ADDENDUM #02

Monterey Regional Waste Management District
MONTERY PENINSULA LANDFILL
MONTEREY COUNTY, CA

FEBRUARY 7, 2023

Bid Documents

Specification and Plan Holders, and bidders, are to note changes and also acknowledge addenda in Part 3 of Document 00300 Bid Form.

DOCUMENT 00405 Schedule of Unit Price Work

Specification and Plan Holders, and bidders, are to note changes to the quantities and utilize the updated Schedule of Unit Price Work.

Response to Bidder Questions

Specification and Plan Holders, and bidders, are to note the responses to bidder questions included in the attached Memorandum from WSP dated February 6, 2023 from Michael Gonzales and use this information when preparing their bids. Information included in these responses supersede information in the original bid documents.

END OF ADDENDUM #02

Document 00405

SCHEDULE OF UNIT PRICE WORK

Name of Bidder: _____

Date: _____

This Document 00405 constitutes an attachment to Document 00300 - Bid Form for Module 7 Phase 3 Excavation and Liner, Monterey Regional Waste Management District (OWNER). When a Contract is awarded, this Document becomes an attachment to Document 00500 - Agreement Between Monterey Regional Waste Management District (OWNER) and Contractor (CONTRACTOR). Refer to Section 01025 for detail on bid items.

		EAD-A Bid Table				***EAD-B Bid Table***			
Bid Item	**Description**	**Unit**	**Quantity**	***Unit Price***	***Extension***	**Unit**	**Quantity**	***Unit Price***	***Extension***
1	Mobilization/Demobilization	LS	1			LS	1		
2	Layout of Work and Surveys	LS	1			LS	1		
3	Clearing, Grubbing, and Stripping	LS	1			LS	1		
4	Excavation and Stockpiling	CY	133,900			CY	133,900		
5	Remove and Stockpile Ballast Rock	LS	1			LS	1		
6	Groundwater Underdrain	LF	2,580			LF	2,580		
7	Geocomposite for Sideslope Groundwater Collection	SF	306,000			SF	306,000		
8	Engineered Fill	CY	39,400			CY	39,400		
9	Anchor Trench Backfill	LF	3,320			LF	3,320		
10	Compacted Clay Liner Test Pad (Optional Bid Item)	LS	1			LS	0		
11	Clay Berm Plug	CY	6,040			CY	6,040		
12A	Compacted Clay Liner (Optional Bid Item)	CY	28,900			CY	0		
12B	Compacted Soil	CY	0			CY	28,900		

13	LCRS & Underdrain Drainage Gravel	CY	1,100			CY	1,100		
14	LCRS Drainage Layer	CY	19,150			CY	19,150		
15	Operations Layer	CY	21,800			CY	21,800		
16	Single-Sided Textured HDPE 60-mill Geomembrane	SF	266,000			SF	266,000		
17	Double-Sided Textured HDPE 60-mill Geomembrane	SF	546,000			SF	1,084,000		
18	Double-Sided Textured HDPE 40-mil Geomembrane	SF	802,000			SF	802,000		
19	Geosynthetic Clay Liner	SF	802,000			SF	802,000		
20	Geotextile	SF	102,000			SF	102,000		
21	Sacrificial Geomembrane	SF	216,000			SF	216,000		
22	12" Lysimeter Riser Pipes	LF	200			LF	200		
23	LCRS 6-inch Dia. HDPE Pipe	LF	3,060			LF	3,060		
24	LCRS 18-inch Dia. HDPE Riser Pipe	LF	440			LF	440		
25	6" Solid HDPE Pipe	LF	80			LF	80		
26	Groundwater Underdrain 12-inch Dia HDPE Riser Pipe	LF	200			LF	200		
27	Subdrain Discharge Pipe	LF	3,660			LF	3,660		
28	Alternate Subdrain Discharge Pipe	LF	3,440			LF	3,440		
29	LCRS Tie in to Module 6	LS	1			LS	1		
30	Liner Tie-in	LF	1,960			LF	1,960		
31	Rain Gutter	LS	1			LS	1		
32	Temporary Sand Bag Lines	LS	1			LS	1		
33	Erosion Control Blanket and Straw Wattles	SF	403,060			SF	403,060		
34	Hydroseeding	SF	126,840			SF	126,840		
35	Culverts and Miscellaneous Drainage Related Work	LS	1			LS	1		
36	Bonds - Payment and Performance Bonds	LS	1			LS	1		

37	Basin Dewatering	LS	1			LS	1		
38	Wet Well Extension	LS	1			LS	1		
TOTAL BID									

END OF DOCUMENT

MEMORANDUM

DATE February 6, 2023 **Project No.** GL18114936

TO David Ramirez
ReGen Monterey

CC Guy Petraborg, Jeffrey Dobrowolski

FROM Michael Gonzalez **EMAIL Michael.A.Gonzalez@wsp.com**

RE: MODULE 7 PHASE 3 – EXCAVATION AND LINER – RESPONSE TO BIDDER QUESTIONS AND INQUERIES

1. What is the plan detail for the Lysimeter & LCRS sump riser termination anchors?

   The lysimeter and LCRS sump risers are to be extended a nominal 2-ft height above finished surface grade as measured to the bottom of the riser pipe. Riser termination anchors are not necessary.

2. For the tie-in to Module 6, how much trash is expected to be encountered? Where will this item be paid?

   Trash is not expected to be encountered during the tie-in to Module 6. Bid Item No. 30, *Liner Tie-in*, is the appropriate bid item for the liner system tie-in to Module 6.

3. Where on the plans should encountered trash be transported to?

   Should trash be encountered, the contractor should haul it to an area designated by the Owner located on the upper deck area of Module 6.

4. At the LCRS Module 6 tie-in, will the Christy box need to be removed along with the clay plug termination?

   The clay plug will have to be removed in order to tie into the existing 6" LCRS collection pipe of Module 6. Please see Detail 2 on Sheet 9 for a cross section of the Module 6 leachate termination detail. The temporary geomembrane, temporary soil fill, and utility box and plywood get removed. The underlying HDPE geomembrane shall be protected-in-place.

   No leachate shall be allowed to flow into Module 7 until the liner has been accepted by the Central Coast Regional Water Quality Control Board. This will not occur until after CQA documents have been prepared and submitted near the end of construction.

5. Can more clarification be added to Detail 2, Sheet 9 showing the LCRS Drainage Layer & Operations Layer tie-in to Module 6? A cross section along the sloped section would be helpful as well.

   Assume the 12" LCRS drainage layer, geotextile and operations layer will be installed after the tie-in to the Module 6 LCRS collector pipe. Please see Details 3 and 5 on Sheet 7 for liner additional tie-in details to Module 6.

6. Is any power available onsite for the contractor's field office?

   Power is available on site. It is the responsibility of the contractor to establish/extend power to the contractor' field office following Owner's acceptance of contactor's proposed field office location.

7. How much ground water is expected to be encountered and in what locations? This will determine the necessary effort required for dewatering.

   Groundwater is expected to be encountered along the southern and western sides of Module 7. For bidding purposes, assume a baseline rate of 190 gpm to be dewatered.

8. Where is encountered groundwater to be pumped or transported to?

   For bidding purposes, encountered groundwater should be pumped to the existing stormwater pond located on the eastern side of the sand stockpile area (See Sheet 2).

9. Will a cross section be provided for the clay fill Detail 7 on Sheet 13?

   Assume a 2H:1V slope along the nominal southern embankment of the clay plug.

10. Will the Stormwater Basin need to be completely dewatered for installation of the clay fill?

    Dewatering is necessary to the extent needed for construction of the clay plug.

11. What is the anticipated water level within the Stormwater Basin? How many gallons is the capacity?

    The estimated elevation of the water based on the July 7, 2022 topography is 17.6 ft, Relative to a perpetuated local datum. The bottom elevation of the basin at 6 ft, and top of the channel/basin is at 18 ft. The channel discharges into the basin at an elevation of approximately 10 ft. An approximate stage storage table is below for the basin and channel.

STAGE STORAGE TABLE

Contour Elevation (ft)	Contour Area (sq. ft)	Cumulative Volume Conic (cu. ft)	Cumulative Volume Conic (gal)
6	36,632.40	0	0
8	41,726.50	78,304	585,714
10	47,006.70	166,984	1,249,040
12	53,824.50	267,739	2,002,688
14	67,811.20	389,105	2,910,505
16	91,439.90	547,769	4,097,312
18	114,591.00	753,365	5,635,170

12. What is the anticipated start date for the project?

    The anticipated start may be as early as March 2023.

13. Does the engineer anticipate a cofferdam to be required for the clay fill installation at the Stormwater Basin?

    No. Assume a 2H:1V slope along the nominal southern embankment of the clay plug.

14. Where groundwater is encountered or over-saturated areas, will over-excavation be required before fill is placed? What item will this work be paid under?

    Over-excavation is not anticipated. In the event that over-excavation is required due to over-saturation or inadequate dewatering, it shall be included in the unit price for Bid Item No. 4, *Excavation and Stockpiling*, as specified in Section 02200-3.01.B of the Technical Specifications.

15. Due to recent storm activities, it is anticipated that stormwater storage levels have increased dramatically. Is the plan to wait for these levels to decrease and dry out? What is the plan for the excess water that must be removed in the Stormwater Basin area of the fill?

    Basin dewatering is included in Bid Item No. 37. Construction will begin following Owner's Notice to Proceed and will not be deferred for stormwater storage levels. The Owner is presently transferring stormwater offsite and plans to continue those activities until the contactor becomes responsible for implementing the scope of work of the project's contract.

16. Is select backfill from the clay required for the anchor trench backfill?

    Technical Specification Section 02200-2.02, *Anchor Trench Backfill,* requires that material to meet the requirements for compacted clay liner, with the exception of the permeability requirement.

17. What storm water drainage (storm drain & culverts) currently drains to the Stormwater Basin that the Contractor must divert or control during construction activities?

    Stormwater from the existing channel on the west and southern sides of Module 6 is conveyed to the existing stormwater basin.

18. Is there an approximate quantity of ballast rock to be removed and stockpiled? Quantities are not provided and there is not enough information in the plans to develop an accurate quantity. Where is the ballast rock to be stockpiled?

    For bidding purposes, assume 1,710 tons of ballast rock will need to be removed and stockpiled at an onsite location near the "Clay Stockpile" area as specified by the owner.

19. I am unable to find the location or specific details for the Wet Well Extension. Perhaps it may be referred to as something else in the Contract Documents. Can you provide this information and / or provide clarification on the Wet Well Extension?

    The existing wet well is a Jensen precast manhole with a 48-inch ID, approximately 11 feet high, with a (concrete) sidewall thickness of approximately 5 inches. This manhole will remain in place but be tapped with a 12-inch diameter HDPE subdrain riser pipe aligned as presented on Sheet 3.

20. Do you have a specific model name & number for the HDPE rain gutter shown on Plan Sheet 13?

    Rain gutters are often fabricated by the liner installer in close coordination with the liner manufacturer.

21. A revised gradation table for the drainage gravel, presented in Section 02223-2.01, *Drainage Gravel*, is provided below:

US Sieve Size	Percent Passing
1/2"	100
3/8"	85-100
No. 4	0-35
No. 200	0-2

22. Is there a soils report for this bid?

    Boring logs and laboratory test results are attached for bidder information.

23. Is the sacrificial liner only on the slope? Per detail 1 on sheet 6 and detail 6 on sheet 6 they show the sacrificial liner being overlapped into Module 6 but they do not specify how far into module 6 we place the cover in.

    Sacrificial liner is expected to be placed at the Module 6 and Module 7 tie-in as shown in detail 1 sheet 6, at minimum 5 ft overlap similar to detail 6 sheet 6. The sacrificial liner shall also be placed along the slopes from the anchor trench to the top of operations layers.

24. There appears to be two layers of 60 mil double sided texture on the floor area per detail 1 on sheet 8. One layer is placed followed by a foot of soil. Then the second layer is placed over that. According to the bid schedule only 538,000 sf of 60 mil DST is required. However if there are two layers on the floor area that would require double that quantity.

    For EAD-A and EAD-B the 60-mil SST quantity should be 266,000 sf to include sideslopes only. The 60-mil DST quantities for EAD-A and EAD-B should be 546,000 sf and 1,084,000 sf, respectively.

25. Per the bid schedule they are showing 802,000 sf of 60 mil SST which would cover the floor and slope area. The specifications state that Single sided texture shall only be placed on the slope. Can you confirm quantities of the 60 mil Single sided texture.

    For EAD-A and EAD-B the 60-mil SST quantity should be 266,000 sf to include sideslopes only. The 60-mil DST quantities for EAD-A and EAD-B should be 546,000 sf and 1,084,000 sf, respectively.

26. Can you confirm quantities of 40 mil DST and 60 mil DST.

    For EAD-A and EAD-B the 40-mil DST quantity is 802,000 sf. For EAD-A and EAD-B the 60-mil SST quantity should be 266,000 sf to include sideslopes only. The 60-mil DST quantities for EAD-A and EAD-B should be 546,000 sf and 1,084,000 sf, respectively. Sacrificial liner quantity is 216,000 sf

    An updated/revised Bid Schedule is attached (also part of the Addendum issued by the Owner).

27. Is the “Module 7 Liner Grades” line shown in the cross sections of Plan Sheet 5 the subgrade of the basin at the **bottom** of the Compacted Clay Liner, or the finished grade of the basin at the **top** of the Operations Layer? This question is being asked because if it is the bottom of the Compacted Clay Liner, our excavation quantity is close to the Engineer’s Estimate. If it is the top of the Operations Layer, our excavation quantity is significantly more.

    The elevations shown are the bottom of the compacted clay liner, i.e., top of subgrade.

28. For bidder information, CQA plan has been included as an attachment.

    See attachments for project CQA plan.

29. On the bid schedule Item 6 is Groundwater Underdrain paid by the lineal foot and Item 13 is LCRS & Underdrain Drainage Gravel paid by the cubic yard, but in the measure & payment section Item 6 states that this includes pipe & rock and Item 13 only refers to LCRS rock. Under which item should underdrain gravel be included?

    Item 6 should include the effort for the construction of the Groundwater underdrain (e.g., all components), except that item 13 should be for the procurement and placement of the LCRS and underdrain gravel.

30. What are the dimensions for the underdrain trench shown in detail 4 on sheets 7 & 8 ?

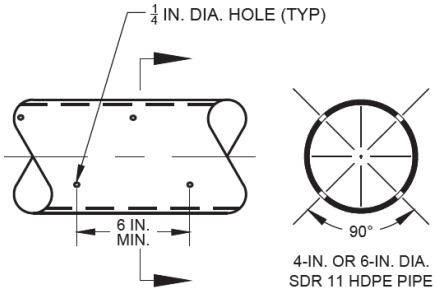
    Approximate dimensions are 2 ft deep trench with 2H:1V sideslopes.

31. Is the geotextile on top of the underdrain rock to be included in item 6 or measured under item 20?

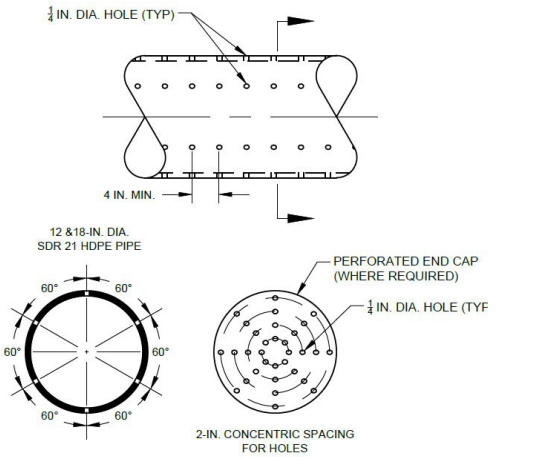
    Quantity is measured under item 20.

32. What is the perf pattern for the perforated HDPE pipe?

    See image below for perforation pattern.



6-INCH PIPE PERFORATIONS



12 & 18-INCH PIPE PERFORATIONS

33. Please provide location & details for Bid Item 38 – Wet Well Extension.

    See response for item 19.

34. Item #20 Geotextile 625,000SF. This quantity of geotextile is not depicted in the plans. Please clarify.

    This quantity has been revised, see attached update Bid Schedule.

35. Is the primary liner Single Sided Textured on slope and floor?

    Primary Geomembrane is single sided on the slopes and double sided on the floor. See updated bid schedule for quantity estimate.

36. AutoCAD format of drawings are included at the link

    below: https://tinyurl.com/yv45a9dw

37. It appears that Item 11 Clay Berm Plug is existing, please confirm if this bid item should be deleted?

    The clay berm plug for Bid Item 11 is required to be constructed. The clay berm plug is located at the eastern end of Module 7, as shown on Sheets 3 and 13.

38. There are no specific erosion control plans, can you clarify areas to receive specific treatments. This affects the amount of fiber rolls to be installed with E/C Blanket based upon the amount of slope and size.

    See attached figures.

39. Is the area to receive blanket and straw wattles also to be hydroseeded. The hydroseed item 34 is much smaller than item 33. If so, is the hydroseed under the blanket to be included in that item?

    See Attached Figures for delineated areas for erosion control blanket, straw wattles and hydroseed. The outlined unlined slope and stockpile slopes shall receive blanket and straw wattles, which is accounted for in item 33 quantity. The area to be receive hydroseed are the new stockpile slopes as shown on drawing 4, which is item 34

40. If the stockpile is to receive straw wattles only we will need and item broken out for those in LF.

    See previous answer. Stockpile receives erosion control blanket, straw wattles and hydroseed as stated on drawing 4.

ATTACHMENTS

ATTACHMENT 1

CQA PLAN

REPORT

CONSTRUCTION QUALITY ASSURANCE PLAN

Module 7 Base Liner System, Monterey Peninsula Landfill, Monterey County, California

Submitted to:

ReGen Monterey

Monterey Regional Waste Management District
14201 Del Monte Boulevard
Monterey County, California 93933-1670
(831) 384-5313

Submitted by:

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GL18114936

January 2023

Table of Contents

List of Tables

1.0 INTRODUCTION

This plan addresses the Construction Quality Assurance (CQA) procedures required during the construction of the Module 7 base liner at the Monterey Peninsula Landfill, in Monterey County, California. This CQA Plan establishes procedures to verify that construction is in accordance with the Construction Drawings and Construction Specifications, meets the appropriate regulatory requirements, and develops the necessary documentation for submittal to the regulatory agency.

The objective of this plan is to establish:

- Duties of parties responsible for the CQA program
- Qualification requirements of the CQA Engineer(s)
- Inspection activities
- Sampling procedures
- Document control measures
- Procedures for approving the materials used for construction
- Methods for assuring compliance to design standards and Construction Specifications during construction
- Procedures for resolving issues that may occur concerning the design and construction
- Documentation of construction and testing for submittal to the regulatory agency for their review

The intent of the CQA Plan is to provide independent third-party verification and testing, to demonstrate that the Contractors and Installers have met their obligations in the supply and installation of components and materials according to the Construction Drawings, Construction Specifications, and regulatory requirements. Quality control is provided by the Manufacturers, Installers, and Contractors and refers only to their actions taken to ensure that materials and workmanship meet the requirements of the Construction Drawings and Construction Specifications.

2.0 PARTIES INVOLVED WITH CONSTRUCTION QUALITY ASSURANCE

The following section provides descriptions of the parties referred to in this CQA Plan including their responsibilities and qualifications. Specific qualified personnel will be chosen once the work has been approved and the scheduled is confirmed for the selected CQA project members.

2.1 Owner/Operator

ReGen Monterey (Monterey Regional Waste Management District) is the Owner and Operator. For the purpose of this CQA Plan and the Construction Specifications, all references to the “OWNER” shall mean Monterey Regional Waste Management District.

2.2 Project Manager

The Project Manager is the official representative of the OWNER and is responsible for construction activities at the facility, including oversight and construction management. The Project Manager is responsible for coordinating construction and quality assurance activities for the project. The Project Manager shall be responsible for the resolution of all quality assurance issues that arise during the liner system construction and must be involved in any decisions that may affect future operations of the impoundment.

2.3 Design Engineer

The Design Engineer, also referred to as the “Designer” or “Engineer,” is the individual or firm responsible for the design and preparation of the Construction Drawings and Construction Specifications. The Designer is responsible for approving all design and Construction Specification changes, modifications, or clarifications encountered during construction. The Design Engineer for the Module 7 base liner system is Golder Associates Inc., located in Roseville, California.

2.4 CQA Engineer and CQA Monitor(s)

The CQA Engineer and CQA Monitor(s) will be responsible for understanding this CQA Plan and shall conduct CQA testing, monitoring, documentation, and reporting as required by this CQA Plan. The CQA Engineer will be the Engineer-of-Record and will stamp the final construction report. The implementation and reporting of this CQA Plan shall be conducted under the direct supervision of a State of California registered civil engineer or certified engineering geologist.

2.5 Geosynthetics Manufacturer

The geosynthetics manufacturer(s), also referred to as the "Manufacturer," is responsible for

production of the geosynthetic components outlined in this plan. The Manufacturer may be affiliated with the Geosynthetics Installer. Each Manufacturer must pre-qualify that they are able to produce material that meets the requirements of the Construction Specifications.

2.6 Geosynthetic Installer

The Geosynthetics Installer (Installer), also referred to as the "Geosynthetics Installation Contractor" or the "Installer," is responsible for proper installation of the geosynthetic components in accordance with the Construction Drawings and Construction Specifications. The Installer may be affiliated with the Manufacturer.

The Installer must pre-qualify by meeting the requirements outlined in the Construction Specifications. The Installer shall provide a qualified Superintendent who will provide full-time technical guidance to the field crew. The Superintendent will represent the Installer at all site meetings and will act as the spokesman for the Installer on the project.

Welding technicians will be evaluated based on performance. The CQA Engineer, through the Project Manager, reserves the right to reject any welding technician whose performance is unsatisfactory.

2.7 Earthworks Contractor

The Earthworks Contractor, also referred to as the "CONTRACTOR," is responsible for completion of the site work as defined by contract with the OWNER and in accordance with the Construction Drawings and Construction Specifications except for materials provided by the OWNER or Geosynthetics Manufacturer and work performed by the Geosynthetics Installer.

The Earthworks Contractor will be responsible for retaining a surveyor to set lines and grades required for excavation, construction, and preparation of as-built drawings. Surveying shall be performed under the direction of a California State Licensed Surveyor.

2.8 Independent CQA Laboratory

The Independent CQA Laboratory (CQA Lab) is the third party laboratory responsible for performing the quality assurance soils and/or geosynthetics laboratory testing tasks listed in this plan. The CQA Lab is directed by the CQA Engineer and may be part of the CQA Consultant firm or company. The geosynthetics testing laboratory shall be accredited by the Geosynthetics Research Institute Laboratory Accreditation Program (GRI-LAP). The CQA Lab shall not be affiliated with the Earthworks Contractor or Geosynthetics Installer.

3.0 MEETINGS

Meetings shall be held during the construction of the project to enhance coordination among the various parties involved. Meetings will include a pre-construction meeting, progress meetings, and resolution meetings if necessary.

3.1 Pre-Construction Meeting

A pre-construction meeting will be held at the site prior to the start of construction. The Design Engineer, Project Manager, CQA Monitor, CQA Engineer, Installer, CONTRACTOR, and others designated by the OWNER shall attend this meeting. The purpose of this meeting will at a minimum:

- Define lines of communication, responsibility, and authority
- Conduct a site inspection to discuss work areas, work plans, stockpiling, lay-down areas, access roads, haul roads, and related items
- Review the project schedule
- Review the Construction Drawings, CQA Plan, and Construction Specifications
- Review work area security and safety protocol

This meeting will be documented by the CQA Engineer, and copies of the meeting minutes will be distributed to all parties.

