH: FLOOD SIDE	PAYMENT LENGTH: PROTECTED SIDE	PILE NUMBER
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	2	VERTICAL	- 59.75	71'		(9) (10) (35) (36)
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	2	VERTICAL	- 59.75		71'	(3) (4) (29) (30)
2	4	1H. ON 2V.	- 46.76	65'		(21) (22) (25) (26)
	2	VERTICAL	- 51.75	63'		(23) (24)
	6	1H. ON 2V.	- 46.76		65'	(13) (14) (15) (16) (19) (20)
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⚠1	1/20/87	CHANGED CORROSION PROTECTION DETAIL	T.R.E.

DESIGNED BY: T.T.C.
DRAWN BY: T.R.E.
CHECKED BY: B.H.A.
REVIEWED BY: G.M.K.
DATE: DECEMBER 31, 1986

STATE OF LOUISIANA — ELLIOT H. ADAMS — REG. NO. 18792 — PROFESSIONAL ENGINEER

URS New Orleans 3500 N. Causeway Blvd. -- Metairie, Louisiana 70002

PONTCHARTRAIN BEACH
FLOOD PROTECTION IMPROVEMENT PROJECT
ORLEANS PARISH PHASE II LOUISIANA

PRESTRESSED CONCRETE PILES AND MISCELLANEOUS DETAILS

SHEET NO. 21
OF 24 SHEETS
FILE NO. 46021.00
565-04-73

ADDENDUM NO. 1
Pontchartrain Beach
Flood Protection Improvement Project
Phase II
Proposal No. 2040-0375
Lakefront Capital Improvement Program
The Board of Levee Commissioners
of the
Orleans Levee District
January 22, 1987

The plans and specifications for the construction of the Pontchartrain Beach Flood Protection Improvement Project - Phase II for which sealed bids are to be received by the Board of Levee Commissioners of the Orleans Levee District at Suite 202, Administration Building, New Orleans Lakefront Airport, New Orleans, LA until 2:00 p.m., local time, on Tuesday, January 27, 1987 are hereby modified as follows:

1. All Bidders are reminded of the Orleans Levee District's MBE and WBE combined goal, which is a goal of 12% to which Contractors are encouraged to attain. This 12% goal is not mandatory, however.

2. Refer to Item B-9. Subcontractors and Suppliers on page D-3 of the Instructions to Bidders of the specifications. Bidders are reminded of the requirement that a Contractor submit the list of proposed subcontractors and suppliers documenting the amount of their work and stating whether or not the firm is a MBE. Also, delete the requirement that such documentation be provided within 7 days after the bid opening and replace it with the requirement that such documentation be provided prior to or at the pre-construction conference.

3. Refer to the Advertisement for Bids (page A-1), the Bidder's Check List (page B-1), and Item B 10.03. Submission of Bids (page D-4) of the Instructions to Bidders, all of the specifications. Delete the requirement that two (2) copies of pages i through I-2 of the contract documents be submitted as the bid documents. In lieu of that, the entire bound set of specifications, properly executed by the Bidder, shall be submitted in a sealed envelope and identified all in accordance with paragraph 1.01 of the General Specifications (page 1-1) of these specifications. A sample envelope, sufficiently large for this submittal is enclosed with this Addendum No. 1. Each Bidder shall label such (or similar) envelope with the appropriate information as printed on the smaller envelopes originally provided with the bidding documents and as required by the specifications.

4. Refer to the Questionnaire (page C-1) of the specifications. In items 1 and 2 of the Questionnaire, delete the certification requirement. However, the Bidder shall provide the material type, source and location for each of Items 1 and 2.

5. Refer to Item B-11. Award of Contract of the Instructions to Bidders (page D-5) of the specifications. In the last paragraph on page D-5, delete the two sub-paragraphs concerning Borrow and Aggregate material

sources and replace them with, "Information Requested in the Questionnaire". The following sub-paragraphs on page D-6 shall remain in effect, except that the last sub-paragraph on page D-6 shall be revised to read, "Experience and performance record of the contractor, sub-contractors, and/or manufacturers, fabricators and suppliers".

6. Refer to page K-6 of the Supplementary Conditions. Between Item SC-9 and SC-11, insert the item number "SC-10" in front of the paragraph entitled "Specifications".

7. Refer to Item 1A-15. Preconstruction Conference on page L-4 of the specifications. In the first new paragraph on page L-5 concerning tentative schedules, add the following:

CPM Network Schedule
Schedule of Values

In the second new paragraph on page L-5, delete the last sentence noting submittal of the CPM schedule with the signed contract.

In the third new paragraph on page L-5 concerning agenda, add the following items:

Subcontractors and suppliers
Utility Coordination

8. Refer to 1B-3. CPM Submittal. Delete the requirement that the CPM Network Schedule and related information be submitted at the time the contract is signed and executed by the Contractor. Such information shall be provided prior to or at the pre-construction conference.

