MANATEE COUNTY

June 29, 2010

All Interested Bidders:

SUBJECT: Invitation for Bid #10-2318-OV
Lake Manatee Dam Tainter Gates, Bradenton, FL
(Project Number: 6026073)

ADDENDUM #2

Bidders are hereby notified that this Addendum shall be acknowledged on page 00300-1 of the Bid Form and made a part of the above named bidding and contract documents. Bids submitted without acknowledgement of the Addendum will be considered incomplete.

The following items are issued to add to, modify, and clarify the bid and contract documents. These items shall have the same force and effect as the original bidding and contract documents, and cost involved shall be included in the bid prices. Bids to be submitted on the specified bid date, shall conform to the additions and revisions listed herein.

Additional questions shall not be accepted at this time as the stated deadline of June 25, 2010 has lapsed. This deadline has been established to maintain fair treatment of all potential bidders, while maintaining the expedited nature of the Economic Stimulus that the contracting of this work may achieve.

Attached:

- URS Memorandum dated June 28, 2010 responding to the "Clarification Requests" received via email from various contractors along with modifications to the Construction Plans. (2 Total Pages)
- Geotechnical Report dated March 19, 2008. (42 Total Pages)

Financial Management Department – Purchasing Division
1112 Manatee Avenue West, Suite 803, Bradenton, FL 34205
Phone: 941-708-7527 – Fax: 941-708-7544

If you have submitted a bid prior to receiving this addendum, you may request in writing that your original, sealed bid be returned to your firm. All sealed bids received will be opened on the date stated.

END OF ADDENDUM #2

Bids will be received at the **Manatee County Purchasing Division, 1112 Manatee Avenue West, Suite 803, Bradenton, FL 34205 until 2:00 P.M. on July 9, 2010**

Sincerely,

R. C. "Rob" Cuthbert, CPM, CPPO
Purchasing Division Manager

Ov
Attachment (44 Total Pages)

URS # Memorandum

Date: June 28, 2010

To: Olga Valcich, Manatee County Purchasing Department

Cc: Jeff Streitmatter, Manatee County Project Management

From: David A. Wilcox, P.E.

Subject: **Text for Addendum No. 2**
IFB 10-2318-OV Lake Manatee Dam Tainter Gates (6026073)

General Clarifications

1) The Contractor may utilize the existing boat ramp located at the site. It is the Contractor's responsibility to determine the adequacy of the ramp for their equipment. The Contractor is also responsible for repairing any damage inflicted to the ramp. If the Contractor elects to utilize other ramps, located off the water plant site, it is his responsibility to coordinate this usage with the appropriate jurisdictional authority.

2) Attached is a copy of the geotechnical report, prepared by Driggers Engineering Services Incorporated in 2008, associated with the boring logs shown on the construction plans.

Modifications to the Drawings

Sheet C-2, Spillway Plan
Upper left quadrant of the sheet.
Delete Note: "Fill grass area with new conc. slab and sheet pile cap."

Sheet C-10, Emergency Spillway Modifications – Plan & Sections
Boxed note in upper center of page.
Delete: "Remove earthen plugs (4) to the slab (Elev 38 NGVD). Refer to C-13 for plug details. Bid Item No. 17."
Replace with: "Remove earthen plugs (4) to the slab (Elev 38 NGVD). Refer to C-11 for plug details. Bid Item No. 17."

Add Note: "Per Detail F on Sheet C-11, the original design included 2"x12" wood cribbing. However, as shown on this sheet, the new wood cribbing for this project shall be 4"x12". The Contractor shall trim the edges of the new wood cribbing as required so that it fits into the existing frame."

Sheet C-11, Emergency Spillway Modifications – Sections & Details
Restoration of Plugs, Note 2.
Add the following: "Impervious fabric shall be 30 mil HDPE liner or equivalent."

Add Note: "Per Detail F on this Sheet, the original design included 2"x12" wood cribbing. However, as shown on Sheet C-10 of these plans, the new wood cribbing for this project shall be 4"x12". The Contractor shall trim the edges of the new wood cribbing as required so that it fits into the existing frame."

URS Corporation
7650 West Courtney
Campbell Causeway
Tampa, FL 33607-1462
Tel: 813.286.1711
Fax:813.286.6587
www.urscorp.com

URS

Sheet S-6, Cofferdam Details

Delete Note 5.

Replace with: "The Contractor has the option of providing an alternative cofferdam design. This design must be prepared and signed and sealed by a licensed Florida Structural Engineer. The design must be submitted to the Engineer for review and approval after the bid award. URS will not review designs during the bidding phase. If the Contractor utilizes an alternative design in preparing his bid instead of the provided design, he accepts the risk that the alternative design may not be approved."

DRIGGERS ENGINEERING SERVICES INCORPORATED
Geotechnical Engineering & Construction Materials Testing

March 19, 2008

McKim & Creed
1365 Hamlet Avenue
Clearwater, Florida 33756

Attention: Mr. Daniel E. Glaser, P.E.

RE: Report of the Geotechnical Investigation
Manatee Dam Embankment
Manatee County, Florida
Our File: DES 086132

Dear Dan:

Pursuant to your request and authorization, **DRIGGERS ENGINEERING SERVICES, INC. (DESI)** has completed the requested geotechnical investigation for the subject project. This report presents the results of our studies.

PROJECT INFORMATION

The purposes of our studies were to examine the soils present at selected locations within and below the existing dam embankment as an aid in the evaluation of the potential for corrosion of the steel sheet piling and the potential for the formation of voids beneath the upstream concrete facing and the roadway. We understand that as part of the inspection process, divers will expose and observe a portion of the sheet piling along the upstream side of the dam.

FIELD INVESTIGATION

Ground Penetrating Radar Survey - A Ground Penetrating Radar (GPR) survey was requested along the upstream concrete face of the dam to check for the possible presence of voids beneath the concrete. Accordingly, a GPR survey was conducted by GeoView, Inc., as a sub-consultant to DESI. The GPR survey consisted of roughly parallel transects spaced 5 to 8 feet apart along the dam face. Suspected

potential void areas identified by anomalous radar reflections were marked on the surface and identified by GPS coordinates for potential further investigation. A copy of GeoView's report is included in the attachments to this report.

Soil Borings - Two (2) Standard Penetration Test (SPT) borings were requested and conducted along the crest of the dam, north of the spillway. Boring B-1 was performed off the edge of the existing pavement. Boring B-2 was conducted after first coring through the existing pavement. The approximate boring locations are illustrated on the appended Plate 1.

Each test boring was advanced to a nominal depth of 75 feet below present grade and encountered the limestone formation. Accordingly, the boreholes were properly sealed in accordance with Southwest Florida Water Management District regulations. The core hole in the pavement was patched.

The Standard Penetration test method of sampling was utilized in our investigation to obtain samples of the soils for visual and estimated Soil Classification and laboratory testing. The Standard Penetration test borings were conducted in general accordance with ASTM D-1586, with tabulated and graphically plotted Standard Penetration resistance values depicted on each test boring log. In addition, three (3) relatively undisturbed thin wall Shelby tube samples were collected on representative soil samples and returned to the laboratory for examination by the project engineer and consolidation testing.

Logs of the test borings are presented in the attachments indicating visual and estimated Unified Soil Classification. It must be understood that the graphical plotting of the Standard Penetration resistance values is for ease of visual examination. The lines connecting the data points should not be interpreted as a linear variation in soil properties.

LABORATORY TESTING

Laboratory Testing - Laboratory classification testing was conducted on representative samples recovered from the borings. These tests included ten (10) grainsize analyses or fines content tests; seven (7) Atterberg liquid limit and plastic limit determinations; and an organic content test. Four (4) samples were also tested for their corrosivity potential characteristics (pH, chlorides, sulfates and resistivity). Samples form two (2) of the Shelby tube samples were also subjected to one dimensional consolidation testing. Results of the laboratory testing program are presented in the report attachments.

SOIL CONDITIONS

Soil Conditions - As seen from the attached boring logs, the exploratory borings encountered an upper unit of fine sands with varying silt and clay fines content to a depth of 23 feet in boring B-1 and 8 feet in boring B-2. These upper sands which contain some to minimal fines have an SP to SP-SM Unified Classification. Where the soils appeared to have an increase in organic fines, visual examination of the recovered samples and results of laboratory testing indicate that the organic content is generally low and merely the result of staining of individual soil grains. Therefore, the organic fines should not have a detrimental effect on the compressibility of these fine sands.

Beneath the cleaner sands, the borings penetrated predominantly low plasticity clayey fine sands with interbedded medium to high plasticity clays. These soils have unified classifications of SC to CH. The clayey strata also contained thin seams of fine sand. The clayey sands and clays continued to the top of the limestone formation which was evidenced at about 74.5 feet at boring location B-1 and 73 feet at boring location B-2.

Standard penetration resistances suggest that the principally sandy soils are in a very loose to loose state to depths of about 28 feet and typically medium dense below that depth. The clays evidenced in the borings exhibited a firm to very stiff consistency.

GEOTECHNICAL EVALUATION

Review of the soil profiles contained in the 1965 plans provided to us suggests that original soil boring B-14 is closest to the location of the current borings. This soil descriptions for this original boring are as follows: gray sandy clay to about 8 feet; gray clay between about 8 and 23.9 feet; gray sandy clay between about 23.9 and 37.5 feet; and gray limestone below 37.5 feet. There are no laboratory classification test results on the plans for use in comparison to the results of our current investigation. No classification symbols are included on the soil profiles on the 1965 plans. Reported penetration resistances on the profiles range from 8 to 18 blows per foot, suggesting a firm to very stiff consistency, which is comparable to the consistency range revealed for the deeper clays encountered in our borings. Results of laboratory corrosivity testing suggests that the soils tested are "Slightly to Moderately Aggressive" according to the Florida Department of Transportation classification system, as summarized in the following table.

FDOT ENVIRONMENTAL CLASSIFICATION
(FDOT STRUCTURE DESIGN GUIDELINES, 2006)

