# ALLTERES

Preliminary Soil and Groundwater Data Submittal and Proposed Boring and Monitoring Well Locations 160 Holmes Street, Livermore, California

Date: December 9, 2005

Project No.: 015-01-008

Prepared For:
Manwel and Samira Shuwayhat
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December 9, 2005

Project No.: 015-01-008

Jerry Wickham Hazardous Materials Specialist Alameda County Environmental Health 1131 Harbor Bay Parkway, Suite 250 Alameda, CA 94502-6577

Subject:

Preliminary Soil and Groundwater Data Submittal and Proposed Boring and Monitoring Well Locations for 160 Holmes Street, Livermore, California

Dear Mr. Wickham:

On behalf of Manwel and Samira Shuwayhat, Allterra Environmental, Inc. (Allterra) has prepared this document to provide Alameda County Environmental Health – Local Oversight Program (ACEH) with preliminary soil and groundwater data from recent investigation activities and propose locations for new groundwater monitoring wells for the property located at 160 Holmes Street in Livermore, California (Site).

Should you have any questions please contact Allterra at (831) 425-2608.

Sincerely,

Allterra Environmental, Inc.

Nathaniel Allen Project Scientist



December 9, 2005 Project No.: 015-01-008

Manwel and Samira Shuwayhat 54 Wolfe Canyon Road Kentfield, California 94904

Subject: Preliminary Soil and Groundwater Data Submittal and Proposed Boring and

Monitoring Well Locations for 160 Holmes Street, Livermore, California

Dear Mr. and Mrs. Shuwayhat:

On your behalf, Allterra Environmental, Inc. (Allterra) has prepared this document to provide Alameda County Environmental Health – Local Oversight Program (ACEH) with preliminary soil and groundwater data from recent investigation activities and propose locations for new groundwater monitoring wells for the property located at 160 Holmes Street in Livermore, California (Site).

# Soil and Groundwater Investigation Activities

The following is a brief discussion of recent Geoprobe® drilling activities that were conducted at the Site in order to evaluate the subsurface geology and hydrology and determine the vertical and lateral extent of hydrocarbon in soil and groundwater beneath and down-gradient of the Site. The data collected during recent investigation work was reviewed and evaluated in order to determine the best groundwater monitoring well network for the Site. The data discussed herein will be formally presented in a technical report (with laboratory analytical reports, permits, boring logs, data tables, etc.) upon completion of soil and groundwater investigation activities.

Geoprobe® Borings

On November 10, 11, and 14, 2005, Allterra supervised the installation of Geoprobe® soil borings (continuous core and/or hydropunch) MB-1, MB-2, MB-3, DB-1, DB-2, DB-3, DB-4, DB-5, B-1, B-2, B-3, and HP-1. Boring locations are presented in Figure 1. Nine borings were continuously logged to approximately 32 feet below ground surface (bgs), two borings (MB-1 and MB-2) were continuously logged to approximately 52 feet bgs, and one boring (HP-1) was a hydropunch to approximately 28 feet bgs. Hydropunch borings, which were not logged, were installed at borings MB-1 through MB-3 in order to collect depth discrete groundwater samples. Groundwater samples were collected at 28 feet bgs from all borings, at approximately 52 feet bgs from borings MB-1 through MB-3, and at approximately 70 feet bgs from borings MB-1 and MB-3. A formal presentation of Geoprobe® boring installations and sample collection will be presented in a technical report following completion of investigation activities.

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# Soil and Groundwater Sample Analyses

Selected soil and all groundwater samples were submitted for chemical testing to McCampbell Analytical, Inc., of Pacheco, California, a state of California certified laboratory (ELAP #1644). Soil and groundwater samples collected from Geoprobe® borings were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and as diesel (TPHd) by EPA Method 8015Cm and benzene, toluene, ethylbenzene, xylenes (BTEX), and methyl tertiary butyl ether (MTBE) by EPA Method 8021b. Groundwater samples were also analyzed for MTBE, di-isopropyl ether (DIPE), ethyl tert-butyl ether (ETBE), tert-amyl methyl ether (TAME), and tert-butyl alcohol (TBA) by EPA Method 8260B.

# Soil and Groundwater Investigation Results

Subsurface Geology and Hydrogeology

The local soil conditions encountered during drilling at the Site generally consisted of:

- Clayey silt with varying amounts of gravel and sand, from the ground surface to about 5-10 feet bgs;
- Gravel-sand-silt and gravel-sand-clay of variable composition underlying the clayey silt
  and generally extended to the depth of first-encountered groundwater, approximately 28
  feet bgs. (However, this layer may extend to depths of up to 50 feet bgs near MW-3 and
  MB-2);
- Brown silty clay, with an average thickness of about 5 feet, was encountered within the above-referenced gravel-sand-silt/gravel-sand-clay layer;
- Relatively small and discontinuous lenses of clayey sand and clay were encountered in some borings near the groundwater table;
- Coarse-grained materials, generally consisting of sandy gravel with varying amounts of clay/silt, were encountered in borings logged below the uppermost groundwater table; and
- Possible clay layer at about 70 feet bgs. Water samples were collected from the bottom of two hydropunch borings that were advanced to 70 feet bgs. Although logging of soil was not possible in these borings, resistance encountered at 68-70 feet bgs by the driller in both hydropunch borings may be indicative of the clay aquitard described by other consultants in surrounding nearby areas. Furthermore, water subsequently rose within both borings, after retrieving water samples, to about 44 feet bgs, suggesting this water-bearing zone may be confined or partially confined, and distinct from the zone encountered at approximately 30 feet bgs.

Boring logs from Geoprobe® drilling are presented in Appendix A. The generalized geology and updated site conceptual model (SCM), simplified to show potentially water-bearing coarsergrained material and finer-grained material that is generally not considered water bearing, shows interlayering coarse- and fine-grained strata that are sometimes discontinuous above the water table and an upper aquifer consisting of sandy gravel with varying amounts of clay/silt. We present the hypothesis that hydropunch borings advanced to 70 feet bgs may have hit the top of a clay aquitard, and propose to confirm our hypothesis during future drilling that includes

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advancement of a deep monitoring well. The generalized cross section is presented in Appendix B.

# Soil and Groundwater Analytical Data

Soil and groundwater analytical results are presented in Tables 1 and 2, respectively. A formal presentation of the soil and groundwater data will be included in a technical report following completion of the soil and groundwater investigation. A general discussion of laboratory analytical results from soil and groundwater samples is presented below:

- Soil analytical results generally indicated moderate levels of hydrocarbon contamination between approximately 22 and 28 feet bgs in on-site borings adjacent to the former UST pit.
- High levels of dissolved TPHg (up to 42,000 μg/L), TPHd (up to 41,000 μg/L), and MTBE (up to 85,000 μg/L) were detected in groundwater samples collected at 28 feet bgs (initial groundwater) from borings MB-1, MB-3, B-2, and B-3. These borings were installed adjacent to the former UST pit (MB-1, B-2, and B-3) and directly down-gradient to the north (MB-3).
- Depth-discrete groundwater samples collected from borings MB-1 and MB-3 at depths of approximately 50 feet bgs indicated levels of TPHg up to 1,400 μg/L (MB-3) and MTBE up to 1,500 μg/L (MB-1).
- Depth-discrete groundwater samples collected from borings MB-1 and MB-3 at depths of approximately 70 feet bgs indicated levels of TPHg up to 990 μg/L (MB-1) and MTBE up to 1,200 μg/L (MB-1).