9. Refer to Item B-12. Execution of the Agreement of the Instructions to Bidders (page D-6), the fourth paragraph of the Form of Proposal (page E-1), and paragraph 1.04 Notarial Contract (page 1-1), all of the specifications. Change all references therein to the Contractor's execution of the contract within 48 hours to 72 hours.

10. Replace sheet 21 of the project drawings with the enclosed sheet 21 as revised by this Addendum No. 1.

11. Refer to Item B-4.03 Interpretations (page D-2) of the Instructions to Bidders of the specifications. In the last sentence therein, change the last sentence to read as follows: "Questions received less than seven (7) calendar days (including weekends and holidays) to the time for opening Bids will not be answered".

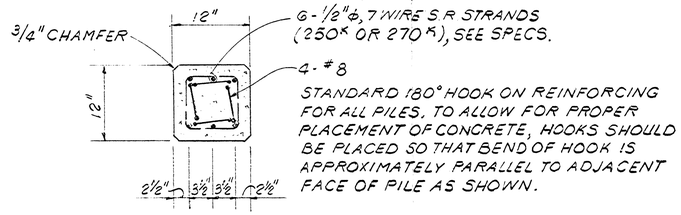
On Tuesday, January 20, 1987, at 10:00 a.m., the project pre-bid conference was held at the offices of the Orleans Levee District. The following were in attendance:

C. E. Bailey	OLB
Frank Vicidomina	OLB
Bruce Adams	URS
Charlene Thompson	URS
Dennis Snyder	DEI
Berkley Traughber	EBT and Associates
Roy Madere	Donald M. Clement Contr.
Charles Smith	Donald M. Clement Contr.
Paul Manifold	Professional Construction
Ernest Koehler	Professional Construction
Tommy Becnel	Dixie Machine
J. M. Lewis	Audubon Construction
K. J. Richards	Atlas Construction Co.
Cleveland Chautin	Atlas Construction Co.
Clifton Valentine	Maharrey-Houston
Fred Fuchs	Boh Bros.

END OF ADDENDUM NO. 1

Enclosures - Sheet 21 - Revised
~~Envelope for Bid Submittal~~

Distribution: Meeting Attendees and/or Plan Holders



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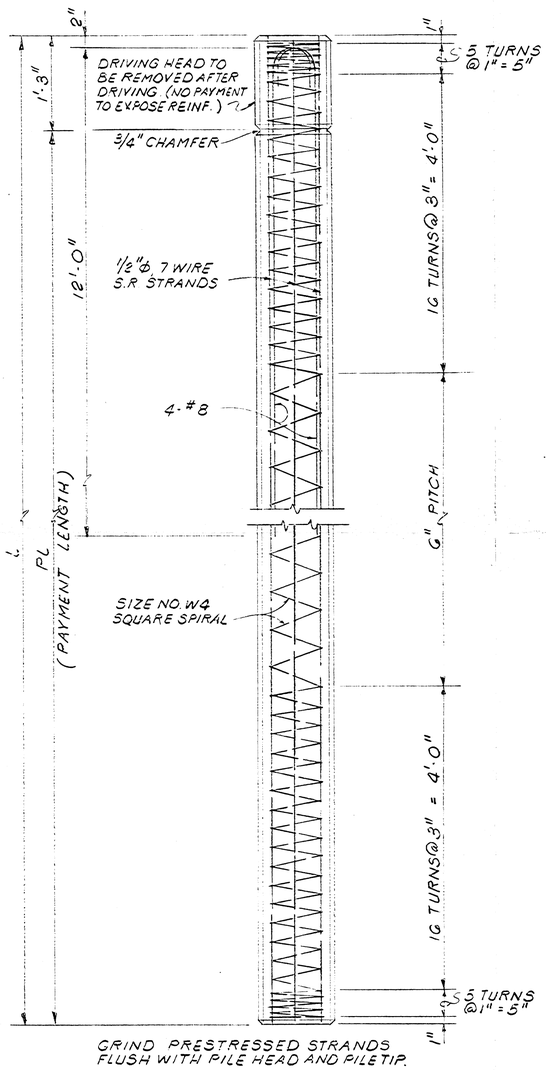
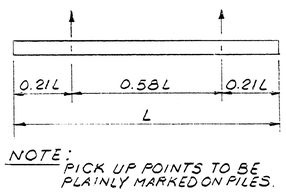


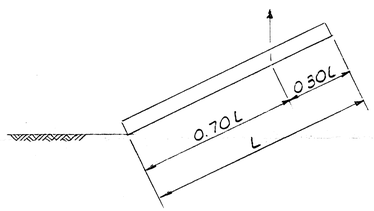
GRIND PRESTRESSED STRANDS FLUSH WITH PILE HEAD AND PILE TIP.

PRESTRESSED PRECAST CONCRETE PILE
SCALE: 1" = 1'-0"

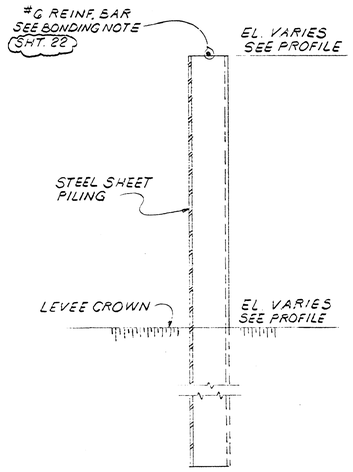


NOTE: PICK UP POINTS TO BE PLAINLY MARKED ON PILES.