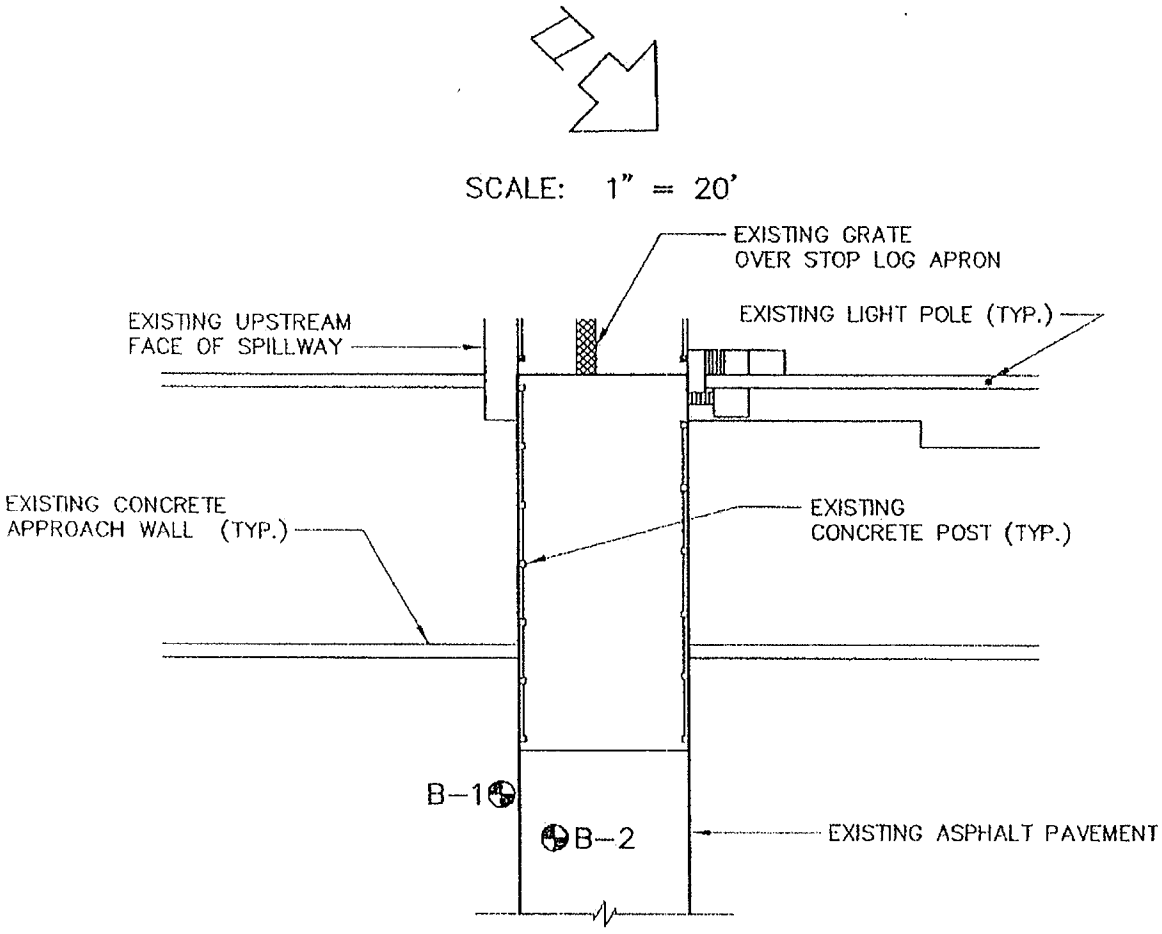
	Slightly Aggressive when all of the following conditions exist	**Moderately Aggressive** for sites not meeting either Slightly or Extremely Aggressive	**Extremely Aggressive** when any one of the following conditions exist
pH	>6.6		<5.0 for concrete <6.0 for steel
Resistivity	>3,000 ohm-cm		<500 ohm-cm
Sulfates	<150 ppm		>1,500 ppm
Chlorides	< 500 ppm		>2,000 ppm

The profiles on the plans indicate that the ground surface elevation at original boring location B-16 was El.+17.9 ft. The elevation data on the plans indicate that the crest is at about elevation El.+52 ft. Thus, the upper 34 to 35 feet of soil identified in our current borings probably represent embankment fill.

It is not clear whether either boring encountered the "impervious core material" described on the plans. No specifications for the core material are included on the plans. Laboratory testing performed on the clayey sands penetrated below about 8 feet in boring B-2, conducted in the roadway, indicate that these soils typically have more than about 35 percent silt and clay fines and would, therefore, likely be much less permeable than the clean to slightly silty fine sands encountered in boring B-1. It should also be noted that while the clayey sands (SC) are classified as such according to the Unified classification system, clayey sands with more than 35 percent silt and clay and moderate plasticity characteristics are classified as clays with a classification of A-7-5 and A-7-6 according to the AASHTO classification system. Plans indicate that steel sheet piling were driven through the completed core and that the edges of the bridge approach slab are supported on the sheet piling.

As previously mentioned, penetration resistances suggest that the embankment fill soils are in a very loose to loose state of relative density. Results of consolidation and associated testing on the clayey fine sands in the deeper portion of the embankment fill suggest that the soils may have some potential for additional compression with the application of additional load. However, considering that the soils are principally sandy in nature and the embankment has been in place for about 40 years, compression related settlements should have been essentially complete many years ago.

PLATE I - BORING LOCATION PLAN



LEGEND:

APPROXIMATE STANDARD PENETRATION TEST BORING LOCATION

CAD FILE NAME: N:\ACLTWN\PLATE1\086132.DWG. DRAWN BY: R.D.B. DATE: 2/22/08

SHEET TITLE	PREPARED BY
BORING LOCATION PLAN	DRIGGERS ENGINEERING SERVICES, INCORPORATED
PROJECT NAME	SHEET NO.
MANATEE DAM MANATEE COUNTY, FLORIDA	PLATE 1

STANDARD PENETRATION TEST BORING LOGS

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 086132 **BORING NO. B-1**

Project Manatee Dam, Manatee County, Florida

Location See Plate I Foreman A.P.

Completion Depth 75.2' Date 1/22/08 Depth To Water ____ Time ____ Date ____

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.
			SURF. EL:	
0			Very loose dark brown Fine SAND with trace of finely divided organic material (SP)	2/1/2
5			Very loose dark brown slightly silty Fine SAND with trace of finely divided organic material (SP-SM)	1/1/2 0/1/1 0/1/1
10			- trace of cemented sand fragments below depth 10.0'	0/1/0 0/0/0
15			- loose seam at depth 15.0'	2/3/4
20				0/0/0
25			Loose dark brown Fine SAND with trace of weakly cemented sand fragments and trace of gray CLAY (SP)	0/3/6
30			Medium dense to loose greenish-gray clayey Fine SAND (SC)	5/5/6
35				

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP

10 20 40 60 80

Remarks Borehole Grouted

Casing Length ____

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 086132 **BORING NO. B-1**

Project Manatee Dam, Manatee County, Florida

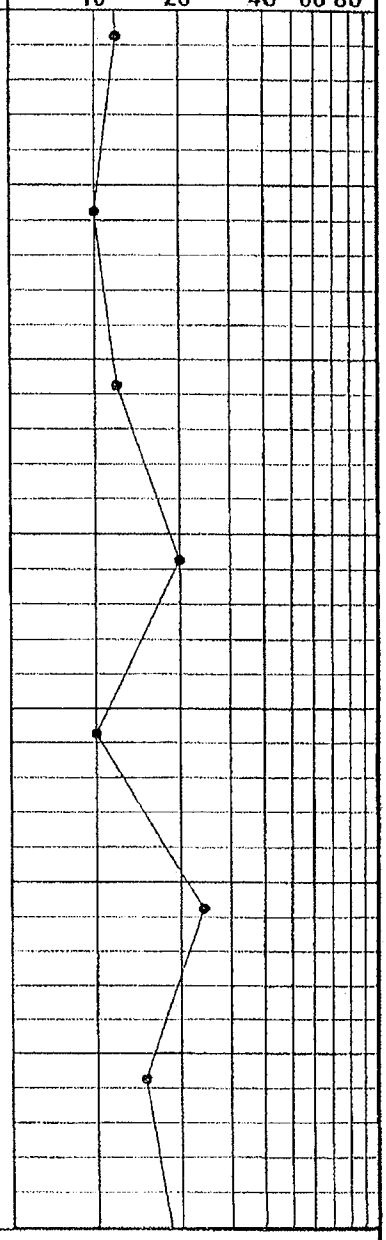
Location See Plate 1 Foreman A.P.

Completion Depth 75.2' Date 1/22/08 Depth To Water ____ Time ____ Date ____

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.
			SURF. EL:	
			Medium dense to loose greenish-gray clayey Fine SAND (SC)	3/5/7
40				3/4/6
			Stiff greenish-gray CLAY with seams of gray Fine SAND (CH/SP)	
45				3/5/7
			Medium dense greenish-gray clayey Fine SAND (SC)	
50				6/8/12
			Stiff to very stiff greenish-gray CLAY with seams of Fine SAND (CH/SP)	
55				3/4/6
60				4/11/13
			Medium dense gray Fine SAND with thin seams of gray CLAY (SP/CH)	
65				10/7/8
			Very stiff gray CLAY with seams of Fine SAND (CH/SP)	
70				

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP

10 20 40 60 80



Remarks Borehole Grouted

Casing Length ____

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 086132 **BORING NO. B-1**

Project Manatee Dam, Manatee County, Florida

Location See Plate I Foreman A.P.

Completion Depth 75.2' Date 1/22/08 Depth To Water _____ Time _____ Date _____

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.	STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP
			SURF. EL:		10 20 40 60 80
			Very stiff gray CLAY with seams of Fine SAND (CH/SP)	7/6/13	
75			Greenish-gray LIMESTONE	50*	* 0.2' Penetration
80					
85					
90					
95					
100					
105					

Remarks Borehole Grouted

Casing Length _____

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 086132 **BORING NO.** B-2

Project Manatee Dam, Manatee County, Florida

Location See Plate I Foreman A.P.

Completion Depth 75.2' Date 1/21/08 Depth To Water ____ Time ____ Date ____

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.
			SURF. EL:	
0			12" Concrete Slab	
			Medium dense dark brown Fine SAND (SP)	5/7/6
5			Loose to very loose dark brown Fine SAND with trace of finely divided organic material (SP)	2/2/3
			- trace of cemented sand fragments at depth 6.0'	0/2/2
			Loose greenish-gray clayey Fine SAND with trace of phosphate (SC)	1/2/3
10				1/2/3
			Very loose greenish-gray clayey Fine SAND (SC)	0/2/1
15			- trace of cemented sand fragments below depth 15.0'	1/1/0
20				0/0/0
25			Soft greenish-gray sandy CLAY with trace of phosphate (CH)	0/1/3
			Medium dense greenish-gray clayey Fine SAND (SC)	
30				2/10/16
35				

STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP

10 20 40 60 80

Remarks Borehole Grouted

Casing Length ____

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 086132 **BORING NO. B-2**

Project Manatee Dam, Manatee County, Florida

Location See Plate I Foreman A.P.

Completion Depth 75.2' Date 1/21/08 Depth To Water ____ Time ____ Date ____

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.	STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP
			SURF. EL:		10 20 40 60 80
			- trace of phosphate from depth 35.0' - 41.5'	7/9/12	
			Medium dense greenish-gray clayey Fine SAND (SC)		
40				2/5/7	
45				12/12/8	
50				7/12/12	
			Firm greenish-gray CLAY (CH)		
55				3/3/5	
			Stiff greenish-gray silty CLAY with seams of Fine SAND (CH/SP)		
60				5/6/7	
			Medium dense gray Fine SAND with seams of greenish-gray silty CLAY (SP/CH)		
65				7/10/12	
70					

Remarks Borehole Grouted

Casing Length ____

DRIGGERS ENGINEERING SERVICES INCORPORATED

Project No. DES 086132 **BORING NO. B-2**

Project Manatee Dam, Manatee County, Florida

Location See Plate I Foreman A.P.

