COLUMBUS CONSOLIDATED GOVERNMENT
Georgia's First Consolidated Government

FINANCE DEPARTMENT
PURCHASING DIVISION

1111 1ST Avenue, P. O. Box 1340
Columbus, Georgia 31902-1340
706-225-4087 | www.columbusga.org

March 23, 2026

ADDENDUM No. 1

Pine Grove Municipal Solid Waste Landfill Phase 5: Cells 5A – 5C
RFP No. 26-0017

Use the form provided in the solicitation to acknowledge receipt of this addendum. Failure to do so may result in your submittal being deemed non-responsive and not receiving further consideration for award.

Vendors are informed that the above subject solicitation is hereby modified, corrected, or supplemented as specified, described and set forth in this Addendum:

I. DUE DATE EXTENSION

The due date is extended.
Sealed responses are due no later than 5:00 PM on Friday, April 10, 2026

II. QUESTION(S) / RESPONSE(S)

See attached addendum for responses to submitted questions/requests for clarification.

III. ADDITIONAL QUESTIONS

Responses to additional questions will be provided via a forthcoming addendum.

IV. ACKNOWLEDGEMENT

Indicate that your company has received this Addendum in the appropriate areas and include with electronic response. **Failure to acknowledge receipt of this addendum may render your Bid "Incomplete".**

Andrea J. McCorvey
Purchasing Manager

Columbus Georgia
We do amazing.

ADDENDUM NO. 1

PINE GROVE MSW LANDFILL – PHASE 5 CELLS 5A – 5C CONSTRUCTION

COLUMBUS CONSOLIDATED GOVERNMENT

Proposals to be received until 5:00 p.m., local time, April 10, 2026

**** * * SPECIAL NOTICE * * ****

THE PROPOSAL DATE FOR THIS PROJECT HAS BEEN CHANGED TO APRIL 10, 2026.

ADDITIONAL INFORMATION

The following documents:

- Questions and Responses No. 1
- Use and Transfer of Electronic Media Files Letter of Agreement
- Pine Grove Site Suitability Soils Data

are being provided with this addendum for informational purposes only. The documents listed above are not, and will not, be considered as part of the Contract Documents.

RFP No. 26-0017

Delete Form 6 in its entirety and replace with Form 6 included with this addendum.

REQUEST FOR PROPOSALS

Page 2 of 10, Section 1.01, second paragraph, delete in its entirety and replace with the following:

> The Project consists of construction of approximately 196,500 CY of excavation, 50,400 CY of structural fill; 494,900 SF of low permeability linear base, HDPE geomembrane and leachate collection layer material; 2,195 LF of leachate collection pipe; 1,908 LF of dual-contained HDPE forcemain; leachate pump station; sediment pond cleaning; 9,217 square yards of all-weather access road, and erosion and sedimentation control items.

Page 8 of 10, Section 3.03, “Evaluation Factors” Table, delete table in its entirety and replace with the following:

Evaluation Factors	
Proposer's Team Experience and Capacity	45%
Client References for Similar Work Performed	30%
Cost to the Owner	15%
Schedule	10%

CONTRACT DOCUMENTS

Page C-800-8, Section 6.03.D, "Workers' Compensation and Related Policies" Table, delete table in its entirety and replace with the following:

Workers' Compensation and Related Policies	Policy limits of not less than:
Workers' Compensation	
State	Statutory
Applicable Federal (e.g., Longshoreman's)	Statutory
Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable	Statutory
Employer's Liability	
Each accident	Statutory
Each employee	Statutory
Policy limit	Statutory

Page C-800-9, Section 6.03.H, "Commercial General Liability" Table, delete table in its entirety and replace with the following:

Commercial General Liability	Policy limits of not less than:
General Aggregate	$1,000,000.00
Products—Completed Operations Aggregate	$1,000,000.00
Personal and Advertising Injury	$1,000,000.00
Bodily Injury and Property Damage—Each Occurrence	$1,000,000.00

Page C-800-9, Section 6.03.I, "Automobile Liability" Table, delete table in its entirety and replace with the following:

Automobile Liability	Policy limits of not less than:
Bodily Injury	
Each Accident	$1,000,000.00
Property Damage	
Each Accident	$1,000,000.00

Page C-800-10, Section 6.03, item M., delete table in its entirety and replace with the following:

M. *Environmental Impairment Liability Insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of sudden or gradual pollution incidents arising from Contractor's operations and completed operations. This coverage must be maintained for no less than three years after final completetion.

Environmental Impairment Liability Insurance	**Policy limits of not less than:**
Each Claim	$2,000,000.00
General Aggregate	$2,000,000.00

Page 01010-1, Section 1.01.A., delete in its entirety and replace with the following:

A. The Project consists of providing all labor, materials, tools, equipment, services, and incidentals and performing all Work required to construct complete in place and ready to operate Municipal Solid Waste Landfill Cells consisting of approximately 196,500 CY of excavation, 50,400 CY of structural fill; 494,900 SF of low permeability linear base, HDPE geomembrane and leachate collection layer material; 2,195 LF of leachate collection pipe; 1,908 LF of dual-contained HDPE forcemain; leachate pump station; sediment pond cleaning; 9,217 square yards of all-weather access road, and erosion and sedimentation control items.

Page 02200-5, Section 2.01 A., item 7.d., delete in its entirety and replace with the following:

d. The leachate collection layer shall have a minimum permeability of 1×10^{-2} cm/sec for Alternative A and a maximum permeability of 1×10^{-4} cm/sec for Alternative B when tested in accordance with ASTM D2434.

DRAWINGS

Sheets C-001 through C-501 and C-502 through C-506, revised in accordance with Sketch 1 included with this addendum.

Sheet C-101, NOTES, Note 3, delete in its entirety and replace with the following:

3. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND PROPER DISPOSAL OF ALL MISCELLANEOUS ITEMS WITHIN THE LIMITS OF CONSTRUCTION THAT MAY INTERFERE WITH NEW CONSTRUCTION. THESE INCLUDE, BUT ARE NOT LIMITED TO, SHRUBBERY, TREES, MISCELLANEOUS UTILITIES, ASPHALT PAVEMENT, GRAVEL PAVEMENT AND CONCRETE. CONTRACTOR SHALL COORDINATE THIS WORK WITH OWNER. CONCRETE AND MISCELLANEOUS DEBRIS SHALL BE DELIVERED TO OWNER AT THE MATERIALS RECOVERY AND TIRE STORAGE AREA. ONLY TREES SHOWN TO BE REMOVED ON PLANS, OR INTERFERING WITH CONSTRUCTION, SHALL BE REMOVED; GRUBBING SHALL BE PERFORMED AROUND ALL TREES, SHRUBS, AND OTHER VEGETATION THAT ARE BEING REMOVED.

Proposer Must Acknowledge Receipt of this Addendum on Proposal Affidavit Form

March 23, 2026

Atlantic Coast Consulting, Inc.
7414 Hodgson Memorial Drive, Unit 2B
Savannah, Georgia 31406
912-236-3471

FORM 6

INSURANCE CHECKLIST

Pine Grove Municipal Solid Waste Landfill
Phase 5: Cells 5A – 5C
RFP No. 26-0017

CERTIFICATE OF INSURANCE MUST SHOW ALL COVERAGE AND ENDORSEMENTS INDICATED BY "X"

CSL = Combined Single Limit; BI = Bodily Injury; PD=Property Damage

	Required Coverage(s)	Limits (Figures denote minimums)	Bidders Limits/Response
X	1. Worker's Compensation and Employer's Liability	**STATUTORY REQUIREMENTS**	
	Comprehensive General Liability		
X	2. General Liability Premises/Operations	$1 Million CSL BI/PD each occurrence, $1 Million annual aggregate	
	3. Independent Contractors and Sub - Contractors	$1 Million CSL BI/PD each occurrence, $1 Million annual aggregate	
	4. Products Liability	$1 Million CSL BI/PD each occurrence, $1 Million annual aggregate	
	5. Completed Operations	$1 Million CSL BI/PD each occurrence, $1 Million annual aggregate	
	6. Contractual Liability (Must be shown on Certificate)	$ 1 Million CSL BI/PD each occurrence, $1 Million annual aggregate	
	Automobile Liability		
X	7. *Owned/Hired/Non-Owned Vehicles/ Employer non ownership	$1 Million BI/PD each Accident, Uninsured Motorist	
	Others		
	8. Miscellaneous Errors and Omissions	$1 Million per occurrence/claim	
X	9. Umbrella/Excess Liability	$10 Million Bodily Injury, Property Damage and Personal Injury	
X	10. Personal and Advertising Injury Liability	$1 Million each offense, $1 Million annual aggregate	
X	11. Professional Liability	$1 Million per occurrence/claim	
	12. Architects and Engineers	$1 Million per occurrence/claim	
	13. Asbestos Removal Liability	$2 Million per occurrence/claim	
	14. Medical Malpractice	$1 Million per occurrence/claim	
	15. Medical Professional Liability	$1 Million per occurrence/claim	
	16. Dishonesty Bond		

Required Coverage(s)		Limits (Figures denote minimums)	Bidders Limits/Response
X	17. Builder's Risk	Provide Coverage in the full amount of contract	
	18. XCU (Explosive, Collapse, Underground) Coverage		
	19. USL&H (Long Shore Harbor Worker's Compensation Act)		
X	20. Contractor Pollution Liability	$2 Million per occurrence/claim	
X	21. Environmental Impairment Liability	$2 Million per occurrence/claim	
X	22. Carrier Rating shall be Best's Rating of A-VII or its equivalents		
X	23. Notice of Cancellation, non-renewal or material change in coverage shall be provided to City at least 30 days prior to action.		
X	24. **The City shall be named Additional Insured on all policies**		
X	25. Certificate of Insurance shall show **Solicitation Number** (***RFP No. 26-0017***) and **Solicitation Title** (***Pine Grove Municipal Solid Waste Landfill Phase 5: Cells 5A – 5C***) in box: ***Description of Operations***		
	26. Pollution:	$2 Million per occurrence/claim	

*If offeror's employees will be using their privately owned vehicles while working on this contract and are privately insured, please state that fact in the **Bidders Limits/Response** column of the insurance checklist.

VENDOR'S STATEMENT:

If awarded the contract, I will comply with contract insurance requirements and provide the required certificate(s).

Company Name

Signature of Authorized Agent Date

Title of Authorized Agent

Print Name of Authorized Agent

EXISTING
SEDIMENT
POND 4

EXISTING
SEDIMENT
POND 6

C&D AREA 1
(EXISTING)

C&D AREA 3
(EXISTING)

C&D AREA 2
(EXISTING)

1

ATLANTIC COAST
CONSULTING, INC.
Alpharetta, GA
Savannah, GA
Knoxville, TN
11545 Wills Road, Suite 100
Alpharetta, GA 30009
C.O.A #PEF004740
EXP: 06/30/2026

PINE GROVE MSW LANDFILL
PHASE 5 CELLS 5A - 5C CONSTRUCTION

PHASE 6 STREAM BUFFER

PROJECT :	G035-136
ADDENDUM:	1
SKETCH :	1
SHEET REVISED:	C-001-C-501 & C-502-C-506
SCALE:	1"=150'
DATE:	03/16/26
BY:	JLY

P: \Governmental\G035-Columbus Consolidated Gov\136-Phase 5 Construction\3-Design Data\2-DWGs\G035-136-C-101-Existing Conditions.dwg 3/16/26 JOSHUA YOUNG

QUESTIONS AND RESPONSES NO. 1

Pine Grove MSW Landfill
Phase 5 Cells 5A – 5C Construction

COLUMBUS CONSOLIDATED GOVERNMENT

1. Q: Is the CAD file available for the Pine Grove Landfill project?

   R: An electronic file release form is included with Addendum #1. CAD files will be made available to proposers that execute and return the form. Completed forms can be emailed to joshua.young@atlcc.net.

2. Q: After completing earthwork take off from the provided plans, [redacted] has discovered a quite large discrepancy. The quantities we have estimated are as follows:
   Sed Basin 7 = 68, 348 cy of cut
   Temp Basin 1 = 7,527 cy of cut and 1,316 cy of fill
   Phase 1 grading plan = 68,348 cy of cut and 77,369 cy of fill
   This gives the following totals:
   Cut = 138,285 cy
   Fill = 78,688 cy
   Can this be checked and adjusted?

   R: The earthwork quantities provided in the Proposal Cost Form are correct.

3. Q: Can the clearing debris be burnt on-site? If not, is there a disposal area onsite, and will it have to be ground up before placement onsite?

   R: See Specification Section 02110, Part 3.03, Subparts A and B.

4. Q: The base bid is asking for a clay layer of 10^{-7}. Is this material available onsite?

   R: The contract documents provide no guarantee that on-site earthen materials will meet the requirements for use to construct the proposed clay liner. However, previous cell construction projects at the Pine Grove Landfill have used 10^{-7} clay liner material obtained from on-site borrow areas. Proposers can coordinate with Rachel Masenburge at masenburge.rachel@columbusga.org or 706-225-4516 for access to the site to obtain soil samples, if desired.

5. Q: Are there soil borings available for the site?

   R: See Addendum #1.

6. Q: Who is responsible for the power connection to the pumpstation?

   R: **The selected contractor will be responsible for service installation. Installation requirements shall be coordinated with the local power company per Note 10 on Sheet E-100.**

7. Q: If the contractor is responsible for the electrical connection can you provide the electrician the landfill uses?

   R: **See Response to Question 6 above. No, the County does not have information for a primary electrician. However, TC & C Electric, Inc. performed electrical work at existing pump station 1.**

8. Q: Will the topsoil have to be screened before placement?

   R: **See Specification Section 02200, Part 2.01 and Section 02930, Part 2.01, Subparts B and C for topsoil material requirements.**

9. Q: If the underdrain shown as a bid alternate is selected, will there be additional time allowed in the contract for the installation?

   R: **See Section C-520, Article 4, Part 4.02 of the Contract Documents.**

10. Q: What stone quarry is used by the landfill?

    R: **See Specification Section 02125, Part 2.01 and Section 02200, Part 2.01 for aggregate material requirements. GDOT's Qualified Product List (QPL-2) contains an approved list of coarse aggregate sources.**

11. Q: What hours and how many days a week will the contractor be allowed onsite?

    R: **See Specification Section C-800, Part 7.03.**

12. Q: No soil information for the site has been provided in the RFP. Also no addenda has been issued addressing this. We would like to obtain soil samples from the site to be tested and we are requesting a 2 week extension to get this done.

    R: **See Addendum #1 and Responses to Questions 4 and 5 above.**

13. Q: Protective Cover. Can you provide an actual material name I.E. Sand, Stone, Soil? Is there soil onsite that will meet the requirements for protective cover?

    R: **See Addendum #1. The protective cover material shall meet the requirements of Specification Section 02200, Part 2.01, Subpart A.7. The contract documents provide no guarantee that on-site earthen materials will meet the requirements for use to construct the protective cover. However, previous cell**

construction projects at the Pine Grove Landfill have used protective cover material obtained from on-site borrow areas.

14. Q: Can CAD files be provided for this project?

R: See Response to Question 1 above.

15. Q: Geosynthetic, HDPE Pipe, Fuel and Freight rates are rising daily due to the issues in the Middle East. Is there an agreeable method for material price escalations? Price indexes are not applicable right now.

R: See Specification Section C-700, Article 11.

16. Q: Can the Concrete Wetwell and Valve Vault shown on C-704 be priced HDPE Structures?

R: Yes, HDPE wetwell and valve vault structures are an acceptable alternative. See Specification Section 02748 for HDPE fabrication requirements. Wetwell shall meet the requirements for dual containment. Contractor shall be responsible for providing anti-floatation of the wetwell and valve vault structures. Buoyancy calculations should assume ground water to be at finished grade elevation of the pump station area.

17. Q: On sheet C - 703 there's an Isolation manhole with a stem extension. Could you clarify what type of extension this is? Asahi makes one piece and 2 piece extensions out of many different types of materials. Asahi won't make a stem extension that's over 12 feet long and this one will be 15'9" long.?

R: The valve stem extension shall be a single or two piece extension manufactured by Asahi/America, Inc. or an approved equal.

ATLANTIC COAST CONSULTING, INC.

Our work helps produce a cleaner environment for all.

USE AND TRANSFER OF ELECTRONIC MEDIA FILES LETTER OF AGREEMENT

Dear *Proposer*:

At your request, Atlantic Coast Consulting, Inc. ("ACC") will provide data in any form of electronic media files ("Files") for Recipient's convenience and use related to *Pine Grove MSW Landfill Phase 5 Cells 5A – 5C Construction*, subject to the following terms and conditions:

ACC makes no representations as to the compatibility of these Files with Recipient's hardware or software.

These Files are a part of ACC's instruments of professional service and shall not be used by Recipient or anyone else receiving these Files through or from Recipient for any purpose other than as a convenience for the referenced project. Any other use or reuse by Recipient or by others will be at Recipient's sole risk and without liability or legal exposure to ACC. Recipient agrees to make no claim whatsoever and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against ACC, its officers, directors, employees, agents or subconsultants which may arise out of or in connection with Recipient's use of the Files. Furthermore, Recipient shall, to the fullest extent permitted by law, indemnify and hold harmless ACC from all claims, damages, losses, and expenses, including attorneys' fees, arising out of or resulting from Recipient's use of these Files.

Significant differences may exist between these Files and the corresponding printed documents (hard copies). ACC makes no representation or certifications regarding the accuracy or completeness of the Files you receive. In the event that a conflict arises between any hard copies prepared by ACC and the Files, the hard copies shall govern.

Because of the potential that the information presented in the Files can be altered, modified and/or added to, unintentionally or otherwise, ACC reserves the right to remove all reference of its ownership and/or involvement for each File.

ACC will furnish the Files listed in Attachment A.

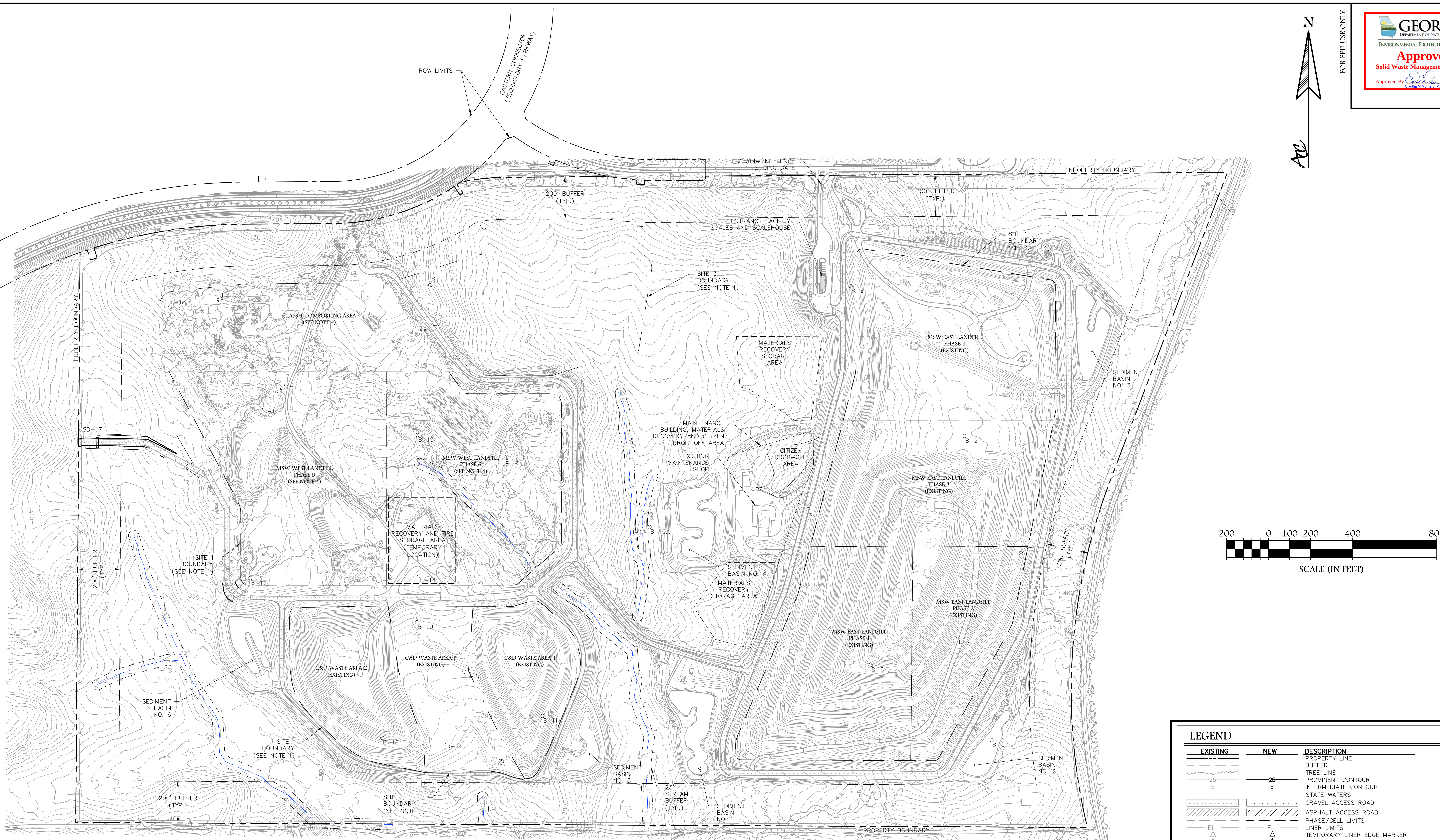
Under no circumstances shall delivery of the Files for use by Recipient be deemed a sale by ACC, and ACC makes no warranties, either expressed or implied, of merchantability and fitness for any particular purpose. In no event shall ACC be liable for any direct, special, or consequential damages.

Other Party: _____	ATLANTIC COAST CONSULTING, INC.
Signature: _____	Signature: _____
Print Name, Title: _____	Print Name, Title: _____
Date: _____	Date: _____

ATTACHMENT A

1) G035-136-0-BASE.dwg

PINE GROVE SITE SUITABILITY SOILS DATA



FOR EPD USE ONLY:

GEORGIA DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
Approved
Solid Waste Management Program
Approved By: Claudia M Moreno, P.E. April 30, 2025 Date

BORING SUMMARY LOG

BORING I.D. NO.	DATE OF BORING (MM/DD/YY)	GROUND SURFACE ELEVATION (FT MSL)	TOP OF CASING ELEVATION (FT MSL)	DEPTH TO GW BTOC (FT)	STABILIZED GW ELEVATION (FT MSL)	DEPTH TO ROCK (FT)	TOTAL BORING DEPTH (FT)
B-1	5/19/94	422.07	424.95	10.00	414.95	–	40.00
B-2	5/1-3/94	474.10	477.18	20.20	456.98	–	39.50
B-3	4/28/94	469.96	472.90	33.55	439.35	–	55.00
B-4	5/2/94	461.86	465.16	12.76	452.40	–	37.00
B-5	4/28/94	421.05	423.99	15.28	408.71	–	40.00
B-6	5/4/94	451.47	454.41	35.06	419.35	–	60.60
B-7	4/28/94	432.17	435.05	16.70	418.35	–	50.00
B-8	5/17/94	426.30	429.52	13.71	415.81	–	47.00
B-8A	5/25/94	426.98	429.80	13.81	415.99	–	42.00
B-9	5/11-12/94	407.22	410.31	6.53	403.78	–	30.00
B-10	5/16/94	369.25	372.45	9.51	362.94	–	65.00
B-10A	10/6/94	369.61	371.58	4.95	366.63	–	9.00
B-11	5/9/94	390.15	393.02	30.86	362.16	–	45.00
B-12	5/12-13/94	442.25	444.93	31.82	413.11	–	65.00
B-13	5/10-11/94	418.79	421.89	6.99	414.90	–	40.00
B-14	5/5-6/94	424.72	427.69	14.53	413.16	–	35.00
B-15	5/15-18/94	399.48	402.35	46.05	356.30	–	98.00
B-16	5/4-5/94	427.09	430.21	30.18	400.03	–	54.60
B-17	5/5/94	404.10	407.35	14.89	392.46	–	40.00
B-18	5/10/94	433.09	435.98	29.95	406.03	–	50.00
B-19S	9/15	406.98	409.91	8.50	401.41	–	25.45
B-19D	9/15	406.98	410.10	10.56	399.54	–	57.82
B-20S	9/15	399.30	402.66	10.21	392.45	–	24.15
B-20D	9/15	399.30	402.32	25.78	376.54	–	55.55
B-21S	9/15	395.92	399.40	13.48	385.92	–	25.46
B-21D	9/15	395.92	400.58	28.16	372.42	–	58.61
B-22S	9/15	381.98	384.10	13.63	370.47	–	14.00
B-22D	9/15	381.98	383.66	14.83	368.83	–	35.48
PZ-2	3/28/2017	430.82	433.87	30.44	403.43	–	40.00
PZ-3	3/28/2017	445.36	448.53	17.76	430.86	–	35.00
PZ-4	3/28/2017	443.31	446.30	26.96	419.34	–	40.00

NOTES:
1. DEPTH TO GROUNDWATER INDICATES MEASUREMENT BELOW TOP OF CASING (BTOC).
2. STABILIZED GROUNDWATER DEPTHS AND ELEVATIONS BASED ON WATER LEVEL MEASUREMENTS RECORDED OCTOBER 7, 1994 FOR 1994 BORINGS, MARCH 17, 2016 FOR 2015 BORINGS, AND MAY 18, 2020 FOR 2017 BORINGS.

LEGEND

EXISTING	NEW	DESCRIPTION
		PROPERTY LINE
		BUFFER
		TREE LINE
25	25	PROMINENT CONTOUR
5	5	INTERMEDIATE CONTOUR
		STATE WATERS
		GRAVEL ACCESS ROAD
		ASPHALT ACCESS ROAD
		PHASE/CELL LIMITS
EL	EL	LINER LIMITS
		TEMPORARY LINER EDGE MARKER
		PERMANENT LINER EDGE MARKER
		DOWNDRAIN
		STORM DRAIN
X		SECURITY FENCE (HOG WIRE)
	XX	SILT FENCE
		STONE CHECK DAM
<	<	TACK-ON TERRACE
FM	FM	FORCEMAIN
GS	GS	GRAVITY SEWER
UD	UD	UNDERDRAIN
		RIP RAP
LC	LC	LEACHATE COLLECTION LINE
		MANHOLE
C.O.	C.O.	CLEANOUT
		CROSS SECTION
	xHP	HIGH POINT
		SITE 1 BOUNDARY
		SITE 2 BOUNDARY
		SITE 3 BOUNDARY
PZ-1		PIEZOMETER (TO BE ABANDONED)
B-1		BORING (ABANDONED)
		DOUBLE LINER LIMITS
		25' STREAM BUFFER
		GROUNDWATER FLOW ARROW
		AIR RELEASE VALVE
		LEACHATE CLEANOUT
5E	5E	PHASE/CELL

NOTES:

1. SITE 1 INCLUDES MSW EAST LANDFILL PHASES 1, 2, 3 AND 4, MSW WEST LANDFILL PHASES 5 AND 6, AND C&D WASTE AREAS 1 AND 2 AND IS SUBJECT TO SITE LIMITATIONS DERIVED FROM D&O PLANS PREPARED BY JACOBS AND APPROVED BY EPD ON JUNE 26, 2015. PREVIOUSLY APPROVED D&O PLAN SITE LIMITATIONS WERE BASED ON THE SITE ACCEPTABILITY REPORT BY JACOBS DATED NOVEMBER 1994 (SEE SHEET 30). SITE 2 INCLUDES C&D AREA 3 AND IS SUBJECT TO SITE LIMITATIONS DEFINED IN THE SITE ACCEPTABILITY REPORT PREPARED BY ACC DATED OCTOBER 2017 (SEE SHEET 30). SITE 3 INCLUDES CLASS 4 COMPOSTING AREA AND IS SUBJECT TO SITE LIMITATIONS ISSUED BY EPD ON DECEMBER 20, 2022 (SEE SHEET 30).
2. EXISTING CONDITIONS COMPILED FROM AERIAL TOPOGRAPHIC SURVEY FOR C&D AREAS 1-3 AND MSW PHASES 1-4 DATED APRIL 8, 2021 AND A TOPOGRAPHIC SURVEY OF ALL OTHER AREAS DATED FEBRUARY 1, 2020 BY PLATINUM GEOMATICS OF BUFORD, GA.
3. STATE WATERS DELINEATION PROVIDED BY FOX LAND & WATER CONSULTING OF COLUMBUS, GA (2019). DELINEATION OF STATE WATERS WAS CONDUCTED FOLLOWING THE ACCEPTED METHODOLOGY OF THE UNITED STATES ARMY CORPS OF ENGINEERS (USACE) AND GEORGIA ENVIRONMENTAL PROTECTION DIVISION (GAEPD).
4. PHASES 5 AND 6 OF THE MSW LANDFILL AND CLASS 4 COMPOSTING AREA MAY BE USED AS A CLASS 1 COMPOSTING AND MULCHING FACILITY IN ACCORDANCE WITH GA EPD RULES FOR SOLID WASTE 391-3-4-.16.

ATLANTIC COAST CONSULTING, INC.
Alpharetta, GA
Savannah, GA
Knoxville, TN
11545 Wills Road, Suite 100
Alpharetta, GA 30009
C.O.A #PEF004740
EXP: 06/30/2026

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. PE0[illegible] JOSHUA L. [illegible] 4/15/25
69625
LEVEL II CERTIFICATION

PROJECT:
DESIGN & OPERATIONAL PLAN PINE GROVE MSW LANDFILL VERTICAL EXPANSION
106-016D(MSWL)
COLUMBUS, GA

COLUMBUS GEORGIA
We do amazing.
602 11TH AVENUE
BUILDING E
COLUMBUS, GA 31901
706-225-4665

REVISIONS
0. Initial Issue 04/15/2025

Drawn by: CH/AA
Checked by: [illegible]
QC by: SK

PROJECT NUMBER:
G035-124
APRIL 2025

EXISTING CONDITIONS PLAN AND LEGEND

SHEET 3

Laboratory hydraulic conductivity ranged from 4.0 x 10^{-9} to 4.4 x 10^{-5} centimeters per second (cm/sec). The 2015 geotechnical sample data is provided in Appendix 7 and includes analysis of the above listed parameters. Laboratory geotechnical test results are summarized in Tables 3, 4, and 5 and are consistent with the previous data.

Table 4 Summary of 1994 Laboratory Vertical Hydraulic Conductivity

Boring No.	Depth (feet MSL)	Permeability (cm/sec)	Permeability (ft/day)	Material
B-7	414-412	1.1E-07	3.1E-04	medium to fine sand
B-8	409-407	5.9E-08	1.7E-04	medium to fine sand
B-12	424-422	4.0E-09	1.1E-05	silty clay
B-14	416-415	4.4E-05	1.2E-01	medium to fine sand
B-15	311-310	4.3E-09	1.2E-05	silty clay
B-16	399-397	6.6E-09	1.9E-05	silty clay
B-18	410-409	7.8E-09	2.2E-05	silty clay

cm/sec = centimeters per second ft/day = feet per day

Table 5 Summary of 2015 Geotechnical Test Results

				Atterberg Limits			Hydraulic Conductivity		
Sample ID	Depth Collected (ft BGS)	USCS	Soil Description	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Initial Moisture Content (%)	Init.Dry Density (pcf)	Vertical Hydraulic Conductivity (cm/sec)
B-19	5'-7'	SP-SM	Light Yellowish Brown Poorly Graded Sand with Silt	NP	NP	NP	5.00	107.3	3.30E-04
B-20	10'-11'	SC	Red and White Clayey Sand	38	17	21	18.50	112.3	1.30E-06
B-21	20'-21'	SC	Brown Clayey Sand	33	18	15	32.03	97.4	1.80E-04
B-22	25'-26'	SC	Olive Brown and Yellowish Red Clayey Sand	50	22	28	48.63	105.9	3.50E-07

Notes: NP = nonplastic
pcf = pounds per cubic foot
cm/sec = centimeters per second

TIMELY ENGINEERING SOIL TESTS, LLC
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	09/24/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20542/B-19	Depth/Elev.	5-7'
Location	-	Add. Info	-

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311; Particle Size Analysis (Split Sieve)

MOISTURE CONTENT of TOTAL SAMPLE

Mass of Wet Sample & Tare, g	397.5
Mass of Dry Sample & Tare, g	382.6
Mass of Tare, g	85.3
Moisture Content, %	5.0

MOISTURE CONTENT of FINE MATERIAL

Mass of Wet Sample & Tare, g	397.50
Mass of Dry Sample & Tare, g	382.60
Mass of Tare, g	85.30
Moisture Content, %	5.0

TOTAL Mass of wet sample before splitting & tare, g	1290.0
Mass of Tare, g	0.0
TOTAL Mass of dry sample, g	1228.4

Mass of Wet Fine Material & Tare, g	150.20
Mass of Tare, g	0.00
Mass of Dry Fine Material, g	143.03
% of Total Sample Passing Split Sieve	99.7

SIEVE ANALYSIS*

COARSE MATERIAL

Mass of Tare, g: 0.0

Sieve Size		Sample & Tare, g	% RETAINED	% PASSING
12"	COBBLES		0.0	100.0
3"			0.0	100.0
2.5"	COARSE		0.0	100.0
2"	GRAVEL		0.0	100.0
1.5"			0.0	100.0
1"			0.0	100.0
.75"			0.0	100.0
.5"	FINE GRAVEL		0.0	100.0
.375"			0.0	100.0
#4	COARSE SAND	4.0	0.3	99.7

FINE MATERIAL

Mass of Tare, g: 0.00

Sieve Size		Cumulative Mass retained, g	% PASSING (of Total)
#10	MEDIUM	3.13	97.5
#20	SAND	22.42	84.1
#40		54.34	61.8
#60	FINE SAND	89.72	37.2
#100		113.73	20.4
#200	FINES	128.02	10.5

* - ASTM Definitions of Classification
** - AASHTO Definitions of Classification

NOTE: # 4 (4.75 mm) Sieve used for splitting sample on fine and coarse material

Oven ID #	15/496/610
Balance ID#	139/142/700
Sieve Shaker ID #	555

PARTICLE-SIZE ANALYSIS*

% COBBLES	0.0	% MEDIUM Sand	35.7
% COARSE Gravel	0.0	% FINE Sand	51.3
% FINE Gravel	0.3	% FINES	10.5
% COARSE Sand	2.2	% TOTAL SAMPLE	100.0

REMARKS

PARTICLE-SIZE ANALYSIS**

% COBBLES	0.0	% COARSE Sand	35.7
% COARSE Gravel (Stone)	0.0	% FINE Sand	51.3
% MEDIUM Gravel (Stone)	0.0	% FINES (Silt-Clay)	10.5
% FINE Gravel (Stone)	2.5	% TOTAL SAMPLE	100.0

DESCRIPTION: Light Yellowish Brown Poorly Graded Sand with Silt

USCS (ASTM D2487; D2488): SP-SM

AASHTO (M 145): NA

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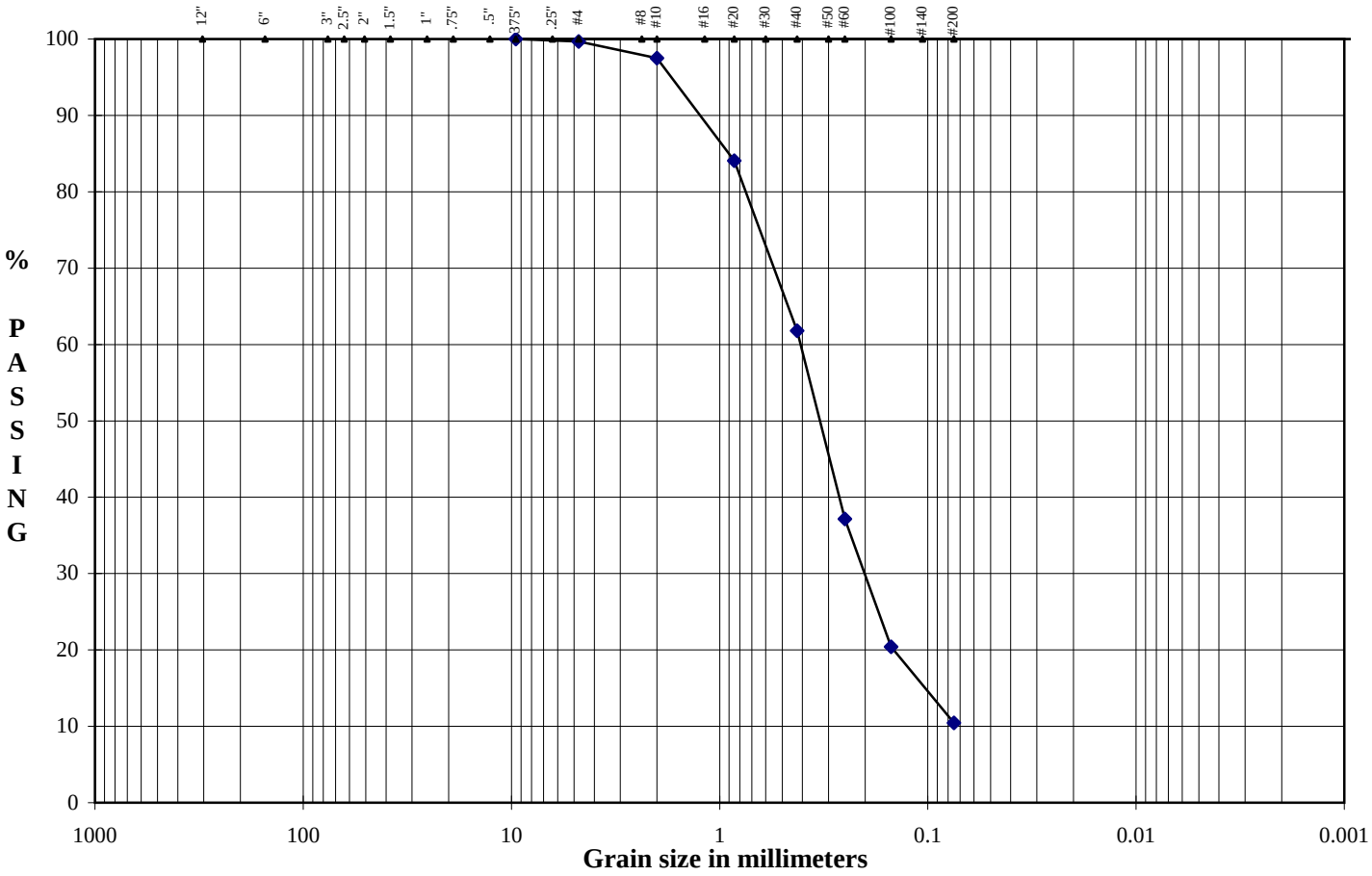
1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	09/24/15
Checked By	LB

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20542/B-19	Depth/Elev.	5-7'
Location	-	Add. Info	-

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311
Standard Test Method for Particle-Size Analysis of Soils and Aggregates (Split Sieve)

Particle-Size Analysis



Boulders	Cobbles	Gravel: Coarse	Gravel: Fine	Sand: Coarse	Sand: Medium	Sand: Fine	Fines: Silt or Clay

D_{10}	NA	mm
D_{30}	NA	mm
D_{60}	NA	mm
Cu	NA	
Cc	NA	

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Tested By	EB
Date	09/28/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20542/B-19	Depth/Elev.	5-7'
Location	-	Add. Info	-

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.004	in	7.63	cm
Diameter	2.852	in	7.24	cm
Area	6.39	in^2	41.22	cm^2
Volume	314.48	cm^3	0.0111	ft^3
Mass	567.80	g	1.25	lb
Specific Gravity	2.650	(Assumed)		
Dry Density	107.3	pcf		

Moisture Content

Mass of wet sample & tare	397.50	g
Mass of dry sample & tare	382.60	g
Mass of tare	85.30	g
% Moisture	5.0	

Test Data

Speed	3	
Board Number	2	
Cell Number	8	
Flow Pump Number	1A	
Flow Pump Rate	2.87E-02	cm^3/sec
B - Value	0.95	
Cell Pressure	84.0	psi
Back Pressure	80.0	psi
Confining (Effective) Pressure	4.0	psi
Max Head	14.07	cm
Min Head	13.36	cm
Maximum Gradient	1.85	
Minimum Gradient	1.75	

Final Data (After Test)

Average Height of Sample		3.000	in	7.62	cm	
Average Diameter of Sample		2.850	in	7.24	cm	
Area	6.38 in^2	41.16	cm^2			
Volume	313.62 cm^3	0.0111	ft^3	Dry Density	96.4	pcf
Mass	614.50 g	1.35	lb	Vol. of Voids	130.80	cm^3
				Vol. of Solids	182.82	cm^3
				Void Ratio	0.72	
				Saturation	99.4	%

Moisture Content

Mass of wet sample & tare	683.10	g
Mass of dry sample & tare	553.30	g
Mass of tare	69.70	g
% Moisture	26.8	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
09/28/15	16	45	-	0.20	14.07	1.85	26.0	-	-	-	
09/28/15	16	50	300	0.19	13.36	1.75	26.0	3.87E-04	0.869	3.36E-04	
09/28/15	16	55	300	0.20	14.07	1.85	26.0	3.87E-04	0.869	3.36E-04	
09/28/15	17	0	300	0.19	13.36	1.75	26.0	3.87E-04	0.869	3.36E-04	*
09/28/15	17	5	300	0.20	14.07	1.85	26.0	3.87E-04	0.869	3.36E-04	*
09/28/15	17	10	300	0.20	14.07	1.85	26.0	3.77E-04	0.869	3.28E-04	*
09/28/15	17	15	300	0.20	14.07	1.85	26.0	3.77E-04	0.869	3.28E-04	*

Reported Average Hydraulic Conductivity* 3.3E-04 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: Light Yellowish Brown Poorly Graded Sand with Silt

USCS (ASTM D2487;2488): SP-SM

REMARKS: Portion of sample used for testing located 7" above bottom of shelby tube.

