

Meiners Oaks Water District Ojai, Ca Request for final Design

REQUEST FOR PROPOSAL

Final Design:

Final design engineering for .75 MG tank foundation

Proposal due

July 10, 2014

5:00 pm

For:

Meiners Oaks Water District

202 W. El Roblar

Ojai, Ca 93023

Issue Date: 6//14

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Attachments:

Geotechnical Engineering report 09-2-6 dated February 6, 2009 By Earth Systems Southern California

Addendum to Geotechnical Report dated June 20, 2012

Plasticity Index File No. VT-24086-01 dated November 14, 2012

Second Addendum to Geotechnical report 09-2-6 dated February 9, 2009

Option 1 – Complete removal and replacement of unsuitable fills and native material Bengal Engineering May 6, 2014

Site plan

Tank plumbing details

Proposal sheet

Meiners Oaks Water District Ojai, Ca Request for final Design

Topographic survey of the Tank Farm

Request for Proposal

Meiners Oaks Water District is soliciting proposals for from selected engineering firms to provide professional Geotechnical Engineering services for final design and specifications for soil repair by removal and replacement. The area to be required will support a new 750,000 gallon water storage tank and foundation. Proposal shall include fee and schedule.

Background

MOWD is a purveyor supplying domestic fire protection water in Meiners Oaks, California. MOWD owns a parcel that serves as its water storage tank farm and maintenance yard. Originally the tank farm had a capacity of 1.75 million gallons comprised of three .5 MG and one .25 MG tanks. One of the three .5 MG tanks was recently demolished and the .25 MG tank will be demolished to make room for the new .75 MG tank.

The new tank will be a welded steel unit set upon a concrete ring foundation constructed over geo grid mats. The site however, is challenging, as it once was a large open reservoir. The reservoir was previously decommissioned and filled with uncertified material including dirt, rock, concrete, asphalt, steel, and other materials. Additionally, the site has high ground water and is located in an active seismic area.

Geotechnical information on this site is in the Earth Systems Southern California (ESYS) Geotechnical Engineering Report (2009), addendum (2012). ESYS also performed other investigative tests at the site including Cone Penetration Tests (CPT). The Report, Addendum, and CPT results are attached in this RFP.

Scope of Services

The proposal must cover Geotechnical Engineering Design and Specifications for R&R of the site according to Option One, Bengal May 6, 2014.

Deliverables shall be the design and Specification for:

- Volume and Extents of uncertified fill removal
- Certified fill Material
- Drawings of solution
- Geosynthetic and soil stabilization materials
- Compaction and compacting testing requirements

General Proposal Information

1. Respondents are encouraged to carefully review this RFP and documents and provided materials in their entirety prior to preparation of proposals.
2. All proposals submitted will become the property of MOWD
3. A proposal may be considered non-responsive if conditional, incomplete, or if it contains alterations of form, additions not called for, or other irregularities that may constitute a material change to the proposal.
4. Proposals must be valid for a period of at least three (3) months from closing date and time of this solicitation. Proposals may not be withdrawn after the submission date.
5. MOWD reserves the right to:
 - Reject any and all proposals;
 - Select the proposal most advantageous to MOWD;
 - Verify all information submitted in the proposal;

Meiners Oaks Water District Ojai, Ca Request for final Design

- Withdraw this solicitation at any time without prior notice and furthermore, makes no representations that any contract will be awarded to any respondent responding to this solicitation;
- Negotiate the final contract with any respondent (s) as necessary to serve the best interests of MOWD;
- Amend this solicitation;
- Amend the final contract to incorporate necessary attachments and exhibits or to reflect negotiations between MOWD and the successful respondent.

Anticipated Schedule

This solicitation is subject to the following schedule:

- | | |
|---|-----------------------|
| • Solicit proposals | Week of June 23, 2014 |
| • Last Day for respondent comments or questions | July 7, 2014 |
| • Proposals Due MOWD office | 5:00 pm July 10, 2014 |
| • Notice of Recommended award to Board of Directors | July 15, 2014 |
| • Notice to proceed | July 16, 2014 |

Terms

Respondents are required to be California Registered Civil or Geotechnical Engineers.

Proposals shall be received by MOWD no later than July 10, 2014 5:00 pm

The final proposal fee shall be submitted as a Fixed-Fee total. Respondent shall also include a Fee Schedule.

Fixed Fee proposals shall be presented in this RFP.

A time frame for completion shall be included in the proposal. The time to complete will be evaluated and is an important component of this proposal. The time frame will be part of the negotiated contract terms.

MOWD and the selected Consultant will negotiate contract terms after selection.

The project will be awarded upon signing of an agreement or contract that outlines terms, scope, fee and other necessary items.

Qualifying Experience

The ideal responder will have relevant experience in Geotechnical Engineering and Soils repair.

Respondent shall provide a description along with contact information for any similar project experience that reflects work relevant to this project.



Earth Systems
Southern California

1731-A Walter Street
Ventura, CA 93003
(805) 642-6727
FAX (805) 642-1325

June 20, 2012

VT-24086-01
12-6-23

Meiners Oaks County Water District
Attention: Mike Hollebrands
202 W. El Roblar Drive
Meiners Oaks, California 93023

Project: Proposed Replacement Water Tanks
Meiners Oaks County Water District
Meiners Oaks Area of Ventura County, California
Subject: Addendum to Geotechnical Engineering Report
Reference: Geotechnical Engineering Report, Two Proposed Water Tanks, Meiners Oaks Water District, Meiners Oaks area of Ventura County, California. File VT-24086-01, Report 09-2-6, February 6, 2009, Earth Systems Southern California

Introduction

As authorized we have performed additional field studies to supplement the recommendations within the referenced Geotechnical Engineering Report for the proposed replacement water tanks. The additional field studies were necessary to define the depths of uncertified fills and current groundwater elevations. The following letter summarizes our field study and provides additional design parameters and geotechnical considerations.

Field Study

On May 2, 2012, four additional test pits were excavated near the proposed limits of the new tank diameters (see attached Site Plan). Bedrock was encountered in two of the test pits, but fill soils were not penetrated in two of the test pits because of a shallow water table. On May 30, 2012, two borings were drilled near the proposed limits of the new tank diameters. These borings penetrated the fill soils and encountered bedrock. The maximum depth explored within the test pits and borings was about 25.5 feet below the existing grade. The test pits were excavated with a subcontracted backhoe. The borings were drilled using a solid stem 8-inch, diameter, hollow stem auger powered by a CME-75 truck mounted drilling rig.

Samples within the test pits were obtained with a relatively lightweight hand sampler. Samples in the borings were obtained using an above ground automatic trip hammer. The samples within the borings were obtained by driving the samplers with a 140-pound automatic trip hammer dropping 30 inches in accordance with ASTM D 1586. The approximate locations of the test pits and borings were determined in the field by pacing and sighting, and are shown on the attached Site Plan. Samples were obtained within the test pits and borings with a Modified California (M.C.) ring sampler (ASTM D 3550 with shoe similar to ASTM D 1586), and with a Standard

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Penetration Test (SPT) sampler (ASTM D 1586). The M.C. sampler has a 3-inch outside diameter and a 2.37-inch inside diameter. The SPT sampler has a 2-inch outside diameter and a 1.37-inch inside diameter. Bulk samples of the soils encountered were gathered from the excavation/auger cuttings. The final logs of the test pits and borings represent our interpretation of the contents of the field logs and the results of laboratory testing performed on the samples obtained during the subsurface study. The final logs are attached.

Revised Seismic Design Parameters

The site is located in southern California which is within an active seismic area where large numbers of earthquakes are recorded each year. Historically, major earthquakes felt in the vicinity of the Ojai area have originated from faults outside the area. These include the 1812 Santa Barbara Channel Earthquake, 1857 Fort Tejon earthquake, the 1872 Owens Valley earthquake, and the 1952 Arvin-Tehachapi earthquake.

This site, like all other sites in the general area, can be affected by moderate to major earthquakes centered on faults in southern California. An estimate of the seismic shaking that the proposed development could experience was made by a calculation (dividing the S_{DS} seismic design value by 2.5) as recommended in the 2010 California Building Code. This calculation results in an estimated peak horizontal ground acceleration of about 0.62-g.

The latest adopted version of the California Building Code (2010) specifies that peak ground acceleration for design purposes can be determined either from a site-specific study taking into account soil amplification effects or from results of regional probabilistic analyses of spectral accelerations with adjustments made based on subject site soil profile. The second option has been chosen for this study. The United States Geological Survey (USGS) has undertaken a probabilistic earthquake analysis that covers the continental United States. Determined spectral acceleration values can be adjusted for five common soil/rock classes. The site geographic coordinates (34.4624° north latitude and 119.2771° west longitude) were input into the USGS's web based Seismic Hazard Curves and Uniform Response Spectra calculator to determine the site's short term (0.2 sec.) and long term (1.0 sec.) spectral accelerations. Spectral acceleration parameters that are applicable to seismic design as well as a list of nearby faults are attached to this letter.

Additional Geotechnical Considerations

It is our understanding that two to three of the existing water tanks may be replaced by two new water tanks because of performance and capacity issues. Since the preparation of the referenced Geotechnical Engineering Report, the past topographic map representing the open reservoir has been overlain with the current topography and tank/building locations. This overlay map indicates approximately 30 feet of uncertified fill at the center of the reservoir and areas of the uncertified fill under the portions of the existing tanks. This is consistent with the results of the previous (ESSC 2009) and current field explorations.

The referenced Geotechnical Engineering Report provided five methods for mitigating the potential settlement below the proposed water tanks. It is our understanding that the Client's preferred method is utilizing rammed aggregate piers (RAP's). As previously discussed in the referenced report, the contractor should determine the RAP's construction feasibility and design. This design should include depth, spacing, and diameter of the RAP's. At a minimum the RAP's

June 20, 2012


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should be overlain by an approximately 5-foot mat of engineered fill to provide a uniform support for the tank base. Any dewatering for construction purposes should be performed cautiously to minimize the effect of reducing pore water pressure and buoyancy forces which could lead to additional settlement below the existing tanks for which removal is not planned.

Please call if you have any questions, or if we can be of further service.


Respectfully submitted,

EARTH SYSTEMS SOUTHERN CALIFORNIA


Todd J. Tranby
Engineering Geologist



Reviewed and Approved

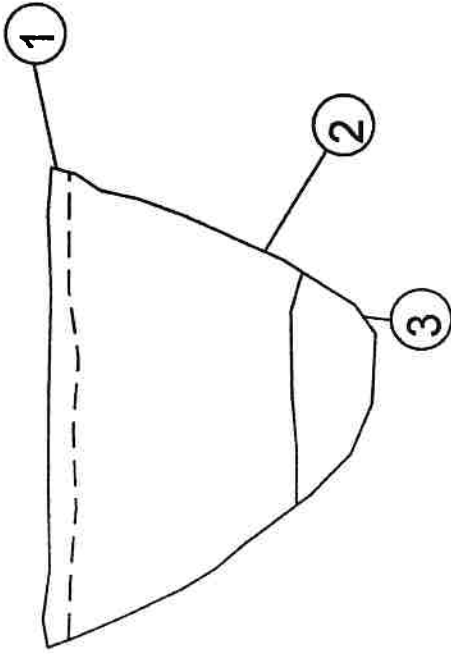

Richard M. Beard
Geotechnical Engineer



Attached: Test Pit Logs
Boring Logs
Site Plan
Earthquake Hazard Analysis
2010 California Building Code (CBC) (ASCE 7-05) Seismic Design Parameters
Table 1 Fault Parameters

Copies: 3 - Meiners Oaks County Water District; Attention: Mike Hollebrands
1 - WREA; Attention: Barney Caudill
1 - Project File

N35E
↓



DESCRIPTIONS

1. **TOPSOIL (SM):** Silty fine sand with; slightly moist; loose to medium dense; brown.
2. **SOIL (SM):** Silty fine to medium sand; moist; medium dense to dense; dark brown.
3. **WEATHERED BEDROCK (Tsp):** Fine to medium Sespe sandstone weathers to silty fine to medium sand; moist; dense to very dense; dark brown.

FINAL DEPTH: 9.0 FEET
RING SAMPLE @ 3.0 FEET
RING SAMPLE @ 5.0 FEET
RING SAMPLE @ 7.0 FEET
BULK SAMPLE @ 0-5 FEET
NO GROUNDWATER ENCOUNTERED

TEST PIT #9

Meiners Oaks Water District
Ventura County, CA



Earth Systems
Southern California

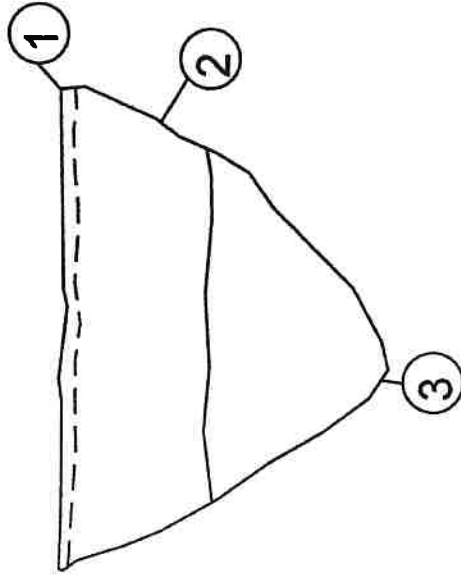
May 2, 2012 VT-24086-01

SCALE: 1" = 5' (VERTICAL & HORIZONTAL)

N22E
←

DESCRIPTIONS

1. **TOPSOIL (SM)**: Silty fine sand with; slightly moist; loose to medium dense; brown.
2. **ARTIFICIAL FILL (SM)**: Silty clayey sand with some fine to medium gravel; moist; medium dense to dense; yellow brown.
3. **ARTIFICIAL FILL (SC)**: Clayey silty sand to sandy silty clay; moist to wet; medium dense to loose; red brown.



FINAL DEPTH: 9.0 FEET
RING SAMPLE @ 3.0 FEET
RING SAMPLE @ 7.0 FEET
BULK SAMPLE @ 0-5 FEET
GROUNDWATER ENCOUNTERED @ 9.0 FEET
GROUNDWATER STABILIZED @ 8.5 FEET

TEST PIT #10

Meiners Oaks Water District
Ventura County, CA

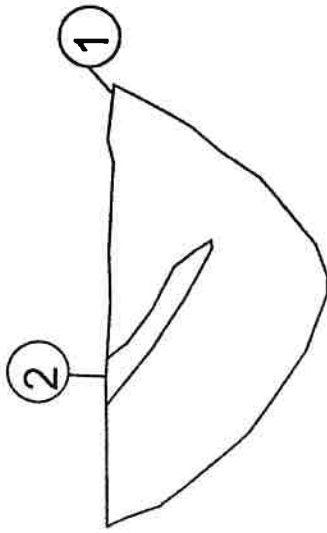


Earth Systems
Southern California

May 2, 2012 VT-24086-01

SCALE: 1" = 5' (VERTICAL & HORIZONTAL)

N15E
←



DESCRIPTIONS

1. **WEATHERED BEDROCK (TSP):** Fine to coarse Sespe sandstone weathers to fine to coarse silty sand; moist; dense to very dense; yellow brown.
2. **WEATHERED BEDROCK (TSP):** Sespe siltstone, moist; dense; dark brown.

FINAL DEPTH: 6.5 FEET
RING SAMPLE @ 3.0 FEET
RING SAMPLE @ 5.0 FEET
BULK SAMPLE @ 0-5 FEET
NO GROUNDWATER ENCOUNTERED

TEST PIT #11

Meiners Oaks Water District
Ventura County, CA

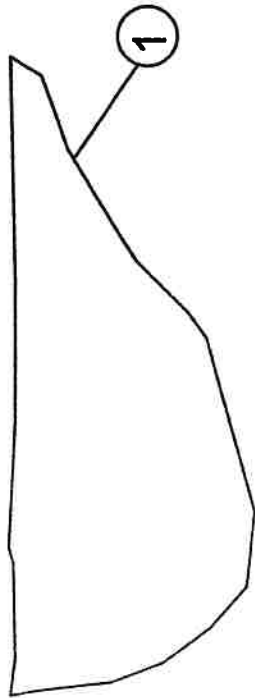


Earth Systems
Southern California

May 2, 2012 VT-24086-01

SCALE: 1" = 5' (VERTICAL & HORIZONTAL)

N32E
↓



DESCRIPTIONS

1. **ARTIFICIAL FILL (SM/GW):** Silty sand with boulders, concrete debris, metal debris, and brick debris; slightly moist; medium dense to loose; brown.