Completion Depth 75.2' Date 1/21/08 Depth To Water _____ Time _____ Date _____

DEPTH, FT	SYMBOL	SAMPLES	SOIL DESCRIPTION	BLOWS ON SAMPLER PER 6" OR PEN. STR.	STANDARD PENETRATION TEST BLOWS/FT. ON 2" O.D. SAMPLER-140 LB. HAMMER, 30" DROP
			SURF. EL:		10 20 40 60 80
			Medium dense gray Fine SAND with seams of greenish-gray silty CLAY (SP/CH)	4/6/8	
			Gray LIMESTONE		
75				50*	* 0.2' Penetration
80					
85					
90					
95					
100					
105					

Remarks Borehole Grouted

Casing Length _____

SUMMARY OF LABORATORY TEST RESULTS

SUMMARY OF LABORATORY TEST RESULTS

BORING NO.	DEPTH (ft)	DESCRIPTION	W %	Y_d (pcf)	G_s	ATTERBERG LIMITS			P.P. (tsf)	U.C.	CON.	G.S.	ORG. (%)	pH	Cl. (ppm)	SO_4 (ppm)	RES. (Ohm-cm)
						LL	PL	SL									
B-1	4.0-5.5	Dark brown slightly silty Fine SAND with trace of finely divided organic material										*					
B-1	8.0-9.5	Dark brown slightly silty Fine SAND with trace of finely divided organic material										*	2.4	7.5 "S"	81.7 "S"	< 50 "S"	4,600 "S"
B-1	20.0-21.5	Dark brown slightly silty Fine SAND with trace of finely divided organic material and cemented sand										*					
B-1	32.0-34.0	Greenish-gray clayey Fine SAND	17.9	109.1	2.734	31	18		1.75			*		7.2 "S"	29.4 "S"	245 "M"	1,550 "M"
B-1	70.0-71.5	Gray CLAY with seams of Fine SAND	103.8			86	29					** 88.5					
B-2	8.0-9.5	Greenish-gray clayey Fine SAND with trace of phosphate	17.3			35	19					*					
B-2	12.0-13.5	Greenish-gray clayey Fine SAND	22.1			40	18					** 35.5					
B-2	22.0-24.0	Greenish-gray clayey Fine SAND with trace of cemented sand	23.6	110.6	2.734	32	18		0.25			*		7.2 "S"	28.7 "S"	136 "S"	2,250 "M"
B-2	32.0-34.0	Greenish-gray clayey Fine SAND	14.8		2.762	32	17		+4.50			*		6.9 "S"	27.8 "S"	248 "M"	1,800 "M"
B-2	45.0-46.5	Greenish-gray clayey Fine SAND	14.9			36	19					** 39.4					

W % = Water Content
Y_d (pcf) = Dry Density
G_s = Specific Gravity
LL = Liquid Limit
PL = Plastic Limit
SL = Shrinkage Limit
P.P. (tsf) = Pocket Penetrometer
U.C. = Unconfined Compression
"S" = Slightly Aggressive

Con. = Consolidation Test
G.S. (#) = Grainsize Analysis (Hydrometer)
ORG. (%) = Organic Content
Cl. (ppm) = Total Chloride
SO_4 (ppm) = Total Sulfate
RES. (ohm-cm) = Lab Resistivity
* = See Test Curves
** = Percent Passing No. 200 Sieve
"E" = Extremely Aggressive

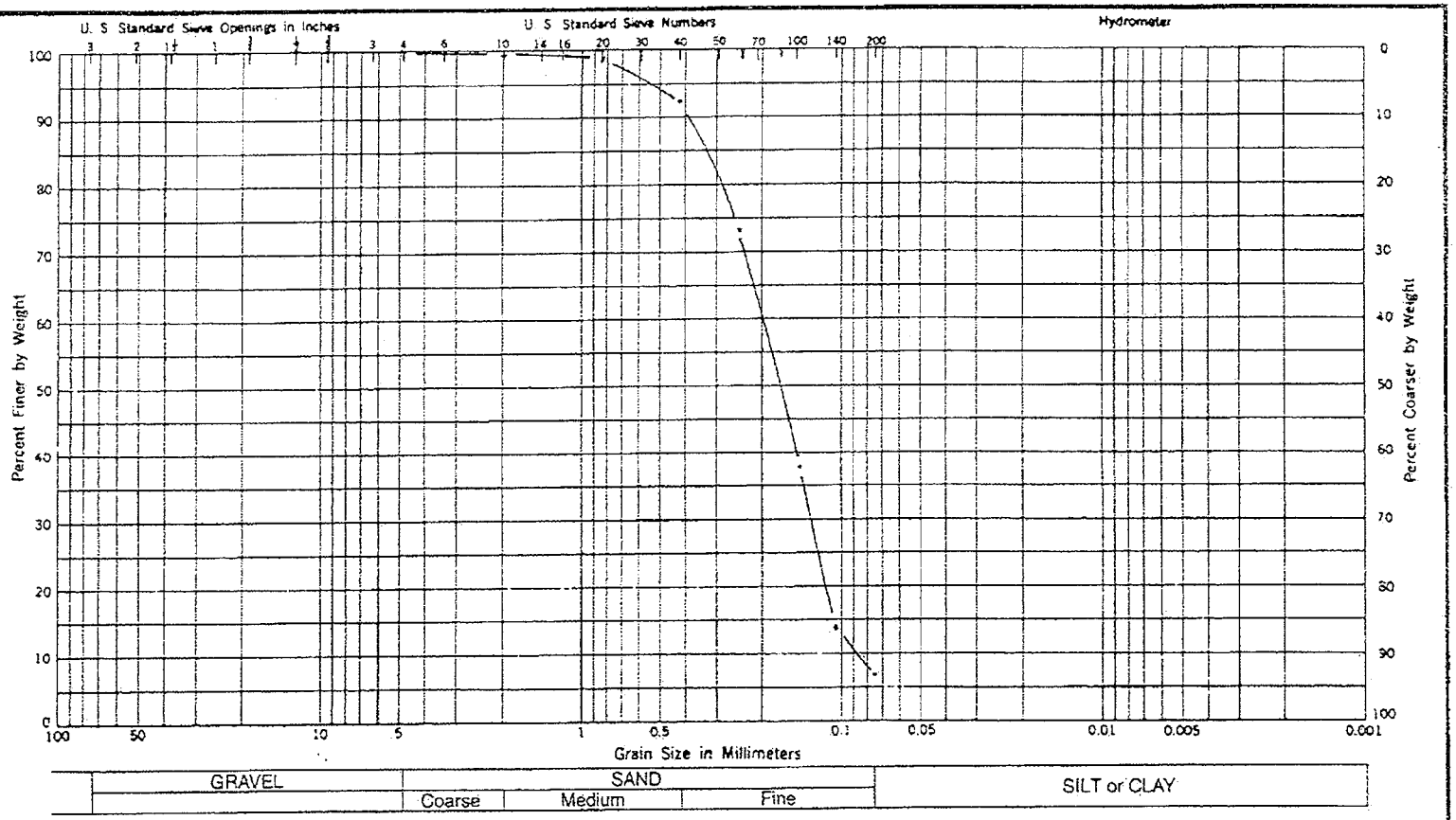
CLIENT: McKim & Creed

PROJECT: Manatee Dam, Manatee County, Florida

FILE: DES 086132

GRAINSIZE ANALYSES

DRIGGERS ENGINEERING SERVICES, INC.



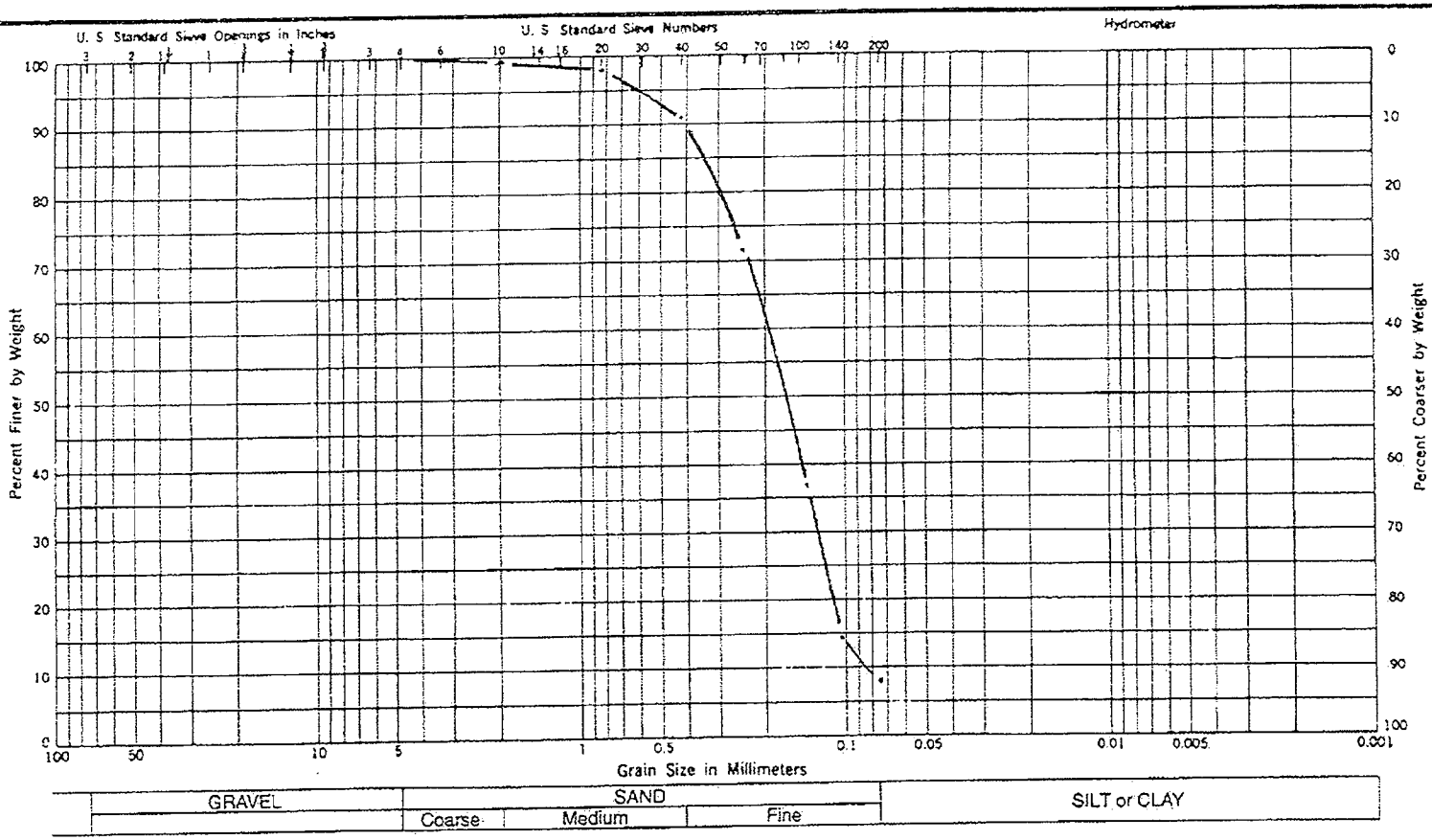
Number	Depth	Natural Moisture	L L	P. L	P. I.	Classification
B-1	4.0' - 5.5'					Dark brown slightly silty Fine SAND with trace of finely divided organic material

CLIENT: McKim & Creed

PROJECT: Manatee Dam,
Manatee County, Florida

FILE: DES 086132

DRIGGERS ENGINEERING SERVICES, INC.