Flow pump ID #	22	Balance ID #	1/6/7	Differential Pressure Transducer ID #	24/25
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	64
Syringe ID #	140			Pore Pressure Transducer ID #	26/27

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1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	EB
Date	09/25/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20543/B-20	Depth/Elev.	10-11'
Location	-	Add. Info	-

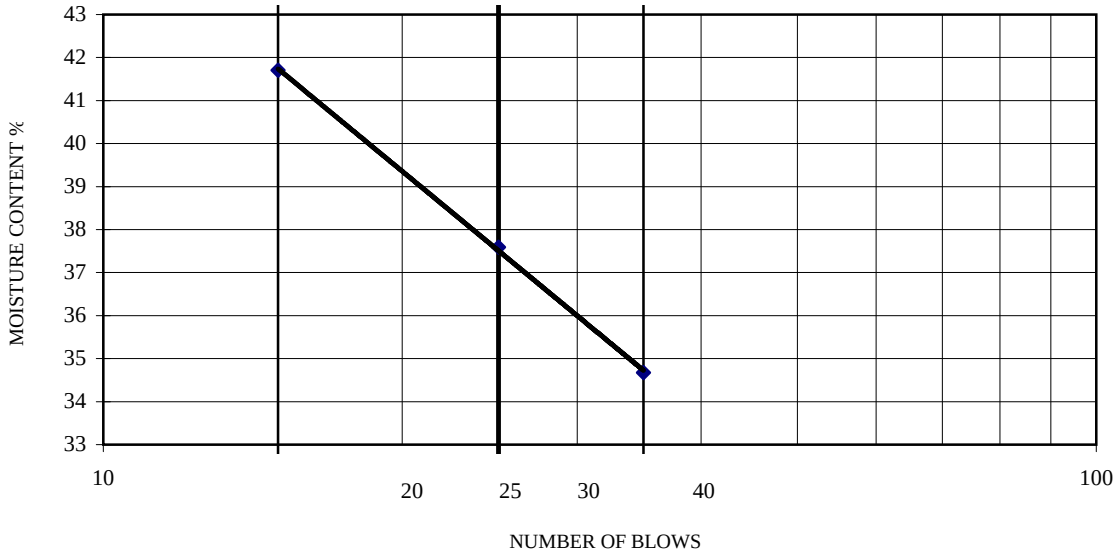
ASTM D 4318/AASHTO T 88, T 89

Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

LIQUID LIMIT

Number of Blows	35	25	15
Mass of Wet Sample & Tare, g	46.09	42.89	41.53
Mass of Dry Sample & Tare, g	40.66	38.33	35.85
Mass of Tare, g	25.00	26.20	22.23
Moisture Content, %	34.67	37.59	41.70

Oven ID #	15/496/610
Balance ID #	139/563
Liquid Limit Device ID #	451/569



PLASTIC LIMIT

Mass of Wet Sample & Tare, g	32.21	33.34
Mass of Dry Sample & Tare, g	31.11	32.30
Mass of Tare, g	24.74	26.18
Moisture Content, %	17.27	16.99

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

Mass of Wet Sample & Tare, g	364.10
Mass of Dry Sample & Tare, g	329.30
Mass of Tare, g	102.70
Moisture Content, %	15.36

LIQUID LIMIT (LL)	38
PLASTIC LIMIT (PL)	17
PLASTICITY INDEX (PI)	21
LIQUIDITY INDEX (LI)	-0.08

DESCRIPTION: Red and White Clayey Sand

USCS (ASTM D2487; D2488): SC

AASHTO (M 145): NA

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1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
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Date	09/25/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20543/B-20	Depth/Elev.	10-11'
Location	-	Add. Info	-

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311; Particle Size Analysis (Split Sieve)

MOISTURE CONTENT of TOTAL SAMPLE

Mass of Wet Sample & Tare, g	364.1
Mass of Dry Sample & Tare, g	329.3
Mass of Tare, g	102.7
Moisture Content, %	15.4

MOISTURE CONTENT of FINE MATERIAL

Mass of Wet Sample & Tare, g	304.10
Mass of Dry Sample & Tare, g	278.60
Mass of Tare, g	99.40
Moisture Content, %	14.2

TOTAL Mass of wet sample before splitting & tare, g	1417.2
Mass of Tare, g	0.0
TOTAL Mass of dry sample, g	1228.5

Mass of Wet Fine Material & Tare, g	125.80
Mass of Tare, g	0.00
Mass of Dry Fine Material, g	110.13
% of Total Sample Passing Split Sieve	99.0

SIEVE ANALYSIS*

COARSE MATERIAL

Mass of Tare, g: 0.0

Sieve Size		Sample & Tare, g	% RETAINED	% PASSING
12"	COBBLES		0.0	100.0
3"			0.0	100.0
2.5"	COARSE		0.0	100.0
2"	GRAVEL		0.0	100.0
1.5"			0.0	100.0
1"			0.0	100.0
.75"			0.0	100.0
.5"	FINE GRAVEL	0.0	0.0	100.0
.375"		2.6	0.2	99.8
#4	COARSE SAND	12.7	1.0	99.0

FINE MATERIAL

Mass of Tare, g: 0.00

Sieve Size		Cumulative Mass retained, g	% PASSING (of Total)
#10	MEDIUM	7.31	92.4
#20	SAND	33.43	68.9
#40		62.37	42.9
#60	FINE SAND	81.16	26.0
#100		87.96	19.9
#200	FINES	90.72	17.4

* - ASTM Definitions of Classification
** - AASHTO Definitions of Classification

NOTE: # 4 (4.75 mm) Sieve used for splitting sample on fine and coarse material

Oven ID #	15/496/610
Balance ID#	139/142/700
Sieve Shaker ID #	555

PARTICLE-SIZE ANALYSIS*

% COBBLES	0.0	% MEDIUM Sand	49.5
% COARSE Gravel	0.0	% FINE Sand	25.5
% FINE Gravel	1.0	% FINES	17.4
% COARSE Sand	6.6	% TOTAL SAMPLE	100.0

REMARKS

PARTICLE-SIZE ANALYSIS**

% COBBLES	0.0	% COARSE Sand	49.5
% COARSE Gravel (Stone)	0.0	% FINE Sand	25.5
% MEDIUM Gravel (Stone)	0.2	% FINES (Silt-Clay)	17.4
% FINE Gravel (Stone)	7.4	% TOTAL SAMPLE	100.0

DESCRIPTION: Red and White Clayey Sand

USCS (ASTM D2487; D2488): SC AASHTO (M 145): NA

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TESTS, LLC

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
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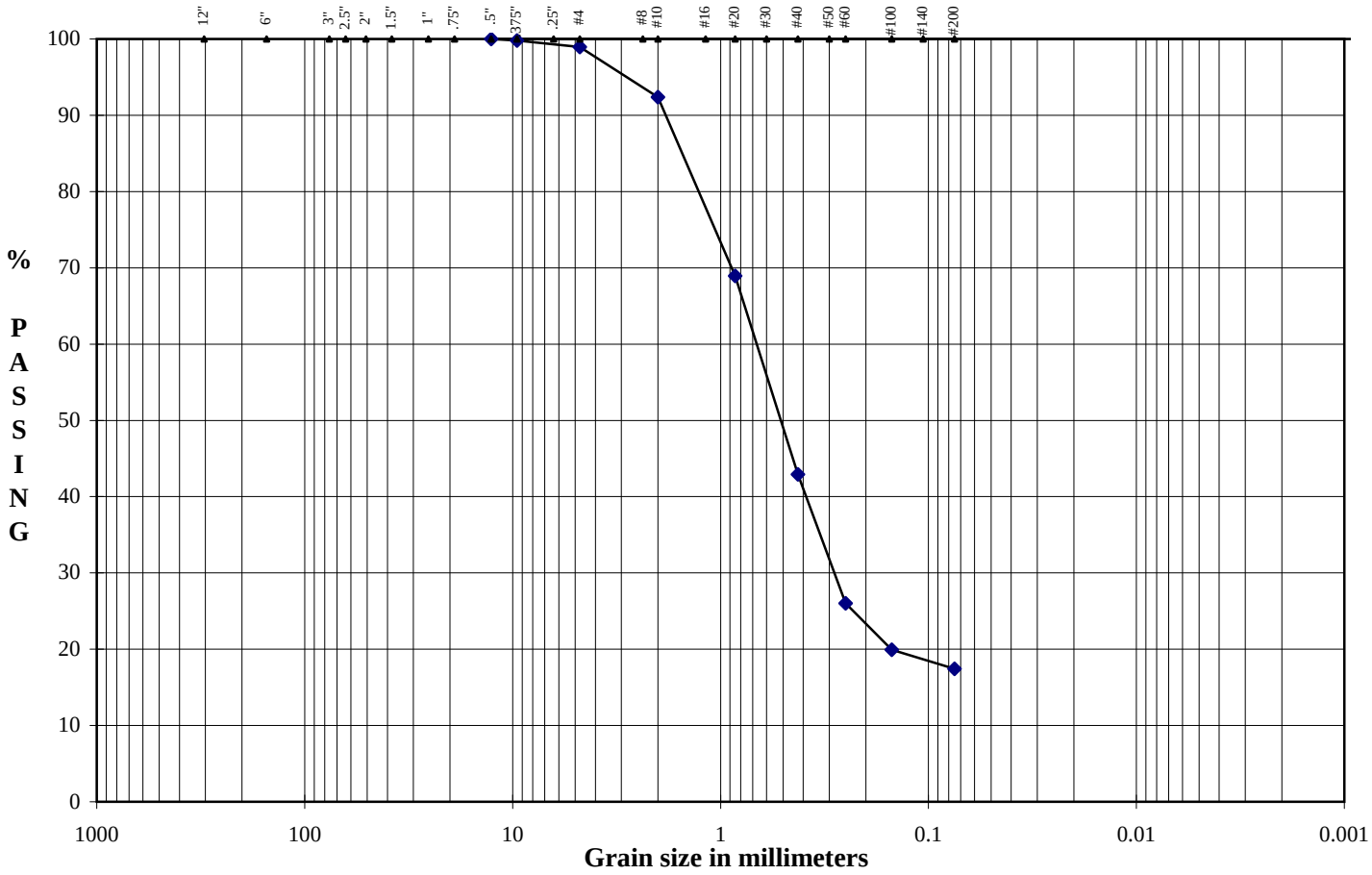
Tested By	RI
Date	09/25/15
Checked By	LB

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20543/B-20	Depth/Elev.	10-11'
Location	-	Add. Info	-

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311
Standard Test Method for Particle-Size Analysis of Soils and Aggregates (Split Sieve)

Particle-Size Analysis



Boulders	Cobbles	Gravel: Coarse	Gravel: Fine	Sand: Coarse	Sand: Medium	Sand: Fine	Fines: Silt or Clay

D_{10}	NA	mm
D_{30}	NA	mm
D_{60}	NA	mm
Cu	NA	
Cc	NA	

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Tested By	EB
Date	09/28/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20543/B-20	Depth/Elev.	10-11'
Location	-	Add. Info	-

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.030	in	7.70	cm
Diameter	2.844	in	7.22	cm
Area	6.35	in^2	40.98	cm^2
Volume	315.42	cm^3	0.0111	ft^3
Mass	673.20	g	1.48	lb
Specific Gravity	2.650	(Assumed)		
Dry Density	112.3	pcf		

Moisture Content

Mass of wet sample & tare	673.20	g
Mass of dry sample & tare	567.90	g
Mass of tare	0.00	g
% Moisture	18.5	

Test Data

Speed	10	
Board Number	7	
Cell Number	19	
Flow Pump Number	2A	
Flow Pump Rate	2.24E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	89.0	psi
Back Pressure	80.0	psi
Confining (Effective) Pressure	9.0	psi
Max Head	28.84	cm
Min Head	28.14	cm
Maximum Gradient	3.73	
Minimum Gradient	3.64	

Final Data (After Test)

Average Height of Sample			3.043	in	7.73	cm
Average Diameter of Sample			2.848	in	7.23	cm
Area	6.37	in^2	41.10	cm^2		
Volume	317.67	cm^3	0.0112	ft^3		
Mass	673.60	g	1.49	lb		

Dry Density	111.6	pcf
Vol. of Voids	103.27	cm^3
Vol. of Solids	214.40	cm^3
Void Ratio	0.48	
Saturation	102.1	%

Moisture Content

Mass of wet sample & tare	755.00	g
Mass of dry sample & tare	649.60	g
Mass of tare	81.70	g
% Moisture	18.6	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
09/28/15	17	0	-	0.41	28.84	3.73	26.0	-	-	-	
09/28/15	17	5	300	0.40	28.14	3.64	26.0	1.48E-06	0.869	1.29E-06	
09/28/15	17	10	300	0.41	28.84	3.73	26.0	1.48E-06	0.869	1.29E-06	
09/28/15	17	15	300	0.40	28.14	3.64	26.0	1.48E-06	0.869	1.29E-06	*
09/28/15	17	20	300	0.41	28.84	3.73	26.0	1.48E-06	0.869	1.29E-06	*
09/28/15	17	25	300	0.41	28.84	3.73	26.0	1.46E-06	0.869	1.27E-06	*
09/28/15	17	30	300	0.41	28.84	3.73	26.0	1.46E-06	0.869	1.27E-06	*

Reported Average Hydraulic Conductivity* 1.3E-06 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: Red and White Clayey Sand

USCS (ASTM D2487;2488): SC

REMARKS: Portion of sample used for testing located 1" above bottom of shelby tube.

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	262
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	215
Syringe ID #	245			Pore Pressure Transducer ID #	28

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Tested By	EB
Date	09/25/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20544/B-21	Depth/Elev.	20-21'
Location	-	Add. Info	-

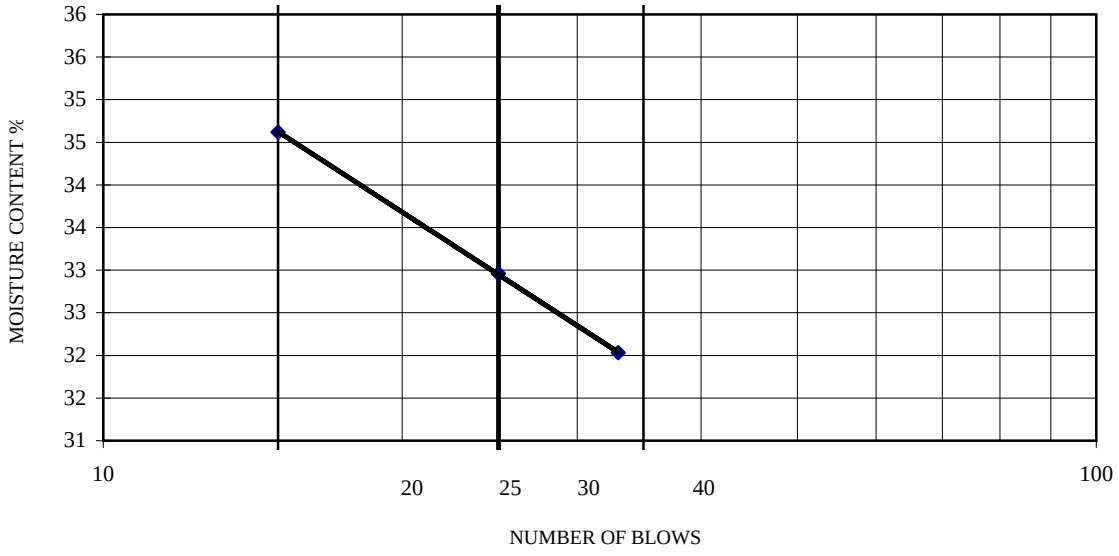
ASTM D 4318/AASHTO T 88, T 89

Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

LIQUID LIMIT

Number of Blows	33	25	15
Mass of Wet Sample & Tare, g	40.29	45.66	45.25
Mass of Dry Sample & Tare, g	36.52	40.95	39.96
Mass of Tare, g	24.75	26.66	24.68
Moisture Content, %	32.03	32.96	34.62

Oven ID #	15/496/610
Balance ID #	139/563
Liquid Limit Device ID #	451/569



PLASTIC LIMIT

Mass of Wet Sample & Tare, g	29.51	27.31
Mass of Dry Sample & Tare, g	28.57	26.40
Mass of Tare, g	23.32	21.27
Moisture Content, %	17.90	17.74

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

Mass of Wet Sample & Tare, g	191.50
Mass of Dry Sample & Tare, g	183.60
Mass of Tare, g	91.00
Moisture Content, %	8.53

LIQUID LIMIT (LL)	33
PLASTIC LIMIT (PL)	18
PLASTICITY INDEX (PI)	15
LIQUIDITY INDEX (LI)	-0.63

DESCRIPTION: Brown Clayey Sand

USCS (ASTM D2487; D2488): SC

AASHTO (M 145): NA

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Fax: 770-923-8973
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Tested By	RI
Date	09/25/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20544/B-21	Depth/Elev.	20-21'
Location	-	Add. Info	-

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311; Particle Size Analysis (Split Sieve)

MOISTURE CONTENT of TOTAL SAMPLE

Mass of Wet Sample & Tare, g	191.5
Mass of Dry Sample & Tare, g	183.6
Mass of Tare, g	91.0
Moisture Content, %	8.5

MOISTURE CONTENT of FINE MATERIAL

Mass of Wet Sample & Tare, g	191.50
Mass of Dry Sample & Tare, g	183.60
Mass of Tare, g	91.00
Moisture Content, %	8.5

TOTAL Mass of wet sample before splitting & tare, g	1091.2
Mass of Tare, g	0.0
TOTAL Mass of dry sample, g	1005.4

Mass of Wet Fine Material & Tare, g	100.50
Mass of Tare, g	0.00
Mass of Dry Fine Material, g	92.60
% of Total Sample Passing Split Sieve	99.5

SIEVE ANALYSIS*

COARSE MATERIAL

Mass of Tare, g: 0.0

Sieve Size		Sample & Tare, g	% RETAINED	% PASSING
12"	COBBLES		0.0	100.0
3"			0.0	100.0
2.5"	COARSE		0.0	100.0
2"	GRAVEL		0.0	100.0
1.5"			0.0	100.0
1"			0.0	100.0
.75"			0.0	100.0
.5"	FINE GRAVEL		0.0	100.0
.375"		0.0	0.0	100.0
#4	COARSE SAND	5.0	0.5	99.5

FINE MATERIAL

Mass of Tare, g: 0.00

Sieve Size		Cumulative Mass retained, g	% PASSING (of Total)
#10	MEDIUM	2.73	96.6
#20	SAND	22.90	74.9
#40		44.53	51.7
#60	FINE SAND	59.70	35.4
#100		67.09	27.4
#200	FINES	68.24	26.2

* - ASTM Definitions of Classification
** - AASHTO Definitions of Classification

NOTE: # 4 (4.75 mm) Sieve used for splitting sample on fine and coarse material

Oven ID #	15/496/610
Balance ID#	139/142/700
Sieve Shaker ID #	555

PARTICLE-SIZE ANALYSIS*

% COBBLES	0.0	% MEDIUM Sand	44.9
% COARSE Gravel	0.0	% FINE Sand	25.5
% FINE Gravel	0.5	% FINES	26.2
% COARSE Sand	2.9	% TOTAL SAMPLE	100.0

REMARKS

PARTICLE-SIZE ANALYSIS**

% COBBLES	0.0	% COARSE Sand	44.9
% COARSE Gravel (Stone)	0.0	% FINE Sand	25.5
% MEDIUM Gravel (Stone)	0.0	% FINES (Silt-Clay)	26.2
% FINE Gravel (Stone)	3.4	% TOTAL SAMPLE	100.0

DESCRIPTION: Brown Clayey Sand

USCS (ASTM D2487; D2488): SC

AASHTO (M 145): NA

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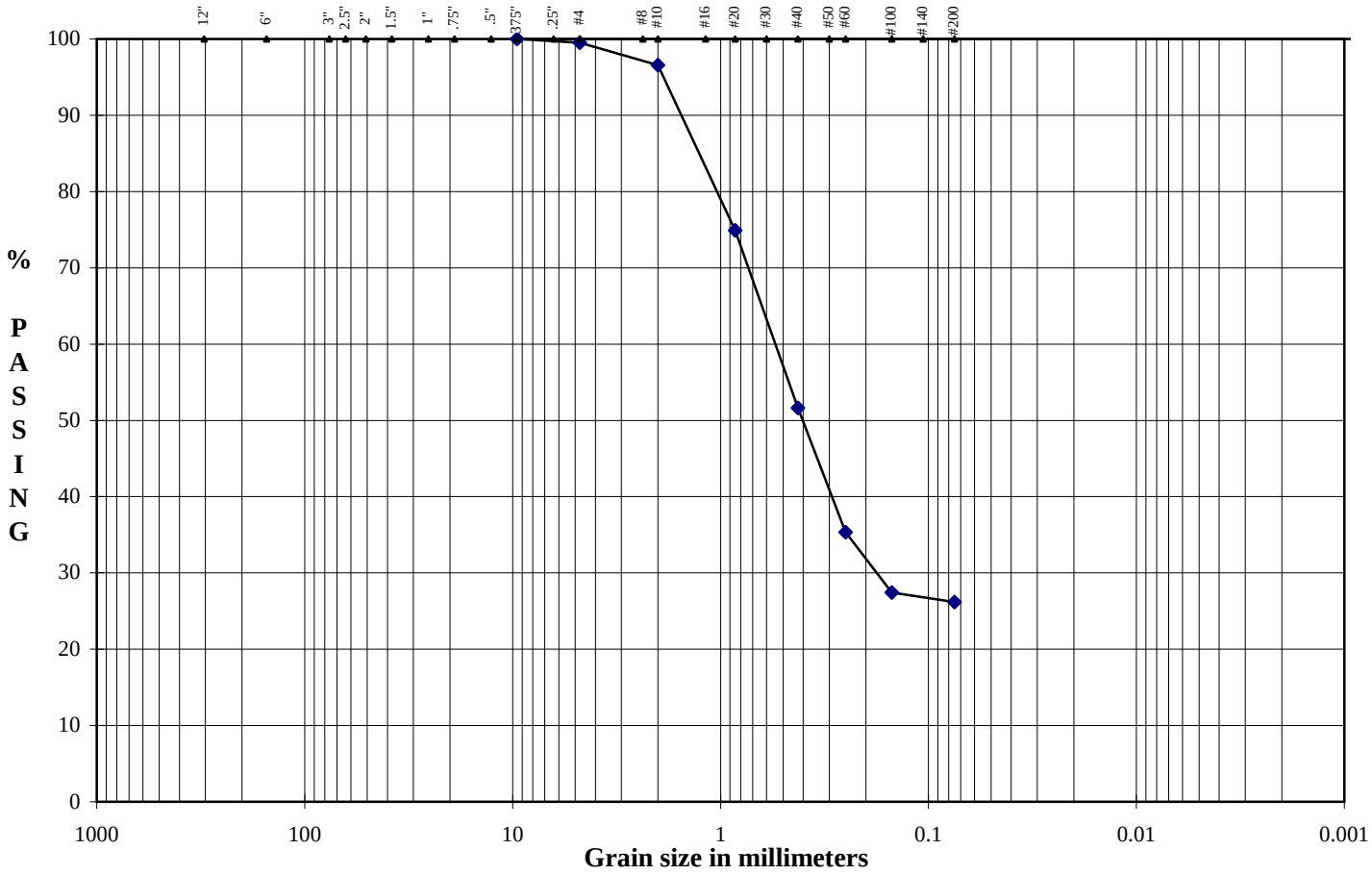
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	09/25/15
Checked By	LB

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20544/B-21	Depth/Elev.	20-21'
Location	-	Add. Info	-

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311
Standard Test Method for Particle-Size Analysis of Soils and Aggregates (Split Sieve)

Particle-Size Analysis



Boulders	Cobbles	Gravel: Coarse	Gravel: Fine	Sand: Coarse	Sand: Medium	Sand: Fine	Fines: Silt or Clay

D_{10}	NA	mm
D_{30}	NA	mm
D_{60}	NA	mm
Cu	NA	
Cc	NA	

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Tested By	EB
Date	09/28/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20544/B-21	Depth/Elev.	20-21'
Location	-	Add. Info	-

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.004	in	7.63	cm
Diameter	2.852	in	7.24	cm
Area	6.39	in^2	41.22	cm^2
Volume	314.48	cm^3	0.0111	ft^3
Mass	532.80	g	1.17	lb
Specific Gravity	2.600	(Assumed)		
Dry Density	97.4	pcf		

Moisture Content

Mass of wet sample & tare	191.50	g
Mass of dry sample & tare	183.60	g
Mass of tare	91.00	g
% Moisture	8.5	

Test Data

Speed	3	
Board Number	19	
Cell Number	4	
Flow Pump Number	2B	
Flow Pump Rate	2.87E-02	cm^3/sec
B - Value	0.95	
Cell Pressure	91.5	psi
Back Pressure	80.0	psi
Confining (Effective) Pressure	11.5	psi
Max Head	26.03	cm
Min Head	25.32	cm
Maximum Gradient	3.44	
Minimum Gradient	3.35	

Final Data (After Test)

Average Height of Sample		2.975	in	7.56	cm
Average Diameter of Sample		2.815	in	7.15	cm
Area	6.22 in^2	40.15	cm^2		
Volume	303.41 cm^3	0.0107	ft^3		
Mass	600.60 g	1.32	lb		

Dry Density	100.7	pcf
Vol. of Voids	115.12	cm^3
Vol. of Solids	188.29	cm^3
Void Ratio	0.61	
Saturation	96.5	%

Moisture Content

Mass of wet sample & tare	672.10	g
Mass of dry sample & tare	561.30	g
Mass of tare	72.80	g
% Moisture	22.7	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
09/28/15	17	40	-	0.37	26.03	3.44	26.0	-	-	-	
09/28/15	17	45	300	0.36	25.32	3.35	26.0	2.10E-04	0.869	1.83E-04	
09/28/15	17	50	300	0.37	26.03	3.44	26.0	2.10E-04	0.869	1.83E-04	
09/28/15	17	55	300	0.36	25.32	3.35	26.0	2.10E-04	0.869	1.83E-04	*
09/28/15	18	0	300	0.37	26.03	3.44	26.0	2.10E-04	0.869	1.83E-04	*
09/28/15	18	5	300	0.37	26.03	3.44	26.0	2.07E-04	0.869	1.80E-04	*
09/28/15	18	10	300	0.37	26.03	3.44	26.0	2.07E-04	0.869	1.80E-04	*

Reported Average Hydraulic Conductivity* 1.8E-04 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: Brown Clayey Sand

USCS (ASTM D2487;2488): SC

REMARKS: Shelby tube was bent. Unit weight determination was performed for determination of remolding parameters. Material passed #4 sieve used for testing. Material was remolded to as-received density @ natural moisture

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

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Fax: 770-923-8973
Web: www.test-llc.com

Tested By	RI
Date	09/24/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20544/B-21	Depth/Elev.	20-21'
Location	-	Add. Info	-

ASTM D7263; D4531-A; D2937-Modified; USACE EM 1110-2-1906

Sample Data

Average Height of sample, in.	6.848	Mass of Sample & Tube, g	1691.40
Average Diameter of sample, in.	2.860	Mass of Tube, g	470.50
Digital Caliper ID Number	16	Mass of Sample, g	1220.90

Moisture Content

Mass of Wet Sample & Tare, g	191.50
Mass of Dry Sample & Tare, g	183.60
Mass of Tare, g	91.00
Moisture Content, %	8.5
Balance ID Number	1/7
Oven ID Number	12/13/14

Unit Weight and Volumetric Data

Volume of sample, cm^3	720.92
Specific Gravity	NA
Wet Density, pcf	105.7
Dry Density, pcf	97.4
Volume of solids, cm^3	NA
Volume of voids, cm^3	NA
Void ratio	NA
Saturation, %	NA
Porosity, %	NA

DESCRIPTION

Brown Clayey Sand

REMARKS

Portion of sample used for testing located 0.5" above bottom of shelby tube. Tube was bent. Obtained unit weight was used for remolding parameters for permeability.

USCS (ASTM D2487: D2488)

SC

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Tested By	EB
Date	09/25/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20545/B-22	Depth/Elev.	25-26'
Location	-	Add. Info	-

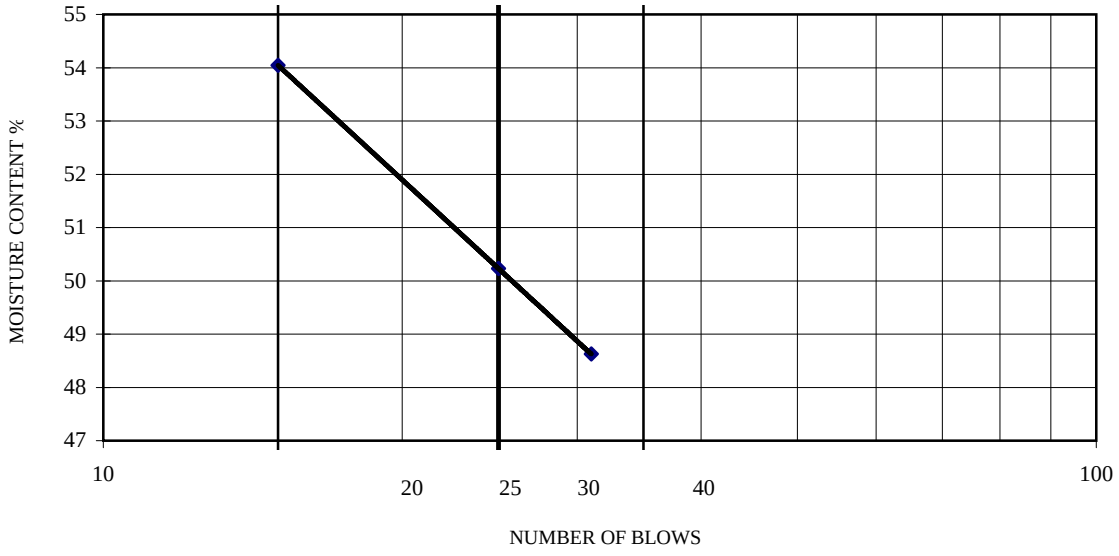
ASTM D 4318/AASHTO T 88, T 89

Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

LIQUID LIMIT

Number of Blows	31	25	15
Mass of Wet Sample & Tare, g	46.72	42.77	46.04
Mass of Dry Sample & Tare, g	39.63	36.17	38.49
Mass of Tare, g	25.05	23.03	24.52
Moisture Content, %	48.63	50.23	54.04

Oven ID #	15/496/610
Balance ID #	139/563
Liquid Limit Device ID #	451/569



PLASTIC LIMIT

Mass of Wet Sample & Tare, g	32.98	33.14
Mass of Dry Sample & Tare, g	31.54	31.79
Mass of Tare, g	24.99	25.57
Moisture Content, %	21.98	21.70

PREPARATION PROCEDURE: DRY

NOTE: MATERIAL PASSING NO. 40 SIEVE WAS USED FOR TEST

NATURAL MOISTURE

Mass of Wet Sample & Tare, g	295.50
Mass of Dry Sample & Tare, g	264.00
Mass of Tare, g	94.90
Moisture Content, %	18.63

LIQUID LIMIT (LL)	50
PLASTIC LIMIT (PL)	22
PLASTICITY INDEX (PI)	28
LIQUIDITY INDEX (LI)	-0.12

DESCRIPTION: Olive Brown and Yellowish Red Clayey Sand

USCS (ASTM D2487; D2488): SC

AASHTO (M 145): NA

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Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com

Tested By: RI
Date: 09/25/15
Checked By: LB

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20545/B-22	Depth/Elev.	25-26'
Location	-	Add. Info	-

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311; Particle Size Analysis (Split Sieve)

MOISTURE CONTENT of TOTAL SAMPLE

Mass of Wet Sample & Tare, g	295.5
Mass of Dry Sample & Tare, g	264.0
Mass of Tare, g	94.9
Moisture Content, %	18.6

MOISTURE CONTENT of FINE MATERIAL

Mass of Wet Sample & Tare, g	300.90
Mass of Dry Sample & Tare, g	269.70
Mass of Tare, g	100.90
Moisture Content, %	18.5

TOTAL Mass of wet sample before splitting & tare, g	1157.3
Mass of Tare, g	0.0
TOTAL Mass of dry sample, g	975.6

Mass of Wet Fine Material & Tare, g	125.60
Mass of Tare, g	
Mass of Dry Fine Material, g	106.01
% of Total Sample Passing Split Sieve	99.2

SIEVE ANALYSIS*

COARSE MATERIAL

Mass of Tare, g: 0.0

Sieve Size		Sample & Tare, g	% RETAINED	% PASSING
12"	COBBLES		0.0	100.0
3"			0.0	100.0
2.5"	COARSE		0.0	100.0
2"	GRAVEL		0.0	100.0
1.5"			0.0	100.0
1"			0.0	100.0
.75"			0.0	100.0
.5"	FINE GRAVEL	0.0	0.0	100.0
.375"		2.7	0.3	99.7
#4	COARSE SAND	7.3	0.8	99.2

FINE MATERIAL

Mass of Tare, g: 0.00

Sieve Size		Cumulative Mass retained, g	% PASSING (of Total)
#10	MEDIUM	3.71	95.8
#20	SAND	22.02	78.6
#40		44.75	57.4
#60	FINE SAND	65.43	38.0
#100		72.79	31.1
#200	FINES	77.04	27.1

* - ASTM Definitions of Classification
** - AASHTO Definitions of Classification

NOTE: # 4 (4.75 mm) Sieve used for splitting sample on fine and coarse material

Oven ID #	15/496/610
Balance ID#	139/142/700
Sieve Shaker ID #	555

PARTICLE-SIZE ANALYSIS*

% COBBLES	0.0	% MEDIUM Sand	38.4
% COARSE Gravel	0.0	% FINE Sand	30.2
% FINE Gravel	0.8	% FINES	27.1
% COARSE Sand	3.5	% TOTAL SAMPLE	100.0

PARTICLE-SIZE ANALYSIS**

% COBBLES	0.0	% COARSE Sand	38.4
% COARSE Gravel (Stone)	0.0	% FINE Sand	30.2
% MEDIUM Gravel (Stone)	0.3	% FINES (Silt-Clay)	27.1
% FINE Gravel (Stone)	4.0	% TOTAL SAMPLE	100.0

REMARKS

DESCRIPTION: Olive Brown and Yellowish Red Clayey Sand

USCS (ASTM D2487; D2488): SC

AASHTO (M 145): NA

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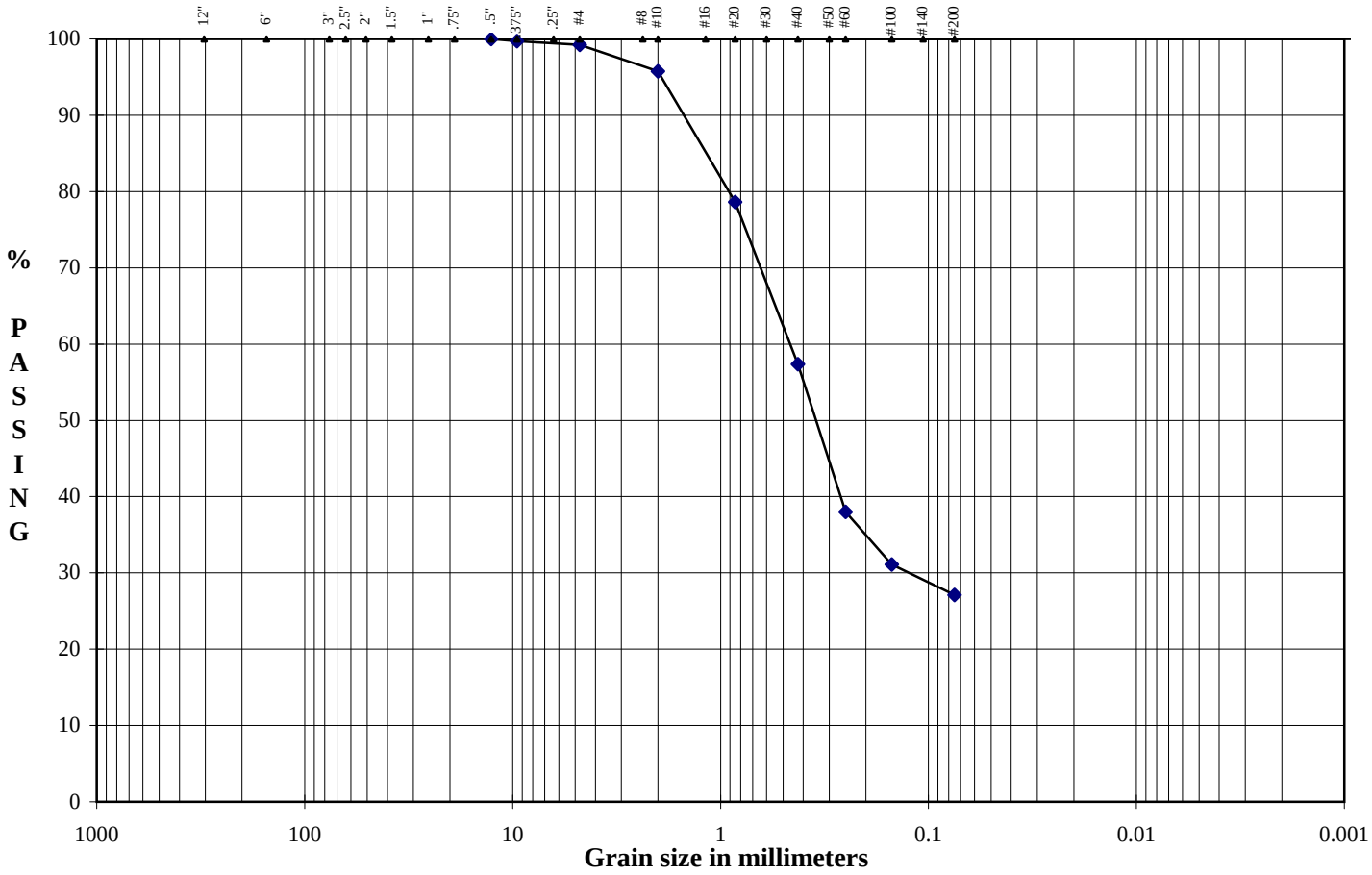
Tested By	RI
Date	09/25/15
Checked By	LB

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20545/B-22	Depth/Elev.	25-26'
Location	-	Add. Info	-

ASTM D 6913 (D 422 old version), D 1140, C 136, C 117 / AASHTO T 88, T 27, T 11, T 311
Standard Test Method for Particle-Size Analysis of Soils and Aggregates (Split Sieve)

Particle-Size Analysis



Boulders	Cobbles	Gravel: Coarse	Gravel: Fine	Sand: Coarse	Sand: Medium	Sand: Fine	Fines: Silt or Clay

D_{10}	NA	mm
D_{30}	NA	mm
D_{60}	NA	mm
Cu	NA	
Cc	NA	

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Web: www.test-llc.com

Tested By	AV
Date	09/28/15
Checked By	

Client Pr. #	-	Lab. PR. #	1508-11-1
Pr. Name	Pine Grove Landfill	S. Type	UD
Sample ID	20545/B-22	Depth/Elev.	25-26'
Location	-	Add. Info	-

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)

Height	3.052	in	7.75	cm
Diameter	2.859	in	7.26	cm
Area	6.42	in^2	41.42	cm^2
Volume	321.07	cm^3	0.0113	ft^3
Mass	646.40	g	1.43	lb
Specific Gravity	2.650	(Assumed)		
Dry Density	105.9	pcf		

Moisture Content

Mass of wet sample & tare	295.50	g
Mass of dry sample & tare	264.00	g
Mass of tare	94.90	g
% Moisture	18.6	

Test Data

Speed	10	
Board Number	5	
Cell Number	9	
Flow Pump Number	2B	
Flow Pump Rate	2.24E-04	cm^3/sec
B - Value	0.95	
Cell Pressure	98.0	psi
Back Pressure	80.0	psi
Confining (Effective) Pressure	18.0	psi
Max Head	105.51	cm
Min Head	104.81	cm
Maximum Gradient	13.62	
Minimum Gradient	13.53	

Final Data (After Test)

Average Height of Sample			3.050	in	7.75	cm
Average Diameter of Sample			2.850	in	7.24	cm
Area	6.38	in^2	41.16	cm^2		
Volume	318.85	cm^3	0.0113	ft^3		
Mass	655.10	g	1.44	lb		

Dry Density	106.7	pcf
Vol. of Voids	113.12	cm^3
Vol. of Solids	205.72	cm^3
Void Ratio	0.55	
Saturation	97.2	%

Moisture Content

Mass of wet sample & tare	733.50	g
Mass of dry sample & tare	623.60	g
Mass of tare	78.60	g
% Moisture	20.2	

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)			
DATE	HOUR	MIN	(sec)	(psi)	(cm)		T_x(°C)	@ T_x	R_T	@ 20 °C	
09/28/15	18	20	-	1.50	105.51	13.62	26.0	-	-	-	
09/28/15	18	25	300	1.49	104.81	13.53	26.0	4.01E-07	0.869	3.49E-07	
09/28/15	18	30	300	1.50	105.51	13.62	26.0	4.01E-07	0.869	3.49E-07	
09/28/15	18	35	300	1.49	104.81	13.53	26.0	4.01E-07	0.869	3.49E-07	*
09/28/15	18	40	300	1.50	105.51	13.62	26.0	4.01E-07	0.869	3.49E-07	*
09/28/15	18	45	300	1.50	105.51	13.62	26.0	4.00E-07	0.869	3.47E-07	*
09/28/15	18	50	300	1.50	105.51	13.62	26.0	4.00E-07	0.869	3.47E-07	*

Reported Average Hydraulic Conductivity* 3.5E-07 cm/sec

Note: Deaired Water Used for Permeability Test.

DESCRIPTION: Olive Brown and Yellowish Red Clayey Sand

USCS (ASTM D2487;2488): SC

REMARKS: Portion of sample used for testing located 9" above bottom of shelby tube.

Flow pump ID #	244	Balance ID #	1/6/7	Differential Pressure Transducer ID #	263
Thermometer ID #	63	Oven ID #	14/15	Board Pressure Transducer ID #	216
Syringe ID #	246			Pore Pressure Transducer ID #	28

JJ & G/LABORATORY TESTING/GA

SUMMARY OF SOIL DATA

Sample Identification	Sample Number	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Mc	(lb/cuft)		
B-1	-	8 - 9.5'	CH	21.5	50	19	31	0.09	-	-	-	-	-	-	-	-	-	-
B-1	-	13 - 14.5'	(SC)	-	-	-	-	-	99.1	17.7	-	-	-	-	-	-	-	-
B-1	-	33 - 34.5'	(SC)	-	-	-	-	-	100.0	24.3	18.0	-	-	-	-	-	-	-
B-8	-	18 - 19.5'	SC	17.6	38	17	21	0.05	99.9	20.8	15.9	-	-	2.62	17.6	107.9	5.9E-08	-
B-8	-	43 - 44.5'	(SC)	-	-	-	-	-	83.7	12.4	-	-	-	-	-	-	-	-
B-9	-	3 - 4.5'	(SC)	-	-	-	-	-	99.9	26.8	-	-	-	-	-	-	-	-
B-9	-	13 - 14.5'	CL	13.5	42	18	24	-0.19	-	-	-	-	-	-	-	-	-	-
B-9	-	18 - 19.5'	(SC)	-	-	-	-	-	100.0	31.6	16.0	-	-	-	-	-	-	-
B-10	-	13 - 14.5'	(SP-SC)	-	-	-	-	-	98.9	11.1	-	-	-	-	-	-	-	-
B-10	-	48 - 49.5'	(CL-CH)	-	-	-	-	-	100.0	73.0	42.0	-	-	-	-	-	-	-
B-10	-	53 - 54'	CL	19.4	49	23	26	-0.15	-	-	-	-	-	-	-	-	-	-
B-11	-	18 - 19.5'	CH	21.2	50	15	35	0.17	-	-	-	-	-	-	-	-	-	-
B-11	-	23 - 24.5'	(SC)	-	-	-	-	-	99.8	23.7	-	-	-	-	-	-	-	-

ABBREVIATIONS:

LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (I)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES:

T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

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JJ & G/LABORATORY TESTING/GA
SUMMARY OF SOIL DATA

Sample Identification	Sample Number	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.L.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Mc	(lb/cuft)		
B-12	-	18 - 19.5'	CH	23.6	61	26	35	-0.07	-	-	-	-	-	2.68	23.6	102.4	4.0E-09	-
B-12	-	33 - 34.5'	(CL-CH)	-	-	-	-	-	100.0	66.6	32.5	-	-	-	-	-	-	-
B-12	-	63 - 64.5'	(SC)	-	-	-	-	-	99.7	21.2	-	-	-	-	-	-	-	-
B-13	-	18 - 19.5'	CL	12.8	40	17	23	-0.19	-	-	-	-	-	-	-	-	-	-
B-13	-	28 - 29.5'	(SC)	-	-	-	-	-	99.7	21.2	-	-	-	-	-	-	-	-
B-15	-	78 - 79.5'	(CL)	-	-	-	-	-	100.0	66.8	-	-	-	-	-	-	-	-
B-15	-	88 - 89.5'	CL	21.7	49	19	30	0.08	-	-	-	-	-	2.66	21.7	104.6	4.3E-09	-
B-16	-	28 - 29.5'	(CL)	-	-	-	-	-	-	-	-	-	-	2.68	16.6	105.8	6.6E-09	-
B-18	-	23 - 24'	CH	21.1	65	25	40	-0.11	100.0	68.8	55.5	-	-	2.69	21.1	101.1	7.8E-09	-
B-18	-	33 - 34.5'	(CL-CH)	-	-	-	-	-	100.0	53.7	-	-	-	-	-	-	-	-

ABBREVIATIONS:
LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (I)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES:
T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

GOLDER ASSOCIATES INC.