## Conclusions

Based on field observations and laboratory data from Geoprobe® drilling activities, Allterra concludes the following:

- Subsurface soils encountered while advancing the Geoprobe® borings consisted of clayey silt, silty clay, sandy clay, gravel-sand-silt and gravel-sand-clay, and sandy gravel from near ground surface to at least the total depth of the logged portion of the borings, which ranged from 28 to 52 feet bgs.
- During drilling, initial groundwater was encountered at approximately 28 feet bgs and the static groundwater surface stabilized at approximately 22 feet bgs. The rise of groundwater surface suggests the shallow aquifer beneath the Site is locally confined to semi-confined.
- Soil types encountered from approximately 28 feet bgs (initial groundwater) to approximately 52 feet bgs consisted of coarse-grained material and no apparent aquitard (clay layer) was encountered within this interval.
- Groundwater analytical results indicate lateral definition of the dissolved hydrocarbon plume up-gradient to the south (MB-2) and cross-gradient to the west (DB-2).



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- When compared to data from borings in the core of the dissolved plume (MB-1, MB-3, B-2, and B-3), concentrations of petroleum hydrocarbons are relatively low in samples from cross-gradient borings (B-1, DB-1, and DB-5 to the east and DB-2, DB-3, DB-4, and HP-1 to the west).
- In general, the highest levels of hydrocarbon concentrations in groundwater were detected at approximately 28 feet bgs and levels generally decrease with depth.
- Previously installed groundwater monitoring wells MW-1, MW-2, and MW-3 extend to approximately 30 feet bgs and have a screen interval from 15 to 30 feet bgs. These wells appear to be appropriately constructed and do not appear to have a screen interval that extends through multiple water-bearing zones.
- Previously installed groundwater monitoring wells MW-4, MW-5, and MW-6 extend to approximately 50 feet bgs and have a screen interval from 20 to 50 feet bgs. These wells appear to be appropriately constructed and do not appear to have a screen interval that extends through multiple water-bearing zones.
- Previously installed well EX-1 extends to approximately 55 feet bgs and is screened from 30 to 55 feet bgs. While well EX-1's screen interval does not appear to extend through multiple water-bearing zones, its construction is not ideal for use as an extraction well for remediation. Dual-phase extraction will likely be the best approach for cleanup of the site and, therefore, extraction wells should have a screen interval that extends above the water table.

# Hypothesis and Recommended Actions Regarding Subsurface Conditions

The following discussion presents Allterra's general hypothesis for subsurface conditions beneath and down-gradient of the Site. Our hypotheses are based on previous investigative findings at the Site, discussions with ACEH, a review of files for other LUFT projects in the Livermore area, and field observations and analytical results from recent Geoprobe® drilling.

# Hypothesis 1:

- Shallow groundwater (at approximately 30 feet bgs), in the immediate vicinity of the former UST pit and directly north (inferred down-gradient direction), is highly contaminated with petroleum hydrocarbons. The core of the dissolved plume extends laterally down-gradient to the north, directly toward boring MB-3, and appears to be fairly narrow (limited laterally to the east and west).
- • Hydrocarbon levels within the groundwater plume generally decrease with depth; yet appear to have impacted Aquifer 1 throughout its vertical extent.
- Fourth quarter 2005 sampling data indicate TPHg and MTBE levels in well MW-1 of  $58,000~\mu g/L$  and  $170,000~\mu g/L$ , respectively; while TPHg and MTBE levels in well EX-1 (located approximately 5 feet from MW-1) were <50 μg/L and 31 μg/L, respectively. Allterra's hypothesis for the disparity of contaminant levels is based on each well's screen interval: Well MW-1's screen interval extends approximately 2 feet into the top



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of the first aquifer and virtually "skims" LNAPL contaminants, such as hydrocarbons, off the top of the aquifer, resulting in elevated contaminant levels. By contrast, well EX-1's screen interval extends from just below the top of the aquifer to 55 feet bgs, which appears to block off the top 2 feet of the aquifer (where it appears that the majority of the LNAPL contaminants reside) and allows the surrounding formation groundwater to dilute the hydrocarbon contaminants in the well.

# Recommended Action 1:

• In order to evaluate hydrocarbons levels with depth and measure vertical hydraulic gradients, groundwater monitoring wells with depth-discrete screen intervals will be installed in two key locations. One location will be at boring MB-3 and will consist of three separate 2-inch diameter wells designated MW-7A, MW-7B, and MW-7C. Well MW-7A will be constructed with a screen interval from 15 to 30 feet bgs, MW-7B will be screened from 45 to 50 feet bgs, and MW-7C will be screened from 65 to 70 feet bgs. The other depth-discrete sampling location will be at well MW-1, and will consist of two separate 2-inch diameter wells designated MW-1B and MW-1C (MW-1 will be renamed MW-1A). Well MW-1B will be constructed with a screen interval from 45 to 50 feet bgs and MW-1C will be screened from 65 to 70 feet bgs. The new wells will allow for depth discrete data collection from within the core of the hydrocarbon plume. A typical well construction diagram for the proposed wells is presented in Figure 3.

# Hypothesis 2:

• Well MW-5 is located directly down-gradient of "hot" well MW-1 and "hot" boring MB-3, yet historical groundwater monitoring data indicates relatively low levels of TPHg and MTBE (when compared to MW-1 and MB-3). Allterra's hypothesis for the relatively low hydrocarbon levels is based on well MW-5's screen interval and is as follows: Well MW-5 has a screen interval that extends from 20 to 50 feet bgs, which allows formation water from approximately 28 to 50 feet bgs into the well. Allterra believes that groundwater from the deeper portions of the aquifer enters the well and dilutes LNAPL hydrocarbon contaminants that enter the well from the top portion of the aquifer.

# Recommended Action 2:

- In order to evaluate hydrocarbon levels in the uppermost portion of the shallow aquifer down-gradient of MB-3, Allterra recommends installing a Geoprobe® boring (MB-4) near well MW-5 (see Figure 2) and collecting a groundwater sample from the top of the aquifer (at approximately 28 feet bgs).
- In order to evaluate hydrocarbon concentrations at approximately 50 feet bgs, a hydropunch Geoprobe® boring will be installed adjacent to MB-4 in order to collect a depth discrete groundwater sample at approximately 50 feet bgs.
- Data collected from boring MB-4 will be used to evaluate the need for re-installing well MW-5 with a different screen interval.



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# Hypothesis 3:

Based on the high levels for petroleum hydrocarbons observed in borings B-2, B-3, and MB-1, it appears as though the source of hydrocarbon contamination is the area surrounding the former UST pit. Therefore, in order to begin interim remediation of the suspected source area, dual-phase extraction wells should be installed in appropriate locations and an interim remediation system should be installed.