FINAL DEPTH: 6.5 FEET
NO GROUNDWATER ENCOUNTERED

TEST PIT #12

Meiners Oaks Water District
Ventura County, CA



Earth Systems
Southern California

May 2, 2012 VT-24086-01

SCALE: 1" = 5' (VERTICAL & HORIZONTAL)

**BORING NO: 1**

PROJECT NAME: Meiners Oaks Water District

PROJECT NUMBER: VT-24086-01

BORING LOCATION: Per Plan

DRILLING DATE: May 30, 2012

DRILL RIG: CME-75

DRILLING METHOD: 8" Hollow Stem

LOGGED BY: G. Olin

Vertical Depth	Sample Type			PENETRATION RESISTANCE (BLOWS/6"	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
	Bulk	SPT	Mod. Calif.						
0									
5				4/4/3		SM			ARTIFICIAL FILL: Silty fine sand with concrete, asphalt, and rock gravel; slightly moist; loose; moderate yellowish brown
				2/3/2		SM			ARTIFICIAL FILL: Same as above
10				P/P/P		ML			ARTIFICIAL FILL: Very fine sandy silt; wet; very soft; dark yellowish brown
15				18/38/50 for 5.5"		TSP			SESPE FORMATION: Fine sandy siltstone to silty sandstone; slightly moist to moist; very hard; dark reddish brown; calcium carbonate in fractures
20				46/50 for 5"		TSP			SESPE FORMATION: Fine to medium silty sandstone; slightly moist to moist; very hard; yellow brown
25				50 for 5"		TSP			SESPE FORMATION: Same as above
30									TOTAL DEPTH: 25.5 Feet Water Encountered From 8 to 13.5 Feet
35									

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.

**BORING NO: 2**

PROJECT NAME: Meiners Oaks Water District

PROJECT NUMBER: VT-24086-01

BORING LOCATION: Per Plan

DRILLING DATE: May 30, 2012

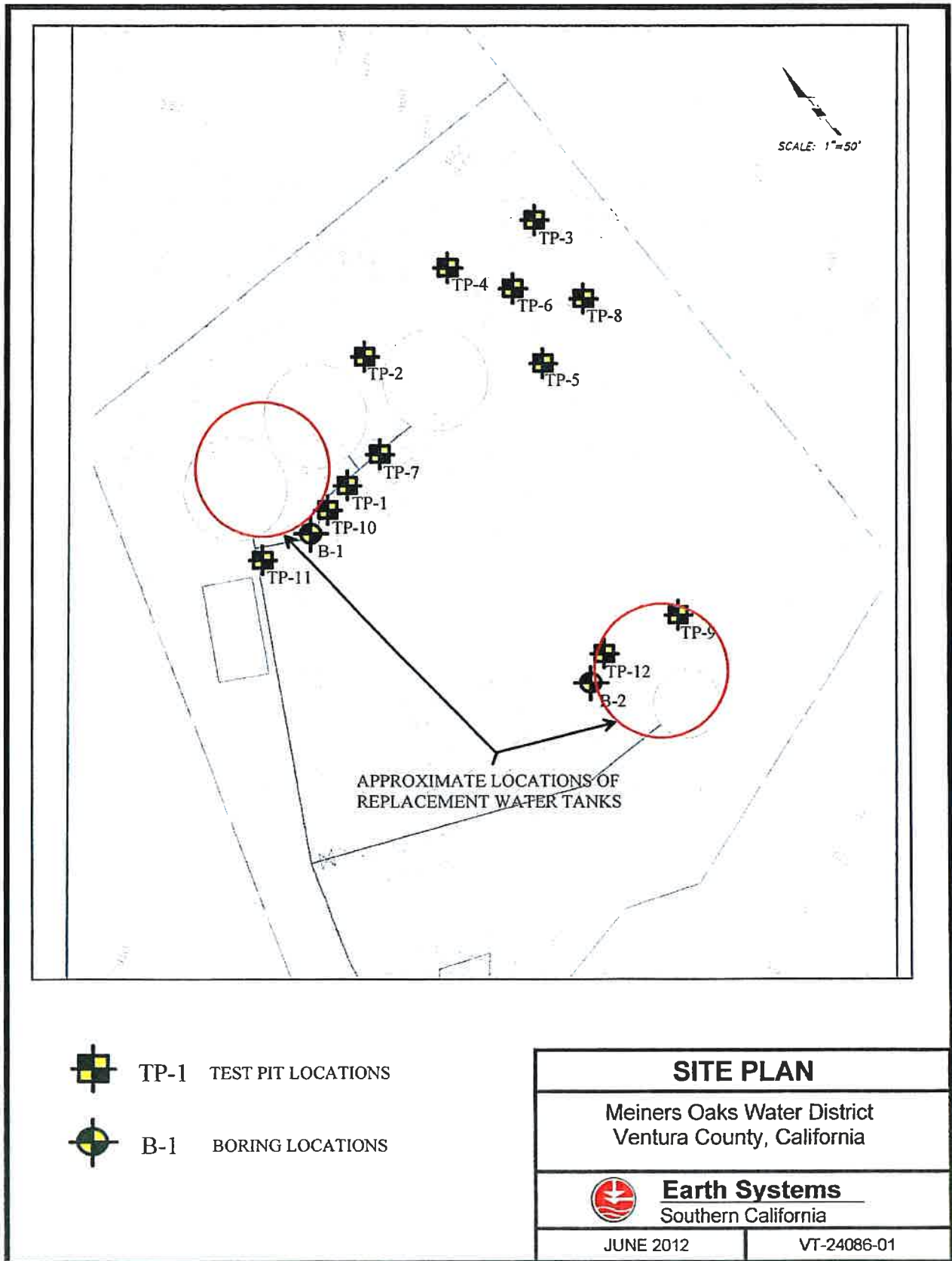
DRILL RIG: CME-75

DRILLING METHOD: 8" Hollow Stem

LOGGED BY: G. Olin

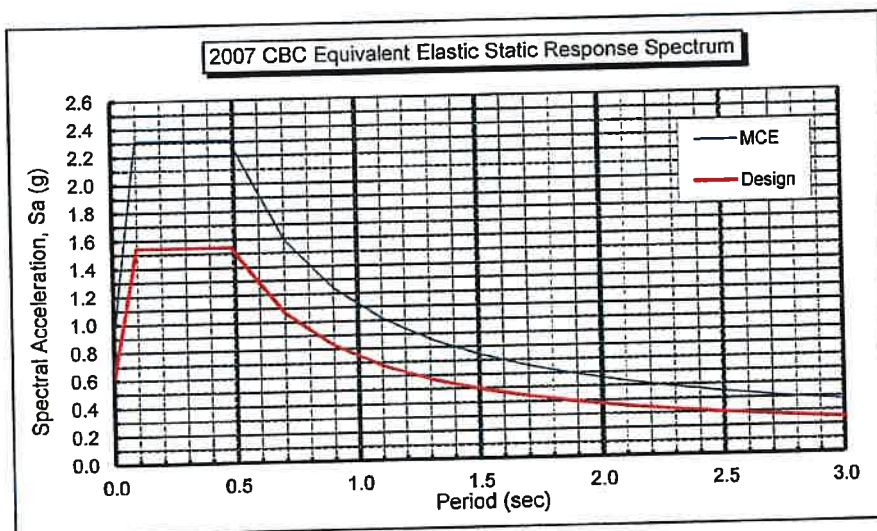
Vertical Depth	Sample Type			PENETRATION RESISTANCE (BLOWS/6"	SYMBOL	USCS CLASS	UNIT DRY WT. (pcf)	MOISTURE CONTENT (%)	DESCRIPTION OF UNITS
	Bulk	SPT	Mod. Calif.						
0									
5				8/20/12		SM			ARTIFICIAL FILL: Silty fine sand with concrete, asphalt, and rock gravel; slightly moist; loose; moderate yellowish brown
10				5/8/5		SC			ALLUVIUM: Clayey silty sand; moist to wet; loose; dark gray
15				6/2/3		SC			ALLUVIUM: Gravelly clayey silty sand; wet; loose; mottled dark gray
20				50 for 5.5"		TSP			SESPE FORMATION: Fine sandy siltstone to silty sandstone; slightly moist to moist; very hard; dark reddish brown; calcium carbonate in fractures
25				50 for 5.5"		TSP			SESPE FORMATION: Same as above
30									TOTAL DEPTH: 25.5 Feet Water Encountered From 8 to 16 Feet
35									

Note: The stratification lines shown represent the approximate boundaries between soil and/or rock types and the transitions may be gradual.



2010 California Building Code (CBC) (ASCE 7-05) Seismic Design Parameters

			<u>CBC Reference</u>	<u>ASCE 7-05 Reference</u>
Seismic Design Category	E		Table 1613.5.6	Table 11.6-2
Site Class	C		Table 1613.5.2	Table 20.3-1
Latitude:	34.462 N			
Longitude:	-119.277 W			
<u>Maximum Considered Earthquake (MCE) Ground Motion</u>				
Short Period Spectral Response	S_s	2.310 g	Figure 1613.5	Figure 22-3
1 second Spectral Response	S_1	0.857 g	Figure 1613.5	Figure 22.4
Site Coefficient	F_a	1.00	Table 1613.5.3(1)	Table 11.4-1
Site Coefficient	F_v	1.30	Table 1613.5.3(2)	Table 11-4.2
	S_{MS}	2.310 g	$= F_a * S_s$	
	S_{M1}	1.114 g	$= F_v * S_1$	
<u>Design Earthquake Ground Motion</u>				
Short Period Spectral Response	S_{DS}	1.540 g	$= 2/3 * S_{MS}$	
1 second Spectral Response	S_{D1}	0.743 g	$= 2/3 * S_{M1}$	
	T_o	0.10 sec	$= 0.2 * S_{D1} / S_{DS}$	
	T_s	0.48 sec	$= S_{D1} / S_{DS}$	



Design	
Period T (sec)	Sa (g)
0.00	0.616
0.05	1.095
0.10	1.540
0.48	1.540
0.70	1.061
0.90	0.825
1.10	0.675
1.30	0.571
1.50	0.495
1.70	0.437
1.90	0.391
2.10	0.354
2.30	0.323
2.50	0.297
2.70	0.275
2.90	0.256

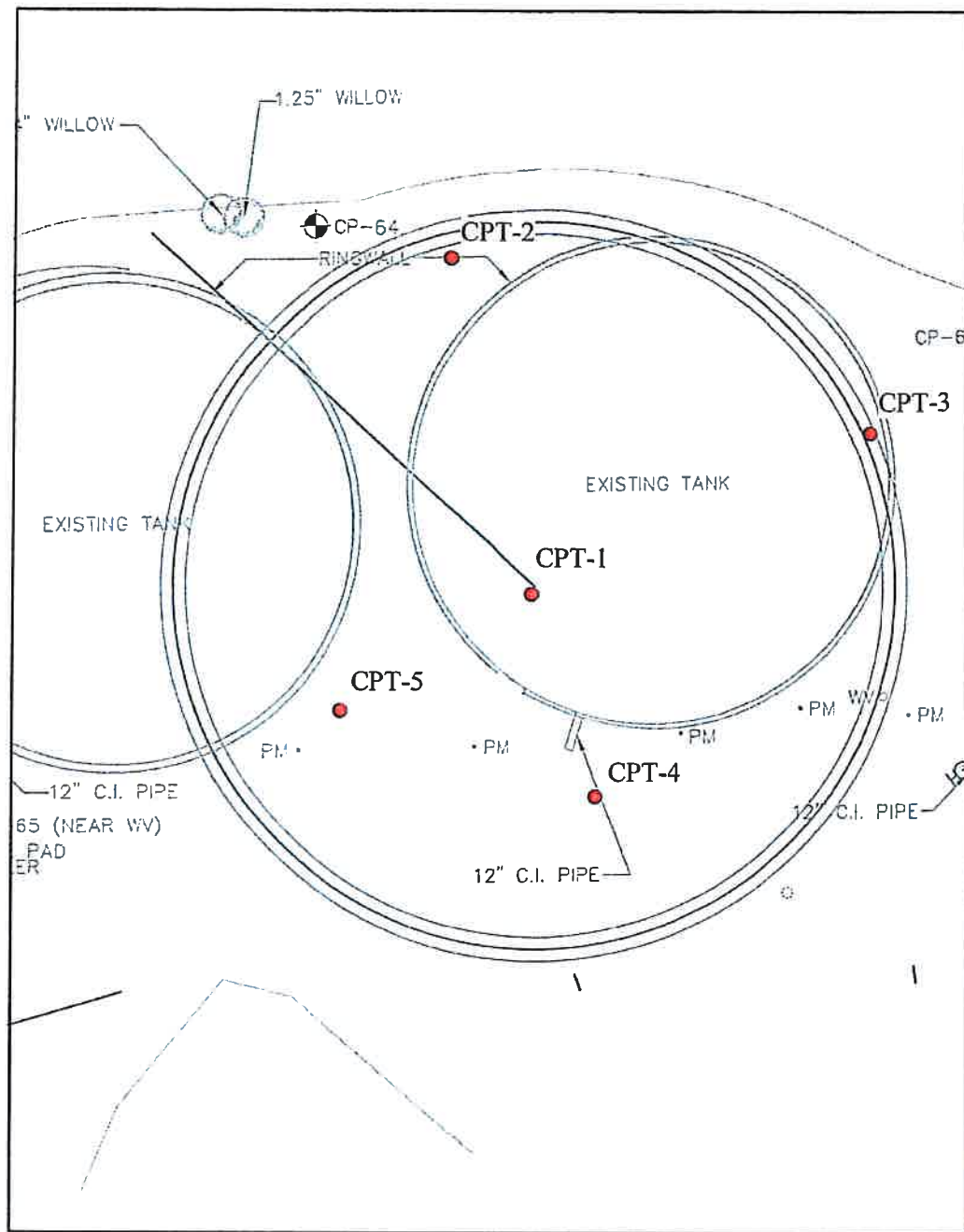
Table 1
Fault Parameters

Fault Section Name	Distance		Avg Dip	Avg Dip	Avg Rake	Trace Length	Fault Type	Mean Mag	Mean Return Interval	Slip Rate
	(miles)	(km)	(deg.)	Direction (deg.)	(deg.)	(km)			(years)	(mm/yr)
Mission Ridge-Arroyo Parida-Santa Ana	2.0	3.2	70	176	90	69	B	6.8		0.4
Santa Ynez (East)	3.7	5.9	70	172	0	68	B	7.2		2
Sisar	4.2	6.8	29	168	na	20	B'	7.0		
San Cayetano	6.8	10.9	42	3	90	42	B	7.2		6
Red Mountain	8.7	14.0	56	2	90	101	B	7.4		2
Pine Mtn	9.8	15.7	45	5	na	62	B'	7.3		
Ventura-Pitas Point	11.4	18.4	64	353	60	44	B	6.9		1
North Channel	13.0	20.9	26	10	90	51	B	6.7		1
Oak Ridge (Onshore)	14.4	23.1	65	159	90	49	B	7.2		4
Oak Ridge (Offshore)	14.6	23.4	32	180	90	38	B	6.9		3
Big Pine (Central)	15.0	24.1	76	167	na	23	B'	6.3		
Big Pine (West)	16.4	26.4	50	2	na	18	B'	6.5		
Big Pine (East)	19.6	31.5	73	338	na	23	B'	6.6		
Simi-Santa Rosa	19.7	31.8	60	346	30	39	B	6.8		1
Santa Ynez (West)	20.6	33.1	70	182	0	63	B	6.9		2
Pitas Point (Upper)	21.3	34.3	42	15	90	35	B	6.8		1
Nacimiento	22.7	36.5	66	40	na	113	B'	7.1		
Pitas Point (Lower)-Montalvo	23.1	37.2	16	359	90	30	B	7.3		2.5
Channel Islands Western Deep Ramp	27.0	43.4	21	204	90	62	B'	7.3		
Oak Ridge (Offshore), west extension	27.0	43.5	67	195	na	28	B'	6.1		
Malibu Coast (Extension), alt 1	27.1	43.7	74	4	30	35	B'	6.5		
Malibu Coast (Extension), alt 2	27.1	43.7	74	4	30	35	B'	6.9		
San Andreas (Big Bend)	27.9	45.0	90	198	180	50	A	7.8	108	34
San Gabriel	28.7	46.2	61	39	180	71	B	7.3		1
Santa Susana, alt 2	29.5	47.4	53	10	90	43	B'	6.8		
Holser, alt 1	29.9	48.1	58	187	90	20	B	6.7		0.4
Holser, alt 2	29.9	48.1	58	182	90	17	B'	6.7		
Del Valle	29.9	48.1	73	195	90	9	B'	6.3		
Santa Susana, alt 1	29.9	48.1	55	9	90	27	B	6.8		5
Channel Islands Thrust	30.2	48.5	20	354	90	59	B	7.3		1.5
Garlock (West)	32.2	51.8	90	149	0	98	A	7.6	493	6
Northridge	32.3	52.0	35	201	90	33	B	6.8		1.5
San Andreas (Mojave N)	32.4	52.2	90	199	180	37	A	7.8	106	27
Pitas Point (Lower, West)	32.5	52.3	13	3	90	35	B	7.2		2.5
South Cuyama	33.0	53.1	33	210	na	48	B'	6.8		
Pleito	33.1	53.3	46	181	90	44	B	7.1		2
Santa Cruz Island	33.1	53.3	90	188	30	69	B	7.1		1
San Andreas (Carrizo) rev	34.0	54.7	90	224	180	59	A	7.8	106	34
Northridge Hills	34.4	55.4	31	19	90	25	B'	7.0		
Anacapa-Dume, alt 1	34.5	55.5	45	354	60	51	B	7.2		3

Reference: USGS OFR 2007-1437 (CGS SP 203)

Based on Site Coordinates of 34.4624 Latitude, -119.2771 Longitude

Mean Magnitude for Type A Faults based on 0.1 weight for unsegmented section, 0.9 weight for segmented model (weighted by probability of each scenario with section listed as given on Table 3 of Appendix G in OFR 2007-1437). Mean magnitude is average of Ellworths-B and Hanks & Bakun moment area relationship.