M 1110-2-1906
PPENDIX III
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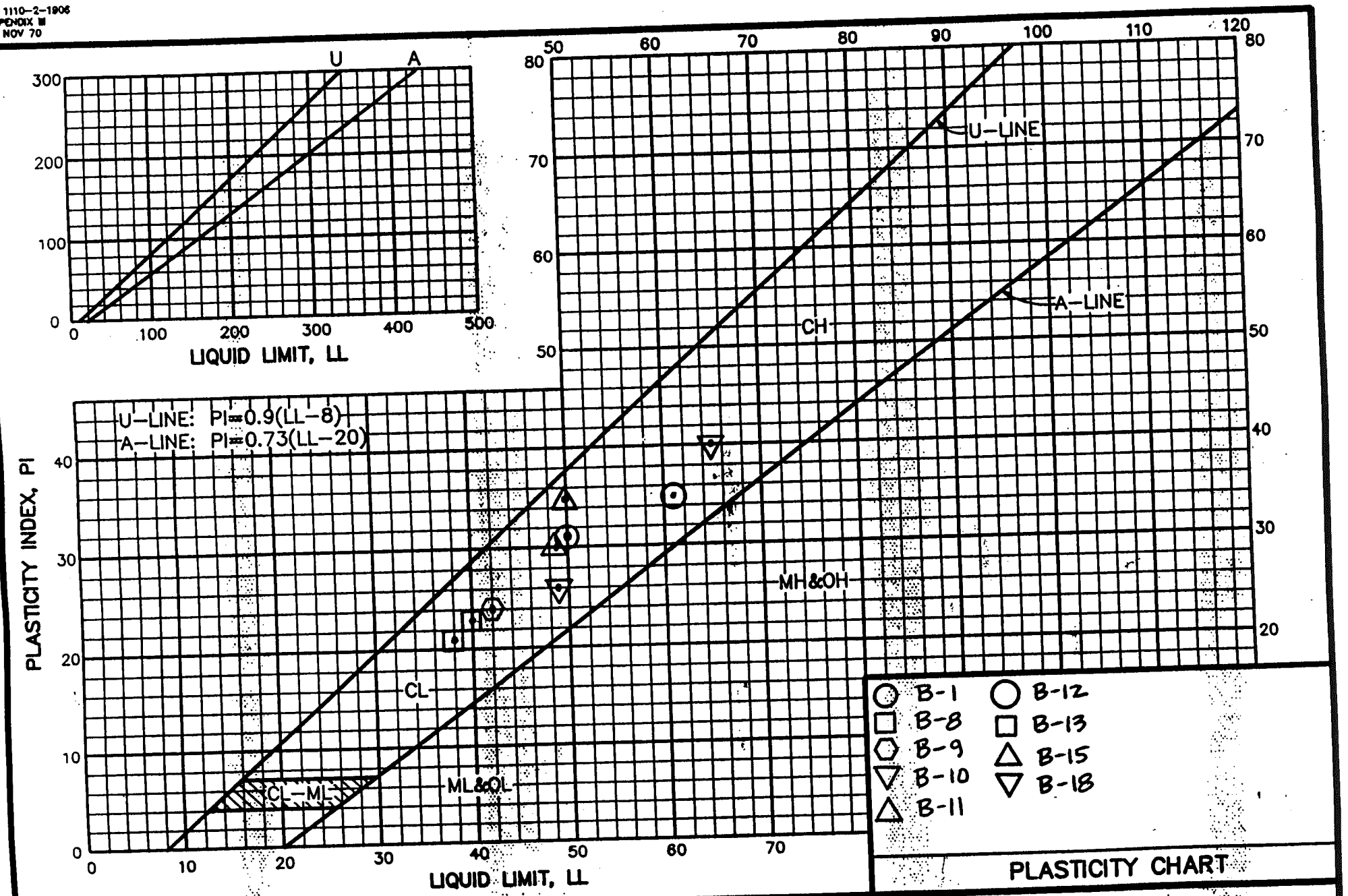


PLASTICITY CHART

DATE OF TESTING : 6-17-94

PROJECT NO : 933-3580-005

Golder Associates
Atlanta, Georgia

PLOTTED BY : SLC

CHECKED BY : BAP

ONE-POINT

ATTERBERG LIMIT DETERMINATION

ASTM D-4318-84

PROJECT TITLE	JJ & G/LAB TESTING/GA	**SAMPLE ID.**	B-1
PROJECT NO.	933-3580-005	**SAMPLE TYPE**	JAR
		SAMPLE DEPTH	8 - 9.5'

SAMPLE PREPARATION
Wet or Dry Air Dry

Minus #40 Sieve Yes

PLASTIC LIMIT DETERMINATION

				NATURAL MOISTURE
TARE NUMBER	1	10	20	123
WEIGHT OF WET SOIL +TARE, gm.	21.12	21.64	21.89	144.09
WEIGHT OF DRY SOIL +TARE, gm.	19.65	20.08	20.26	127.80
WEIGHT OF WATER, gm.	1.47	1.56	1.63	16.29
WEIGHT OF TARE, gm.	11.71	11.74	11.79	51.94
WEIGHT OF DRY SOIL, gm.	7.94	8.34	8.47	75.86
WATER CONTENT (%)	18.51	18.71	19.24	21.47

LIQUID LIMIT DETERMINATION

			TEST RESULTS	
TARE NUMBER	23	33	TRIAL 1	TRIAL 2
NUMBER OF BLOWS	26	25		
WEIGHT OF WET SOIL +TARE, gm.	24.19	22.88		
WEIGHT OF DRY SOIL +TARE, gm.	18.36	16.74		
WEIGHT OF WATER, gm.	5.83	6.14		
WEIGHT OF TARE, gm.	6.63	4.27		
WEIGHT OF DRY SOIL, gm.	11.73	12.47		
WATER CONTENT (%)	49.70	49.24		
			BLOWS:	26 / 25
			K VALUE:	1.005 / 1.000

LIQUID LIMIT (Wl)	49.60	50
PLASTIC LIMIT (Wp)	18.82	19
PLASTICITY INDEX (Ip)		31
MOISTURE CONTENT (%)	21.47	
LIQUIDITY INDEX(I)	0.09	

DESCRIPTION Mottled Light Gray and Brownish Yellow, SILTY CLAY, some medium to fine sand.

USCS CH

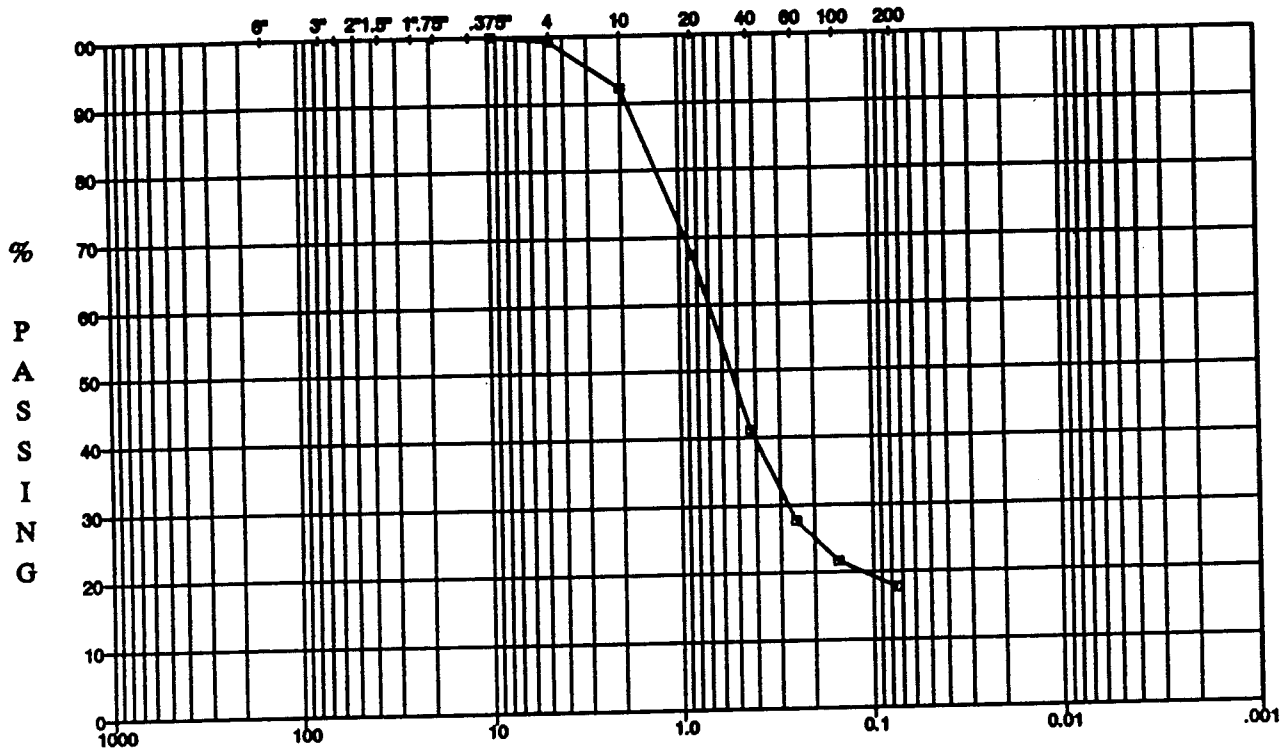
TECH	GEC
DATE	06/10/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-10

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B-1 13 - 14.5'	-	-	-	-	-	Tan, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.
Sample Type:	JAR				USCS	(SC)

Need Summary sheet to define soil classification terms used on this and following gradation curves

DATE	06/13/94
CHECK	Pum
REVIEW	Bgll

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-1
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	13 - 14.5'

WATER CONTENT (Delivered Moisture)			Hygroscopic Moisture		Wet Soil & Tare (gm)	218.04
Tare Number			For Sieve Sample		Dry Soil & Tare (gm)	197.54
Wt Wet Soil & Tare (gm)	(w1)				Tare Weight (gm)	52.11
Wt Dry Soil & Tare (gm)	(w2)				Moisture Content (%)	14.10
Weight of Tare (gm)	(w3)		Total Weight Of Sample Used For Sieve			
Weight of Water (gm)	(w4=w1-w2)		Corrected For Hygroscopic Moisture		Weight Of Sample (gm)	218.04
Weight of Dry Soil (gm)	(w5=w2-w3)				Tare Weight (gm)	52.11
Moisture Content (%)	(w4/w5)*100			(W6)	Total Dry Weight (gm)	145.43

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) ((wt ret/w6)*100)	% PASS (100-%ret)	SIEVE	
6.000					6.000	coarse gravel
3.000					3.000	coarse gravel
2.500					2.500	coarse gravel
2.000					2.000	coarse gravel
1.500					1.500	coarse gravel
1.000					1.000	coarse gravel
0.750					0.750	fine gravel
0.500					0.500	fine gravel
0.375	203.30	0.00		100.0	0.375	fine gravel
#4	204.57	1.27	0.87	99.1	#4	coarse sand
#10	214.41	11.11	7.64	92.4	#10	medium sand
#20	250.63	47.33	32.54	67.5	#20	medium sand
#40	288.86	85.56	58.83	41.2	#40	fine sand
#60	308.51	105.21	72.34	27.7	#60	fine sand
#100	317.44	114.14	78.48	21.5	#100	fine sand
#200	323.06	119.76	82.35	17.7	#200	fines
PAN					PAN	

% C GRAVEL	
% F GRAVEL	0.87
% C SAND	6.77
% M SAND	51.19
% F SAND	23.52
% FINES	17.65
% TOTAL	100.00

Descriptive Terms		
trace	0 to 5%	> 10% mostly coarse (c)
little	5 to 12%	> 10% mostly medium (m)
some	12 to 30%	< 10% fine (c-m)
and	30 to 50%	< 10% coarse (m-f)
		< 10% coarse and fine (m)
		< 10% coarse and medium (f)
		> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Tan, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

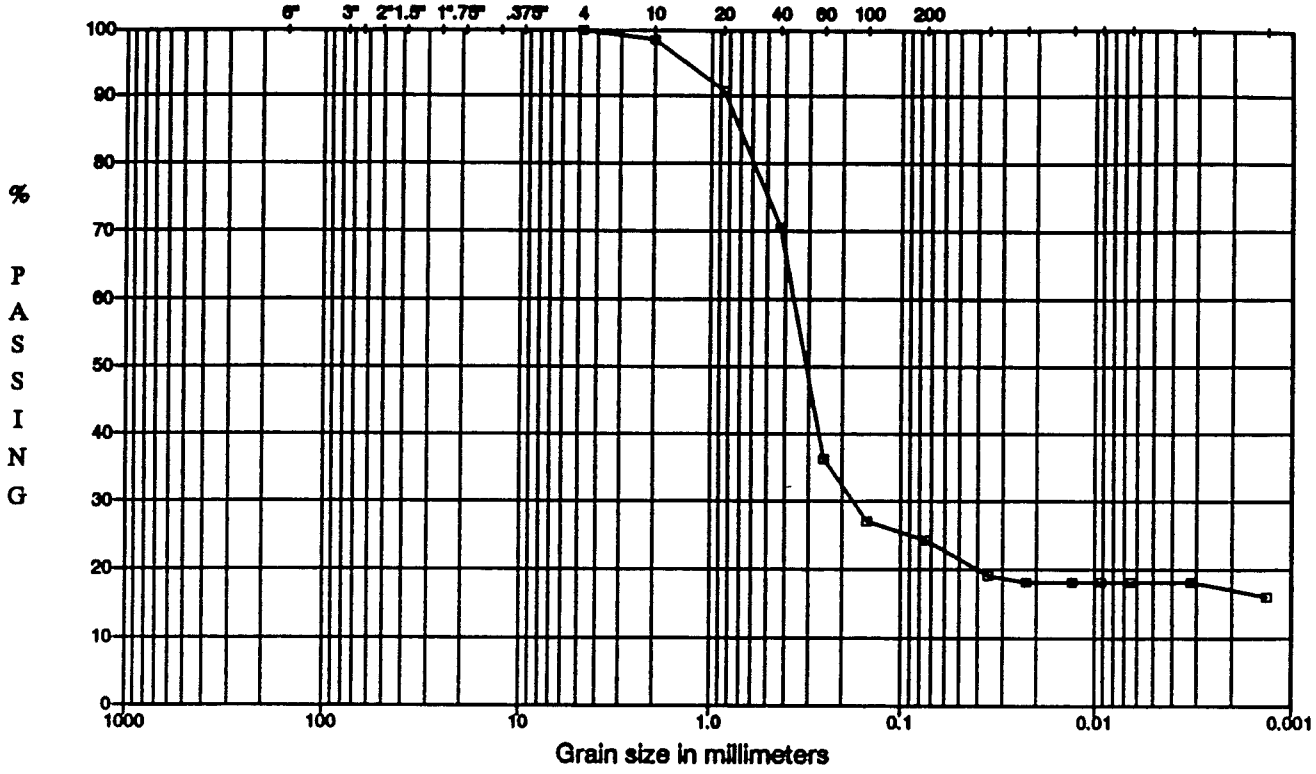
USCS: (SC)

TECH	FWM
DATE	06/13/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B-1 33 - 34.5'	-	-	-	-	2.65	Grayish White, MEDIUM TO FINE SAND, some silty clay.
Sample Type: JAR					USCS	(SC)

DATE	6/13/94
CHECK	PWM
REVIEW	BJP

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-1
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
		SAMPLE DEPTH	33 - 34.5'

AS RECEIVED WATER CONTENT

Tare No.		
Wt Wet Soil & Tare (gm)	(W1)	
Wt Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	0.00
Weight of Dry Soil (gm)	(W5=W2-W3)	0.00
Moisture Content (%)	(W4/W5)*100	0.00

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	155.91
Dry Soil & Tare (gm)	154.88
Tare Weight (gm)	51.07
Moisture Content (%)	0.99

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	270.48	
Tare Wt (gm)	114.88	
Total Wt (gm)	154.81	(W6)

Plus #4 Material Sieve

TARE WEIGHT: 203.30

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	% PASSING		
6.0"	203.30	0.0		6.0"	cobbles
3.0"	203.30	0.0		3.0"	coarse gravel
2.5"	203.30	0.0		2.5"	coarse gravel
2.0"	203.30	0.0		2.0"	coarse gravel
1.5"	203.30	0.0		1.5"	coarse gravel
1.0"	203.30	0.0		1.0"	coarse gravel
0.75"	203.30	0.0		0.75"	fine gravel
0.50"	203.30	0.0		0.50"	fine gravel
0.375"	203.30	0.0		0.375"	fine gravel
#4	203.30	0.0	100.0	#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.65
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
th of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	50.49
Calculated Dry Wt used in test (gm)	49.99
Hydrometer Bulb Number	280629
% Pass #4 Sieve For Whole Sample	100.00

Hygroscopic Moisture

Wet Soil & Tare (gm)	155.91
Dry Soil & Tare (gm)	154.88
Tare Weight (gm)	51.07
Moisture Content (%)	0.99

DATE	TIME	ET	RDNG	TEMP	TEMP.COR	HYD. COR.
06/14/94	10:51	(min)	R	T	K	Cc
06/14/94	10:53	2.00	15.5	23.00	0.013	6.00
06/14/94	10:56	5.00	15.0	23.00	0.013	6.00
06/14/94	11:06	15.00	15.0	23.00	0.013	6.00
06/14/94	11:21	30.00	15.0	23.00	0.013	6.00
06/14/94	11:51	60.00	15.0	23.00	0.013	6.00
06/14/94	15:01	250.00	15.0	23.00	0.013	6.00
06/15/94	10:51	1440.00	14.0	23.00	0.013	6.00

(40ml $Na(PO_4)_6$ per 1000ml H_2O)

Cc= Composite Correction Reading

TARE WEIGHT: 203.27

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING		
#10	204.05	0.78	98.4	#10	medium sand
#20	207.86	4.59	90.8	#20	medium sand
#40	217.97	14.70	70.6	#40	fine sand
#60	235.16	31.89	36.2	#60	fine sand
#100	239.77	36.50	27.0	#100	fine sand
#200	241.10	37.83	24.3	#200	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	9.50	14.8	0.013	1.00	0.0358	19.0
5.00	9.00	14.8	0.013	1.00	0.0227	18.0
15.00	9.00	14.8	0.013	1.00	0.0131	18.0
30.00	9.00	14.8	0.013	1.00	0.0093	18.0
60.00	9.00	14.8	0.013	1.00	0.0065	18.0
250.00	9.00	14.8	0.013	1.00	0.0032	18.0
1440.00	8.00	15.0	0.013	1.00	0.0013	16.0

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	0.0
% COARSE SAND	1.6
% MEDIUM SAND	27.8
% FINE SAND	46.3
% FINES	24.3
% TOTAL SAMPLE	100.0

Description: Grayish White, MEDIUM TO FINE SAND, some silty clay.

USCS: (SC)

-	LL
-	PL
-	PI

TECH	PWM/MJL
DATE	6/13/94
CHECK	PWM
REVIEW	BJP

GOLDER ASSOCIATES INC.

FN: 3580-14

ONE-POINT

ATTERBERG LIMIT DETERMINATION

ASTM D-4318-84

PROJECT TITLE	JJ & G/LAB TESTING/GA	**SAMPLE ID.**	B - 8
PROJECT NO.	933-3580-005	**SAMPLE TYPE**	UD
		SAMPLE DEPTH	18 - 19.5'

SAMPLE PREPARATION

Wet or Dry Air Dry

Minus #40 Sieve Yes

PLASTIC LIMIT DETERMINATION

				NATURAL MOISTURE
TARE NUMBER	5	9	15	106
WEIGHT OF WET SOIL +TARE, gm.	23.00	23.06	23.02	292.71
WEIGHT OF DRY SOIL +TARE, gm.	21.43	21.45	21.43	256.73
WEIGHT OF WATER, gm.	1.57	1.61	1.59	35.98
WEIGHT OF TARE, gm.	11.85	11.84	11.81	52.40
WEIGHT OF DRY SOIL, gm.	9.58	9.61	9.62	204.33
WATER CONTENT (%)	16.39	16.75	16.53	17.61

LIQUID LIMIT DETERMINATION

			TEST RESULTS	
TARE NUMBER	39	40	TRIAL 1	TRIAL 2
NUMBER OF BLOWS	30	30		
WEIGHT OF WET SOIL +TARE, gm.	23.38	24.85		
WEIGHT OF DRY SOIL +TARE, gm.	18.15	19.22		
WEIGHT OF WATER, gm.	5.23	5.63		
WEIGHT OF TARE, gm.	4.26	4.24	**BLOWS:** 30	30
WEIGHT OF DRY SOIL, gm.	13.89	14.98		
WATER CONTENT (%)	37.65	37.58	**K VALUE:** 1.022	1.022

LIQUID LIMIT (Wl)	38.45	38
PLASTIC LIMIT (Wp)	16.56	17
PLASTICITY INDEX (Ip)		21
MOISTURE CONTENT (%)	17.61	
LIQUIDITY INDEX(I)	0.05	

DESCRIPTION White, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

USCS SC

TECH	GEC
DATE	06/13/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-23

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE	LJ & G/LAB TESTING/GA
PROJECT NO.	933-3580-005

SAMPLE ID	B - 8
SAMPLE TYPE	UD
SAMPLE DEPTH	18 - 19.5'

AS RECEIVED WATER CONTENT

Tare No.		106
Wt Wet Soil & Tare (gm)	(W1)	292.71
Wt Dry Soil & Tare (gm)	(W2)	256.73
Weight of Tare (gm)	(W3)	52.40
Weight of Water (gm)	(W4=W1-W2)	35.98
Weight of Dry Soil (gm)	(W5=W2-W3)	204.33
Moisture Content (%)	(W4/W5)*100	17.61

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	52.14
Dry Soil & Tare (gm)	51.90
Tare Weight (gm)	3.16
Moisture Content (%)	0.49

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	508.00	
Tare Wt (gm)	108.69	
Total Wt (gm)	396.36	(W6)

Plus #4 Material Sieve

TARE WEIGHT: 203.28

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	% PASSING	
6.0"	203.28	0.0		cobbles
3.0"	203.28	0.0		coarse gravel
2.5"	203.28	0.0		coarse gravel
2.0"	203.28	0.0		coarse gravel
1.5"	203.28	0.0		coarse gravel
1.0"	203.28	0.0		coarse gravel
0.75"	203.28	0.0		fine gravel
0.50"	203.28	0.0		fine gravel
0.375"	203.28	0.0	100.0	fine gravel
#4	203.75	0.1	99.9	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	
Specific Gravity	(tested)	2.617
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
gth of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	51.11
Calculated Dry Wt used in test (gm)	50.86
Hydrometer Bulb Number	280629
% Pass #4 Sieve For Whole Sample	99.88

Hygroscopic Moisture

Wet Soil & Tare (gm)	52.14
Dry Soil & Tare (gm)	51.90
Tare Weight (gm)	3.16
Moisture Content (%)	0.49

DATE	TIME	ET (min)	RDNG R	TEMP T	TEMP.COR K	HYD. COR. Cc
06/15/94	13:29					
06/15/94	13:31	2.00	15.0	23.00	0.013	6.00
06/15/94	13:34	5.00	14.5	23.00	0.013	6.00
06/15/94	13:44	15.00	14.5	23.00	0.013	6.00
06/15/94	13:59	30.00	14.5	23.00	0.013	6.00
06/15/94	14:29	60.00	14.0	23.00	0.013	6.00
06/15/94	17:39	250.00	14.0	23.00	0.013	6.00
06/16/94	13:29	1440.00	14.0	23.00	0.013	6.00

(40ml Na(PO4)n per 1000ml H2O)
Cc= Composite Correction Reading

TARE WEIGHT: 203.30

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING	
#10	204.84	1.54	96.9	medium sand
#20	218.94	15.64	69.2	medium sand
#40	232.96	29.66	41.6	fine sand
#60	239.82	36.52	28.2	fine sand
#100	242.88	39.58	22.2	fine sand
#200	243.58	40.28	20.8	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	9.00	14.8	0.013	1.01	0.0364	17.9
5.00	8.50	15.0	0.013	1.01	0.0232	16.9
15.00	8.50	15.0	0.013	1.01	0.0134	16.9
30.00	8.50	15.0	0.013	1.01	0.0095	16.9
60.00	8.00	15.0	0.013	1.01	0.0067	15.9
250.00	8.00	15.0	0.013	1.01	0.0033	15.9
1440.00	8.00	15.0	0.013	1.01	0.0014	15.9

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	0.1
% COARSE SAND	3.0
% MEDIUM SAND	55.3
% FINE SAND	20.8
% FINES	20.8
% TOTAL SAMPLE	100.0

Description: White, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

USCS: SC

38	LL
17	PL
21	PI

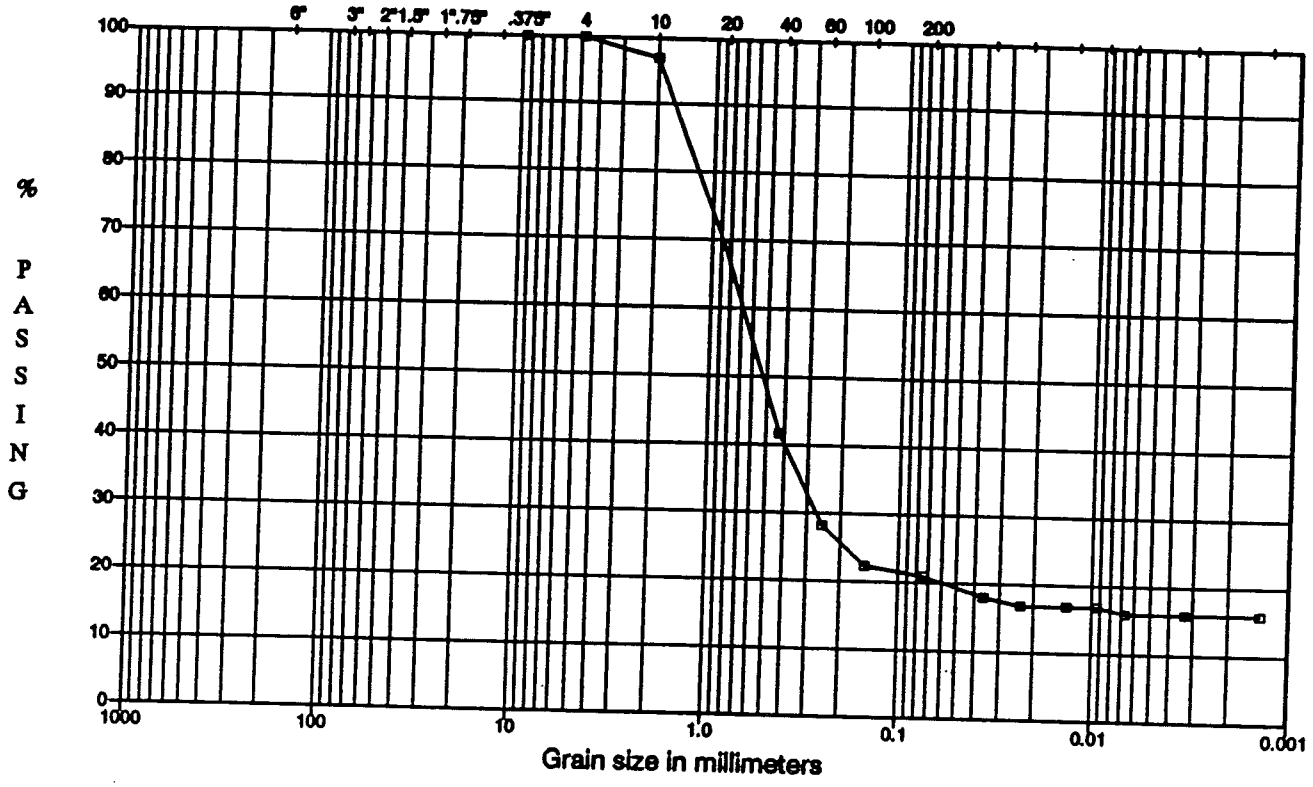
GOLDER ASSOCIATES INC.

TECH	GEC/MJL
DATE	6/14/94
CHECK	
REVIEW	

FN: 3580-33

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



COBBLES	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
	GRAVEL		SAND			FINES

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B - 8 18 - 19.5'	17.61	38	17	21	2.62	White, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.
Sample Type:	UD				USCS	SC

933-3580-005

G/LAB TESTING/GA

3580-33

GOLDER ASSOCIATES INC.

DATE	6/14/94
CHECK	
REVIEW	

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE:	JJ & G/LAB TESTING/GA		
PROJECT NO.:	933-3580-005		
SAMPLE ID:	B - 8	18 - 19.5'	
SAMPLE TYPE:			

BOARD #:	13
CELL #:	7
Flow Pump Speed	9
Technician:	GEC/JWE

COMMENTS:

Sample Data, Initial			
Height, inches	3.137	B-Value,f	1.00
Diameter, inches	2.869	Cell Pres	105.00
Area, cm^2	41.71	Bot. Pres.	90.00
Volume, cm^3	332.33	Top Pres.	90.00
Mass, g	675.78	Tot. B.P.	90.00
Moisture Content, %	17.61	Head, max.	167.41
Dry Density, pcf	107.89	Head, min.	163.89
Spec. Gravity	2.617	Max. Grad.	21.00
Volume Solids, cm^3	219.56	Min. Grad.	20.56
Volume Voids, cm^3	112.76		
Void Ratio	0.51		
Saturation, %	89.7%		

Sample Data, Final	
Height, inches	3.139
Diameter, inches	2.875
Area, cm^2	41.88
Volume, cm^3	333.93
Mass, g	680.90
Moisture Content	19.91
Dry Density, pcf	106.11
Volume Solids, cm^3	216.98
Volume Voids, cm^3	116.96
Void Ratio	0.54
Saturation, %	96.7%

WATER CONTENTS		Trimmings Initial	Sample Final
Tare No.		106	T-10
Wt soil&tare, i	g	292.71	396.42
Wt soil&tare, f	g	256.73	339.23
Wt Tare	g	52.40	52.04
Wt Moisture Lost	g	35.98	57.19
Wt Dry Soil	g	204.33	287.19
Water Content	%	17.6%	19.9%

DESCRIPTION:
White, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

Flow Pump Rate: 5.50E-05 cm 3/sec.

USCS: SC

TIME FUNCTION,SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (Degrees C)	dt (min)	dt, acc (min)	dt (sec)	dt, acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/15/94	34500	13	3	22.8	0	0	0	0	2.33	163.89	20.56	6.0E-08
06/15/94	34500	13	38	22.9	35	35	2100	2100	2.37	166.71	20.91	5.9E-08
06/15/94	34500	13	57	22.9	19	54	1140	3240	2.38	167.41	21.00	5.8E-08
06/15/94	34500	14	30	22.9	33	87	1980	5220	2.36	166.00	20.82	5.9E-08 *
06/15/94	34500	15	3	23.0	33	120	1980	7200	2.36	166.00	20.82	5.9E-08 *
06/15/94	34500	15	25	23.0	22	142	1320	8520	2.38	167.41	21.00	5.8E-08 *
06/15/94	34500	15	31	23.0	6	148	360	8880	2.36	166.00	20.82	5.9E-08 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 5.9E-08 cm/sec **

GOLDER ASSOCIATES INC
FN: 3580-18

DATE 06/15/94
CHECK
REVIEW

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	JJ & G/LAB TESTING/GA
PROJECT NO.	933-3580-005
TESTED FOR	PERM

SAMPLE ID	B - 8
SAMPLE TYPE	UD
SAMPLE DEPTH	18 - 19.5'

HYGROSCOPIC MOISTURE OF MATERIAL PASSING THE #10 SIEVE

Tare Number		106
Weight Soil and Tare, Inital (gm)	(W1)	283.18
Weight Soil and Tare, Final (gm)	(W2)	282.24
Weight Of Tare (gm)	(W3)	52.39
Weight Of Moisture (gm)	(W4=W1-W2)	0.94
Weight Of Dry Soil (gm)	(W5=W2-W3)	149.85
Hygroscopic Moisture In (%)	(HM=(W4/W5)*100)	0.6%

AIR REMOVAL METHOD: VACUUM

TRIAL		1	2	3
Pycnometer Number		2		
Weight Pycnometer Empty (gm)	(Mf)	174.14		
Weight of Soil & Pycnometer (gm)		225.02		
Weight of Soil, Water & Pycnometer (gm)	(Mb)	703.91		
Observed Temperature (Tb), for (Mb) In Degrees C		24.0		
Observed Temperature (Ta), for (Ma) In Degrees C		24.50		
Weight of Pycnometer & Water (gm)	(Ma @ Ta)	672.59		
Relative Density of Water @ (Ta)		0.99720		
Relative Density of Water @ (Tx)		0.99732		
Correction Factor due to Temperature @Tx	(K)	0.9991		
Weight of Soil (gm)		50.88		
Weight of Dry Soil (gm)	(Mo)	50.56		
Weight of Pycnometer & Water (gm)	(Ma)	672.65		
Weight of Soil,Water & Pycnometer (gm)	(Mb)	703.91		

SPECIFIC GRAVITY

G @ 20 degrees C = [Mo/(Mo+((Ma - Mb)))]*(K)

1	2	3
2.617		

Gs Average: 2.62

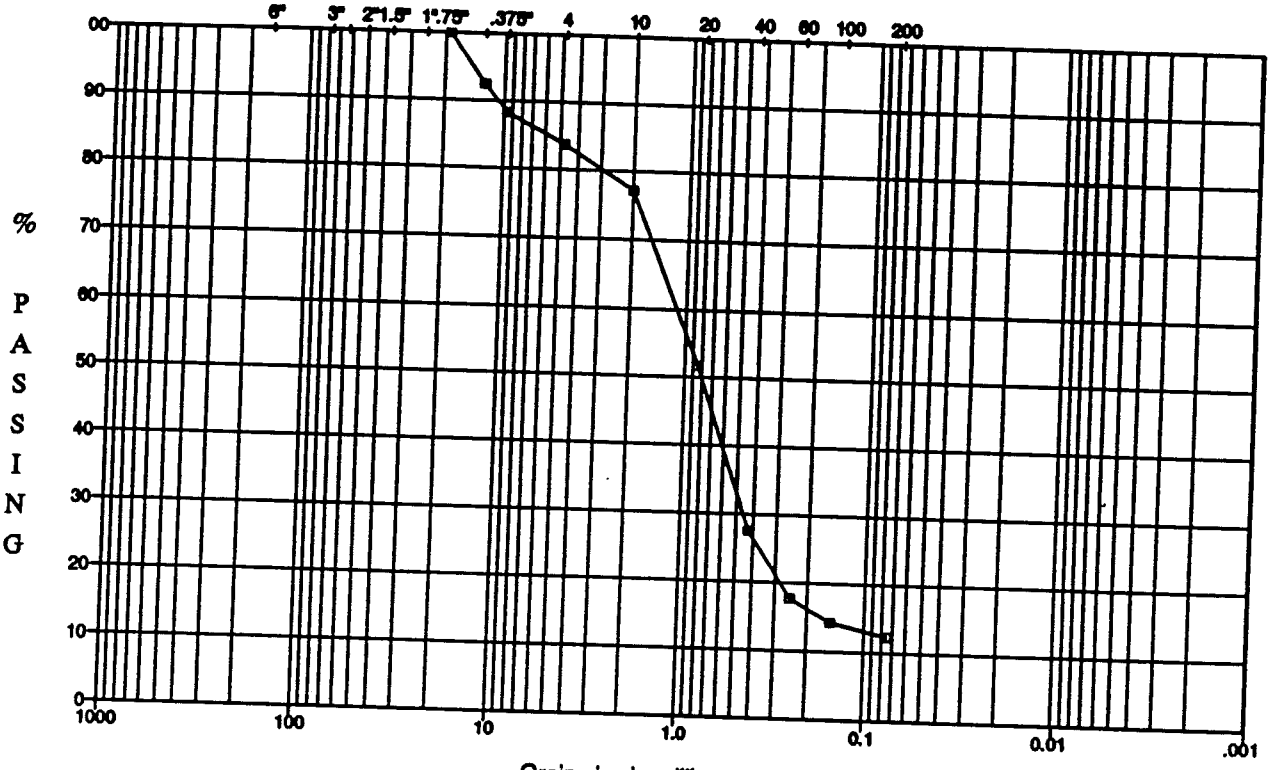
Correction Values Due To Temperature

Temp. (C)	Rel.Density	Corr. (K)	Temp. (C)	Rel. Density	Corr. (K)
16.00	0.99897	1.0007	23.50	0.99745	0.9992
16.50	0.99889	1.0007	24.00	0.99732	0.9991
17.00	0.99880	1.0006	24.50	0.99720	0.9990
17.50	0.99871	1.0005	25.00	0.99707	0.9988
18.00	0.99862	1.0004	25.50	0.99694	0.9987
18.50	0.99853	1.0003	26.00	0.99681	0.9986
19.00	0.99843	1.0002	26.50	0.99668	0.9984
19.50	0.99833	1.0001	27.00	0.99654	0.9983
20.00	0.99823	1.0000	27.50	0.99640	0.9982
20.50	0.99812	0.9999	28.00	0.99626	0.9980
21.00	0.99802	0.9998	28.50	0.99612	0.9979
21.50	0.99791	0.9997	29.00	0.99597	0.9977
22.00	0.99780	0.9996	29.50	0.99582	0.9976
22.50	0.99768	0.9995	30.00	0.99567	0.9974
23.00	0.99757	0.9993			

TECH	GEC
DATE	06/16/94
CHECK	
REVIEW	

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	C	Med	Fine	SILT OR CLAY

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B-8 43 - 44.5'	-	-	-	-	-	Gray, MEDIUM TO FINE SAND, some silty clay, some fine gravel.
Sample Type: JAR					USCS	(SC)

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-8
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	43 - 44.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	313.20
Dry Soil & Tare (gm)	278.60
Tare Weight (gm)	50.95
Moisture Content (%)	15.20

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		313.20
Tare Weight (gm)		50.95
Total Dry Weight (gm)	(W6)	227.65

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE
6.000					6.000 coarse gravel
3.000					3.000 coarse gravel
2.500					2.500 coarse gravel
2.000					2.000 coarse gravel
1.500					1.500 coarse gravel
1.000					1.000 coarse gravel
0.750	203.30	0.00		100.0	0.750 fine gravel
0.500	220.55	17.25	7.58	92.4	0.500 fine gravel
0.375	230.36	27.06	11.89	88.1	0.375 fine gravel
#4	240.35	37.05	16.27	83.7	#4 coarse sand
#10	255.25	51.95	22.82	77.2	#10 medium sand
#20	313.03	109.73	48.20	51.8	#20 medium sand
#40	368.61	165.31	72.62	27.4	#40 fine sand
#60	390.91	187.61	82.41	17.6	#60 fine sand
#100	398.44	195.14	85.72	14.3	#100 fine sand
#200	402.73	199.43	87.60	12.4	#200 fines
PAN					PAN

% C GRAVEL	
% F GRAVEL	16.27
% C SAND	6.55
% M SAND	49.80
% F SAND	14.99
% FINES	12.40
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Gray, MEDIUM TO FINE SAND, some silty clay, some fine gravel.

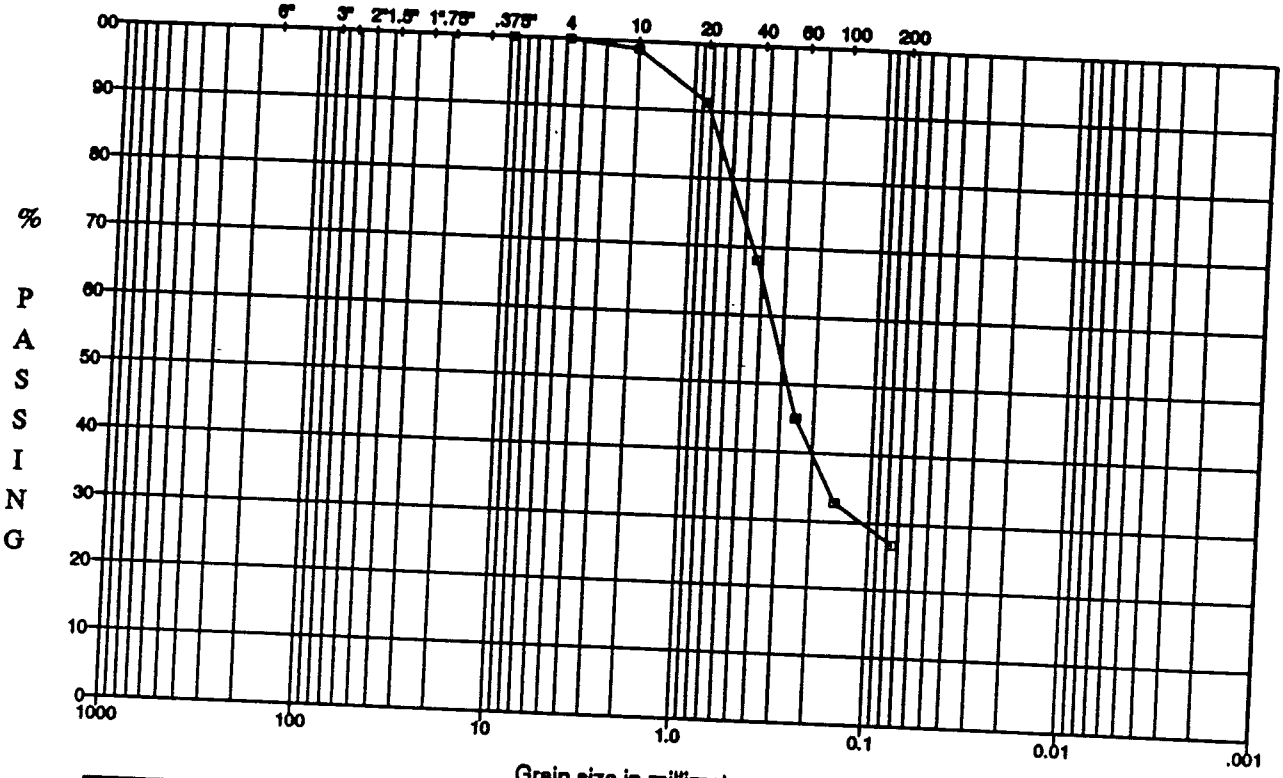
USCS: (SC)

TECH	PWM
DATE	06/13/94
CHECK	AJM
REVIEW	BJP

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



COBBLES	Coarse	Fine	C	Med	Fine	SILT OR CLAY
	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B-9 3 - 4.5'	-	-	-	-	-	Mottled Gray & Reddish Tan, MEDIUM TO FINE SAND, some silty clay, trace fine sand.
Sample Type: JAR						USCS (SC)

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-9
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	3 - 4.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	
Dry Soil & Tare (gm)	
Tare Weight (gm)	
Moisture Content (%)	

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture (W6)

Weight Of Sample (gm)	197.16
Tare Weight (gm)	42.93
Total Dry Weight (gm)	154.23

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE
6.000					6.000 coarse gravel
3.000					3.000 coarse gravel
2.500					2.500 coarse gravel
2.000					2.000 coarse gravel
1.500					1.500 coarse gravel
1.000					1.000 coarse gravel
0.750					0.750 fine gravel
0.500					0.500 fine gravel
0.375	203.30	0.00		100.0	0.375 fine gravel
#4	203.52	0.22	0.14	99.9	#4 coarse sand
#10	205.09	1.79	1.16	98.8	#10 medium sand
#20	216.81	13.51	8.76	91.2	#20 medium sand
#40	252.56	49.26	31.94	68.1	#40 fine sand
#60	288.22	84.92	55.06	44.9	#60 fine sand
#100	307.03	103.73	67.26	32.7	#100 fine sand
#200	316.19	112.89	73.20	26.8	#200 fines
PAN					PAN

% C GRAVEL	
% F GRAVEL	0.14
% C SAND	1.02
% M SAND	30.78
% F SAND	41.26
% FINES	26.80
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description Mottled Gray & Reddish Tan, MEDIUM TO FINE SAND, some silty clay, trace fine sand.

USCS (SC)

TECH	PWM
DATE	06/13/94
CHECK	PWM
REVIEW	BJP

GOLDER ASSOCIATES INC.

3580-6

ONE-POINT

ATTERBERG LIMIT DETERMINATION

ASTM D-4318-84

PROJECT TITLE	JJ & G/LAB TESTING/GA	**SAMPLE ID.**	B-9
PROJECT NO.	933-3580-005	**SAMPLE TYPE**	JAR
		SAMPLE DEPTH	13 - 14.5'

SAMPLE PREPARATION

Wet or Dry Air Dry **Minus #40 Sieve** Yes

PLASTIC LIMIT DETERMINATION

TARE NUMBER	31	51	52	NATURAL MOISTURE
WEIGHT OF WET SOIL +TARE, gm.	22.97	22.93	23.17	152.35
WEIGHT OF DRY SOIL +TARE, gm.	21.16	21.07	21.38	140.42
WEIGHT OF WATER, gm.	1.81	1.86	1.79	11.93
WEIGHT OF TARE, gm.	11.12	10.82	11.46	51.92
WEIGHT OF DRY SOIL, gm.	10.04	10.25	9.92	88.50
WATER CONTENT (%)	18.03	18.15	18.04	13.48

LIQUID LIMIT DETERMINATION

TARE NUMBER	1	45
NUMBER OF BLOWS	28	27
WEIGHT OF WET SOIL +TARE, gm.	25.98	26.04
WEIGHT OF DRY SOIL +TARE, gm.	20.30	19.59
WEIGHT OF WATER, gm.	5.68	6.45
WEIGHT OF TARE, gm.	6.64	4.19
WEIGHT OF DRY SOIL, gm.	13.66	15.40
WATER CONTENT (%)	41.58	41.88

	TEST RESULTS	
	TRIAL 1	TRIAL 2
BLOWS:	28	27
K VALUE:	1.014	1.009

LIQUID LIMIT (Wl)	42.21	42
PLASTIC LIMIT (Wp)	18.07	18
PLASTICITY INDEX (Ip)		-24
MOISTURE CONTENT (%)	13.48	
LIQUIDITY INDEX(I)	-0.19	

DESCRIPTION Mottled Dark Red, White and Weak Red, SILTY CLAY, and medium to fine sand.