# Recommended Action 3:

- Well EX-1 appears to be appropriately located, however, its screen interval is not ideal for remediation. Therefore, Allterra recommends drilling out well EW-1 and re-installing it to a depth of 40 feet bgs with a screen interval from 15 to 40 feet bgs.
- Allterra recommends installing a second extraction well (EX-2) at boring B-2. Well EX-2 will also be installed to an approximate depth of 40 feet bgs and have a screen interval from 15 to 40 feet bgs.
- After the new extractions wells are installed, Allterra recommends performing dual-phase extraction pilot testing using the new extraction wells. Pilot testing at the new extraction wells will provide Allterra with the necessary data to design, permit, and construct an interim remediation system at the Site.

# Hypothesis 4:

- The first aquifer (Aquifer 1) beneath the Site begins at approximately 28 feet bgs and extends to approximately 70 feet bgs and is locally confined to semi-confined.
- An aquitard of undetermined thickness (estimated to be approximately 40 feet) exists beneath Aquifer 1 and a second aquifer (Aquifer 2) underlies the aquitard.
- Allterra hypothesizes that the hydrocarbon plume originating from the Site has not impacted Aquifer 2.

# Recommended Action 4:

- Over the next several quarters, Allterra recommends monitoring groundwater quality at 70 feet bgs from within Aquifer 1 using data from the proposed "C-level" wells (MW-1C and MW-7C).
- If monitoring data indicates that hydrocarbons have impacted the lower portion of Aquifer 1, then it may be necessary to install a boring to the second aquifer, estimated to be approximately 110 feet bgs, and complete the boring as a groundwater monitoring well in order to monitor groundwater quality in Aquifer 2. The well will be sealed off from Aquifer 1 and be constructed with a five-foot screen interval at the top of Aquifer 2. The well will be designated MW-7D and its proposed location is presented in Figure 2.



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# Limitations

Allterra prepared this document for the use of Mr. Manwel and Mrs. Samira Shuwayhat and ACEH in evaluating site conditions at selected on-site locations at the time of this study. Statements, conclusions, and recommendations in this document are based solely on the field observations and analytical results related to work performed by Allterra and there is no warranty, expressed or implied. Site conditions and data can change over time; therefore, data presented in this report is only applicable to the timeframe of this study. Allterra's services have been performed in accordance with environmental principles generally accepted at this time and location.

Should you have any questions, please contact Allterra at (831) 425-2608.

Sincerely,

Allterra Environmental, Inc.

+a $\epsilon$ 

James Allen, R.E.A.

**Project Scientist** 

Attachments:

Figure 1, Site Plan

Figure 2, Proposed Boring and Well Location Plan

Figure 3, Typical Well Construction Diagram

Table 1, Preliminary Soil Analytical Results

Table 2, Preliminary Groundwater Analytical Results

Appendix A, Boring Logs

Appendix B, Generalized Cross Sections

cc: Mr. Jerry Wickham, ACEH Michael Killoran, P.G. 6670

**KILLORAN** 

No. 6670

OF CALIF

MICHAEL I Senior Geologist

Table 2
Preliminary Groundwater Analytical Results
160 Holmes Street, Livermore, California

Sample ID	Sample Depth	Date Collected	Total Per Hydrocar (µg.	bons as	Aromatic	: Volatile C (µg	rganic Con /L)	pounds		Oxyg	enated Volatile (µg/L)	Organics	
	(feet)		Gasoline	Diesel	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE	DIPE	ETBE	TAME	TBA
MB-1-A**	28	11/11/05	21,000	4,300	970	<25	3,300	1200	100,000	<2,500	<2,500	<2,500	<25,000
MB-1-B	50	11/11/05	470	210	7.8	0.97	31	48	1,500	<25	<25	<25	<250
MB-1-C	70	11/11/05	990	*	17	1.3	89	160	1,200	<25	<25	<25	<250
MB-2-A	28	11/10/05	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<5.0
MB-2-B	50	11/11/05	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0
MB-3-A	28	11/11/05	40,000	41,000	120	130	1,700	2,800	<4,500	<50	<50	<50	2,500
MB-3-B	50	11/14/05	1,400	210	0.93	9.3	14	27	190	<50	<50	<50	6,200
MB-3-C	70	11/14/05	930	260	1.7	3.8	33	100	330	<100	<100	<100	16,000
DB-1-A	28	11/10/05	160	*	<0.5	<0.5	<0.5	<0.5	86	<1.7	<1.7	<1.7	<17
DB-2-A	28	11/11/05	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0
DB-3-A	28	11/14/05	<50	51	<0.5	<0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	<0.5	<5.0
DB-4-A	28	11/14/05	<50	57	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0
DB-5-A	28	11/11/05	<50	910	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5.0
B-1-A	28	11/10/05	<50	230	<0.5	<0.5	<0.5	<0.5	28	<0.5	<0.5	<0.5	<5.0
B-2-A	28	11/10/05	25,000	6,200	900	<50	2,000	2,600	80,000	<1,700	<1,700	<1,700	<17,000
B-3-A	28	11/10/05	42,000	14,000	530	140	2,400	7,800	19,000	<500	<500	<500	<5,000
HP-1-A	28	11/14/05	<50	*	<0.5	<0.5	<0.5	0.80	12	<50	<50	<50	24

## Notes:

μg/L = micrograms per liter

NS = Not Sampled

NA = Not Analyzed

TPHg and TPHd were analyzed by EPA Method 8015CM

Benzene, toluene, ethylbenzene, and xylenes were analyzed by EPA Method 8021B

MTBE, DIPE, ETBE, TAME, and TBA were analyzed by EPA Method 8260b.

MTBE = methyl tertiary butyl ether

DIPE = Di-isoprpopyl Ether

ETBE = Ethyl tert-Butyl Ether

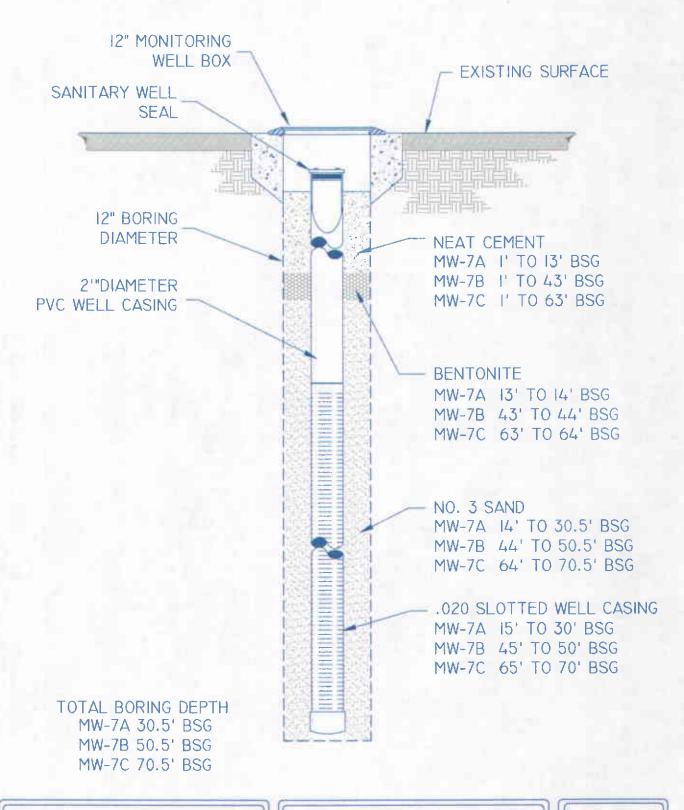
TAME - tert-Amyl Methyl Ether

TBA = tert-Butanol

<sup>--\* =</sup> insufficient groundwater available TPHd analysis

<sup>\*\*:</sup> MB-1-A samples tested for fuel oxygenates by EPA Method 8260 were past laboratory hold time