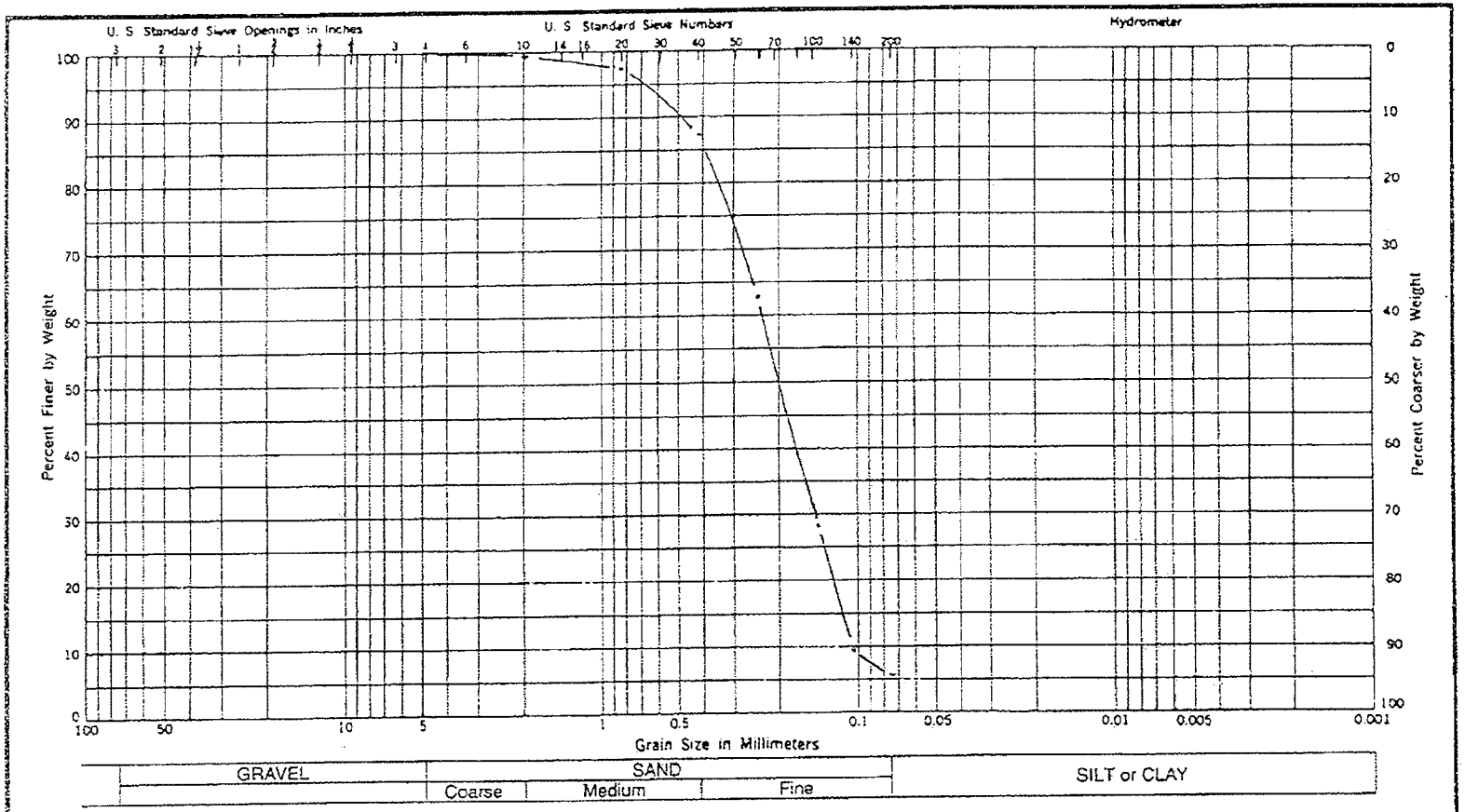
Number	Depth	Natural Moisture	L L	P. L	P. I.	Classification
B-1	8.0' - 9.5'					Dark brown slightly silty Fine SAND with trace of finely divided organic material

CLIENT: McKim & Creed

PROJECT: Manatee Dam, Manatee County, Florida

FILE: DES 086132

DRIGGERS ENGINEERING SERVICES, INC.



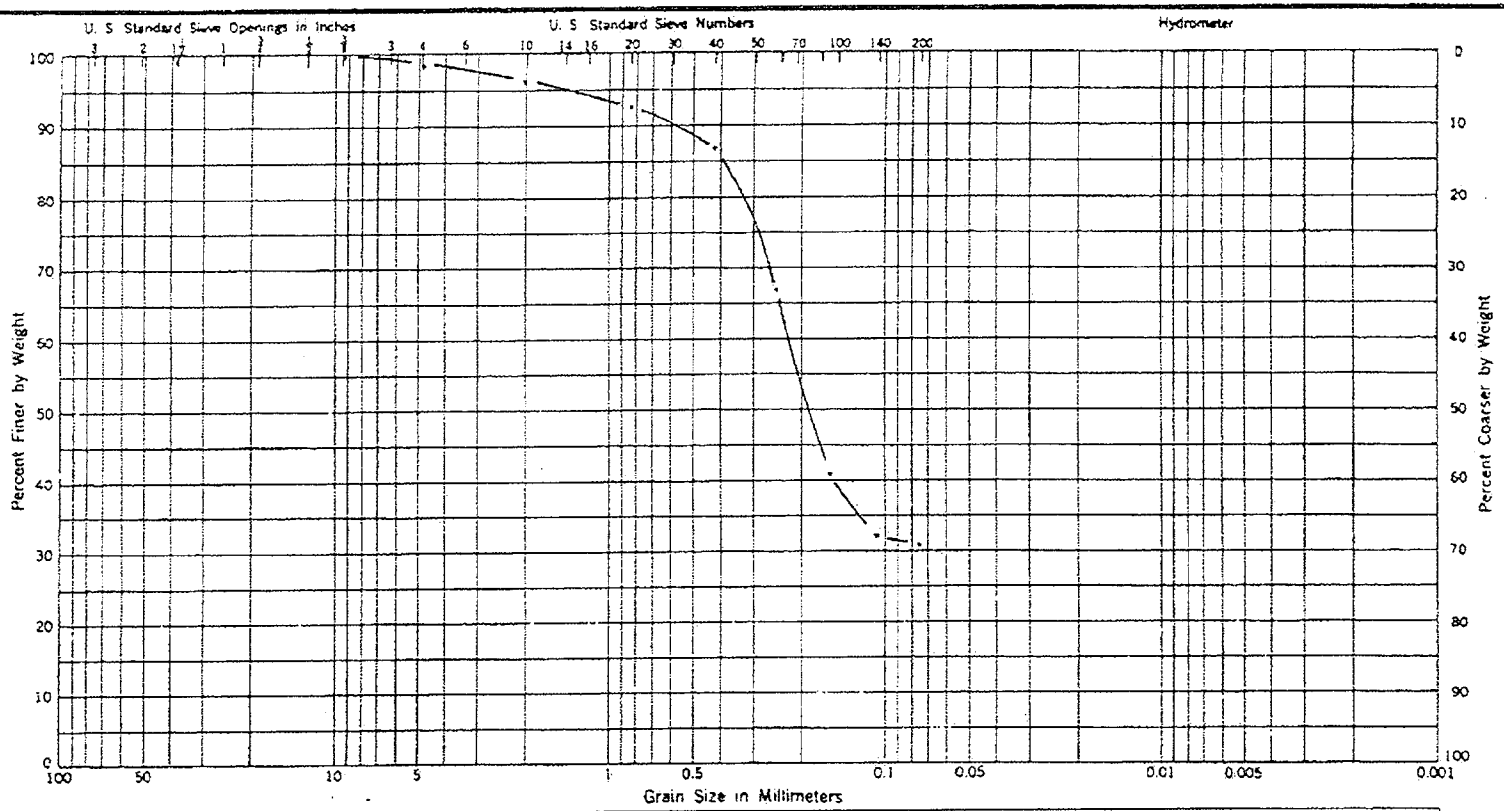
Number	Depth	Natural Moisture	L L	P. L	P. I.	Classification
B-1	20.0' - 21.5'					Dark brown slightly silty fine SAND with trace of finely divided organic material and cemented sand

CLIENT: McKim & Creed

PROJECT: Manatee Dam, Manatee County, Florida

FILE: DES 086132

DRIGGERS ENGINEERING SERVICES, INC.



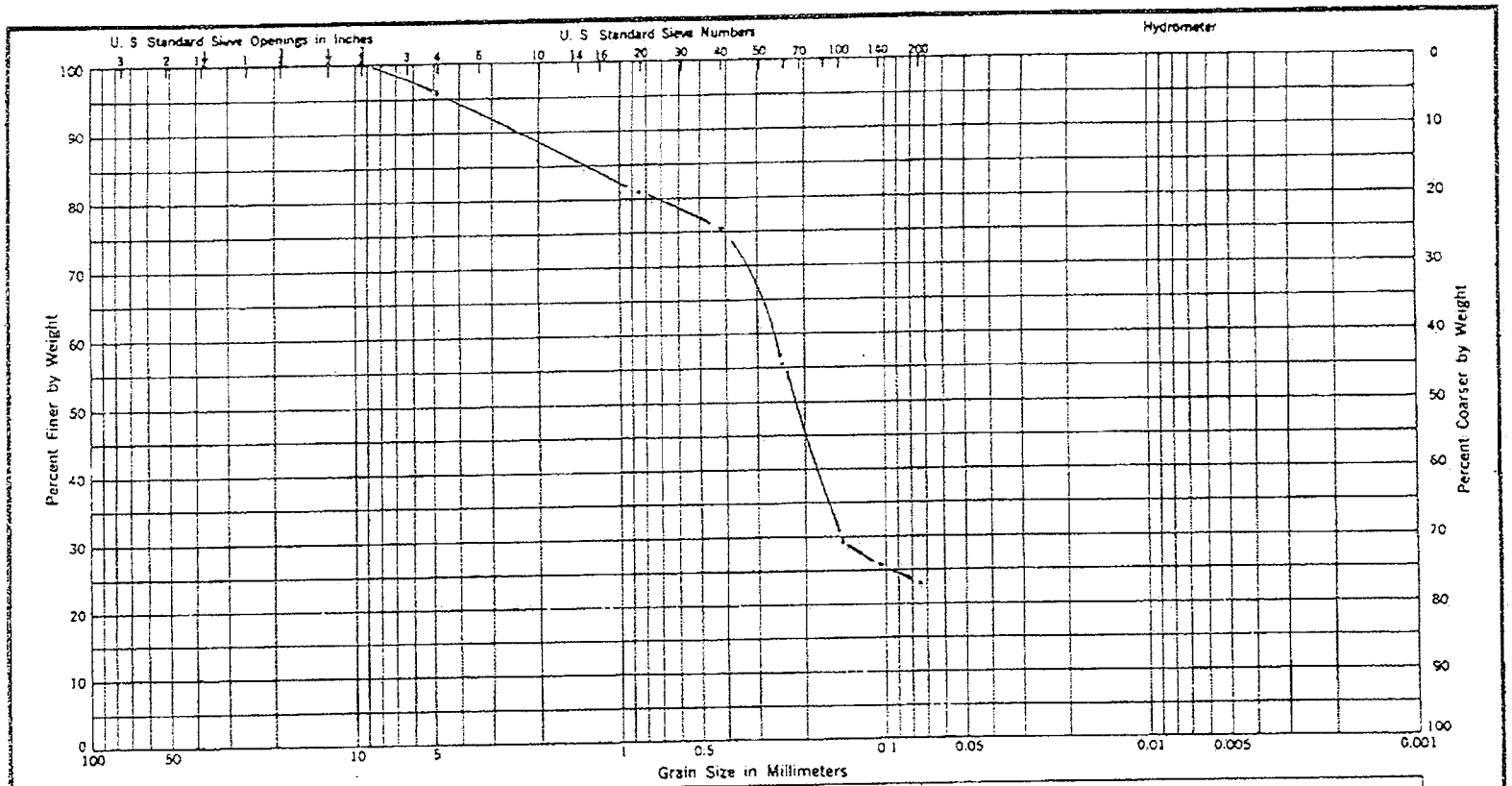
Number	Depth	Natural Moisture	L L	P. L	P. I.	Classification
B-1	32.0' - 34.0'					Greenish-gray clayey Fine SAND

CLIENT: McKim & Creed

PROJECT: Manatee Dam,
Manatee County, Florida

FILE: DES 086132

DRIGGERS ENGINEERING SERVICES, INC.