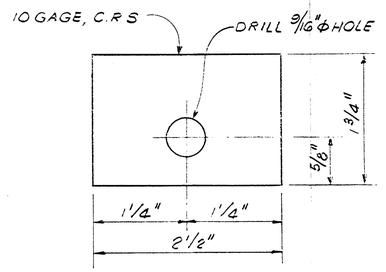
2 POINT PICKUP 50' < L < 74'
12" x 12" PILES



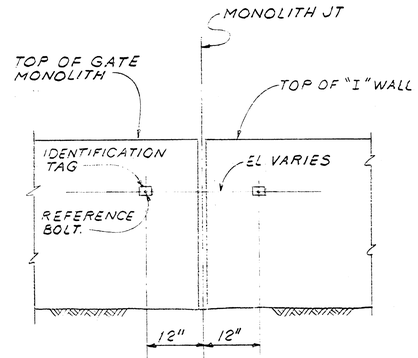
1 POINT PICKUP L ≤ 50'
12" x 12" PILES



CORROSION PROTECTION DETAIL
STEEL SHEET PILING
SCALE: NONE

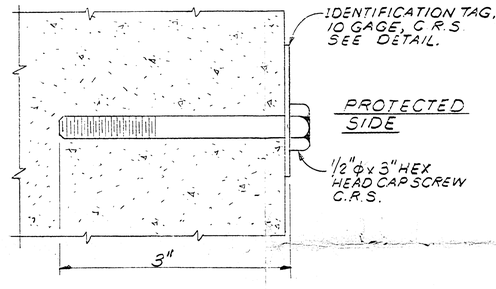


IDENTIFICATION TAG
SCALE: NONE



PROTECTED SIDE

TYPICAL ELEVATION OF SETTLEMENT REFERENCE MARKER
SCALE: 3/4" = 1'-0"



REFERENCE BOLT
SCALE: NONE

PILE SCHEDULE

GATE NO.	NUMBER OF PILES	PILE BATTER	TIP ELEVATION	PAYMENT LENGTH		PILE NUMBER
				FLOOD SIDE	PROTECTED SIDE	
1 & 3	4	1H. ON 2V.	-60.00	72'		(7) (8) (11) (12) (33) (34) (37) (38)
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REVISED BY ADDENDUM NO. 1 JANUARY 22, 1987

NO	DATE	REVISION	BY
1	1/20/87	CHANGED CORROSION PROTECTION DETAIL	T.R.E.

DESIGNED BY: T.Y.C.
DRAWN BY: T.R.E.
CHECKED BY: B.H.A.
REVIEWED BY: G.M.K.
DATE: DECEMBER 31, 1986

URS New Orleans

PONTCHARTRAIN BEACH
FLOOD PROTECTION IMPROVEMENT PROJECT
ORLEANS PARISH PHASE II LOUISIANA

PRESTRESSED CONCRETE PILES AND MISCELLANEOUS DETAILS

SHEET NO. 21 OF 24 SHEETS
FILE NO. 46021.00
565-04-73

ADDENDUM NO. 1
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Flood Protection Improvement Project
Phase II
Proposal No. 2040-0375
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The Board of Levee Commissioners
of the
Orleans Levee District
January 22, 1987

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K. J. Richards	Atlas Construction Co.
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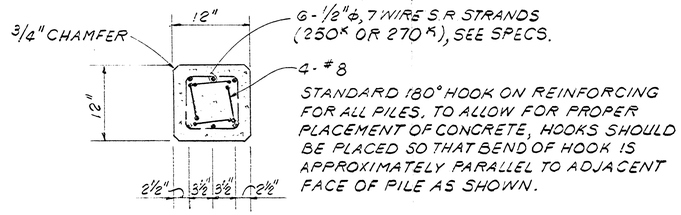
Fred Fuchs	Boh Bros.