APPENDIX A, Boring Logs



# ALLTERRA

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TYPICAL MONITORING WELL CONSTRUCTION DIAGRAM

160 HOLMES STREET LIVERMORE, CALIFORNIA FIGURE 3 12/05/05

Table 1
Preliminary Soil Analytical Results
160 Holmes Street, Livermore, California

Sample ID	Sample Depth (feet)	Sample Date	TPHg	TPHd	Benzene	Toluene	Ethyl- benzene	Total Xylenes	мтве
MB-1	18	11/11/05	<1.0	<1.0	<0.005	< 0.005	< 0.005	< 0.005	<0.05
MB-1	22	11/11/05	78	23	0.028	0.073	1.0	4.8	2.3
MB-1	26	11/11/05	110	18	0.27	0.51	2.0	1.7	14
MB-3	20	11/11/05	<1.0	<1.0	<0.005	<0.005	< 0.005	<0.005	<0.05
MB-3	28	11/11/05	<1.0	<1.0	<0.005	< 0.005	< 0.005	< 0.005	< 0.05
MB-3	32	11/11/05	1,400	100	<0.5	5.0	20	67	<5.0
B-1	28	11/10/05	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05
B-2	16	11/10/05	<1.0	-	<0.005	< 0.005	<0.005	< 0.005	<0.05
B-2	20	11/10/05	<1.0	_	<0.005	< 0.005	< 0.005	< 0.005	<0.05
B-2	24	11/10/05	5.7	9.5	<0.005	0.018	0.076	0.25	1.7
B-2	28	11/10/05	11	2.4	0.075	0.073	0.26	0.14	7.2
В-3	16	11/10/05	<1.0		<0.005	< 0.005	<0.005	<0.005	<0.05
B-3	20	11/10/05	<1.0		<0.005	0.0058	0.0071	0.024	< 0.05
B-3	24	11/10/05	9.0	1.4	0.077	0.037	0.32	1.1	<1.0
B-3	28	11/10/05	48	6.1	0.053	0.20	0,53	0.49	<1.0
DB-1	26	11/10/05	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.05

Notes and Definitions:

All results are in milligrams per kilogram (mg/kg)