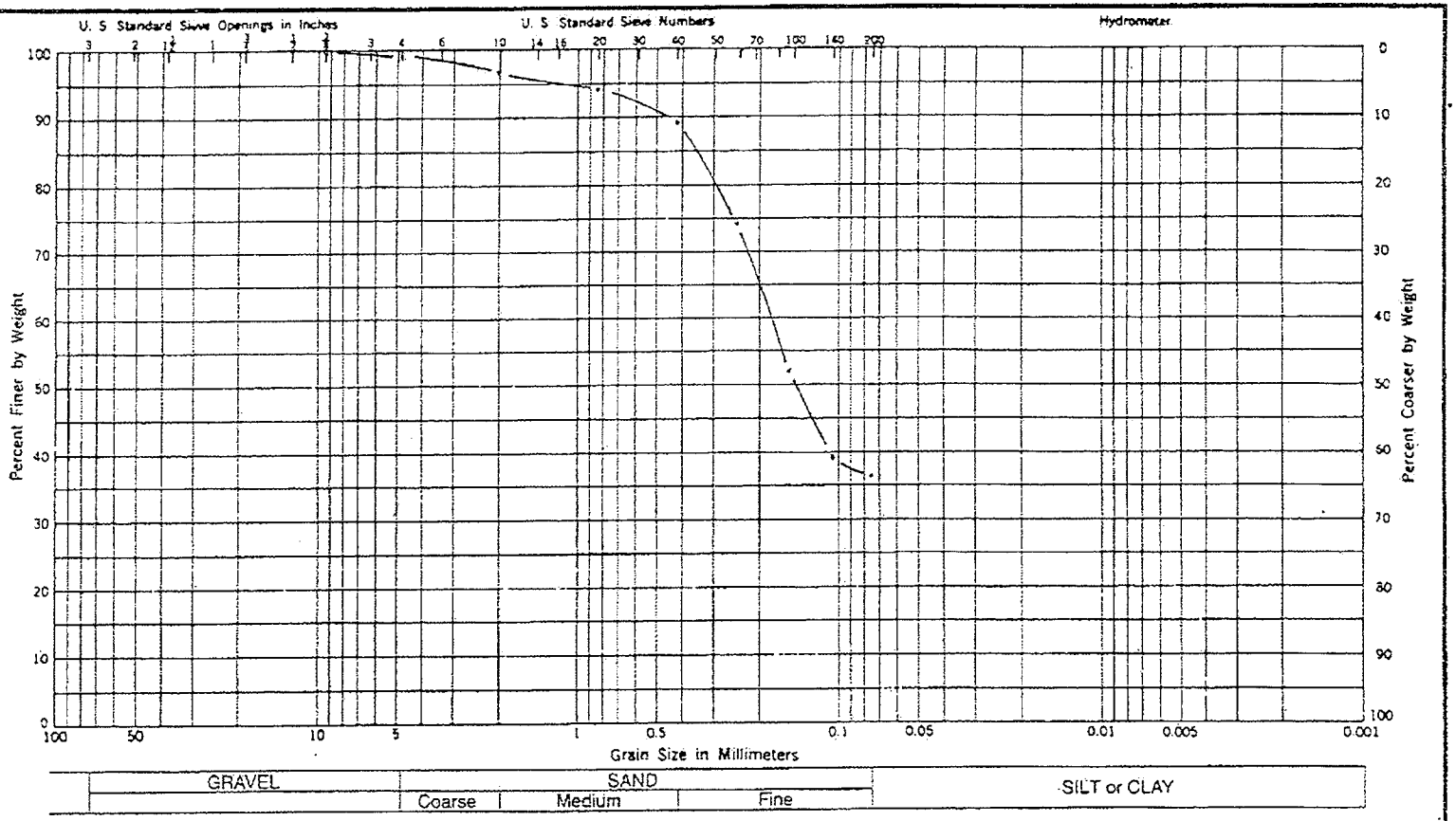
Number	Depth	Natural Moisture	L L	P. L	P. I.	Classification
B-2	8.0' - 9.5'					Greenish-gray clayey Fine SAND with trace of phosphate

CLIENT: McKim & Creed

PROJECT: Manatee Dam, Manatee County, Florida

FILE: DES 086132

DRIGGERS ENGINEERING SERVICES, INC.



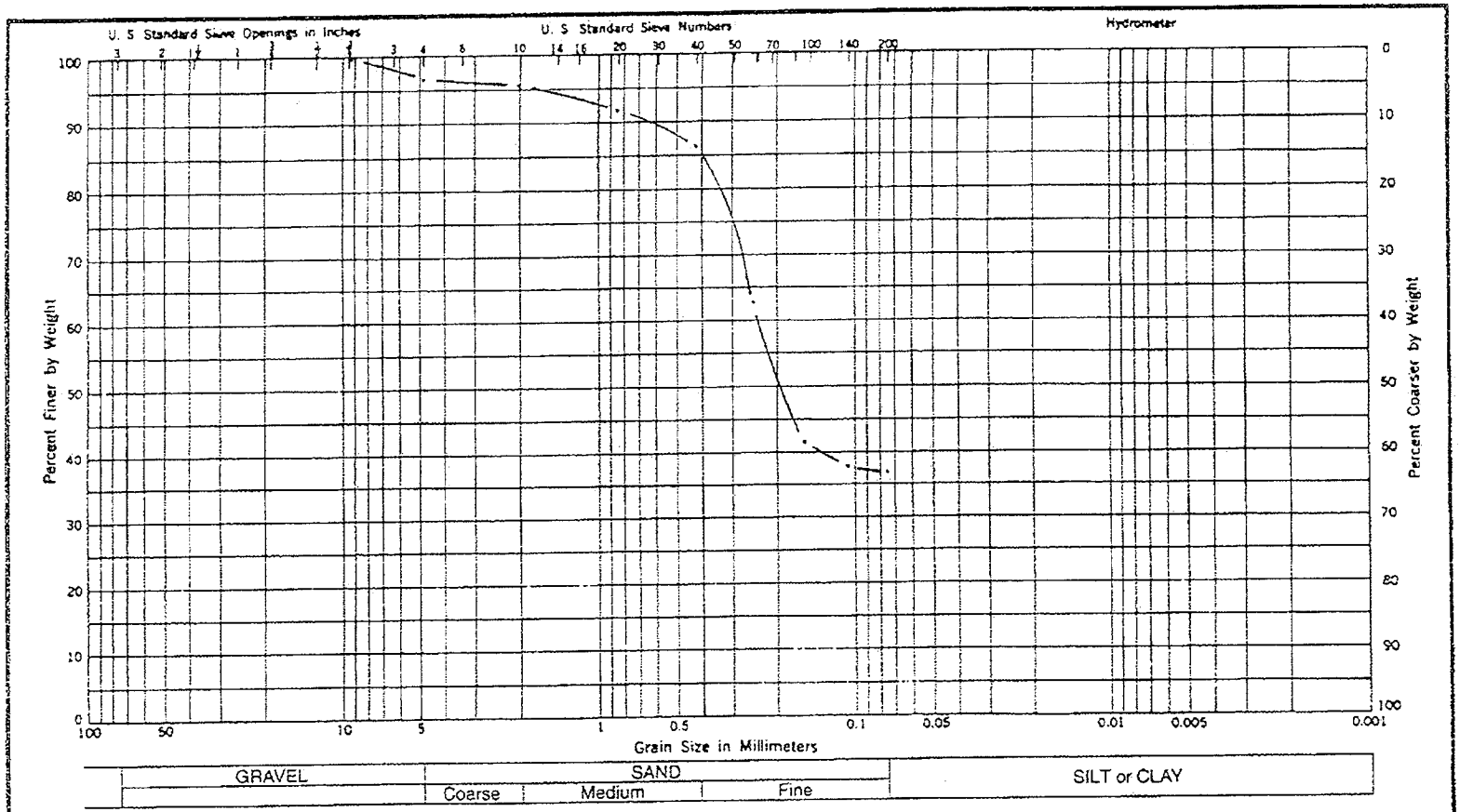
Number	Depth	Natural Moisture	L.L.	P.L.	P.I.	Classification
B-2	22.0' - 24.0'					Greenish-gray clayey Fine SAND with trace of cemented sand

CLIENT: McKim & Creed

PROJECT: Manatee Dam, Manatee County, Florida

FILE: DES 086132

DRIGGERS ENGINEERING SERVICES, INC.



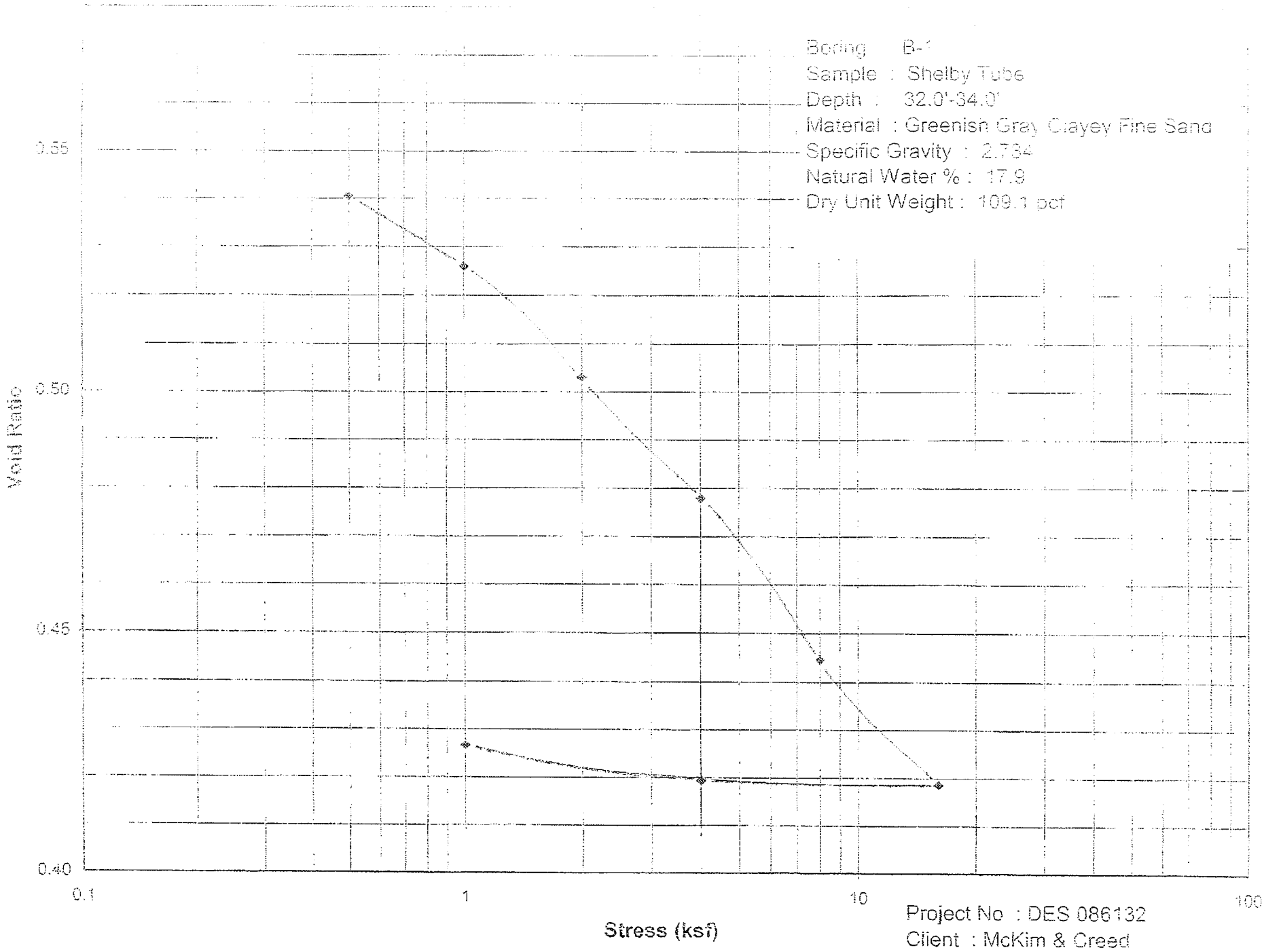
Number	Depth	Natural Moisture	L. L.	P. L.	P. I.	Classification
B-2	32.0' - 34.0'					Greenish-gray clayey fine SAND