● APPROXIMATE CPT LOCATION

NOT TO SCALE

SITE PLAN 1

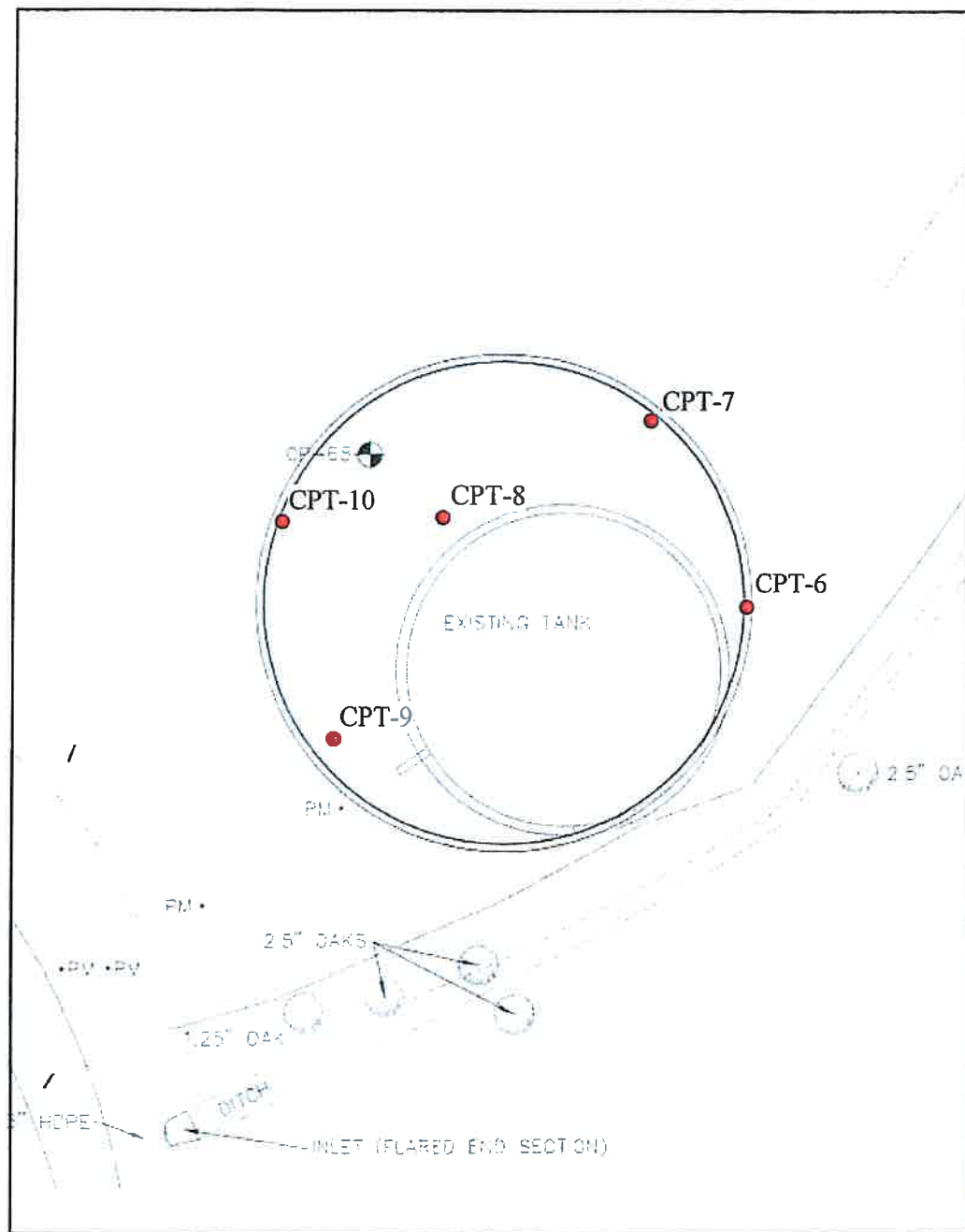
MEINERS OAKS WATER TANKS
VENTURA COUNTY, CALIFORNIA



Earth Systems
Southern California

JANUARY 2013

VT-24086-02



● APPROXIMATE CPT LOCATION

NOT TO SCALE

SITE PLAN 2

MEINERS OAKS WATER TANKS
VENTURA COUNTY, CALIFORNIA



Earth Systems
Southern California

JANUARY 2013

VT-24086-02

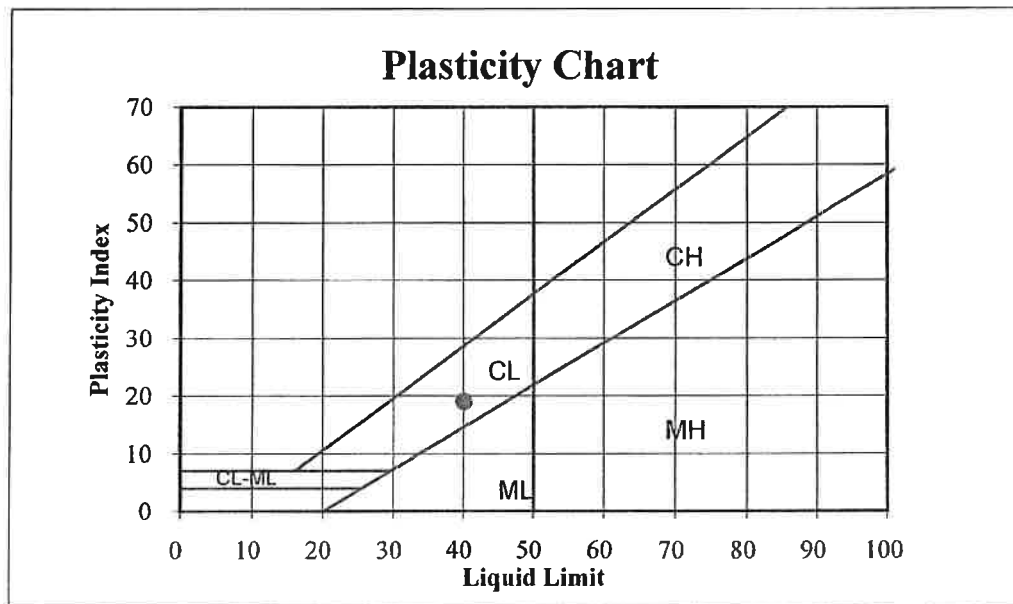
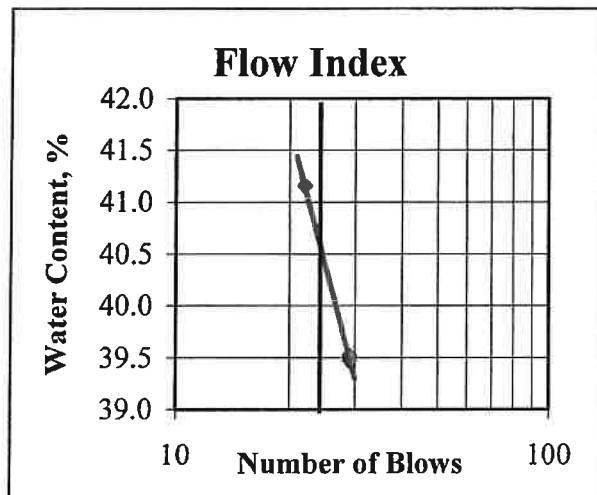
PLASTICITY INDEX

ASTM D-4318

Job Name: Meiners Oaks Water District
Sample ID: TP 13
Soil Description: CL

DATA SUMMARY**TEST RESULTS**

Number of Blows:	22	29	29	LIQUID LIMIT	40
Water Content, %	41.2	39.5	39.5	PLASTIC LIMIT	21
Plastic Limit:	21.0	21.2		PLASTICITY INDEX	19



PLASTICITY INDEX

ASTM D-4318

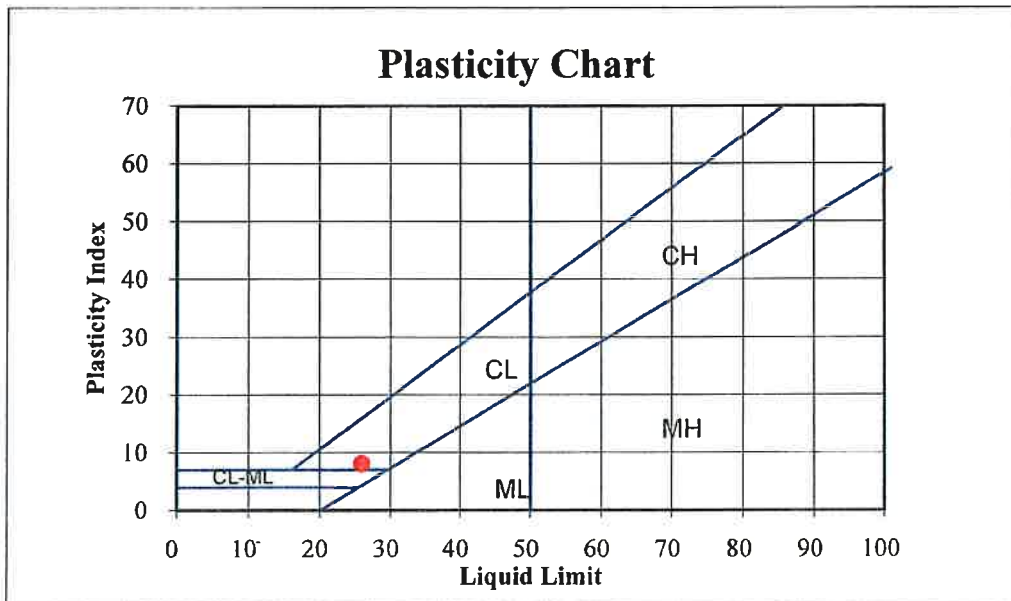
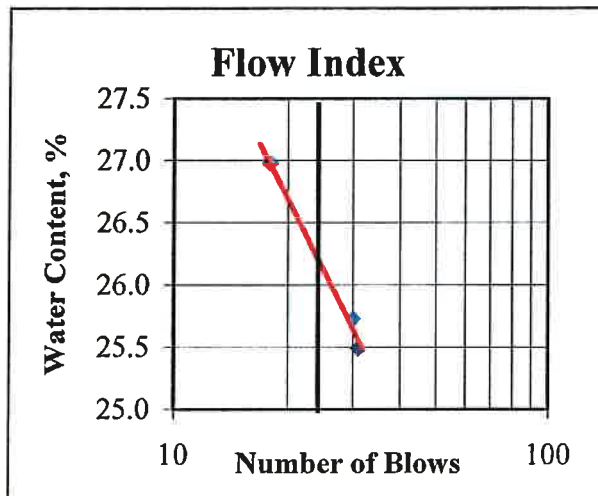
Job Name: Meiners Oaks Water District
Sample ID: TP 14
Soil Description: CL-ML

DATA SUMMARY

Number of Blows:	18	30	31
Water Content, %	27.0	25.7	25.5
Plastic Limit:	17.8	17.5	

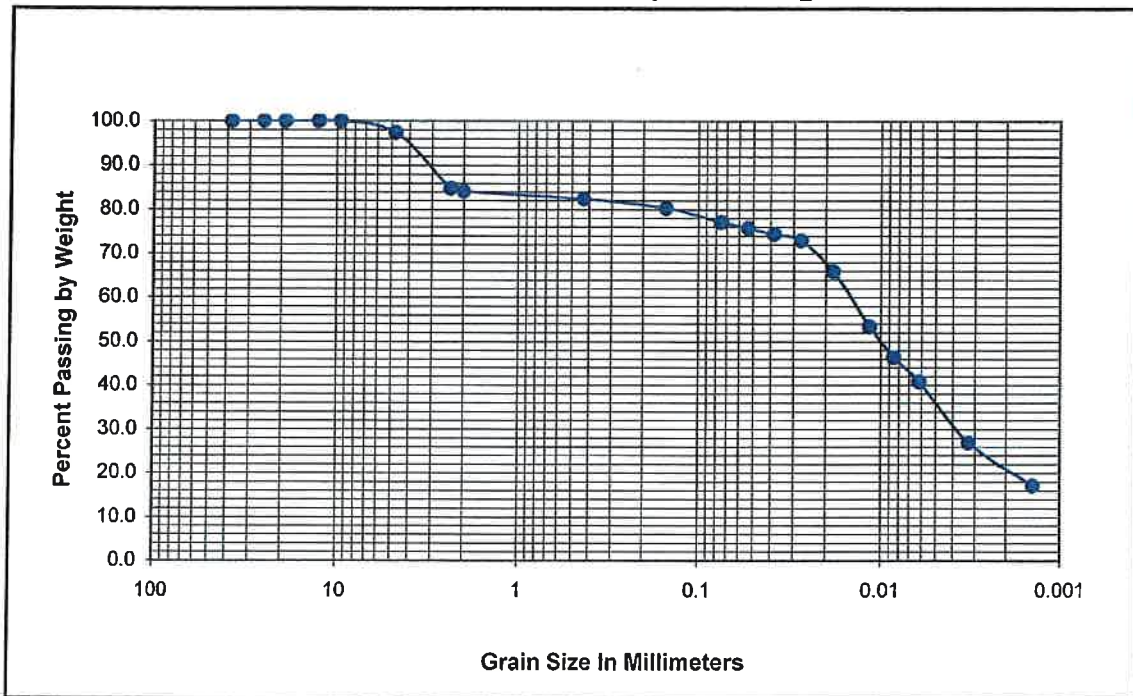
TEST RESULTS

LIQUID LIMIT	26
PLASTIC LIMIT	18
PLASTICITY INDEX	8



Sample Number TP 13
 Date: 11/14/2012
 Tech. SD

Mechanical Analysis Graph



Summary of Sieve Results

Mechanical Analysis		Hydrometer Analysis		Particle Distribution	
Sieve Size	Percent Passing	Particle Diameter	Percent Passing	Particle Name	Percent of Sample
1 1/2	100.0	0.0745	77.1	Gravel	2.6
1	100.0	0.0533	75.7	Sand	20.3
3/4	100.0	0.0381	74.3	Silt	46.8
1/2	100.0	0.0273	72.9	Clay	30.3
3/8	100.0	0.0182	65.9		
#4	97.4	0.0115	53.4		
#8	84.8	0.0084	46.4		
#10	84.1	0.0062	40.8		
#40	82.3	0.0032	26.9		
#100	80.2	0.0014	17.1		
#200	77.1				