TPHg and TPHd were analyzed by EPA Method 8015CM

Benzene, toluene, ethylbenzene, and xylenes were analyzed by EPA Method 8021B

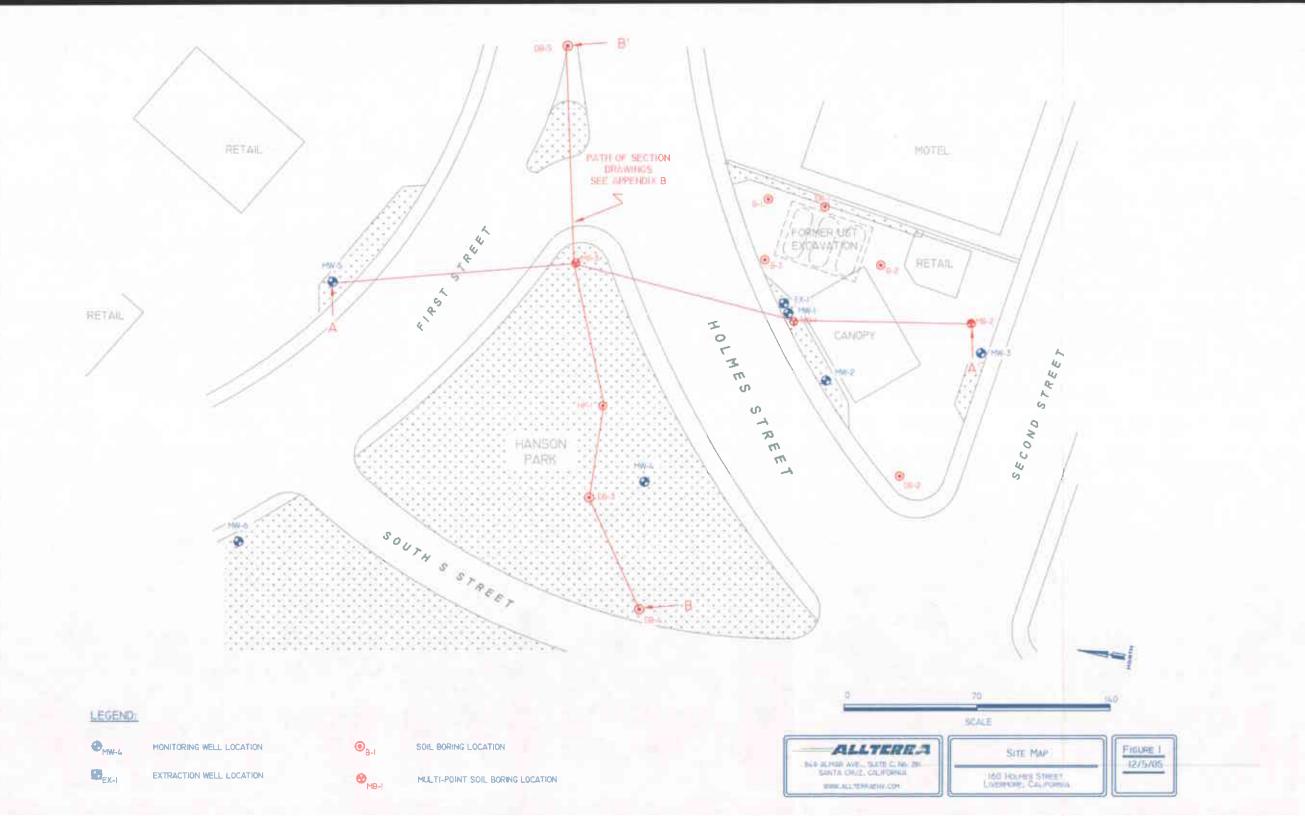
-: not analyzed

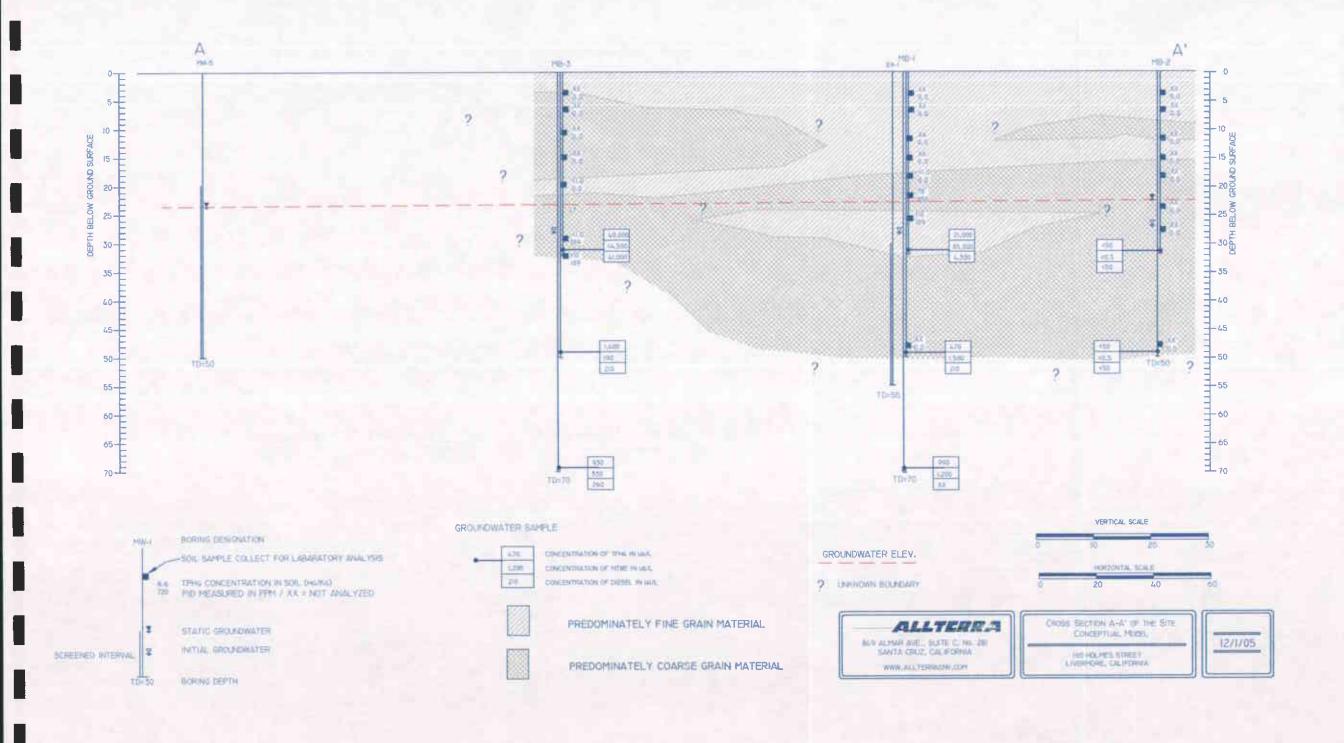
ND: Not Detected at or above laboratory reporting limits

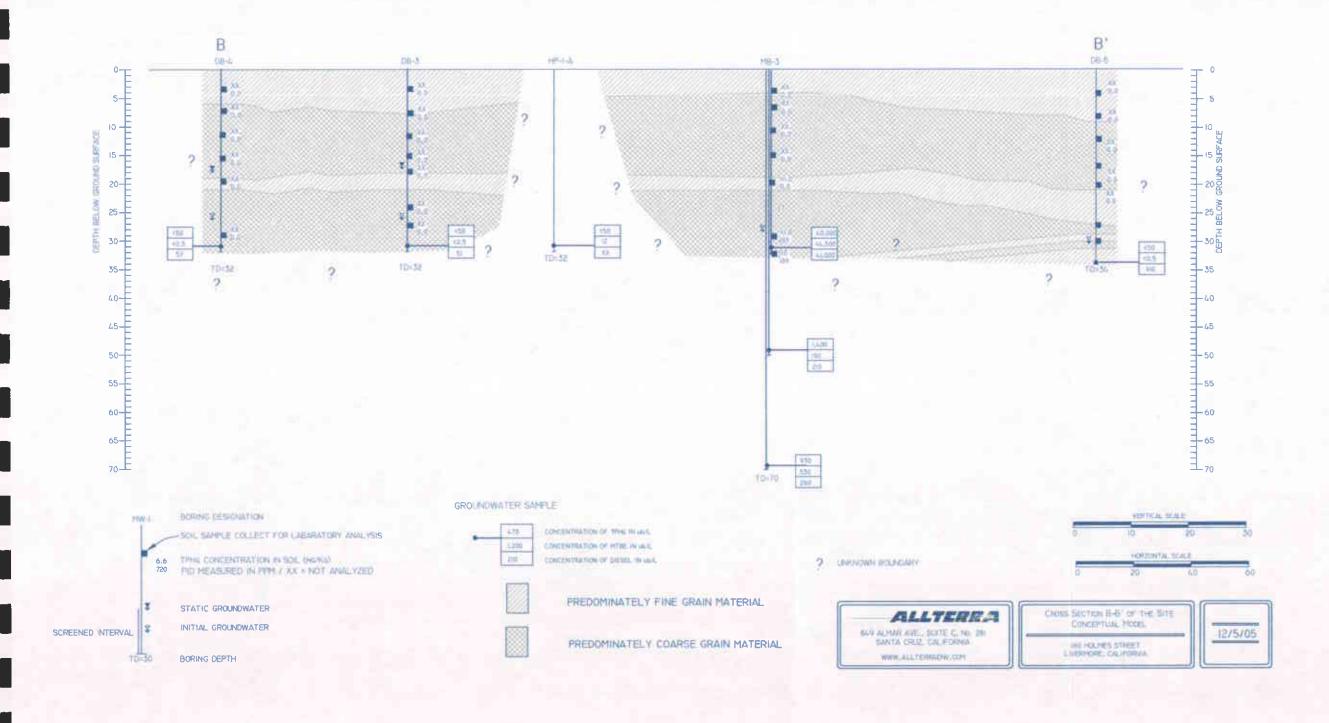
TPHg: Total Petroleum Hydrocarbons as gasoline