END OF ADDENDUM NO. 1

Enclosures - Sheet 21 - Revised
~~Envelope for Bid Submittal~~

Distribution: Meeting Attendees and/or Plan Holders



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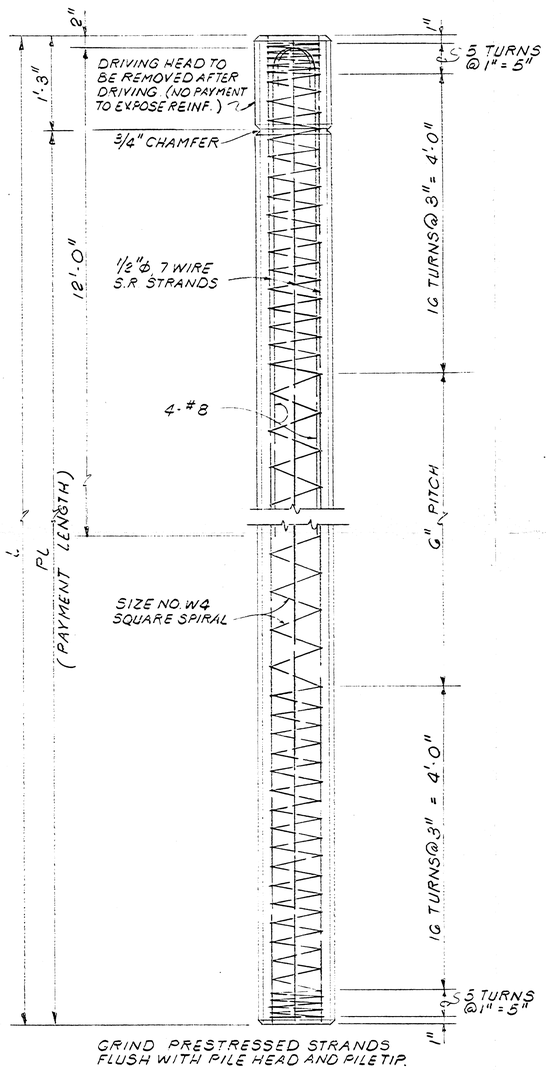
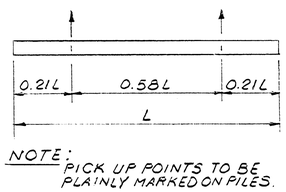


GRIND PRESTRESSED STRANDS FLUSH WITH PILE HEAD AND PILE TIP.

PRESTRESSED PRECAST CONCRETE PILE
SCALE: 1" = 1'-0"



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2 POINT PICKUP 50' < L < 74'
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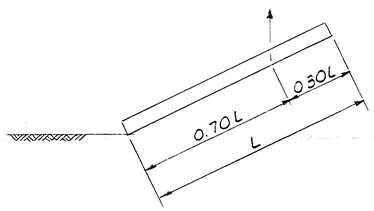

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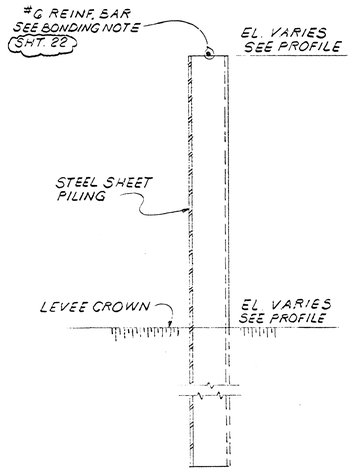
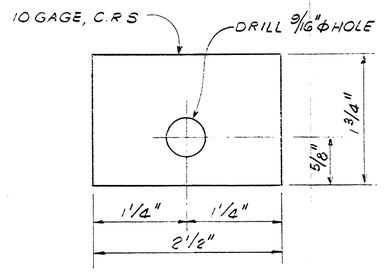
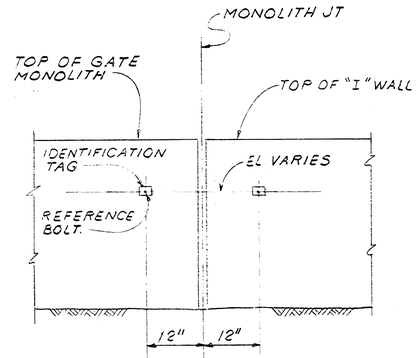


CORROSION PROTECTION DETAIL
STEEL SHEET PILING
SCALE: NONE

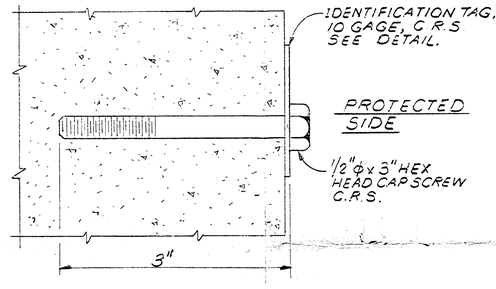


IDENTIFICATION TAG
SCALE: NONE



PROTECTED SIDE

TYPICAL ELEVATION OF SETTLEMENT REFERENCE MARKER
SCALE: 3/4" = 1'-0"



REFERENCE BOLT
SCALE: NONE

PILE SCHEDULE

GATE NO.	NUMBER OF PILES	PILE BATTER	TIP ELEVATION	PAYMENT LENGTH		PILE NUMBER
				FLOOD SIDE	PROTECTED SIDE	
1 & 3	4	1H. ON 2V.	-60.00	72'		(7) (8) (11) (12) (33) (34) (37) (38)
	2	VERTICAL	-64.75	69'		(9) (10) (35) (36)
	4	1H. ON 2V.	-60.00		72'	(1) (2) (5) (6) (27) (28) (31) (32)
	2	VERTICAL	-64.75		69'	(3) (4) (29) (30)
2	4	1H. ON 2V.	-54.00	65'		(21) (22) (25) (26)
	2	VERTICAL	-50.75	61'		(23) (24)
	6	1H. ON 2V.	-54.00		65'	(13) (14) (15) (18) (19) (20)
	2	VERTICAL	-50.75		61'	(16) (17)