Mieners Oaks Water District



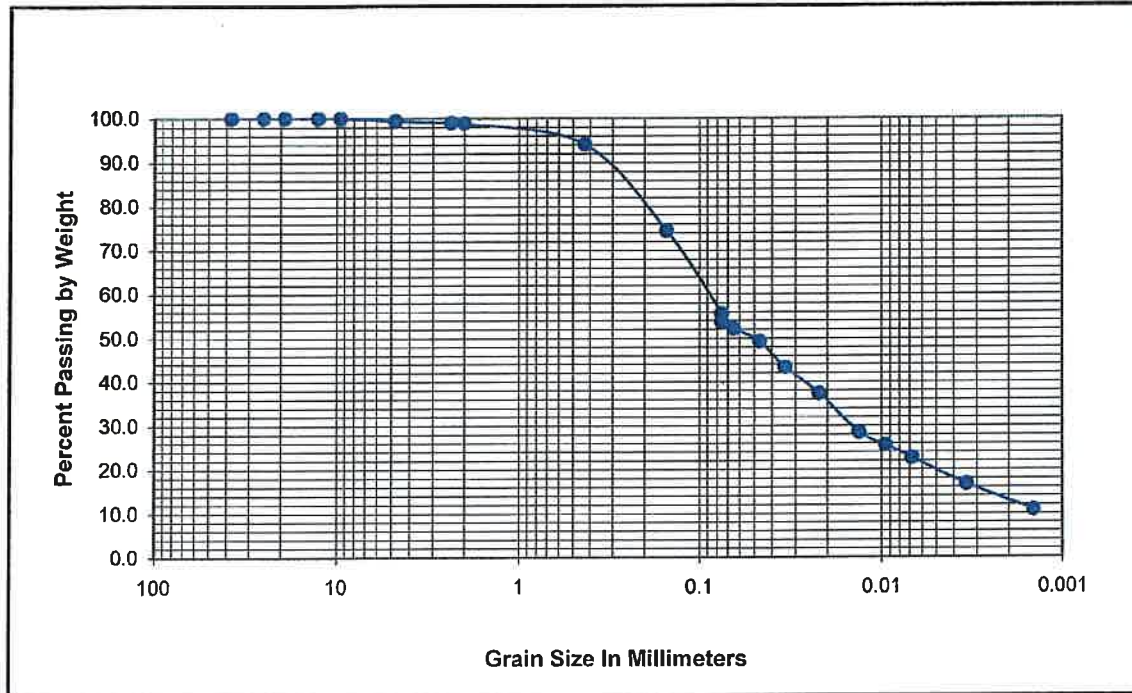
Earth Systems
 Southern California

11/14/2012

VT-24086-01

Sample Number TP 14
 Date: 11/14/2012
 Tech. SD

Mechanical Analysis Graph



Summary of Sieve Results

Mechanical Analysis	
Sieve Size	Percent Passing
1 1/2	100.0
1	100.0
3/4	100.0
1/2	100.0
3/8	100.0
#4	99.4
#8	99.0
#10	98.8
#40	94.1
#100	74.5
#200	55.5

Hydrometer Analysis	
Particle Diameter	Percent Passing
0.0746	53.6
0.0644	52.1
0.0463	49.2
0.0337	43.3
0.0220	37.4
0.0132	28.5
0.0095	25.5
0.0068	22.6
0.0034	16.7
0.0015	10.8

Particle Distribution	
Particle Name	Percent of Sample
Gravel	0.6
Sand	43.8
Silt	37.5
Clay	18.1

Mieners Oaks Water District



Earth Systems
 Southern California

11/14/2012

VT-24086-01

CERTIFICATE OF ANALYSIS

Client: Earth Systems Southern California	Date Sampled: 11/07/12
CAS LAB NO: 123321	Date Received: 11/07/12
Analyst: AN	Sample Matrix: Soil

WET CHEMISTRY SUMMARY

COMPOUND	RESULT	UNITS	DF	PQL	METHOD	ANALYZED
----------	--------	-------	----	-----	--------	----------

CAS Lab #: 123321-01
Sample ID: TP13

pH (Corrosivity)	7.3	S.U.	1	---	9045	11/08/12
------------------	-----	------	---	-----	------	----------

CAS Lab #: 123321-02
Sample ID: TP14

pH (Corrosivity)	7.2	S.U.	1	---	9045	11/08/12
Organic Matter	2.8	%	1	0.05	ASTM D2974	11/08/12



Earth Systems
Southern California

1731-A Walter Street
Ventura, CA 93003
(805) 642-6727
FAX (805) 642-1325

December 14, 2012

Project No.: VT-24086-02
Report No.: 12-12-34

Mike Hollebrands
Meiners Oaks Water District
202 W. El Roblar Drive
Meiners Oaks, California 93023

Project: Proposed Replacement Water Tanks
Meiners Oaks Water District
Meiners Oaks Area of Ventura County, California
Subject: Second Addendum to Geotechnical Engineering Report
References: 1. Geotechnical Engineering Report, Two Proposed Water Tanks, Meiners Oaks Water District, Meiners Oaks area of Ventura County, California. File VT-24086-01, Report 09-2-6, February 6, 2009, Earth Systems Southern California
2. Addendum to Geotechnical Engineering Report, Proposed Replacement Water Tanks, Meiners Oaks Water District, Meiners Oaks area of Ventura County, California. File VT-24086-01, Report 12-6-23, June 20, 2012, Earth Systems Southern California

Introduction

As authorized we have performed additional field studies and laboratory testing for the proposed replacement water tanks. The additional field studies were based on recommended testing by the construction contractor Hayward Baker. The following letter summarizes our field study and laboratory testing.

Field Study

On October 30, 2012, two additional test pits (TP-13 and TP-14) were excavated near the proposed limits of the new tank diameters (see attached Site Plan) to obtain bulk samples of the soils from the ground surface to the bottoms of the test pits. The bulk samples will be transported to Hayward Baker for soil-cement testing. The depths of the test pits were about 6.5 to 7 feet, respectively, below the existing grade. The test pits were excavated with a backhoe. The final logs of the test pits represent our interpretation of the contents of the field logs and the results of laboratory testing performed on the samples obtained during the subsurface study. The final logs are attached.

On October 30, 2012, ten cone penetrometer tests (CPT's) were performed to depths of refusal. The CPT exploration was conducted by Kehoe Testing and Engineering by hydraulically advancing a 15 cm² conical probe into the ground using an approximately 30-ton truck as a reaction mass. An electronic data acquisition system recorded a near-continuous log of the

resistance of the soil against the cone tip (Q_c) and soil friction against the cone sleeve (f_s) as the probe was advanced. Resistance readings were recorded for every 2.5 cm (about 1 inch) of depth. Empirical relationships (Robertson et al, 1990) were applied to the data to give a near-continuous profile of soil stratigraphy. Interpretation of CPT data provides correlations for SPT blow count, internal friction angle, undrained strength (S_u) of clays, and soil type. Logs of the CPT soundings are attached to this letter. The approximate locations of the CPT's were determined in the field by pacing and sighting, and are shown on the attached Site Plan.

Laboratory Testing

The results of the following laboratory testing are attached to this letter.

Plasticity index testing was performed on the two bulk samples in general accordance with ASTM 4318.

The gradation characteristics of the two bulk samples were made by hydrometer (in accordance with ASTM D 422) and sieve analysis procedures. The samples were soaked in water until individual soil particles were separated and then washed on the No. 200 mesh sieve, oven dried, weighed to calculate the percent passing the No. 200 sieve and then mechanically sieved.

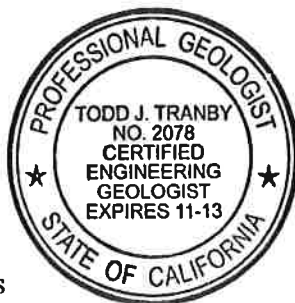
The testing of pH was performed for both of the bulk samples by Capco Analytical.

Please call if you have any questions, or if we can be of further service.

Respectfully submitted,

EARTH SYSTEMS SOUTHERN CALIFORNIA

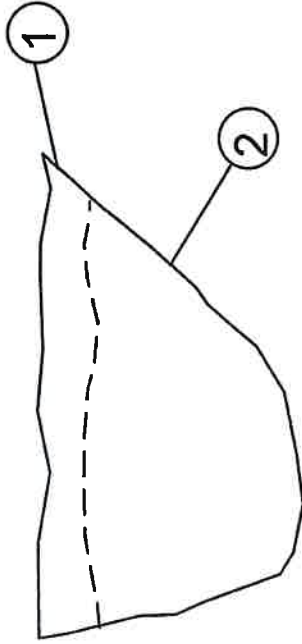
Todd J. Tranby
Engineering Geologist



Attached: Test Pit Logs
CPT Logs
Site Plan
Laboratory Data

Copies: 1 - Meiners Oaks County Water District; Attention: Mike Hollebrands
1 - WREA; Attention: Barney Caudill
1 - Hayward Baker; Attention: Lisheng Shao
1 - Project File

N27E
↓



DESCRIPTIONS

1. ARTIFICIAL FILL (SM): Silty gravelly sand; slightly moist to moist; loose to medium dense; yellow brown.

2. ARTIFICIAL FILL (ML): Sandy clayey silt; moist; medium stiff; dark brown to dark yellow brown; organics.

FINAL DEPTH: 7.0 FEET
BULK SAMPLE @ 2-7 FEET
NO GROUNDWATER ENCOUNTERED

TEST PIT #14

Meiners Oaks Water District
Ventura County, CA

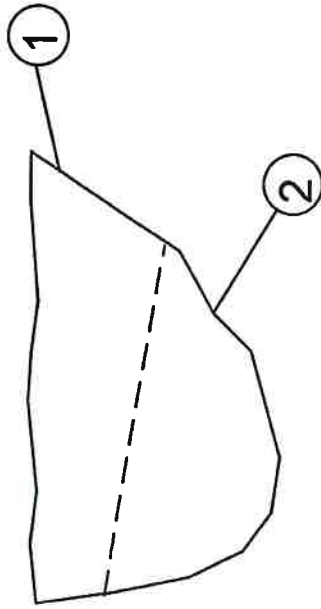


Earth Systems
Southern California

NOVEMBER 2012 | VT-24086-02

SCALE: 1" = 5' (VERTICAL & HORIZONTAL)

N10W
←



DESCRIPTIONS

1. **ARTIFICIAL FILL (SM)**: Silty sand with metal, concrete, asphalt, and wood debris; dry to slightly moist; loose; brown.
2. **SOIL (SM)**: Clayey silty sand; moist; medium dense; dark red brown.

FINAL DEPTH: 6.5 FEET
BULK SAMPLE @ 3-6 FEET
NO GROUNDWATER ENCOUNTERED

TEST PIT #13

Meiners Oaks Water District
Ventura County, CA



Earth Systems
Southern California

NOVEMBER 2012 VT-24086-02

SCALE: 1" = 5' (VERTICAL & HORIZONTAL)

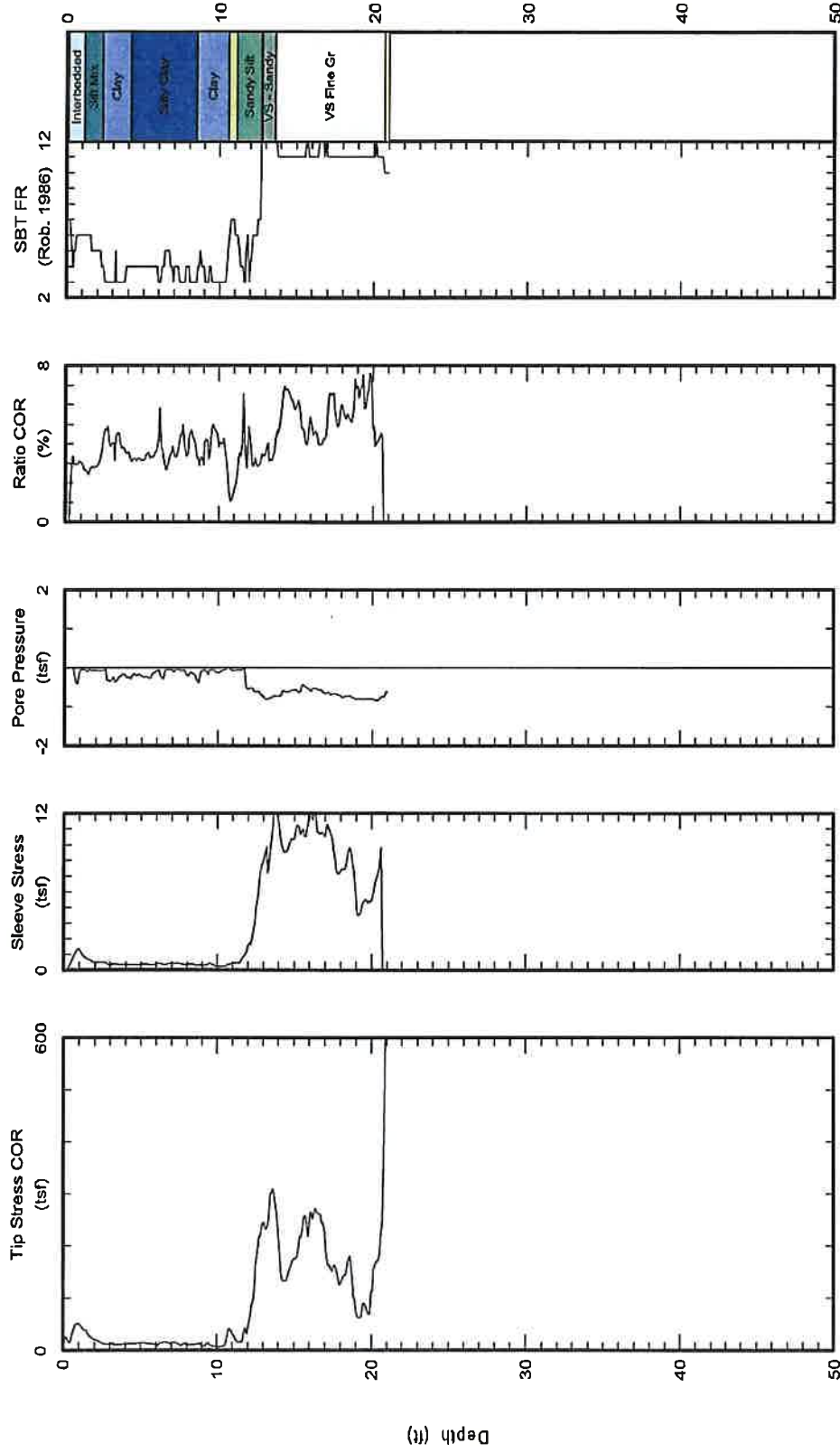


Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Customer: Earth Systems Southern California
Job Site: Water District Tank

Date: 30/Oct/2012
Test ID: CPT-1
Project: Ojai



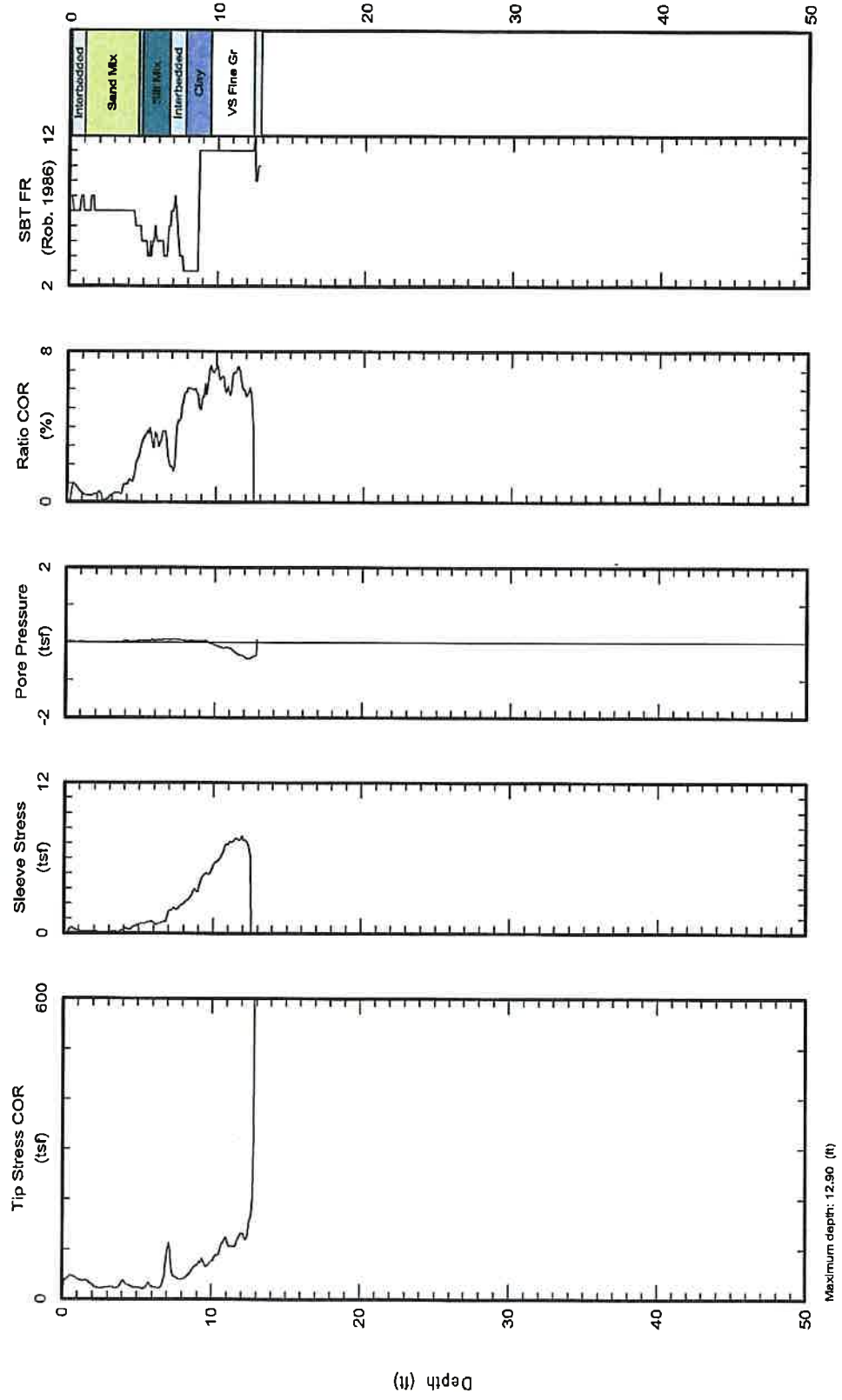


Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 30/Oct/2012
Test ID: CPT-2
Project: Ojai