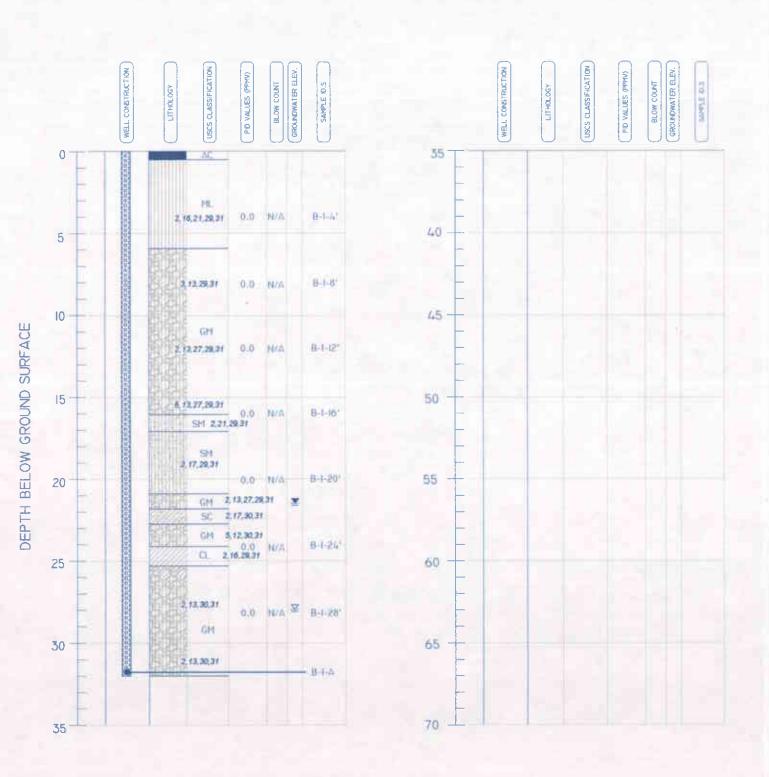
TPHd: Total Petroleum Hydrocarbons as diesel

MTBE = methyl tertiary butyl ether









	BORING INFOR	MATION	
WELL I.D.	B-1	TOTAL DEPTH	32"
LOGGED BY:	MICHAEL KILLORAN	CASING DIA.	NONE
CONTRACTOR	ECA	DRILLED DEPTH.	321
METHODE	GEO PROBE	START DATE	11/10/05
BORING DIA.	21/2	COMPLETION	11/10/05

### LEGEND USCS CLASSIFICATIONS WELL CONSTRUCTION USCS CLASSIFICATIONS BENTONITE PT . PEET POORLY GRADED SAND NO. 2 SAND ORGANIC SILT OR CLAY SW WELL GRADED SAND OL GC 💆 CONCRETE CL SILTY OR SANDY CLAY CLAYEY GRAVEL LANDSCAPE ML CLAYEY SILT SHITY GRAVEL POORLY GRADED GRAVEL ASPHALT SC CLAYEY SAND GP 🖄 WELL GRADED GRAVEL NEAT CEMENT SELTY SAND NOTE: "H" USED INPLACE OF "L" FOR THE SECOND LETTER OF THE ABOVE DENOTES LIQUID 1 HIS 10 SECOND GREATER ☑ GROUNDWATER ELEV. (INITIAL) N/A NOT APPLICABLE

# SOIL DESCRIPTION KEY

1	DARK BROWN	12	<5% CLAY AND SET	23	NOT USED
2	HELICH BROWN	13	125% CLAY AND SET	24	NOT USED
3	LIGHT BROWN	14	125% CLAY AND SELT	25	NOT LIKED
4	LIGHT RUST	15	KASHI CLAY AND SILT	26	FRACTURED ROCK
5	NUST:	16	< 5% COARSE MATERIAL < 6.75 HeV	27	WEATHERED ROOK
6	RUSTY BROWN	17	4 20% COARSE MATERIAL 4 L.75 PM	28	pery
7	DARK OUNE	18	C SENS COMPSE MATERIAL, C 6.75 HH	29	MORE
8	HEDILIPI OLIVE	19	< ASSU COARSE MATERIAL < 6.75 HH	30	WET (FREE WATER)
9	LIGHT (KIVE	20	CONTRACTOR HATERIAL > 4.75 HH	31	NO PRODUCT ODOR
10	GREY HPOWN	21	1 20% COASPE HATERIAL > 4,75 Hr	32	HODERATE PRODUCT GROR
11	LT SEET BROWN	22	4 55% COMME MATERIAL > 6.75 HH	33	STRONG PRODUCT DOOR



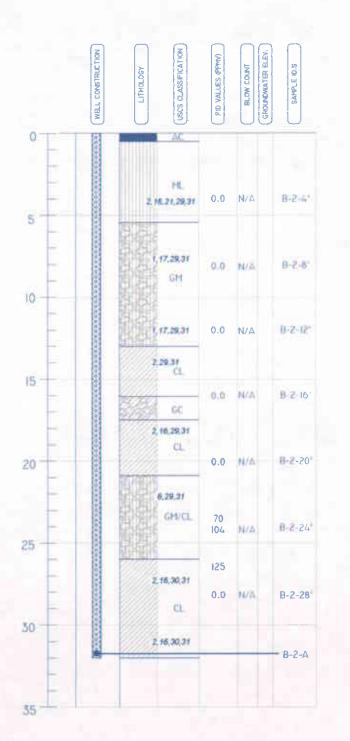
■ GROUNDWATER ELEV. (STATIC)

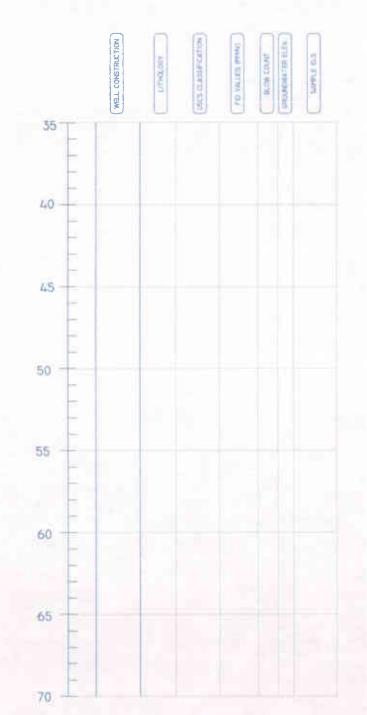


HIG FOLKES STREET LIVERNORE, CALIFORNIA 11/21/05

GROUNDWATER SAMPLE

# DEPTH BELOW GROUND SURFACE





# BORING INFORMATION

 WELL I.D.
 B-2
 TOTAL DEPTH
 32'

 LOGGED BY:
 MICHAEL KILLORAN
 CASING DIA.
 NONE

 CONTRACTOR
 ECA
 DRILLED DEPTH
 32'

 METHODE
 GEO PROBE
 START DATE
 II/I0/05

 BORING DIA.
 2 1/2'
 COMPLETION
 II/I0/05

### LEGEND

- WE	ELL CONSTRUCTION	1	ISCS CLASSIFICATIONS	US	CS CLASSIFICATIONS
	BENTONITE	PI	PEET	SP	POORLY GRADED SAND
羅	NO. 2 SAND	Ot.	ORGANIC SILT OR CLAY	SW L	WELL GRADED SAMO
	CONCRETE	a 🛭	SILTY OR SANDY CLAY	GC 🗟	CLAYEY GRAVEL
	LANDSCAPE	HL.	CLAYEY SILT	GM E	SILTY GRAVEL
	ASPHALT	SC 🐰	CLAYEY SAND	GP E	POORLY GRADED GRAVEL
188	NEAT CEMENT	SH	SILTY SAND	GW	WELL GRADED GRAVEL