TOTAL PILES REQ'D. = 38

NOTES:

1. THE CONTRACTOR SHALL TAKE FINAL ELEVATIONS OF ALL SETTLEMENT REFERENCE MARKERS AND SHALL SUBMIT THIS DATA TO THE CONTRACTING OFFICER REPRESENTATIVE.
2. THE CONTRACTOR SHALL PREDRILL PILE PILOT HOLES ONLY TO THE ELEVATIONS REQUIRED BY THE SPECIFICATIONS. ANY ADDITIONAL PREDRILLING BEYOND THAT REQUIRED BY THE SPECIFICATIONS SHALL ONLY BE PERFORMED UPON THE ENGINEER'S APPROVAL.

REVISED BY ADDENDUM NO. 1 JANUARY 22, 1987

NO	DATE	REVISION	BY
1	1/20/87	CHANGED CORROSION PROTECTION DETAIL	T.R.E.

DESIGNED BY: T.Y.C.
DRAWN BY: T.R.E.
CHECKED BY: B.H.A.
REVIEWED BY: G.M.K.
DATE: DECEMBER 31, 1986

URS New Orleans

PONTCHARTRAIN BEACH
FLOOD PROTECTION IMPROVEMENT PROJECT
ORLEANS PARISH PHASE II LOUISIANA

PRESTRESSED CONCRETE PILES AND MISCELLANEOUS DETAILS

SHEET NO. 21 OF 24 SHEETS
FILE NO. 46021.00
565-04-73

ADDENDUM NO. 3
Pontchartrain Beach
Flood Protection Improvement Project
Phase II
Proposal No. 2040-0375
Lakefront Capital Improvement Program
The Board of Levee Commissioners
of the
Orleans Levee District
January 23, 1987

The plans and specifications for the construction of the Pontchartrain Beach Flood Protection Improvement Project - Phase II for which sealed bids are to be received by the Board of Levee Commissioners of the Orleans Levee District at Suite 202, Administration Building, New Orleans Lakefront Airport, New Orleans, LA until 2:00 p.m., local time, on Tuesday, January 27, 1987, are hereby modified as follows:

1. Disregard and delete Addendum No. 2 dated January 22, 1987.

2. Refer to Sheet 21 of the Project Drawings. Delete the Pile Schedule shown thereon and replace it with the Pile Schedule shown in Attachment A.

3. Refer to Section 5, Prestressed Concrete Piles, Part 5-4, Measurement and Payment (page 5-7) of the Specifications. In part 5-4-A, Method of Measurement, in the last sentence in the first paragraph, change "... will be measured to the nearest tenth of a foot" to "... will be measured to the nearest foot."

4. Refer to Section 5, Prestressed Concrete Piles, Part 5-4, Measurement and Payment (page 5-7) of the Specifications. In part 5-4-B (page 5-8), Basis of Payment, after:

   "Payment will be made under:

   Pay Item No. 6: Piling, Concrete, Precast, Prestressed, 12 inch square - per Linear Foot.",

   Add the following:

   "a. Vertical Piling
   b. Batter Piling"

5. Delete page E-4 of the Bid Schedule within the Form of Proposal of the Specifications, and replace with the enclosed revised page E-4.

6. Refer to Advertisement for Bids (page A-1) of the Specifications. Change only the date for receipt of sealed bids from January 27, 1987, to February 3, 1987.

END OF ADDENDUM NO. 3

Enclosures: Attachment A
Sheet E-4 (Revised)

Distribution: All Plan Holders

ADDENDUM NO. 3
Pontchartrain Beach
Flood Protection Improvement Project
Phase II
Proposal No. 2040-0375

Attachment A

PILE SCHEDULE						
GATE NO.	NUMBER OF PILES	PILE BATTER	TIP ELEVATION	PAYMENT LENGTH		PILE NUMBER
				FLOOD SIDE	PROTECTED SIDE	
1 AND 3	4	1H ON 2V	-60.00	80'		(7)(8)(11)(12)(33)(34)(37)(38)
	2	VERTICAL	-64.75	76'		(9)(10)(35)(36)
	4	1H ON 2V	-60.00		80'	(1)(2)(5)(6)(27)(28)(31)(32)
	2	VERTICAL	-64.75		76'	(3)(4)(29)(30)
2	4	1H ON 2V	-54.00	73'		(21)(22)(25)(26)
	2	VERTICAL	-50.75	62'		(23)(24)
	6	1H ON 2V	-54.00		73'	(13)(14)(15)(18)(19)(20)
	2	VERTICAL	-50.75		62'	(16)(17)