Customer: Earth Systems Southern California
Job Site: Water District Tank



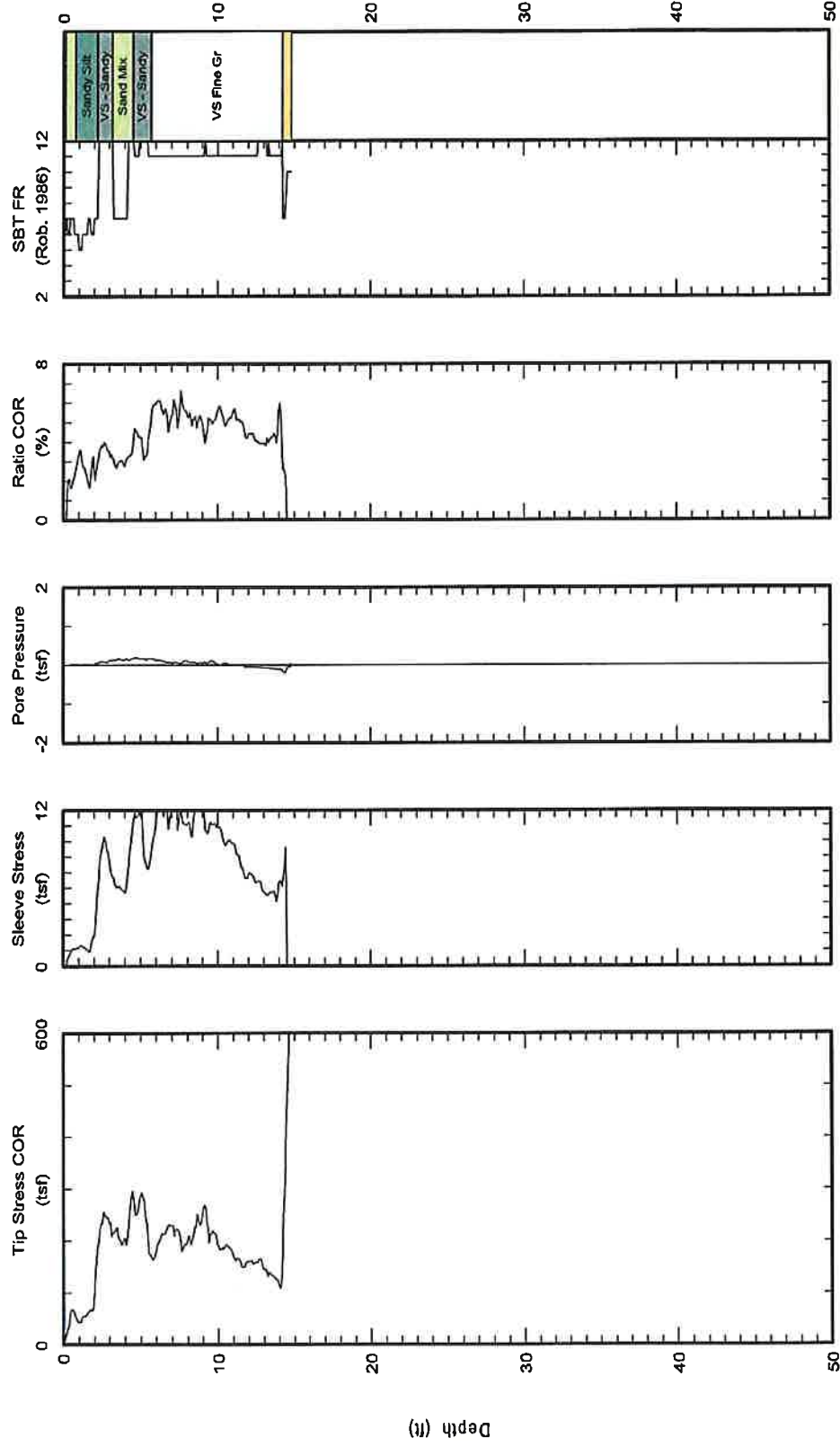


Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com


CPT Data
30 ton rig

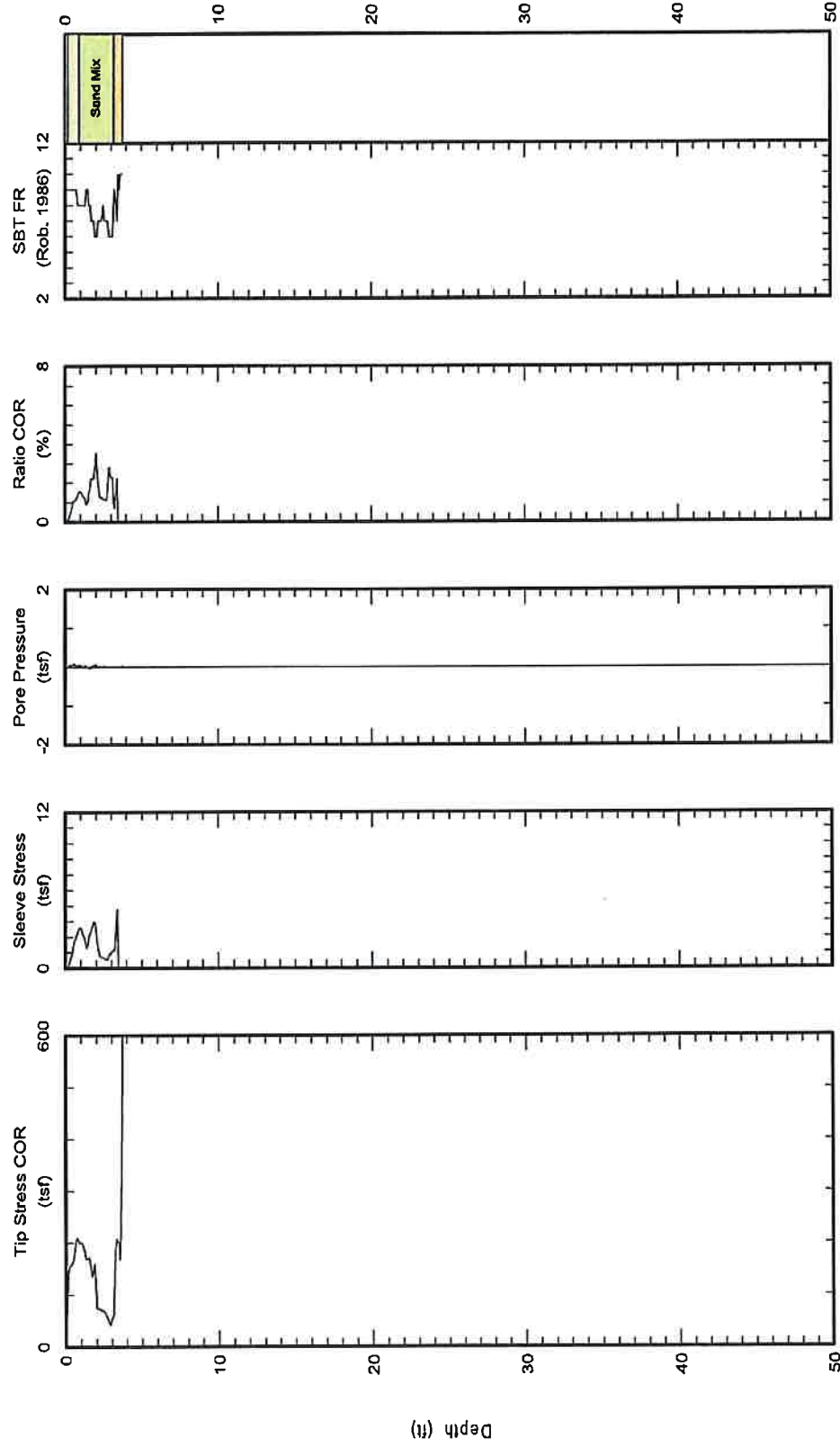
Date: 30/Oct/2012
Test ID: CPT-3
Project: Ojai

Customer: Earth Systems Southern California
Job Site: Water District Tank



Maximum depth: 14.83 (ft)

 Kehoe Testing & Engineering Office: (714) 901-7270 Fax: (714) 901-7289 rich@kehoetesting.com www.kehoetesting.com	CPT Data 30 ton rig	Date: 30/Oct/2012 Test ID: CPT-4 Project: Ojai
	Customer: Earth Systems Southern California Job Site: Water District Tank	



Maximum depth: 3.78 (ft)

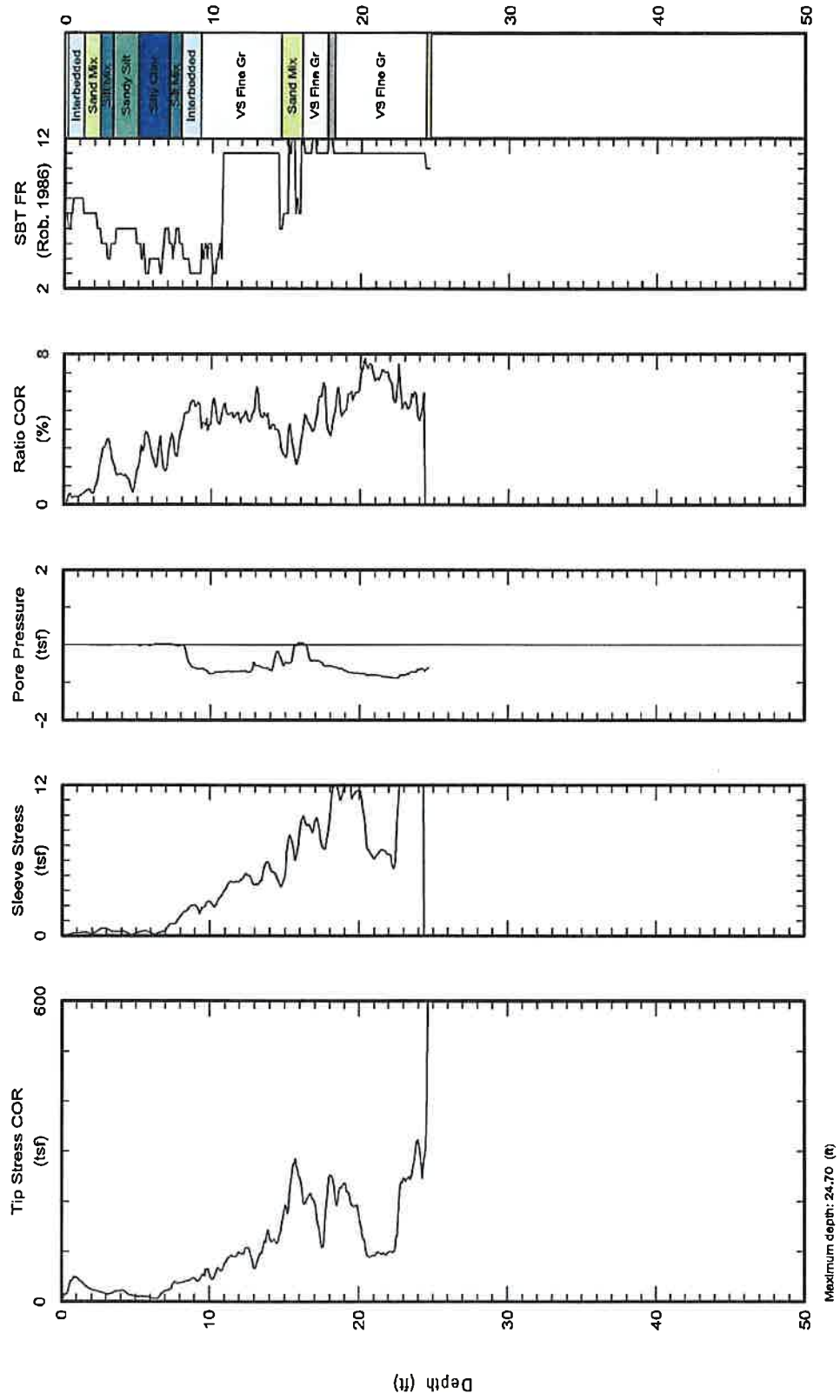


Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 30/Oct/2012
Test ID: CPT-5
Project: Ojai

Customer: Earth Systems Southern California
Job Site: Water District Tank

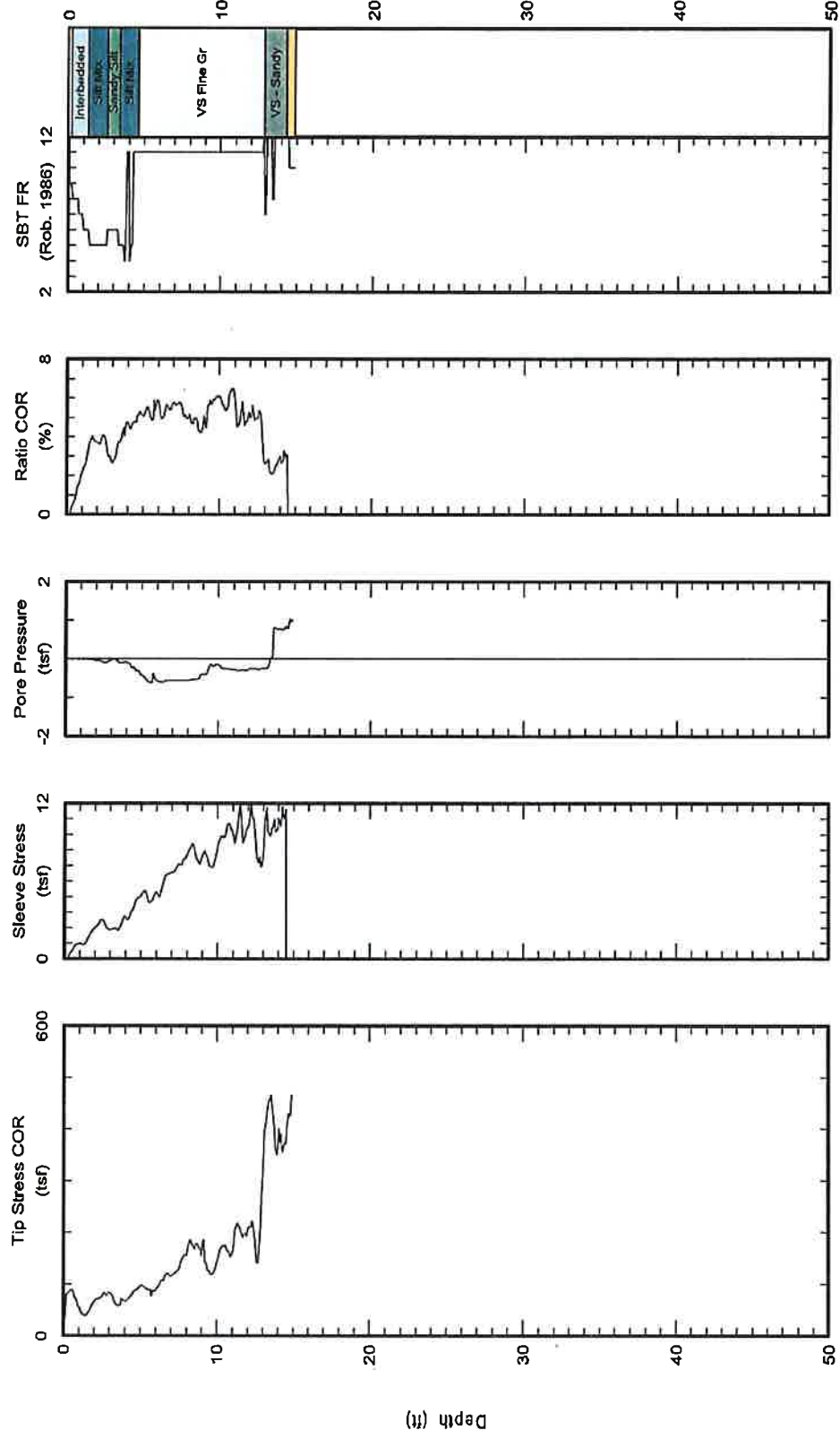




Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 30/Oct/2012
Test ID: CPT-6
Project: Ojai
Customer: Earth Systems Southern California
Job Site: Water District Tank