NOTICE WELLIGED WILLIAGE OF "L" FOR THE SECOND LIKTERS OF THE ADOVE OFWERTS LIQUID LIFTED OF \$50% OR GREATER

SE GROUNDWATER ELEV. (INITIAL)

N/A NOT APPLICABLE

S GROUNDWATER ELEV. (STATIC)

GROUNDWATER SAMPLE

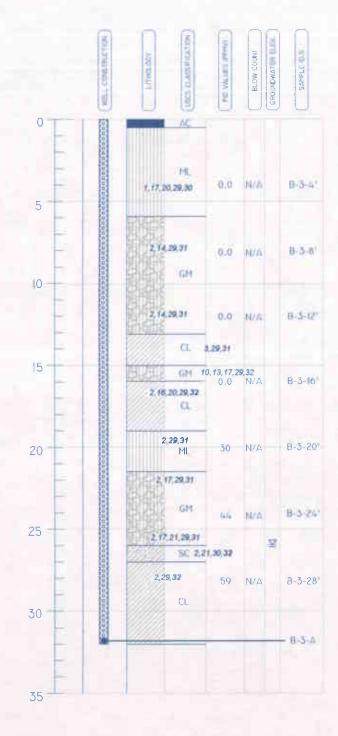
# SOIL DESCRIPTION KEY

1	DARK BROWN	12	<5% CLAY AND SET	23	NOT USED
2	MEDIUM BROWN	13	<20% CLAY AND SILT	24	NOT USED
3	LIGHT BROWN	14	<35% CLAY AND SILT	25	NOT USED
4	LIGHT RUST	15	KASM, CLAY AND SILT	26	FRACTURED ROCK
5	RUST	16	< 5% COARSE MATERIAL < 4.75 MM	27	WEATHERED ROCK
6	RUSTY BROWN	17	C 20% COARSE HATERIAL C 5.75 PM	28	DRY
7	DARK OLNE	18	< 30% COARSE MATERIAL < 6,78 Her	29	MOIST
8	HEDRUM OLIVE	19	< 45% COARSE HATERIAL < 4.75 Hrs.	30	WET O'REE WATERO
9	LIGHT CLIVE	20	< 5% COARSE MATERIAL > 4.75 MM	31	NO PRODUCT ODOR
10	OREY: BROWN	21	< 20% COASRE MATERIAL > 4.75 MM	32	MODERATE PRODUCT OFOR
11	LT GREY BROWN	22	< 50% COASPE MATERIAL > 6.75 yer	33	STRONG PRODUCT COOR

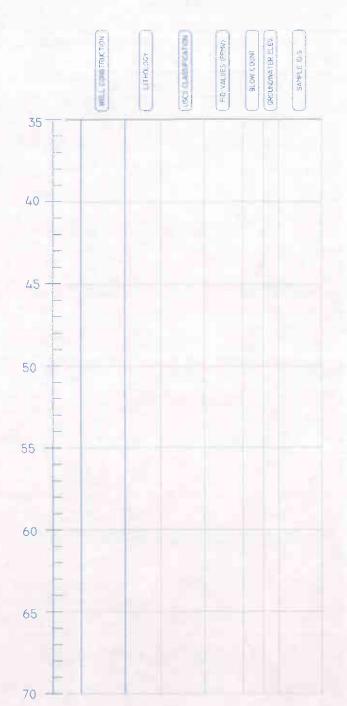
# ALLTERRA

SANTA CRUZ, CALFORNIA WWW.ALLTERRARM.COM BORING LOG B-2

SOUNCERS STREET



DEPTH BELOW GROUND SURFACE



### BORING INFORMATION WELL LD. 8-3 TOTAL DEPTH 32 MICHAEL KILLORAN CASING DIA. NONE LOGGED BY: CONTRACTOR ECA DRILLED DEPTH 521 METHODE GEO PROBE START DATE 11/10/05 COMPLETION 11/10/05 BORING DIA. 2 1/2"

W	ELL CONSTRUCTION		USCS CLASSIFICATIONS	US	CS CLASSIFICATIONS
H	HENTONITE	PT	PEET	SP	POOPLY GRADED SAND
	NO. 2 SAND	OL	ORGANIC SILT OR CLAY	SW	WELL GRADED SAND
3	CONCRETE	CL 💆	SILTY OR SANDY CLAY	GC (mg/	CLAYEY GRAVEL
	LANDSCAPE	ML	CLAYEY SILT	GM	SILTY GRAVEL
	ASPHALT	SC	CLAYEY SAND	GP	POORLY GRADED GRAVEL
	NEAT CEMENT	SM	SILTY SAND	GW	WELL GRADED GRAVEL

LEGEND

HOTEL "HE USED WISLIGHT OF THE SECOND LETTER OF THE ABOVE DENOTES CITATED CHISTS OF TOTAL OR GREATER

☑ GROUNDWATER ELEV (INITIAL)

N/A NOT APPLICABLE

■ GROUNDWATER ELEV (STATIC)

GROUNDWATER SAMPLE

# SOIL DESCRIPTION KEY

1	DARK BROWN	12	KEN CLAY AND SUT	23	MOT UNED
2	MEDIUM BROWN	13	CON CLAY AND SILT	24	NOT USED :
3	LIGHT BROWN	14	KMINI CLAY AND SILT	25	NOT LINED
4	LIGHT PUST	15	CLOW CLAY AND SILT	26	FRACTURED ROCK
5	RUST	16	5 % COURSE HATERIAL < 4.75 MM	27	WEATHERED ROOM
6	RUSTY BROWN	17	1 20% CONFISE MATERIAL < 4.75 MM	28	OFFY
7	DARK OLIVE	18	3 3 4 COMPET HATERY < 4.75 MM	29	HOIST
8	MEDIUM OLIVE	19	< 4 H COMISE HATERIAL < 4.75 MM	30	WET SPREE WATERS
9	LIGHT OLIVE	20	5 S COMME MATERIAL 1 4.75 MM	31	NO PRODUCT COOR
10	GREY BROWN	21	C 2014 COMPREMATERIAL > 4.75 MM	32	HODERATE PRODUCT OFOR
11	LT GREY BROWN	22	31W COATRE MATERIAL > 4.75 MM	33	STRONG PRODUCT COOR