3.2 Progress Meetings

Weekly progress meetings will be held. At a minimum, these meetings will be attended by the CQA Monitor, the CQA Engineer or their designee, the Project Manager, the Installer, and the CONTRACTOR. The CQA Monitor is responsible for organizing and conducting the progress meetings. The purpose of this meeting will be to:

- Review the previous weeks accomplishments and activities
- Review upcoming scheduled work and project milestones
- Discuss any problems or potential construction problems
- Review the results and status of CQA field and laboratory testing

This meeting will be documented by the CQA Monitor and the minutes transmitted to all in attendance.

3.3 Resolution Meetings

Special meetings will be held, as needed, to discuss and resolve potential problems or deficiencies. At a minimum, these meetings will be attended by the Project Manager, CQA Engineer, CQA Monitor,

and the Installer and/or CONTRACTOR. If the problem relates to a design issue, the Design Engineer shall also be present. The meeting will be documented by the CQA Engineer.

When deficiencies (items that do not the project requirements stated in the Construction Specifications) are discovered, the CQA Monitor or CQA Engineer shall immediately determine the nature and extent of the problem and notify the CONTRACTOR. If unsatisfactory test results identify a deficiency, additional tests will be performed to define the extent of the deficient material or work area.

The Installer or CONTRACTOR shall correct the deficiency to the satisfaction of the CQA Engineer. If unable to correct the problem, the CQA Engineer will notify the CQA Monitor who will assist during problem resolution. If the solution involves a design revision, the Project Manager and Design Engineer shall also be contacted. Design revisions can only be made by the Design Engineer.

The corrected deficiency shall be re-tested and/or approved before any additional related work is performed by the Installer or CONTRACTOR. Retest results shall be recorded by the CQA Monitor and included in the final report documentation.

4.0 EARTHWORK CONSTRUCTION QUALITY ASSURANCE

Construction of the Module 7 base liner or specified earthwork must be in accordance with the approved Construction Drawings and Construction Specifications. This CQA Plan establishes the CQA monitoring and testing program designed to ensure compliance with the Construction Drawings and Construction Specifications. The earthwork quality assurance testing program consists of testing of soil and rock materials used during the excavation and the construction of the Module 7 base liner. Quality assurance testing and observation is required during excavation of subgrade, placement of the engineered fill, and construction of the liner system components for Module 7 base liner.

4.1 Construction Monitoring and Testing

All components of the construction shall be observed and tested as required by the CQA Monitor to verify that the construction is in accordance with the Construction Specifications. The CQA Engineer shall review the work performed by the CQA Monitor and identify inadequate construction methodologies or materials which may adversely impact the performance of the Module 7 base liner. Visual observations and verification of the independent survey required for specific layers throughout the construction process shall be made to evaluate whether the materials are placed to the lines and grades as shown on the Construction Drawings.

The CQA Monitor or CQA Engineer will give the Project Manager sufficient notice of anticipated completion of the construction components so that related CQA documentation may be reviewed and accepted without delay to the CONTRACTOR. Specific CQA observation and/or testing are required for the following:

- Engineered Fill
- Subgrade Preparation
- Engineered Fill
- Anchor trench backfill
- Drainage Gravel and LCRS Drainage Layer
- Operations soil layer

In addition to the above components, the CQA Monitor or CQA Engineer will observe the construction of the aggregate base surfacing and HDPE pipes for compliance with the Construction Drawings and Construction Specifications.

4.1.1 Engineered Fill And Anchor Trench Backfill

The CQA Monitor shall observe and document the subgrade preparation prior to placement of engineered fill and shall include:

- Monitoring the stripping of vegetated soil, and growth media to be stockpiled, if directed, in the area designated by the OWNER.
- Monitoring that appropriate dust control measures are implemented
- Visually inspecting the excavation for moisture seeps, soft or excessively wet areas, and unstable slopes
- Monitoring subgrade preparation and confirming that the surface of the subgrade is free of soft, organic, and otherwise deleterious materials, and that the surface is firm and unyielding
- Verify that the subgrade is suitable for supporting any overlying geosynthetic layers as required by the Construction Specifications

Borrow materials for engineered fill and anchor trench backfill will be obtained from the excavation area within Module 7 or the clay stockpile. CQA observation and/or testing is required during construction to verify that the materials and construction are in accordance with the Construction Specifications. The tests to be performed, including testing frequency, are shown on Table 1. The testing frequencies specified in Table 1 may be increased when construction conditions warrant additional tests. Additional tests may be recommended by the CQA Monitor and approved by the CQA Engineer.

TABLE 1: ENGINEERED FILL AND ANCHOR TRENCH BACKFILL CONSTRUCTION TESTING

Test Designation	ASTM Designation	Frequency
Visual-Method Soil Classification	D2488	Continual during excavation and placement of soils
Moisture-Density	D1557	1 per 5000 CY or each material type
Sieve Analysis	D422	1 per 1,500 CY or each material type
Atterberg Limits	D4318	1 per 1,500 CY or each material type
Nuclear Moisture/Density[1]	D6938	1 Per 500 CY, one per lift, or one per day – whichever results in a higher number of tests
Moisture Content	D2216	1 per 20 nuclear moisture tests
Sand Cone Test, or Drive Cylinder Test	D1556 D2937	1 Per 20 Nuclear Density Tests

Notes to Table 1:

1. Tests shall be performed on an even grid to provide adequate testing coverage. For large fills in small areas, the testing frequency shall be increased as necessary to insure testing for each lift of soil placed.

4.1.2 Compacted Clay Liner

4.1.2.1 Test Pad Construction

4.1.2.1.1 Purpose and Scope

The purpose of the test pad is to establish the placement and compaction procedures to be used to construct the compacted clay liner component of the liner system and to ensure conformance with the Construction Specifications, and state and federal requirements. The test pad program is intended to establish methods, equipment, and procedures for attaining the specified properties, not to pre-qualify materials for the compacted clay liner. Once the methods and procedures have been verified by completing a successful test, the Contractor must use the same method and procedures to construct the compacted clay liner.

4.1.2.1.2 Subgrade Preparation

- The test pad shall be in an area of the project site designated by the Project Manager
- The area within the limits of the test pad shall be cleared and grubbed of all trees, debris, stumps, and any other vegetation. After clearing and grubbing, the area shall be stripped of topsoil and/or organic materials
- The surface of the subgrade shall be proof-rolled with a heavy-wheeled vehicle to detect soft zones, irregularities that may require removal and replacement. The finished subgrade surface shall be sloped at a grade of 1% to 3%
- Construction of the test pad shall not commence until the condition of the subgrade has been examined and documented by the CQA Monitor

4.1.2.1.3 Test Pad Construction

The test pad shall be constructed in a rectangular shape to a minimum plan area of 30 feet by 45 feet. The test pad should consist of a minimum 2-foot thick compacted clay liner placed and compacted in accordance with the requirements of the Construction Specifications.

The compacted clay liner in the test pad shall be constructed in four lifts not exceeding 8 inches loose and 6 inches in compacted thickness The soil material shall be compacted within the specified moisture-density window. If appropriate, the moisture-density window may be modified by the CQA Engineer to improve permeability or constructability based on the results of the test pad, if approved by the Design Engineer. The CQA Engineer shall finalize the moisture-density compaction window in writing prior to full-scale construction of the compacted clay liner.

When the CQA Engineer has determined that each lift meets the target dry density and moisture content requirements, the following lift shall be constructed. The completed compacted clay liner shall

be sealed by rolling with appropriate equipment (e.g., rubber tired or smooth drum roller). Overbuilding the test pad and trimming back may be necessary to obtain a sufficiently smooth top of clay surface and to protect the test pad from desiccation and cracking.

4.1.2.1.4 Monitoring and Testing

The CQA Engineer Monitor shall monitor and document the borrow material and construction of each lift of the test pad and shall ensure that construction is performed in accordance with the appropriate sections of the Construction Specifications. Monitoring and documentation shall include:

- Weather conditions during construction
- Equipment used in construction
- Manner in which equipment was used
- Soil type and USCS classification
- Moisture content and dry density measurements for each lift
- Approximate thickness of each uncompacted and compacted soil lift

Field and laboratory testing shall be performed by the CQA Monitor, as a minimum, during construction of the subgrade and compacted clay liner in the test pad and shall include those tests presented in Table 2.

TABLE 2: TEST PAD CONSTRUCTION TESTING

Test Designation	ASTM Designation	Compacted Clay	Subgrade
Visual-Method Soil Classification	D2488	Continuous	1 per Soil Type
Moisture-Density	D1557	1 Test	1 Test
Sieve Analysis	D422	1 per Lift	NA
Atterberg Limits	D4318	1 per Lift	NA
Nuclear Moisture/Density[1]	D6938	4 Tests Per Lift[1]	3 Tests
Moisture Content	D2216 or D 4643	4 Tests Per Lift[2]	1 Test
Sand Cone Test or Drive Cylinder Test	D1556 D2937	1 Per 20 Nuclear Density Tests	NA
Hydraulic Conductivity	D5084 (5 psi)	2 per Lift[3,4]	NA
Field-Scale Infiltration Test & Permeability Evaluation	D6391	Two-Stage Borehole Permeameter[4]	NA

Notes to Table 2:

1. Nuclear gauge tests for moisture content and dry density shall be performed at evenly spaced locations in a grid pattern within the footprint of the test pad. Acceptance will be based on test results that fall within the compaction window developed by the Design Engineer, or as modified by the CQA Engineer based on pre-construction testing.
2. A correlation shall be developed between the moisture contents as determined by the nuclear gauge and conventional oven and/or microwave oven methods during construction of the test pad in order to facilitate construction testing and placement of compacted clay liner during full- scale operations.
3. Upon completion of the test pad, samples shall be collected using 3-inch outside diameter thin- walled sampling tubes (Shelby tubes) in accordance with ASTM D1587 or by the block sampling technique in accordance with ASTM D4220, at the discretion of the CQA Engineer. Two samples in each lift shall be collected to represent the compacted clay liner. Samples should be collected outside of the future location of the field scale infiltration test.
4. The hydraulic conductivity evaluated in the laboratory (ASTM D5084) for the 3-inch diameter samples shall be correlated to the hydraulic conductivity evaluated in the field scale testing. Effective confining pressures of 5 psi shall be applied during the test. The correlation is to provide a means for establishing criteria for laboratory and field testing of the full-scale (construction) compacted clay liner. In addition, in-situ hydraulic conductivity data is to provide information demonstrating the feasibility of constructing a compacted clay liner meeting the Construction Specifications.

4.1.2.1.5 Test Pad Data Interpretation

The interpretation of the test results shall focus on the feasibility of constructing a full-scale compacted clay liner in conformance with the project and regulatory requirements. A letter report summarizing the test results shall be issued by the CQA Engineer at the completion of the test pad testing program. This letter report shall also be included as a part of the final project CQA documentation.

4.1.2.2 Compacted Clay Liner Construction Monitoring and Testing

CQA observation and/or testing is required during construction to verify that the compacted clay liner construction is in accordance with the Construction Specifications. The tests to be performed, including testing frequency, are presented in Table 3. The testing frequencies specified in Table 3 may be increased when construction conditions warrant additional tests. Additional tests shall be recommended by the CQA Monitor and approved by the CQA Engineer.

TABLE 3: COMPACTED CLAY LINER CONSTRUCTION TESTING

Test Designation	ASTM Designation	Frequency[1]
Visual-Method Soil Classification	D2488	Continual during excavation and placement of soils
Moisture-Density	D1557	1 per 5000 CY or each material type
Sieve Analysis	D422/D1140	1 per 1,500 CY or each material type
Atterberg Limits	D4318	1 per 1,500 CY or each material type
Nuclear Moisture/Density	D6938	1 Per 250 CY
Moisture Content	D2216	1 per 5 nuclear moisture tests
Sand Cone Test, or Drive Cylinder Test	D1556 D2937	1 Per 20 Nuclear Density Tests
Laboratory Hydraulic Conductivity on Field Collected Sample[2,3,4]	D5084	1 per 1,500 CY

Notes to Table 3:

1. Specified frequency or one per material type and source, whichever is greater.
2. Tests shall be performed on an approximately even grid to provide adequate testing coverage.
3. Samples will be collected and transported to the laboratory using the same procedures selected by the CQA Engineer for the test pad (i.e., Shelby tubes or block samples).
4. Laboratory samples will be tested at confining pressures of 15 psi.

Construction observation and monitoring during the compacted clay liner placement includes:

- Verify that the Contractor obtains compacted clay liner material from the approved excavation or borrow location
- Observe construction staking and/or grade control methods to verify that the compacted clay liner is placed to the lines, grades, and elevations shown on the Construction Drawings

- Verify that fill is placed in loose lifts no more than 8-inches thick that result in a nominal compacted thickness of 6-inches or less
- Verify that the Contractor adequately moisture conditions the borrow soils
- Perform field testing in accordance with Table 3 to verify that the fill materials are placed to the moisture and density requirements indicated in the Construction Specifications
- Perform laboratory testing in accordance with Table 3 to verify that the compacted clay liner exhibits the required material properties
- Promptly notify the Contractor of test results that affect the work. Notify the Project Manager of construction progress and of the results of all testing. In the event of failing tests, verify that the Contractor adequately reworks the areas which do not meet the Construction Specifications
- Observe that the Contractor takes adequate protective measures to maintain the surface of the compacted clay liner and prevent desiccation cracking
- Verify that the CQA survey has been completed and that the Record Drawing furnished by the surveyor indicates compliance with the lines, grades, elevations, and tolerances as indicated by the Construction Drawings and Specifications

4.1.3 Drainage Gravel and LCRS Drainage Layer Placement

Drainage gravel is used in the LCRS collection system and groundwater underdrain system. On-site sand is used for the LCRS drainage layer. Both pre-construction and construction testing are required for these materials. Pre-construction testing consists of testing proposed materials from samples obtained at the aggregate or on-site borrow source. Construction testing consists of testing performed from samples obtained during delivery of materials during the module construction. The tests to be performed, including testing frequency, for each material type are presented in Table 4. The testing frequencies specified in Table 4 may be increased when construction conditions warrant additional tests. Additional testing may be performed on suspect materials as recommended by the CQA Engineer.

TABLE 4: DRAINAGE GRAVEL AND LCRS DRAINAGE LAYER CONSTRUCTION TESTING

Test Designation	ASTM Designation	Frequency
Sieve Analysis	D422	1 per 1,500 CY or each material type
Hydraulic Conductivity	D2434	1 per 1,500 CY or each material type
Visual-Method Soil Classification	D2488	Continual during excavation and placement of soils

Construction observation and monitoring required during the drainage gravel and LCRS drainage layer includes:

- Verification that all pre-construction testing has been performed and that laboratory test results indicate compliance with the Construction Specifications. The CQA Monitor shall assure that the Project Engineer and the Contractor receive prompt notification of material conformance
- Verify that the material upon which the gravel will be placed (HDPE geomembrane) has been installed in accordance with the Construction Drawings and Specifications, and that all required testing, and as-built documentation have been completed
- Observe that care is taken when placing the drainage gravel and LCRS drainage layer on the HDPE geomembrane and that the geomembrane is not punctured or damaged during placement operations
- Observe and document that appropriate light ground pressure equipment is used andthat such equipment avoids sharp turns.
- Observation and monitoring of hauling equipment and spreading equipment to verify that) the minimum thickness is maintained for spreading and hauling equipment above the HDPE geomembrane
- Collect and transmit to the laboratory the required number of samples for testing. Communicate with the laboratory to verify that the materials tested comply with the Construction Specifications
- Visually observe the gravel and sand materials to inspect for any variability in the material including variation in gradation, excess fines or any deleterious material present
- Verify that the CQA Survey has been completed and that the Record Drawings furnished by the surveyor indicates compliance with the lines, grades, elevations, and tolerances as indicated by the Construction Drawings and Specifications

If the equipment or gravel placement procedures do not comply with the Construction Specifications, the geomembrane shall be exposed and inspected for potential damage.

4.1.4 Operations Soil Layer Placement

Construction observation and monitoring required during operations layer placement includes:

- Observation and monitoring of hauling and spreading equipment to verify that the minimum thickness is maintained between equipment and the underlying geosynthetic materials
- Verify the integrity of the geotextile layer by final inspection of all seams and geotextile panels
- Verify that the operations layer fill materials meet the Construction Specifications
- Observe that operations layer fill materials are pushed upslope on side slope areas
- Verify that the thickness layer required by Construction Drawings is achieved.

TABLE 5: OPERATIONS SOIL LAYER CONSTRUCTION TESTING

Test Designation	ASTM Designation	Frequency
Visual-Method Soil Classification	D2488	Continual during excavation and placement of soils
Sieve Analysis	D422	1 per 1,500 CY or each material type

4.2 Surveying

Surveying shall be conducted such that all applicable standards are followed. The Surveyor shall furnish "Record Drawings" (also referred to as "as-built" drawings) for review by the CQA Engineer. The CQA Monitor shall also review and approve the drawings prior to placement of a new system component over the work. Required Record Drawings shall be as specified in the Construction Specifications. All surveying shall be performed under the direction of a surveyor licensed to perform such work in the State of California. All Record Drawings shall be signed and sealed by the licensed surveyor who directed the CQA survey work. Record Drawings shall be at a scale not smaller than 1 inch = 50 feet. The accuracy of the surveying shall be sufficient to determine if the measurements are within the tolerances specified in the Construction Specifications.

The required surveying of the liner system elevations shall be carried out on a maximum 50-foot square grid. Additional survey locations shall be recorded to define the following features in the liner system: toe of slope, crest of slope, grade breaks, ridges and valleys, anchor trench, drainage system piping, and perimeter drainage ditch. The thickness of the geosynthetic liner system components on the Construction Drawings shall be interpreted as negligible. Refer to the Construction Specifications for details of the minimum requirements for surveys, Record Drawings, and grades, lines, and levels.

5.0 GEOSYNTHETICS CONSTRUCTION QUALITY ASSURANCE

Construction of the specified geosynthetics must be in accordance with the approved Construction Drawings and Construction Specifications. This Quality Assurance program consists of reviewing Geosynthetics Manufacturer's and Installer's Quality Control submittals, material conformance testing, and construction monitoring and testing.

The types of geosynthetics used in the liner system construction include geomembrane, geosynthetic clay liner, and HDPE pipe and fittings. These geosynthetics are defined in the Construction Specifications. Prior to and during construction, these geosynthetics shall be sampled and tested to determine if they conform to the Construction Specifications. All geosynthetic conformance testing shall be the responsibility of the CQA Engineer.

5.1 Review Quality Control Submittals

Prior to geosynthetic installation, the CQA Engineer shall review the Geosynthetic Installer's Quality Control submittals to confirm that materials meet the Construction Specifications. The CQA Engineer shall review the following submittals for each geosynthetic material specified for the Project:

- Geosynthetic material samples, name of Manufacturer, and minimum material specifications which shall include the Manufacturer's minimum physical properties of the material, test methods (ASTM Standards) used, and factory and site seaming methods
- Manufacturer's Quality Control Manual followed during the manufacturing process
- The origin (supplier's name and production plant), identification (brand name and number) and material properties of the resin used to manufacture the product
- Geosynthetics Installer's Quality Control Manual, for the installation and testing of the geosynthetic
- Resume of the Installer Superintendent, Master Seamer, and Seamers to be assigned to this project (geomembrane only)
- A copy of each of the Quality Control Certificates on each lot of resin issued by the resin Supplier for the specific material for this project. Geomembrane submittals shall include certification of the resin for extrusion welding rod
- The result of quality control testing conducted on the resin used in manufacturing the specific material for this project
- A listing which correlates the resin to the individual geosynthetic rolls and extruded materials
- A copy of the geosynthetic roll Quality Control Certificates which shall be supplied at a minimum frequency of one (1) per every fifty thousand (50,000) square feet of geosynthetic material continuously produced and supplied to the project unless otherwise presented in the Construction Specifications

- A panel layout drawing for geomembrane showing the proposed installation layout identifying field seams as well as any variance or additional details which deviate from the Construction Drawings
- A detailed installation schedule for the project Certification that the extrusion welding rod to be used is comprised of the same resin type as the geomembrane to be used (geomembrane only)

5.2 Conformance Testing

Prior to geosynthetic installation, the CQA Engineer shall obtain samples of the geosynthetics for conformance testing to evaluate or confirm that these materials meet the Construction Specifications. The conformance testing frequency shall be at a rate of 1 per 150,000 square feet, or one sample per lot, whichever results in the greater number of conformance tests. Samples shall be taken across the entire width of the roll and shall not include the first 3 feet. The samples shall be a minimum of3 feet wide by the roll width. The CQA Engineer shall mark the machine direction and roll number on the sample, and date the sample was obtained and forward the sample to the geosynthetic laboratory.

All conformance tests shall be performed in accordance with the Construction Specifications. The CQA Engineer shall review the test results and shall report any nonconformance to the Project Manager and the Installer.

5.3 Geosynthetics Construction Monitoring and Testing

All geosynthetic components of the construction shall be monitored and tested to verify that the construction is in accordance with the Construction Specifications. The CQA Engineer shall identify inadequate construction methodologies or materials which may adversely impact the performance of the facility being constructed and existing structures. Visual observations throughout the construction process shall be made to evaluate whether materials are placed to the lines and grades as shown on the Construction Drawings.

The CQA Monitor shall review the following submittals provided by the Installer during the project:

- Quality control documentation recorded during installation
- Daily reports detailing arrival and departure times, the personnel present on-site, the progress of the work, the arrival of materials, and any problems encountered
- Subgrade surface acceptance certificates for each area to be covered by the liner system, signed by the Geosynthetics Installer's Superintendent

The CQA Monitor shall observe and document the geosynthetic installation including:

- Delivery and unloading of geosynthetic materials to the site to verify that the

materials are not damaged and are properly labeled

- Obtaining geosynthetic packaging identification slips for verification and generation of an on-site materials inventory
- Subgrade conditions prior to liner installation and verify that any deficiencies (e.g. surface irregularities, protrusions, excessively soft areas, stones, desiccation cracks) noted are corrected
- Verification that the CQA Engineer has reviewed completed surveys
- Handling of geosynthetic materials from storage to the work area
- Temporary and permanent anchoring of geosynthetics to verify that Construction Specifications are met
- Verification that required overlap distances are met

5.3.1 Geomembrane

During geomembrane installation, the CQA Monitor(s) shall observe and document deployment, trial seams, field seaming, non-destructive and destructive seam testing, and repairs to determine whether the installation is in accordance with the Construction Specifications.

Storage and Handling - Geomembrane shall be stored in accordance with the Manufacturer's recommendations at a site selected by the Project Manager. Rolls shall be off-loaded using the appropriate equipment and straps. Rolls shall not be placed directly on the ground and shall be stacked no higher than three rolls. Only soft-sole shoes will be allowed on the deployed geomembrane and rub sheets shall be placed under equipment.

Deployment - The CQA Monitor shall verify that only approved materials are used, that each panel is given a unique panel number, that no geomembrane is placed during inclement or unsuitable weather conditions, that the geomembrane is not damaged during installation, that excessive wrinkles are not present, and that anchoring is performed in accordance with the Construction Specifications and Construction Drawings. The CQA Monitor shall record the deployment on a deployment log form.

Trial Seams - The CQA Monitor shall verify that seaming conditions are adequate, tests are performed at required intervals, specified test procedures are followed, and that re-testing is performed in accordance with the Construction Specifications. The Installer shall perform pre-weld testing at the beginning of each crew shift and immediately following any work stoppage (e.g., for lunch, weather, etc.) of 30 minutes or more. Seaming operation shall not commence until the CQA Monitor has determined that the seaming process meets the Construction Specifications. Testing shall include visual observation of a trial seam a minimum of 42

inches long on the geomembrane material. The Installer shall mark the trial seam with date, ambient temperature, welding machine number, welding technician's initials, machine temperature, and speed. For extrusion welding, the Installer shall record the nozzle and extrusion settings and for fusion welding, the wedge temperature and machine speed shall be recorded. A one foot portion of each trial seam sample shall be archived by the CQA Monitor at the site. The CQA Monitor shall record the trial seam test results on a trial seam log form.