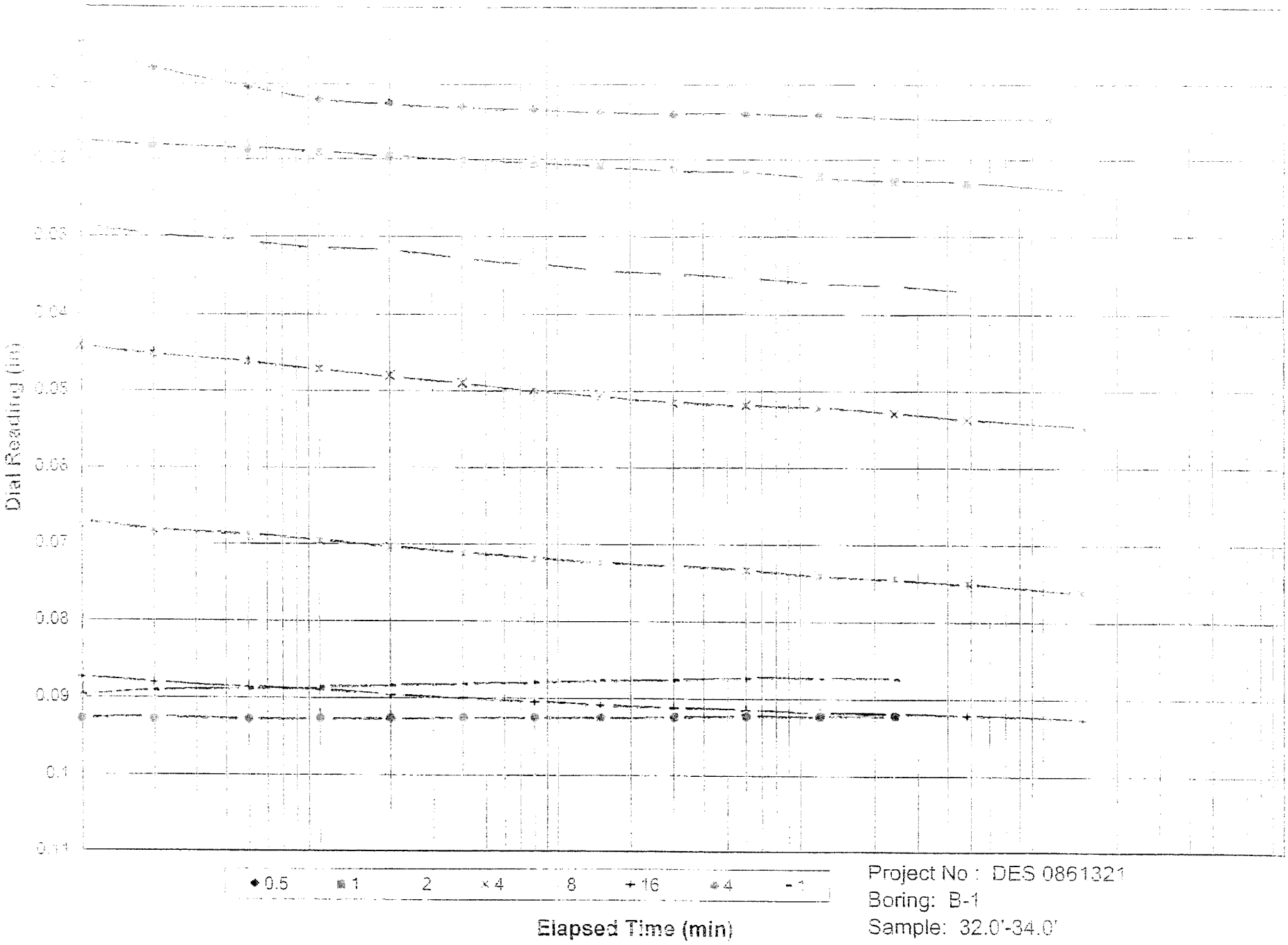
CLIENT: McKim & Creed

PROJECT: Manatee Dam,
Manatee County, Florida

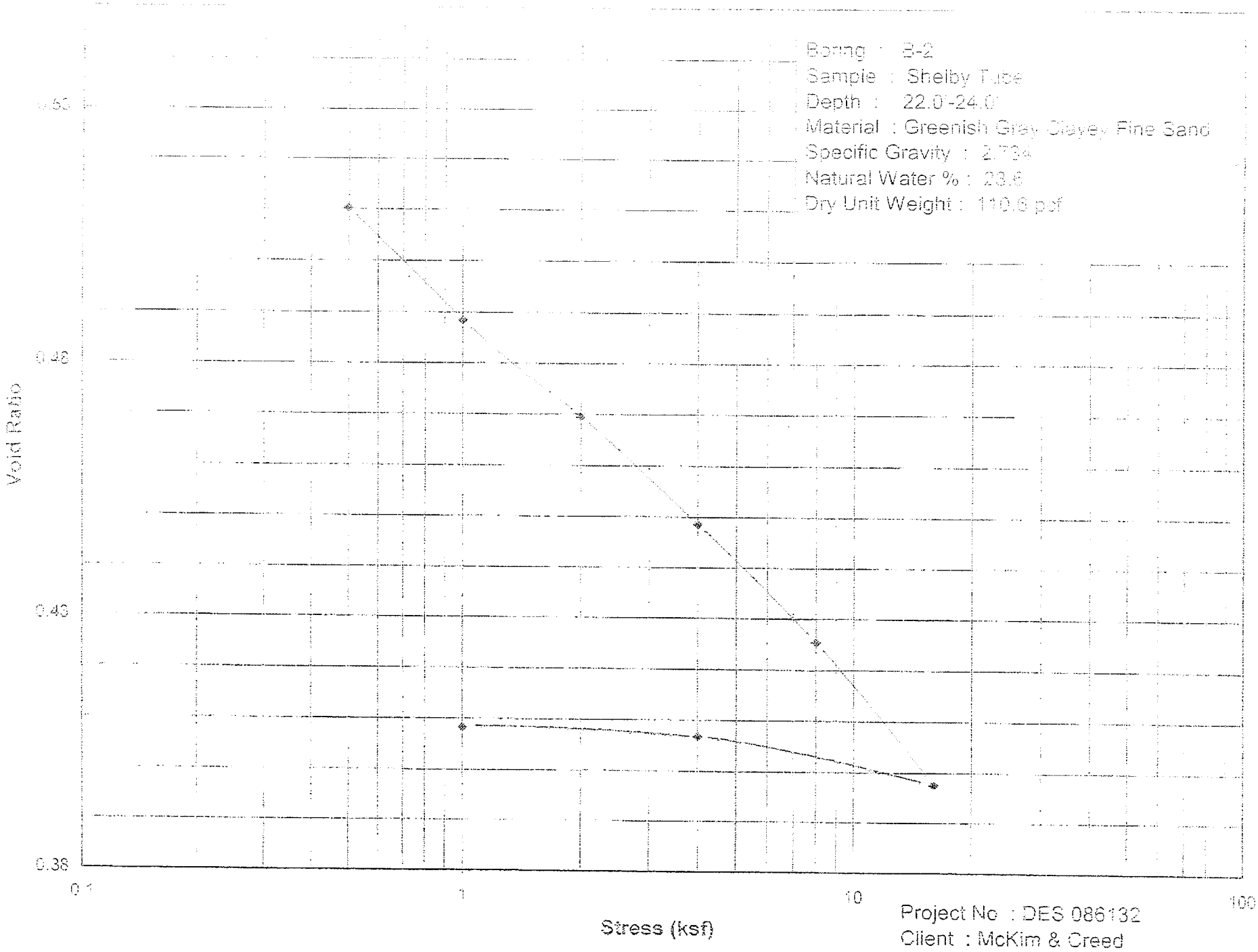
FILE: DES 086132

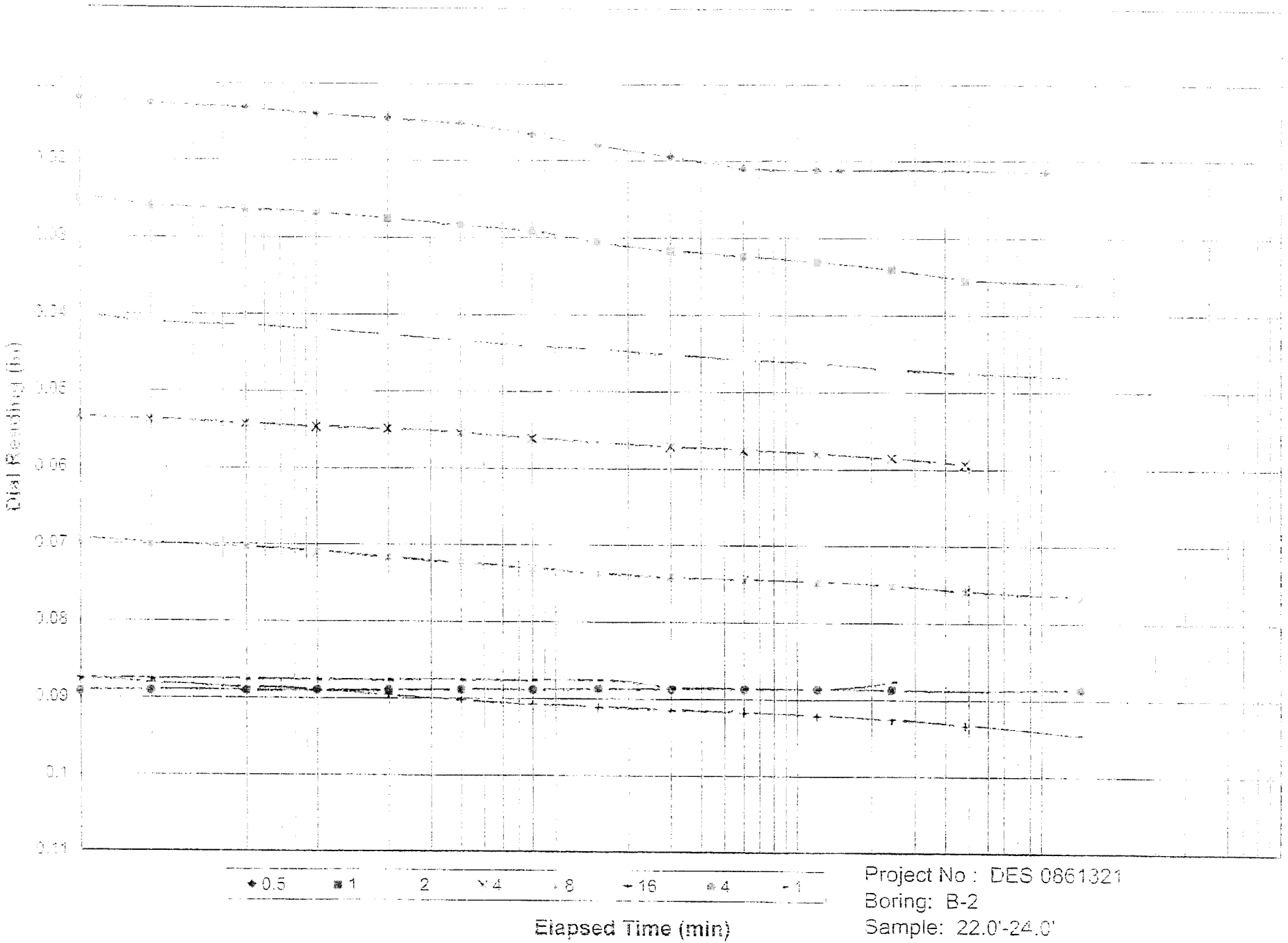
CONSOLIDATION TEST RESULTS


Boring : B-1
Sample : Shelby Tube
Depth : 32.0'-34.0'
Material : Greenish Gray Clayey Fine Sand
Specific Gravity : 2.734
Natural Water % : 17.9
Dry Unit Weight : 109.1 pcf
Void Ratio
0.55
0.50
0.45
0.40
0.1
1
10
100
Stress (ksf)
Project No : DES 086132
Client : McKim & Creed