USCS CL

TECH	GEC
DATE	06/10/94
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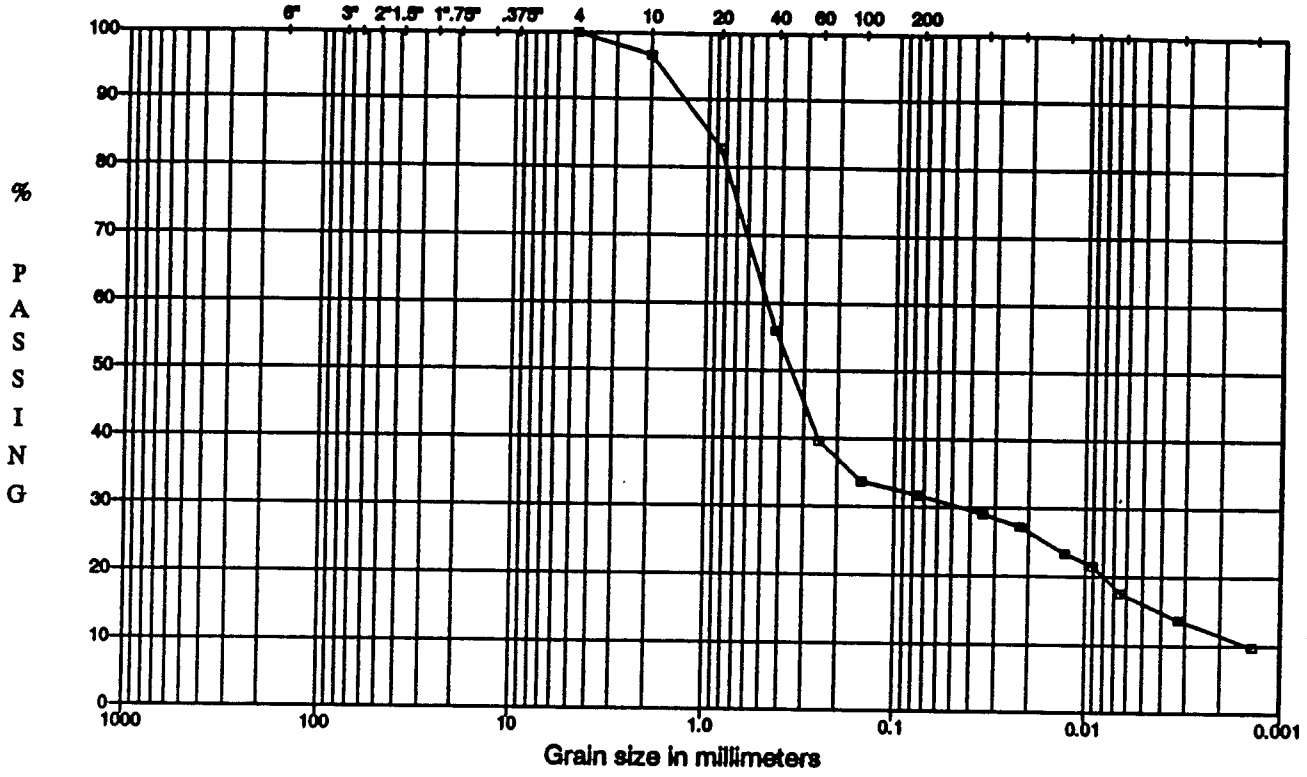
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-11

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B-9 18 - 19.5'	-	-	-	-	2.65	Yellow & Grayish Tan, MEDIUM TO FINE SAND, and silty clay.
Sample Type: JAR					USCS	(SC)

933-3580-005

JJ & G/LAB TESTING/GA

3580-15

GOLDER ASSOCIATES INC.

DATE	6/13/94
CHECK	PWM
REVIEW	BJP

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-9
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
		SAMPLE DEPTH	18 - 19.5'

AS RECEIVED WATER CONTENT

Tare No.		
Wt Wet Soil & Tare (gm) (W1)		
Wt Dry Soil & Tare (gm) (W2)		
Weight of Tare (gm) (W3)		
Weight of Water (gm) (W4=W1-W2)		0.00
Weight of Dry Soil (gm) (W5=W2-W3)		0.00
Moisture Content (%) (W4/W5)*100		0.00

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	133.31
Dry Soil & Tare (gm)	133.12
Tare Weight (gm)	52.32
Moisture Content (%)	0.24

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	252.39	
Tare Wt (gm)	113.77	
Total Wt (gm)	138.29	(W6)

Pass #4 Material Sieve

TARE WEIGHT 203.30

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	% PASSING		
6.0"	203.30	0.0		6.0"	cobbles
3.0"	203.30	0.0		3.0"	coarse gravel
2.5"	203.30	0.0		2.5"	coarse gravel
2.0"	203.30	0.0		2.0"	coarse gravel
1.5"	203.30	0.0		1.5"	coarse gravel
1.0"	203.30	0.0		1.0"	coarse gravel
0.75"	203.30	0.0		0.75"	fine gravel
0.50"	203.30	0.0		0.50"	fine gravel
0.375"	203.30	0.0		0.375"	fine gravel
#4	203.30	0.0	100.0	#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.65
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	51.62
Calculated Dry Wt used in test (gm)	51.50
Hydrometer Bulb Number	280629
% Pass #4 Sieve For Whole Sample	100.00

Hygroscopic Moisture

Wet Soil & Tare (gm)	133.31
Dry Soil & Tare (gm)	133.12
Tare Weight (gm)	52.32
Moisture Content (%)	0.24

DATE	TIME	ET	RDNG	TEMP	TEMP.COR	HYD. COR.
06/14/94	10:45	(min)	R	T	K	Cc
06/14/94	10:47	2.00	21.0	23.00	0.013	6.00
06/14/94	10:50	5.00	20.0	23.00	0.013	6.00
06/14/94	11:00	15.00	18.0	23.00	0.013	6.00
06/14/94	11:15	30.00	17.0	23.00	0.013	6.00
06/14/94	11:45	60.00	15.0	23.00	0.013	6.00
06/14/94	14:55	250.00	13.0	23.00	0.013	6.00
06/15/94	10:45	1440.00	11.0	23.00	0.013	6.00

(40ml Na(PO4)n per 1000ml H2O)

Cc= Composite Correction Reading

TARE WEIGHT 203.28

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING		
#10	205.00	1.72	96.7	#10	medium sand
#20	212.11	8.83	82.9	#20	medium sand
#40	225.99	22.71	55.9	#40	fine sand
#60	234.36	31.08	39.6	#60	fine sand
#100	237.40	34.12	33.7	#100	fine sand
#200	238.52	35.24	31.6	#200	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	15.00	13.8	0.013	1.00	0.0346	29.1
5.00	14.00	14.0	0.013	1.00	0.0220	27.2
15.00	12.00	14.3	0.013	1.00	0.0129	23.3
30.00	11.00	14.5	0.013	1.00	0.0092	21.4
60.00	9.00	14.8	0.013	1.00	0.0065	17.5
250.00	7.00	15.2	0.013	1.00	0.0032	13.6
1440.00	5.00	15.5	0.013	1.00	0.0014	9.7

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	0.0
% COARSE SAND	3.3
% MEDIUM SAND	40.8
% FINE SAND	24.3
% FINES	31.6
% TOTAL SAMPLE	100.0

Description: Yellow & Grayish Tan, MEDIUM TO FINE SAND, and silty clay.

USCS: (SC)

-	LL
-	PL
-	PI

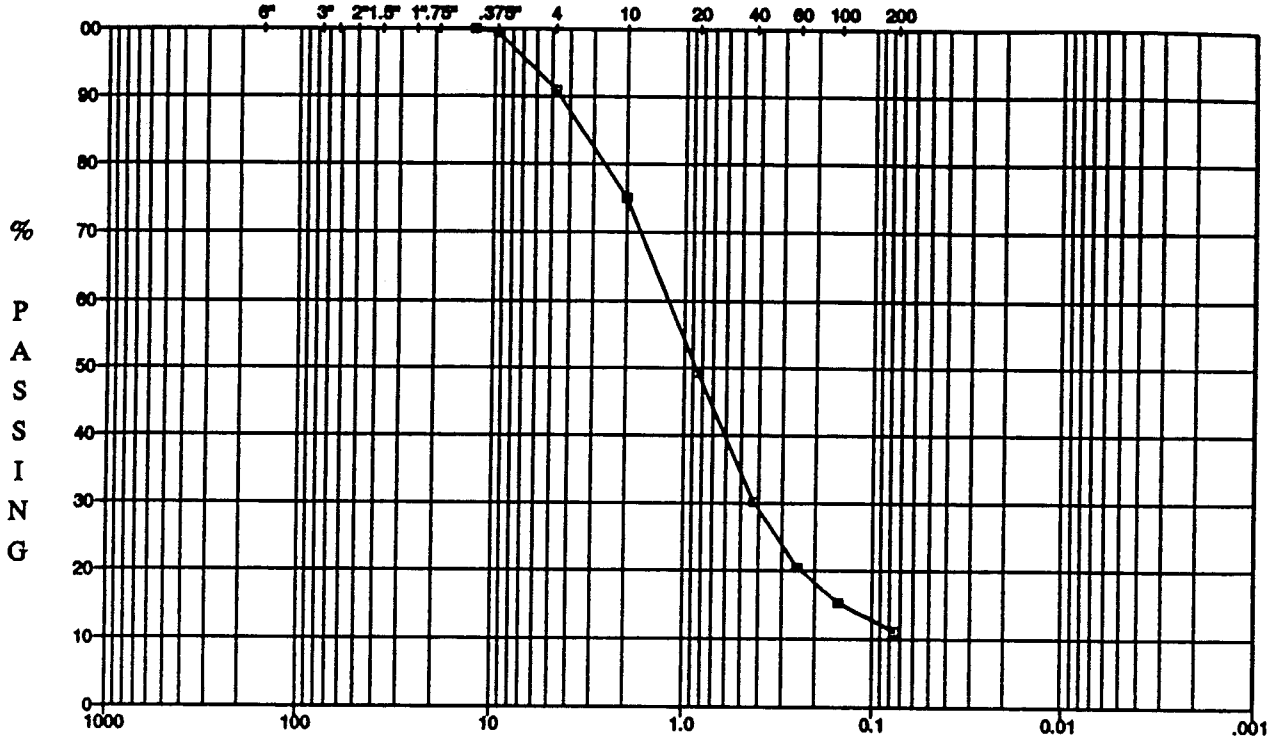
TECH	PWM/MJL
DATE	6/13/94
CHECK	PWM
REVIEW	BP

GOLDER ASSOCIATES INC.

PN: 3580-15

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B-10 13 - 14.5'	-	-	-	-	-	Tan, COARSE TO FINE SAND, little silty clay, little fine gravel.
Sample Type:	JAR				USCS	(SP-SC)

DATE	06/13/94
CHECK	
REVIEW	

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-10
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	13 - 14.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	229.60
Dry Soil & Tare (gm)	208.96
Tare Weight (gm)	51.72
Moisture Content (%)	13.13

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		229.60
Tare Weight (gm)		51.72
Total Dry Weight (gm)	(W6)	157.24

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE
6.000					6.000 coarse gravel
3.000					3.000 coarse gravel
2.500					2.500 coarse gravel
2.000					2.000 coarse gravel
1.500					1.500 coarse gravel
1.000					1.000 coarse gravel
0.750					0.750 fine gravel
0.500	203.30	0.00		100.0	0.500 fine gravel
0.375	204.26	0.96	0.61	99.4	0.375 fine gravel
#4	217.65	14.35	9.13	90.9	#4 coarse sand
#10	242.52	39.22	24.94	75.1	#10 medium sand
#20	283.10	79.80	50.75	49.2	#20 medium sand
#40	313.19	109.89	69.89	30.1	#40 fine sand
#60	328.26	124.96	79.47	20.5	#60 fine sand
#100	336.25	132.95	84.55	15.4	#100 fine sand
#200	343.06	139.76	88.88	11.1	#200 fines
PAN					PAN

% C GRAVEL	
% F GRAVEL	9.13
% C SAND	15.82
% M SAND	44.94
% F SAND	19.00
% FINES	11.12
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Tan, COARSE TO FINE SAND, little silty clay, little fine gravel.

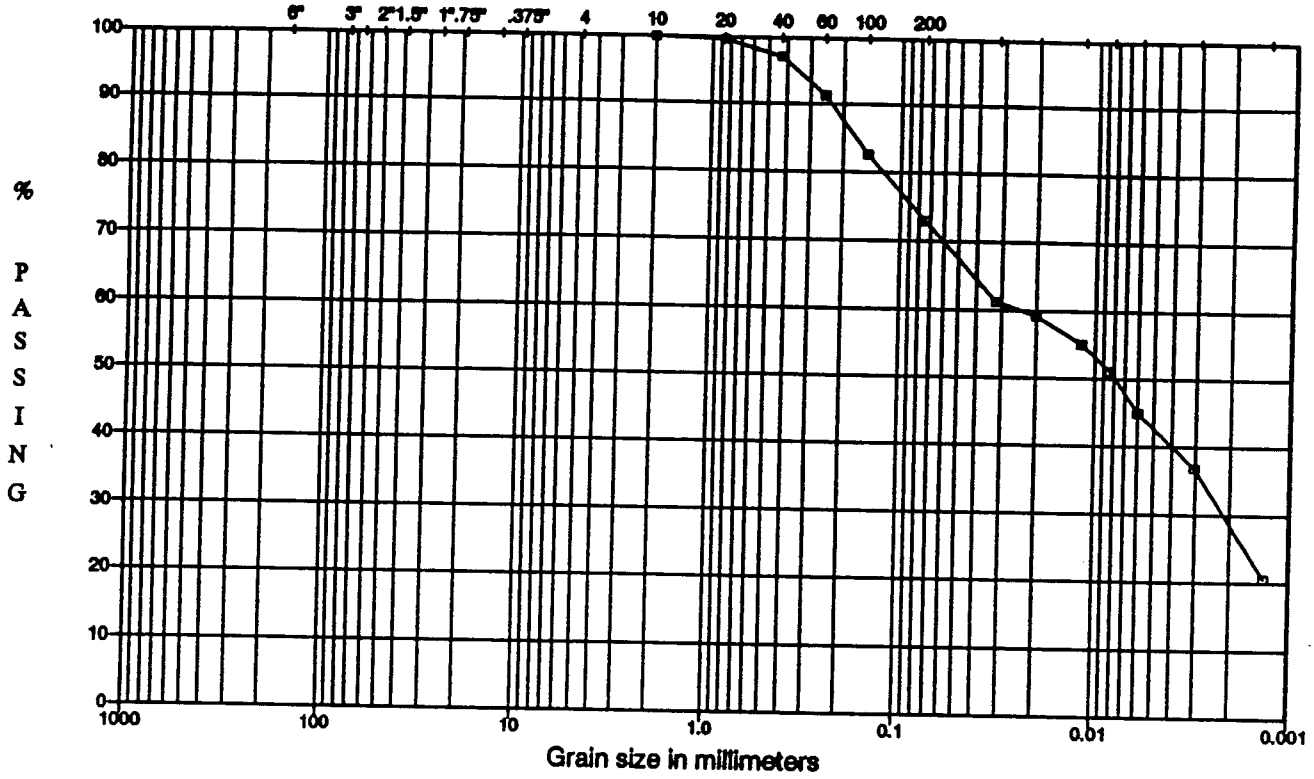
USCS: (SP-SC)

TECH	PWM
DATE	06/13/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B-10 48 - 49.5'	-	-	-	-	2.65	Mottled Gray & Reddish Brown, SILTY CLAY, some medium to fine sand.
Sample Type: JAR					USCS	(CL-CH)

933-3580-005
JJ & G/LAB TESTING/GA
3580-17

GOLDER ASSOCIATES INC.

DATE	6/13/94
CHECK	AWM
REVIEW	BJP

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE: IJ & G/LAB TESTING/GA
PROJECT NO.: 933-3580-005

SAMPLE ID	B-10
SAMPLE TYPE	JAR
SAMPLE DEPTH	48 - 48.5'

AS RECEIVED WATER CONTENT

Tare No.		
Wt Wet Soil & Tare (gm)	(W1)	
Wt Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	0.00
Weight of Dry Soil (gm)	(W5=W2-W3)	0.00
Moisture Content (%)	(W4/W5)*100	0.00

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	147.66
Dry Soil & Tare (gm)	141.60
Tare Weight (gm)	51.78
Moisture Content (%)	6.75

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	263.47	
Tare Wt (gm)	115.34	
Total Wt (gm)	130.86	(W9)

Plus #4 Material Sieve

TARE WEIGHT: 203.30

	(Wt+Tare)	(((Wt-Tare)/W9)*100)	% PASSING		
6.0"	203.30	0.0		6.0"	cobbles
3.0"	203.30	0.0		3.0"	coarse gravel
2.5"	203.30	0.0		2.5"	coarse gravel
2.0"	203.30	0.0		2.0"	coarse gravel
1.5"	203.30	0.0		1.5"	coarse gravel
1.0"	203.30	0.0		1.0"	coarse gravel
0.75"	203.30	0.0		0.75"	fine gravel
0.50"	203.30	0.0		0.50"	fine gravel
0.375"	203.30	0.0		0.375"	fine gravel
#4	203.30	0.0		#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.65
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	52.30
Calculated Dry Wt used in test (gm)	48.99
Hydrometer Bulb Number	280629
% Pass #4 Sieve For Whole Sample	100.00

Hygroscopic Moisture

Wet Soil & Tare (gm)	147.66
Dry Soil & Tare (gm)	141.60
Tare Weight (gm)	51.78
Moisture Content (%)	6.75

DATE	TIME	ET (min)	RDNG R	TEMP T	TEMP.COR K	HYD. COR. Cc
06/14/94	10:49					
06/14/94	10:51	2.00	36.0	23.00	0.013	6.00
06/14/94	10:54	5.00	35.0	23.00	0.013	6.00
06/14/94	11:04	15.00	33.0	23.00	0.013	6.00
06/14/94	11:19	30.00	31.0	23.00	0.013	6.00
06/14/94	11:49	60.00	28.0	23.00	0.013	6.00
06/14/94	14:59	250.00	24.0	23.00	0.013	6.00
06/15/94	10:49	1440.00	16.0	23.00	0.013	6.00

(40ml Na(PO4)n per 1000ml H2O)
Cc= Composite Correction Reading

TARE WEIGHT: 203.28

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING		
#10	203.28	0.00	100.0	#10	medium sand
#20	203.53	0.25	99.5	#20	medium sand
#40	204.67	1.39	97.2	#40	fine sand
#60	207.47	4.19	91.4	#60	fine sand
#100	211.78	8.50	82.7	#100	fine sand
#200	216.49	13.21	73.0	#200	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	30.00	11.4	0.013	1.00	0.0314	61.2
5.00	29.00	11.5	0.013	1.00	0.0200	59.2
15.00	27.00	11.9	0.013	1.00	0.0117	55.1
30.00	25.00	12.2	0.013	1.00	0.0084	51.0
60.00	22.00	12.7	0.013	1.00	0.0061	44.9
250.00	18.00	13.3	0.013	1.00	0.0030	36.7
1440.00	10.00	14.7	0.013	1.00	0.0013	20.4

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	0.0
% COARSE SAND	0.0
% MEDIUM SAND	2.8
% FINE SAND	24.2
% FINES	73.0
% TOTAL SAMPLE	100.0

Description: Mottled Gray & Reddish Brown, SILTY CLAY, some medium to fine sand.
USCS: (CL-CH)

LL	-
PL	-
PI	-

TECH	PWM/JWE
DATE	6/13/94
CHECK	PWM
REVIEW	BJP

GOLDER ASSOCIATES INC.

FN: 3580-17

ONE-POINT

ATTERBERG LIMIT DETERMINATION

ASTM D-4318-84

PROJECT TITLE	JJ & G/LAB TESTING/GA	**SAMPLE ID.**	B-10
PROJECT NO.	933-3580-005	**SAMPLE TYPE**	JAR
		SAMPLE DEPTH	53 - 54'

SAMPLE PREPARATION

Wet or Dry Air Dry

Minus #40 Sieve Yes

PLASTIC LIMIT DETERMINATION

TARE NUMBER	3	41	45	NATURAL MOISTURE
WEIGHT OF WET SOIL +TARE, gm.	21.58	21.35	22.11	100
WEIGHT OF DRY SOIL +TARE, gm.	19.74	19.48	20.09	133.91
WEIGHT OF WATER, gm.	1.84	1.87	2.02	120.37
WEIGHT OF TARE, gm.	11.83	11.45	11.36	13.54
WEIGHT OF DRY SOIL, gm.	7.91	8.03	8.73	50.73
WATER CONTENT (%)	23.26	23.29	23.14	69.64
				19.44

LIQUID LIMIT DETERMINATION

TARE NUMBER	14	21
NUMBER OF BLOWS	21	21
WEIGHT OF WET SOIL +TARE, gm.	23.77	26.05
WEIGHT OF DRY SOIL +TARE, gm.	18.07	19.59
WEIGHT OF WATER, gm.	5.70	6.46
WEIGHT OF TARE, gm.	6.72	6.72
WEIGHT OF DRY SOIL, gm.	11.35	12.87
WATER CONTENT (%)	50.22	50.19

	TEST RESULTS	
	TRIAL 1	TRIAL 2
BLOWS:	21	21
K VALUE:	0.979	0.979

LIQUID LIMIT (Wl)	49.16	49
PLASTIC LIMIT (Wp)	23.23	23
PLASTICITY INDEX (Ip)		26
MOISTURE CONTENT (%)	19.44	
LIQUIDITY INDEX(I)	-0.15	

DESCRIPTION Olive, SILTY CLAY, trace medium to fine sand.

USCS CL

TECH	GEC
DATE	06/10/94
CHECK	SLC
REVIEW	BJP

GOLDER ASSOCIATES INC.

ONE-POINT

ATTERBERG LIMIT DETERMINATION

ASTM D-4318-84

PROJECT TITLE	JJ & G/LAB TESTING/GA	**SAMPLE ID.**	B-11
PROJECT NO.	933-3580-005	**SAMPLE TYPE**	JAR
		SAMPLE DEPTH	18 - 19.5'

SAMPLE PREPARATION

Wet or Dry Air Dry

Minus #40 Sieve Yes

PLASTIC LIMIT DETERMINATION

				NATURAL MOISTURE
TARE NUMBER	33	36	49	26
WEIGHT OF WET SOIL +TARE, gm.	22.21	22.24	22.22	128.21
WEIGHT OF DRY SOIL +TARE, gm.	20.75	20.78	20.80	113.18
WEIGHT OF WATER, gm.	1.46	1.46	1.42	15.03
WEIGHT OF TARE, gm.	11.21	11.29	11.41	42.28
WEIGHT OF DRY SOIL, gm.	9.54	9.49	9.39	70.90
WATER CONTENT (%)	15.30	15.38	15.12	21.20

LIQUID LIMIT DETERMINATION

			TEST RESULTS	
TARE NUMBER	3	22	TRIAL 1	TRIAL 2
NUMBER OF BLOWS	30	29		
WEIGHT OF WET SOIL +TARE, gm.	24.03	24.83		
WEIGHT OF DRY SOIL +TARE, gm.	18.36	18.85		
WEIGHT OF WATER, gm.	5.67	5.98		
WEIGHT OF TARE, gm.	6.76	6.69	**BLOWS:**	30 29
WEIGHT OF DRY SOIL, gm.	11.60	12.16		
WATER CONTENT (%)	48.88	49.18	**K VALUE:**	1.022 1.018

LIQUID LIMIT (Wl)	50.01	50
PLASTIC LIMIT (Wp)	15.27	15
PLASTICITY INDEX (Ip)		35
MOISTURE CONTENT (%)	21.20	
LIQUIDITY INDEX(I)	0.17	

DESCRIPTION Mottled White, Light Gray, Yellowish Brown and Weak Red, SILTY CLAY, some medium to fine sand.

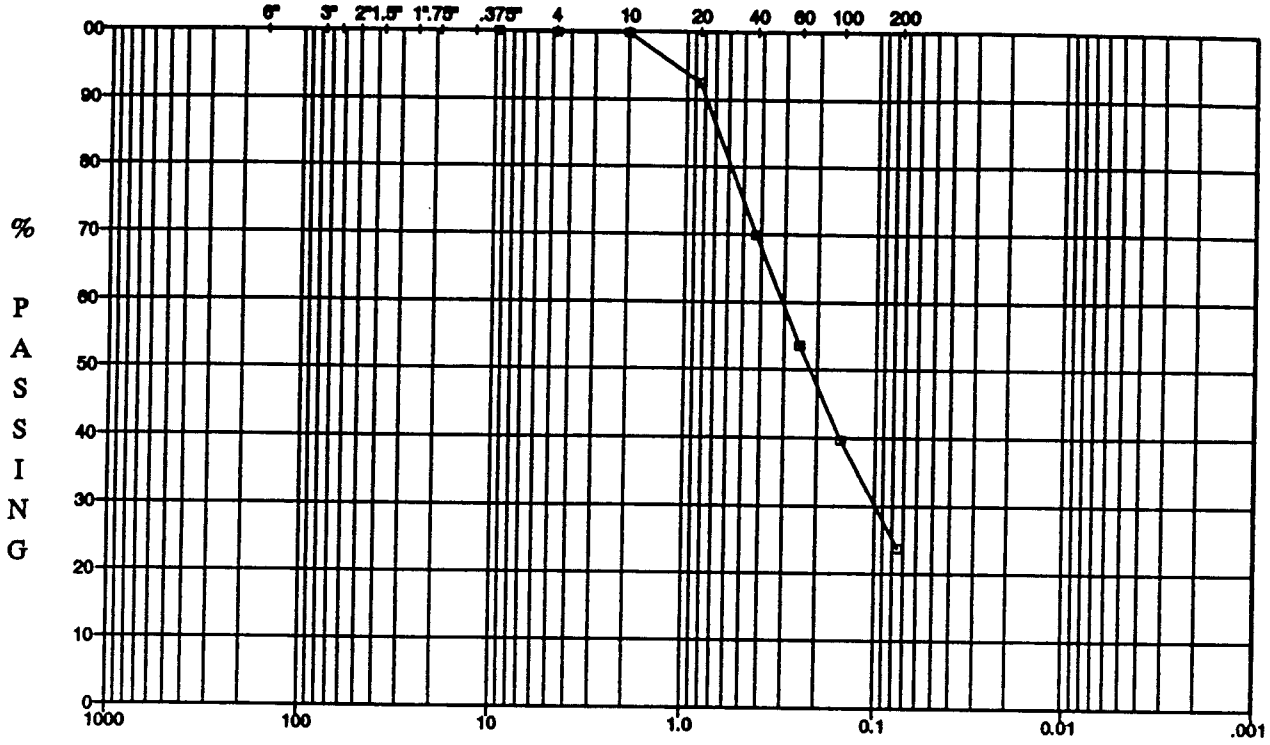
USCS CH

TECH	GEC
DATE	06/10/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B-11 23 - 24.5'	-	-	-	-	-	Reddish Brown, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.
Sample Type:	JAR				USCS	(SC)

933-3580-005
J & G/LAB TESTING/GA
N: 3580-9

GOLDER ASSOCIATES INC.

DATE	06/13/94
CHECK	
REVIEW	

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-11
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	23 - 24.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	213.66
Dry Soil & Tare (gm)	196.05
Tare Weight (gm)	51.60
Moisture Content (%)	12.19

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		213.66
Tare Weight (gm)		51.60
Total Dry Weight (gm)	(W6)	144.45

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE
6.000					6.000 coarse gravel
3.000					3.000 coarse gravel
2.500					2.500 coarse gravel
2.000					2.000 coarse gravel
1.500					1.500 coarse gravel
1.000					1.000 coarse gravel
0.750					0.750 fine gravel
0.500					0.500 fine gravel
0.375	203.30	0.00		100.0	0.375 fine gravel
#4	203.57	0.27	0.19	99.8	#4 coarse sand
#10	203.69	0.39	0.27	99.7	#10 medium sand
#20	214.22	10.92	7.56	92.4	#20 medium sand
#40	246.89	43.59	30.18	69.8	#40 fine sand
#60	270.30	67.00	46.38	53.6	#60 fine sand
#100	290.40	87.10	60.30	39.7	#100 fine sand
#200	313.46	110.16	76.26	23.7	#200 fines
PAN					PAN

% C GRAVEL	-
% F GRAVEL	0.19
% C SAND	0.08
% M SAND	29.91
% F SAND	46.09
% FINES	23.74
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description Reddish Brown, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

USCS (SC)

TECH	PWM
DATE	06/13/94
CHECK	PWM
REVIEW	

GOLDER ASSOCIATES INC.

3580-9

ONE-POINT

ATTERBERG LIMIT DETERMINATION

ASTM D-4318-84

PROJECT TITLE	JJ & G/LAB TESTING/GA	**SAMPLE ID.**	B - 12
PROJECT NO.	933-3580-005	**SAMPLE TYPE**	UD
		SAMPLE DEPTH	18 - 19.5'

SAMPLE PREPARATION

Wet or Dry	Air Dry	**Minus #40 Sieve**	Yes

PLASTIC LIMIT DETERMINATION

				NATURAL MOISTURE
TARE NUMBER	11	18	37	903
WEIGHT OF WET SOIL +TARE, gm.	23.33	22.73	23.57	271.40
WEIGHT OF DRY SOIL +TARE, gm.	20.92	20.47	21.01	229.54
WEIGHT OF WATER, gm.	2.41	2.26	2.56	41.86
WEIGHT OF TARE, gm.	11.74	11.81	11.26	52.00
WEIGHT OF DRY SOIL, gm.	9.18	8.66	9.75	177.54
WATER CONTENT (%)	26.25	26.10	26.26	23.58

LIQUID LIMIT DETERMINATION

TARE NUMBER	13	42
NUMBER OF BLOWS	30	30
WEIGHT OF WET SOIL +TARE, gm.	24.24	22.43
WEIGHT OF DRY SOIL +TARE, gm.	17.62	15.61
WEIGHT OF WATER, gm.	6.62	6.82
WEIGHT OF TARE, gm.	6.64	4.18
WEIGHT OF DRY SOIL, gm.	10.98	11.43
WATER CONTENT (%)	60.29	59.67

	TEST RESULTS	
	TRIAL 1	TRIAL 2
BLOWS:	30	30
K VALUE:	1.022	1.022

LIQUID LIMIT (Wl)	61.30	61
PLASTIC LIMIT (Wp)	26.20	26
PLASTICITY INDEX (Ip)		35
MOISTURE CONTENT (%)	23.58	
LIQUIDITY INDEX(I)	-0.07	

DESCRIPTION Mottled Reddish Yellow, Dark Red and Weak Red, SILTY CLAY, some medium to fine sand.

USCS CH

TECH	GEC
DATE	06/13/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-24

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE:	JJ & G/LAB TESTING/GA		
PROJECT NO.:	933-3580-005		
SAMPLE ID:	B - 12	18 - 19.5'	
SAMPLE TYPE:	UD		

BOARD #:	13
CELL #:	6
Flow Pump Speed	12
Technician:	GEC/BJP

COMMENTS:

Sample Data, Initial

Height, inches	3.199	B-Value,f	1.00
Diameter, inches	2.860	Cell Pres	105.00
Area, cm^2	41.45	Bot. Pres.	90.00
Volume, cm^3	336.77	Top Pres.	90.00
Mass, g	683.17	Tot. B.P.	90.00
Moisture Content, %	23.58	Head, max.	251.11
Dry Density, pcf	102.43	Head, min.	238.45
Spec. Gravity	2.682	Max. Grad.	30.93
Volume Solids, cm^3	206.12	Min. Grad.	29.37
Volume Voids, cm^3	130.65		
Void Ratio	0.63		
Saturation, %	99.8%		

Sample Data, Final

Height, inches	3.196
Diameter, inches	2.872
Area, cm^2	41.80
Volume, cm^3	339.29
Mass, g	687.12
Moisture Content	22.67
Dry Density, pcf	103.01
Volume Solids, cm^3	208.84
Volume Voids, cm^3	130.44
Void Ratio	0.62
Saturation, %	97.4%

WATER CONTENTS

		Trimmings Initial	Sample Final
Tare No.		903	38
Wt soil&tare, i	g	271.40	388.40
Wt soil&tare, f	g	229.54	325.99
Wt Tare	g	52.00	58.74
Wt Moisture Lost	g	41.86	62.41
Wt Dry Soil	g	177.54	275.25
Water Content	%	23.6%	22.7%

Flow Pump Rate: 5.90E-06 cm 3/sec.

USCS: CH

DESCRIPTION:
Mottled Reddish Yellow, Dark Red and Weak Red, SILTY CLAY, some medium to fine sand.

TIME FUNCTION,SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (Degrees C)	dt (min)	dt, acc (min)	dt (sec)	dt, acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/16/94	34501	8	5	22.9	0	0	0	0	3.39	238.45	29.37	4.2E-09
06/16/94	34501	8	17	22.9	12	12	720	720	3.41	239.86	29.55	4.2E-09
06/16/94	34501	8	25	23.0	8	20	480	1200	3.46	243.38	29.98	4.1E-09
06/16/94	34501	8	36	23.0	11	31	660	1860	3.54	249.00	30.67	4.0E-09 *
06/16/94	34501	8	48	23.1	12	43	720	2580	3.48	244.78	30.15	4.1E-09 *
06/16/94	34501	8	57	23.1	9	52	540	3120	3.57	251.11	30.93	4.0E-09 *
06/16/94	34501	9	7	23.1	10	62	600	3720	3.51	246.89	30.41	4.0E-09 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 4.0E-09 cm/sec **

DATE 06/16/94
CHECK
REVIEW

GOLDER ASSOCIATES INC
FN: 3580-31

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	JJ & G/LAB TESTING/GA
PROJECT NO.	933-3580-005
TESTED FOR	PERM

SAMPLE ID	B - 12
SAMPLE TYPE	UD
SAMPLE DEPTH	18 - 19.5'

HYGROSCOPIC MOISTURE OF MATERIAL PASSING THE #10 SIEVE

Tare Number		903
Weight Soil and Tare, Inital (gm)	(W1)	177.86
Weight Soil and Tare, Final (gm)	(W2)	175.40
Weight Of Tare (gm)	(W3)	51.98
Weight Of Moisture (gm)	(W4=W1-W2)	1.66
Weight Of Dry Soil (gm)	(W5=W2-W3)	123.42
Hygroscopic Moisture In (%)	(HM=(W4/W5)*100)	1.3%

AIR REMOVAL METHOD: VACUUM

TRIAL		1	2	3
Pycnometer Number		9		
Weight Pycnometer Empty (gm)	(Mf)	172.19		
Weight of Soil & Pycnometer (gm)		222.20		
Weight of Soil, Water & Pycnometer (gm)	(Mb)	701.42		
Observed Temperature (Tb), for (Mb) In Degrees C		24.0		
Observed Temperature (Ta), for (Ma) In Degrees C		23.00		
Weight of Pycnometer & Water (gm)	(Ma @ Ta)	670.58		
Relative Density of Water @ (Ta)		0.99757		
Relative Density of Water @ (Tx)		0.99732		
rrection Factor due to Temperature @Tx	(K)	0.9991		
eight of Soil (gm)		50.01		
Weight of Dry Soil (gm)	(Md)	49.35		
Weight of Pycnometer & Water (gm)	(Ma)	670.46		
Weight of Soil,Water & Pycnometer (gm)	(Mb)	701.42		

SPECIFIC GRAVITY

G @ 20 degrees C = [Md/(Md+((Ma - Mb)))]*(K)

2.682		

Gs Average: 2.68

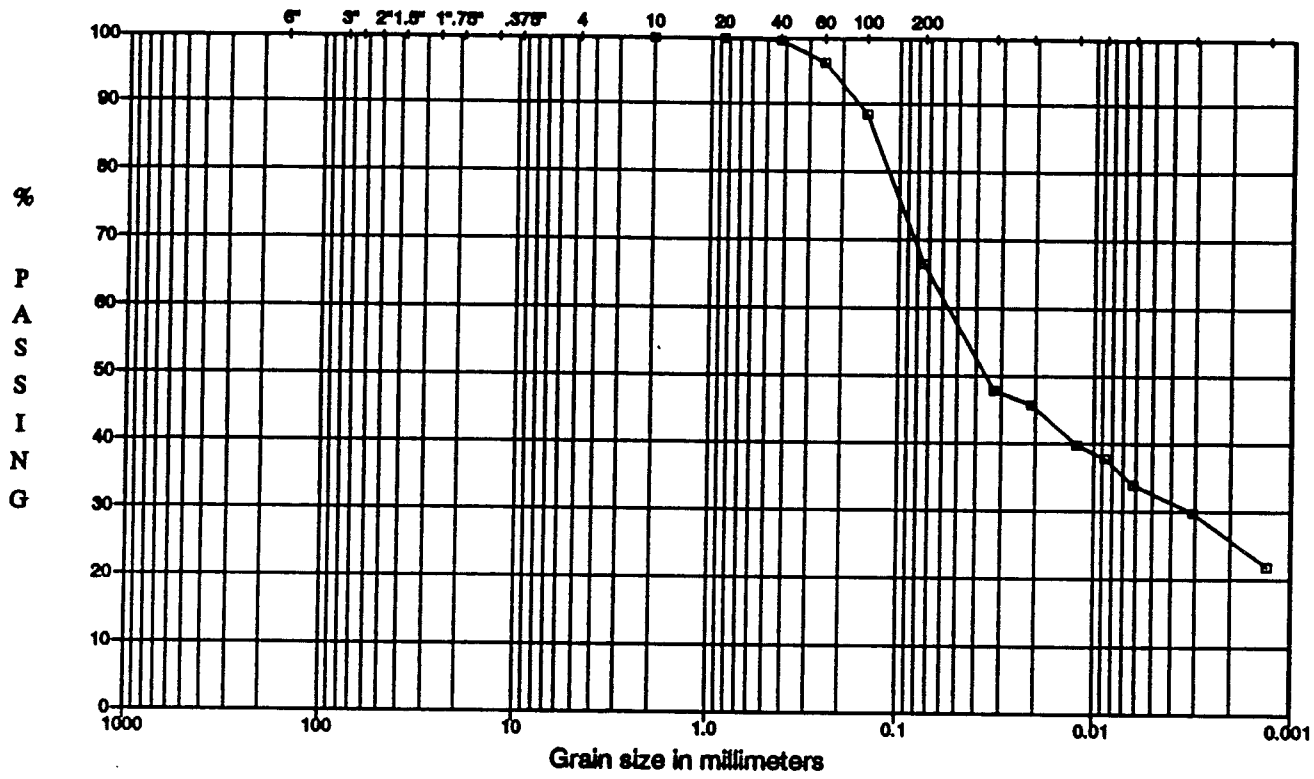
Correction Values Due To Temperature

Temp. (C)	Rel.Density	Corr. (K)	Temp. (C)	Rel. Density	Corr. (K)
16.00	0.99897	1.0007	23.50	0.99745	0.9992
16.50	0.99889	1.0007	24.00	0.99732	0.9991
17.00	0.99880	1.0006	24.50	0.99720	0.9990
17.50	0.99871	1.0005	25.00	0.99707	0.9988
18.00	0.99862	1.0004	25.50	0.99694	0.9987
18.50	0.99853	1.0003	26.00	0.99681	0.9986
19.00	0.99843	1.0002	26.50	0.99668	0.9984
19.50	0.99833	1.0001	27.00	0.99654	0.9983
20.00	0.99823	1.0000	27.50	0.99640	0.9982
20.50	0.99812	0.9999	28.00	0.99626	0.9980
21.00	0.99802	0.9998	28.50	0.99612	0.9979
21.50	0.99791	0.9997	29.00	0.99597	0.9977
22.00	0.99780	0.9996	29.50	0.99582	0.9976
22.50	0.99768	0.9995	30.00	0.99567	0.9974
23.00	0.99757	0.9993			

TECH	GEC/MJL
DATE	06/16/94
CHECK	
REVIEW	

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B-12 33 - 34.5'	-	-	-	-	2.65	Mottled Gray, Yellow & Reddish Brown, SILTY CLAY, and fine sand.
Sample Type: JAR					USCS	(CL-CH)

933-3580-005

G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

DATE	6/13/94
CHECK	PWM
REVIEW	BJP

FN: 3580-16

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE	LJ & G/LAB TESTING/GA	SAMPLE ID	B-12
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
		SAMPLE DEPTH	33 - 34.9'

AS RECEIVED WATER CONTENT

Tare No.		
Wt Wet Soil & Tare (gm)	(W1)	
Wt Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	0.00
Weight of Dry Soil (gm)	(W5=W2-W3)	0.00
Moisture Content (%)	(W4/W5)*100	0.00

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	151.52
Dry Soil & Tare (gm)	150.43
Tare Weight (gm)	51.91
Moisture Content (%)	1.39

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	246.32	
Tare Wt (gm)	113.45	
Total Wt (gm)	130.85	(W6)

Pass #4 Material Sieve

TARE WEIGHT: 203.30

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	% PASSING		
6.0"	203.30	0.0		6.0"	cobbles
3.0"	203.30	0.0		3.0"	coarse gravel
2.5"	203.30	0.0		2.5"	coarse gravel
2.0"	203.30	0.0		2.0"	coarse gravel
1.5"	203.30	0.0		1.5"	coarse gravel
1.0"	203.30	0.0		1.0"	coarse gravel
0.75"	203.30	0.0		0.75"	fine gravel
0.50"	203.30	0.0		0.50"	fine gravel
0.375"	203.30	0.0		0.375"	fine gravel
#4	203.30	0.0		#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.65
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Dispersion Device		Mechanical
h of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	50.99
Calculated Dry Wt used in test (gm)	50.29
Hydrometer Bulb Number	280629
% Pass #4 Sieve For Whole Sample	100.00

Hygroscopic Moisture

Wet Soil & Tare (gm)	151.52
Dry Soil & Tare (gm)	150.43
Tare Weight (gm)	51.91
Moisture Content (%)	1.39

DATE	TIME	ET (min)	RDNG R	TEMP T	TEMP.COR K	HYD. COR. Cc
06/14/94	10:47					
06/14/94	10:49	2.00	30.0	23.00	0.013	6.00
06/14/94	10:52	5.00	29.0	23.00	0.013	6.00
06/14/94	11:02	15.00	26.0	23.00	0.013	6.00
06/14/94	11:17	30.00	25.0	23.00	0.013	6.00
06/14/94	11:47	60.00	23.0	23.00	0.013	6.00
06/14/94	14:57	250.00	21.0	23.00	0.013	6.00
06/15/94	10:47	1440.00	17.0	23.00	0.013	6.00

(40ml $Na(PO_4)_6$ per 1000ml H_2O)

Cc= Composite Correction Reading

TARE WEIGHT: 203.30

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING		
#10	203.30	0.00	100.0	#10	medium sand
#20	203.36	0.06	99.9	#20	medium sand
#40	203.56	0.26	99.5	#40	fine sand
#60	205.19	1.89	96.2	#60	fine sand
#100	209.08	5.78	88.5	#100	fine sand
#200	220.12	16.82	66.6	#200	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	24.00	12.4	0.013	1.00	0.0328	47.7
5.00	23.00	12.5	0.013	1.00	0.0208	45.7
15.00	20.00	13.0	0.013	1.00	0.0123	39.8
30.00	19.00	13.2	0.013	1.00	0.0087	37.8
60.00	17.00	13.5	0.013	1.00	0.0062	33.8
250.00	15.00	13.8	0.013	1.00	0.0031	29.8
1440.00	11.00	14.5	0.013	1.00	0.0013	21.9

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	0.0
% COARSE SAND	0.0
% MEDIUM SAND	0.5
% FINE SAND	32.9
% FINES	66.6
% TOTAL SAMPLE	100.0

Description: Mottled Gray, Yellow & Reddish Brown, SILTY CLAY, and fine sand.