Field Seaming - The CQA Monitor shall verify that only approved equipment and personnel perform welding, all welding is performed under suitable conditions as specified in the Construction Specifications, specified overlaps are achieved, seams are oriented in accordance with project requirements, and that grinding techniques and extrudate meet project requirements for extrusion welding. The CQA Monitor shall record all field seaming on the field seaming log forms.

Seaming shall not proceed at an ambient temperature below 32°F or above 104°F unless the Installer demonstrates the capability of achieving acceptable results through the utilization of special seaming techniques. Such cold or hot weather seaming shall be proven by an approved program presented in the Construction Specifications or presented otherwise by the Design Engineer. If seaming operations are conducted at night, lighting equipment shall be sufficient to allow the Installer and CQA Monitor to adequately and safely perform their duties.

Non-Destructive Seam Continuity Testing - The CQA Monitor shall verify that all seams are non- destructively tested in accordance with the Construction Specifications. If the seam cannot be tested, the CQA Monitor shall observe cap strip operations and verify that test equipment and gauges are functioning properly and that test procedures are in accordance with the project requirements. The CQA Monitor shall verify that all failing tests are repaired and re-tested until passing results are achieved. The CQA Monitor shall record all non-destructive test locations on the vacuum test and pressure test log forms.

Destructive Seam Testing - The Installer shall obtain samples, at locations selected and marked by the CQA Monitor, of the field seamed geomembrane. The samples shall be taken centered over the seam and prioritized as follows:

- All areas identified as suspect during non-destructive testing/monitoring

- Seams that appear suspect to the CQA Monitor
- A minimum of one sample per day
- A minimum of one sample for each geomembrane seaming apparatus
- A minimum of one sample for each representative working conditions (e.g. weather condition)
- A minimum of one sample every 500 feet of seaming for each apparatus

Two types of samples shall be obtained at each location. The first sample shall consist of two specimens, each cut approximately 1 inch wide by 8 inches long, taken 48 inches apart. These specimens shall be tested for peel and shear strength in the field by the Installer using a calibrated field tensiometer capable of quantitatively measuring peel and shear strengths. The CQA Monitor shall observe all field tests and record the test results.

If one or both of the specimens fail, the Installer shall take additional test samples 10 feet from the point of the failed test in each direction and repeat the field test procedure. If these additional tests fail, then the procedure shall be repeated until the length of the poor quality seam is established. If the initial field tests pass, the second type of sample shall be taken between the passing

specimens. The second sample type shall be approximately 42 inches along and 12 inches across. The sample shall be divided into three equal sections and distributed and tested as follows:

- One sample - Manufacturer/Installer for their use
- One sample - CQA Monitor for destructive testing
- One sample - CQA Monitor for site archives

Each sample shall be subject to the following destructive tests at a GRI-LAP accredited CQA geosynthetics laboratory or at the CQA Site Office and tested per ASTM D6392 with appropriate calibrated equipment:

- Seam shear strength (five tests)
- Seam peel strength (five tests)

For fusion seams, one peel strength test refers to testing of both sides of the seam. A passing test must have all five passing tests for the shear test and peel test.

Failed destructive tests shall be subject to additional testing until a passing area is found. The Installer shall take another test sample 10 feet from the point of the failed test in each

direction and repeat the field test procedure. If subsequent tests fail, then the procedure is repeated until the length of the poor quality seam is established. Once the field tests have passed, a second sample shall be taken between the passing specimens and tested by the Independent CQA Laboratory. Failed seams shall be tracked according to the welding apparatus and the machine operator. All failed seams shall be bounded by locations from which passing Independent CQA Laboratory tests have been taken.

The Installer shall be responsible for patching all areas cut for test samples in accordance with the Construction Specifications and the Manufacturer's recommended procedures, and for non- destructive testing (e.g. vacuum box, etc.) of the patched seams. The CQA Monitor shall record all test locations, results, actions taken in conjunction with destructive test failures, and repairs.

Repairs - The CQA Monitor shall observe and document that all repair materials, techniques, and procedures used for repairs are approved in advance and meet the requirements of the Construction Specifications. The CQA Monitor shall verify that all repairs are marked, recorded, repaired, tested, and that wrinkles are addressed, prior to being covered by other materials; and that repairs are performed as specified, including specified type of repair according to type of damage and proper patch size or dimension. The CQA Monitor shall record defects and repairs on repair log forms.

Acceptance - The CQA Engineer shall approve areas of the geomembrane prior to coverage of the geomembrane by other materials. Acceptance of areas shall follow these procedures:

- As-built panel layout survey
- Full documentation of all seams
- Full documentation of nondestructive testing on all seams and repairs
- Full documentation of repairs on all defects
- Full documentation of passing destructive tests
- A final “walk-over” of the area to observe any subsequent damages or non- addressed items
- All submittals required by this CQA Plan or the Construction Specifications

5.3.2 GCL

During installation, the CQA Monitor shall observe and document deployment, adequate overlap, seaming, and repairs to evaluate whether the installation is in accordance with the Construction Specifications.

Deployment - The CQA Monitor shall verify that the subgrade is suitable for supporting the geosynthetics, any underlying layers are clean and free of deleterious materials prior to deployment, and that anchoring is achieved as specified.

Seams and Repairs - The CQA Monitor shall verify sufficient overlap and that the specified seam procedures were followed as required in the Construction Specifications. The CQA Monitor shall verify that all repairs are performed in accordance with Construction Specifications.

Protection - The CQA Monitor shall observe and document that all geocomposite materials are covered with the approved material and that traffic or hauling equipment does not damage the material during installation. In the presence of wind, the geosynthetic layers will be securely anchored with sandbags or equivalent.

Submittal - The Installer shall submit an as-built GCL panel layout to the CQA Monitor.

5.3.3 Geotextile

During the geotextile installation, the CQA Monitor(s) shall observe and document deployment and repairs to determine whether the installation is in accordance with the Construction Specifications.

Deployment - The CQA Monitor shall confirm that the subgrade is in conformance with Construction Specifications, any underlying installations are complete, installed as designed, and as-built documentation has been obtained.

Seams and Repairs - The CQA Monitor shall verify sufficient overlap and that the specified patch procedures were followed as required in the Construction Specifications. The CQA Monitor shall verify that all repairs are performed in accordance with Construction Specifications.

Protection - The CQA Monitor shall observe and document that all geosynthetics materials have no damage, no slippage of geosynthetics underlying layers and no excessive tensile stresses in the geosynthetics.

5.3.4 HDPE Pipe and Fittings

During high-density polyethylene (HDPE) pipe installation, the CQA Monitor shall observe and document that the installation is in accordance with the Construction Specifications.

Placement - Observation that the handling procedures used do not damage the pipe, backfill is placed in accordance with the requirements of the Construction Specifications so as not to damage the pipe, any foreign material is removed from the interior of the pipe, and indentations on the pipe are within the allowable limits.

Joints and Connections - Monitoring of the jointing and connection operations to verify that the Installer follows the Construction Specifications and the pipe Manufacturer's recommendations, verification that the pipes are clean when installed, and that perforated sections of pipe are aligned properly prior to connection.

Non-destructive Testing - Observe any required testing of the pipe to verify accordance with the Construction Specifications

6.0 DOCUMENTATION

An effective Quality Assurance program depends on thorough monitoring and documentation of all construction activities during all phases of construction. Documentation shall consist of daily record-keeping, construction problem resolutions, design and specification changes, photographic records, weekly progress reports, chain of custody forms for test sample tracking, and a certification and summary report. During construction, all documentation shall be kept on-site and will be available for review by the Project Manager, CQA Engineer, or CQA Monitor(s).

No section of the liner system may be covered up until the CQA Monitor or CQA Engineer observes and approves the completed section of the liner system and assures that all CQA documentation has been completed.

6.1 Daily Record Keeping

Daily records shall consist of field notes, observation and testing data sheets, summary of the daily meeting with the Installer and CONTRACTOR, and reporting of construction problems and resolutions. This information shall be submitted weekly along with a weekly summary to the CQA Monitor. Copies of all CQA documentation shall be maintained at the site and be made available for review by the Project Manager.

6.2 Soils Observation and Testing Data Sheets

Soils observation and testing data sheets generally include the following information:

- Date, project name, location, and weather data
- A reduced-scale site plan, or full-scale plots, showing work areas and test locations
- Descriptions of ongoing construction
- Summary of test results and samples taken, with locations and elevations
- Off-site materials received including quarry certificates
- Test equipment calibrations, if necessary
- Signature or initials of the CQA Monitor

6.3 Geosynthetic Observation and Testing Forms

Geosynthetic observation and testing forms generally include the following information:

- Date, project name, location, and weather data
- Identification of panel or seam number
- Numbering system identifying test or sample number

- Location and identification of repairs and date of repair
- Length and/or thickness measurements for geomembrane panels or seams
- Welding machine temperatures and settings
- Welding machine and technician identifications
- Location of tests and test results
- Identification of testing technicians and time of tests
- Signature or initials of the CQA Monitor

6.4 Construction Problem and Resolution Documentation

Any construction problem which cannot be resolved between the Installer, CONTRACTOR, and CQA Monitor may require a special meeting in order to resolve the problem. The problem should be discussed with the Project Manager, CQA Engineer, and Design Engineer if a design issue is involved. Specific written documentation of that problem should be prepared, if warranted, and will generally include the following information:

- Detailed description of the problem
- Location and cause of the problem
- How and when the situation or deficiency was identified
- How the problem was resolved
- Any measures taken to prevent similar problems in the future
- Signature of the CQA Engineer and CQA Monitor

Copies of all Construction Problem and Resolution correspondence will be submitted to the Project Manager.

6.5 Photographic Documentation

All phases of construction shall be sufficiently photographed by the CQA Monitor. Photographs shall be identified by separate photographic log by location, time, date, and name of the person taking the photograph. A camera which records the time and date shall be used. Representative photographs will be included in the certification report.

6.6 Design and Specification Changes

If it is necessary to address Construction Drawings and/or Construction Specification changes, modifications, or clarifications during construction, the CQA Monitor or CQA Engineer will inform the Project Manager who will notify the Design Engineer. Construction Drawing and Construction Specification changes shall only be made with written agreement from the Project Manager and Design Engineer, and approval of the RWQCB if required.

6.7 Construction Report

At the completion of construction, a construction report shall be prepared and signed by the CQA Engineer to certify that the work has been performed in compliance with the Construction Drawings and Construction Specifications and will contain the following general information:

- Summary of construction activities
- Observation and test data summary sheets
- Sampling, testing locations, and test results
- A description of significant construction problems and the resolution of these problems
- Changes to the Construction Drawings or Construction Specifications and the justification for these changes
- Record drawings
- A certification statement signed and sealed by a registered civil engineer (PE) or certified engineering geologist (CEG) registered in the State of California, by whom the CQA activities were supervised and work performed in responsible charge

The Record Drawings shall be prepared by the Surveyor and shall accurately locate all construction items including the lines, grades, and thickness of all soil components for the liner system.

ATTACHMENT 2

BORING LOGS

RECORD OF BOREHOLE B19-1

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 10, 2019 16:15
DRILLING END: September 11, 2019 15:40
COORDINATES: 36.7093,-121.76869

SHEET: 1 of 4
GS ELEV.: 110 feet
DATUM:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic)	REC / ATT (in)	PENETRATION RESISTANCE BLOWS / ft; WATER CONTENT (%)	NOTES WATER LEVELS LABORATORY DATA	ADDITIONAL LAB TESTING
0	Mud Rotary	0.0	(SM), silty sand, sand fine grained; light brown; non-cohesive, dry	110.0	SM							
		2.0	(SP) Poorly-graded sand, sand fine to medium grained; yellow-brown; non-cohesive, dry	108.0								
5												
10			Becomes dense, moist.				DO	13-16-17 33	13 18	33		
15												
20					SP							
25												
30							DO	10-14-17 31	10 18	31		
35												

Log continued on next page

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

RECORD OF BOREHOLE B19-1

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 10, 2019 16:15
DRILLING END: September 11, 2019 15:40
COORDINATES: 36.7093,-121.76869

SHEET: 2 of 4
GS ELEV.: 110 feet
DATUM:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	DESCRIPTION	SOIL PROFILE: Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	SAMPLES: BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	SAMPLES: REC / ATT (in)	PENETRATION RESISTANCE BLOWS / ft; WATER CONTENT (%)	NOTES WATER LEVELS LABORATORY DATA	ADDITIONAL LAB TESTING
35	Mud Rotary	35.0	(SP) *(continued)*	75.0	SP							
		38.0	(SM) Silty sand, sand fine to medium grained; light brown; non-cohesive, dense, moist	72.0			DO	15-17-18 35	11/18	35		
40												
45												
50			Becomes yellow brown.				DO	14-18-21 39	12/18	39		
55					SM							
60			Becomes very dense.				DO	26-29-30 59	12/18	59		
65												
70							DO	20-28-28 56	11/18	56		

Log continued on next page

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

RECORD OF BOREHOLE B19-1

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 10, 2019 16:15
DRILLING END: September 11, 2019 15:40
COORDINATES: 36.7093,-121.76869

SHEET: 3 of 4
GS ELEV.: 110 feet
DATUM:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	DESCRIPTION	SOIL PROFILE: Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	SAMPLES: BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	SAMPLES: REC / ATT (in)	PENETRATION RESISTANCE BLOWS / ft; WATER CONTENT (%)	NOTES WATER LEVELS LABORATORY DATA	ADDITIONAL LAB TESTING
70	Mud Rotary	70.0	(SM) *(continued)* Becomes moist to wet.	40.0	SM							
80							DO	24-32-32 64	16/18	64		
90							DO	25-40-46 86	16/18	86		
100			Becomes light brown.				DO	35-43-24 67	17/18	67		
		100.2	(CH), clay, high plasticity, trace sand fine grained; gray; cohesive, very stiff, w < PL	9.8	CH							

Log continued on next page

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

RECORD OF BOREHOLE B19-1

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 10, 2019 16:15
DRILLING END: September 11, 2019 15:40
COORDINATES: 36.7093,-121.76869

SHEET: 4 of 4
GS ELEV.: 110 feet
DATUM:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic)	REC / ATT (in)	PENETRATION RESISTANCE BLOWS / ft; WATER CONTENT (%)	NOTES, WATER LEVELS, LABORATORY DATA	ADDITIONAL LAB TESTING
105	Mud Rotary	105.0	(CH), clay, high plasticity, trace sand fine grained; gray; cohesive, very stiff, w < PL *(continued)*	5.0	CH							
							DS		24/24		108 - 110: Moisture = 32.8%; LL = 55, PL = 29, PI = 26	S
110			Becomes dark gray, stiff to very stiff.				DO	8-13-17 30	18/18	30	110: Pushed Shelby up to 1,100 psi.	
115		115.0		-5.0								
			(CL), clay, low plasticity, trace sand fine grained; dark gray; cohesive, stiff, w < PL		CL							
120							DO	9-11-20 31	18/18	31		
125		126.5		-16.5			DS		15/15		126 - 127.6: Moisture = 18.8% 126.5: Seive contained both clay and sand layers. 127.6: Pushed Shelby up to 1,350 psi.	S
			(SM), silty sand; gray; non-cohesive, dense, dry to moist		SM		DO	20-16-21 37	18/18	37		
130												
135		135.0		-25.0			DO	24-27-27 54	18/18	54		
			Bottom of borehole at 135.0 ft. (Target Depth) Installed vibrating wire piezometer.									
140												

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

RECORD OF BOREHOLE B19-2

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 10, 2019 10:30
DRILLING END: September 10, 2019 14:50
COORDINATES: 36.71063,-121.76714

SHEET: 1 of 2
GS ELEV.: 47 feet
DATUM:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	SAMPLES: BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	SAMPLES: REC / ATT (in)	PENETRATION RESISTANCE BLOWS / ft (20 40 60 80)	WATER CONTENT (%) (W_p W W_l) (20 40 60 80)	NOTES WATER LEVELS LABORATORY DATA	ADDITIONAL LAB TESTING
0	Mud Rotary	0.0	(SP), poorly-graded sand, sand fine to medium grained; yellow-brown; non-cohesive, dense, dry to moist	47.0	SP								
5							DO	6-5-17 22	18 18	22			
10							DO	12-20-29 49	11 18	49			
15			Becomes light brown to brown, moist to wet				DO	21-24-25 49	18 18	49			
20							DO	13-18-21 39	16 18	39			
25			Becomes wet, very dense				DO	28-30-30 60	18 18	60			
30			4-inch clayey sand lens				DO	30-38-35 73	16 18	73			
35		32.0	(CH), clay, high plasticity, trace sand fine grained; gray; cohesive, very stiff, w ~ PL	15.0	CH		DO	9-8-10 18	18 18	18			

Log continued on next page

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

RECORD OF BOREHOLE B19-2

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 10, 2019 10:30
DRILLING END: September 10, 2019 14:50
COORDINATES: 36.71063,-121.76714

SHEET: 2 of 2
GS ELEV.: 47 feet
DATUM:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586, 140 lb hammer, 30 inch drop, Automatic)	REC / ATT (in)	PENETRATION RESISTANCE BLOWS / ft; WATER CONTENT (%)	NOTES WATER LEVELS LABORATORY DATA	ADDITIONAL LAB TESTING
35	Mud Rotary	35.0	(CH), clay, high plasticity, trace sand fine grained; gray; cohesive, very stiff, w ~ PL *(continued)*	12.0	CH							
							DS		28/28		36 - 38.3: Moisture = 36.4%; LL = 96, PL = 39, PI = 57 38.3: Pushed Shelby up to 850 psi.	S
40							DO	8-11-12 23	18/18	23		
45			Becomes stiff to very stiff.				DO	10-14-16 30	18/18	30		
50							DS		28/28		49 - 51.3: Moisture = 41.3%; LL = 114, PL = 45, PI = 69 51.3: Pushed Shelby up to 650 psi.	S
55			Becomes very stiff.				DO	9-10-18 28	18/18	28		
		59.5		-12.5			DO	8-7-12 19	18/18	19		
60			Bottom of borehole at 59.5 ft. (Target Depth) Installed vibrating wire piezometer.									
65												
70												

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

RECORD OF BOREHOLE B19-3

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 9, 2019 09:50
DRILLING END: September 10, 2019 08:40
COORDINATES: 36.70863,-121.76346

SHEET: 1 of 2
GS ELEV.: 35 feet
DATUM:

DEPTH (ft)	BORING METHOD	Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLE TYPE & NUMBER	BLOWS per 6 in ASTM D1586 140 lb hammer 30 inch drop Automatic	REC / ATT (in)	PENETRATION RESISTANCE BLOWS / ft (20 40 60 80)	WATER CONTENT (%) W_p W W_l (20 40 60 80)	NOTES WATER LEVELS LABORATORY DATA	ADDITIONAL LAB TESTING
0	Mud Rotary	0.0	(SP), poorly-graded sand, sand fine to medium grained; yellow-brown; non-cohesive, dry to moist	35.0	SP								
5			Becomes brown, medium dense, moist.				DO	4-5-15 20	12 18	20			
10			Becomes dense, wet.				DO	18-18-20 38	9 18	38			
15			Becomes very dense.				DO	50	4 4	100			
20		17.0	(CH) Clay, high plasticity, trace sand fine grained; gray to dark gray; cohesive, stiff to very stiff, w ~ PL	18.0	CH		DO	5-7-12 19	18 18	19		20.5 - 22.8: Moisture = 35.9%; LL = 104, PL = 41, PI = 63	
							DS		28 28			22.8: Pushed Shelby up to 850 psi.	S
25							DO	15-24-28 52	0 18	52			
30							DO	6-9-13 22	17 18	22			
							DS		28 28			30 - 32.3: Moisture = 30.3%; LL = 70, PL = 33, PI = 37 32.3: Pushed Shelby up to 750 psi.	S
35			Becomes gray, W<PL. Increase in sand content.				DO	8-10-16 26	18 18	26			

Log continued on next page

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

RECORD OF BOREHOLE B19-3

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 9, 2019 09:50
DRILLING END: September 10, 2019 08:40
COORDINATES: 36.70863,-121.76346

SHEET: 2 of 2
GS ELEV.: 35 feet
DATUM:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	DESCRIPTION	SOIL PROFILE: Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	SAMPLES: BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	SAMPLES: REC / ATT (in)	PENETRATION RESISTANCE BLOWS / ft; WATER CONTENT (%)	NOTES WATER LEVELS LABORATORY DATA	ADDITIONAL LAB TESTING
35	Mud Rotary	35.0	(CH) *(continued)*	0.0	CH							
40			Becomes sandy clay, gray to brown.				DO	6-8-19 27	17/18	27		
		42.0		-7.0								
45			(SC), clayey sand, sand fine grained; light gray; non-cohesive, medium dense, wet		SC		DO	10-11-11 22	16/18	22		
		47.0		-12.0								
50			(SP), poorly-graded sand, sand fine to medium grained; red-brown; non-cohesive, medium dense, wet		SP		DO	10-11-14 25	12/18	25		
		52.0		-17.0								
55			(CH), clay, high plasticity, trace sand fine grained; gray; cohesive, stiff, w ~ PL		CH		DO	5-7-12 19	18/18	19		
		55.5		-20.5								
60			Bottom of borehole at 55.5 ft. (Target Depth) Installed vibrating wire piezometer.									
65												
70												

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

RECORD OF BOREHOLE B19-4

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 12, 2019 08:00
DRILLING END: September 12, 2019 11:15
COORDINATES: 36.71073,-121.75671

SHEET: 1 of 3
GS ELEV.: 29 feet
DATUM:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC / ATT (in)	PENETRATION RESISTANCE BLOWS / ft (20 40 60 80) / WATER CONTENT (%) (W_p W W_l)	NOTES WATER LEVELS LABORATORY DATA	ADDITIONAL LAB TESTING
0	Mud Rotary	0.0	(SC), clayey sand with gravel, sand fine to coarse grained, gravel fine grained; brown; non-cohesive, moist	29.0	SC							
		3.0		26.0								
5			(GC), clayey sand with gravel, sand fine to coarse grained, gravel fine to coarse grained; gray; non-cohesive, very dense, dry to moist		GC		DO	5-26-26 52	8 18	52		
		7.0		22.0								
10			(CH), clay, high plasticity, trace sand fine grained; dark gray; cohesive, stiff to very stiff, w < PL		CH		DO	7-9-10 19	12 18	19		
15							DO	9-14-20 34	17 18	34		
		16.0		13.0								
			(SM), silty sand, sand fine to medium grained; gray; non-cohesive, medium dense, dry to moist		SM		DS		28 28		17 - 19.3: Moisture = 14.7% 19.3: Pushed Shelby up to 1400 psi.	S
20							DO	12-13-15 28	16 18	28		
		22.0		7.0								
25			(ML), sandy silt, sand fine grained, non plastic; dark gray; cohesive, very soft, w < PL		ML		DO	2-2-3 5	6 18	5	24 - 25.5: Moisture = 29.3%	
30							DO	2-4-5 9	0 18	9		
		32.0		-3.0								
35			(SM), silty sand, sand fine to medium grained; dark gray; non-cohesive, medium dense, wet		SM		DO	8-9-9 18	18 18	18	34 - 35.5: Moisture = 31.6%	

Log continued on next page

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

RECORD OF BOREHOLE B19-4

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 12, 2019 08:00
DRILLING END: September 12, 2019 11:15
COORDINATES: 36.71073,-121.75671