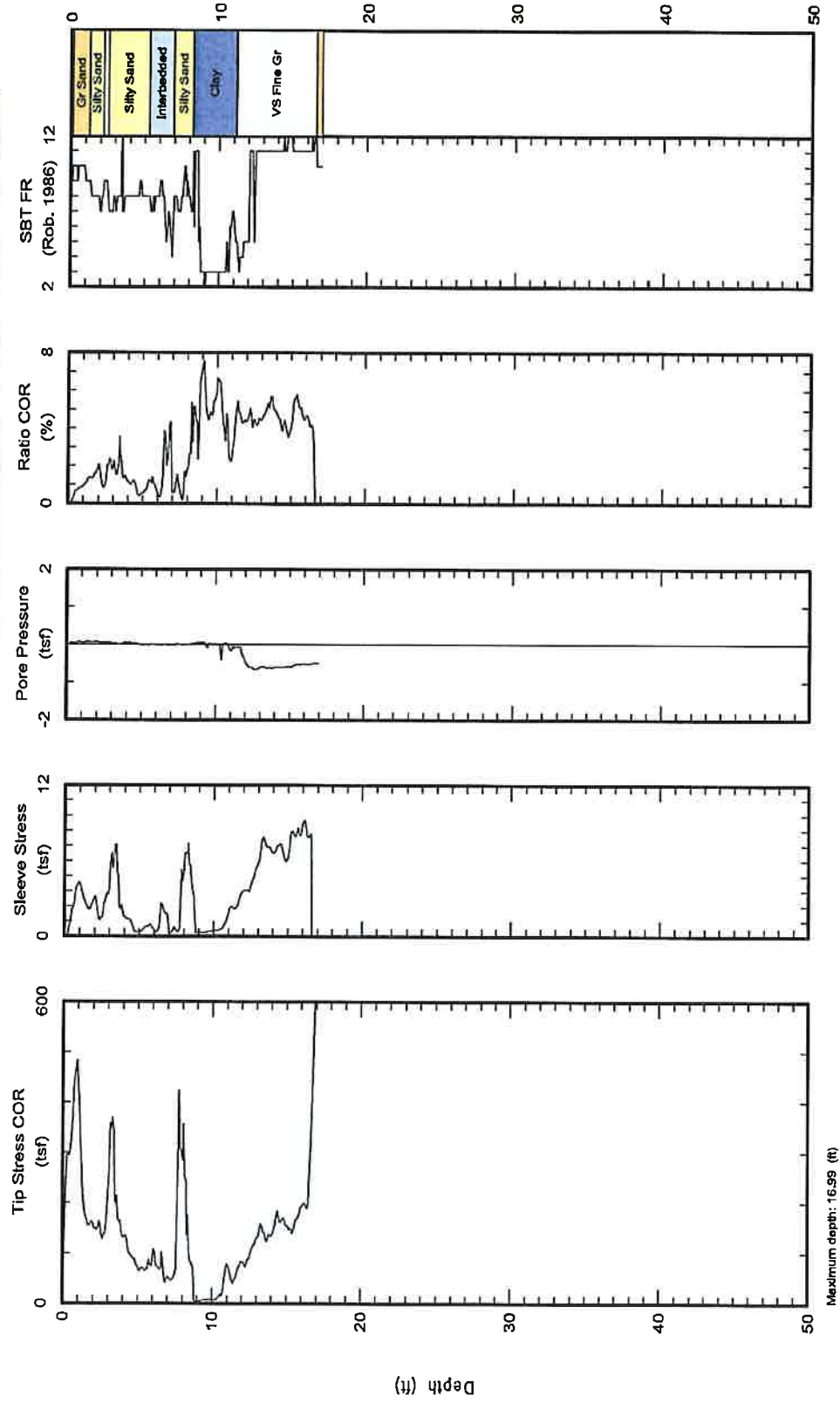




Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 30/Oct/2012
Test ID: CPT-7
Project: Qjai
Customer: Earth Systems Southern California
Job Site: Water District Tank

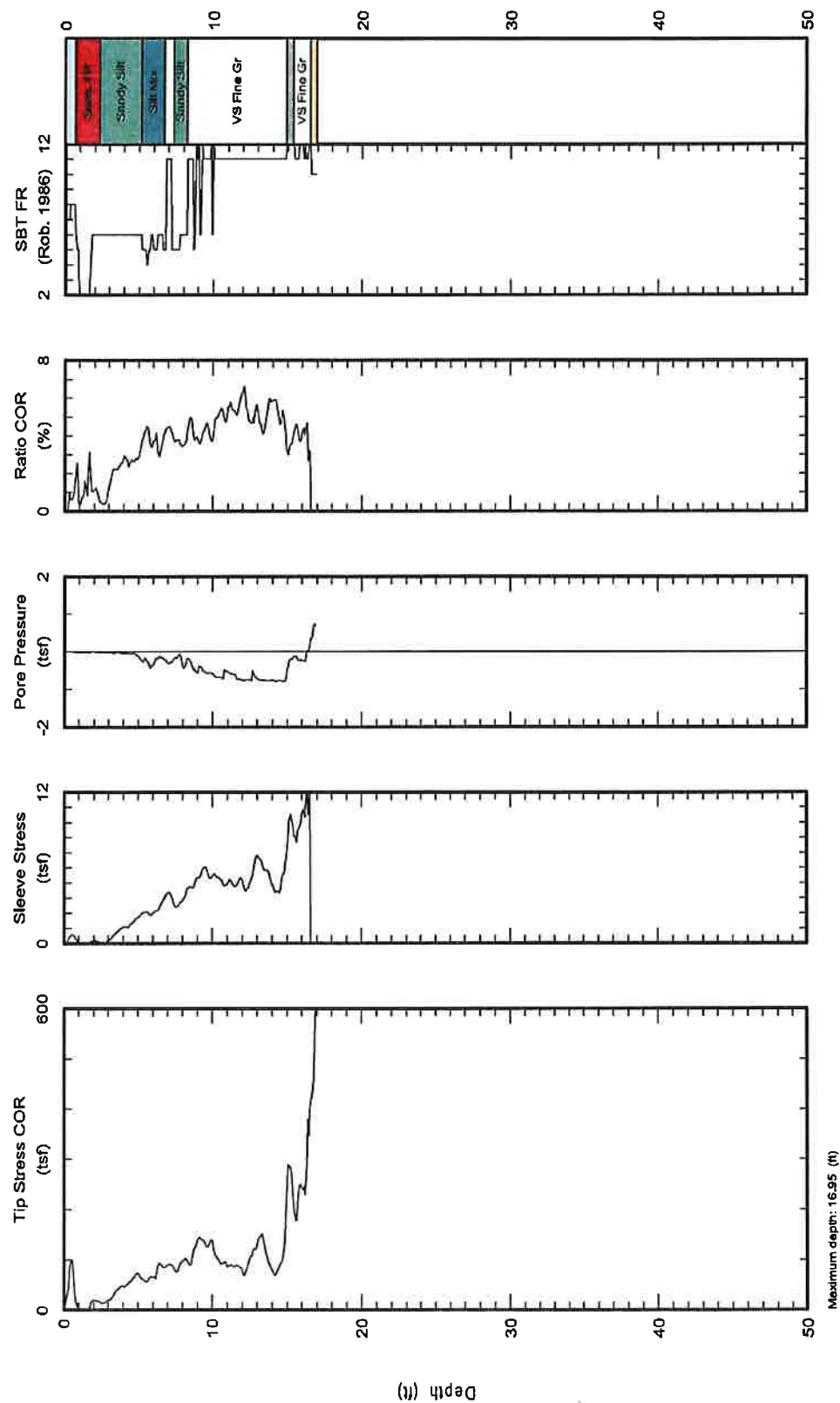


Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Date: 30/Oct/2012
Test ID: CPT-8
Project: Ojai