USCS: (CL-CH)

LL	-
PL	-
PI	-

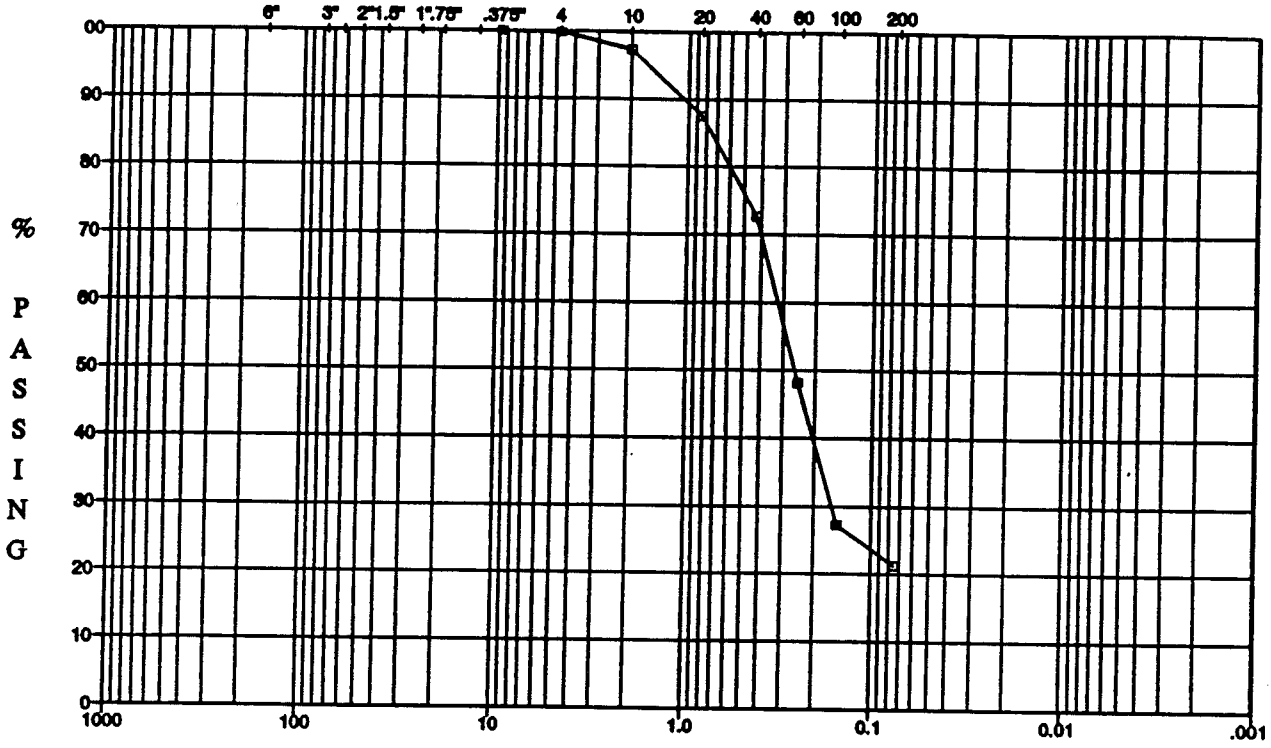
TECH	PWM/MJL
DATE	6/13/94
CHECK	PWM
REVIEW	BJP

GOLDER ASSOCIATES INC.

FN: 3580-16

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B-12 63 - 64.5'	-	-	-	-	-	Mottled Brown, Yellowish White, MEDIUM TO FINE SAND, some silty clay.
Sample Type:	JAR				USCS	(SC)

J-3580-005
JJ & G/LAB TESTING/GA
FN: 3580-7

GOLDER ASSOCIATES INC.

DATE	06/13/94
CHECK	
REVIEW	

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-12
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	63 - 64.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	217.22
Dry Soil & Tare (gm)	192.29
Tare Weight (gm)	52.16
Moisture Content (%)	17.79

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		217.22
Tare Weight (gm)		52.16
Total Dry Weight (gm)	(W6)	140.13

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) ((wt ret/w6)*100)	% PASS (100-%ret)	SIEVE
6.000					6.000 coarse gravel
3.000					3.000 coarse gravel
2.500					2.500 coarse gravel
2.000					2.000 coarse gravel
1.500					1.500 coarse gravel
1.000					1.000 coarse gravel
0.750					0.750 fine gravel
0.500					0.500 fine gravel
0.375	203.30	0.00		100.0	0.375 fine gravel
#4	203.72	0.42	0.30	99.7	#4 coarse sand
#10	207.18	3.88	2.77	97.2	#10 medium sand
#20	220.84	17.54	12.52	87.5	#20 medium sand
#40	241.55	38.25	27.30	72.7	#40 fine sand
#60	275.88	72.58	51.79	48.2	#60 fine sand
#100	305.26	101.96	72.76	27.2	#100 fine sand
#200	313.73	110.43	78.81	21.2	#200 fines
PAN					PAN

% C GRAVEL	
% F GRAVEL	0.30
% C SAND	2.47
% M SAND	24.53
% F SAND	51.51
% FINES	21.19
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Mottled Brown, Yellowish White, MEDIUM TO FINE SAND, some silty clay.

USCS: (SC)

TECH	PWM
DATE	06/13/94
CHECK	PWM
REVIEW	

GOLDER ASSOCIATES INC.

ONE-POINT

ATTERBERG LIMIT DETERMINATION

ASTM D-4318-84

PROJECT TITLE	JJ & G/LAB TESTING/GA	**SAMPLE ID.**	B - 13
PROJECT NO.	933-3580-005	**SAMPLE TYPE**	JAR
		SAMPLE DEPTH	18 - 19.5'

SAMPLE PREPARATION

Wet or Dry Air Dry **Minus #40 Sieve** Yes

PLASTIC LIMIT DETERMINATION

TARE NUMBER	13	30	39	NATURAL MOISTURE
WEIGHT OF WET SOIL +TARE, gm.	21.59	22.91	21.11	105
WEIGHT OF DRY SOIL +TARE, gm.	20.13	21.28	19.68	144.73
WEIGHT OF WATER, gm.	1.46	1.63	1.43	134.21
WEIGHT OF TARE, gm.	11.60	11.75	11.26	10.52
WEIGHT OF DRY SOIL, gm.	8.53	9.53	8.42	52.00
WATER CONTENT (%)	17.12	17.10	16.98	82.21
				12.80

LIQUID LIMIT DETERMINATION

TARE NUMBER	31	41
NUMBER OF BLOWS	24	24
WEIGHT OF WET SOIL +TARE, gm.	25.18	23.89
WEIGHT OF DRY SOIL +TARE, gm.	19.19	18.30
WEIGHT OF WATER, gm.	5.99	5.59
WEIGHT OF TARE, gm.	4.25	4.33
WEIGHT OF DRY SOIL, gm.	14.94	13.97
WATER CONTENT (%)	40.09	40.01

	TEST RESULTS	
	TRIAL 1	TRIAL 2
BLOWS:	24	24
K VALUE:	0.995	0.995

LIQUID LIMIT (Wl)	39.85	40
PLASTIC LIMIT (Wp)	17.07	17
PLASTICITY INDEX (Ip)		23
MOISTURE CONTENT (%)	12.80	
LIQUIDITY INDEX(I)	-0.19	

DESCRIPTION Mottled Red, Dusky Red, White and Yellowish Brown, SILTY CLAY, and medium to fine sand.

USCS CL

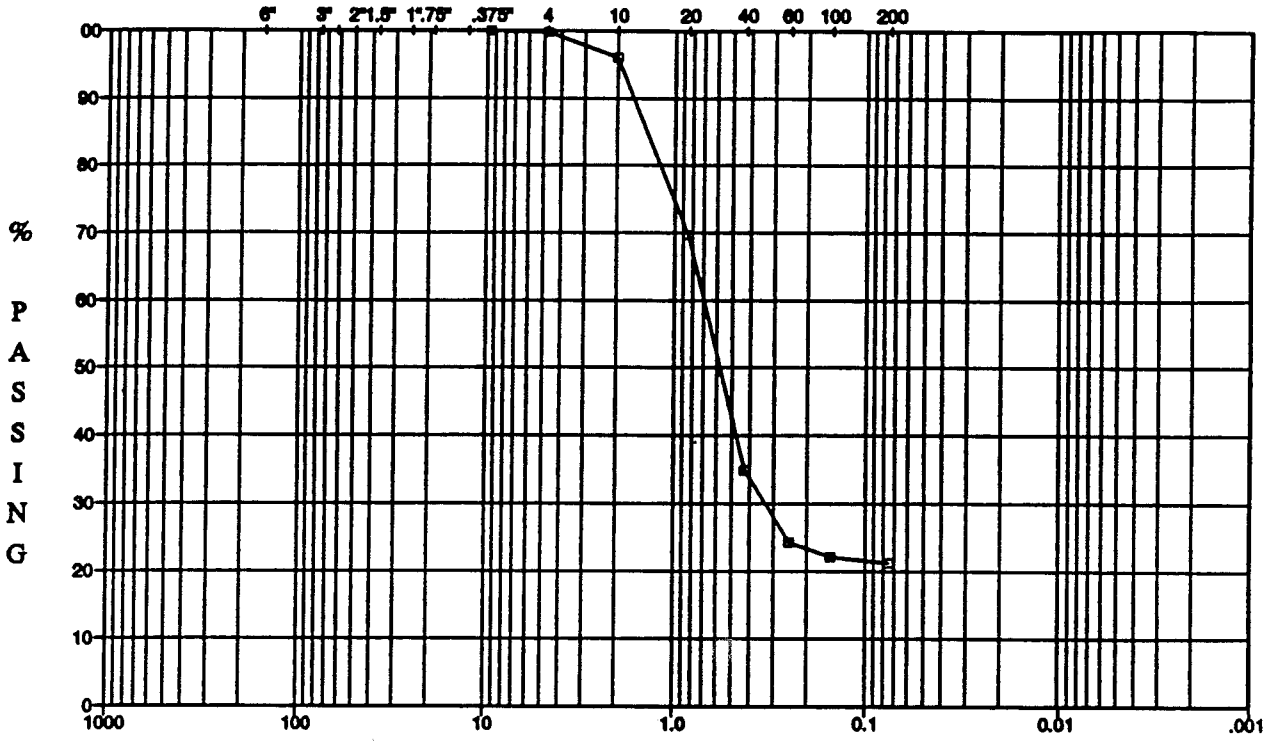
TECH	GEC
DATE	06/10/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-22

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B-13 28 - 29.5'	-	-	-	-	-	Reddish Brown, Grayish White, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.
Sample Type:	JAR				USCS	(SC)

3-3580-005

JJ & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

FN: 3580-4

DATE	06/13/94
CHECK	PWM
REVIEW	BJP

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-13
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	28 - 29.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	230.60
Dry Soil & Tare (gm)	202.17
Tare Weight (gm)	51.34
Moisture Content (%)	18.85

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		230.60
Tare Weight (gm)		51.34
Total Dry Weight (gm)	(W6)	150.83

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)
6.000				
3.000				
2.500				
2.000				
1.500				
1.000				
0.750				
0.500				
0.375	203.30	0.00		100.0
#4	203.80	0.50	0.33	99.7
#10	209.20	5.90	3.91	96.1
#20	249.03	45.73	30.32	69.7
#40	301.57	98.27	65.15	34.8
#60	317.45	114.15	75.68	24.3
#100	320.68	117.38	77.82	22.2
#200	322.09	118.79	78.76	21.2
PAN				

SIEVE	
6.000	coarse gravel
3.000	coarse gravel
2.500	coarse gravel
2.000	coarse gravel
1.500	coarse gravel
1.000	coarse gravel
0.750	fine gravel
0.500	fine gravel
0.375	fine gravel
#4	coarse sand
#10	medium sand
#20	medium sand
#40	fine sand
#60	fine sand
#100	fine sand
#200	fines
PAN	

% C GRAVEL	
% F GRAVEL	0.33
% C SAND	3.58
% M SAND	61.24
% F SAND	13.60
% FINES	21.24
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Reddish Brown, Grayish White, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

USCS: (SC)

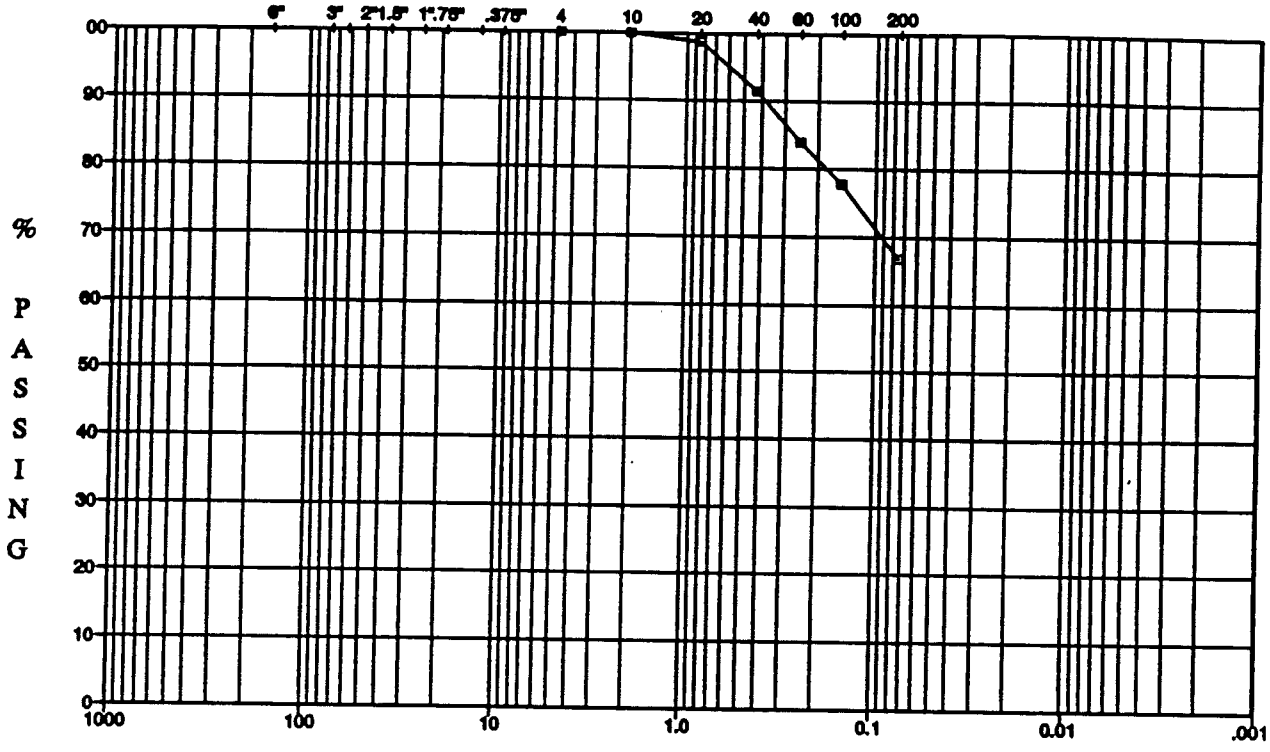
TECH	PWM
DATE	06/13/94
CHECK	PWM
REVIEW	

GOLDER ASSOCIATES INC.

580-4

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B-15 78 - 79.5'	-	-	-	-	-	Brown, SILTY CLAY, and medium to fine sand.
Sample Type:	JAR				USCS	(CL)

GOLDER ASSOCIATES INC.

DATE	06/13/94
CHECK	PJM
REVIEW	BJP

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-15
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	78 - 79.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	182.67
Dry Soil & Tare (gm)	166.11
Tare Weight (gm)	51.50
Moisture Content (%)	14.45

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		182.67
Tare Weight (gm)		51.50
Total Dry Weight (gm)	(W6)	114.61

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE
6.000					6.000 coarse gravel
3.000					3.000 coarse gravel
2.500					2.500 coarse gravel
2.000					2.000 coarse gravel
1.500					1.500 coarse gravel
1.000					1.000 coarse gravel
0.750					0.750 fine gravel
0.500					0.500 fine gravel
0.375					0.375 fine gravel
#4	203.30	0.00		100.0	#4 coarse sand
#10	203.31	0.01	0.01	100.0	#10 medium sand
#20	204.91	1.61	1.40	98.6	#20 medium sand
#40	213.13	9.83	8.58	91.4	#40 fine sand
#60	221.80	18.50	16.14	83.9	#60 fine sand
#100	228.71	25.41	22.17	77.8	#100 fine sand
#200	241.36	38.06	33.21	66.8	#200 fines
PAN					PAN

% C GRAVEL	
% F GRAVEL	
% C SAND	0.01
% M SAND	8.57
% F SAND	24.63
% FINES	66.79
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description Brown, SILTY CLAY, and medium to fine sand.

USCS (CL)

TECH	PWM
DATE	06/13/94
CHECK	PWM
REVIEW	

ONE-POINT

ATTERBERG LIMIT DETERMINATION

ASTM D-4318-84

PROJECT TITLE	JJ & G/LAB TESTING/GA	**SAMPLE ID.**	B - 15
PROJECT NO.	933-3580-005	**SAMPLE TYPE**	UD
		SAMPLE DEPTH	88 - 89.5'

SAMPLE PREPARATION

Wet or Dry	Air Dry	**Minus #40 Sieve**	Yes

PLASTIC LIMIT DETERMINATION

				NATURAL MOISTURE
TARE NUMBER	21	38	50	103
WEIGHT OF WET SOIL +TARE, gm.	21.77	21.85	22.57	210.56
WEIGHT OF DRY SOIL +TARE, gm.	20.14	20.12	20.79	182.27
WEIGHT OF WATER, gm.	1.63	1.73	1.78	28.29
WEIGHT OF TARE, gm.	11.78	11.21	11.57	51.96
WEIGHT OF DRY SOIL, gm.	8.36	8.91	9.22	130.31
WATER CONTENT (%)	19.50	19.42	19.31	21.71

LIQUID LIMIT DETERMINATION

			TEST RESULTS	
			TRIAL 1	TRIAL 2
TARE NUMBER	8	34		
NUMBER OF BLOWS	27	27		
WEIGHT OF WET SOIL +TARE, gm.	25.14	22.31		
WEIGHT OF DRY SOIL +TARE, gm.	19.17	16.43		
WEIGHT OF WATER, gm.	5.97	5.88	BLOWS:	27	27
WEIGHT OF TARE, gm.	6.75	4.28			
WEIGHT OF DRY SOIL, gm.	12.42	12.15			
WATER CONTENT (%)	48.07	48.40	K VALUE:	1.009	1.009

LIQUID LIMIT (Wl)	48.67	49
PLASTIC LIMIT (Wp)	19.41	19
PLASTICITY INDEX (Ip)		30
MOISTURE CONTENT (%)	21.71	
LIQUIDITY INDEX(I)	0.08	

DESCRIPTION Mottled Brownish Yellow, Red, Light Greenish Gray, Grayish Green, and Reddish Brown, SILTY CLAY, some medium to fine sand.

USCS CL

TECH	GEC
DATE	06/13/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-21

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE:	JJ & G/LAB TESTING/GA		BOARD #:	13	COMMENTS:
PROJECT NO.:	933-3580-005		CELL #:	5	
SAMPLE ID:	B-15	88 - 89.5'	Flow Pump Speed	12	
SAMPLE TYPE:	UD		Technician:	GEC/BJP	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.094	B-Value,f	1.00	Height, inches	3.071
Diameter, inches	2.884	Cell Pres	185.00	Diameter, inches	2.872
Area, cm^2	42.15	Bot. Pres.	80.00	Area, cm^2	41.80
Volume, cm^3	331.21	Top Pres.	80.00	Volume, cm^3	326.02
Mass, g	675.92	Tot. B.P.	80.00	Mass, g	669.81
Moisture Content, %	21.71	Head, max.	234.23	Moisture Content	20.64
Dry Density, pcf	104.63	Head, min.	228.87	Dry Density, pcf	106.27
Spec. Gravity	2.663	Max. Grad.	30.83	Volume Solids, cm^3	208.49
Volume Solids, cm^3	208.54	Min. Grad.	28.32	Volume Voids, cm^3	117.53
Volume Voids, cm^3	122.66			Void Ratio	0.56
Void Ratio	0.59			Saturation, %	97.5%
Saturation, %	98.3%				

WATER CONTENTS		Trimmings Initial	Sample Final
Tare No.		183	35
Wt soil&tare, i	g	210.56	389.93
Wt soil&tare, f	g	182.27	331.98
Wt Tare	g	51.96	51.26
Wt Moisture Lost	g	28.29	57.95
Wt Dry Soil	g	130.31	280.72
Water Content	%	21.7%	20.6%

Flow Pump Rate: 5.50E-06 cm 3/sec.

USCS: CL

DESCRIPTION:

Mottled Brownish Yellow, Red, Light Greenish Gray, Grayish Green, and Reddish Brown, SILTY CLAY, some medium to fine sand.

TIME FUNCTION,SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (Degrees C)	dt (min)	dt, acc (min)	dt (sec)	dt, acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/18/94	34503	11	0	22.5	0	0	0	0	3.33	234.23	30.83	4.1E-09
06/18/94	34503	12	0	22.5	60	60	3600	3600	3.20	225.09	28.86	4.3E-09
06/18/94	34503	13	0	22.5	60	120	3600	7200	3.14	220.87	28.32	4.4E-09
06/18/94	34503	14	0	22.5	60	180	3600	10800	3.19	224.38	28.77	4.3E-09 *
06/18/94	34503	15	0	22.5	60	240	3600	14400	3.25	228.61	29.31	4.2E-09 *
06/18/94	34503	16	0	22.5	60	300	3600	18000	3.28	230.72	29.58	4.2E-09 *
06/18/94	34503	17	0	22.5	60	360	3600	21600	3.22	226.49	29.04	4.3E-09 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 4.3E-09 cm/sec **

DATE 06/20/94

CHECK

REVIEW

GOLDER ASSOCIATES INC

FN: 3580P35

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	JJ & G/LAB TESTING/GA
PROJECT NO.	933-3580-005
TESTED FOR	PERM
SAMPLE ID	B - 15
SAMPLE TYPE	UD
SAMPLE DEPTH	88 - 89.5'

HYGROSCOPIC MOISTURE OF MATERIAL PASSING THE #10 SIEVE

Tare Number		103
Weight Soil and Tare, Inital (gm)	(W1)	122.28
Weight Soil and Tare, Final (gm)	(W2)	120.73
Weight Of Tare (gm)	(W3)	51.93
Weight Of Moisture (gm)	(W4=W1-W2)	1.55
Weight Of Dry Soil (gm)	(W5=W2-W3)	68.80
Hygroscopic Moisture In (%)	(HM=(W4/W5)*100)	2.3%

AIR REMOVAL METHOD: VACUUM

TRIAL

		1	2	3
Pycnometer Number		11		
Weight Pycnometer Empty (gm)	(Mf)	174.73		
Weight of Soil & Pycnometer (gm)		224.77		
Weight of Soil, Water & Pycnometer (gm)	(Mb)	783.57		
Observed Temperature (Tb), for (Mb) In Degrees C		24.0		
Observed Temperature (Ta), for (Ma) In Degrees C		24.00		
Weight of Pycnometer & Water (gm)	(Ma @ Ta)	672.99		
Relative Density of Water @ (Ta)		0.99732		
Relative Density of Water @ (Tx)		0.99732		
Correction Factor due to Temperature @Tx	(K)	0.9991		
Weight of Soil (gm)		50.04		
Weight of Dry Soil (gm)	(Ms)	48.94		
Weight of Pycnometer & Water (gm)	(Ma)	672.99		
Weight of Soil,Water & Pycnometer (gm)	(Mb)	783.57		

SPECIFIC GRAVITY

G @ 20 degrees C = [Ms/(Ms+((Ma - Mb)))]*(K)	2.663		

Gs Average: 2.66

Correction Values Due To Temperature

Temp. (C)	Rel.Density	Corr. (K)	Temp. (C)	Rel. Density	Corr. (K)
16.00	0.99897	1.0007	23.50	0.99745	0.9992
16.50	0.99889	1.0007	24.00	0.99732	0.9991
17.00	0.99880	1.0006	24.50	0.99720	0.9990
17.50	0.99871	1.0005	25.00	0.99707	0.9988
18.00	0.99862	1.0004	25.50	0.99694	0.9987
18.50	0.99853	1.0003	26.00	0.99681	0.9986
19.00	0.99843	1.0002	26.50	0.99668	0.9984
19.50	0.99833	1.0001	27.00	0.99654	0.9983
20.00	0.99823	1.0000	27.50	0.99640	0.9982
20.50	0.99812	0.9999	28.00	0.99626	0.9980
21.00	0.99802	0.9998	28.50	0.99612	0.9979
21.50	0.99791	0.9997	29.00	0.99597	0.9977
22.00	0.99780	0.9996	29.50	0.99582	0.9976
22.50	0.99768	0.9995	30.00	0.99567	0.9974
23.00	0.99757	0.9993			

TECH	GEC/MJL
DATE	06/16/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-27

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE:	JJ & G/LAB TESTING/GA		BOARD #:	13	COMMENTS:
PROJECT NO.:	933-3580-005		CELL #:	3	
SAMPLE ID:	B-16	28 - 29.5'	Flow Pump Speed	12	
SAMPLE TYPE:	UD		Technician:	GEC	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.452	B-Value,f	99.00	Height, inches	2.401
Diameter, inches	2.873	Cell Pres	103.00	Diameter, inches	2.875
Area, cm^2	41.82	Bot. Pres.	90.00	Area, cm^2	41.88
Volume, cm^3	260.49	Top Pres.	90.00	Volume, cm^3	255.42
Mass, g	515.19	Tot. B.P.	90.00	Mass, g	523.58
Moisture Content, %	16.61	Head, max.	113.95	Moisture Content	20.09
Dry Density, pcf	105.84	Head, min.	112.54	Dry Density, pcf	106.51
Spec. Gravity	2.679	Max. Grad.	18.68	Volume Solids, cm^3	162.74
Volume Solids, cm^3	164.91	Min. Grad.	18.45	Volume Voids, cm^3	92.68
Volume Voids, cm^3	95.57			Void Ratio	0.57
Void Ratio	0.58			Saturation, %	94.5%
Saturation, %	76.8%				

WATER CONTENTS		Trimmings Initial	Sample Final
Tare No.		25	9
Wt soil&tare, i	g	240.95	325.09
Wt soil&tare, f	g	212.62	279.29
Wt Tare	g	42.07	51.34
Wt Moisture Lost	g	28.33	45.80
Wt Dry Soil	g	170.55	227.95
Water Content	%	16.6%	20.1%

DESCRIPTION:
Mottled Yellow, White, Red, Dark Red and Pale Red, SILTY CLAY, some medium to fine sand.

Flow Pump Rate: 5.50E-06 cm 3/sec.

USCS: (CL)

TIME FUNCTION,SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (Degrees C)	dt (min)	dt, acc (min)	dt (sec)	dt, acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/28/94	34505	15	3	22.8	0	0	0	0	1.60	112.54	18.45	6.7E-09
06/28/94	34505	15	18	22.8	15	15	900	900	1.60	112.54	18.45	6.7E-09
06/28/94	34505	15	33	22.8	15	30	900	1800	1.62	113.95	18.68	6.6E-09
06/28/94	34505	15	48	22.8	15	45	900	2700	1.61	113.25	18.57	6.6E-09 *
06/28/94	34505	16	1	22.8	13	58	780	3480	1.60	112.54	18.45	6.7E-09 *
06/28/94	34505	16	16	22.8	15	73	900	4380	1.60	112.54	18.45	6.7E-09 *
06/28/94	34505	16	31	22.8	15	88	900	5280	1.60	112.54	18.45	6.7E-09 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 6.6E-09 cm/sec **

DATE 06/20/94
CHECK
REVIEW

GOLDER ASSOCIATES INC
FN: 3580P36

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	JJ & G/LAB TESTING/GA
PROJECT NO.	933-3580-005
TESTED FOR	FERM

SAMPLE ID	B - 16
SAMPLE TYPE	UD
SAMPLE DEPTH	28 - 29.5'

HYGROSCOPIC MOISTURE OF MATERIAL PASSING THE #10 SIEVE

Tare Number		25
Weight Soil and Tare, Inital (gm)	(W1)	161.02
Weight Soil and Tare, Final (gm)	(W2)	160.22
Weight Of Tare (gm)	(W3)	42.06
Weight Of Moisture (gm)	(W4=W1-W2)	0.80
Weight Of Dry Soil (gm)	(W5=W2-W3)	118.16
Hygroscopic Moisture In (%)	(EM=(W4/W5)*100)	0.7%

AIR REMOVAL METHOD: VACUUM

TRIAL		1	2	3
Pycnometer Number		16		
Weight Pycnometer Empty (gm)	(Mf)	178.77		
Weight of Soil & Pycnometer (gm)		228.85		
Weight of Soil, Water & Pycnometer (gm)	(Mb)	708.22		
Observed Temperature (Tb), for (Mb) In Degrees C		24.0		
Observed Temperature (Ta), for (Ma) In Degrees C		23.00		
Weight of Pycnometer & Water (gm)	(Ma @ Ta)	677.15		
Relative Density of Water @ (Ta)		0.99757		
Relative Density of Water @ (Tx)		0.99732		
Correction Factor due to Temperature @Tx	(K)	0.9991		
Weight of Soil (gm)		50.06		
Weight of Dry Soil (gm)	(Mo)	49.74		
Weight of Pycnometer & Water (gm)	(Ma)	677.83		
Weight of Soil,Water & Pycnometer (gm)	(Mb)	708.22		

SPECIFIC GRAVITY

G @ 20 degrees C = [Mo/(Mo+((Ma - Mb)))]*(K)

1	2	3
2.679		

Gs Average: 2.68

Correction Values Due To Temperature

Temp. (C)	Rel.Density	Corr. (K)	Temp. (C)	Rel. Density	Corr. (K)
16.00	0.99897	1.0007	23.50	0.99745	0.9992
16.50	0.99889	1.0007	24.00	0.99732	0.9991
17.00	0.99880	1.0006	24.50	0.99720	0.9990
17.50	0.99871	1.0005	25.00	0.99707	0.9988
18.00	0.99862	1.0004	25.50	0.99694	0.9987
18.50	0.99853	1.0003	26.00	0.99681	0.9986
19.00	0.99843	1.0002	26.50	0.99668	0.9984
19.50	0.99833	1.0001	27.00	0.99654	0.9983
20.00	0.99823	1.0000	27.50	0.99640	0.9982
20.50	0.99812	0.9999	28.00	0.99626	0.9980
21.00	0.99802	0.9998	28.50	0.99612	0.9979
21.50	0.99791	0.9997	29.00	0.99597	0.9977
22.00	0.99780	0.9996	29.50	0.99582	0.9976
22.50	0.99768	0.9995	30.00	0.99567	0.9974
23.00	0.99757	0.9993			

TECH	GEC/MJL
DATE	06/16/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-28

ONE-POINT

ATTERBERG LIMIT DETERMINATION

ASTM D-4318-84

PROJECT TITLE	JJ & G/LAB TESTING/GA	**SAMPLE ID.**	B - 18
PROJECT NO.	933-3580-005	**SAMPLE TYPE**	UD
		SAMPLE DEPTH	23 - 24'

SAMPLE PREPARATION

Wet or Dry Air Dry

Minus #40 Sieve Yes

PLASTIC LIMIT DETERMINATION

TARE NUMBER	4	34	46
WEIGHT OF WET SOIL +TARE, gm.	22.06	21.64	21.64
WEIGHT OF DRY SOIL +TARE, gm.	19.98	19.50	19.54
WEIGHT OF WATER, gm.	2.08	2.14	2.10
WEIGHT OF TARE, gm.	11.76	11.09	11.24
WEIGHT OF DRY SOIL, gm.	8.22	8.41	8.30
WATER CONTENT (%)	25.30	25.45	25.30

NATURAL MOISTURE

T-4
182.81
160.01
22.80
51.95
108.06
21.10

LIQUID LIMIT DETERMINATION

TARE NUMBER	6	38
NUMBER OF BLOWS	30	30
WEIGHT OF WET SOIL +TARE, gm.	22.36	23.27
WEIGHT OF DRY SOIL +TARE, gm.	16.23	15.87
WEIGHT OF WATER, gm.	6.13	7.40
WEIGHT OF TARE, gm.	6.62	4.31
WEIGHT OF DRY SOIL, gm.	9.61	11.56
WATER CONTENT (%)	63.79	64.01

	TEST RESULTS	
	TRIAL 1	TRIAL 2
BLOWS:	30	30
K VALUE:	1.022	1.022

LIQUID LIMIT (Wl)	65.31	65
PLASTIC LIMIT (Wp)	25.35	25
PLASTICITY INDEX (Ip)		40
MOISTURE CONTENT (%)	21.10	
LIQUIDITY INDEX(I)	-0.11	

DESCRIPTION Mottled Yellowish Brown, White, Red and Weak Red, SILTY CLAY, and medium to fine sand.

USCS CH

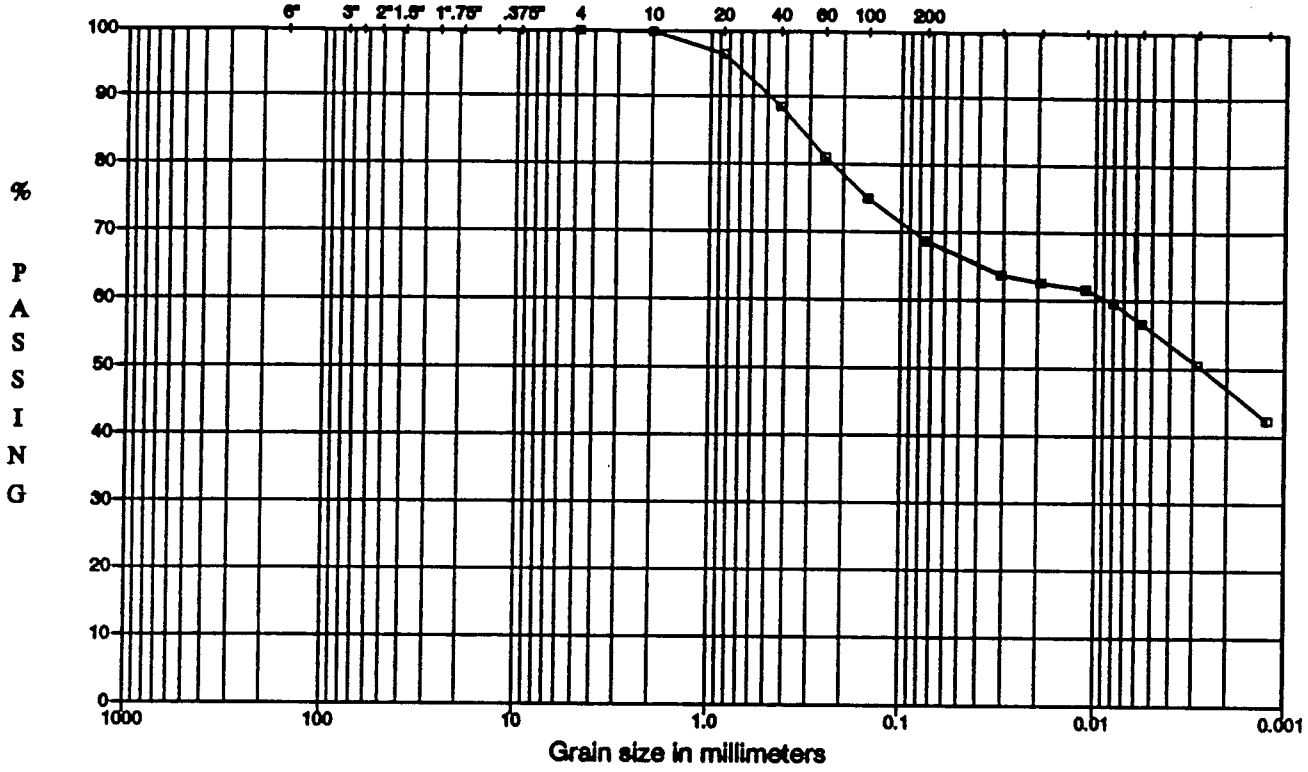
TECH	GEC
DATE	06/13/94
CHECK	gec
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-25

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B - 18 23 - 24'	21.10	65	25	40	2.69	Mottled Yellowish Brown, White, Red and Weak Red, SILTY CLAY, and medium to fine sand.
Sample Type: UD					USCS	CH

933-3580-005

J[illegible] G/LAB TESTING/GA

580-34

GOLDER ASSOCIATES INC.

DATE	6/14/94
CHECK	gcc
REVIEW	BJP

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B - 18
PROJECT NO.	933-3580-005	SAMPLE TYPE	UD
		SAMPLE DEPTH	23 - 24'

AS RECEIVED WATER CONTENT

Tare No.		T-4
Wt Wet Soil & Tare (gm)	(W1)	182.81
Wt Dry Soil & Tare (gm)	(W2)	160.01
Weight of Tare (gm)	(W3)	51.95
Weight of Water (gm)	(W4=W1-W2)	22.80
Weight of Dry Soil (gm)	(W5=W2-W3)	108.06
Moisture Content (%)	(W4/W5)*100	21.10

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	50.64
Dry Soil & Tare (gm)	50.09
Tare Weight (gm)	3.20
Moisture Content (%)	1.17

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	343.42	
Tare Wt (gm)	105.88	
Total Wt (gm)	234.79	(W9)

Plus #4 Material Sieve

TARE WEIGHT: 203.26

	(Wt+Tare)	(((Wt-Tare)/W9)*100)	% PASSING		
6.0"	203.26	0.0		6.0"	cobbles
3.0"	203.26	0.0		3.0"	coarse gravel
2.5"	203.26	0.0		2.5"	coarse gravel
2.0"	203.26	0.0		2.0"	coarse gravel
1.5"	203.26	0.0		1.5"	coarse gravel
1.0"	203.26	0.0		1.0"	coarse gravel
0.75"	203.26	0.0		0.75"	fine gravel
0.50"	203.26	0.0		0.50"	fine gravel
0.375"	203.26	0.0		0.375"	fine gravel
#4	203.26	0.0	100.0	#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	
Specific Gravity	(tested)	2.69
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Time of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	50.64
Calculated Dry Wt used in test (gm)	49.46
Hydrometer Bulb Number	280629
% Pass #4 Sieve For Whole Sample	100.00

Hygroscopic Moisture

Wet Soil & Tare (gm)	50.64
Dry Soil & Tare (gm)	50.09
Tare Weight (gm)	3.20
Moisture Content (%)	1.17

DATE	TIME	ET (min)	RDNG R	TEMP T	TEMP.COR K	HYD. COR. Cc
06/15/94	13:27					
06/15/94	13:29	2.00	37.5	23.00	0.013	6.00
06/15/94	13:32	5.00	37.0	23.00	0.013	6.00
06/15/94	13:42	15.00	36.5	23.00	0.013	6.00
06/15/94	13:57	30.00	35.5	23.00	0.013	6.00
06/15/94	14:27	60.00	34.0	23.00	0.013	6.00
06/15/94	17:37	250.00	31.0	23.00	0.013	6.00
06/16/94	13:27	1440.00	27.0	23.00	0.013	6.00

(40ml Na(PO4)n per 1000ml H2O)

Cc= Composite Correction Reading

TARE WEIGHT: 203.26

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING		
#10	203.40	0.14	99.7	#10	medium sand
#20	205.10	1.84	96.3	#20	medium sand
#40	208.88	5.62	88.6	#40	fine sand
#60	212.54	9.28	81.2	#60	fine sand
#100	215.62	12.36	75.0	#100	fine sand
#200	218.69	15.43	68.8	#200	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	31.50	11.2	0.013	1.00	0.0307	63.7
5.00	31.00	11.2	0.013	1.00	0.0194	62.7
15.00	30.50	11.4	0.013	1.00	0.0113	61.7
30.00	29.50	11.5	0.013	1.00	0.0080	59.6
60.00	28.00	11.7	0.013	1.00	0.0057	56.6
250.00	25.00	12.2	0.013	1.00	0.0029	50.5
1440.00	21.00	12.9	0.013	1.00	0.0012	42.5

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	0.0
% COARSE SAND	0.3
% MEDIUM SAND	11.1
% FINE SAND	19.8
% FINES	68.8
% TOTAL SAMPLE	100.0

Description: Mottled Yellowish Brown, White, Red and Weak Red, SILTY CLAY, and medium to fine sand.

USCS: CH

68	LL
25	PL
40	PI

TECH	GBC/MJL
DATE	6/14/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-34

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE:	JJ & G/LAB TESTING/GA		BOARD #:	13	COMMENTS: Wax in large crevasses could not be removed without potential damage to the sample.
PROJECT NO.:	933-3580-005		CELL #:	4	
SAMPLE ID:	B - 18	23 - 24'	Flow Pump Speed	12	
SAMPLE TYPE:	UD		Technician:	GEC/BJP	

Sample Data, Initial				Sample Data, Final	
Height, inches	3.322	B-Value,f	1.00	Height, inches	3.330
Diameter, inches	2.839	Cell Pres	109.00	Diameter, inches	2.853
Area, cm^2	40.84	Bot. Pres.	90.00	Area, cm^2	41.24
Volume, cm^3	344.60	Top Pres.	90.00	Volume, cm^3	348.85
Mass, g	676.35	Tot. B.P.	90.00	Mass, g	688.35
Moisture Content, %	21.10	Head, max.	137.87	Moisture Content	23.49
Dry Density, pcf	101.13	Head, min.	130.83	Dry Density, pcf	99.71
Spec. Gravity	2.687	Max. Grad.	16.30	Volume Solids, cm^3	207.45
Volume Solids, cm^3	207.86	Min. Grad.	15.47	Volume Voids, cm^3	141.40
Volume Voids, cm^3	136.75			Void Ratio	0.68
Void Ratio	0.66			Saturation, %	92.6%
Saturation, %	86.2%				

WATER CONTENTS		Trimmings Initial	Sample Final
Tare No.		T-4	38
Wt soil&tare, i	g	182.81	354.30
Wt soil&tare, f	g	160.01	296.56
Wt Tare	g	51.95	58.73
Wt Moisture Lost	g	22.80	57.74
Wt Dry Soil	g	108.06	245.83
Water Content	%	21.1%	23.5%

Flow Pump Rate: 5.50E-06 cm 3/sec.

USCS: CH

DESCRIPTION: Mottled Yellowish Brown, White, Red and Weak Red, SILTY CLAY, and medium to fine sand.