SHEET: 2 of 3
GS ELEV.: 29 feet
DATUM:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	DESCRIPTION	Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	REC / ATT (in)	PENETRATION RESISTANCE BLOWS / ft; WATER CONTENT (%)	NOTES WATER LEVELS LABORATORY DATA	ADDITIONAL LAB TESTING
35	Mud Rotary	35.0	(SM), silty sand, sand fine to medium grained; dark gray; non-cohesive, medium dense, wet *(continued)*	-6.0	SM							
		37.0	(SP-SM), poorly-graded sand with silt, sand fine to coarse grained; dark gray; non-cohesive, medium dense, wet	-8.0								
40							DO	4-7-7 14	12 18	14	39 - 40.5: Moisture = 25.5%	
45					SP-SM							
50		50.0	(CH) Clay, high plasticity, trace sand fine grained; dark gray; cohesive, medium stiff to stiff, w ~ PL	-21.0			DO	3-4-5 9	18 18	9		
55											57 - 59.3: Moisture = 45.1%; LL = 62, PL = 31, PI = 31	S
							DS		28 28			
60			Becomes W>PL, stiff.		CH		DO	7-8-9 17	18 18	17	59.3: Pushed Shelby up to 550 psi.	
65												
70			Becomes sandy clay, medium stiff to stiff.				DO	7-6-7 13	18 18	13		

Log continued on next page

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

RECORD OF BOREHOLE B19-4

PROJECT: MRWMD Module 7 Design
PROJECT NO.: 18114936
LOCATION: Marina, CA

DRILLING START: September 12, 2019 08:00
DRILLING END: September 12, 2019 11:15
COORDINATES: 36.71073,-121.75671

SHEET: 3 of 3
GS ELEV.: 29 feet
DATUM:

DEPTH (ft)	BORING METHOD	SOIL PROFILE: Depth	DESCRIPTION	SOIL PROFILE: Elev	USCS	GRAPHIC LOG	SAMPLES: SAMPLE TYPE & NUMBER	SAMPLES: BLOWS per 6 in (ASTM D1586 140 lb hammer 30 inch drop Automatic)	SAMPLES: REC ATT (in)	PENETRATION RESISTANCE BLOWS / ft (20 40 60 80) / WATER CONTENT (%) (W_p W W_l) (20 40 60 80)	NOTES WATER LEVELS LABORATORY DATA	ADDITIONAL LAB TESTING
70		70.0		-41.0								
		70.5		-41.5	CH							
			Bottom of borehole at 70.5 ft. (Target Depth) Backfilled with cement grout.									
75												
80												
85												
90												
95												
100												
105												

DRILLING CO.: Cascade Drilling, L.P.
DRILLER: Juan Franco
DRILL RIG: CME 85

LOGGED: J. Consoli
CHECKED: DRAFT
REVIEWED:

GOLDER

ATTACHMENT 3

LAB RESULTS

MOISTURE CONTENT TEST RESULTS

Sample Identification	Depth, ft.	Moisture Content, %
B-19-1	108'-110'	32.8
B-19-1	126'-127.6'	18.8
B-19-2	36'-38.3'	36.4
B-19-2	49'-51.3'	41.3
B-19-3	20.5'-22.8'	35.9
B-19-3	30'-32.3'	30.3
B-19-4	17'-19.3'	14.7
B-19-4	24'-25.5'	29.3
B-19-4	34'-35.5'	31.6
B-19-4	39'-40.5'	25.5
B-19-4	57'-59.3'	45.1

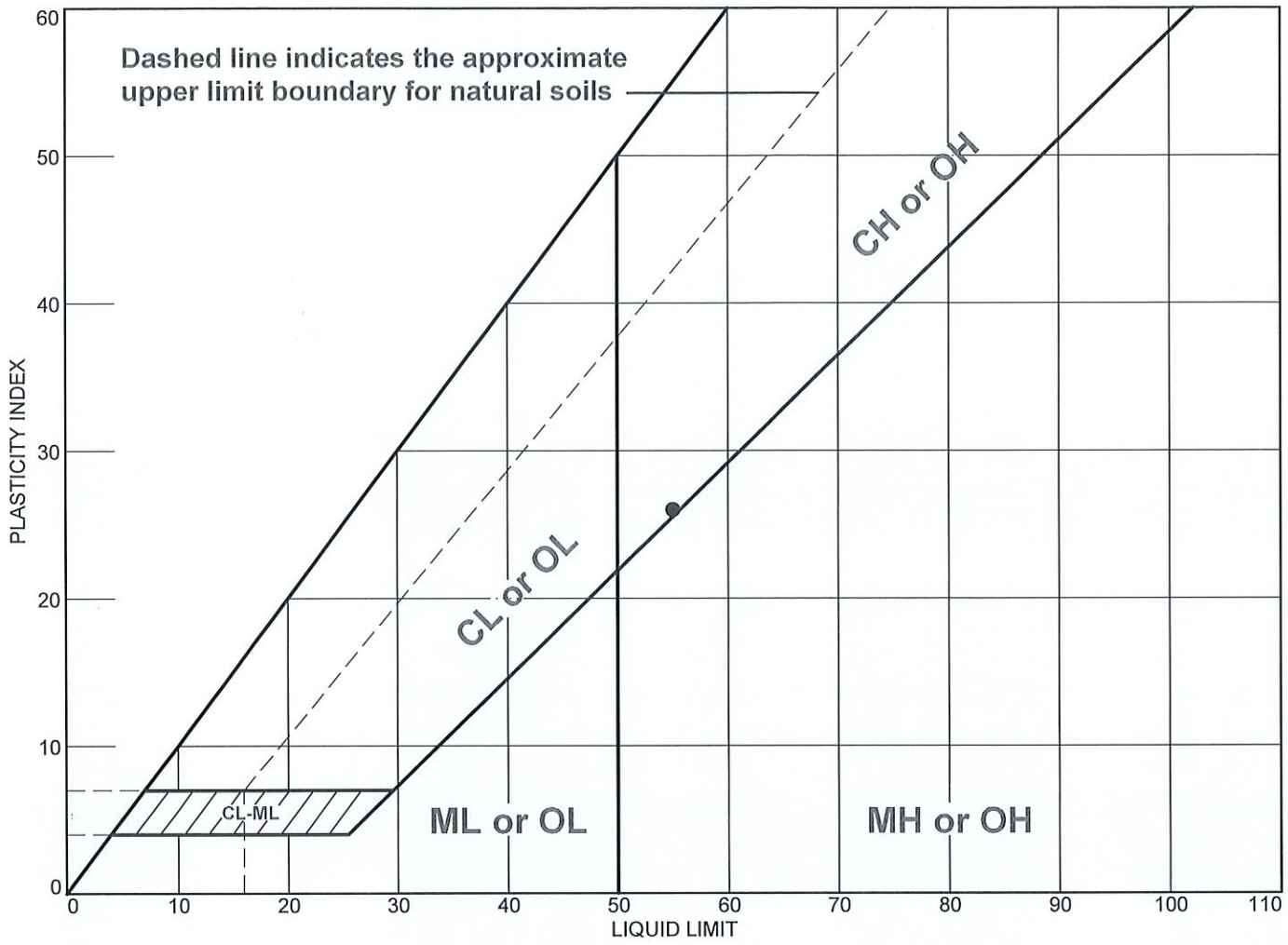
Test Method: ASTM D2216

PROJECT NUMBER:	19-244	October 18, 2019	Monterey Peninsula Landfill Mod 7	

GS GULF SHORE EXPLORATION AND TESTING

3362 Fitzgerald Road
Rancho Cordova, CA 95742
Phone: (916) 939-4117
FAX: (916) 635-4315

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		55	29	26	99.9	99.7	CH

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

● **Location:** B-19-1 **Depth:** 108'-110' **Sample Number:** 46764

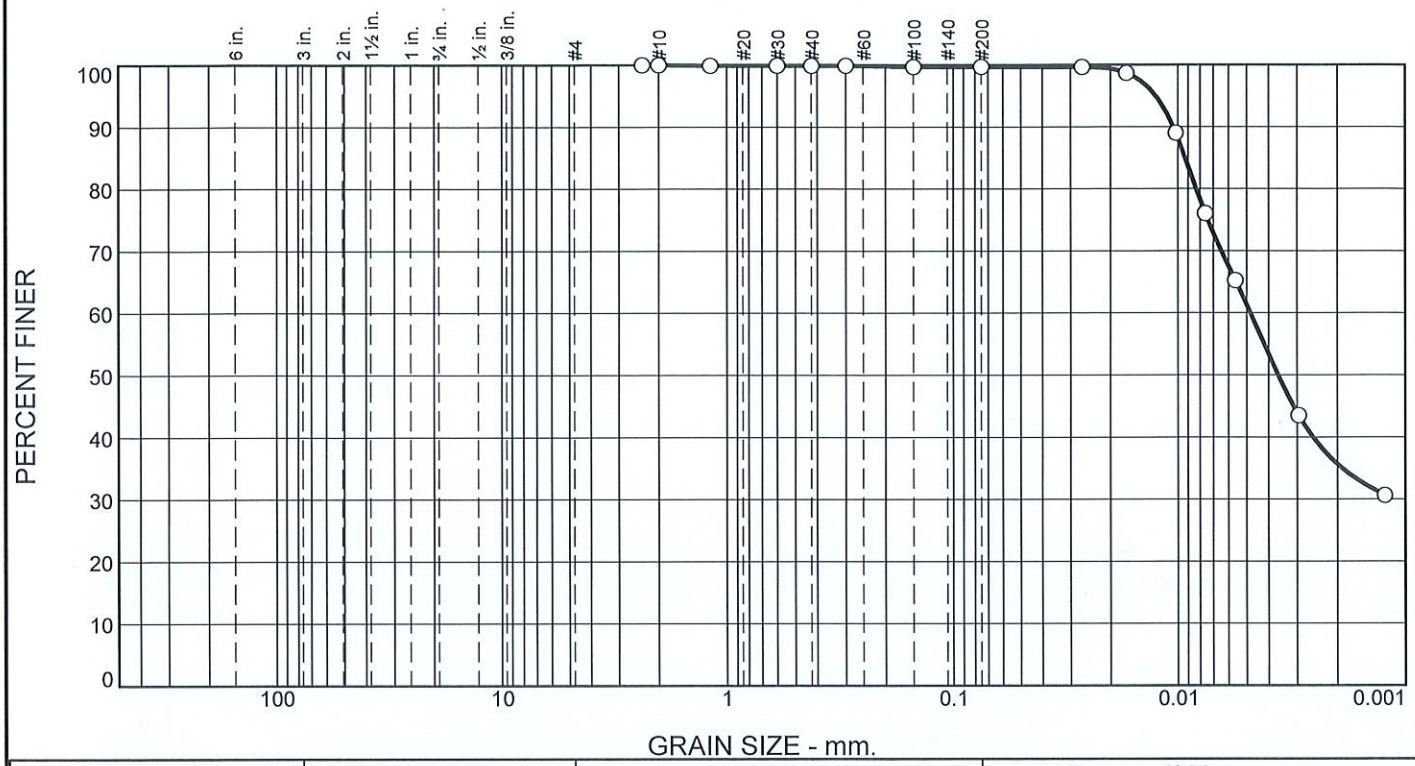
Remarks:

GULF SHORE EXPLORATION AND TESTING

Figure

Tested By: MM **Checked By:** JML

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	0.2	38.4	61.3

Test Results (ASTM D422 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100.0		
#10	100.0		
#16	99.9		
#30	99.9		
#40	99.9		
#50	99.9		
#100	99.7		
#200	99.7		
0.0267 mm.	99.6		
0.0170 mm.	98.7		
0.0102 mm.	89.0		
0.0076 mm.	76.1		
0.0056 mm.	65.3		
0.0030 mm.	43.5		
0.0012 mm.	30.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 29 LL= 55 PI= 26

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-6(31)

Coefficients

D_{90}= 0.0105 D_{85}= 0.0093 D_{60}= 0.0048
D_{50}= 0.0036 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.01

Date Received: 9/20/19 **Date Tested:** 10/23/19

Tested By: JM

Checked By: JML

Title: PM

Location: B-19-1 **Date Sampled:** -

Sample Number: 46764 **Depth:** 108'-110'

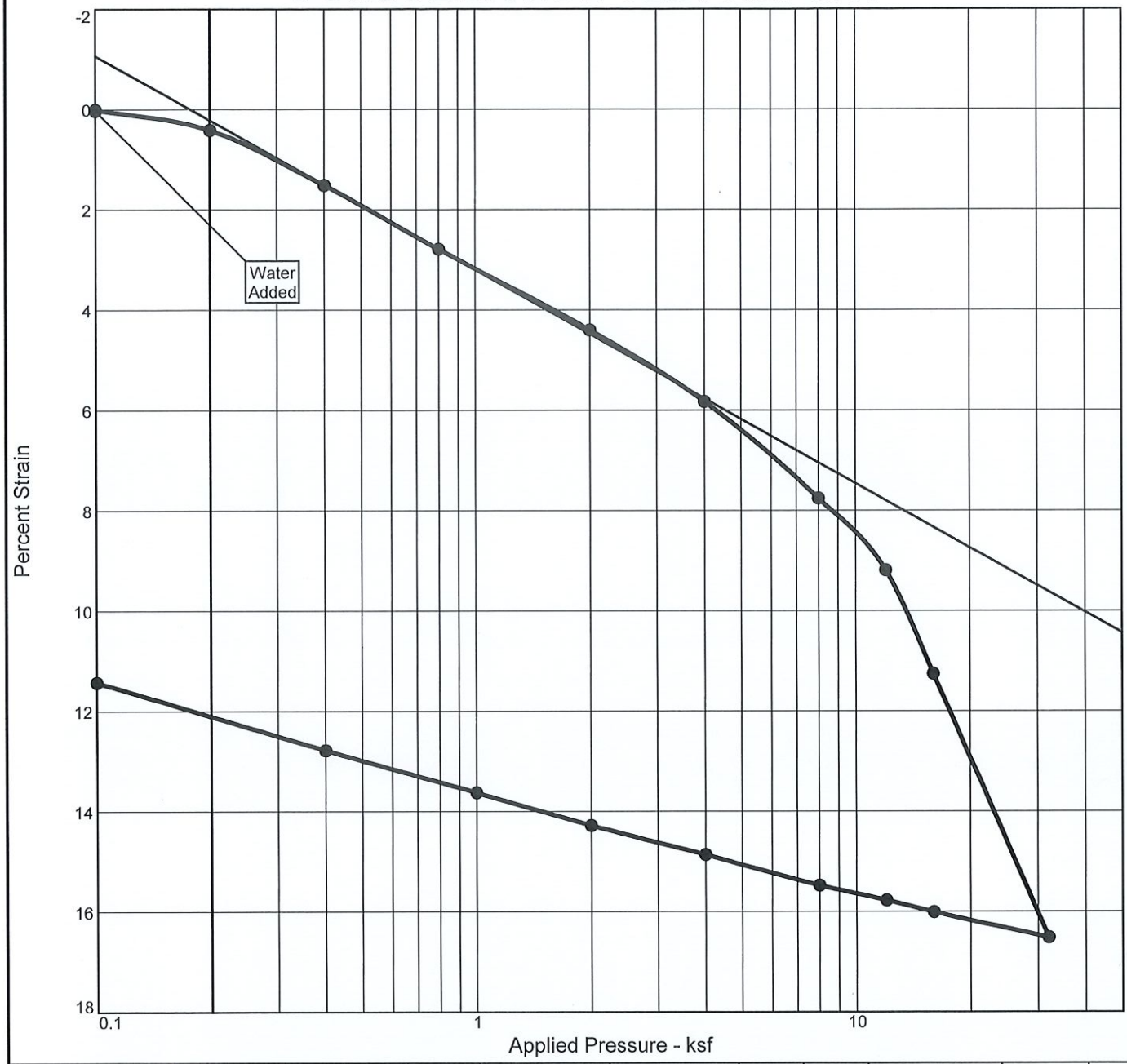
GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Swell %	e_o
94.6 %	36.3 %	82.7	55	26	2.70	0	0.2	0.09	0.04	0.1	0.0	1.038

MATERIAL DESCRIPTION	USCS	AASHTO
	CH	A-7-6(31)

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Location: B-19-1 **Depth:** 108'-110' **Sample Number:** 46764

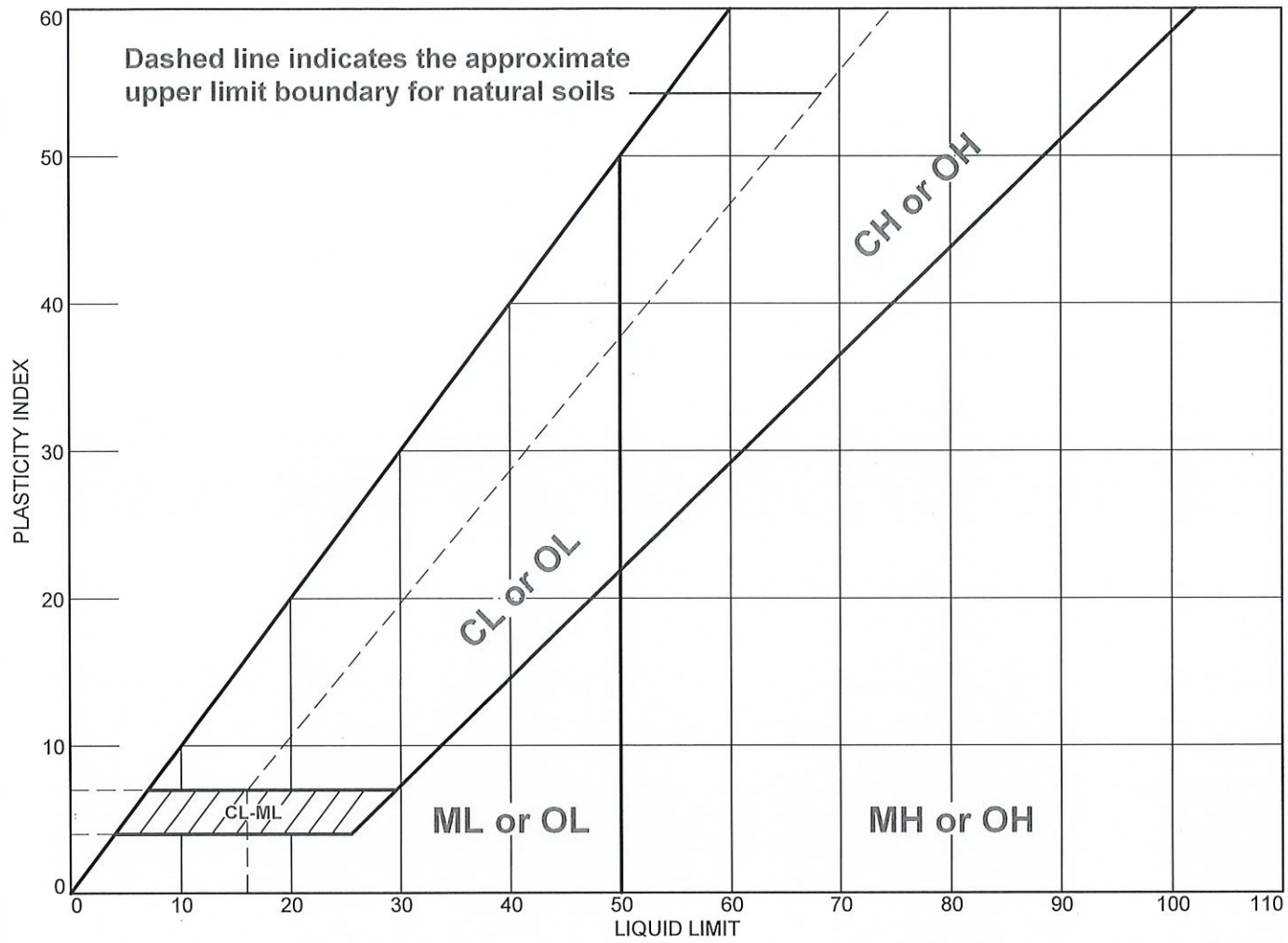
GS GULF SHORE EXPLORATION AND TESTING

Remarks:

Figure

Tested By: MPW **Checked By:** JML

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		NV	NP	NP	99.8	56.5	ML

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

● **Location:** B-19-1 **Depth:** 126'-127.6' **Sample Number:** 46765

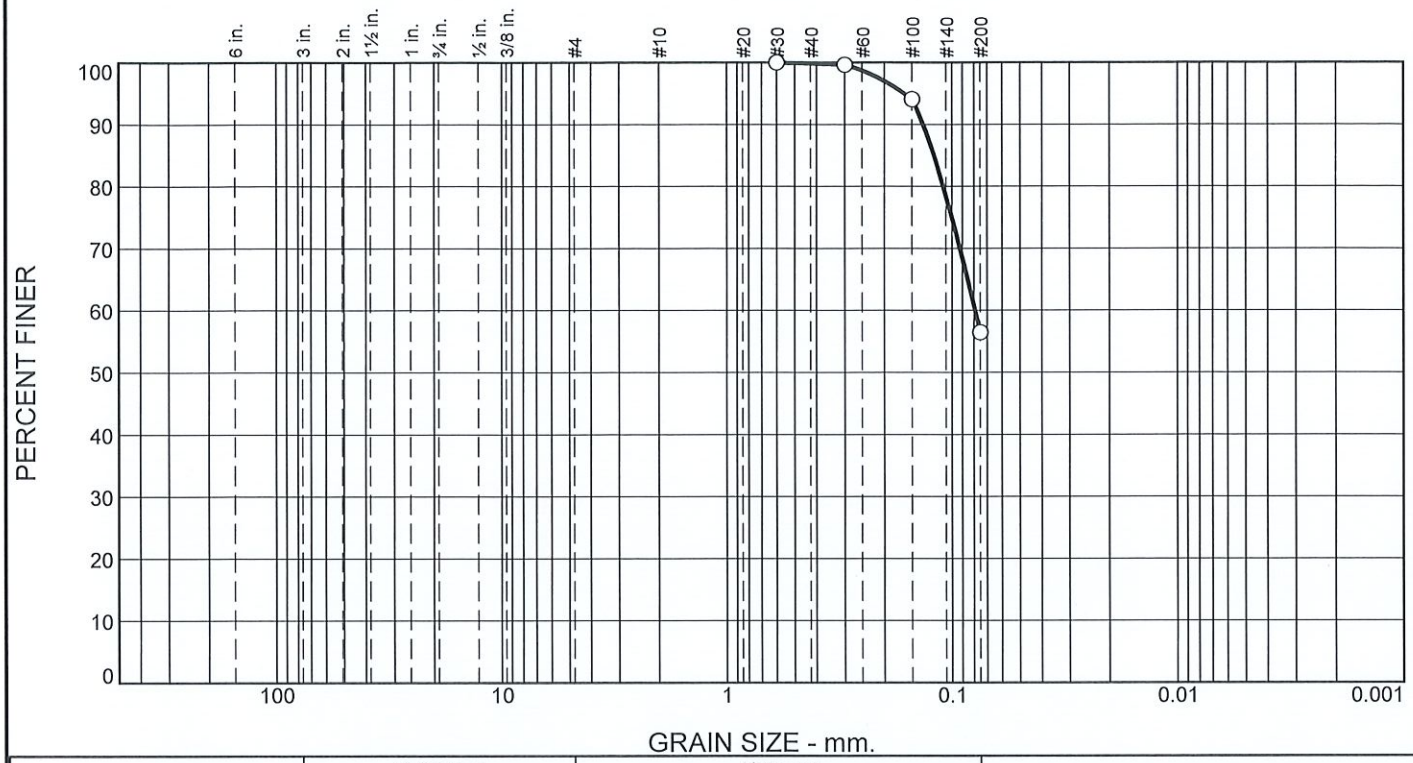
Remarks:

GULF SHORE EXPLORATION AND TESTING

Figure

Tested By: SL **Checked By:** JML

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	0.0	0.0	0.2	43.3	56.5

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#30	100.0		
#50	99.7		
#100	94.1		
#200	56.5		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.1339 D_{85}= 0.1200 D_{60}= 0.0791
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.06

Date Received: 9/20/19 **Date Tested:** 10/16/19

Tested By: MPW

Checked By: JML

Title: PM

Location: B-19-1 **Date Sampled:** -

Sample Number: 46765 **Depth:** 126'-127.6'

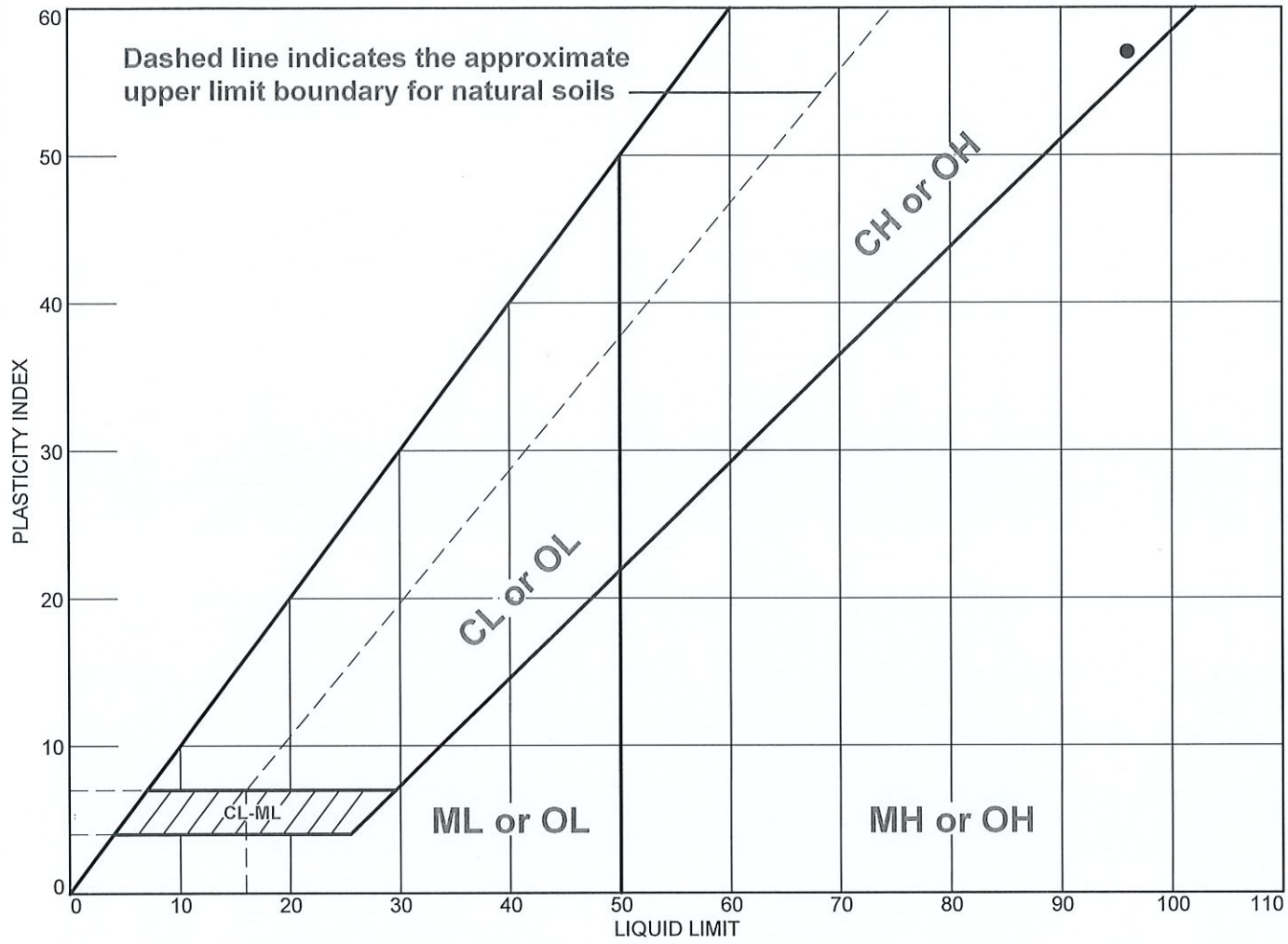
GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		96	39	57	100.0	99.5	CH

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

● **Location:** B-19-2 **Depth:** 36'-38.3' **Sample Number:** 46766

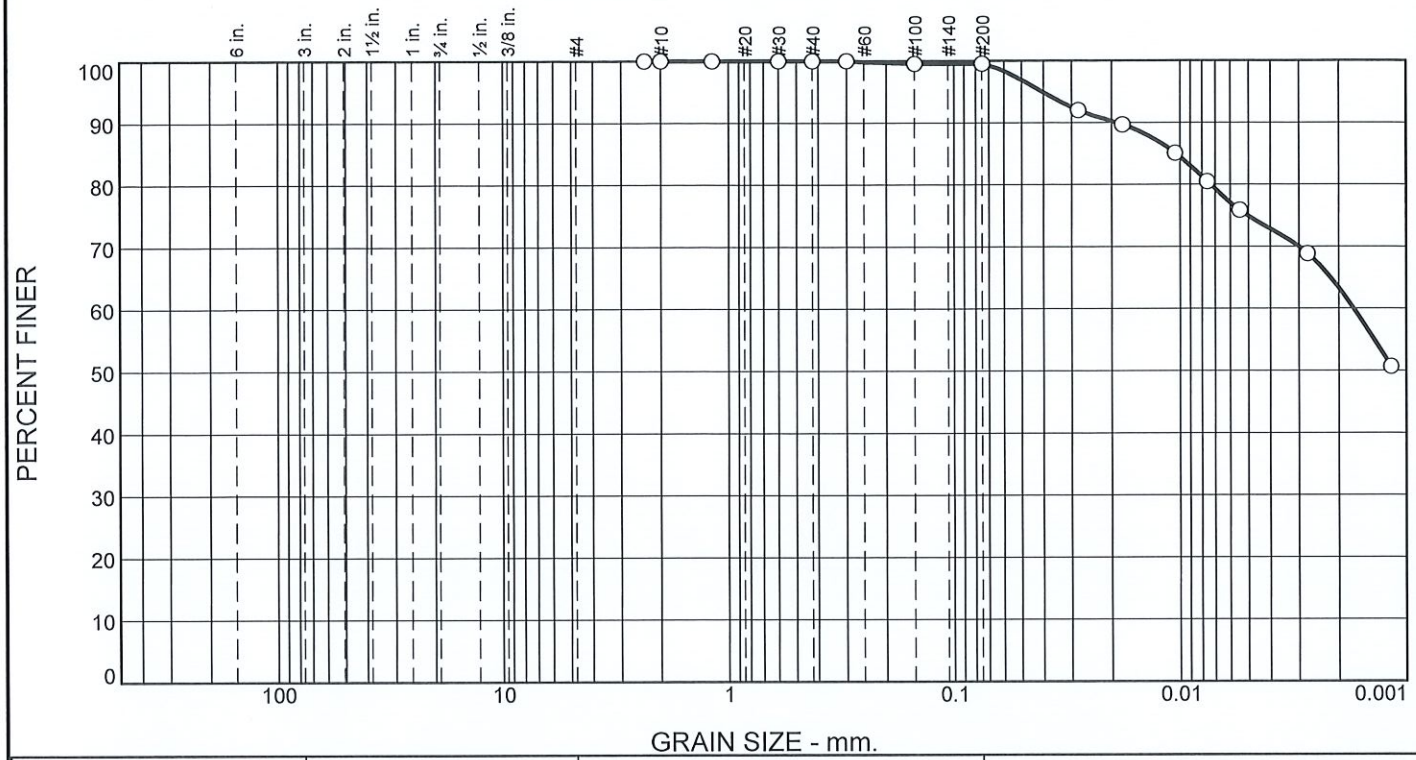
Remarks:

GULF SHORE EXPLORATION AND TESTING

Figure

Tested By: SL **Checked By:** JML

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.5	24.6	74.9

Test Results (ASTM D422 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#40	100.0		
#50	100.0		
#100	99.5		
#200	99.5		
0.0281 mm.	92.0		
0.0179 mm.	89.7		
0.0105 mm.	85.1		
0.0076 mm.	80.5		
0.0055 mm.	75.9		
0.0027 mm.	68.9		
0.0012 mm.	50.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 39 LL= 96 PI= 57

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-5(71)

Coefficients

D_{90}= 0.0191 D_{85}= 0.0105 D_{60}= 0.0017
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.00

Date Received: 9/20/19 **Date Tested:** 10/23/19

Tested By: JM

Checked By: JML

Title: PM

Location: B-19-2 **Date Sampled:** -

Sample Number: 46766 **Depth:** 36'-38.3'

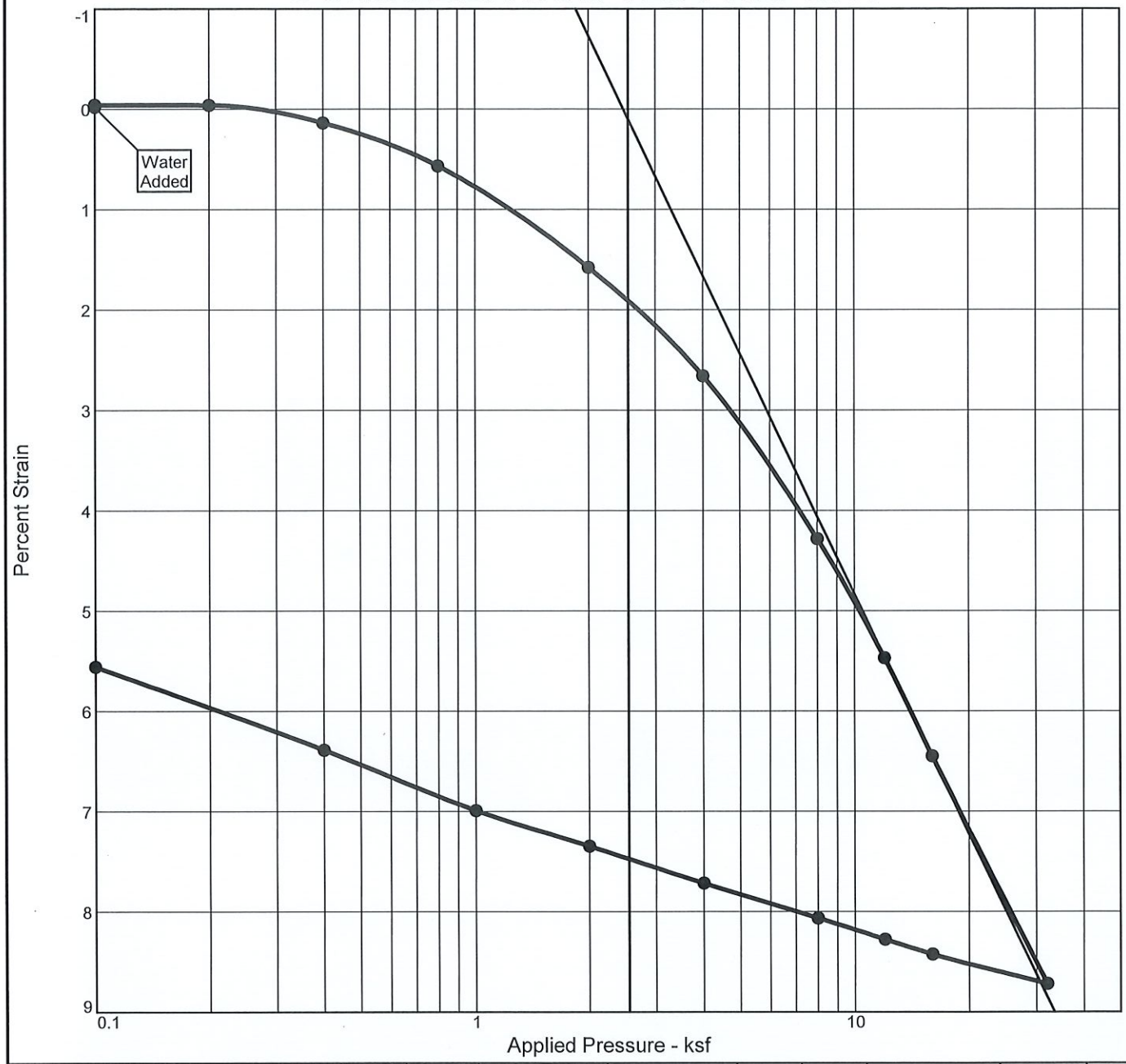
GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Swell %	e_o
91.1 %	36.3 %	81.2	96	57	2.70	0	4.9	0.17	0.03	0.2	0.0	1.077

MATERIAL DESCRIPTION	USCS	AASHTO
	CH	A-7-5(71)

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Location: B-19-2 **Depth:** 36'-38.3' **Sample Number:** 46766

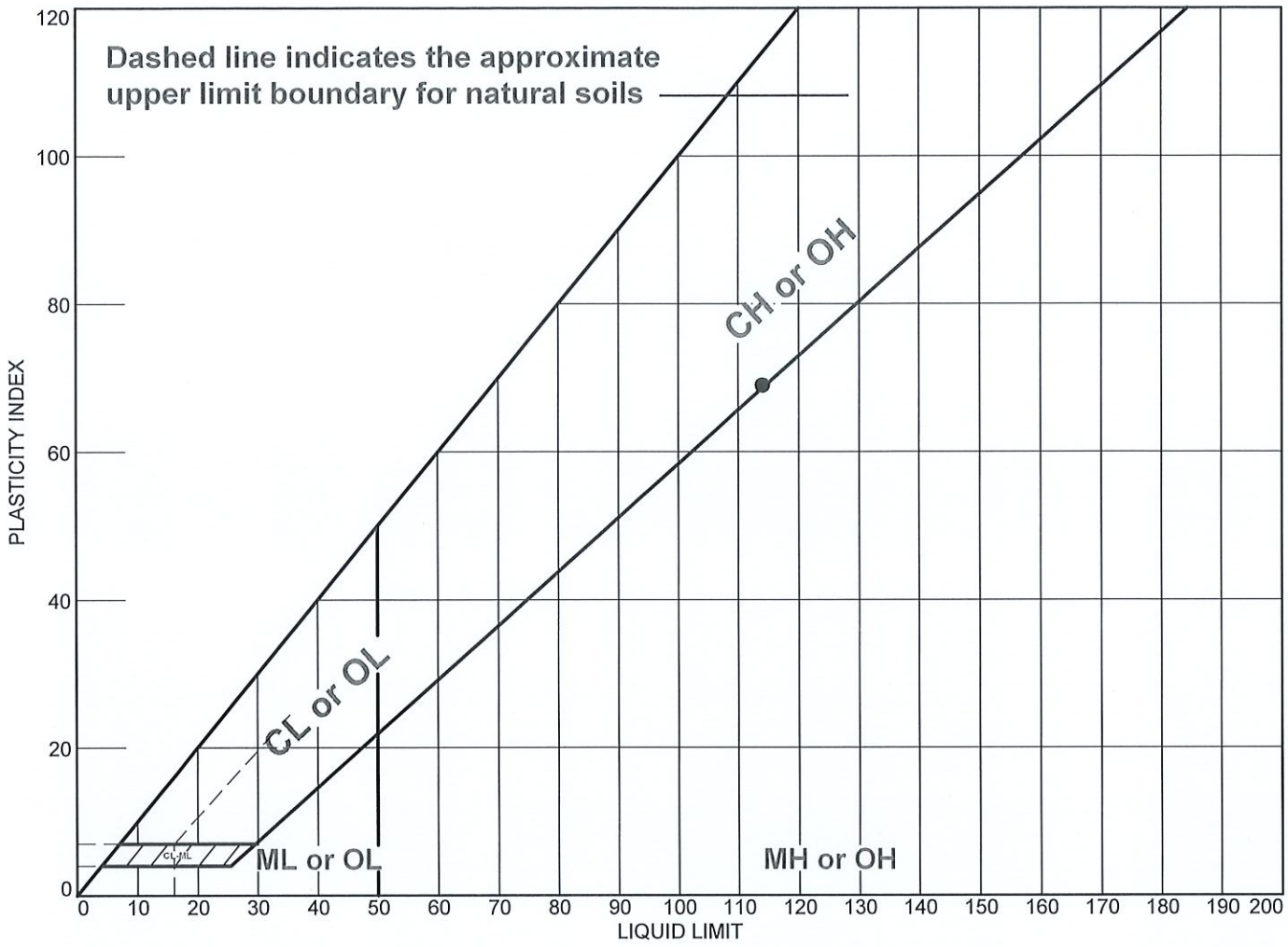
GULF SHORE EXPLORATION AND TESTING

Remarks:

Figure

Tested By: MPW **Checked By:** JML

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		114	45	69	100.0	99.9	CH

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

● **Location:** B-19-2 **Depth:** 49'-51.3' **Sample Number:** 46767

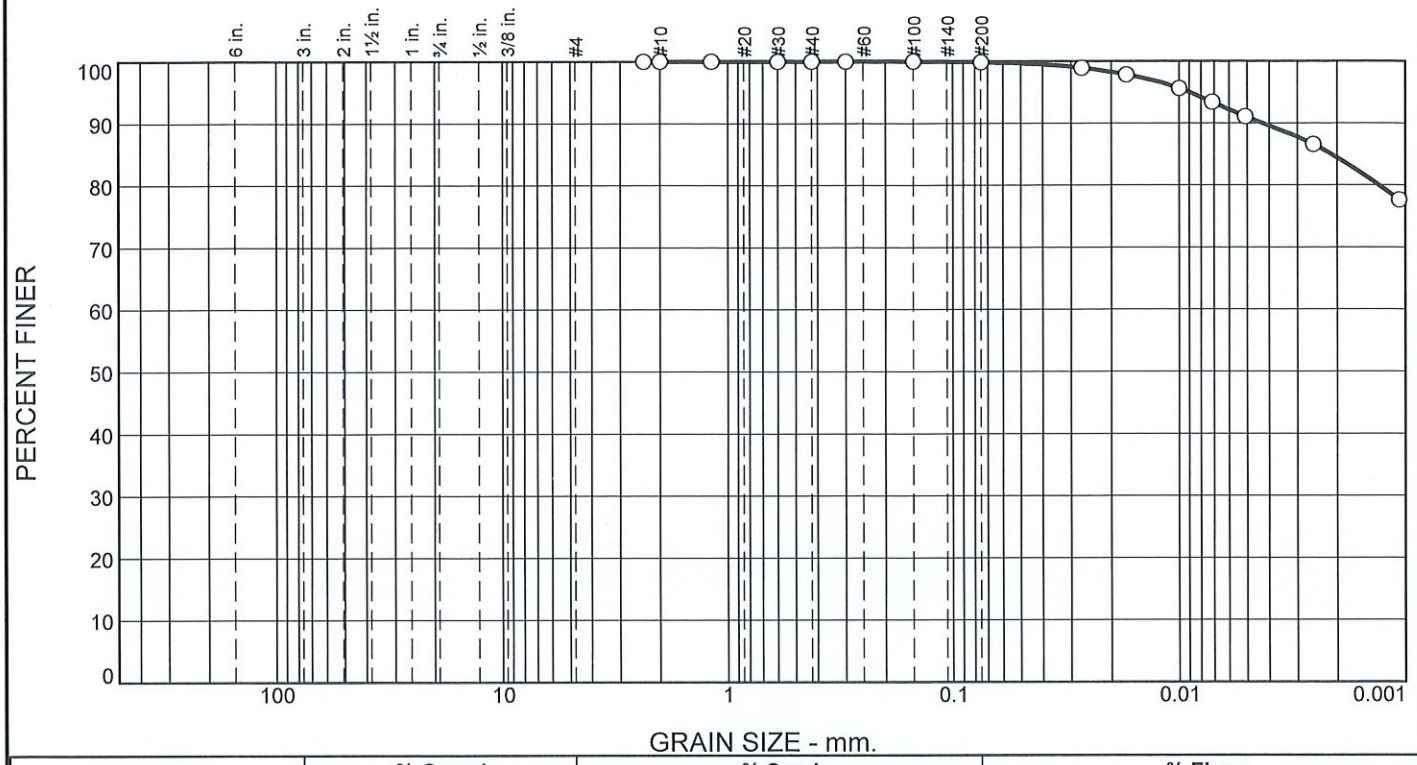
Remarks:

GS GULF SHORE EXPLORATION AND TESTING

Figure

Tested By: MM **Checked By:** JML

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	0.1	8.9	91.0

Test Results (ASTM D422 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#40	100.0		
#50	100.0		
#100	100.0		
#200	99.9		
0.0270 mm.	98.9		
0.0171 mm.	97.8		
0.0100 mm.	95.6		
0.0071 mm.	93.4		
0.0051 mm.	91.1		
0.0026 mm.	86.6		
0.0011 mm.	77.7		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 45 LL= 114 PI= 69

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-5(87)

Coefficients

D_{90}= 0.0043 D_{85}= 0.0021 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.00

Date Received: 9/20/19 **Date Tested:** 10/23/19

Tested By: JM

Checked By: JML

Title: PM

Location: B-19-2 **Date Sampled:** -

Sample Number: 46767 **Depth:** 49'-51.3'

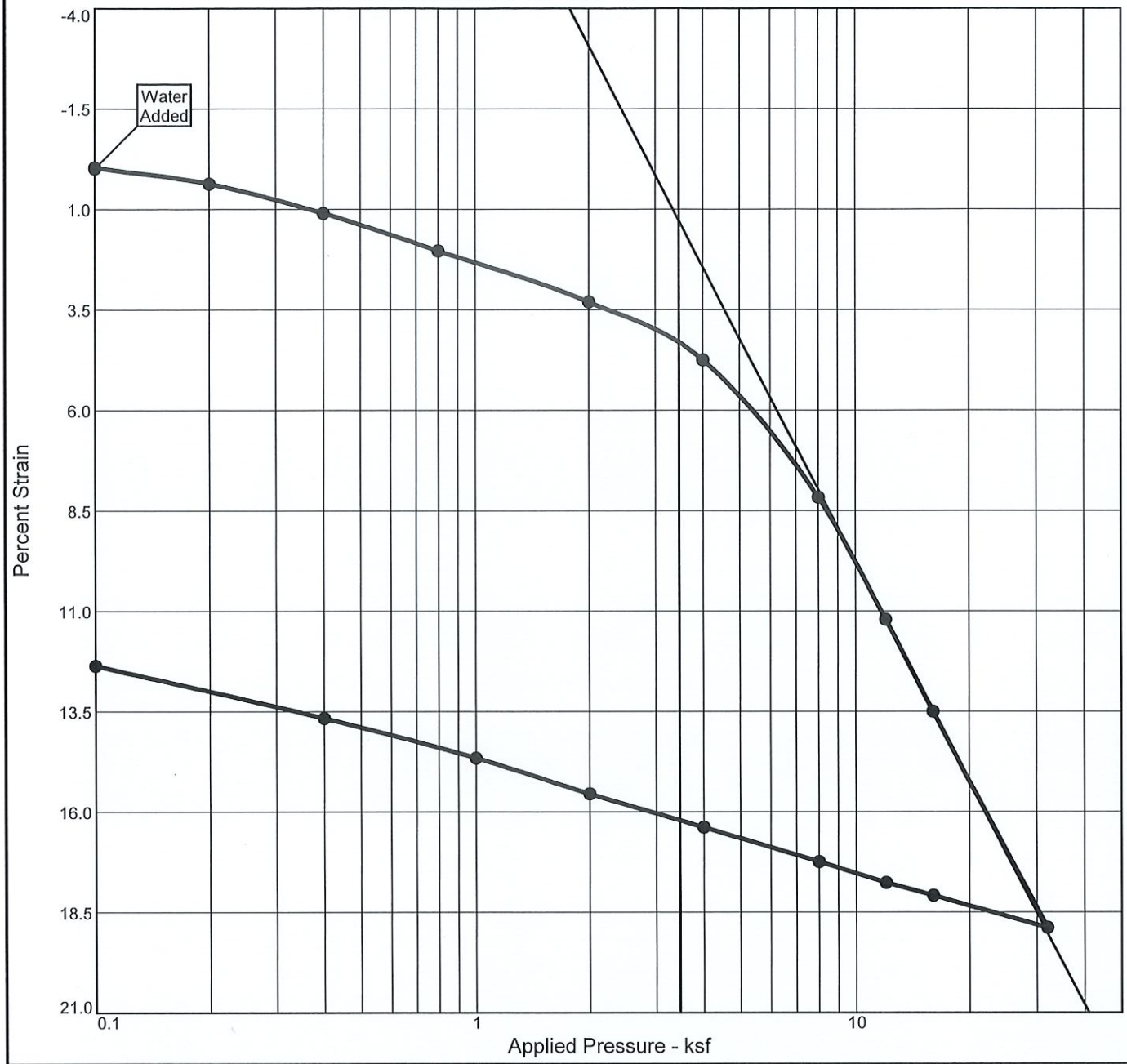
GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Swell %	e_o
97.1 %	44.0 %	75.8	114	69	2.7	0	5.5	0.41	0.06	0.1	0.0	1.223