Project No : DES 0861321
Boring: B-1
Sample: 32.0'-34.0'

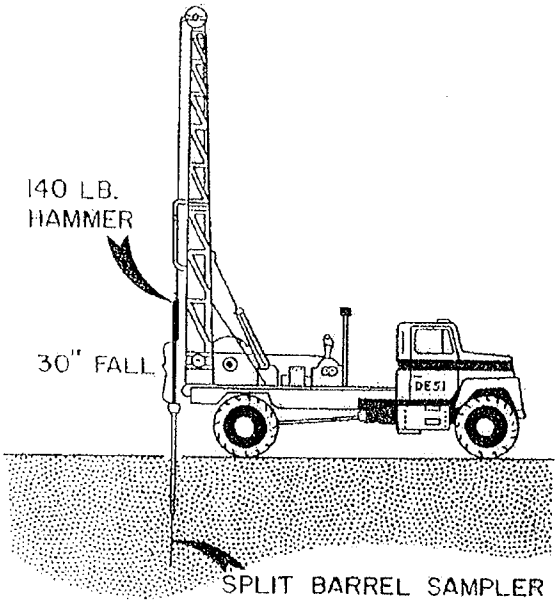

Boring : B-2
Sample : Shelby Tube
Depth : 22.0'-24.0'
Material : Greenish Gray Clayey Fine Sand
Specific Gravity : 2.734
Natural Water % : 23.6
Dry Unit Weight : 110.9 pcf
Void Ratio
0.48
0.43
0.38
0.1
1
10
100
Stress (ksf)
Project No : DES 086132
Client : McKim & Creed



Project No : DES 0861321
Boring: B-2
Sample: 22.0'-24.0'

METHOD OF TESTING

STANDARD PENETRATION TEST
AND
SOIL CLASSIFICATION

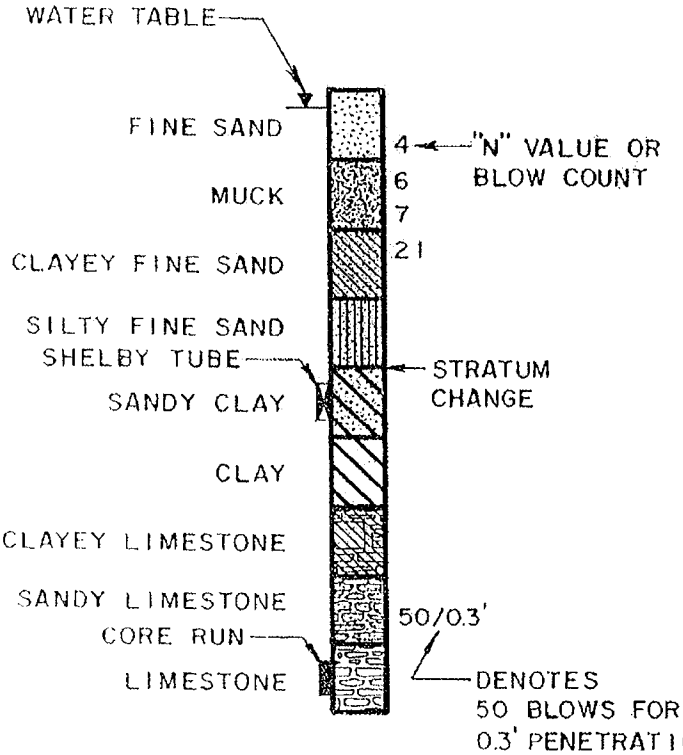


STANDARD PENETRATION TEST (ASTM D-1586)

In the Standard Penetration Test borings, a rotary drilling rig is used to advance the borehole to the desired test depth. A viscous drilling fluid is circulated through the drill rods and bit to stabilize the borehole and to assist in removal of soil and rock cuttings up and out of the borehole.

Upon reaching the desired test depth, the 2 inch O.D. split-barrel sampler or "split-spoon", as it is sometimes called, is attached to an N-size drill rod and lowered to the bottom of the borehole. A 140-pound hammer, attached to the drill string at the ground surface, is then used to drive the sampler into the formation. The hammer is successively raised and dropped for a distance of 30 inches using a rope and "cathead" assembly. The number of blows is recorded for each 6 inch interval of penetration or until virtual refusal is achieved. In the above manner, the samples are ideally advanced a total of 18 inches. The sum of the blows required to effect the final 12 inches of penetration is called the blowcount, penetration resistance of "N" value of the particular material at the sample depth.

After penetration, the rods and sampler are retracted to the ground surface where the core sample is removed, sealed in a glass jar and transported to the laboratory for verification of field classification and storage.



SOIL SYMBOLS AND CLASSIFICATION

Soil and rock samples secured in the field sampling operation were visually classified as to texture, color and consistency. Soil classifications are presented descriptively and symbolically for ease of interpretation. The stratum identification lines represent the approximate boundary between soil types. In many cases, this transition may be gradual.

Consistency of the soil as to relative density or undrained shear strength, unless otherwise noted, is based upon Standard Penetration resistance values of "N" values and industry-accepted standards. "N" values, or blowcounts, are presented in both tabular and graphical form on each respective boring log at each sample interval. The graphical plot of blowcount versus depth is for illustration purposes only and does not warrant continuity in soil consistency or linear variation between sample intervals.

The borings represent subsurface conditions at respective boring locations and sample intervals only. Variations in subsurface conditions may occur between boring locations. Groundwater depths shown represent water depths at the dates and time shown only. The absence of water table information does not necessarily imply that groundwater was not encountered.

GROUND PENETRATING RADAR REPORT

Driggers Engineering Services Incorporated

FINAL REPORT
GROUND PENETRATING RADAR SURVEY
LAKE MANATEE DAM SITE
MANATEE COUNTY, FLORIDA

Prepared for Driggers Engineering Services, Inc.
Clearwater, FL

Prepared by GeoView, Inc.
St. Petersburg, FL

GeoView

February 8th, 2007

Mr. Nicholas Korecki, P.E.
Driggers Engineering Services, Inc.
12220 49th Street North
Clearwater, FL 33762

Subject: Transmittal of Final Report for GPR Survey
Lake Manatee Dam Site- Manatee County, Florida
GeoView Project Number 4865

Dear Mr. Korecki,

GeoView, Inc. (GeoView) is pleased to submit the final report which summarizes and presents the results of the GPR survey conducted at the Lake Manatee Dam in Manatee County, Florida. Ground penetrating radar, a geophysical technique, was used to locate anomalous features potentially associated with near surface voids underneath the soil cement of the dam. GeoView appreciates the opportunity to have assisted you on this project. If you have any questions or comments about the report, please contact us.

Sincerely,

GEOVIEW, INC.

Michael J. Wightman, P.G.
Florida P.G. Number 1423

Chris Taylor, P.G.
Florida P.G. Number 2256

1.0 Introduction

A ground penetrating radar (GPR) survey was conducted Lake Manatee Dam in Manatee County, Florida. (Figure 1) The purpose of the GPR survey was to help determine the presence of subsurface features that may be associated with void development underneath the soil cement of the dam. The investigation was conducted in January, 2008.

2.0 Description of Geophysical Investigation

The GPR investigation was conducted on the eastern (up stream) side of the dam along five GPR transects that were spaced 5 to 8 feet (ft) apart. The data was collected in 300 ft long sections in order to maintain accurate positioning of the GPR instrumentation relative to the ground surface. A discussion of the limitations of the survey grid is provided in Appendix 2.

The GPR survey was performed with an 800-MHz antenna using a time range of 20 nanoseconds. This configuration provided a maximum depth of penetration of 3 ft below land surface (bls). A total of approximately 19,500 linear feet of GPR data was collected. A description of the GPR technique and the methods employed for void characterization studies is provided in Appendix 2.

The positions of the survey grid and identified anomaly areas were recorded using a Trimble AG 114 Global Positioning System (GPS). A Wide Area Augmentation System was used to differentially correct the data during the data collection for improved accuracy.

3.0 Characterization of GPR Anomalies

The GPR anomalies that may represent relatively small voids or low density soils directly beneath the soil cement are characterized by:

1) A minor indication of downwarping in the underlying soils,

2) A minor increase in depth of penetration of the GPR signal

3) In some cases, a localized area of shallow horizontal banding of the GPR signal.

However, it is not possible based on the GPR data alone to definitively determine if an identified feature is related to a near surface void. It is possible that such GPR anomalies are result of heterogeneities in the composition of the near-surface soil materials and not related to the presence of voids.

4.0 Survey Results

A total of five GPR anomaly areas were observed on the GPR profiles produced from the data collected at the site (Figure 1). These anomalies are indicative of areas that are potentially associated with voids or other disturbances beneath soil cement of the dam. The anomalies ranged in diameter from 2 ft by 2 ft to 4 ft by 2 ft. It is noted that none of the void areas appeared to extend from one transect line to the other. This would indicate that the suspect areas are very limited in their lateral extent and are most likely not associated with any significant water infiltration and subsequent erosion that would be caused by a major break in the continuity of the soil cement.

The locations of each anomaly are shown on Figure 1 and Table 1 provides the coordinates and size of each anomaly. The lateral boundaries and apparent centers of each of the void areas were painted on the ground surface using brightly colored spray paint.

During the data collection, there were three areas of the site where undermining of the soil beneath the concrete was visible. These areas were located at joints or edges of the concrete. The areas of undermining were less than 6 inches deep and did not appear to extend beyond one to two ft in from the concrete joints. The locations of these areas of visible undermining are shown on Figure 1. These areas were also painted using the same brightly colored spray paint used for the GPR anomalies.

It is recommended that the each of the five anomaly areas be directly tested to determine whether the anomalies are associated with the presence of near-surface voids. The test of these areas could consist of performing a small diameter core through the soil cement and testing the underling soils with a hand cone penetrometer or equivalent instrumentation.

An example of the GPR data collected across one of the GPR anomaly areas is provided in Appendix 1. A discussion of the limitations of the GPR technique in geological characterization studies is provided in Appendix 2.