TIME FUNCTION,SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (Degrees C)	dt (min)	dt, acc (min)	dt (sec)	dt, acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/17/94	34502	8	11	22.9	0	0	0	0	1.87	131.54	15.55	8.0E-09
06/17/94	34502	8	33	23.0	22	22	1320	1320	1.92	135.05	15.97	7.8E-09
06/17/94	34502	8	39	23.0	6	28	360	1680	1.92	135.05	15.97	7.8E-09
06/17/94	34502	8	44	23.0	5	33	300	1980	1.89	132.94	15.72	7.9E-09 *
06/17/94	34502	8	49	23.1	5	38	300	2280	1.86	130.83	15.47	8.0E-09 *
06/17/94	34502	8	55	23.1	6	44	360	2640	1.96	137.87	16.30	7.6E-09 *
06/17/94	34502	9	5	23.1	10	54	600	3240	1.95	137.16	16.22	7.6E-09 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 7.8E-09 cm/sec **

DATE 06/16/94
CHECK GEC
REVIEW BJP

GOLDER ASSOCIATES INC
FN: 3580-32

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	JJ & G/LAB TESTING/GA
PROJECT NO.	933-3580-005
TESTED FOR	PERM

SAMPLE ID	B - 18
SAMPLE TYPE	UD
SAMPLE DEPTH	23 - 24'

HYGROSCOPIC MOISTURE OF MATERIAL PASSING THE #10 SIEVE

Tare Number		T-4
Weight Soil and Tare, Inital (gm)	(W1)	110.58
Weight Soil and Tare, Final (gm)	(W2)	109.81
Weight Of Tare (gm)	(W3)	51.93
Weight Of Moisture (gm)	(W4=W1-W2)	0.77
Weight Of Dry Soil (gm)	(W5=W2-W3)	57.88
Hygroscopic Moisture In (%)	(HM=(W4/W5)*100)	1.3%

AIR REMOVAL METHOD: VACUUM

TRIAL		1	2	3
Pycnometer Number		17		
Weight Pycnometer Empty (gm)	(Mf)	170.56		
Weight of Soil & Pycnometer (gm)		220.56		
Weight of Soil, Water & Pycnometer (gm)	(Mb)	699.78		
Observed Temperature (Tb), for (Mb) In Degrees C		24.0		
Observed Temperature (Ta), for (Ma) In Degrees C		25.00		
Weight of Pycnometer & Water (gm)	(Ma @ Ta)	668.66		
Relative Density of Water @ (Ta)		0.99707		
Relative Density of Water @ (Tx)		0.99732		
Correction Factor due to Temperature @Tx	(K)	0.9991		
ight of Soil (gm)		50.00		
Weight of Dry Soil (gm)	(Mo)	49.34		
Weight of Pycnometer & Water (gm)	(Ma)	668.78		
Weight of Soil,Water & Pycnometer (gm)	(Mb)	699.78		

SPECIFIC GRAVITY

G @ 20 degrees C = [Mo/(Mo+((Ma - Mb))]*(K)

1	2	3
2.687		

Gs Average: 2.69

Correction Values Due To Temperature

Temp. (C)	Rel.Density	Corr. (K)	Temp. (C)	Rel. Density	Corr. (K)
16.00	0.99897	1.0007	23.50	0.99745	0.9992
16.50	0.99889	1.0007	24.00	0.99732	0.9991
17.00	0.99880	1.0006	24.50	0.99720	0.9990
17.50	0.99871	1.0005	25.00	0.99707	0.9988
18.00	0.99862	1.0004	25.50	0.99694	0.9987
18.50	0.99853	1.0003	26.00	0.99681	0.9986
19.00	0.99843	1.0002	26.50	0.99668	0.9984
19.50	0.99833	1.0001	27.00	0.99654	0.9983
20.00	0.99823	1.0000	27.50	0.99640	0.9982
20.50	0.99812	0.9999	28.00	0.99626	0.9980
21.00	0.99802	0.9998	28.50	0.99612	0.9979
21.50	0.99791	0.9997	29.00	0.99597	0.9977
22.00	0.99780	0.9996	29.50	0.99582	0.9976
22.50	0.99768	0.9995	30.00	0.99567	0.9974
23.00	0.99757	0.9993			

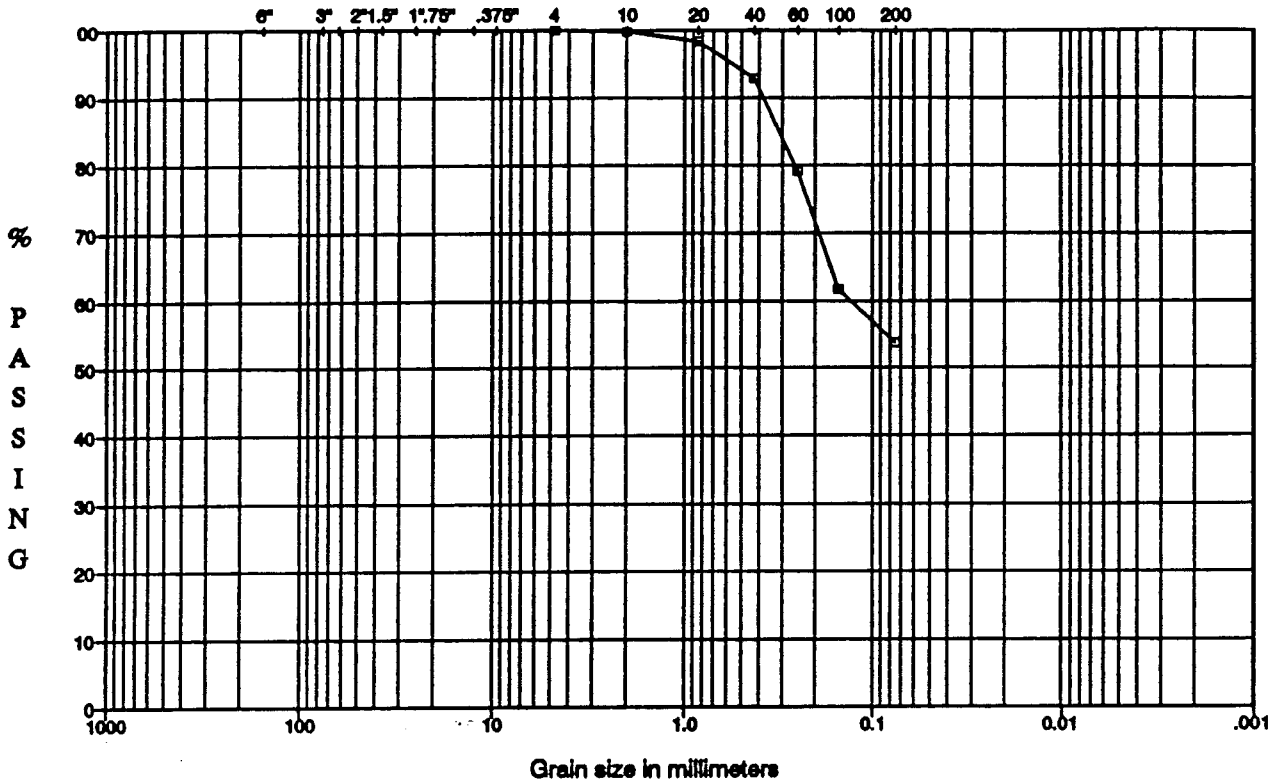
TECH	GEC/MJL
DATE	06/16/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-30

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B-18 33 - 34.5'	-	-	-	-	-	Mottled Yellowish Tan, Reddish Brown, (Micaceous) SILTY CLAY, and medium to fine sand.
Sample Type:	JAR				USCS	(CL-CH)

DATE	06/13/94
CHECK	PWM
REVIEW	BJP

933-3580-005
JJ & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

FN: 3580-1

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-18
PROJECT NO.	933-3580-005	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	33 - 34.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	170.69
Dry Soil & Tare (gm)	152.60
Tare Weight (gm)	51.59
Moisture Content (%)	17.91

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

	Weight Of Sample (gm)	170.69
	Tare Weight (gm)	51.59
(W6)	Total Dry Weight (gm)	101.01

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE
6.000					6.000 coarse gravel
3.000					3.000 coarse gravel
2.500					2.500 coarse gravel
2.000					2.000 coarse gravel
1.500					1.500 coarse gravel
1.000					1.000 coarse gravel
0.750					0.750 fine gravel
0.500					0.500 fine gravel
0.375					0.375 fine gravel
#4	203.30	0.00		100.0	#4 coarse sand
#10	203.54	0.24	0.24	99.8	#10 medium sand
#20	205.05	1.75	1.73	98.3	#20 medium sand
#40	210.56	7.26	7.19	92.8	#40 fine sand
#60	224.31	21.01	20.80	79.2	#60 fine sand
#100	241.88	38.58	38.19	61.8	#100 fine sand
#200	250.02	46.72	46.25	53.7	#200 fines
PAN					PAN

% C GRAVEL	
% F GRAVEL	
% C SAND	0.24
% M SAND	6.95
% F SAND	39.07
% FINES	53.75
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Mottled Yellowish Tan, Reddish Brown, (Micaceous) SILTY CLAY, and medium to fine sand.

USCS: (CL-CH)

TECH	FWM
DATE	06/13/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-1

JJ & G/LAB TESTING/GA

SUMMARY OF SOIL DATA

Sample Identification	Sample Number	Sample Depth	Soil Classification	Natural Moisture %	Atterberg Limits				Grain Size Distribution			Compaction		Gs	Unit Weight		Permeability (cm/sec)	Additional Tests Conducted (See Notes)
					L.L.	P.I.	P.I.	L.I.	% Finer No. 4 Sieve	% Finer No. 200 Sieve	% Finer .005 mm	Maximum Dry Density (lb/cuft)	Optimum Moisture %		Mc	(lb/cuft)		
B-7	JAR	33' - 34.5'	(SC)	-	-	-	-	-	96.7	26.1	-	-	-	-	-	-	-	-
B-14	JAR	28' - 29.5'	(SC)	-	-	-	-	-	100.0	48.6	-	-	-	-	-	-	-	-
B-16	JAR	48' - 49.5'	(SC)	-	-	-	-	-	99.4	19.7	-	-	-	-	-	-	-	-
B-17	JAR	8' - 9'	(SC)	13.8	29	21	8	-0.94	-	-	-	sieve/hydro		-	-	-	-	-
B-17	JAR	33' - 34.5'	(SC)	-	-	-	-	-	96.0	18.3	-	-	-	-	-	-	-	-
B-7	UD	18' - 19.5'	SC	17.2	26	18	8	-0.12	95.1	17.6	11.5	-	-	2.62	17.2	111.9	1.1E-07	-
B-14	UD	13' - 14'	(SC)	15.5	-	-	-	-	99.8	36.9	25.5	-	-	2.66	15.5	108.9	4.4E-08	-

ABBREVIATIONS:

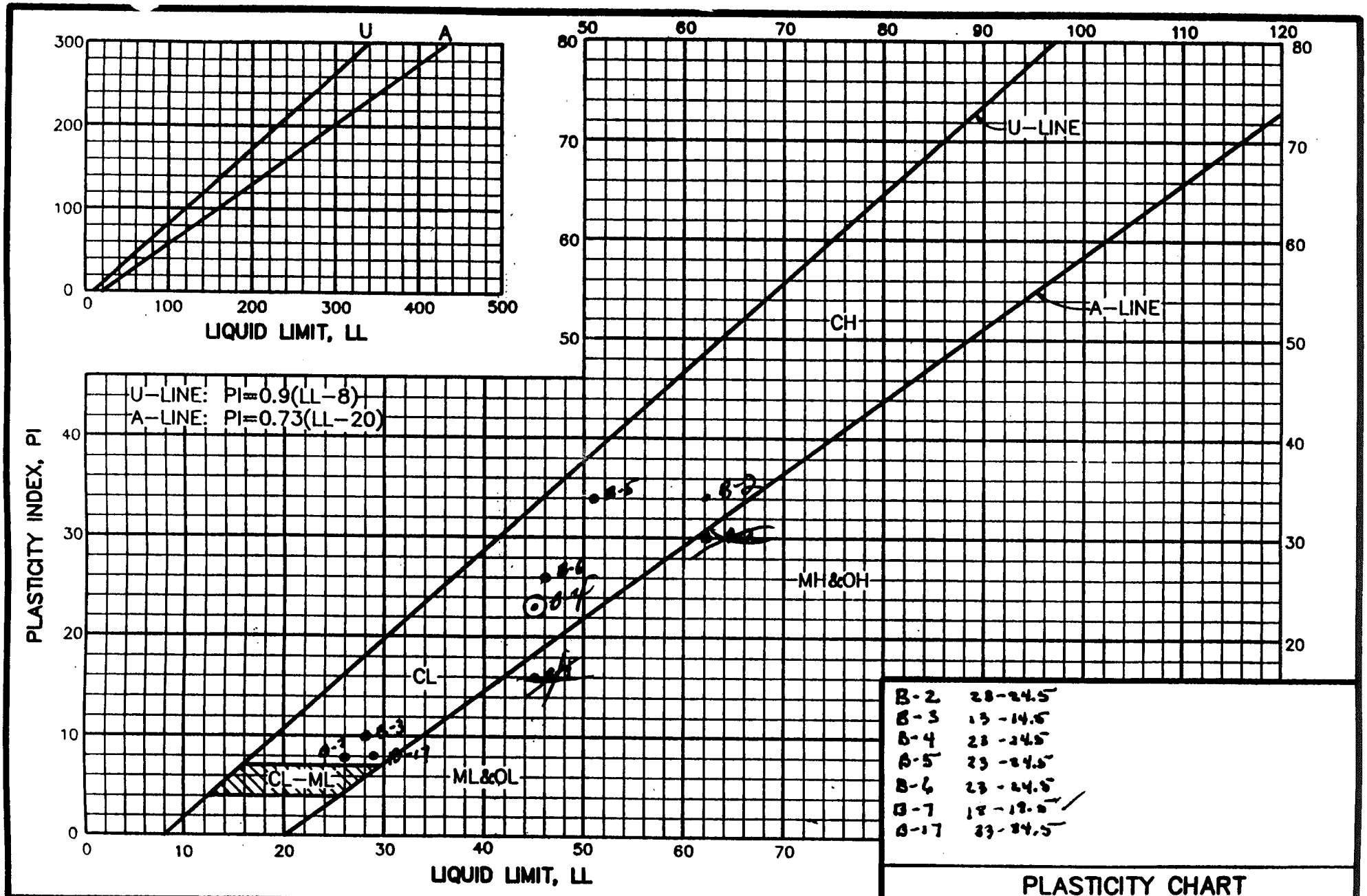
LIQUID LIMIT (LL)
PLASTIC LIMIT (PL)
PLASTICITY INDEX (PI)
LIQUIDITY INDEX (I)
SPECIFIC GRAVITY (Gs)
MOISTURE (Mc)

NOTES:

T = TRIAXIAL TEST
U = UNCONFINED COMPRESSION TEST
C = CONSOLIDATION TEST
DS = DIRECT SHEAR TEST
O = ORGANIC CONTENT
P = pH

GOLDER ASSOCIATES INC.

EM 1110-2-1906
APPENDIX III
30 NOV 70



B-2	28-34.5
B-3	13-14.5
B-4	23-24.5
B-5	23-24.5
B-6	23-24.5
B-7	18-19.5
B-17	33-34.5

PLASTICITY CHART

DATE OF TESTING : 6/10/94

PROJECT NO : 933-3580-a2

Golder Associates
Atlanta, Georgia

PLOTTED BY : PWM

CHECKED BY : BJP

ONE-POINT

ATTERBERG LIMIT DETERMINATION

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID.	B-2
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
		SAMPLE DEPTH	23' - 24.5'

SAMPLE PREPARATION

Wet or Dry: Air Dry Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION				NATURAL MOISTURE
TARE NUMBER	11	37	5	T-7
WEIGHT OF WET SOIL +TARE, gm.	22.66	19.50	21.15	95.06
WEIGHT OF DRY SOIL +TARE, gm.	20.23	17.68	19.12	86.76
WEIGHT OF WATER, gm.	2.43	1.82	2.03	8.30
WEIGHT OF TARE, gm.	11.72	11.25	11.84	51.78
WEIGHT OF DRY SOIL, gm.	8.51	6.43	7.28	34.98
WATER CONTENT (%)	28.55	28.30	27.88	23.73

LIQUID LIMIT DETERMINATION			TEST RESULTS	
TARE NUMBER	15	40		
NUMBER OF BLOWS	22	22	ASTM D-4318-84	
WEIGHT OF WET SOIL +TARE, gm.	22.18	18.94	TRIAL 1	TRIAL 2
WEIGHT OF DRY SOIL +TARE, gm.	16.20	13.26		
WEIGHT OF WATER, gm.	5.98	5.68	BLOWS: 22	22
WEIGHT OF TARE, gm.	6.72	4.25		
WEIGHT OF DRY SOIL, gm.	9.48	9.01		
WATER CONTENT (%)	63.08	63.04	K VALUE: 0.985	0.985

LIQUID LIMIT (Wl)	62.12	62
PLASTIC LIMIT (Wp)	28.25	28
PLASTICITY INDEX (Ip)		34
MOISTURE CONTENT (%)	23.73	
LIQUIDITY INDEX(I)	-0.133	

DESCRIPTION: Brownish Red & Grey, SILTY CLAY, some medium to fine sand.

USCS: (CH)

TECH	PWM
DATE	06/06/94
CHECK	PWM
REVIEW	BDP

GOLDER ASSOCIATES INC.

ONE-POINT

ATTERBERG LIMIT DETERMINATION

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID.	B-3
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
		SAMPLE DEPTH	13' - 14.5'

SAMPLE PREPARATION

Wet or Dry: Dry — Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

TARE NUMBER	15	5	45
WEIGHT OF WET SOIL +TARE, gm.	20.38	20.15	17.88
WEIGHT OF DRY SOIL +TARE, gm.	19.07	18.90	16.90
WEIGHT OF WATER, gm.	1.31	1.25	0.98
WEIGHT OF TARE, gm.	11.81	11.84	11.35
WEIGHT OF DRY SOIL, gm.	7.26	7.06	5.55
WATER CONTENT (%)	18.04	17.71	17.66

NATURAL MOISTURE

3
113.97
107.54
6.43
52.10
55.44
11.60

LIQUID LIMIT DETERMINATION

TARE NUMBER	34	112
NUMBER OF BLOWS	20	20
WEIGHT OF WET SOIL +TARE, gm.	21.91	24.47
WEIGHT OF DRY SOIL +TARE, gm.	18.02	20.54
WEIGHT OF WATER, gm.	3.89	3.93
WEIGHT OF TARE, gm.	4.29	6.59
WEIGHT OF DRY SOIL, gm.	13.73	13.95
WATER CONTENT (%)	28.33	28.17

TEST RESULTS

ASTM D-4318-84

	TRIAL 1	TRIAL 2
BLOWS:	20	20
K VALUE:	0.974	0.974

LIQUID LIMIT (Wl)	27.52	28
PLASTIC LIMIT (Wp)	17.80	18
PLASTICITY INDEX (Ip)		10
MOISTURE CONTENT (%)	11.60	
LIQUIDITY INDEX(I)	-0.620	

DESCRIPTION: Reddish Tan, MEDIUM TO FINE SAND, some silty clay.

USCS: (SC)

TECH	PWM
DATE	06/03/94
CHECK	PWM
REVIEW	BP

GOLDER ASSOCIATES INC.

ONE-POINT

ATTERBERG LIMIT DETERMINATION

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID.	B-4
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
		SAMPLE DEPTH	23' - 24.5'

SAMPLE PREPARATION

Wet or Dry: Dry — Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

TARE NUMBER	35	14	49
WEIGHT OF WET SOIL +TARE, gm.	25.35	24.85	25.99
WEIGHT OF DRY SOIL +TARE, gm.	22.79	22.45	23.34
WEIGHT OF WATER, gm.	2.56	2.40	2.65
WEIGHT OF TARE, gm.	11.17	11.82	11.35
WEIGHT OF DRY SOIL, gm.	11.62	10.63	11.99
WATER CONTENT (%)	22.03	22.58	22.10

NATURAL MOISTURE

34
80.61
74.81
5.80
52.01
22.80
25.44

LIQUID LIMIT DETERMINATION

TARE NUMBER	2	39
NUMBER OF BLOWS	27	27
WEIGHT OF WET SOIL +TARE, gm.	22.10	20.05
WEIGHT OF DRY SOIL +TARE, gm.	17.37	15.16
WEIGHT OF WATER, gm.	4.73	4.89
WEIGHT OF TARE, gm.	6.75	4.26
WEIGHT OF DRY SOIL, gm.	10.62	10.90
WATER CONTENT (%)	44.54	44.86

TEST RESULTS

	ASTM D-4318-84	
	TRIAL 1	TRIAL 2
BLOWS:	27	27
K VALUE:	1.009	1.009

LIQUID LIMIT (Wl)	45.11	45
PLASTIC LIMIT (Wp)	22.24	22
PLASTICITY INDEX (Ip)		23
MOISTURE CONTENT (%)	25.44	
LIQUIDITY INDEX(I)	0.139	

DESCRIPTION: Grey & Yellowish Tan, (Micaceous), SILTY CLAY, some fine sand.

USCS: (CL)

TECH	PWM
DATE	06/03/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

ONE-POINT

ATTERBERG LIMIT DETERMINATION

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID.	B-5
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
		SAMPLE DEPTH	23' - 24.5'

SAMPLE PREPARATION

Wet or Dry: Dry

Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

TARE NUMBER	37	11	46
WEIGHT OF WET SOIL +TARE, gm.	19.60	17.47	20.20
WEIGHT OF DRY SOIL +TARE, gm.	18.39	16.65	18.91
WEIGHT OF WATER, gm.	1.21	0.82	1.29
WEIGHT OF TARE, gm.	11.26	11.72	11.26
WEIGHT OF DRY SOIL, gm.	7.13	4.93	7.65
WATER CONTENT (%)	16.97	16.63	16.86

NATURAL MOISTURE

E
97.68
87.51
10.17
43.45
44.06
23.08

LIQUID LIMIT DETERMINATION

TARE NUMBER	9	8
NUMBER OF BLOWS	30	30
WEIGHT OF WET SOIL +TARE, gm.	22.19	17.78
WEIGHT OF DRY SOIL +TARE, gm.	17.05	14.13
WEIGHT OF WATER, gm.	5.14	3.65
WEIGHT OF TARE, gm.	6.74	6.75
WEIGHT OF DRY SOIL, gm.	10.31	7.38
WATER CONTENT (%)	49.85	49.46

TEST RESULTS

	ASTM D-4318-84	
	TRIAL 1	TRIAL 2
BLOWS:	30	30
K VALUE:	1.022	1.022

LIQUID LIMIT (Wl)	50.75	51
PLASTIC LIMIT (Wp)	16.82	17
PLASTICITY INDEX (Ip)		34
MOISTURE CONTENT (%)	23.08	
LIQUIDITY INDEX(I)	0.184	

DESCRIPTION: Light Grey, MEDIUM TO FINE SAND, some silty clay.

USCS: (SC)

TECH	PWM
DATE	06/03/94
CHECK	PWM
REVIEW	BP

GOLDER ASSOCIATES INC.

ONE-POINT

ATTERBERG LIMIT DETERMINATION

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID.	B-6
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
		SAMPLE DEPTH	23' - 24.5'

SAMPLE PREPARATION

Wet or Dry: Dry Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

				NATURAL MOISTURE
TARE NUMBER	41	3	9	37
WEIGHT OF WET SOIL +TARE, gm.	19.87	22.77	22.18	96.35
WEIGHT OF DRY SOIL +TARE, gm.	18.46	20.95	20.46	90.02
WEIGHT OF WATER, gm.	1.41	1.82	1.72	6.33
WEIGHT OF TARE, gm.	11.45	11.83	11.84	51.65
WEIGHT OF DRY SOIL, gm.	7.01	9.12	8.62	38.37
WATER CONTENT (%)	20.11	19.96	19.95	16.50

LIQUID LIMIT DETERMINATION

TARE NUMBER	44	24
NUMBER OF BLOWS	30	30
WEIGHT OF WET SOIL +TARE, gm.	21.13	18.42
WEIGHT OF DRY SOIL +TARE, gm.	15.90	14.80
WEIGHT OF WATER, gm.	5.23	3.62
WEIGHT OF TARE, gm.	4.19	6.72
WEIGHT OF DRY SOIL, gm.	11.71	8.08
WATER CONTENT (%)	44.66	44.80

TEST RESULTS

	ASTM D-4318-84	
	TRIAL 1	TRIAL 2
BLOWS:	30	30
K VALUE:	1.022	1.022

LIQUID LIMIT (Wl)	45.72	46
PLASTIC LIMIT (Wp)	20.01	20
PLASTICITY INDEX (Ip)		26
MOISTURE CONTENT (%)	16.50	
	-0.135	

DESCRIPTION: Light Grey, (Micaceous), FINE SAND, and silty clay.

USCS: (SC)

TECH	PWM
DATE	06/03/94
CHECK	PWM
REVIEW	BJP

GOLDER ASSOCIATES INC.

ONE-POINT

ATTERBERG LIMIT DETERMINATION

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID.	B-7
PROJECT NO.	933-3580-002	SAMPLE TYPE	U/D
		SAMPLE DEPTH	18' - 19.5'

SAMPLE PREPARATION

Wet or Dry: Air Dry — Minus #40 Sieve: Yes

	PLASTIC LIMIT DETERMINATION			NATURAL MOISTURE
TARE NUMBER	15	46	9	114
WEIGHT OF WET SOIL +TARE, gm.	25.94	25.74	20.40	207.05
WEIGHT OF DRY SOIL +TARE, gm.	23.77	23.49	19.10	184.26
WEIGHT OF WATER, gm.	2.17	2.25	1.30	22.79
WEIGHT OF TARE, gm.	11.81	11.25	11.85	51.77
WEIGHT OF DRY SOIL, gm.	11.96	12.24	7.25	132.49
WATER CONTENT (%)	18.14	18.38	17.93	17.20

	LIQUID LIMIT DETERMINATION		TEST RESULTS	
TARE NUMBER	9	112	ASTM D-4318-84	
NUMBER OF BLOWS	20	20	TRIAL 1	TRIAL 2
WEIGHT OF WET SOIL +TARE, gm.	24.03	24.75		
WEIGHT OF DRY SOIL +TARE, gm.	20.40	20.93		
WEIGHT OF WATER, gm.	3.63	3.82	BLOWS: 20	20
WEIGHT OF TARE, gm.	6.74	6.60		
WEIGHT OF DRY SOIL, gm.	13.66	14.33		
WATER CONTENT (%)	26.57	26.66	K VALUE: 0.974	0.974

LIQUID LIMIT (Wl)	25.92	26
PLASTIC LIMIT (Wp)	18.15	18
PLASTICITY INDEX (Ip)		8
MOISTURE CONTENT (%)	17.20	
LIQUIDITY INDEX(I)	-0.119	

DESCRIPTION: Reddish White, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

USCS: SC

TECH	PWM
DATE	06/06/94
CHECK	PWM
REVIEW	BJC

GOLDER ASSOCIATES INC.

ONE-POINT

ATTERBERG LIMIT DETERMINATION

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID.	B - 17
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
		SAMPLE DEPTH	8' - 9'

SAMPLE PREPARATION

Wet or Dry: Dry — Minus #40 Sieve: Yes

PLASTIC LIMIT DETERMINATION

TARE NUMBER	51	34	35
WEIGHT OF WET SOIL +TARE, gm.	22.77	25.65	20.76
WEIGHT OF DRY SOIL +TARE, gm.	20.67	23.07	19.08
WEIGHT OF WATER, gm.	2.10	2.58	1.68
WEIGHT OF TARE, gm.	10.83	11.08	11.17
WEIGHT OF DRY SOIL, gm.	9.84	11.99	7.91
WATER CONTENT (%)	21.34	21.52	21.24

NATURAL MOISTURE

13	
114.25	
105.63	
8.62	
43.27	
62.36	
13.82	

LIQUID LIMIT DETERMINATION

TARE NUMBER	36	40
NUMBER OF BLOWS	20	20
WEIGHT OF WET SOIL +TARE, gm.	25.70	23.66
WEIGHT OF DRY SOIL +TARE, gm.	20.79	19.17
WEIGHT OF WATER, gm.	4.91	4.49
WEIGHT OF TARE, gm.	4.30	4.25
WEIGHT OF DRY SOIL, gm.	16.49	14.92
WATER CONTENT (%)	29.78	30.09

TEST RESULTS

ASTM D-4318-84

	TRIAL 1	TRIAL 2
BLOWS:	20	20
K VALUE:	0.974	0.974

LIQUID LIMIT (Wl)	29.16	29
PLASTIC LIMIT (Wp)	21.37	21
PLASTICITY INDEX (Ip)		8
MOISTURE CONTENT (%)	13.82	
LIQUIDITY INDEX(I)	-0.943	

DESCRIPTION: Brown, Tan & Grey, MEDIUM TO FINE SAND, some silty clay.

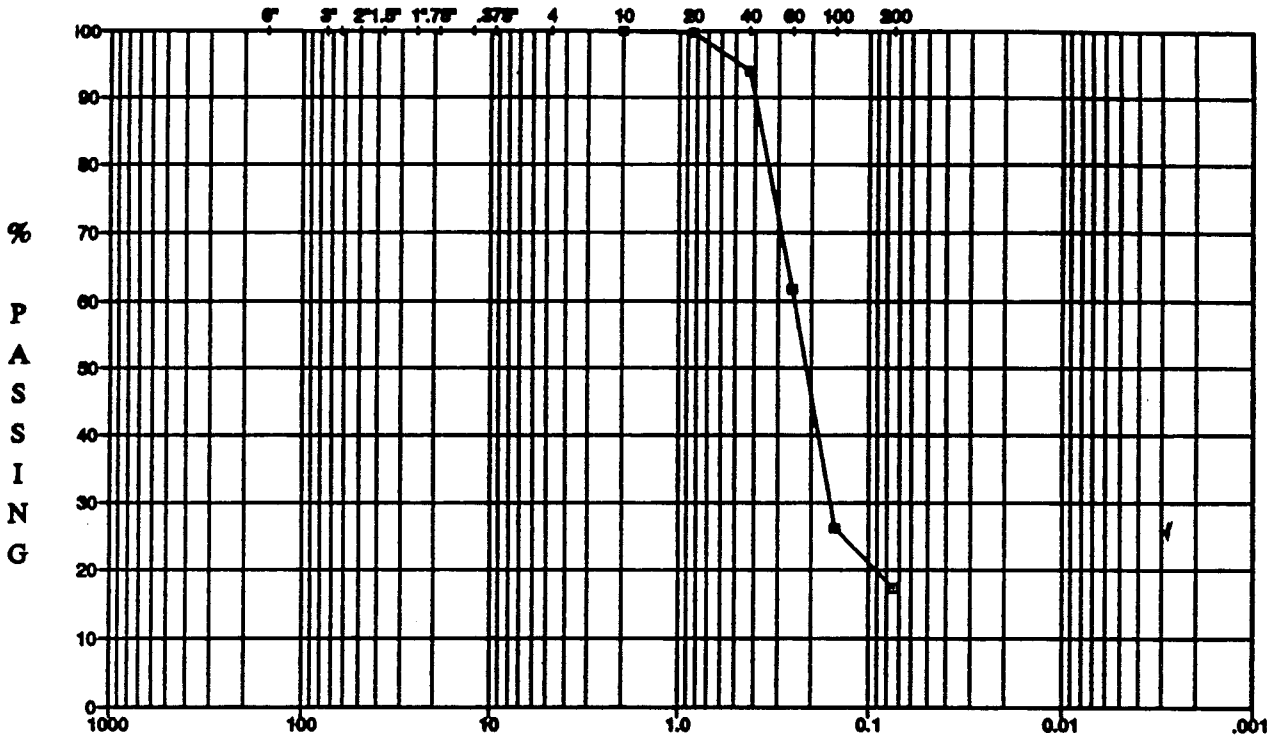
USCS: (SC)

TECH	PWM
DATE	06/01/94
CHECK	PWM
REVIEW	BJ

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B-2 JAR 18' - 19.5'	-	-	-	-	-	Yellowish Tan & Tan, (Micaceous), FINE SAND, some silty clay.
Sample Type:	JAR				USCS	(SC)

Is this curve out of order? It follows B-18

DATE	05/27/94
CHECK	PWM
REVIEW	BGP

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B - 2
PROJECT NO.	933-3500-002	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	18' - 19.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	221.72
Dry Soil & Tare (gm)	189.30
Tare Weight (gm)	51.26
Moisture Content (%)	23.49

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		221.72
Tare Weight (gm)		51.26
Total Dry Weight (gm)	(W6)	138.04

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE
6.000					6.000 coarse gravel
3.000					3.000 coarse gravel
2.500					2.500 coarse gravel
2.000					2.000 coarse gravel
1.500					1.500 coarse gravel
1.000					1.000 coarse gravel
0.750					0.750 fine gravel
0.500					0.500 fine gravel
0.375					0.375 fine gravel
#4					#4 coarse sand
#10	203.30	0.00		100.0	#10 medium sand
#20	203.65	0.35	0.25	99.7	#20 medium sand
#40	211.80	8.50	6.16	93.8	#40 fine sand
#60	256.26	52.96	38.37	61.6	#60 fine sand
#100	305.12	101.82	73.76	26.2	#100 fine sand
#200	317.39	114.09	82.65	17.4	#200 fines
PAN					PAN

% C GRAVEL	
% F GRAVEL	
% C SAND	
% M SAND	6.16
% F SAND	76.49
% FINES	17.35
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Yellowish Tan & Tan, (Micaceous), FINE SAND, some silty clay.

USCS: (SC)

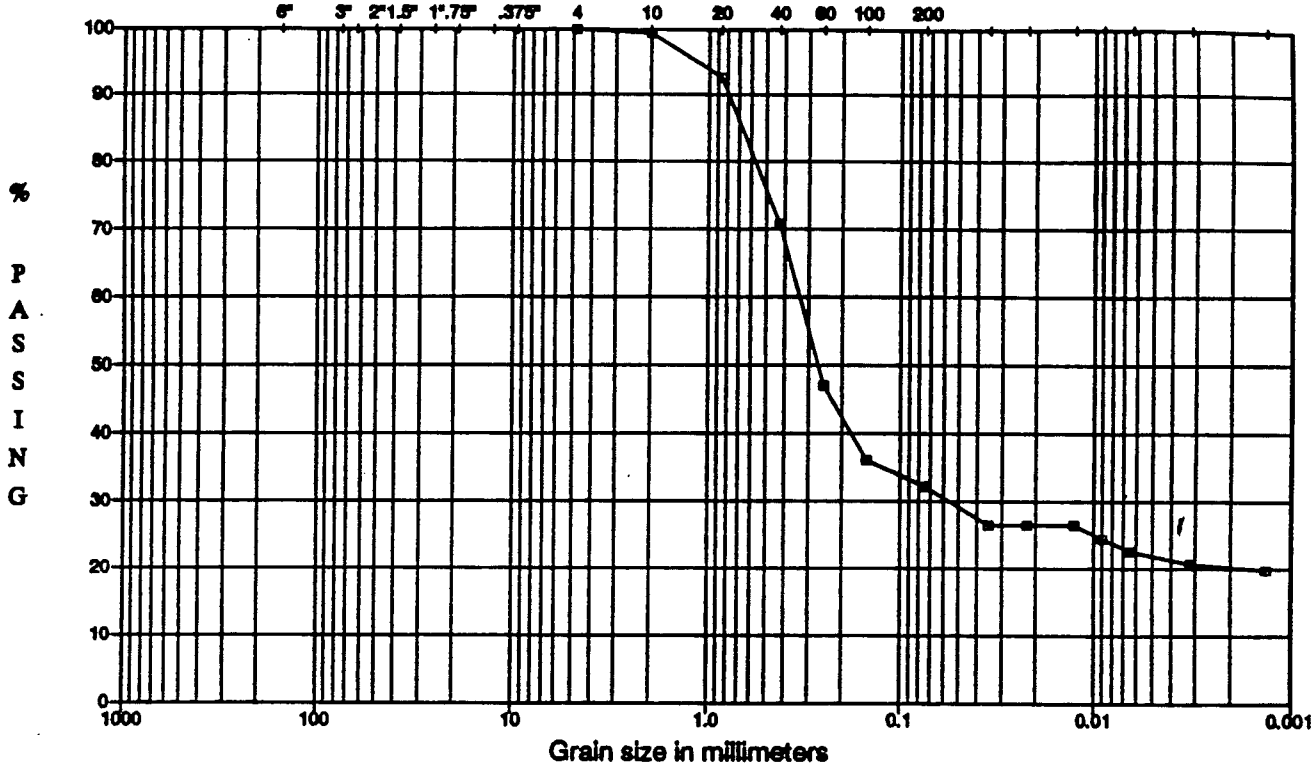
TECH	PWM
DATE	05/27/94
CHECK	PWM
REVIEW	BP

GOLDER ASSOCIATES INC.

I: 3500-3

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B-2 JAR 33 - 35'	-	-	-	-	2.65	Grey, (Micaceous), MEDIUM TO FINE SAND, and silty clay.
Sample Type: JAR					USCS	(SC)

933-3580.002

T & G/LAB TESTING/GA

.: 3580-17

GOLDER ASSOCIATES INC.

DATE	06/02/94
CHECK	RWM
REVIEW	BJD

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE	LJ & G/LAB TESTING/GA		SAMPLE ID	B-3	JAR
PROJECT NO.	933-3580.002		SAMPLE TYPE	JAR	
			SAMPLE DEPTH	33 - 35'	

AS RECEIVED WATER CONTENT

Tare No.		
Wt Wet Soil & Tare (gm)	(W1)	
Wt Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	0.00
Weight of Dry Soil (gm)	(W5=W2-W3)	0.00
Moisture Content (%)	(W4/W5)*100	0.00

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	90.19
Dry Soil & Tare (gm)	88.14
Tare Weight (gm)	3.22
Moisture Content (%)	1.22

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	253.29	
Tare Wt (gm)	114.45	
Total Wt (gm)	138.88	(W6)

Pass #4 Material Sieve

TARE WEIGHT: 203.30

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	% PASSING		
6.0"	203.30	0.0		6.0"	cobbles
3.0"	203.30	0.0		3.0"	coarse gravel
2.5"	203.30	0.0		2.5"	coarse gravel
2.0"	203.30	0.0		2.0"	coarse gravel
1.5"	203.30	0.0		1.5"	coarse gravel
1.0"	203.30	0.0		1.0"	coarse gravel
0.75"	203.30	0.0		0.75"	fine gravel
0.50"	203.30	0.0		0.50"	fine gravel
0.375"	203.30	0.0		0.375"	fine gravel
#4	203.30	0.0	100.0	#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.65		
Specific Gravity	(tested)			
Amount Dispersing Agent (ml)		125.00		
Type Dispersion Device		Mechanical		
Time of Dispersion Period		1 Minute		

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	53.75
Calculated Dry Wt used in test (gm)	53.10
Hydrometer Bulb Number	269629
% Pass #4 Sieve For Whole Sample	100.00

Hygroscopic Moisture

Wet Soil & Tare (gm)	90.19
Dry Soil & Tare (gm)	88.14
Tare Weight (gm)	3.22
Moisture Content (%)	1.22

DATE	TIME	ET (min)	RDNG R	TEMP T	TEMP.COR. K	HYD. COR. Cc
06/03/94	10:02					(40ml Na(PO4)n per 1000ml H2O)
06/03/94	10:04	2.00	20.0	23.00	0.013	6.00
06/03/94	10:07	5.00	20.0	23.00	0.013	6.00
06/03/94	10:17	15.00	20.0	23.00	0.013	6.00
06/03/94	10:32	30.00	19.0	23.00	0.013	6.00
06/03/94	11:02	60.00	18.0	23.00	0.013	6.00
06/03/94	14:12	250.00	17.0	23.00	0.013	6.00
06/04/94	10:02	1440.00	16.5	23.00	0.013	6.00

Cc= Composite Correction Reading

TARE WEIGHT: 203.30

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING		
#10	203.65	0.35	99.3	#10	medium sand
#20	207.24	3.94	92.6	#20	medium sand
#40	218.84	15.54	70.7	#40	fine sand
#60	231.36	28.06	47.1	#60	fine sand
#100	237.21	33.91	36.1	#100	fine sand
#200	239.30	36.00	32.2	#200	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	14.00	14.0	0.013	1.00	0.0348	26.4
5.00	14.00	14.0	0.013	1.00	0.0220	26.4
15.00	14.00	14.0	0.013	1.00	0.0127	26.4
30.00	13.00	14.2	0.013	1.00	0.0091	24.5
60.00	12.00	14.3	0.013	1.00	0.0064	22.6
250.00	11.00	14.5	0.013	1.00	0.0032	20.7
1440.00	10.50	14.7	0.013	1.00	0.0013	19.8

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	0.0
% COARSE SAND	0.7
% MEDIUM SAND	28.6
% FINE SAND	38.5
% FINES	32.2
% TOTAL SAMPLE	100.0

Description: Grey, (Micaceous), MEDIUM TO FINE SAND, and silty clay.

USCS: (SC)

LL	.
PL	.
PI	.

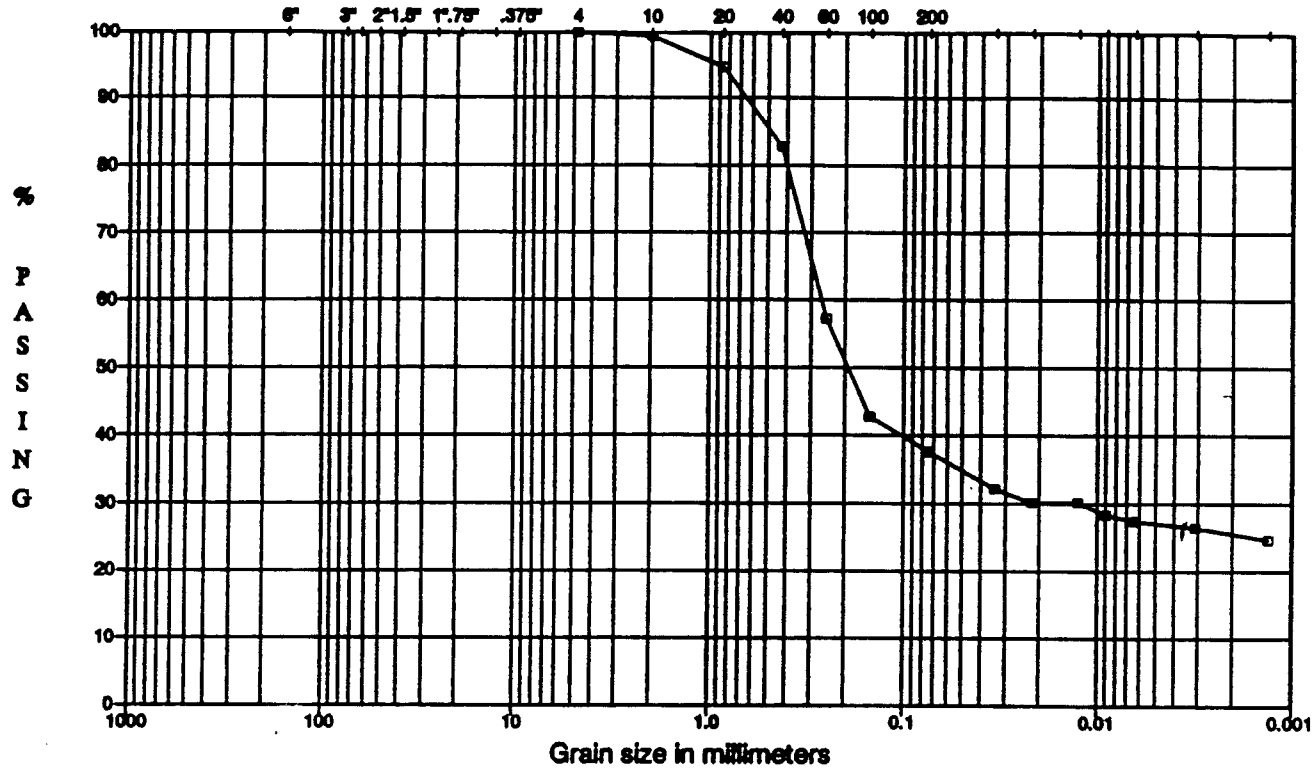
TECH	PWM
DATE	06/02/94
CHECK	Rum
REVIEW	BJ

GOLDER ASSOCIATES INC.