MATERIAL DESCRIPTION	USCS	AASHTO
	CH	A-7-5(87)

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Location: B-19-2 **Depth:** 49'-51.3' **Sample Number:** 46767

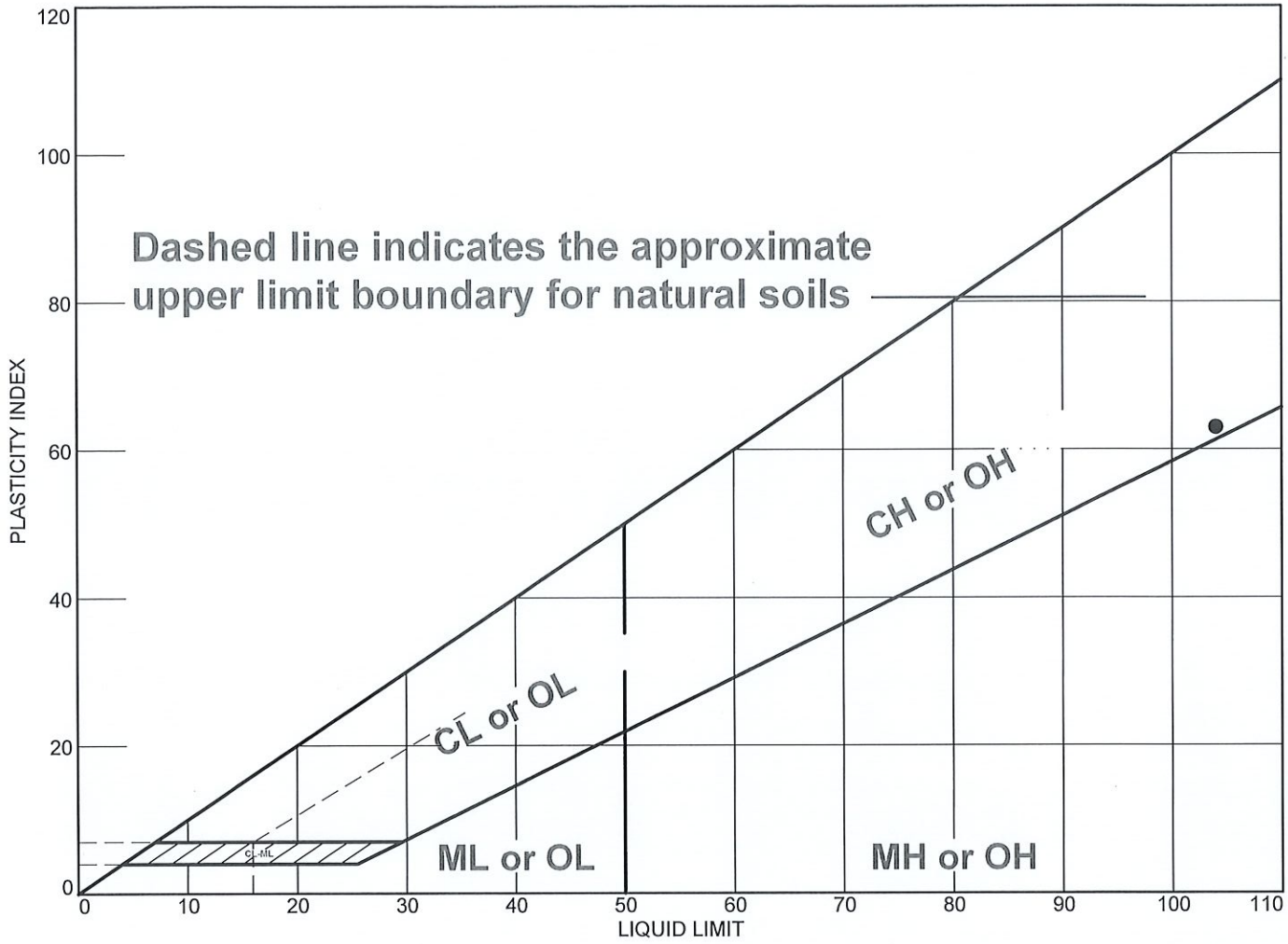
GS GULF SHORE EXPLORATION AND TESTING

Remarks:

Figure

Tested By: MPW **Checked By:** JML

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		104	41	63	100.0	98.7	CH

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

● **Location:** B-19-3 **Depth:** 20.5'-22.8' **Sample Number:** 46768

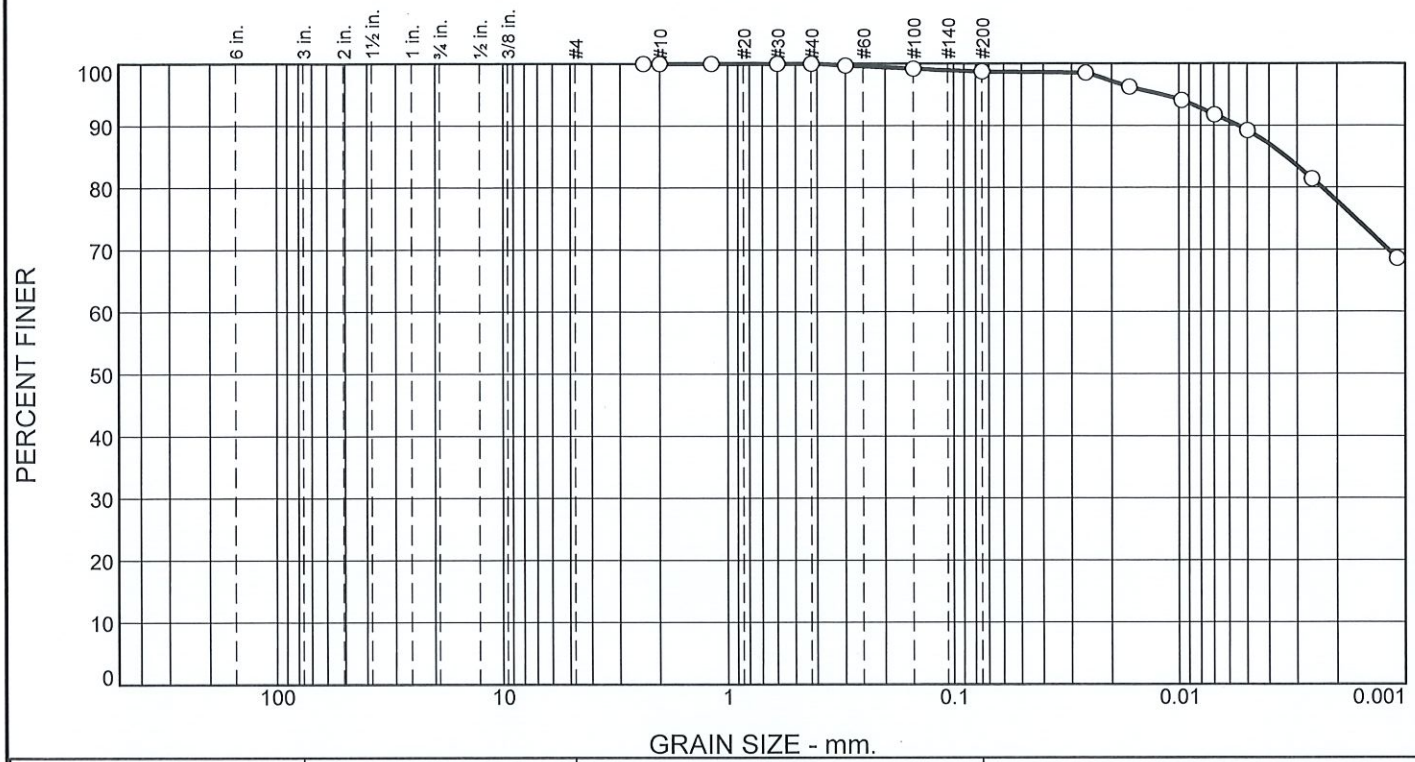
Remarks:

GULF SHORE EXPLORATION AND TESTING

Figure

Tested By: MM **Checked By:** JML

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	1.3	9.5	89.2

Test Results (ASTM D422 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#40	100.0		
#50	99.7		
#100	99.2		
#200	98.7		
0.0261 mm.	98.5		
0.0167 mm.	96.2		
0.0097 mm.	94.1		
0.0069 mm.	91.7		
0.0050 mm.	89.2		
0.0026 mm.	81.4		
0.0011 mm.	68.6		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 41 LL= 104 PI= 63

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-5(78)

Coefficients

D_{90}= 0.0055 D_{85}= 0.0034 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.01

Date Received: 9/20/19 **Date Tested:** 10/29/19

Tested By: MPW/JM

Checked By: JML

Title: PM

Location: B-19-3 **Date Sampled:** -

Sample Number: 46768 **Depth:** 20.5'-22.8'

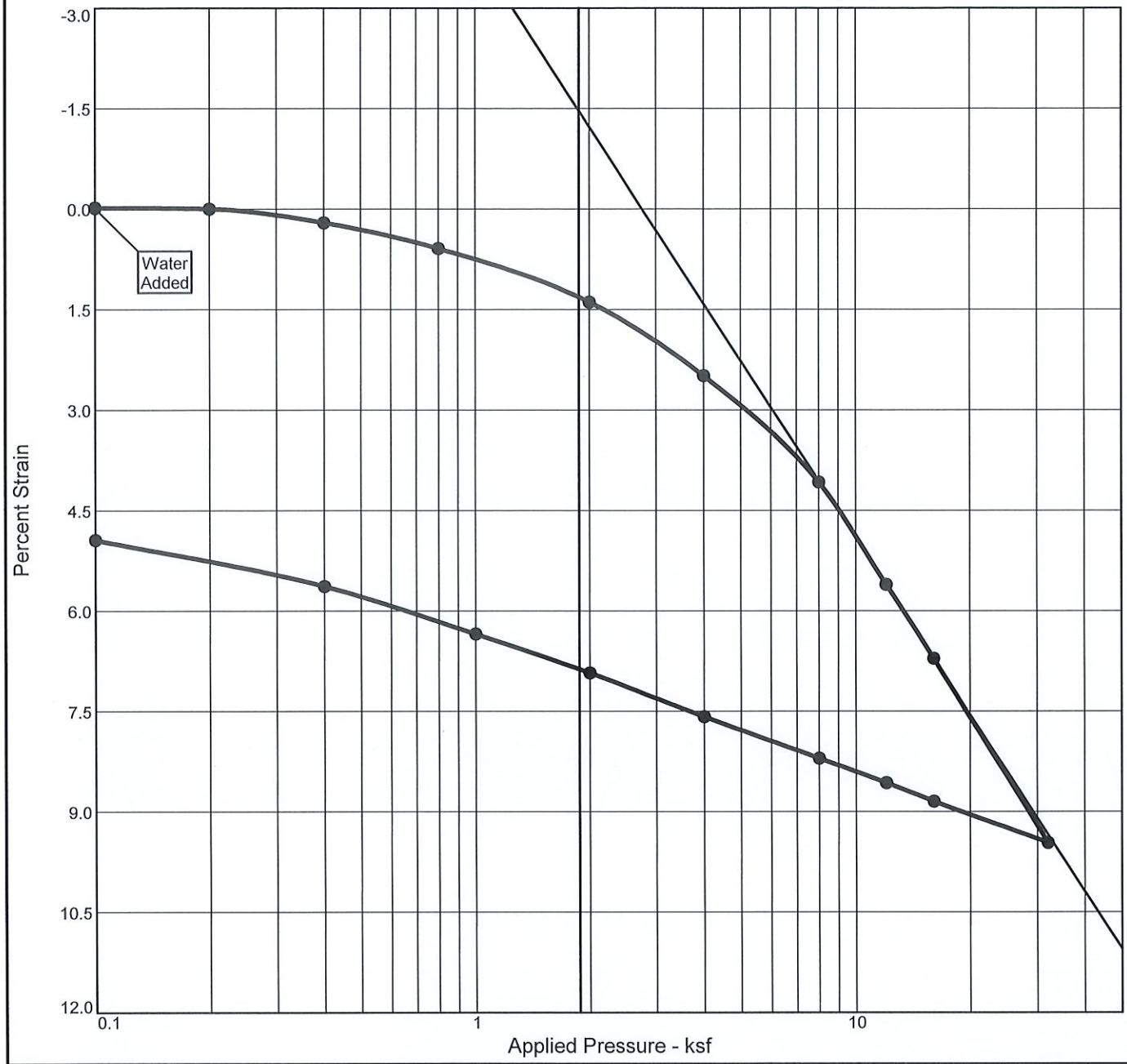
GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Swell %	e_o
Sat.	Moist.											
94.0 %	36.2 %	82.6	104	63	2.70	0	4.5	0.18	0.04	0.2	0.0	1.040

MATERIAL DESCRIPTION	USCS	AASHTO
	CH	A-7-5(78)

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Location: B-19-3 **Depth:** 20.5'-22.8' **Sample Number:** 46768

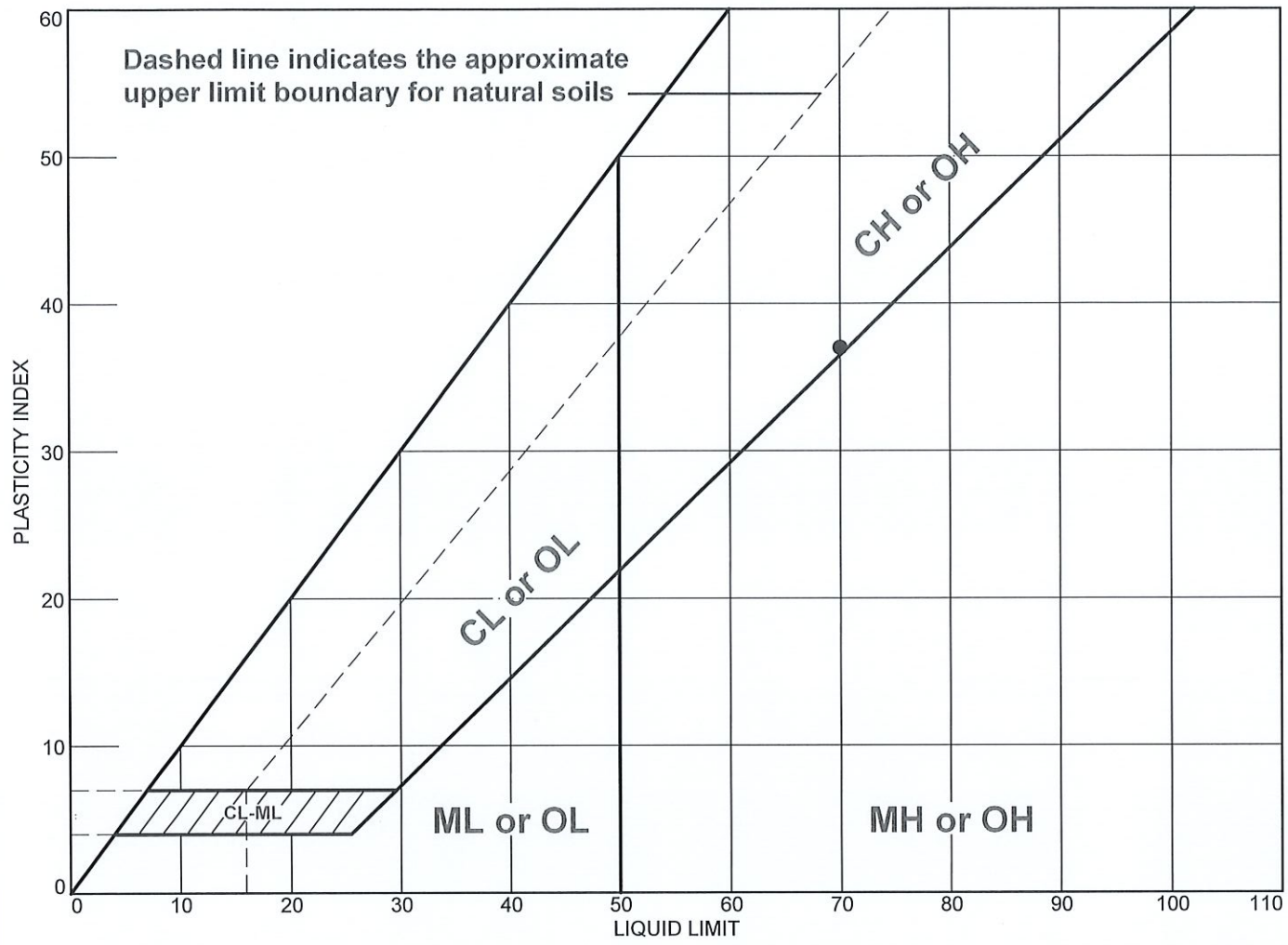
GULF SHORE EXPLORATION AND TESTING

Remarks:

Figure

Tested By: MPW **Checked By:** JML

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		70	33	37	100.0	94.3	CH

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

● **Location:** B-19-3 **Depth:** 30.0'-32.3' **Sample Number:** 46769

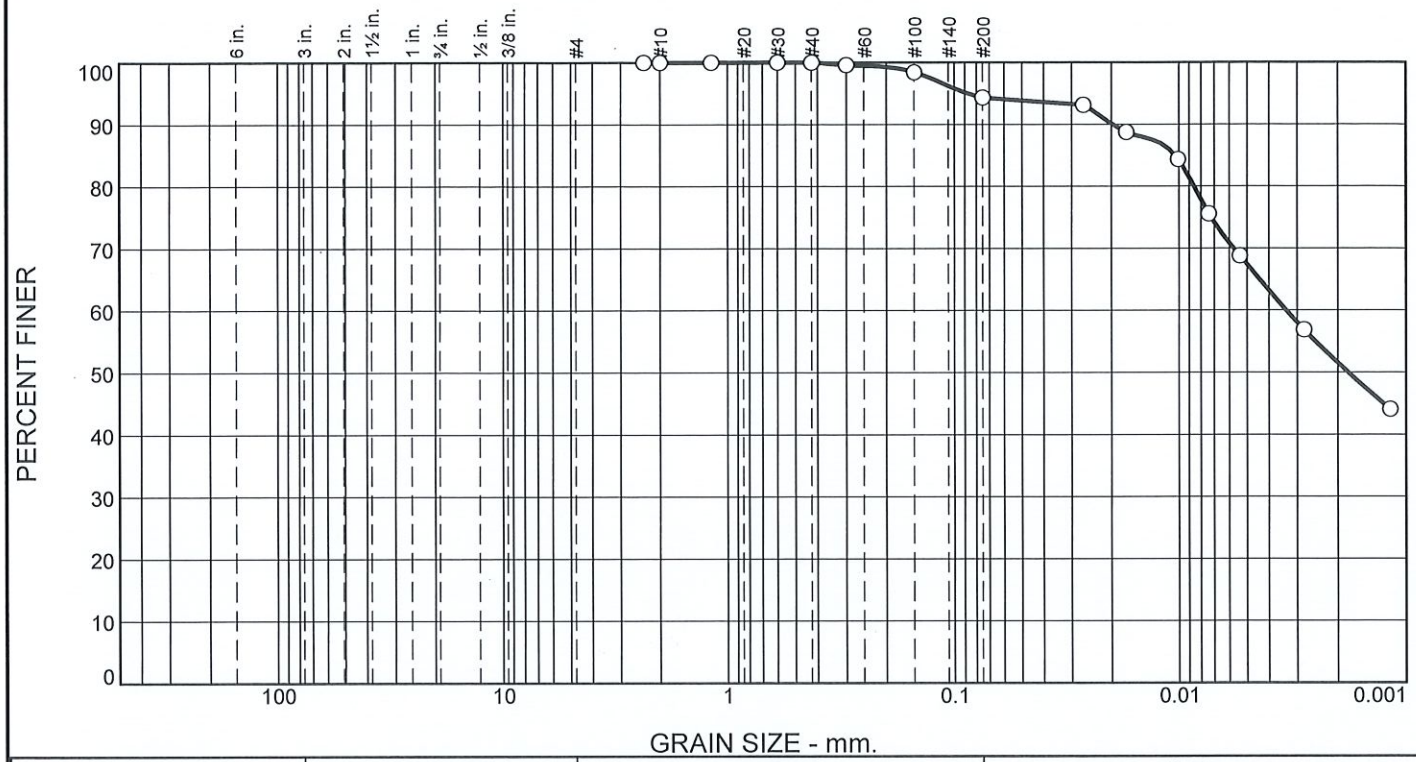
Remarks:

GS GULF SHORE EXPLORATION AND TESTING

Figure

Tested By: MM **Checked By:** JML

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.0	5.7	26.9	67.4

Test Results (ASTM D422 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100.0		
#10	100.0		
#16	100.0		
#30	100.0		
#40	100.0		
#50	99.6		
#100	98.4		
#200	94.3		
0.0266 mm.	93.1		
0.0172 mm.	88.7		
0.0101 mm.	84.4		
0.0074 mm.	75.6		
0.0054 mm.	68.8		
0.0028 mm.	56.9		
0.0012 mm.	44.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 33 LL= 70 PI= 37

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-5(42)

Coefficients

D_{90}= 0.0198 D_{85}= 0.0104 D_{60}= 0.0034
D_{50}= 0.0018 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.02

Date Received: 9/20/19 **Date Tested:** 10/29/19

Tested By: MPW/JM

Checked By: JML

Title: PM

Location: B-19-3 **Date Sampled:** -

Sample Number: 46769 **Depth:** 30.0'-32.3'