TOTAL PILES REQ'D. = 38

BID SCHEDULE

No	Item	Unit	Unit Price	Approx. Quantity	Amount
1.	Mobilization	L.S.	$ _____	Lump Sum	$ _____
2.	Clearing & Grubbing	L.S.	_____	Lump Sum	_____
3.	Removal of Structures and Obstructions	L.S.	_____	Lump Sum	_____
4.	Removal of Pavement (Non Roadway)	S.Y.	_____	888	_____
5.	Compacted Clay Backfill	C.Y.	_____	200	_____
6.	Piling, Concrete, Precast, Prestressed, 12 inch Sq. a) Vertical Piling	L.F.	_____	856	_____
	b) Batter Piling	L.F.	_____	2,010	_____
7.	Concrete	C.Y.	_____	1,688	_____
8.	Structural Steel Gates, Miscellaneous Metals and Specialty Items	L.S.	_____	Lump Sum	_____
9.	Excavation	C.Y.	_____	100	_____
10.	Embankment - Compacted	C.Y.	_____	2,045	_____
11.	Asphaltic Concrete Wearing Course (Type 1)	Ton	_____	142	_____
12.	Asphaltic Concrete Base Course (Type 1)	Ton	_____	236	_____
13.	Sand-Shell Base (6")	S.Y.	_____	1,711	_____
14.	Geotextile Fabric	S.Y.	_____	295	_____
15.	Fertilizing, Seeding and Mulching	Acre	_____	2	_____
16.	Tree Relocation	L.S.	_____	Lump Sum	_____
17.	12" diameter Restrained Joint Ductile Iron Pipe, Class 52	L.F.	_____	140	_____
18.	Fittings (Cast Iron)	Lbs.	_____	1,215	_____

Revised by Addendum No. 3
January 23, 1987

URS

URS ENGINEERS
3500 NORTH CAUSEWAY BOULEVARD
METAIRIE, LOUISIANA 70002
TEL (504) 837-8326

January 22, 1987

Mr. C. E. Bailey, Chief Engineer
Board of Levee Commissioners
Orleans Levee District
Suite 202, Administration Building
New Orleans Lakefront Airport
New Orleans, LA 70126

Subject: Pontchartrain Beach Flood Protection Project - Phase II
OLB Construction Project No. 2040-0375
DEI Project No. 1008
URS Project No. 46021.00

Please find enclosed for your files Addendum No. 2, which is self-explanatory.

Sincerely,

URS COMPANY

Bruce H. Adams

Bruce H. Adams, P.E.

Enclosure

cc: DEI (w/enclosure)
COE (w/enclosures)

ADDENDUM NO. 2
Pontchartrain Beach
Flood Protection Improvement Project
Phase II
Proposal No. 2040-0375
Lakefront Capital Improvement Program
The Board of Levee Commissioners
of the
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January 22, 1987

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1. Refer to Sheet 21 of the Project Drawings. In the Pile Schedule, for Gate nos. 1 and 3, in the second line under Payment Length - Flood Side, change the 69' to 76'. Also, in the Pile Schedule, for Gate nos. 1 and 3, in the fourth line under Payment Length - Protected Side, change the 69' to 76'.

2. Refer to page E-4 of the Bid Schedule within the Form of Proposal of the Specifications. Change the Approximate Quantity of Item No. 6 - Piling, Concrete, Precast, Prestressed, 12 inch sq. from 2598 L.F. to 2654 L.F.

END OF ADDENDUM NO. 2

Distribution: All Plan Holders

ADDENDUM NO. 2
Pontchartrain Beach
Flood Protection Improvement Project
Phase II
Proposal No. 2040-0375
Lakefront Capital Improvement Program
The Board of Levee Commissioners
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METAIRIE, LOUISIANA 70002
TEL: (504) 834-6326

January 21, 1987

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Board of Levee Commissioners
Orleans Levee District
Suite 202, Administration Building
New Orleans Lakefront Airport
New Orleans, LA 70126

Dear Mr. Bailey:

Subject: Pontchartrain Beach Flood Protection Project - Phase II
OLB Construction Project No. 2040-0375
DEI Project No. 1008
URS Project No. 46021.00

Please find enclosed two copies of Addendum No. 1 for the above project. By copy of this letter we are also forwarding copies to DEI and the Corps.

Sincerely,

URS COMPANY

Bruce H. Adams

Bruce H. Adams, P.E.

BHA/mn

Enclosure

cc: DEI (1 set enclosure)
COE (3 sets enclosure) ✓

ADDENDUM NO. 1
Pontchartrain Beach
Flood Protection Improvement Project
Phase II
Proposal No. 2040-0375
Lakefront Capital Improvement Program
The Board of Levee Commissioners
of the
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1. All Bidders are reminded of the Orleans Levee District's MBE and WBE combined goal, which is a goal of 12% to which Contractors are encouraged to attain. This 12% goal is not mandatory, however.

2. Refer to Item B-9. Subcontractors and Suppliers on page D-3 of the Instructions to Bidders of the specifications. Bidders are reminded of the requirement that a Contractor submit the list of proposed subcontractors and suppliers documenting the amount of their work and stating whether or not the firm is a MBE. Also, delete the requirement that such documentation be provided within 7 days after the bid opening and replace it with the requirement that such documentation be provided prior to or at the pre-construction conference.