Customer: Earth Systems Southern California
Job Site: Water District Tank



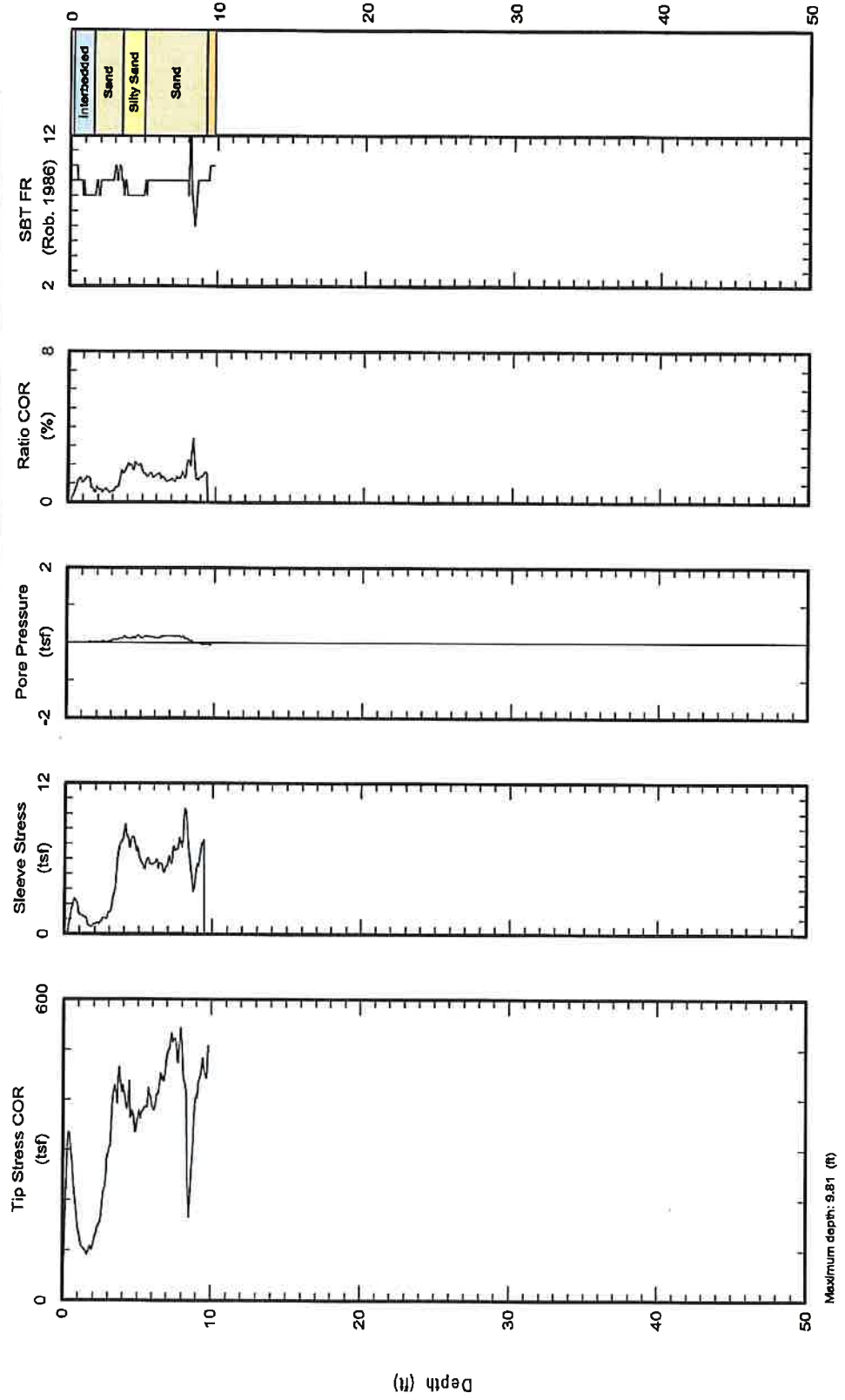


Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com

CPT Data
30 ton rig

Customer: Earth Systems Southern California
Job Site: Water District Tank

Date: 30/Oct/2012
Test ID: CPT-9
Project: Ojai



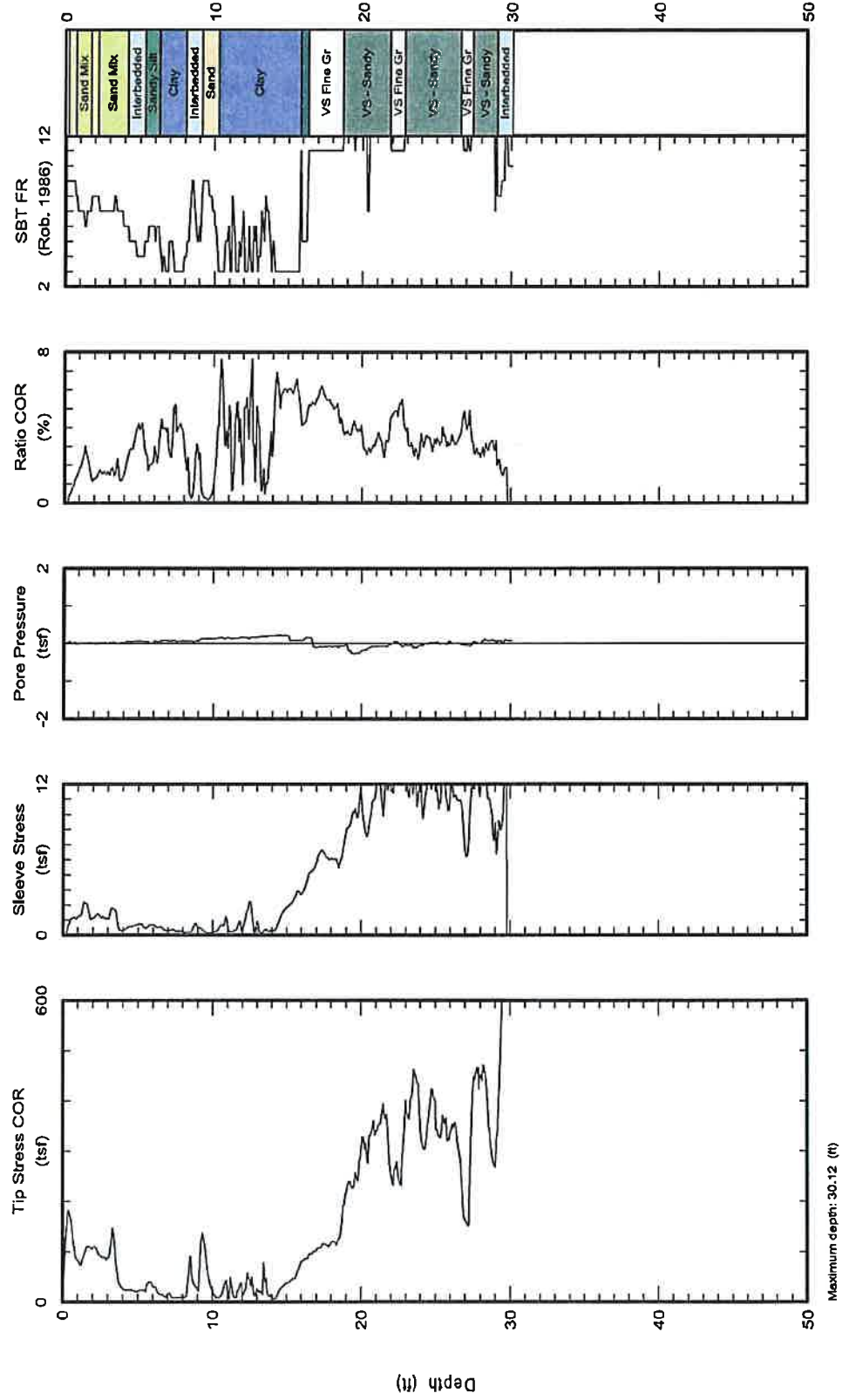


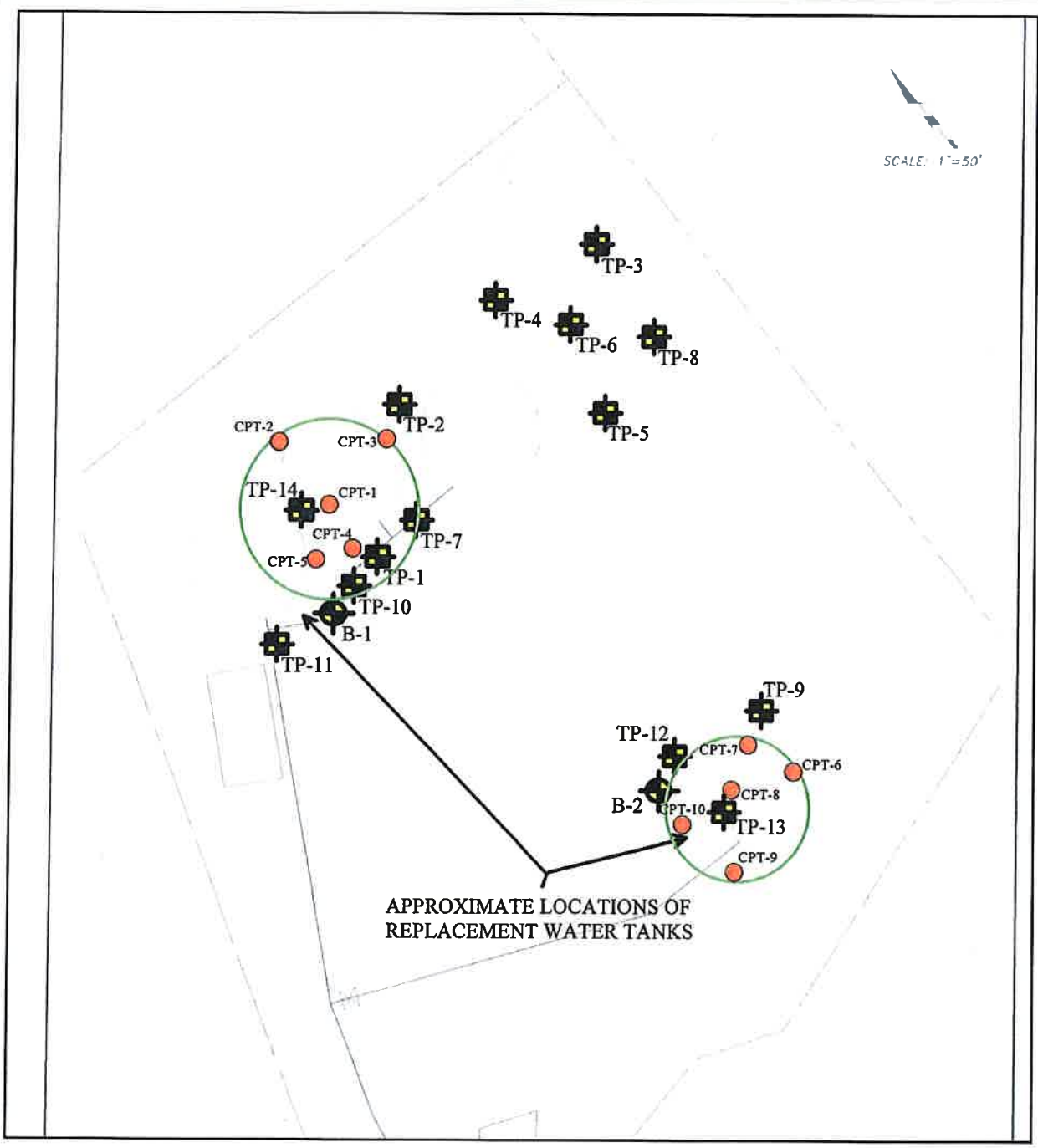
Kehoe Testing & Engineering
Office: (714) 901-7270
Fax: (714) 901-7289
rich@kehoetesting.com
www.kehoetesting.com




CPT Data
30 ton rig

Date: 30/Oct/2012
Test ID: CPT-10
Project: Ojai

Customer: Earth Systems Southern California
Job Site: Water District Tank





-  TP-1 TEST PIT LOCATIONS
-  B-1 BORING LOCATIONS
-  CPT-1 CPT BORING LOCATIONS

SITE PLAN	
Meiners Oaks Water District Ventura County, California	
 Earth Systems Southern California	
NOVEMBER 2012	VT-24086-02

PLASTICITY INDEX

ASTM D-4318

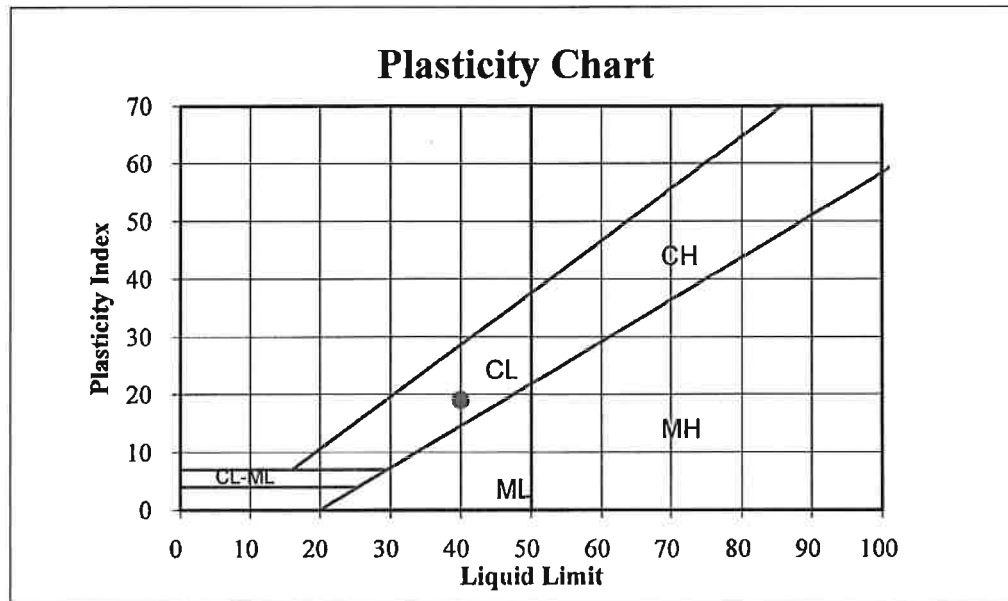
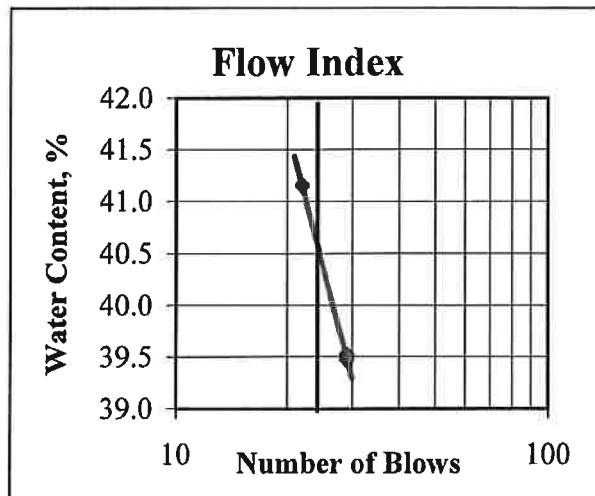
Job Name: Meiners Oaks Water District
Sample ID: TP 13
Soil Description: CL

DATA SUMMARY

Number of Blows:	22	29	29
Water Content, %	41.2	39.5	39.5
Plastic Limit:	21.0	21.2	

TEST RESULTS

LIQUID LIMIT	40
PLASTIC LIMIT	21
PLASTICITY INDEX	19



PLASTICITY INDEX

ASTM D-4318

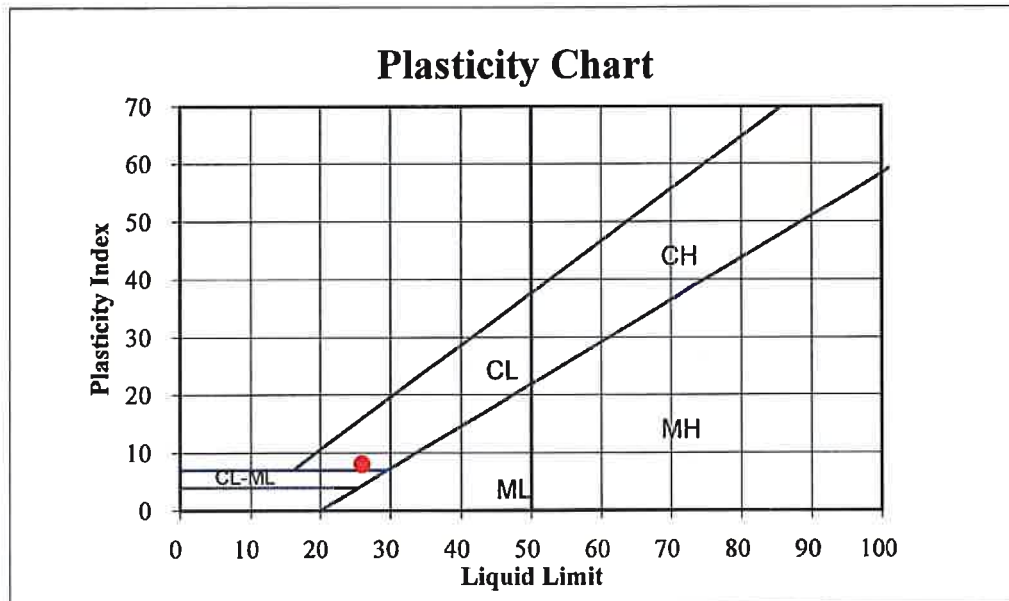
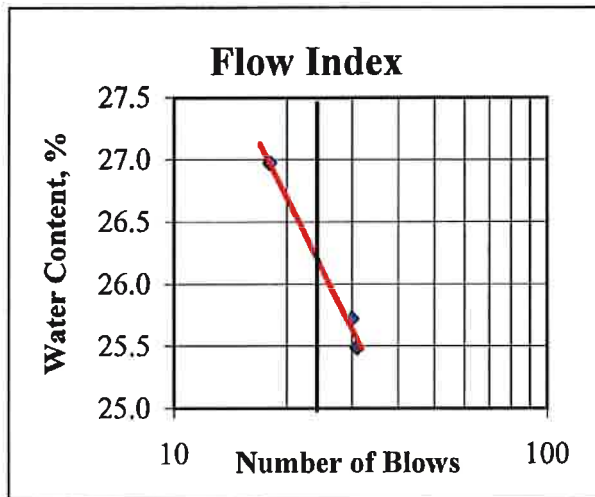
Job Name: Meiners Oaks Water District
Sample ID: TP 14
Soil Description: CL-ML

DATA SUMMARY

Number of Blows:	18	30	31
Water Content, %	27.0	25.7	25.5
Plastic Limit:	17.8	17.5	

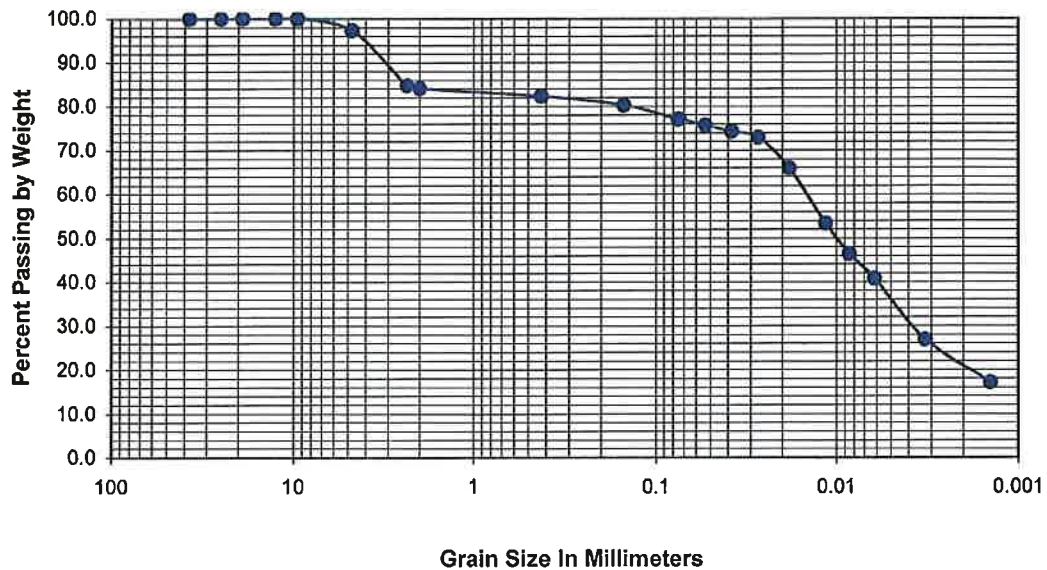
TEST RESULTS

LIQUID LIMIT	26
PLASTIC LIMIT	18
PLASTICITY INDEX	8



Sample Number TP 13
 Date: 11/14/2012
 Tech. SD

Mechanical Analysis Graph



Summary of Sieve Results

Mechanical Analysis	
Sieve Size	Percent Passing
1 1/2	100.0
1	100.0
3/4	100.0
1/2	100.0
3/8	100.0
#4	97.4
#8	84.8
#10	84.1
#40	82.3
#100	80.2
#200	77.1

Hydrometer Analysis	
Particle Diameter	Percent Passing
0.0745	77.1
0.0533	75.7
0.0381	74.3
0.0273	72.9
0.0182	65.9
0.0115	53.4
0.0084	46.4
0.0062	40.8
0.0032	26.9
0.0014	17.1

Particle Distribution	
Particle Name	Percent of Sample
Gravel	2.6
Sand	20.3
Silt	46.8
Clay	30.3

Mieners Oaks Water District



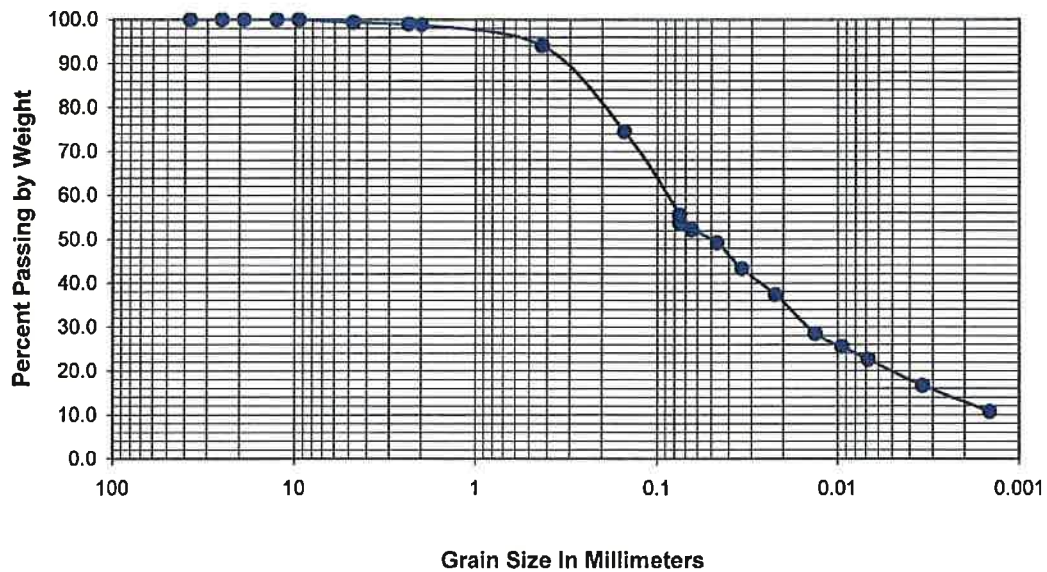
Earth Systems
 Southern California

11/14/2012

VT-24086-01

Sample Number TP 14
 Date: 11/14/2012
 Tech. SD

Mechanical Analysis Graph



Summary of Sieve Results

Mechanical Analysis	
Sieve Size	Percent Passing
1 1/2	100.0
1	100.0
3/4	100.0
1/2	100.0
3/8	100.0
#4	99.4
#8	99.0
#10	98.8
#40	94.1
#100	74.5
#200	55.5

Hydrometer Analysis	
Particle Diameter	Percent Passing
0.0746	53.6
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0.0463	49.2
0.0337	43.3
0.0220	37.4
0.0132	28.5
0.0095	25.5
0.0068	22.6
0.0034	16.7
0.0015	10.8

Particle Distribution	
Particle Name	Percent of Sample
Gravel	0.6
Sand	43.8
Silt	37.5
Clay	18.1

Mieners Oaks Water District



Earth Systems
 Southern California

11/14/2012

VT-24086-01

CERTIFICATE OF ANALYSIS

Client: Earth Systems Southern California	Date Sampled: 11/07/12
CAS LAB NO: 123321	Date Received: 11/07/12
Analyst: AN	Sample Matrix: Soil

WET CHEMISTRY SUMMARY

COMPOUND	RESULT	UNITS	DF	PQL	METHOD	ANALYZED
----------	--------	-------	----	-----	--------	----------

CAS Lab #: 123321-01
Sample ID: TP13


pH (Corrosivity)	7.3	S.U.	1	---	9045	11/08/12
------------------	-----	------	---	-----	------	----------

CAS Lab #: 123321-02
Sample ID: TP14

pH (Corrosivity)	7.2	S.U.	1	---	9045	11/08/12
Organic Matter	2.8	%	1	0.05	ASTM D2974	11/08/12

[illegible]BENCHMARK_DATA

VENTURA COUNTY RECORDS: 70-2 (1988) [LATN=78°18'N] (340-232m) 4450 58
OUR WILE SOUTH-EASTY ALONG STATE HIGHWAY 120 FROM THE POST
OFFICE IN OAK. THERE IS A LIES NORTH-EASTY ALONG STATE HIGHWAY
33 AT THE SOUTH-EASTY CORNER OF THE INTERSECTION OF HIGHWAY
33 FLAVORS ROAD AND LA LUNA AVENUE. 11.0 FEET WESTLY FROM
THE CENTER OF HIGHWAY 33, 34.5 FEET NORTH-EASTY FROM
THE CENTER OF HIGHWAY 33, 2.1 FEET NORTH-EASTY FROM
CHAM LAR AVENUE, 2.1 FEET NORTH-EASTY FROM FORD POLE GRAMMA
HALLWAY, 2.8 FEET EASTLY FROM A CHAM LAR AVENUE, 3.0 FEET LOWER
THAN LA LUNA AVENUE, 10 FT. EASTLY FROM A WITNESS POST.