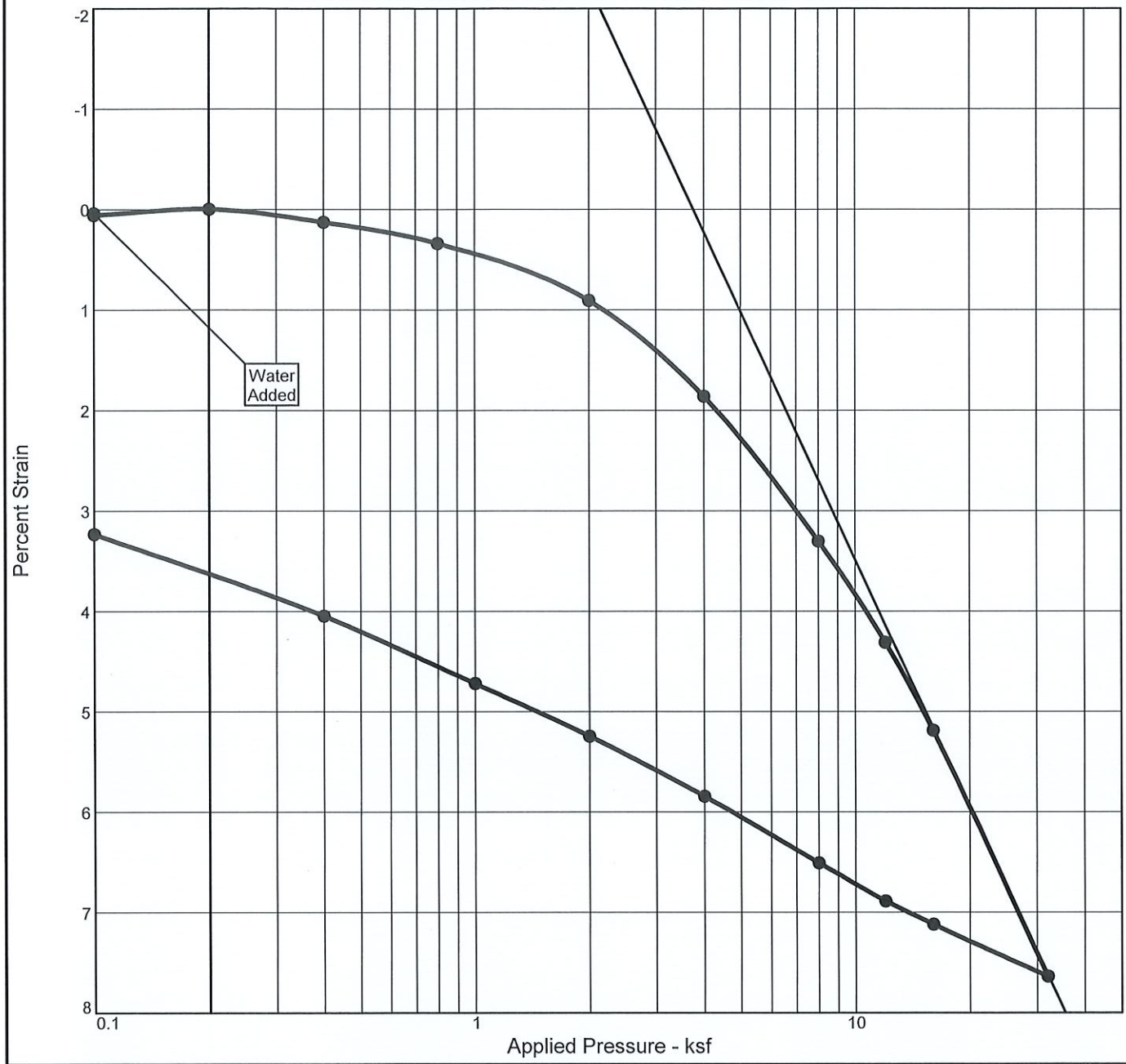
GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Clpse. %	e_o
93.6 %	30.7 %	89.4	70	37	2.70	0	3.8	0.15	0.03		0.0	0.886

MATERIAL DESCRIPTION	USCS	AASHTO
	CH	A-7-5(42)

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Location: B-19-3 **Depth:** 30.0'-32.3' **Sample Number:** 46769

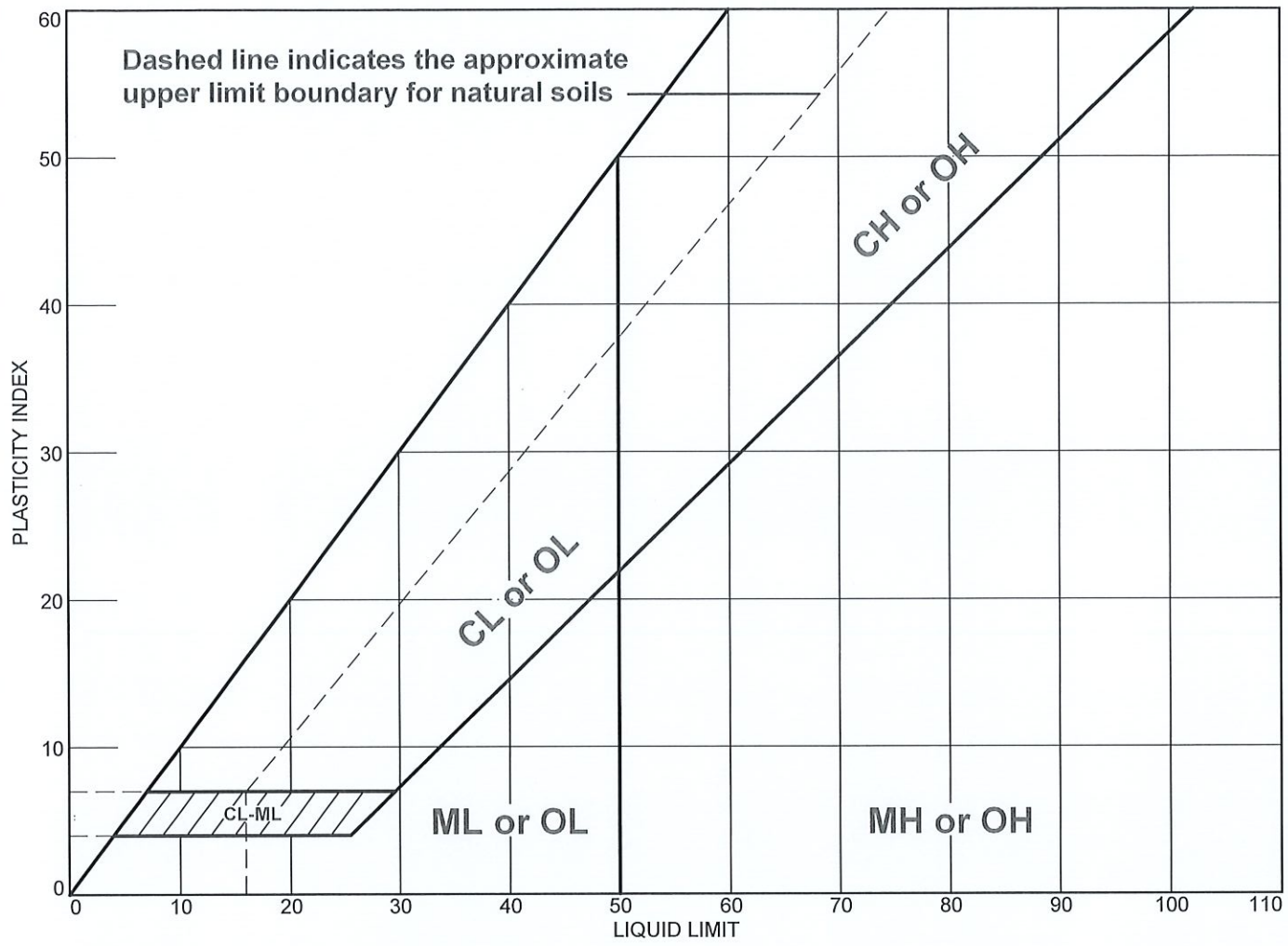
GULF SHORE EXPLORATION AND TESTING

Remarks:

Figure

Tested By: MPW **Checked By:** JML

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		NV	NP	NP	99	14	SM

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

● **Location:** B-19-4 **Depth:** 17.0'-19.3' **Sample Number:** 46770

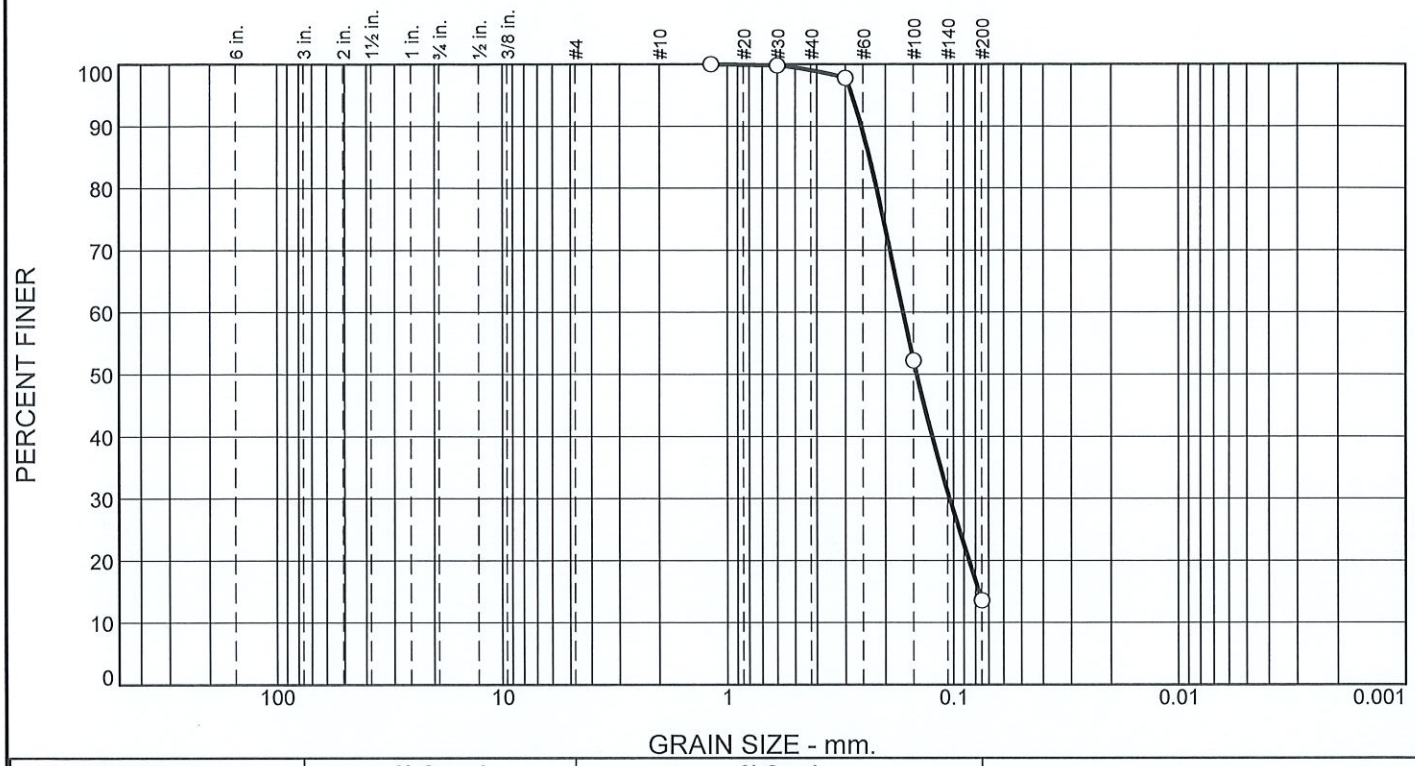
Remarks:

GS GULF SHORE EXPLORATION AND TESTING

Figure

Tested By: MPW **Checked By:** JML

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0	0	0	0	1	85	14

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#16	100		
#30	100		
#50	98		
#100	52		
#200	14		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= SM AASHTO (M 145)= A-2-4(0)

Coefficients

D_{90}= 0.2546 D_{85}= 0.2348 D_{60}= 0.1669
D_{50}= 0.1452 D_{30}= 0.1040 D_{15}= 0.0772
D_{10}= C_u= C_c=

Remarks

F.M.=0.50

Date Received: 9/20/19 **Date Tested:** 10/22/19

Tested By: AS

Checked By: JML

Title: PM

Location: B-19-4

Sample Number: 46770 **Depth:** 17.0'-19.3'

Date Sampled: -

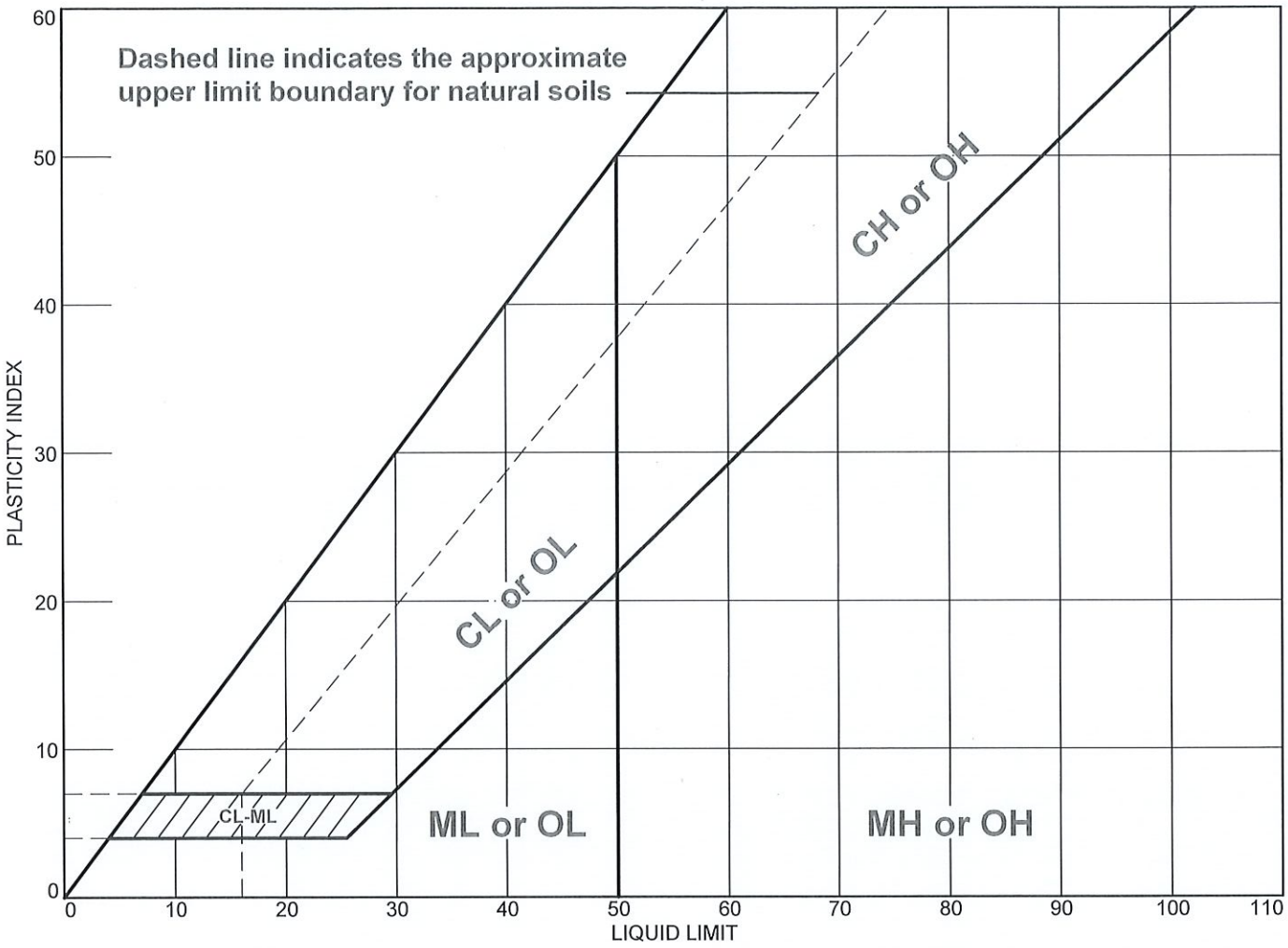
GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		NV	NP	NP	100	66	ML

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

● **Location:** B-19-4 **Depth:** 24.0'-25.5' **Sample Number:** 46771

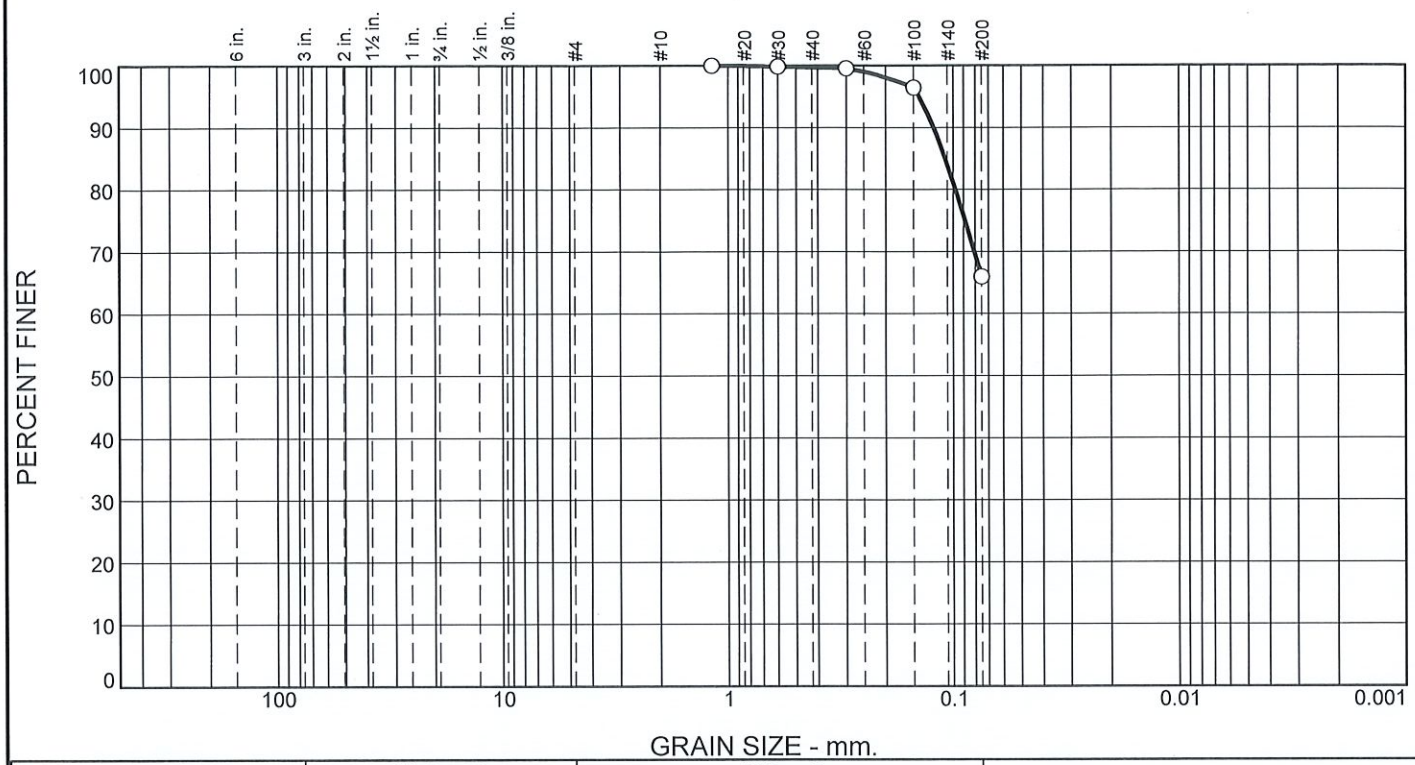
Remarks:

GULF SHORE EXPLORATION AND TESTING

Figure

Tested By: JMC **Checked By:** JML

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0	0	0	0	0	34	66

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#16	100		
#30	100		
#50	100		
#100	96		
#200	66		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= NP LL= NV PI= NP

Classification

USCS (D 2487)= ML AASHTO (M 145)= A-4(0)

Coefficients

D_{90}= 0.1222 D_{85}= 0.1086 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.04

Date Received: 9/20/19 **Date Tested:** 9/27/19

Tested By: ER

Checked By: JML

Title: PM

Location: B-19-4
Sample Number: 46771 **Depth:** 24.0'-25.5'

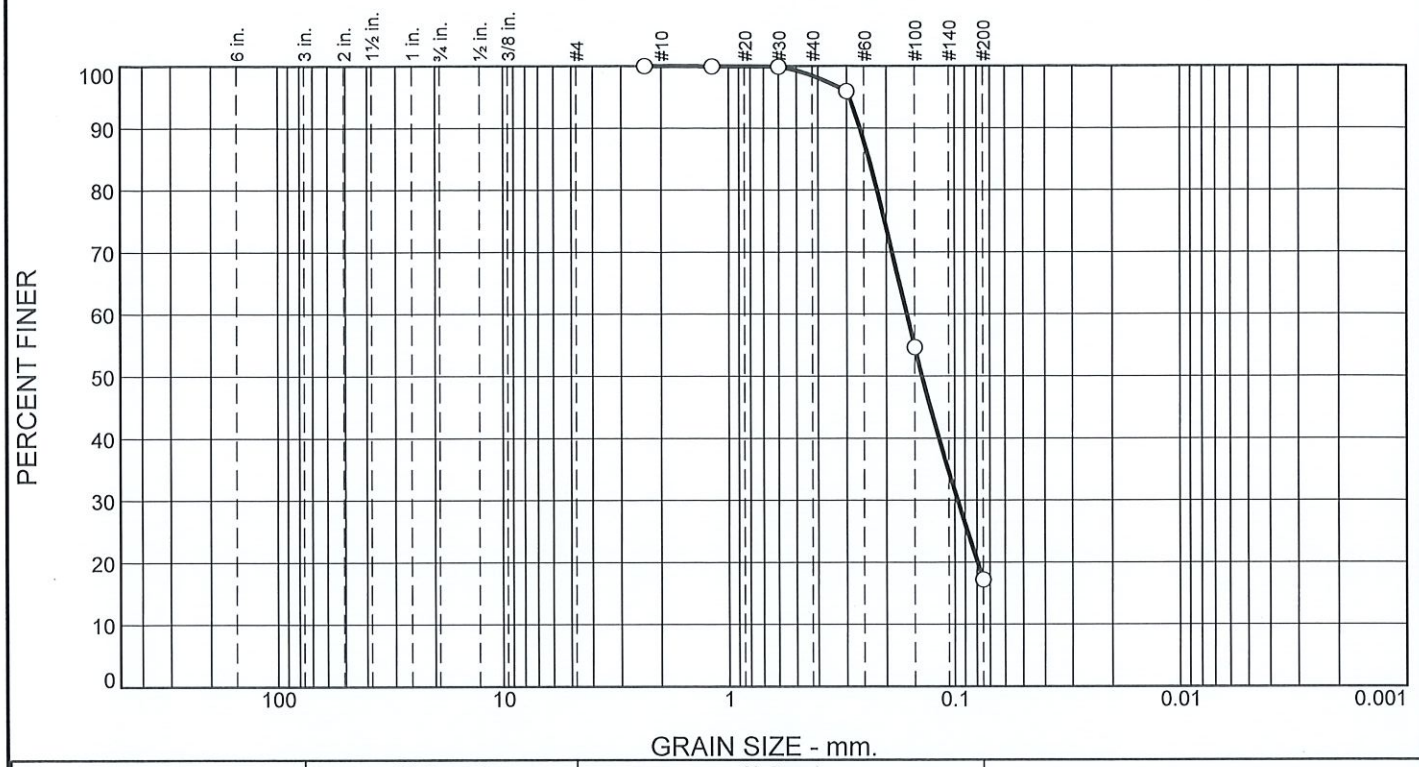
Date Sampled: -

GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates
Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0	0	0	0	2	81	17

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100		
#16	100		
#30	100		
#50	96		
#100	55		
#200	17		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.2610 D_{85}= 0.2380 D_{60}= 0.1627
D_{50}= 0.1394 D_{30}= 0.0972 D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.50

Date Received: 9/20/19 **Date Tested:** 9/26/19

Tested By: AJ

Checked By: JML

Title: PM

Location: B-19-4
Sample Number: 46772 **Depth:** 34.0'-35.5'