FN: 3580-17

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B-3 JAR 38 - 40'	-	-	-	-	2.65	Grey, MEDIUM TO FINE SAND, and silty clay.
Sample Type: JAR					USCS	(SC)

DATE	06/02/94
CHECK	Plum
REVIEW	BDO

933-3580.002

TT & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

3580-18

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE	LJ & G/LAB TESTING/GA	SAMPLE ID	B-3	JAR
PROJECT NO.	933-3580.002	SAMPLE TYPE	JAR	
		SAMPLE DEPTH	30 - 40'	

AS RECEIVED WATER CONTENT

Tare No.		
Wt Wet Soil & Tare (gm)	(W1)	
Wt Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	0.00
Weight of Dry Soil (gm)	(W5=W2-W3)	0.00
Moisture Content (%)	(W4/W5)*100	0.00

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	85.49
Dry Soil & Tare (gm)	84.02
Tare Weight (gm)	3.21
Moisture Content (%)	1.82

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	288.30	
Tare Wt (gm)	114.02	
Total Wt (gm)	69.51	(W6)

Plus #4 Material Sieve

TARE WEIGHT: 203.30

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	% PASSING		
6.0"	203.30	0.0		6.0"	cobbles
3.0"	203.30	0.0		3.0"	coarse gravel
2.5"	203.30	0.0		2.5"	coarse gravel
2.0"	203.30	0.0		2.0"	coarse gravel
1.5"	203.30	0.0		1.5"	coarse gravel
1.0"	203.30	0.0		1.0"	coarse gravel
0.75"	203.30	0.0		0.75"	fine gravel
0.50"	203.30	0.0		0.50"	fine gravel
0.375"	203.30	0.0		0.375"	fine gravel
#4	203.30	0.0	100.0	#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.65
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	53.91
Calculated Dry Wt used in test (gm)	52.95
Hydrometer Bulb Number	280629
% Pass #4 Sieve For Whole Sample	100.00

Hygroscopic Moisture

Wet Soil & Tare (gm)	85.49
Dry Soil & Tare (gm)	84.02
Tare Weight (gm)	3.21
Moisture Content (%)	1.82

DATE	TIME	ET	RDNG	TEMP	TEMP.COR	HYD. COR.
06/03/94	10:08	(min)	R	T	K	Cc
06/03/94	10:10	2.00	23.0	23.00	0.013	6.00
06/03/94	10:13	5.00	22.0	23.00	0.013	6.00
06/03/94	10:23	15.00	22.0	23.00	0.013	6.00
06/03/94	10:38	30.00	21.0	23.00	0.013	6.00
06/03/94	11:08	60.00	20.5	23.00	0.013	6.00
06/03/94	14:18	250.00	20.0	23.00	0.013	6.00
06/04/94	10:08	1440.00	19.0	23.00	0.013	6.00

(40ml Na(PO4)n per 1000ml H2O)

Cc= Composite Correction Reading

TARE WEIGHT: 203.30

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING		
#10	203.69	0.39	99.3	#10	medium sand
#20	206.13	2.83	94.7	#20	medium sand
#40	212.35	9.05	82.9	#40	fine sand
#60	225.97	22.67	57.2	#60	fine sand
#100	233.65	30.35	42.7	#100	fine sand
#200	236.35	33.05	37.6	#200	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	17.00	13.5	0.013	1.00	0.0342	32.1
5.00	16.00	13.7	0.013	1.00	0.0218	30.2
15.00	16.00	13.7	0.013	1.00	0.0126	30.2
30.00	15.00	13.8	0.013	1.00	0.0089	28.3
60.00	14.50	14.0	0.013	1.00	0.0064	27.4
250.00	14.00	14.0	0.013	1.00	0.0031	26.4
1440.00	13.00	14.2	0.013	1.00	0.0013	24.6

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	0.0
% COARSE SAND	0.7
% MEDIUM SAND	16.4
% FINE SAND	45.3
% FINES	37.6
% TOTAL SAMPLE	100.0

Description: Grey, MEDIUM TO FINE SAND, and silty clay.

USCS: (SC)

.	LL
.	PL
.	PI

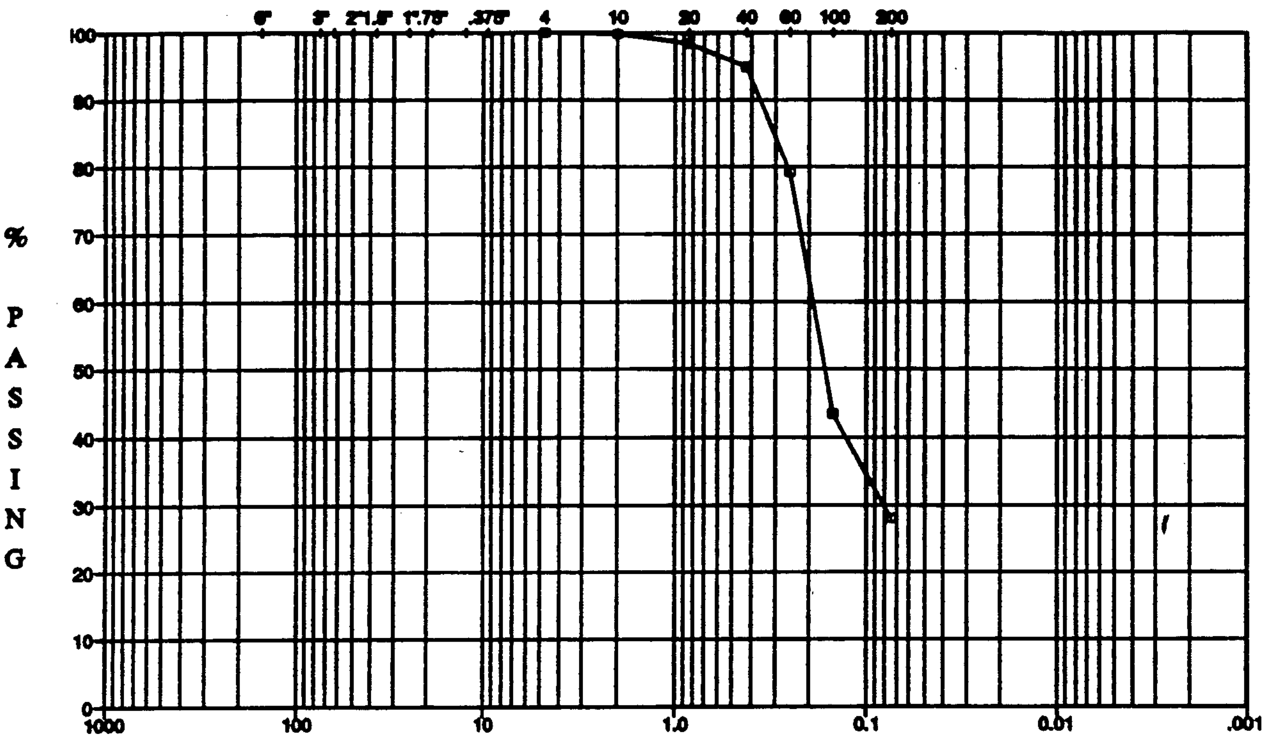
TECH	PWM
DATE	06/03/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-18

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B - 3 JAR 48' - 49.5'	-	-	-	-	-	Yellowish Tan & Yellow, FINE SAND, some silty clay.
Sample Type:	JAR				USCS	(SC)

DATE	05/27/94
CHECK	PWH
REVIEW	[signature]

'3-3580-002

JJ & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

FN: 3580-4

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B - 3
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	48' - 49.5'

WATER CONTENT (Delivered Moisture)		
Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample		
Wet Soil & Tare (gm)		177.26
Dry Soil & Tare (gm)		158.13
Tare Weight (gm)		42.48
Moisture Content (%)		16.54

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture		
Weight Of Sample (gm)		177.26
Tare Weight (gm)		42.48
Total Dry Weight (gm)	(W6)	115.65

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE	
6.000					6.000	coarse gravel
3.000					3.000	coarse gravel
2.500					2.500	coarse gravel/
2.000					2.000	coarse gravel
1.500					1.500	coarse gravel
1.000					1.000	coarse gravel
0.750					0.750	fine gravel
0.500					0.500	fine gravel
0.375					0.375	fine gravel
#4	203.30	0.00		100.0	#4	coarse sand
#10	203.65	0.35	0.30	99.7	#10	medium sand
#20	205.31	2.01	1.74	98.3	#20	medium sand
#40	209.40	6.10	5.27	94.7	#40	fine sand
#60	227.14	23.84	20.61	79.4	#60	fine sand
#100	268.81	65.51	56.65	43.4	#100	fine sand
#200	286.67	83.37	72.09	27.9	#200	fines
PAN					PAN	

% C GRAVEL	
% F GRAVEL	
% C SAND	0.30
% M SAND	4.97
% F SAND	66.81
% FINES	27.91
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

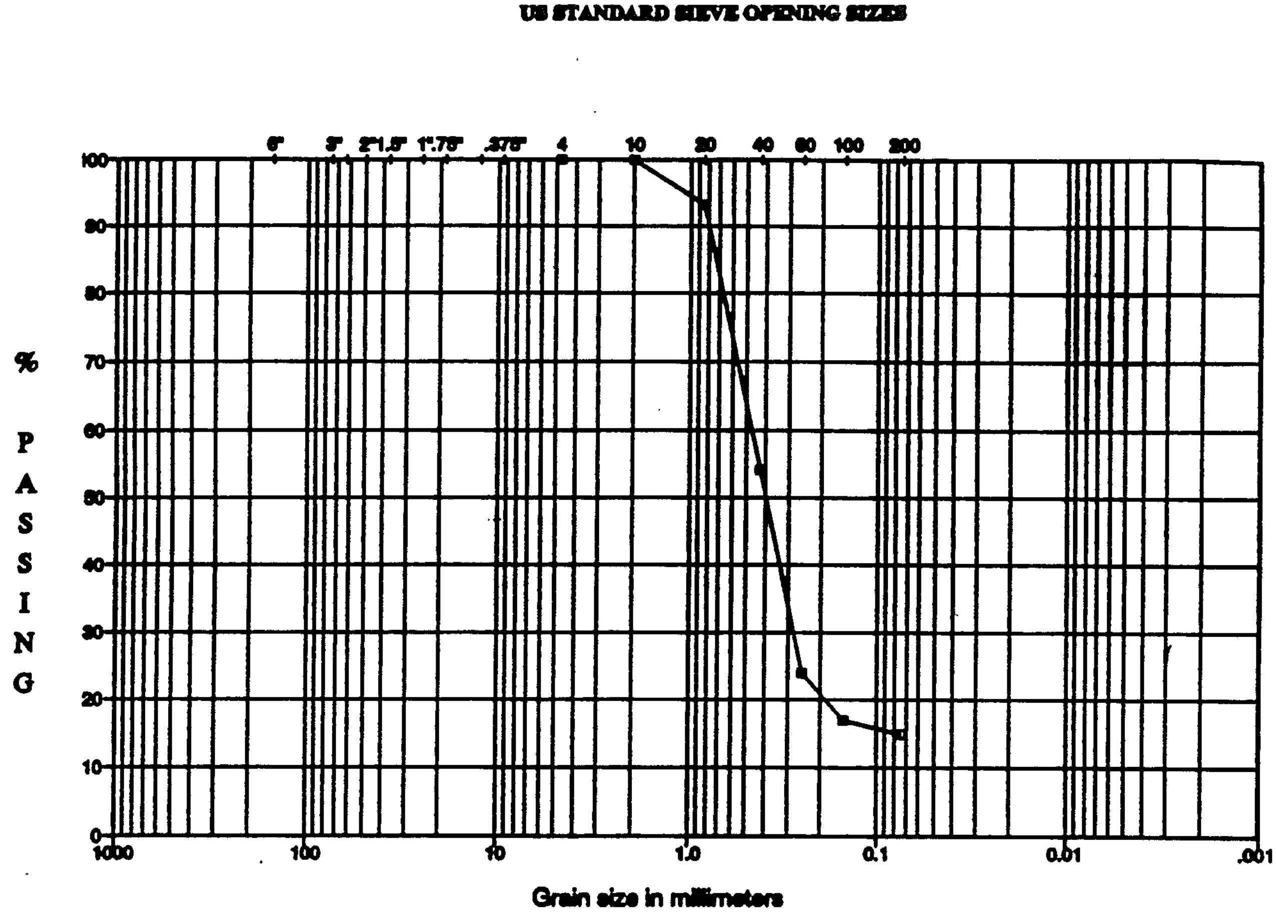
Description: Yellowish Tan & Yellow, FINE SAND, some silty clay.

USCS: (SC)

TECH	PWM
DATE	05/27/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION



COBBLES	GRAVEL		SAND			FINES
	Coarse	Fine	C	Med	Fine	SILT OR CLAY

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B - 4 JAR 18' - 19.5'	-	-	-	-	-	Tan, MEDIUM TO FINE SAND, some silty clay.
Sample Type:	JAR				USCS	(SC)

DATE	05/27/94
CHECK	PWM
REVIEW	BOF

933-3580-002
J & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

FN: 3580-5

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B - 4
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	18' - 19.5'

WATER CONTENT (Delivered Moisture)		
Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample		
Wet Soil & Tare (gm)		217.32
Dry Soil & Tare (gm)		191.26
Tare Weight (gm)		51.76
Moisture Content (%)		18.68
Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture		
Weight Of Sample (gm)		217.32
Tare Weight (gm)		51.76
Total Dry Weight (gm)	(W6)	139.50

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) ((wt ret/w6)*100)	% PASS (100-%ret)	SIEVE	
6.000					6.000	coarse gravel
3.000					3.000	coarse gravel
2.500					2.500	coarse gravel
2.000					2.000	coarse gravel
1.500					1.500	coarse gravel
1.000					1.000	coarse gravel
0.750					0.750	fine gravel
0.500					0.500	fine gravel
0.375					0.375	fine gravel
#4	203.30	0.00		100.0	#4	coarse sand
#10	203.46	0.16	0.11	99.9	#10	medium sand
#20	212.91	9.61	6.89	93.1	#20	medium sand
#40	267.40	64.10	45.95	54.1	#40	fine sand
#60	309.57	106.27	76.18	23.8	#60	fine sand
#100	319.23	115.93	83.10	16.9	#100	fine sand
#200	322.12	118.82	85.18	14.8	#200	fines
PAN					PAN	

% C GRAVEL	
% F GRAVEL	
% C SAND	0.11
% M SAND	45.84
% F SAND	39.23
% FINES	14.82
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Tan, MEDIUM TO FINE SAND, some silty clay.

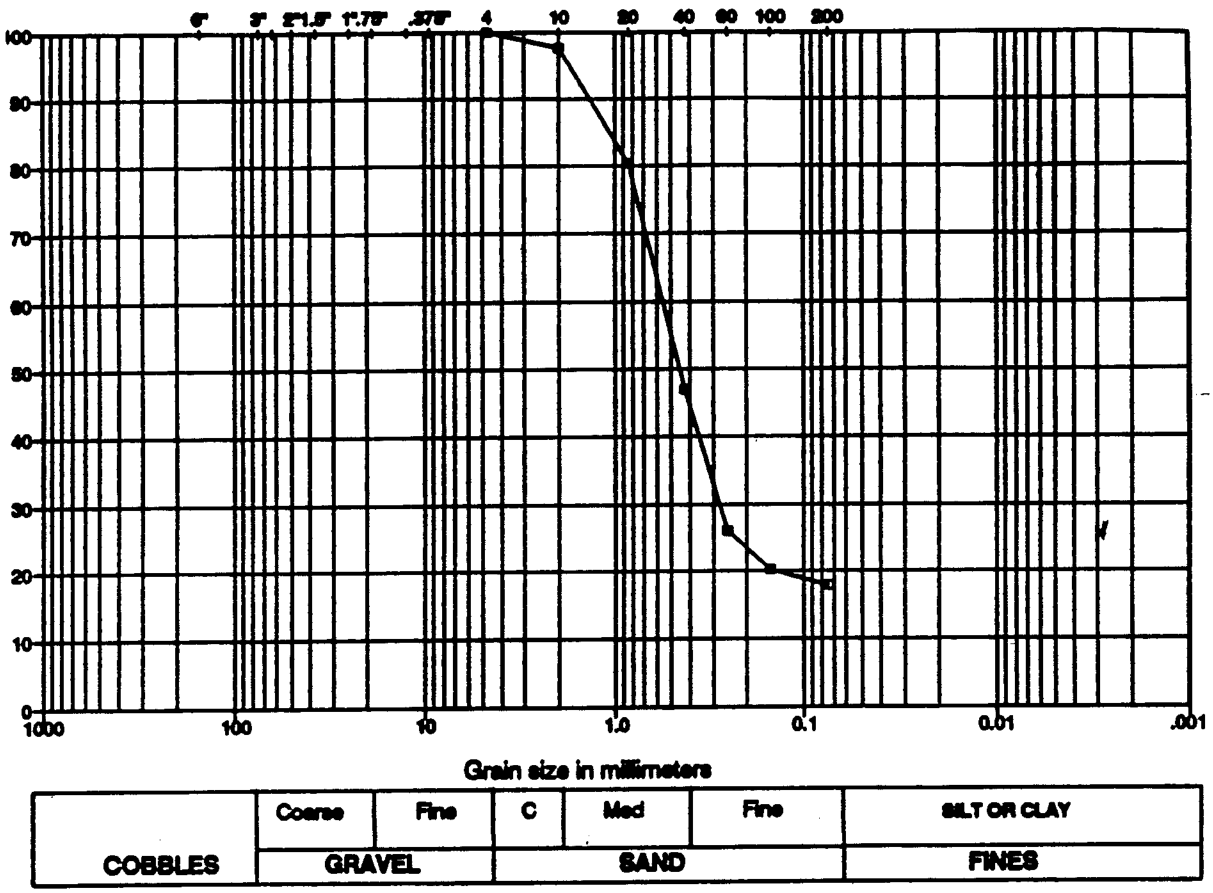
USCS: (SC)

TECH	PWM
DATE	05/27/94
CHECK	PWM
REVIEW	BJP

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B - 5 JAR 33' - 34.5'	-	-	-	-	-	Tan, MEDIUM TO FINE SAND, some silty clay.
Sample Type:	JAR					USCS (SC)

DATE	05/27/94
CHECK	Pw m
REVIEW	BJ

3-3580-002
J & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

FN: 3580-2

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B - 5
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	33' - 34.5'

WATER CONTENT (Delivered Moisture)		
Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample		
	Wet Soil & Tare (gm)	213.65
	Dry Soil & Tare (gm)	190.24
	Tare Weight (gm)	51.78
	Moisture Content (%)	16.91

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture		
	Weight Of Sample (gm)	213.65
	Tare Weight (gm)	51.78
(W6)	Total Dry Weight (gm)	138.46

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE	
6.000					6.000	coarse gravel
3.000					3.000	coarse gravel
2.500					2.500	coarse gravel
2.000					2.000	coarse gravel
1.500					1.500	coarse gravel
1.000					1.000	coarse gravel
0.750					0.750	fine gravel
0.500					0.500	fine gravel
0.375					0.375	fine gravel
#4	203.30	0.00		100.0	#4	coarse sand
#10	206.60	3.30	2.38	97.6	#10	medium sand
#20	230.58	27.28	19.70	80.3	#20	medium sand
#40	276.82	73.52	53.10	46.9	#40	fine sand
#60	305.85	102.55	74.06	25.9	#60	fine sand
#100	313.83	110.53	79.83	20.2	#100	fine sand
#200	316.99	113.69	82.11	17.9	#200	fines
PAN					PAN	

% C GRAVEL	
% F GRAVEL	
% C SAND	2.38
% M SAND	50.72
% F SAND	29.01
% FINES	17.89
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Tan, MEDIUM TO FINE SAND, some silty clay.

USCS: (SC)

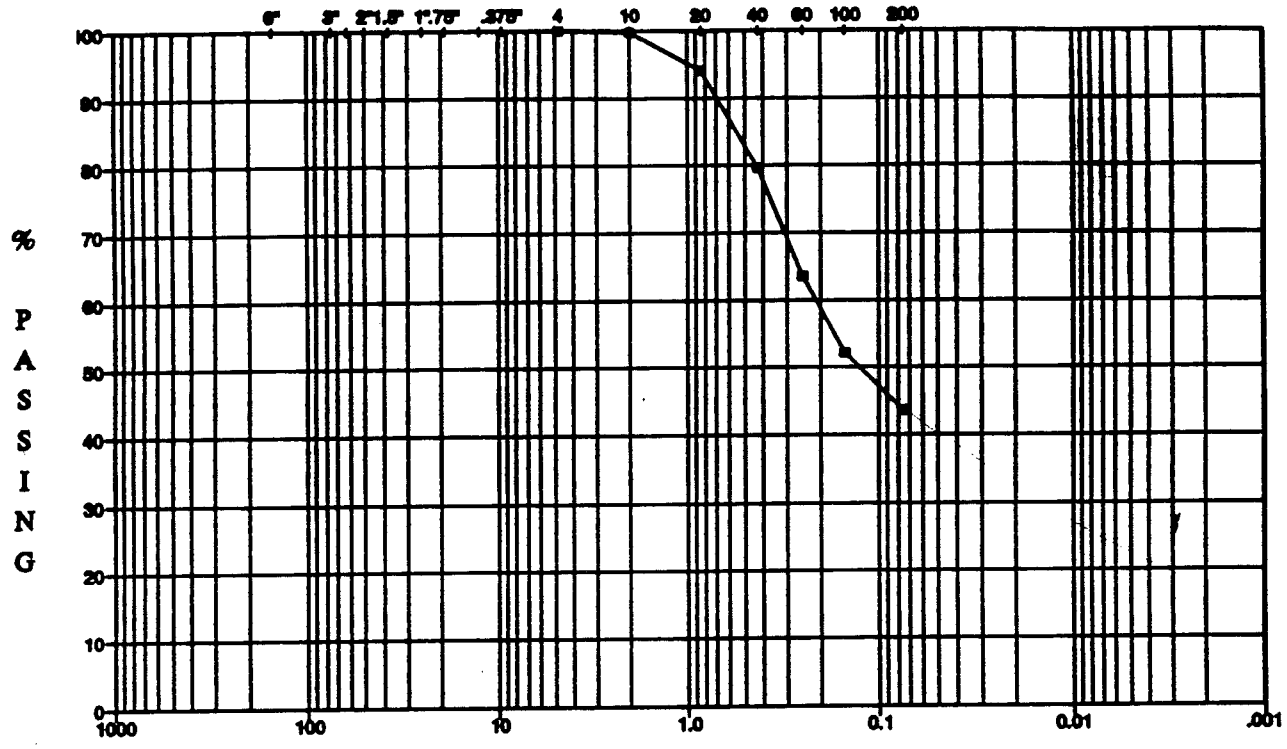
TECH	FWM
DATE	05/27/94
CHECK	FWM
REVIEW	

GOLDER ASSOCIATES INC.

N: 3580-2

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B - 6 JAR 48' - 49.5'	-	-	-	-	-	Brown, White & Yellow, Mottled, MEDIUM TO FINE SAND, and silty clay.
Sample Type: JAR					USCS	(SC)

DATE 05/27/94
CHECK DWM
REVIEW BDP

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B - 6
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	49' - 49.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	158.34
Dry Soil & Tare (gm)	146.44
Tare Weight (gm)	51.76
Moisture Content (%)	12.57

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		158.34
Tare Weight (gm)		51.76
Total Dry Weight (gm)	(W6)	94.68

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE
6.000					6.000 coarse gravel
3.000					3.000 coarse gravel
2.500					2.500 coarse gravel
2.000					2.000 coarse gravel
1.500					1.500 coarse gravel
1.000					1.000 coarse gravel
0.750					0.750 fine gravel
0.500					0.500 fine gravel
0.375					0.375 fine gravel
#4	203.30	0.00		100.0	#4 coarse sand
#10	203.55	0.25	0.26	99.7	#10 medium sand
#20	208.86	5.56	5.87	94.1	#20 medium sand
#40	222.51	19.21	20.29	79.7	#40 fine sand
#60	237.82	34.52	36.46	63.5	#60 fine sand
#100	248.68	45.38	47.93	52.1	#100 fine sand
#200	256.65	53.35	56.35	43.7	#200 fines
PAN					PAN

% C GRAVEL	
% F GRAVEL	
% C SAND	0.26
% M SAND	20.03
% F SAND	36.06
% FINES	43.65
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Brown, White & Yellow, Mottled, MEDIUM TO FINE SAND, and silty clay.

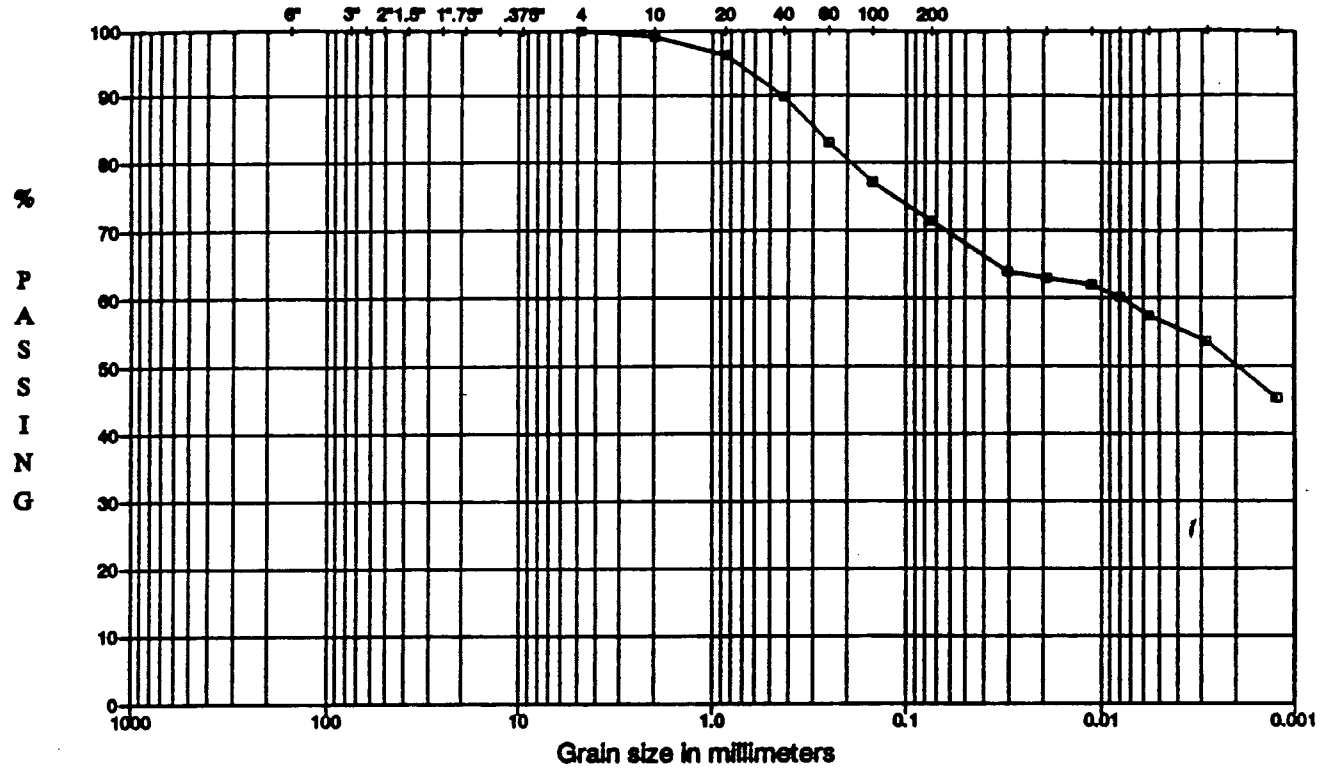
USCS: (SC)

TECH	PWM
DATE	05/27/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



COBBLES	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
	GRAVEL		SAND			FINES

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B-7 JAR 13 - 15'	-	-	-	-	2.65	Reddish Brown, SILTY CLAY, some medium to fine sand.
Sample Type: JAR					USCS	(CL)

DATE 06/02/94
CHECK
REVIEW

933-3580.002
JI & G/LAB TESTING/GA
3580-16

GOLDER ASSOCIATES INC.

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-7	JAR
PROJECT NO.	933-3580.002	SAMPLE TYPE	JAR	
		SAMPLE DEPTH	13 - 15'	

AS RECEIVED WATER CONTENT

Tare No.		
Wt Wet Soil & Tare (gm)	(W1)	
Wt Dry Soil & Tare (gm)	(W2)	
Weight of Tare (gm)	(W3)	
Weight of Water (gm)	(W4=W1-W2)	0.00
Weight of Dry Soil (gm)	(W5=W2-W3)	0.00
Moisture Content (%)	(W4/W5)*100	0.00

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	57.00
Dry Soil & Tare (gm)	55.00
Tare Weight (gm)	3.24
Moisture Content (%)	3.86

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	223.86	
Tare Wt (gm)	113.73	
Total Wt (gm)	106.05	(W6)

Plus #4 Material Sieve

TARE WEIGHT: 203.30

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	% PASSING		
6.0"	203.30	0.0		6.0"	cobbles
3.0"	203.30	0.0		3.0"	coarse gravel
2.5"	203.30	0.0		2.5"	coarse gravel
2.0"	203.30	0.0		2.0"	coarse gravel
1.5"	203.30	0.0		1.5"	coarse gravel
1.0"	203.30	0.0		1.0"	coarse gravel
0.75"	203.30	0.0		0.75"	fine gravel
0.50"	203.30	0.0		0.50"	fine gravel
0.375"	203.30	0.0		0.375"	fine gravel
#4	203.30	0.0	100.0	#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	2.65
Specific Gravity	(tested)	
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	56.10
Calculated Dry Wt used in test (gm)	54.01
Hydrometer Bulb Number	280629
% Pass #4 Sieve For Whole Sample	100.00

Hygroscopic Moisture

Wet Soil & Tare (gm)	57.00
Dry Soil & Tare (gm)	55.00
Tare Weight (gm)	3.24
Moisture Content (%)	3.86

DATE	TIME	ET	RDNG	TEMP	TEMP.COR	HYD. COR.
06/03/94	10:04	(min)	R	T	K	Cc
06/03/94	10:06	2.00	40.5	23.00	0.013	6.00
06/03/94	10:09	5.00	40.0	23.00	0.013	6.00
06/03/94	10:19	15.00	39.5	23.00	0.013	6.00
06/03/94	10:34	30.00	38.5	23.00	0.013	6.00
06/03/94	11:04	60.00	37.0	23.00	0.013	6.00
06/03/94	14:14	250.00	35.0	23.00	0.013	6.00
06/04/94	10:04	1440.00	30.5	23.00	0.013	6.00

(40ml Na(PO4)n per 1000ml H2O)
Cc= Composite Correction Reading

TARE WEIGHT: 203.30

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING		
#10	203.85	0.55	99.0	#10	medium sand
#20	205.34	2.04	96.2	#20	medium sand
#40	208.79	5.49	89.8	#40	fine sand
#60	212.41	9.11	83.1	#60	fine sand
#100	215.55	12.25	77.3	#100	fine sand
#200	218.64	15.34	71.6	#200	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	34.50	10.7	0.013	1.00	0.0305	63.9
5.00	34.00	10.7	0.013	1.00	0.0193	62.9
15.00	33.50	10.9	0.013	1.00	0.0112	62.0
30.00	32.50	11.1	0.013	1.00	0.0080	60.2
60.00	31.00	11.2	0.013	1.00	0.0057	57.4
250.00	29.00	11.5	0.013	1.00	0.0028	53.7
1440.00	24.50	12.4	0.013	1.00	0.0012	45.4

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	0.0
% COARSE SAND	1.0
% MEDIUM SAND	9.2
% FINE SAND	18.2
% FINES	71.6
% TOTAL SAMPLE	100.0

Description: Reddish Brown, SILTY CLAY, some medium to fine sand.

USCS: (CL)

LL	-
PL	-
PI	-

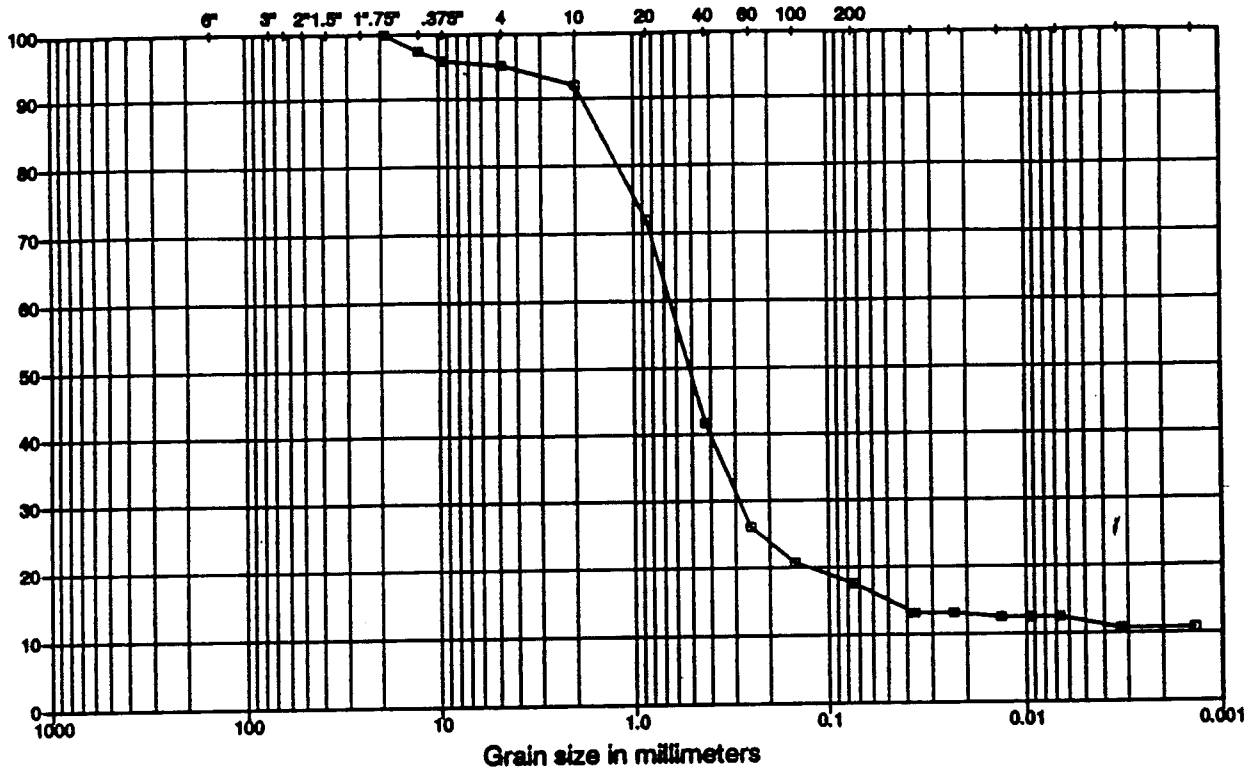
TECH	FWM
DATE	06/02/94
CHECK	Rym
REVIEW	BP

GOLDER ASSOCIATES INC.

FN: 3580-16

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



COBBLES	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
	GRAVEL		SAND			FINES

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B-7 U/D 18 - 19.5'	17.20	26	18	8	2.62	Reddish White, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.
Sample Type: U/D					USCS SC	

DATE 06/02/94
CHECK
REVIEW

933-3580.002
IJ & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-7	U/D	
PROJECT NO.	933-3580.002	SAMPLE TYPE	U/D		
		SAMPLE DEPTH	18 - 19.5'		

AS RECEIVED WATER CONTENT

Tare No.		114
Wt Wet Soil & Tare (gm)	(W1)	207.85
Wt Dry Soil & Tare (gm)	(W2)	184.26
Weight of Tare (gm)	(W3)	51.77
Weight of Water (gm)	(W4=W1-W2)	22.79
Weight of Dry Soil (gm)	(W5=W2-W3)	132.49
Moisture Content (%)	(W4/W5)*100	17.20

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	58.95
Dry Soil & Tare (gm)	58.23
Tare Weight (gm)	3.21
Moisture Content (%)	1.31

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	515.85	
Tare Wt (gm)	114.48	
Total Wt (gm)	396.19	(W6)

Pass #4 Material Sieve

TARE WEIGHT: 203.30

	(Wt+Tare)	(((Wt-Tare)/W6)*100)	% PASSING		
6.0"	203.30	0.0		6.0"	cobbles
3.0"	203.30	0.0		3.0"	coarse gravel
2.5"	203.30	0.0		2.5"	coarse gravel
2.0"	203.30	0.0		2.0"	coarse gravel
1.5"	203.30	0.0		1.5"	coarse gravel
1.0"	203.30	0.0		1.0"	coarse gravel
0.75"	203.30	0.0	100.0	0.75"	fine gravel
0.50"	213.89	2.7	97.3	0.50"	fine gravel
0.375"	219.94	4.2	95.8	0.375"	fine gravel
#4	222.88	4.9	95.1	#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)	
Specific Gravity	(tested)	2.62
Amount Dispersing Agent (ml)		125.00
Type Dispersion Device		Mechanical
Length of Dispersion Period		1 Minute

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	63.30
Calculated Dry Wt used in test (gm)	62.48
Hydrometer Bulb Number	200629
% Pass #4 Sieve For Whole Sample	95.06

Hygroscopic Moisture

Wet Soil & Tare (gm)	58.95
Dry Soil & Tare (gm)	58.23
Tare Weight (gm)	3.21
Moisture Content (%)	1.31

DATE	TIME	ET	RDNG	TEMP	TEMP.COR	HYD. COR.
06/03/94	10:00	(min)	R	T	K	Cc
06/03/94	10:02	2.00	14.5	23.00	0.013	6.00
06/03/94	10:05	5.00	14.5	23.00	0.013	6.00
06/03/94	10:15	15.00	14.0	23.00	0.013	6.00
06/03/94	10:30	30.00	14.0	23.00	0.013	6.00
06/03/94	11:00	60.00	14.0	23.00	0.013	6.00
06/03/94	14:10	250.00	13.0	23.00	0.013	6.00
06/04/94	10:00	1440.00	13.0	23.00	0.013	6.00

(40ml Na(PO4)n per 1000ml H2O)

Cc= Composite Correction Reading

TARE WEIGHT: 203.30

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING		
#10	205.20	1.90	92.3	#10	medium sand
#20	218.48	15.18	72.0	#20	medium sand
#40	238.40	35.10	41.7	#40	fine sand
#60	248.70	45.40	26.0	#60	fine sand
#100	252.15	48.85	20.7	#100	fine sand
#200	254.22	50.92	17.6	#200	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	8.50	15.0	0.013	1.01	0.0566	13.1
5.00	8.50	15.0	0.013	1.01	0.0232	13.1
15.00	8.00	15.0	0.013	1.01	0.0134	12.3
30.00	8.00	15.0	0.013	1.01	0.0095	12.3
60.00	8.00	15.0	0.013	1.01	0.0067	12.3
250.00	7.00	15.2	0.013	1.01	0.0033	10.8
1440.00	7.00	15.2	0.013	1.01	0.0014	10.8

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	4.9
% COARSE SAND	2.9
% MEDIUM SAND	50.5
% FINE SAND	24.1
% FINES	17.6
% TOTAL SAMPLE	100.0

Description: Reddish White, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

USCS: SC

26	LL
18	PL
8	PI

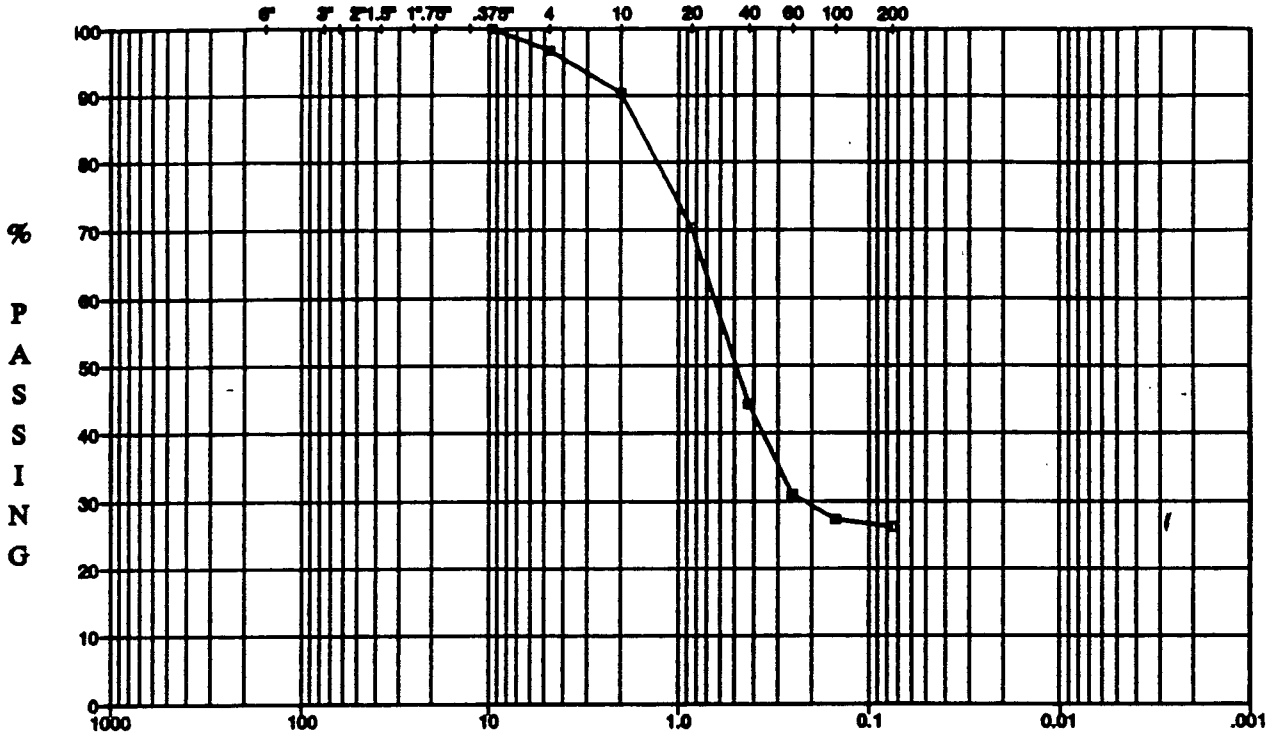
GOLDER ASSOCIATES INC.

TECH	PWM
DATE	06/02/94
CHECK	
REVIEW	

FN: 3580-19

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B - 7 JAR 37' - 38.5'	-	-	-	-	-	Brownish Red, White & Purple, Mottled, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.
Sample Type:	JAR				USCS	(SC)

DATE 05/27/94
CHECK
REVIEW

`33-3580-002
JJ & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

FN: 3580-10

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B - 7
PROJECT NO.	933-3500-002	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	33' - 34.5'

WATER CONTENT (Delivered Moisture)			Hygroscopic Moisture For Sieve Sample		
Tare Number				Wet Soil & Tare (gm)	182.37
Wt Wet Soil & Tare (gm)	(w1)			Dry Soil & Tare (gm)	166.69
Wt Dry Soil & Tare (gm)	(w2)			Tare Weight (gm)	52.12
Weight of Tare (gm)	(w3)			Moisture Content (%)	13.69
Weight of Water (gm)	(w4=w1-w2)		Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture	Weight Of Sample (gm)	182.37
Weight of Dry Soil (gm)	(w5=w2-w3)			Tare Weight (gm)	52.12
Moisture Content (%)	(w4/w5)*100		(W6)	Total Dry Weight (gm)	114.57

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE	
6.000					6.000	coarse gravel
3.000					3.000	coarse gravel
2.500					2.500	coarse gravel
2.000					2.000	coarse gravel
1.500					1.500	coarse gravel
1.000					1.000	coarse gravel
0.750					0.750	fine gravel
0.500					0.500	fine gravel
0.375	203.30	0.00		100.0	0.375	fine gravel
#4	207.06	3.76	3.28	96.7	#4	coarse sand
#10	214.47	11.17	9.75	90.3	#10	medium sand
#20	237.15	33.85	29.55	70.5	#20	medium sand
#40	267.05	63.75	55.64	44.4	#40	fine sand
#60	282.35	79.05	69.00	31.0	#60	fine sand
#100	286.67	83.37	72.77	27.2	#100	fine sand
#200	287.94	84.64	73.88	26.1	#200	fines
PAN					PAN	

% C GRAVEL	
% F GRAVEL	3.28
% C SAND	6.47
% M SAND	45.89
% F SAND	18.23
% FINES	26.12
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Brownish Red, White & Purple, Mottled, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

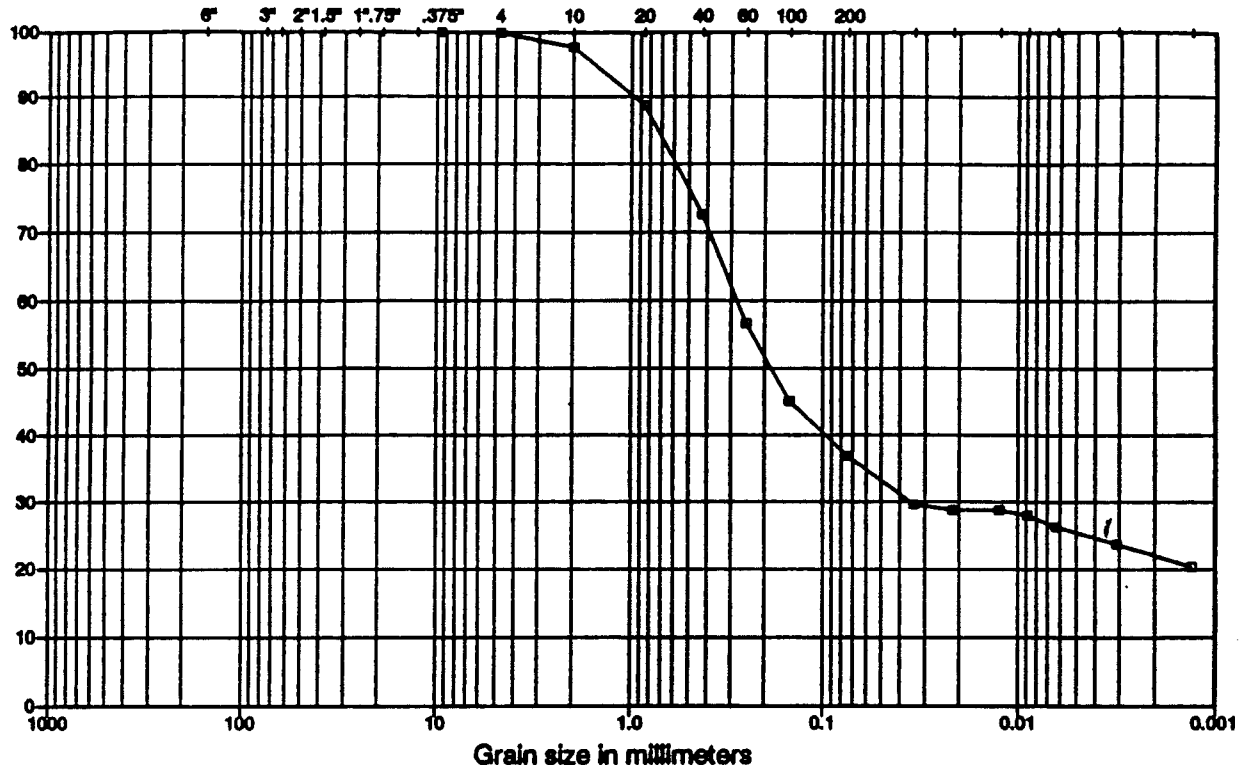
USCS: (SC)

TECH	PWM
DATE	05/27/94
CHECK	PWM
REVIEW	BJP

GOLDER ASSOCIATES INC.