Table 1

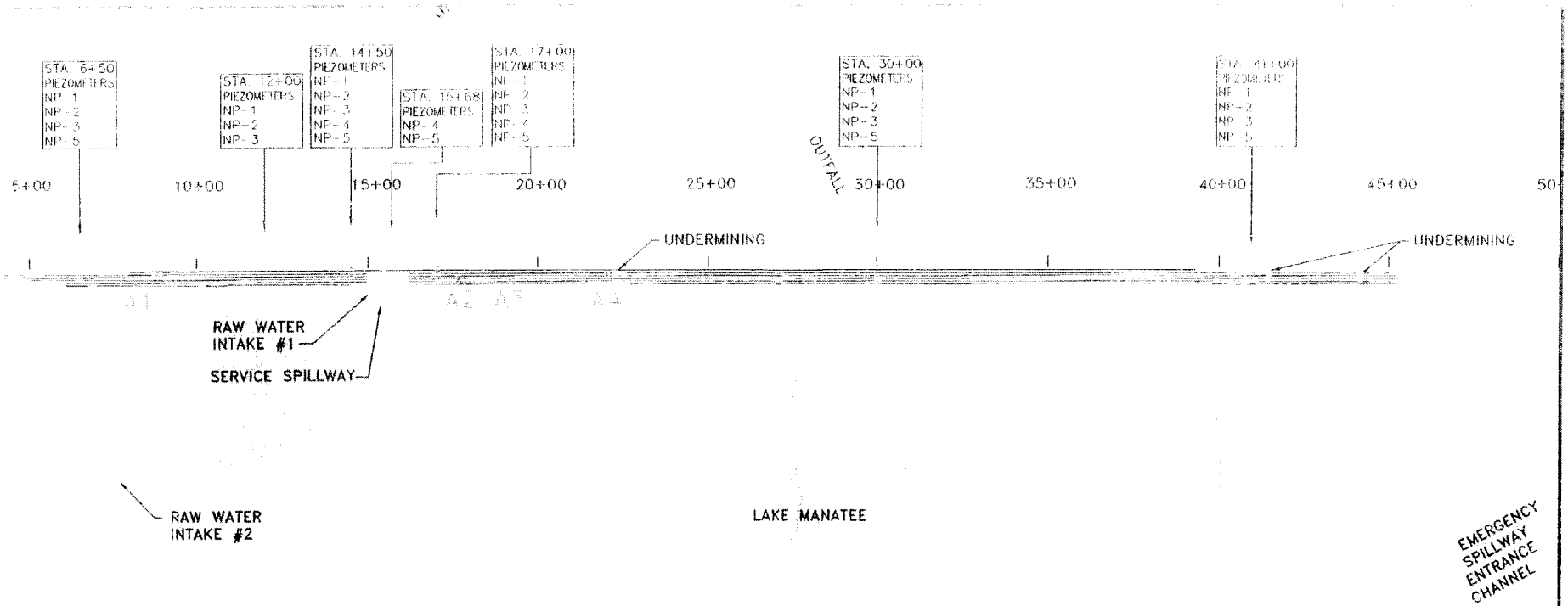
Project 4865-Lake Manatee Dam Site
Description of GPR Anomalies
GeoView, Inc.

Anomaly	Approximate Plan View Dimensions (in feet)	Latitude	Longitude
Anomaly 1	2.5 x 2.5	27 29.515259	-82 21.354891
Anomaly 2	3 x 3.5	27 29.644284	-82 21.254776
Anomaly 3	2 x 2	27 29.663941	-82 21.238524
Anomaly 4	3 x 2.5	27 29.703746	-82 21.210967
Anomaly 5	4 x 2	27 30.004655	-82 20.974962

Latitude/Longitude in degrees minutes.minutes, WGS 1984 Datum

APPENDIX 1

FIGURE AND EXAMPLE OF GPR ANOMALY



EXPLANATION

LOCATION OF GPR TRANSECT LINE

APPROXIMATE LOCATION OF GEOPHYSICAL ANOMALY WITH DESIGNATION

APPROXIMATE LOCATION OF VISIBLE UNDERMINING OF CONCRETE

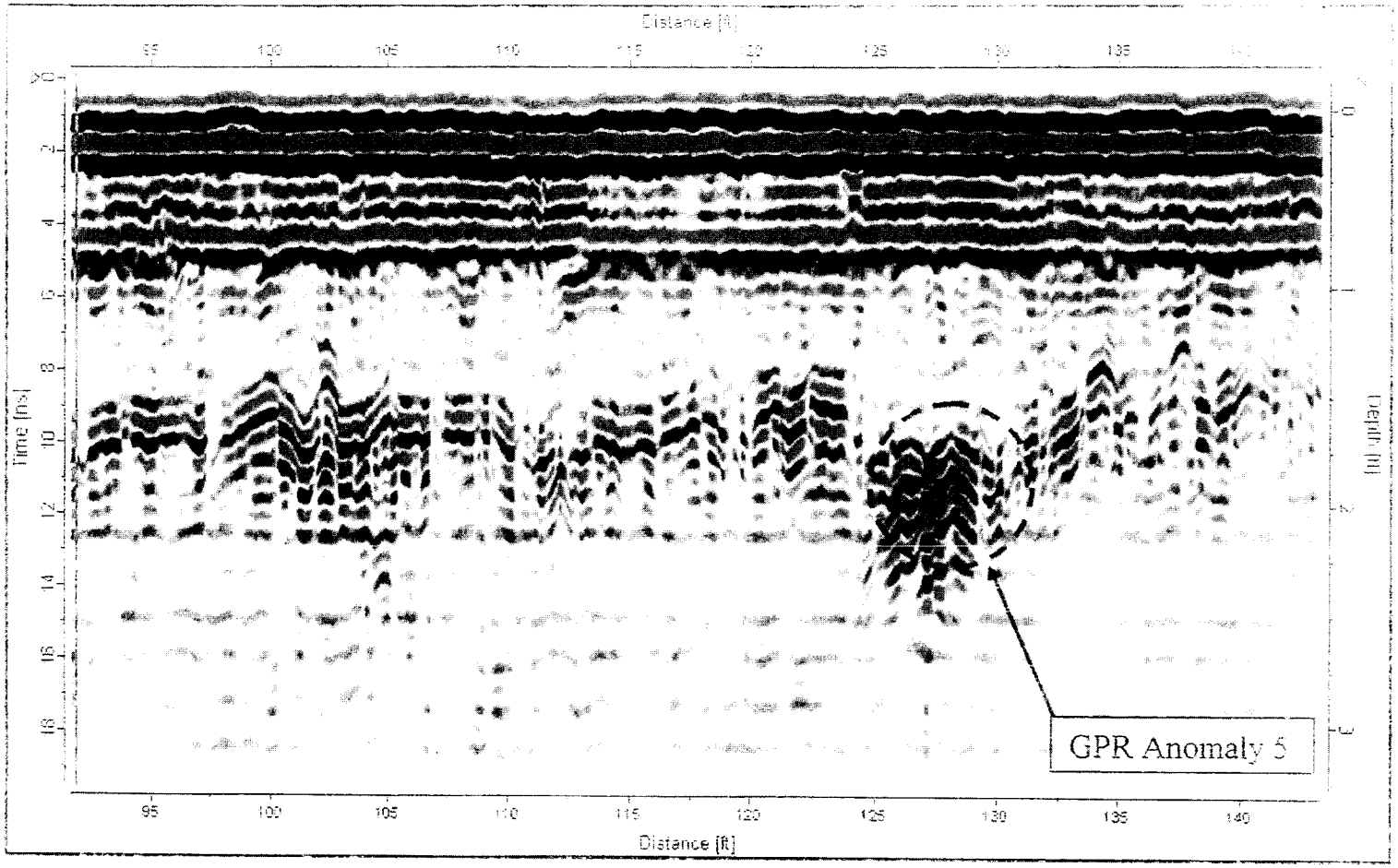
FIGURE 1
SITE MAP SHOWING
RESULTS OF
GPR INVESTIGATION

LAKE MANATEE DAM SITE
MANATEE COUNTY, FLORIDA

PROJECT:
4865

DRIGGERS ENGINEERING SERVICES, INC.
CLEARWATER, FLORIDA

DATE:
02/08/08



GPR Transect 3 Across Anomaly 5

GeoView

APPENDIX 2
DESCRIPTION OF GEOPHYSICAL METHODS, SURVEY METHODOLOGIES AND LIMITATIONS

Ground Penetrating Radar

Ground Penetrating Radar (GPR) consists of a set of integrated electronic components that transmits high frequency (200 to 1500 megahertz [MHz]) electromagnetic waves into the ground and records the energy reflected back to the ground surface. The GPR system consists of an antenna, which serves as both a transmitter and receiver, and a profiling recorder that both processes the incoming signal and provides a graphic display of the data. The GPR data can be reviewed as both printed hard copy output or recorded on the profiling recorder's hard drive for later review. GeoView uses a Mala GPR system. Void characterization studies underneath concrete slabs are typically conducted using either a 500 or 800 MHz antenna.

A GPR survey provides a graphic cross-sectional view of subsurface conditions. This cross-sectional view is created from the reflections of repetitive short-duration electromagnetic (EM) waves that are generated as the antenna is pulled across the ground surface. The reflections occur at the subsurface contacts between materials with differing electrical properties. The electrical property contrast that causes the reflections is the dielectric permittivity that is directly related to conductivity of a material. The GPR method is commonly used to identify such targets as underground utilities, underground storage tanks or drums, buried debris, voids or geological features.

The greater the electrical contrast between the surrounding earth materials and target of interest, the greater the amplitude of the reflected return signal. Unless the buried object is metal, only part of the signal energy will be reflected back to the antenna with the remaining portion of the signal continuing to propagate downward to be reflected by deeper features. If there is little or no electrical contrast between the target interest and surrounding earth materials it will be very difficult if not impossible to identify the object using GPR.

The depth of penetration of the GPR signal is very site specific and is controlled by two primary factors: subsurface soil conditions and selected antenna frequency. The GPR signal is attenuated (absorbed) as is passes through earth materials. As the energy of the GPR signal is diminished due to attenuation, the energy of the reflected waves is reduced, eventually to the level that the reflections can no longer be detected. As the conductivity of the earth materials increases, the

attenuation of the GPR signal increases thereby reducing the signal penetration depth. In Florida, the typical soil conditions that severely limit GPR signal penetration are near-surface clays and/or organic materials.

The depth of penetration of the GPR signal is also reduced as the antenna frequency is increased. However, as antenna frequency is increased the resolution of the GPR data is improved. Therefore, when designing a GPR survey a tradeoff is made between the required depth of penetration and desired resolution of the data. As a rule, the highest frequency antenna that will still provide the desired maximum depth of penetration should be used. For most concrete studies, a moderate frequency (500 MHz) to high frequency (800 MHz) antenna is used. This allows for a high resolution of near surface (2 to 4 feet bls) conditions.

A GPR survey is conducted along survey lines (transects) that are measured paths along which the GPR antenna is moved. Electronic marks are placed in the data by the operator at designated points along the GPR transects. These marks allow for a correlation between the GPR data and the position of the GPR antenna on the ground.

Depth estimates to the top of anomalous features are determined by dividing the time of travel of the GPR signal from the ground surface to the top of the feature by the velocity of the GPR signal. The velocity of the GPR signal is usually obtained from published tables of velocities for the type and condition (saturated vs. unsaturated) of soils underlying the site. The accuracy of GPR-derived depths typically ranges from 20 to 40 percent of the total depth.

Interpretation and Limitations of GPR data

The analysis and collection of GPR data is both a technical and interpretative skill. The technical aspects of the work are learned from both training and experience. Having the opportunity to compare GPR data collected in numerous settings to the results from geotechnical studies performed at the same locations develops interpretative skills for geological characterization studies.

The ability of GPR to collect interpretable information at a project site is limited by the attenuation (absorption) of the GPR signal by underlying soils. Once the GPR signal has been attenuated at a particular depth, information regarding deeper geological conditions will not be obtained. GPR data can only resolve subsurface features that have a sufficient electrical contrast between the features in question and surrounding earth materials. If an insufficient contrast is present, the subsurface feature will not be identified.

GeoView can make no warranties or representations of geological conditions that may be present beyond the depth of investigation or resolving capability of the GPR equipment or in areas that were not accessible to the geophysical investigation.