3. Refer to the Advertisement for Bids (page A-1), the Bidder's Check List (page B-1), and Item B 10.03. Submission of Bids (page D-4) of the Instructions to Bidders, all of the specifications. Delete the requirement that two (2) copies of pages i through I-2 of the contract documents be submitted as the bid documents. In lieu of that, the entire bound set of specifications, properly executed by the Bidder, shall be submitted in a sealed envelope and identified all in accordance with paragraph 1.01 of the General Specifications (page 1-1) of these specifications. A sample envelope, sufficiently large for this submittal is enclosed with this Addendum No. 1. Each Bidder shall label such (or similar) envelope with the appropriate information as printed on the smaller envelopes originally provided with the bidding documents and as required by the specifications.

4. Refer to the Questionnaire (page C-1) of the specifications. In items 1 and 2 of the Questionnaire, delete the certification requirement. However, the Bidder shall provide the material type, source and location for each of Items 1 and 2.

5. Refer to Item B-11. Award of Contract of the Instructions to Bidders (page D-5) of the specifications. In the last paragraph on page D-5, delete the two sub-paragraphs concerning Borrow and Aggregate material

sources and replace them with, "Information Requested in the Questionnaire". The following sub-paragraphs on page D-6 shall remain in effect, except that the last sub-paragraph on page D-6 shall be revised to read, "Experience and performance record of the contractor, sub-contractors, and/or manufacturers, fabricators and suppliers".

6. Refer to page K-6 of the Supplementary Conditions. Between Item SC-9 and SC-11, insert the item number "SC-10" in front of the paragraph entitled "Specifications".

7. Refer to Item 1A-15. Preconstruction Conference on page L-4 of the specifications. In the first new paragraph on page L-5 concerning tentative schedules, add the following:

CPM Network Schedule
Schedule of Values

In the second new paragraph on page L-5, delete the last sentence noting submittal of the CPM schedule with the signed contract.

In the third new paragraph on page L-5 concerning agenda, add the following items:

Subcontractors and suppliers
Utility Coordination

8. Refer to 1B-3. CPM Submittal. Delete the requirement that the CPM Network Schedule and related information be submitted at the time the contract is signed and executed by the Contractor. Such information shall be provided prior to or at the pre-construction conference.

9. Refer to Item B-12. Execution of the Agreement of the Instructions to Bidders (page D-6), the fourth paragraph of the Form of Proposal (page E-1), and paragraph 1.04 Notarial Contract (page 1-1), all of the specifications. Change all references therein to the Contractor's execution of the contract within 48 hours to 72 hours.

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~~Envelope for Bid Submittal~~

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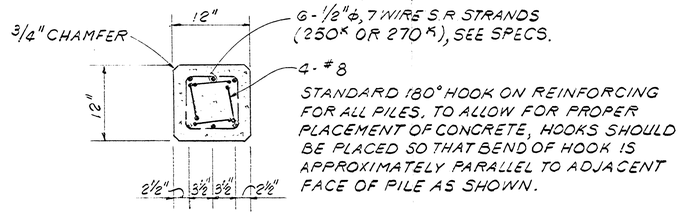

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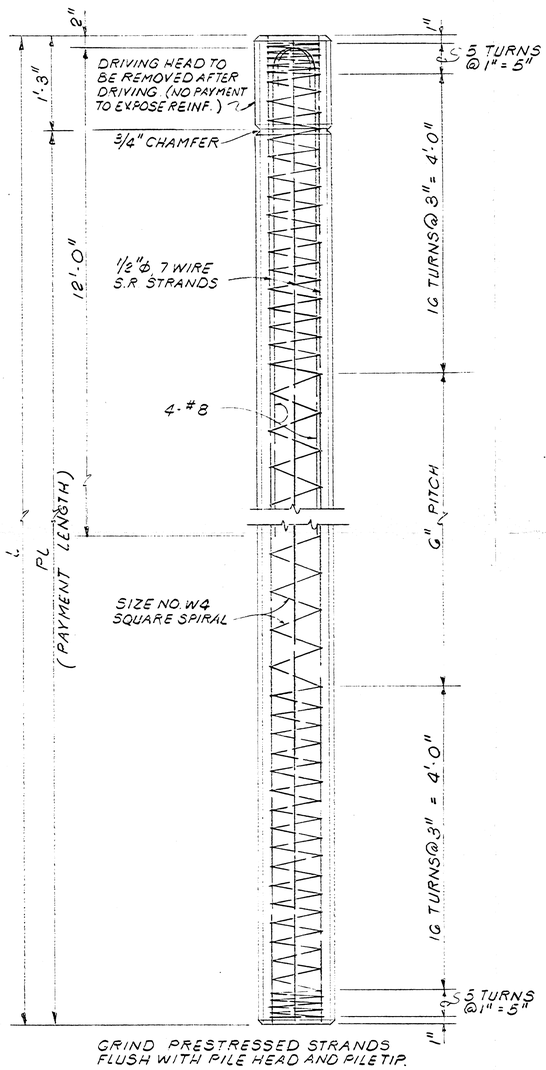