PARTICLE SIZE DISTRIBUTION ASTM D421 AND D422

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	Cor	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc%	LL	PL	PI	Gs	DESCRIPTION
B-14 U/D 13' - 14'	15.52	-	-	-	2.66	Brownish Red, MEDIUM TO FINE SAND, and silty clay, trace fine gravel.
Sample Type: U/D					USCS	(SC)

DATE 6/06/94
CHECK
REVIEW

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, D1140, D2216 and D2217

PROJECT TITLE	LJ & G/LAB TESTING/GA		SAMPLE ID	B-14	U/D
PROJECT NO.	933-3580.002		SAMPLE TYPE	U/D	
			SAMPLE DEPTH	13' - 14'	

AS RECEIVED WATER CONTENT

Tare No.		69
Wt Wet Soil & Tare (gm)	(W1)	198.17
Wt Dry Soil & Tare (gm)	(W2)	178.19
Weight of Tare (gm)	(W3)	41.45
Weight of Water (gm)	(W4=W1-W2)	19.98
Weight of Dry Soil (gm)	(W5=W2-W3)	128.74
Moisture Content (%)	(W4/W5)*100	15.52

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	24.35
Dry Soil & Tare (gm)	23.93
Tare Weight (gm)	3.19
Moisture Content (%)	2.03

Total Weight of Sample Used For Sieve Analysis Corrected For Hygroscopic Moisture

Weight + Tare, Before Separating On The #4 Sieve (gm)	246.75	
Tare Wt (gm)	114.10	
Total Wt (gm)	130.02	(WG)

Plus #4 Material Sieve

TARE WEIGHT: 203.30

	(Wt+Tare)	(((Wt-Tare)/WG)*100)	% PASSING		
6.0"	203.30	0.0		6.0"	cobbles
3.0"	203.30	0.0		3.0"	coarse gravel
2.5"	203.30	0.0		2.5"	coarse gravel
2.0"	203.30	0.0		2.0"	coarse gravel
1.5"	203.30	0.0		1.5"	coarse gravel
1.0"	203.30	0.0		1.0"	coarse gravel
0.75"	203.30	0.0		0.75"	fine gravel
0.50"	203.30	0.0		0.50"	fine gravel
0.375"	203.30	0.0	100.0	0.375"	fine gravel
#4	205.56	0.2	99.8	#4	coarse sand

HYDROMETER ANALYSIS

Specific Gravity	(assumed)			
Specific Gravity	(tested)	2.66		
Amount Dispersing Agent (ml)		125.00		
Type Dispersion Device		Mechanical		
Length of Dispersion Period		1 Minute		

Weight of Sample Used For Hydrometer Test

Weight of Sample Wet or Dry (gm)	60.20
Calculated Dry Wt used in test (gm)	59.01
Hydrometer Bulb Number	280629
% Pass #4 Sieve For Whole Sample	99.80

Hygroscopic Moisture

Wet Soil & Tare (gm)	24.35
Dry Soil & Tare (gm)	23.93
Tare Weight (gm)	3.19
Moisture Content (%)	2.03

DATE	TIME	ET	RDNG	TEMP	TEMP.COR.	HYD. COR.
06/07/94	09:42	(min)	R	T	K	Cc
06/07/94	09:44	2.00	23.5	23.00	0.013	6.00
06/07/94	09:47	5.00	23.0	23.00	0.013	6.00
06/07/94	09:57	15.00	23.0	23.00	0.013	6.00
06/07/94	10:12	30.00	22.5	23.00	0.013	6.00
06/07/94	10:42	60.00	21.5	23.00	0.013	6.00
06/07/94	13:52	250.00	20.0	23.00	0.013	6.00
06/08/94	09:42	1440.00	18.0	23.00	0.013	6.00

(40ml Na(PO4)n per 1000ml H2O)

Cc= Composite Correction Reading

TARE WEIGHT: 203.30

HYDROMETER BACKSIEVE (Percent Passing #10 - #200 Sieves)

Sieve Size		Cumul Wt. Retained	% PASSING		
#10	204.60	1.30	97.6	#10	medium sand
#20	208.78	6.48	88.8	#20	medium sand
#40	219.32	16.02	72.7	#40	fine sand
#60	228.79	25.49	56.7	#60	fine sand
#100	235.61	32.31	45.2	#100	fine sand
#200	240.47	37.17	36.9	#200	fines

HYDROMETER CALCULATIONS

ET (min)	RDNG,C	EFF LTH		A	Particle Diameter	% PASSING
2.00	17.50	13.5	0.013	1.00	0.0542	29.6
5.00	17.00	13.5	0.013	1.00	0.0216	28.8
15.00	17.00	13.5	0.013	1.00	0.0125	28.8
30.00	16.50	13.7	0.013	1.00	0.0089	27.9
60.00	15.50	13.8	0.013	1.00	0.0063	26.2
250.00	14.00	14.0	0.013	1.00	0.0031	23.7
1440.00	12.00	14.3	0.013	1.00	0.0013	20.3

Grain Size Percentages

% COBBLES	0.0
% COARSE GRAVEL	0.0
% FINE GRAVEL	0.2
% COARSE SAND	2.2
% MEDIUM SAND	24.9
% FINE SAND	35.8
% FINES	36.9
% TOTAL SAMPLE	100.0

Description: Brownish Red, MEDIUM TO FINE SAND, and silty clay, trace fine gravel.

USCS: (SC)

LL	-
PL	-
PI	-

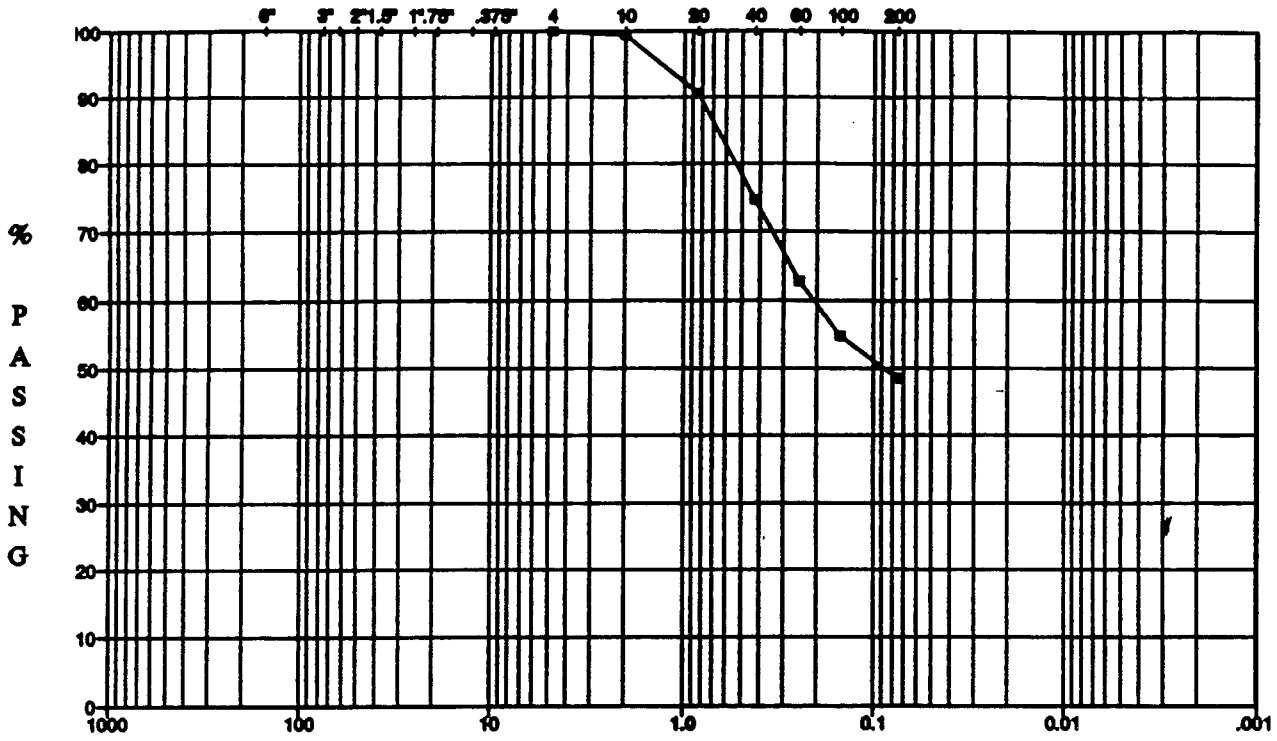
GOLDER ASSOCIATES INC.

TECH	PWM
DATE	6/06/94
CHECK	
REVIEW	

FN: 3580-27

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	Coarse	Fine	C	Med	Fine	FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B - 14 JAR 28' - 29.5'	-	-	-	-	-	Tan, Yellow & Purple, Mottled, MEDIUM TO FINE SAND, and silty clay.
Sample Type:	JAR				USCS	(SC)

DATE	05/27/94
CHECK	
REVIEW	

933-3580-002

J & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

FN: 3580-7

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B - 14
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	28' - 29.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	171.20
Dry Soil & Tare (gm)	157.36
Tare Weight (gm)	52.04
Moisture Content (%)	13.14

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		171.20
Tare Weight (gm)		52.04
Total Dry Weight (gm)	(W6)	105.32

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) {(wt ret/w6)*100}	% PASS (100-%ret)	SIEVE
6.000					6.000 coarse gravel
3.000					3.000 coarse gravel
2.500					2.500 coarse gravel
2.000					2.000 coarse gravel
1.500					1.500 coarse gravel
1.000					1.000 coarse gravel
0.750					0.750 fine gravel
0.500					0.500 fine gravel
0.375					0.375 fine gravel
#4	203.30	0.00		100.0	#4 coarse sand
#10	203.94	0.64	0.61	99.4	#10 medium sand
#20	213.37	10.07	9.56	90.4	#20 medium sand
#40	230.05	26.75	25.40	74.6	#40 fine sand
#60	242.45	39.15	37.17	62.8	#60 fine sand
#100	250.99	47.69	45.28	54.7	#100 fine sand
#200	257.48	54.18	51.44	48.6	#200 fines
PAN					PAN

% C GRAVEL	
% F GRAVEL	
% C SAND	0.61
% M SAND	24.79
% F SAND	26.04
% FINES	48.56
% TOTAL	100.00

Descriptive Terms

trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Tan, Yellow & Purple, Mottled, MEDIUM TO FINE SAND, and silty clay.

USCS: (SC)

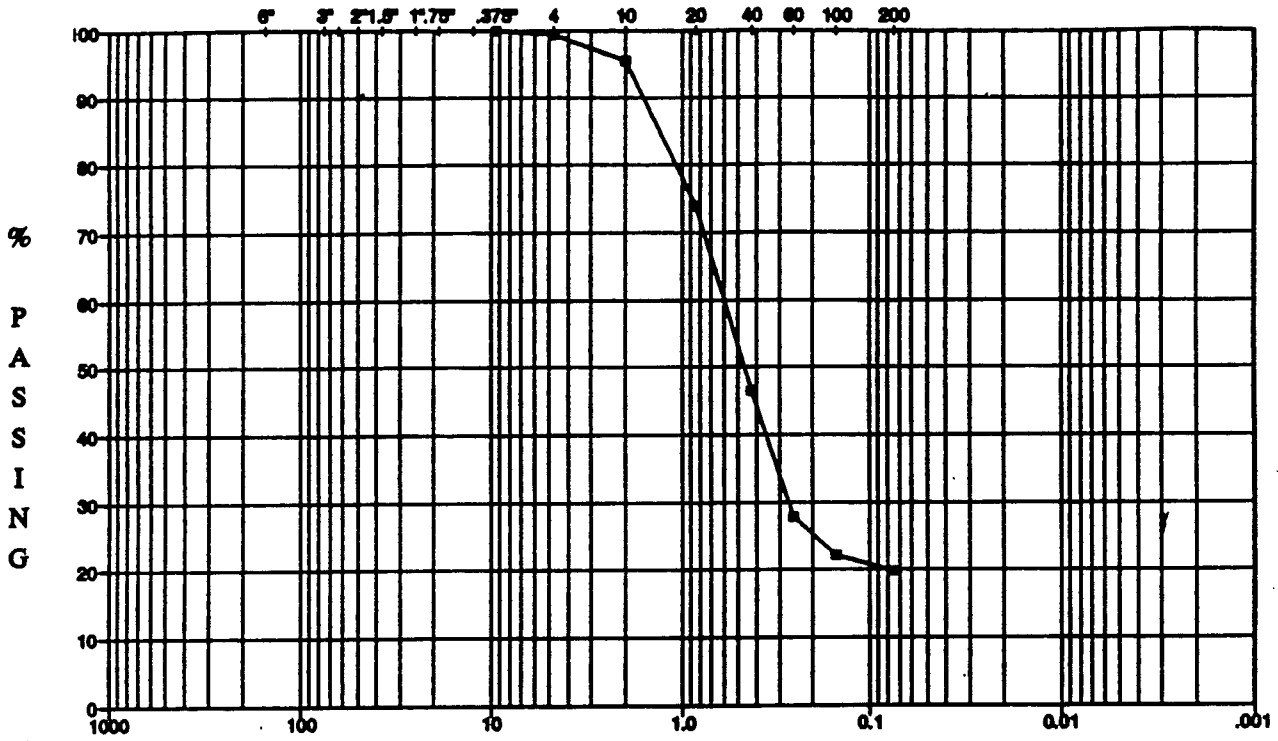
TECH	PWM
DATE	05/27/94
CHECK	PWM
REVIEW	BMP

GOLDER ASSOCIATES INC.

N: 3580-7

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B - 16 JAR 48' - 49.5'	-	-	-	-	-	Brownish Tan, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.
Sample Type: JAR					USCS	(SC)

DATE	05/27/94
CHECK	
REVIEW	

33-3580-002

JJ & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

FN: 3580-9

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B - 16
PROJECT NO.	933-3580-002	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	48' - 49.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	185.85
Dry Soil & Tare (gm)	167.02
Tare Weight (gm)	51.56
Moisture Content (%)	16.31

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture (W6)

Weight Of Sample (gm)	185.85
Tare Weight (gm)	51.56
Total Dry Weight (gm)	115.46

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) ((wt ret/w6)*100)	% PASS (100-%ret)	SIEVE	
6.000					6.000	coarse gravel
3.000					3.000	coarse gravel
2.500					2.500	coarse gravel/
2.000					2.000	coarse gravel
1.500					1.500	coarse gravel
1.000					1.000	coarse gravel
0.750					0.750	fine gravel
0.500					0.500	fine gravel
0.375	203.30	0.00		100.0	0.375	fine gravel
#4	204.00	0.70	0.61	99.4	#4	coarse sand
#10	208.53	5.23	4.53	95.5	#10	medium sand
#20	233.32	30.02	26.00	74.0	#20	medium sand
#40	265.22	61.92	53.63	46.4	#40	fine sand
#60	286.60	83.30	72.15	27.9	#60	fine sand
#100	293.27	89.97	77.92	22.1	#100	fine sand
#200	295.98	92.68	80.27	19.7	#200	fines
PAN					PAN	

% C GRAVEL	
% F GRAVEL	0.61
% C SAND	3.92
% M SAND	49.10
% F SAND	26.64
% FINES	19.73
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Brownish Tan, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

USCS: (SC)

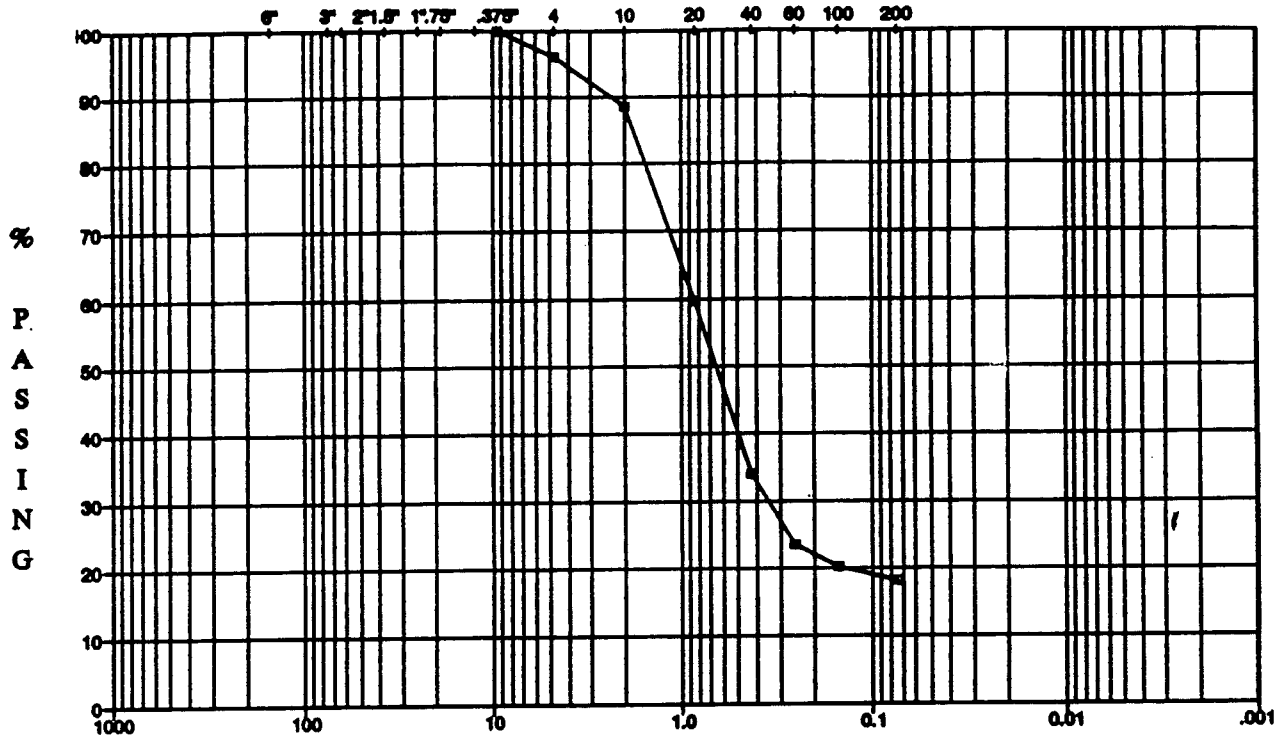
TECH	PWM
DATE	05/27/94
CHECK	PWM
REVIEW	BP

GOLDER ASSOCIATES INC.

N: 3580-9

PARTICLE SIZE DISTRIBUTION

US STANDARD SIEVE OPENING SIZES



	Coarse	Fine	C	Med	Fine	SILT OR CLAY
COBBLES	GRAVEL		SAND			FINES

SAMPLE ID	Mc %	LL	PL	PI	Gs	Description
B - 17 JAR 33' - 34.5'	-	-	-	-	-	Brownish Red, Purple, Mottled, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.
Sample Type: JAR					USCS	(SC)

DATE 05/27/94
CHECK
REVIEW

933-3580-002
J & G/LAB TESTING/GA

GOLDER ASSOCIATES INC.

FN: 3580-8

ASTM GRAIN SIZE ANALYSIS

ASTM D421, D422, C136, D1140, D2216 and D2217

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B - 17
PROJECT NO.	933-3500-002	SAMPLE TYPE	JAR
REMARKS		SAMPLE DEPTH	33' - 34.5'

WATER CONTENT (Delivered Moisture)

Tare Number		
Wt Wet Soil & Tare (gm)	(w1)	
Wt Dry Soil & Tare (gm)	(w2)	
Weight of Tare (gm)	(w3)	
Weight of Water (gm)	(w4=w1-w2)	
Weight of Dry Soil (gm)	(w5=w2-w3)	
Moisture Content (%)	(w4/w5)*100	

Hygroscopic Moisture For Sieve Sample

Wet Soil & Tare (gm)	223.22
Dry Soil & Tare (gm)	202.53
Tare Weight (gm)	51.78
Moisture Content (%)	13.72

Total Weight Of Sample Used For Sieve Corrected For Hygroscopic Moisture

Weight Of Sample (gm)		223.22
Tare Weight (gm)		51.78
Total Dry Weight (gm)	(W6)	150.75

SIEVE ANALYSIS

Tare Weight: 203.30

	Wt Ret +Tare	(Wt-Tare)	(%Retained) ((wt ret/w6)*100)	% PASS (100-%ret)	SIEVE	
6.000					6.000	coarse gravel
3.000					3.000	coarse gravel
2.500					2.500	coarse gravel
2.000					2.000	coarse gravel
1.500					1.500	coarse gravel
1.000					1.000	coarse gravel
0.750					0.750	fine gravel
0.500					0.500	fine gravel
0.375	203.30	0.00		100.0	0.375	fine gravel
#4	209.36	6.06	4.02	96.0	#4	coarse sand
#10	220.58	17.28	11.46	88.5	#10	medium sand
#20	263.82	60.52	40.15	59.9	#20	medium sand
#40	302.72	99.42	65.95	34.0	#40	fine sand
#60	318.46	115.16	76.39	23.6	#60	fine sand
#100	323.63	120.33	79.82	20.2	#100	fine sand
#200	326.52	123.22	81.74	18.3	#200	fines
PAN					PAN	

% C GRAVEL	
% F GRAVEL	4.02
% C SAND	7.44
% M SAND	54.49
% F SAND	15.79
% FINES	18.26
% TOTAL	100.00

Descriptive Terms	
trace	0 to 5%
little	5 to 12%
some	12 to 30%
and	30 to 50%

> 10% mostly coarse (c)
> 10% mostly medium (m)
< 10% fine (c-m)
< 10% coarse (m-f)
< 10% coarse and fine (m)
< 10% coarse and medium (f)
> 10% equal amounts each (c-f)

LL	-
PL	-
PI	-
Gs	-

Description: Brownish Red, Purple, Mottled, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

USCS: (SC)

TECH	PWM
DATE	05/27/94
CHECK	PWM
REVIEW	BGP

GOLDER ASSOCIATES INC.

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE:	JJ & G/LAB TESTING/GA		BOARD #:	13	COMMENTS:
PROJECT NO.:	933-3580-002		CELL #:	13	
SAMPLE ID:	B-7	18 - 19.5'	Flow Pump Speed	8	
SAMPLE TYPE:	Undisturbed		Technician:	PWM	

Sample Data, Initial

Height, inches	3.158	B-Value,f	1.00
Diameter, inches	2.813	Cell Pres	105.00
Area, cm^2	40.10	Bot. Pres.	98.00
Volume, cm^3	321.62	Top Pres.	98.00
Mass, g	675.96	Tot. B.P.	98.00
Moisture Content, %	17.20	Head, max.	234.94
Dry Density, pcf	111.90	Head, min.	225.79
Spec. Gravity	2.621	Max. Grad.	29.19
Volume Solids, cm^3	220.06	Min. Grad.	28.05
Volume Voids, cm^3	101.56		
Void Ratio	0.46		
Saturation, %	97.7%		

Sample Data, Final

Height, inches	3.169
Diameter, inches	2.837
Area, cm^2	40.78
Volume, cm^3	328.27
Mass, g	672.26
Moisture Content	20.84
Dry Density, pcf	105.75
Volume Solids, cm^3	212.26
Volume Voids, cm^3	116.01
Void Ratio	0.55
Saturation, %	99.9%

WATER CONTENTS		Trimmings Initial	Sample Final
Tare No.		114	QQQ
Wt soil&tare, i	g	207.65	459.51
Wt soil&tare, f	g	184.26	393.17
Wt Tare	g	51.77	86.43
Wt Moisture Lost	g	22.79	64.34
Wt Dry Soil	g	132.49	308.74
Water Content	%	17.2%	20.8%

DESCRIPTION:
Reddish White, MEDIUM TO FINE SAND, some silty clay, trace fine gravel.

Flow Pump Rate: 1.40E-04 cm 3/sec. USCS: SC

TIME FUNCTION,SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (Degrees C)	dt (min)	dt, acc (min)	dt (sec)	dt, acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/04/94	34489	13	50	23.0	0	0	0	0	3.21	225.79	28.05	1.1E-07
06/04/94	34489	14	0	23.0	10	10	600	600	3.24	227.90	28.31	1.1E-07
06/04/94	34489	14	10	23.0	10	20	600	1200	3.27	230.01	28.58	1.1E-07
06/04/94	34489	14	20	23.0	10	30	600	1800	3.30	232.12	28.84	1.1E-07 *
06/04/94	34489	14	30	23.0	10	40	600	2400	3.32	233.53	29.01	1.1E-07 *
06/04/94	34489	14	40	23.0	10	50	600	3000	3.33	234.23	29.10	1.1E-07 *
06/04/94	34489	14	50	23.0	10	60	600	3600	3.34	234.94	29.19	1.1E-07 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 1.1E-07 cm/sec **

DATE 06/04/94
CHECK
REVIEW

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-7
PROJECT NO.	943-3580-002	SAMPLE TYPE	U/D
TESTED FOR	PERM	SAMPLE DEPTH	18' - 19.5'

HYGROSCOPIC MOISTURE OF MATERIAL PASSING THE #10 SIEVE

Tare Number		31
Weight Soil and Tare, Inital (gm)	(W1)	46.47
Weight Soil and Tare, Final (gm)	(W2)	46.38
Weight Of Tare (gm)	(W3)	3.17
Weight Of Moisture (gm)	(W4=W1-W2)	0.09
Weight Of Dry Soil (gm)	(W5=W2-W3)	43.21
Hygroscopic Moisture In (%)	(EM=(W4/W5)*100)	0.2%

AIR REMOVAL METHOD: VACUUM

TRIAL		1	2	3
Pycnometer Number		9		
Weight Pycnometer Empty (gm)	(Mf)	196.19		
Weight of Soil & Pycnometer (gm)		253.83		
Weight of Soil, Water & Pycnometer (gm)	(Mb)	706.22		
Observed Temperature (Tb), for (Mb) In Degrees C		22.5		
Observed Temperature (Ta), for (Ma) In Degrees C		23.00		
Weight of Pycnometer & Water (gm)	(Ma @ Ta)	670.98		
Relative Density of Water @ (Ta)		0.99757		
Relative Density of Water @ (Tx)		0.99768		
Correction Factor due to Temperature @Tx	(K)	0.9995		
Weight of Soil (gm)		57.64		
Weight of Dry Soil (gm)	(Md)	57.52		
Weight of Pycnometer & Water (gm)	(Ma)	670.63		
Weight of Soil,Water & Pycnometer (gm)	(Mb)	706.22		
SPECIFIC GRAVITY				
G @ 20 degrees C = [Md/(Md+((Ma - Mb)))]*(K)		2.621		

Gs Average: 2.62

Correction Values Due To Temperature

Temp. (C)	Rel.Density	Corr. (K)	Temp. (C)	Rel. Density	Corr. (K)
16.00	0.99897	1.0007	23.50	0.99745	0.9992
16.50	0.99889	1.0007	24.00	0.99732	0.9991
17.00	0.99880	1.0006	24.50	0.99720	0.9990
17.50	0.99871	1.0005	25.00	0.99707	0.9988
18.00	0.99862	1.0004	25.50	0.99694	0.9987
18.50	0.99853	1.0003	26.00	0.99681	0.9986
19.00	0.99843	1.0002	26.50	0.99668	0.9984
19.50	0.99833	1.0001	27.00	0.99654	0.9983
20.00	0.99823	1.0000	27.50	0.99640	0.9982
20.50	0.99812	0.9999	28.00	0.99626	0.9980
21.00	0.99802	0.9998	28.50	0.99612	0.9979
21.50	0.99791	0.9997	29.00	0.99597	0.9977
22.00	0.99780	0.9996	29.50	0.99582	0.9976
22.50	0.99768	0.9995	30.00	0.99567	0.9974
23.00	0.99757	0.9993			

TECH	PWM
DATE	06/07/94
CHECK	PWM
REVIEW	BJP

GOLDER ASSOCIATES INC.

FN: 3580-26

UNIT WEIGHT DETERMINATION

FOR UNDISTURBED SAMPLE

SAMPLE DESCRIPTION _____

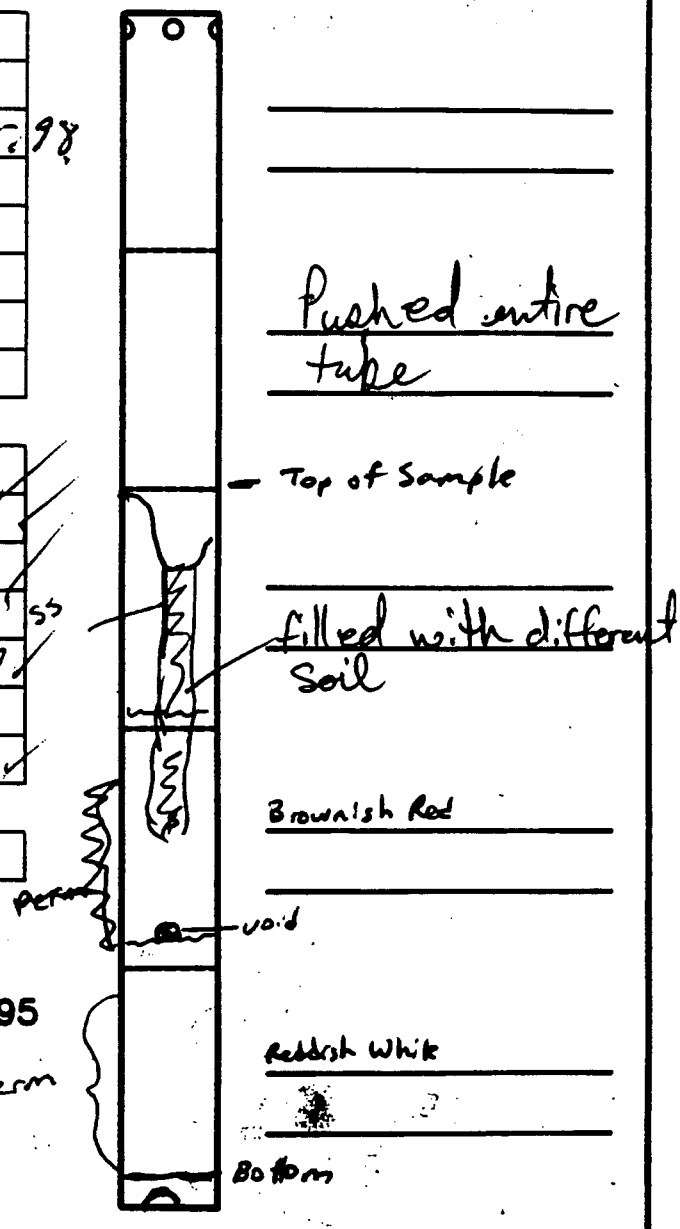
H	D
~~3.037~~	~~2.865~~
~~3.052~~	~~2.895~~
~~3.041~~	~~2.881~~
3.051	2.867

WT. TUBE, SOIL & CAP, gm	
WT. TUBE & CAP, gm	
WEIGHT OF SAMPLE, gm	[redacted] 675.98
LENGTH OF SAMPLE, in.	
DIAMETER OF SAMPLE, in.	
AREA OF SAMPLE, in.^{2}	
VOLUME OF SAMPLE. in.^{3}	
WET UNIT WEIGHT, p.c.f.	

TARE NUMBER	114
WT. WET SOIL & TARE	207.05
WT. DRY SOIL & TARE	184.26
WT. OF WATER	
WT. OF TARE	~~51.77~~
WT. OF DRY SOIL	
WATER CONTENT, %	17.2

DRY UNIT WEIGHT, p.c.f.	

TUBE PROFILE



$$\text{WET UNIT WT.} = \frac{\text{WT. OF SOIL (gm)}}{\text{VOL. OF SAMPLE (in.}^3\text{)}} \times 3.8095$$

$$\text{DRY UNIT WT.} = \frac{\text{WET UNIT WEIGHT, p.c.f.}}{\left(\frac{\text{WATER CONTENT, \%}}{100}\right) + 1}$$

DATE OF TESTING: 6/1/94 SAMPLE DEPTH : 18-19.5

PROJECT NO : 933-3580-002 TESTED BY : TT

BORING NO : B-7 CALCULATED BY : PWM

SAMPLE NO : UD CHECKED BY : BGP

Golder Associates
Atlanta, Georgia

FLEXIBLE WALL TRIAXIAL PERMEABILITY
ASTM D 5084
METHOD D, CONSTANT RATE OF FLOW

PROJECT TITLE:	JJ & G/LAB TESTING/GA		BOARD #:	13	COMMENTS:
PROJECT NO.:	933-3580-002		CELL #:	13	
SAMPLE ID:	B-14	13 - 14'	Flow Pump Speed	2	
SAMPLE TYPE:	Undisturbed		Technician:	PWM	

Sample Data, Initial				Sample Data, Final	
Height, inches	2.953	B-Value,f	1.00	Height, inches	2.945
Diameter, inches	2.887	Cell Pres	100.00	Diameter, inches	2.840
Area, cm^2	42.23	Bot. Pres.	98.00	Area, cm^2	40.87
Volume, cm^3	316.77	Top Pres.	98.00	Volume, cm^3	385.71
Mass, g	638.42	Tot. B.P.	98.00	Mass, g	646.41
Moisture Content, %	15.52	Head, max.	42.20	Moisture Content	18.25
Dry Density, pcf	108.86	Head, min.	42.20	Dry Density, pcf	111.57
Spec. Gravity	2.655	Max. Grad.	5.64	Volume Solids, cm^3	285.89
Volume Solids, cm^3	208.15	Min. Grad.	5.64	Volume Voids, cm^3	99.82
Volume Voids, cm^3	108.62			Void Ratio	0.48
Void Ratio	0.52			Saturation, %	100.0%
Saturation, %	79.8%				

WATER CONTENTS		Trimmings Initial	Sample Final
Tare No.		69	UUU
Wt soil&tare, i	g	198.17	426.38
Wt soil&tare, f	g	178.19	373.71
Wt Tare	g	41.45	85.16
Wt Moisture Lost	g	19.98	52.67
Wt Dry Soil	g	128.74	288.55
Water Content	%	15.5%	18.3%

DESCRIPTION:
Brownish Red, MEDIUM TO FINE SAND, and silty clay, trace fine gravel. (poss. cuttings)

Flow Pump Rate: 1.10E-02 cm 3/sec. USCS: SC

TIME FUNCTION,SECONDS								dP				
DATE	DAY	HOUR	MIN	TEMP (Degrees C)	dt (min)	dt, acc (min)	dt (sec)	dt, acc (sec)	Reading (psi)	Head (cm)	Gradient	Permeability (cm/sec)
06/04/94	34489	15	15	23.0	0	0	0	0	0.60	42.20	5.64	4.4E-05
06/04/94	34489	15	16	23.0	1	1	60	60	0.60	42.20	5.64	4.4E-05
06/04/94	34489	15	17	23.0	1	2	60	120	0.60	42.20	5.64	4.4E-05
06/04/94	34489	15	18	23.0	1	3	60	180	0.60	42.20	5.64	4.4E-05 *
06/04/94	34489	15	19	23.0	1	4	60	240	0.60	42.20	5.64	4.4E-05 *
06/04/94	34489	15	20	23.0	1	5	60	300	0.60	42.20	5.64	4.4E-05 *
06/04/94	34489	15	21	23.0	1	6	60	360	0.60	42.20	5.64	4.4E-05 *

*TRANSCRIBED FROM ORIGINAL DATA SHEETS

PERMEABILITY REPORTED AS ** 4.4E-05 cm/sec **

DATE 06/04/94
CHECK
REVIEW

GOLDER ASSOCIATES INC
FN: 3580-36

UNIT WEIGHT DETERMINATION

FOR UNDISTURBED SAMPLE

SAMPLE DESCRIPTION _____

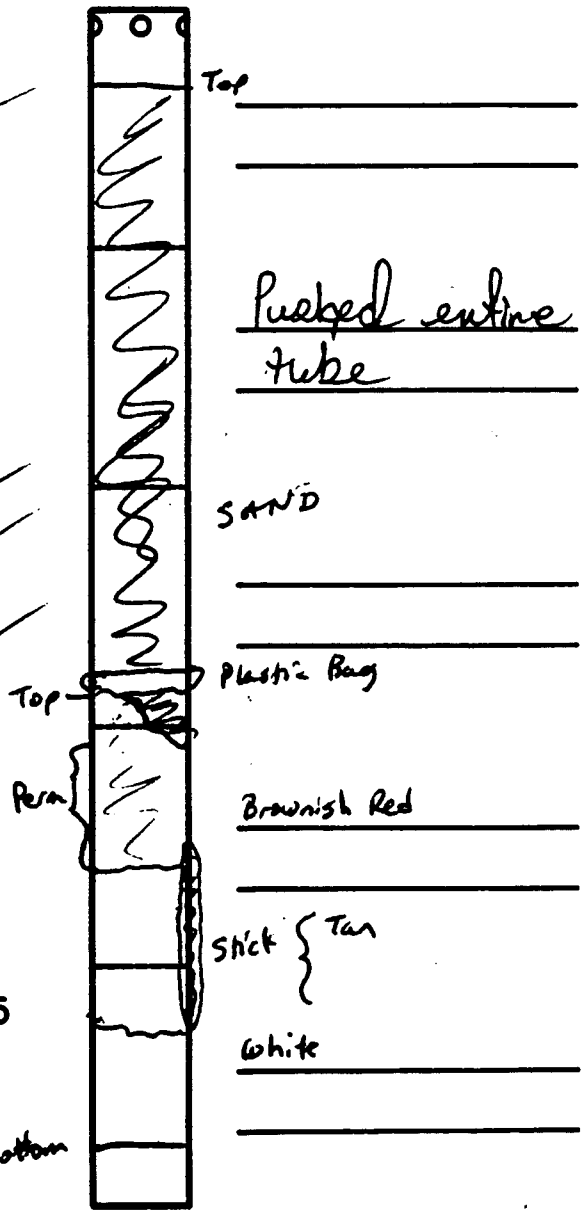
D	H
2.913	2.967
2.991	2.958
2.812	2.933
2.881	2.955

WT. TUBE, SOIL & CAP, gm	
WT. TUBE & CAP, gm	
WEIGHT OF SAMPLE, gm	638.42
LENGTH OF SAMPLE, in.	
DIAMETER OF SAMPLE, in.	
AREA OF SAMPLE, in.^{2}	
VOLUME OF SAMPLE. in.^{3}	
WET UNIT WEIGHT, p.c.f.	

TARE NUMBER	69
WT. WET SOIL & TARE	190.17
WT. DRY SOIL & TARE	170.19
WT. OF WATER	
WT. OF TARE	41.45
WT. OF DRY SOIL	
WATER CONTENT, %	

DRY UNIT WEIGHT, p.c.f.	

TUBE PROFILE



$$\text{WET UNIT WT.} = \frac{\text{WT. OF SOIL (gm)}}{\text{VOL. OF SAMPLE (in.}^3\text{)}} \times 3.8095$$

$$\text{DRY UNIT WT.} = \frac{\text{WET UNIT WEIGHT, p.c.f.}}{\left(\frac{\text{WATER CONTENT, \%}}{100}\right) + 1}$$

DATE OF TESTING: 6/1/94 SAMPLE DEPTH : 13'-14'

PROJECT NO : 933-3580.002 TESTED BY : TT

BORING NO : B-14 CALCULATED BY : pwm

SAMPLE NO : UD CHECKED BY : BJP

Golder Associates
Atlanta, Georgia

SPECIFIC GRAVITY OF SOILS
ASTM D-854
PYCNOMETER METHOD

PROJECT TITLE	JJ & G/LAB TESTING/GA	SAMPLE ID	B-14
PROJECT NO.	943-3580-002	SAMPLE TYPE	U/D
TESTED FOR	PERM	SAMPLE DEPTH	13' - 14'

HYGROSCOPIC MOISTURE OF MATERIAL PASSING THE #10 SIEVE

Tare Number		19
Weight Soil and Tare, Inital (gm)	(W1)	24.35
Weight Soil and Tare, Final (gm)	(W2)	23.78
Weight Of Tare (gm)	(W3)	3.19
Weight Of Moisture (gm)	(W4=W1-W2)	0.57
Weight Of Dry Soil (gm)	(W5=W2-W3)	20.59
Hygroscopic Moisture In (%)	(HM=(W4/W5)*100)	2.8%

AIR REMOVAL METHOD: VACUUM

TRIAL		1	2	3
Pycnometer Number		12		
Weight Pycnometer Empty (gm)	(Mf)	193.93		
Weight of Soil & Pycnometer (gm)		244.86		
Weight of Soil, Water & Pycnometer (gm)	(Mb)	699.43		
Observed Temperature (Tb), for (Mb) In Degrees C		22.5		
Observed Temperature (Ta), for (Ma) In Degrees C		25.00		
Weight of Pycnometer & Water (gm)	(Ma @ Ta)	668.24		
Relative Density of Water @ (Ta)		0.99707		
Relative Density of Water @ (Tx)		0.99768		
Correction Factor due to Temperature @Tx	(K)	0.9995		
Weight of Soil (gm)		50.93		
Weight of Dry Soil (gm)	(Ms)	49.56		
Weight of Pycnometer & Water (gm)	(Ma)	668.53		
Weight of Soil,Water & Pycnometer (gm)	(Mb)	699.43		

SPECIFIC GRAVITY

G @ 20 degrees C = [Ms/(Ms+((Ma - Mb)))]*(K)

2.655		

Gs Average: 2.66

Correction Values Due To Temperature

Temp. (C)	Rel.Density	Corr. (K)	Temp. (C)	Rel. Density	Corr. (K)
16.00	0.99897	1.0007	23.50	0.99745	0.9992
16.50	0.99889	1.0007	24.00	0.99732	0.9991
17.00	0.99880	1.0006	24.50	0.99720	0.9990
17.50	0.99871	1.0005	25.00	0.99707	0.9988
18.00	0.99862	1.0004	25.50	0.99694	0.9987
18.50	0.99853	1.0003	26.00	0.99681	0.9986
19.00	0.99843	1.0002	26.50	0.99668	0.9984
19.50	0.99833	1.0001	27.00	0.99654	0.9983
20.00	0.99823	1.0000	27.50	0.99640	0.9982
20.50	0.99812	0.9999	28.00	0.99626	0.9980
21.00	0.99802	0.9998	28.50	0.99612	0.9979
21.50	0.99791	0.9997	29.00	0.99597	0.9977
22.00	0.99780	0.9996	29.50	0.99582	0.9976
22.50	0.99768	0.9995	30.00	0.99567	0.9974
23.00	0.99757	0.9993			

TECH	PWM
DATE	06/06/94
CHECK	
REVIEW	

GOLDER ASSOCIATES INC.

FN: 3580-25