	BUREAU OF LAND MANAGEMENT 4800 North 29th Avenue, Suite 300 Denver, CO 80202-3159 (303) 251-5700 Fax: (303) 251-5100		SHEET 1 OF 1 SHEETS
	MEINERS OAKS COUNTY WATER DIST. TOPOGRAPHIC SURVEY of EX. TANK FARM		
SCALE: 1"=20' DATE: 09/25/12	JOB NO: 12-088T.DWG 12-088T DATE: 09/25/12	FILE: DWG 12-088T.DWG	

CONSTRUCTION NOTES

- SEE FINAL STRUCTURAL PLANS FOR ACTUAL DIMENSIONS BASED ON CIRCULAR TANK SIZING CALCULATIONS FOR SLURRY WALL.
- SEE SITE GRADING BY ANTIPOD-SURF.

THRUST BLOCK SCHEDULE			
PIPE DIA.	THRUST BLOCK DIA.	THRUST BLOCK LENGTH	THRUST BLOCK WEIGHT
18"	24"	12"	150 LBS.
24"	30"	12"	250 LBS.
30"	36"	12"	350 LBS.
36"	42"	12"	450 LBS.
42"	48"	12"	550 LBS.
48"	54"	12"	650 LBS.
54"	60"	12"	750 LBS.
60"	66"	12"	850 LBS.
66"	72"	12"	950 LBS.
72"	78"	12"	1050 LBS.
78"	84"	12"	1150 LBS.
84"	90"	12"	1250 LBS.
90"	96"	12"	1350 LBS.
96"	102"	12"	1450 LBS.
102"	108"	12"	1550 LBS.
108"	114"	12"	1650 LBS.
114"	120"	12"	1750 LBS.
120"	126"	12"	1850 LBS.
126"	132"	12"	1950 LBS.
132"	138"	12"	2050 LBS.
138"	144"	12"	2150 LBS.
144"	150"	12"	2250 LBS.
150"	156"	12"	2350 LBS.
156"	162"	12"	2450 LBS.
162"	168"	12"	2550 LBS.
168"	174"	12"	2650 LBS.
174"	180"	12"	2750 LBS.
180"	186"	12"	2850 LBS.
186"	192"	12"	2950 LBS.
192"	198"	12"	3050 LBS.
198"	204"	12"	3150 LBS.
204"	210"	12"	3250 LBS.
210"	216"	12"	3350 LBS.
216"	222"	12"	3450 LBS.
222"	228"	12"	3550 LBS.
228"	234"	12"	3650 LBS.
234"	240"	12"	3750 LBS.
240"	246"	12"	3850 LBS.
246"	252"	12"	3950 LBS.
252"	258"	12"	4050 LBS.
258"	264"	12"	4150 LBS.
264"	270"	12"	4250 LBS.
270"	276"	12"	4350 LBS.
276"	282"	12"	4450 LBS.
282"	288"	12"	4550 LBS.
288"	294"	12"	4650 LBS.
294"	300"	12"	4750 LBS.
300"	306"	12"	4850 LBS.
306"	312"	12"	4950 LBS.
312"	318"	12"	5050 LBS.
318"	324"	12"	5150 LBS.
324"	330"	12"	5250 LBS.
330"	336"	12"	5350 LBS.
336"	342"	12"	5450 LBS.
342"	348"	12"	5550 LBS.
348"	354"	12"	5650 LBS.
354"	360"	12"	5750 LBS.
360"	366"	12"	5850 LBS.
366"	372"	12"	5950 LBS.
372"	378"	12"	6050 LBS.
378"	384"	12"	6150 LBS.
384"	390"	12"	6250 LBS.
390"	396"	12"	6350 LBS.
396"	402"	12"	6450 LBS.
402"	408"	12"	6550 LBS.
408"	414"	12"	6650 LBS.
414"	420"	12"	6750 LBS.
420"	426"	12"	6850 LBS.
426"	432"	12"	6950 LBS.
432"	438"	12"	7050 LBS.
438"	444"	12"	7150 LBS.
444"	450"	12"	7250 LBS.
450"	456"	12"	7350 LBS.
456"	462"	12"	7450 LBS.
462"	468"	12"	7550 LBS.
468"	474"	12"	7650 LBS.
474"	480"	12"	7750 LBS.
480"	486"	12"	7850 LBS.
486"	492"	12"	7950 LBS.
492"	498"	12"	8050 LBS.
498"	504"	12"	8150 LBS.
504"	510"	12"	8250 LBS.
510"	516"	12"	8350 LBS.
516"	522"	12"	8450 LBS.
522"	528"	12"	8550 LBS.
528"	534"	12"	8650 LBS.
534"	540"	12"	8750 LBS.
540"	546"	12"	8850 LBS.
546"	552"	12"	8950 LBS.
552"	558"	12"	9050 LBS.
558"	564"	12"	9150 LBS.
564"	570"	12"	9250 LBS.
570"	576"	12"	9350 LBS.
576"	582"	12"	9450 LBS.
582"	588"	12"	9550 LBS.
588"	594"	12"	9650 LBS.
594"	600"	12"	9750 LBS.
600"	606"	12"	9850 LBS.
606"	612"	12"	9950 LBS.
612"	618"	12"	10050 LBS.
618"	624"	12"	10150 LBS.
624"	630"	12"	10250 LBS.
630"	636"	12"	10350 LBS.
636"	642"	12"	10450 LBS.
642"	648"	12"	10550 LBS.
648"	654"	12"	10650 LBS.
654"	660"	12"	10750 LBS.
660"	666"	12"	10850 LBS.
666"	672"	12"	10950 LBS.
672"	678"	12"	11050 LBS.
678"	684"	12"	11150 LBS.
684"	690"	12"	11250 LBS.
690"	696"	12"	11350 LBS.
696"	702"	12"	11450 LBS.
702"	708"	12"	11550 LBS.
708"	714"	12"	11650 LBS.
714"	720"	12"	11750 LBS.
720"	726"	12"	11850 LBS.
726"	732"	12"	11950 LBS.
732"	738"	12"	12050 LBS.
738"	744"	12"	12150 LBS.
744"	750"	12"	12250 LBS.
750"	756"	12"	12350 LBS.
756"	762"	12"	12450 LBS.
762"	768"	12"	12550 LBS.
768"	774"	12"	12650 LBS.
774"	780"	12"	12750 LBS.
780"	786"	12"	12850 LBS.
786"	792"	12"	12950 LBS.
792"	798"	12"	13050 LBS.
798"	804"	12"	13150 LBS.
804"	810"	12"	13250 LBS.
810"	816"	12"	13350 LBS.
816"	822"	12"	13450 LBS.
822"	828"	12"	13550 LBS.
828"	834"	12"	13650 LBS.
834"	840"	12"	13750 LBS.
840"	846"	12"	13850 LBS.
846"	852"	12"	13950 LBS.
852"	858"	12"	14050 LBS.
858"	864"	12"	14150 LBS.
864"	870"	12"	14250 LBS.
870"	876"	12"	14350 LBS.
876"	882"	12"	14450 LBS.
882"	888"	12"	14550 LBS.
888"	894"	12"	14650 LBS.
894"	900"	12"	14750 LBS.
900"	906"	12"	14850 LBS.
906"	912"	12"	14950 LBS.
912"	918"	12"	15050 LBS.
918"	924"	12"	15150 LBS.
924"	930"	12"	15250 LBS.
930"	936"	12"	15350 LBS.
936"	942"	12"	15450 LBS.
942"	948"	12"	15550 LBS.
948"	954"	12"	15650 LBS.
954"	960"	12"	15750 LBS.
960"	966"	12"	15850 LBS.
966"	972"	12"	15950 LBS.
972"	978"	12"	16050 LBS.
978"	984"	12"	16150 LBS.
984"	990"	12"	16250 LBS.
990"	996"	12"	16350 LBS.
996"	1002"	12"	16450 LBS.
1002"	1008"	12"	16550 LBS.
1008"	1014"	12"	16650 LBS.
1014"	1020"	12"	16750 LBS.
1020"	1026"	12"	16850 LBS.
1026"	1032"	12"	16950 LBS.
1032"	1038"	12"	17050 LBS.
1038"	1044"	12"	17150 LBS.
1044"	1050"	12"	17250 LBS.
1050"	1056"	12"	17350 LBS.
1056"	1062"	12"	17450 LBS.
1062"	1068"	12"	17550 LBS.
1068"	1074"	12"	17650 LBS.
1074"	1080"	12"	17750 LBS.
1080"	1086"	12"	17850 LBS.
1086"	1092"	12"	17950 LBS.
1092"	1098"	12"	18050 LBS.
1098"	1104"	12"	18150 LBS.
1104"	1110"	12"	18250 LBS.
1110"	1116"	12"	18350 LBS.
1116"	1122"	12"	18450 LBS.
1122"	1128"	12"	18550 LBS.
1128"	1134"	12"	18650 LBS.
1134"	1140"	12"	18750 LBS.
1140"	1146"	12"	18850 LBS.
1146"	1152"	12"	18950 LBS.
1152"	1158"	12"	19050 LBS.
1158"	1164"	12"	19150 LBS.
1164"	1170"	12"	19250 LBS.
1170"	1176"	12"	19350 LBS.
1176"	1182"	12"	19450 LBS.
1182"	1188"	12"	19550 LBS.
1188"	1194"	12"	19650 LBS.
1194"	1200"	12"	19750 LBS.
1200"	1206"	12"	19850 LBS.
1206"	1212"	12"	19950 LBS.
1212"	1218"	12"	20050 LBS.
1218"	1224"	12"	20150 LBS.
1224"	1230"	12"	20250 LBS.
1230"	1236"	12"	20350 LBS.
1236"	1242"	12"	20450 LBS.
1242"	1248"	12"	20550 LBS.
1248"	1254"	12"	20650 LBS.
1254"	1260"	12"	20750 LBS.
1260"	1266"	12"	20850 LBS.
1266"	1272"	12"	20950 LBS.
1272"	1278"	12"	21050 LBS.
1278"	1284"	12"	21150 LBS.
1284"	1290"	12"	21250 LBS.
1290"	1296"	12"	21350 LBS.
1296"	1302"	12"	21450 LBS.
1302"	1308"	12"	21550 LBS.
1308"	1314"	12"	21650 LBS.
1314"	1320"	12"	21750 LBS.
1320"	1326"	12"	21850 LBS.
1326"	1332"	12"	21950 LBS.
1332"	1338"	12"	22050 LBS.
1338"	1344"	12"	22150 LBS.
1344"	1350"	12"	22250 LBS.
1350"	1356"	12"	22350 LBS.
1356"	1362"	12"	22450 LBS.
1362"	1368"	12"	22550 LBS.
1368"	1374"	12"	22650 LBS.
1374"	1380"	12"	22750 LBS.
1380"	1386"	12"	22850 LBS.
1386"	1392"	12"	22950 LBS.
1392"	1398"	12"	23050 LBS.
1398"	1404"	12"	23150 LBS.
1404"	1410"	12"	23250 LBS.
1410"	1416"	12"	23350 LBS.
1416"	1422"	12"	23450 LBS.
1422"	1428"	12"	23550 LBS.
1428"	1434"	12"	23650 LBS.
1434"	1440"	12"	23750 LBS.
1440"	1446"	12"	23850 LBS.
1446"	1452"	12"	23950 LBS.
1452"	1458"	12"	24050 LBS.
1458"	1464"	12"	24150 LBS.
1464"	1470"	12"	24250 LBS.
1470"	1476"	12"	24350 LBS.
1476"	1482"	12"	24450 LBS.
1482"	1488"	12"	24550 LBS.
1488"	1494"	12"	24650 LBS.
1494"	1500"	12"	24750 LBS.
1500"	1506"	12"	24850 LBS.
1506"	1512"	12"	24950 LBS.
1512"	1518"	12"	25050 LBS.
1518"	1524"	12"	25150 LBS.
1524"	1530"	12"	25250 LBS.
1530"	1536"	12"	25350 LBS.
1536"	1542"	12"	25450 LBS.
1542"	1548"	12"	25550 LBS.
1548"	1554"	12"	25650 LBS.
1554"	1560"	12"	25750 LBS.
1560"	1566"	12"	25850 LBS.
1566"	1572"	12"	25950 LBS.
1572"	1578"	12"	26050 LBS.
1578"	1584"	12"	26150 LBS.
1584"	1590"	12"	26250 LBS.
1590"	1596"	12"	26350 LBS.
1596"	1602"	12"	26450 LBS.
1602"	1608"	12"	26550 LBS.
1608"	1614"	12"	26650 LBS.
1614"	1620"	12"	26750 LBS.
1620"	1626"	12"	26850 LBS.
1626"	1632"	12"	26950 LBS.
1632"	1638"	12"	27050 LBS.
1638"	1644"	12"	27150 LBS.
1644"	1650"	12"	27250 LBS.
1650"	1656"	12"	27350 LBS.
1656"	1662"	12"	27450 LBS.
1662"	1668"	12"	27550 LBS.
1668"	1674"	12"	27650 LBS.
1674"	1680"	12"	27750 LBS.
1680"	1686"	12"	27850 LBS.
1686"	1692"	12"	27950 LBS.
1692"	1698"	12"	28050 LBS.
1698"	1704"	12"	28150 LBS.
1704"	1710"	12"	28250 LBS.
1710"	1716"	12"	28350 LBS.
1716"	1722"	12"	28450 LBS.
1722"	1728"	12"	28550 LBS.
1728"	1734"	12"	28650 LBS.
1734"	1740"	12"	28750 LBS.
1740"	1746"	12"	28850 LBS.
1746"	1752"	12"	28950 LBS.
1752"	1758"	12"	29050 LBS.
1758"	1764"	12"	29150 LBS.
1764"	1770"	12"	29250 LBS.
1770"	1776"	12"	2

**GEOTECHNICAL ENGINEERING REPORT
FOR
TWO PROPOSED WATER TANKS
MEINERS OAKS COUNTY WATER DISTRICT
MEINERS OAKS AREA
VENTURA COUNTY, CALIFORNIA**

**VT-24086-01
FEBRUARY 6, 2009**

**PREPARED FOR
MEINERS OAKS COUNTY WATER DISTRICT**

**BY
EARTH SYSTEMS
SOUTHERN CALIFORNIA
1731-A WALTER STREET
VENTURA, CALIFORNIA**