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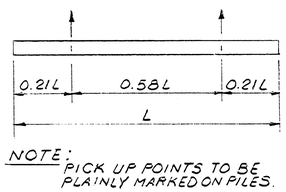
SCALE: 1" = 1'-0"



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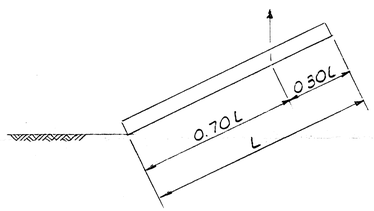

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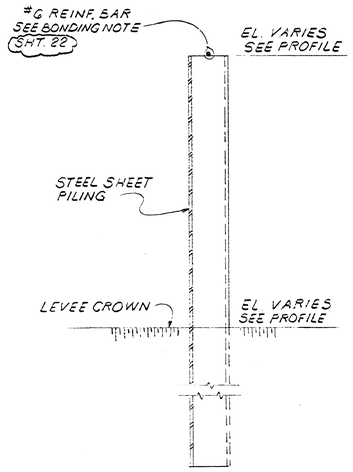

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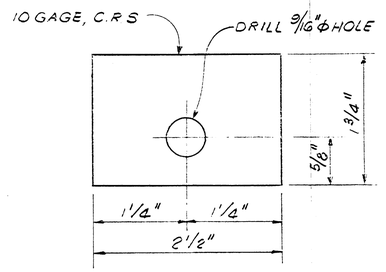

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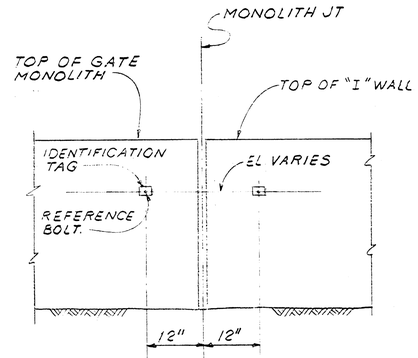

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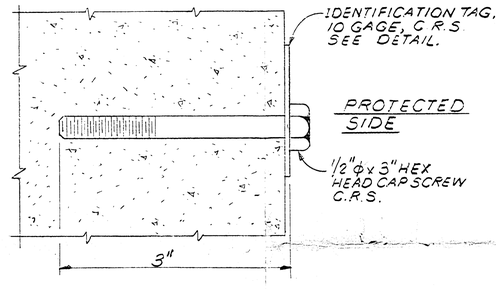

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GATE NO.	NUMBER OF PILES	PILE BATTER	TIP ELEVATION	PAYMENT LENGTH		PILE NUMBER
				FLOOD SIDE	PROTECTED SIDE	
1 & 3	4	1H. ON 2V.	-60.00	72'		(7) (8) (11) (12) (33) (34) (37) (38)
	2	VERTICAL	-64.75	69'		(9) (10) (35) (36)
	4	1H. ON 2V.	-60.00		72'	(1) (2) (5) (6) (27) (28) (31) (32)
	2	VERTICAL	-64.75		69'	(3) (4) (29) (30)
2	4	1H. ON 2V.	-54.00	65'		(21) (22) (25) (26)
	2	VERTICAL	-50.75	61'		(23) (24)
	6	1H. ON 2V.	-54.00		65'	(13) (14) (15) (18) (19) (20)
	2	VERTICAL	-50.75		61'	(16) (17)

TOTAL PILES REQ'D. = 38

NOTES:

1. THE CONTRACTOR SHALL TAKE FINAL ELEVATIONS OF ALL SETTLEMENT REFERENCE MARKERS AND SHALL SUBMIT THIS DATA TO THE CONTRACTING OFFICER REPRESENTATIVE.
2. THE CONTRACTOR SHALL PREDRILL PILE PILOT HOLES ONLY TO THE ELEVATIONS REQUIRED BY THE SPECIFICATIONS. ANY ADDITIONAL PREDRILLING BEYOND THAT REQUIRED BY THE SPECIFICATIONS SHALL ONLY BE PERFORMED UPON THE ENGINEER'S APPROVAL.

REVISED BY ADDENDUM NO. 1 JANUARY 22, 1987

NO	DATE	REVISION	BY
1	1/20/87	CHANGED CORROSION PROTECTION DETAIL	T.R.E.

DESIGNED BY: T.Y.C.
DRAWN BY: T.R.E.
CHECKED BY: B.H.A.
REVIEWED BY: G.M.K.
DATE: DECEMBER 31, 1986

URS New Orleans

PONTCHARTRAIN BEACH
FLOOD PROTECTION IMPROVEMENT PROJECT
ORLEANS PARISH PHASE II LOUISIANA

PRESTRESSED CONCRETE PILES AND MISCELLANEOUS DETAILS

SHEET NO. 21 OF 24 SHEETS
FILE NO. 46021.00
565-04-73