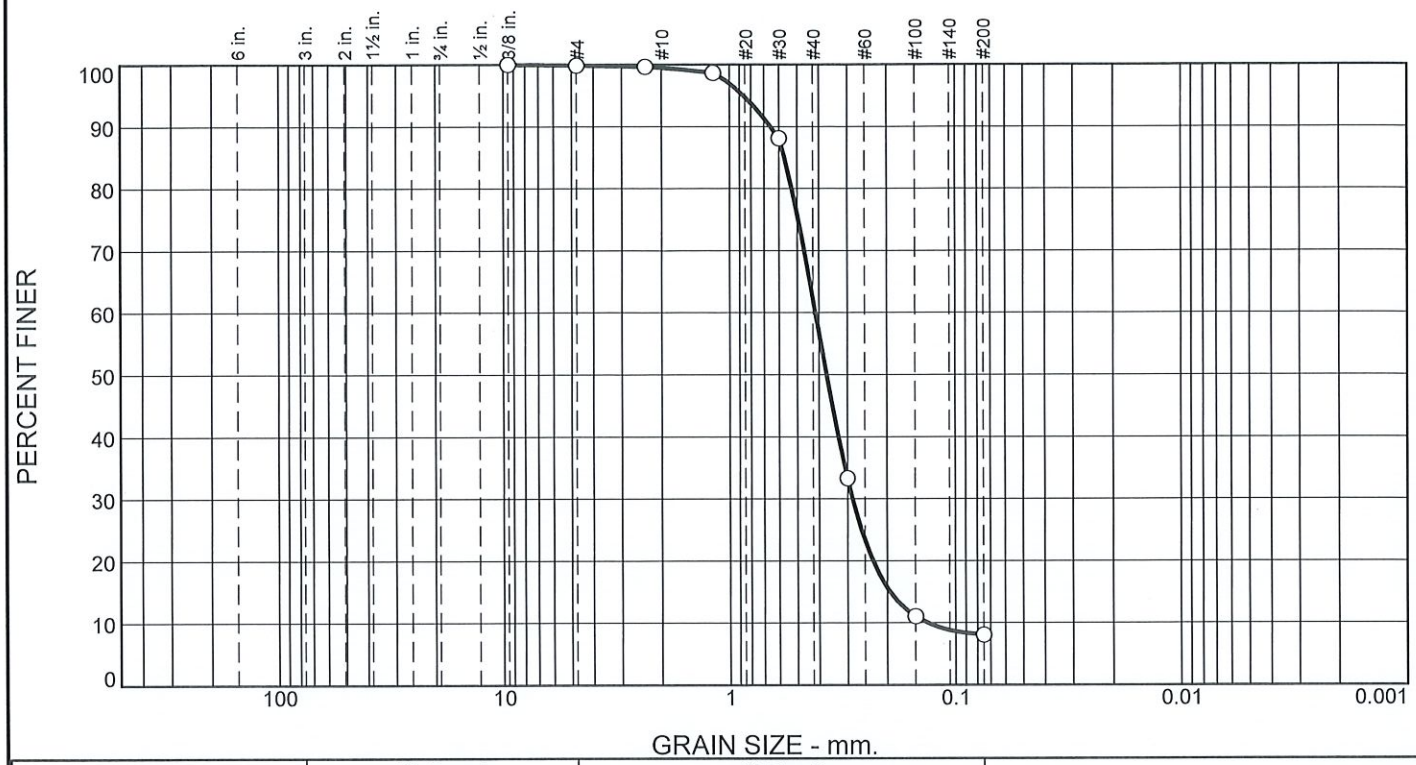
Date Sampled: -

GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates
Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0	0	0	1	37	54	8

Test Results (ASTM D6913 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8 Inch	100		
#4	100		
#8	100		
#16	99		
#30	88		
#50	33		
#100	11		
#200	8.1		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= LL= PI=

Classification

USCS (D 2487)= AASHTO (M 145)=

Coefficients

D_{90}= 0.6544 D_{85}= 0.5689 D_{60}= 0.4154
D_{50}= 0.3708 D_{30}= 0.2848 D_{15}= 0.1941
D_{10}= 0.1325 C_u= 3.13 C_c= 1.47

Remarks

F.M.=1.69

Date Received: 9/20/19 **Date Tested:** 9/26/19

Tested By: AJ

Checked By: JML

Title: PM

Location: B-19-4
Sample Number: 46773 **Depth:** 39.0'-40.5'

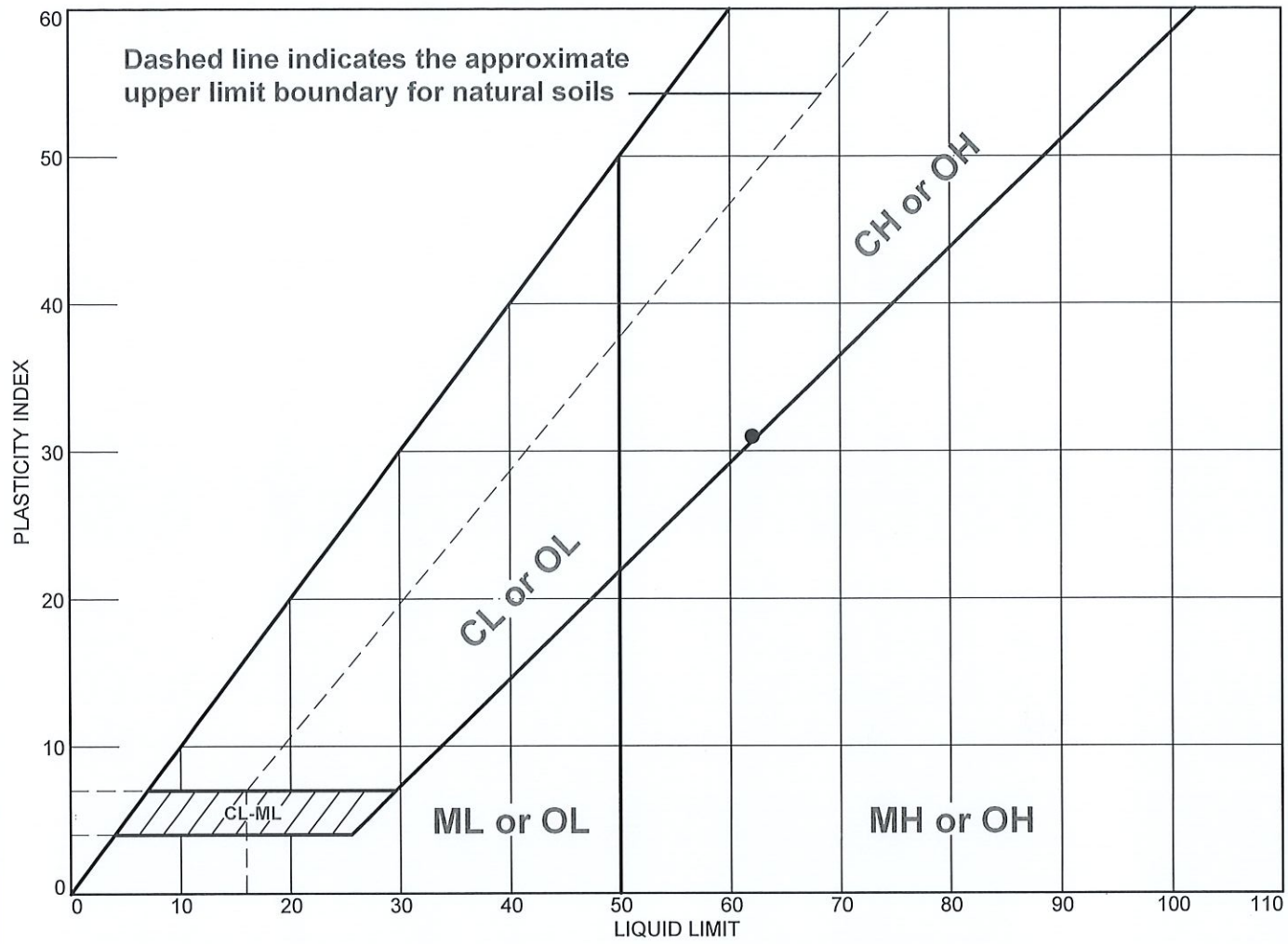
Date Sampled: -

GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates
Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●		62	31	31	99.6	97.3	CH

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

● **Location:** B-19-4 **Depth:** 57.0'-59.3' **Sample Number:** 46774

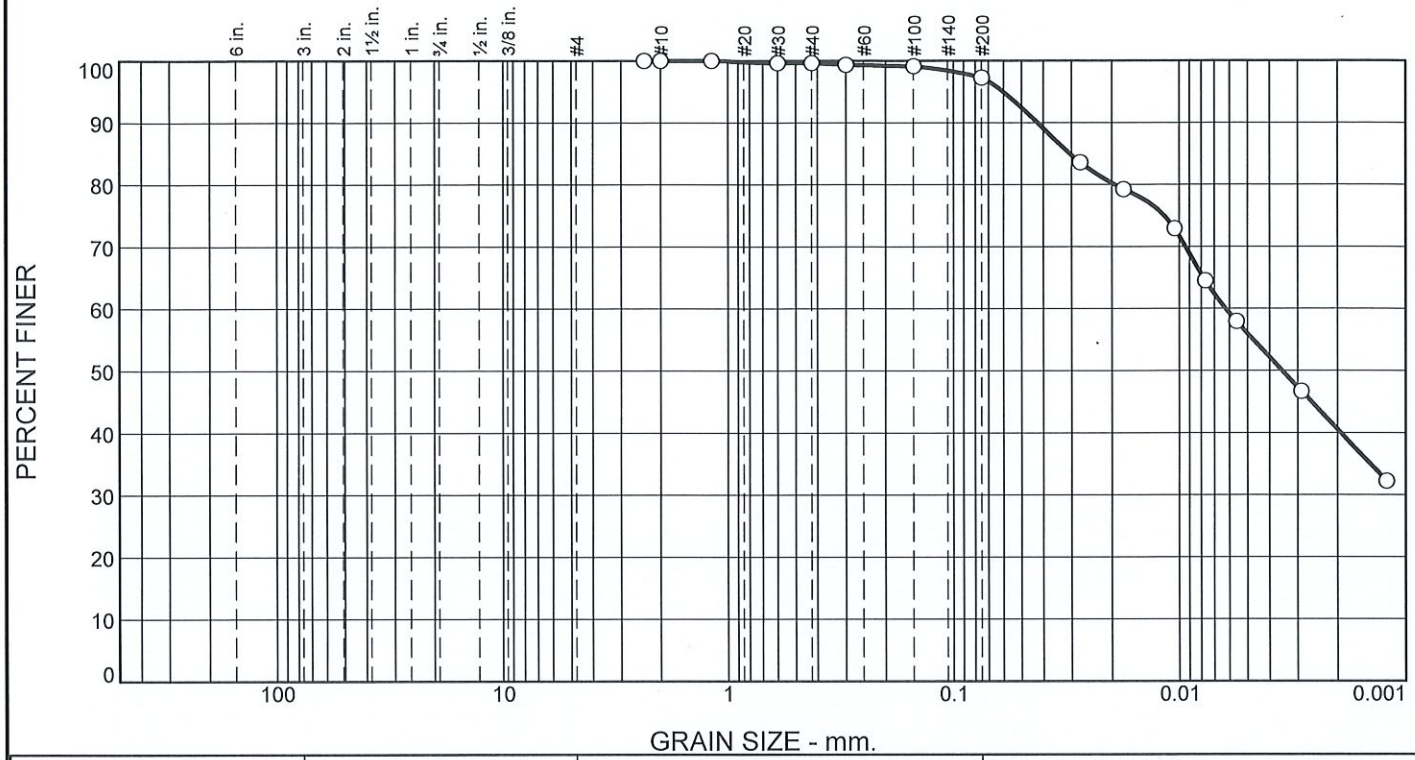
Remarks:

GULF SHORE EXPLORATION AND TESTING

Figure

Tested By: MM **Checked By:** JML

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	2.3	41.3	56.0

Test Results (ASTM D422 & ASTM D1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#8	100.0		
#10	100.0		
#16	100.0		
#30	99.6		
#40	99.6		
#50	99.3		
#100	99.1		
#200	97.3		
0.0275 mm.	83.6		
0.0177 mm.	79.3		
0.0105 mm.	72.9		
0.0077 mm.	64.5		
0.0056 mm.	57.9		
0.0029 mm.	46.7		
0.0012 mm.	32.2		

* (no specification provided)

Material Description

Atterberg Limits (ASTM D 4318)

PL= 31 LL= 62 PI= 31

Classification

USCS (D 2487)= CH AASHTO (M 145)= A-7-5(36)

Coefficients

D_{90}= 0.0426 D_{85}= 0.0306 D_{60}= 0.0063
D_{50}= 0.0035 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

F.M.=0.02

Date Received: 9/20/19 **Date Tested:** 10/29/19

Tested By: MPW/JM

Checked By: JML

Title: PM

Location: B-19-4 **Date Sampled:** -

Sample Number: 46774 **Depth:** 57.0'-59.3'

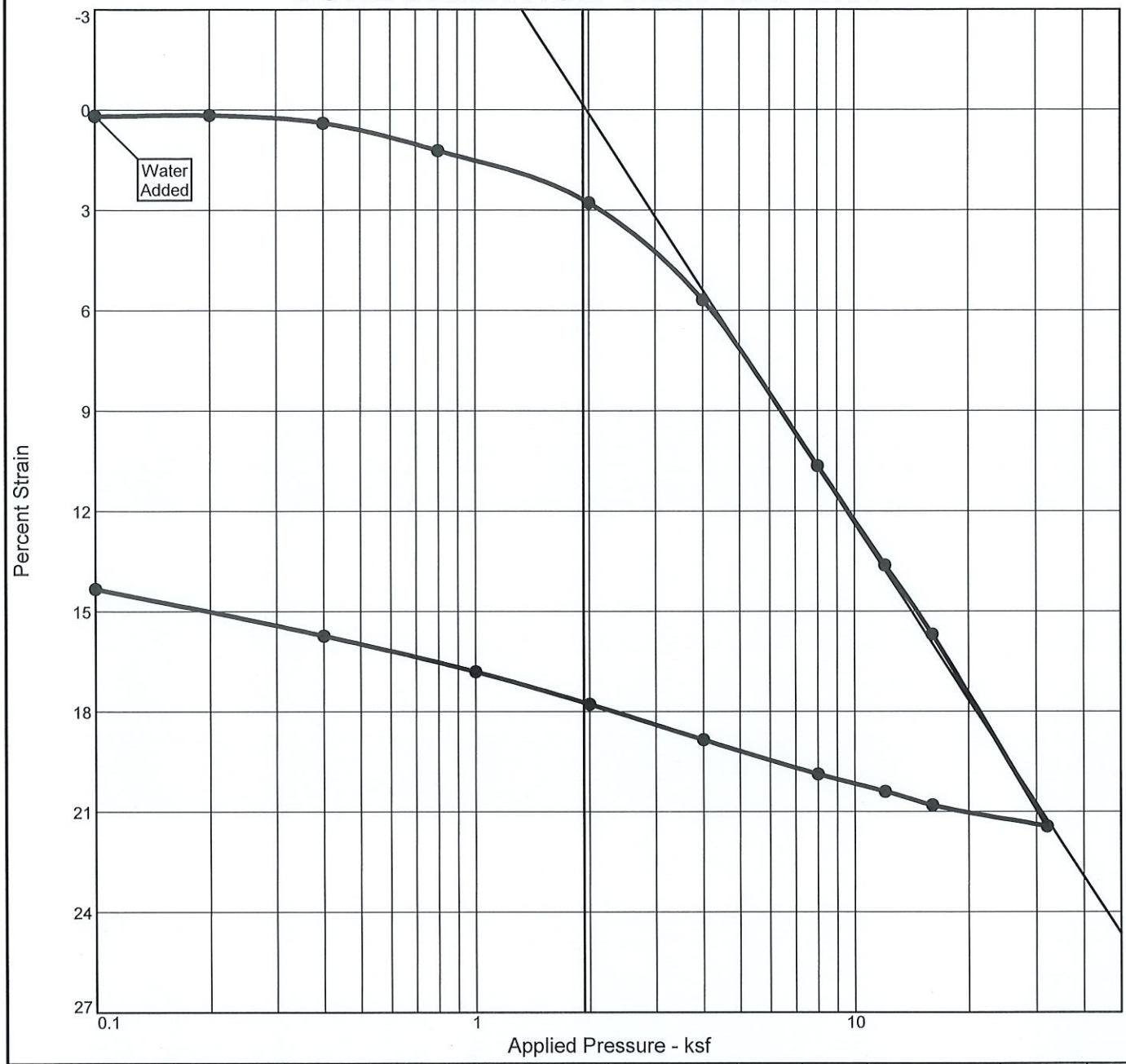
GULF SHORE EXPLORATION AND TESTING

Client: Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Project No: 19-244 **Figure**

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (ksf)	P_c (ksf)	C_c	C_s	Swell Press. (ksf)	Clpse. %	e_o
Sat.	Moist.											
97.1 %	38.8 %	81.1	62	31	2.7	0	3.0	0.36	0.06		0.0	1.079

MATERIAL DESCRIPTION	USCS	AASHTO
	CH	A-7-5(36)

Project No. 19-244 **Client:** Golder Associates

Project: Monterey Peninsula Landfill Mod 7

Location: B-19-4 **Depth:** 57.0'-59.3' **Sample Number:** 46774

GULF SHORE EXPLORATION AND TESTING

Remarks:

Figure

Tested By: MPW **Checked By:** JML

ATTACHMENT 4

FIGURES

SUBDRAIN RISER PIPE
CLEANOUT/ PUMP ACCESS

Approximate area to include Erosion Control Blanket and Straw Wattles

EXISTING 48 IN. SUBDRAIN MANHOLE (APPROX.)

LEACHATE SUMP PLAN (2 | 3|9)

MODULE 6
(EXISTING)

MODULE 7
(PROPOSED)

4 | 3|7,8 SUBDRAIN

1 | 3|7 1 | 3|8 LINER FLOOR DETAIL

APPROXIMATE LOCATION OF BALLAST ROCK (TO BE REMOVED)

EXTENT OF OPERATIONS LAYER PLACEMENT

CLAY FILL

STORMWATER BASIN PLAN (7 | 3|13)

ROAD CROSSING (6 | 3|13)

MODULE 8A
(PROPOSED)

ALTERNATE SUBDRAIN DISCHARGE LINE LOCATION

SUBDRAIN DISCHARGE LINE

0 80 160
1" = 80' FEET

LEGEND

- PERMITTED LANDFILL FOOTPRINT
- APPROXIMATE NEW MODULE LIMIT
- 2% GRADE INDICATOR
- 2H:1V SLOPE INDICATOR
- B-1 VIBRATING WIRE PIEZOMETER
- G-41 MONITORING WELL

NOTE(S)

1. TOPOGRAPHY PROVIDED BY AERIAL PHOTOMAPPING SERVICES. DATE OF TOPOGRAPHY: JULY 7, 2022.
2. ELEVATIONS SHOWN HEREON ARE RELATIVE TO A PERPETUATED LOCAL DATUM, BASED ON RECOVERED LOCAL SITE CONTROL STATIONS. AS ESTABLISHED BY SUBSEQUENT GPS SURVEY TIES TO KNOWN VERTICAL CONTROL, THE FOLLOWING APPROXIMATE DATUM CONVERSIONS APPLY:
   - ADD 2.3 FEET TO ELEVATIONS SHOWN HEREON TO OBTAIN APPROXIMATE ELEVATIONS RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
   - SUBTRACT 0.5 FEET FROM ELEVATIONS SHOWN HEREON TO OBTAIN APPROXIMATE ELEVATIONS RELATIVE TO THE NATIONS GEODETIC VERTICAL DATUM OF 1929 (NGVD29, SOMETIMES ALSO REFERRED TO AS MEAN SEA LEVEL "MSL")
3. THE CONTRACTOR SHALL PLACE EXCAVATED CLAY ON THE EXISTING CLAY STOCKPILE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
4. PROTECT EXISTING UTILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRS ASSOCIATED WITH DAMAGES TO ANY UTILITIES INCURRED BY THE CONTRACTOR OR ASSOCIATED SUBCONTRACTORS.
5. ELEVATED STORAGE TANKS AND ELECTRICAL SUPPLY WITHIN THE FOOTPRINT OF THE PROPOSED EXCAVATION AND/OR FILLS SHALL BE REMOVED BY OTHERS.
6. SALVAGE AND DELIVER TO OWNER.

REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED
0	2023-01-13	ISSUED FOR RWQCB REVIEW	MAL	MAL	MAG	JGD

SEAL

REGISTERED PROFESSIONAL ENGINEER
JEFF DOBROWOLSKI
No. C43890
Exp. 06-30-23
CIVIL
STATE OF CALIFORNIA

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14201 DEL MONTE BOULEVARD
MONTEREY COUNTY, CA 93933-1670

CONSULTANT
wsp

SACRAMENTO OFFICE
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ROSEVILLE, CA 95678
USA
(916) 786-2424
www.golder.com

PROJECT
MONTEREY PENINSULA LANDFILL
MODULE 7 LINER DESIGN
MONTEREY COUNTY, CALIFORNIA

TITLE
MODULE 7 BASE GRADING PLAN

PROJECT NO. GL18114936 | REV. 0 | 3 of 13 | DRAWING 3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

INSTALL STRAW WATTLES EVERY 10 VERTICAL FEET ACROSS THE NEW SLOPES OF THE STOCKPILE AND PLACE EROSION CONTROL MAT AND HYDROSEED ON THE NEW SLOPES OF THE STOCKPILE

2 / 4 13

Approximate area to include Erosion Control Blanket and Straw Wattles and hydroseed

CPE FLARED INLET (TYPICAL)

1 / 4 13

PLACE EROSION CONTROL MATTING ALONG VALLEY CHANNEL TO PREVENT SURFACE WEAR

12in Ø CPE DOWN DRAINS
BENCHES AND TOP DECK GRADED TO DRAIN TOWARDS THE DOWNDRAINS

2H:1V

1 %

2 %

1.5ft HIGH BERM ALONG THE OUTER EDGE OF EACH BENCH

LANDFILL LIMIT

PROPERTY BOUNDARY

Dense Trees

Brush

Equipment

0 40 80
1" = 40'
FEET

NOTE(S)

1. TOPOGRAPHY PROVIDED BY AERIAL PHOTOMAPPING SERVICES. DATE OF TOPOGRAPHY: JULY 7, 2022.
2. ELEVATIONS SHOWN HEREON ARE RELATIVE TO A PERPETUATED LOCAL DATUM, BASED ON RECOVERED LOCAL SITE CONTROL STATIONS. AS ESTABLISHED BY SUBSEQUENT GPS SURVEY TIES TO KNOWN VERTICAL CONTROL, THE FOLLOWING APPROXIMATE DATUM CONVERSIONS APPLY:
   - 2.1. ADD 2.3 FEET TO ELEVATIONS SHOWN HEREON TO OBTAIN APPROXIMATE ELEVATIONS RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
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3. STOCKPILE GRADING SHOWS THE MAXIMUM STOCKPILE CAPACITY AND DOES NOT REFLECT THE CURRENT GRADES. CONTRACTOR IS EXPECTED TO CONFORM TO THE GRADING PLAN AND CONSTRUCT SLOPES, BENCHES, AND ASSOCIATED BERMS IN AREAS WHERE THE CONTRACTOR PLACES FILLS TO THE BENCH ELEVATIONS. CONTRACTOR WILL ALSO EXTEND AND/OR RELOCATE DOWNDRAINS AS NECESSARY.

REV.	YYYY-MM-DD	DESCRIPTION	DESIGNED	PREPARED	REVIEWED	APPROVED
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PROJECT
MONTEREY PENINSULA LANDFILL
MODULE 7 LINER DESIGN
MONTEREY COUNTY, CALIFORNIA

TITLE
MODULE 7 STOCKPILE PLAN

PROJECT NO. GL18114936 | REV. 0 | 4 of 13 | DRAWING 4

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

0 1in