# ALLTERRA

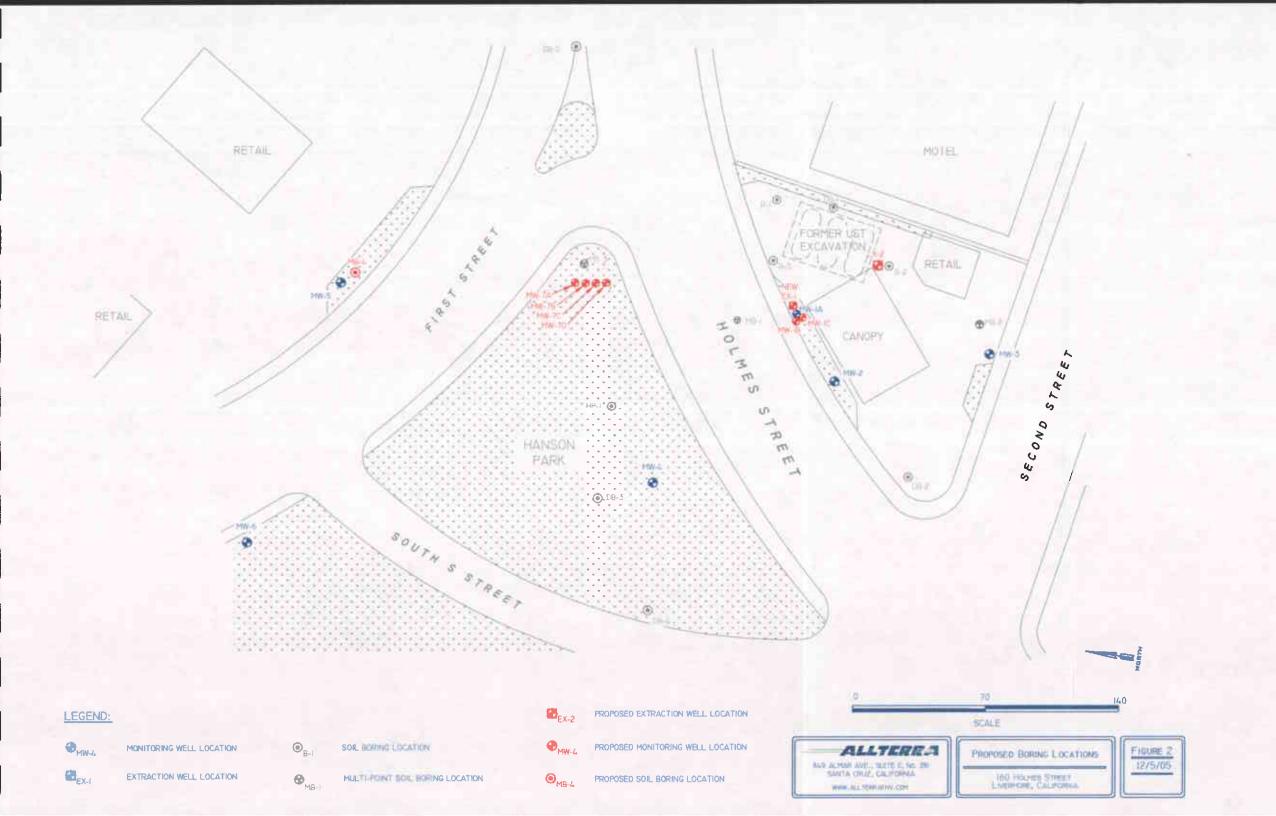
BUG ALMARI AVE., SUITE C, No. 281 SANTA CRUZ, CALIFORNIA WWW.ALLTERNANCEDH

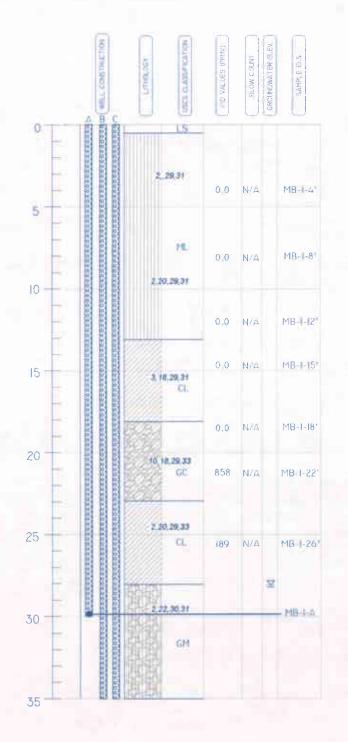
BORING LOG B-3

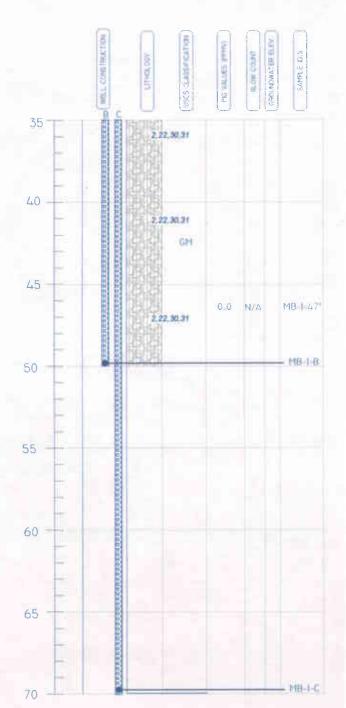
LIVEPHORE, CALIFORNIA

11/21/05

INCHOLNES STREET







# BORING INFORMATION MB-IA,B,C TOTAL DEPTH 70' JAMES ALLEN CASING DIA, NONE ECA DRILLED DEPTH 32' GEO PROBE START DATE II/II/05

COMPLETION II/II/05

			LEGEND		
W	ELL CONSTRUCTION		USCS CLASSIFICATIONS	Ų	ISCS CLASSIFICATIONS
	BENTONITE	P1	PEET	SP	POORLY GRADED SAND
	NO. 2 SAND	OL	ORGANIC SILT OF CLAY	SW	WELL GRUDED SAND
1.77	CONCRETE	CL	SILTY OR SANDY CLAY	GC /	CLAYEY GRAVEL
	LANDSCAPE	ML	CLAYEY SILT	GM	SILTY GRAVEL
	ASPHALT	SC	CLAYEY SAND	GP	POGRLY GRADED GRAVE
000	NEAT CEMENT	SM	SLTT SAND	GW	WELL GRADED GRAVEL

NOTE: HOUSED INPLACE OF 1 FOR THE SECOND LETTER OF THE APOVE DENOTES LIQUID LIMITS OF 50% OR GREATER

☑ GPOINDWATER LLE (INITIAL)

WELL LD:

METHODE BORING DIA.

LOGGED BY:

CONTRACTOR

N/A NOT APPLICABLE

GROUNDWATER ELEV. (STATIC)

GROUNDWATER SAMPLE

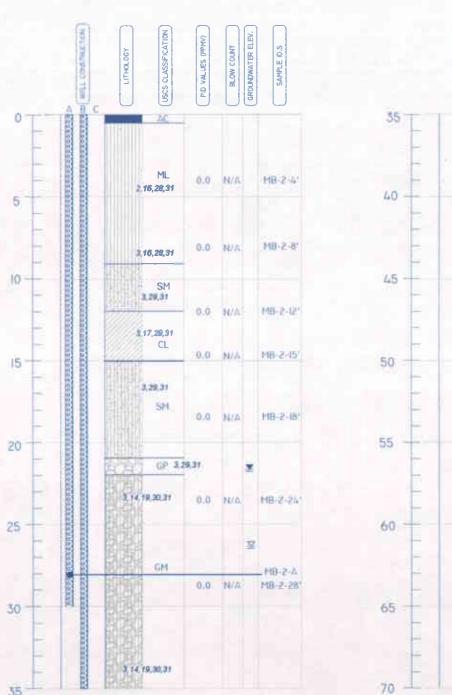
# SOIL DESCRIPTION KEY

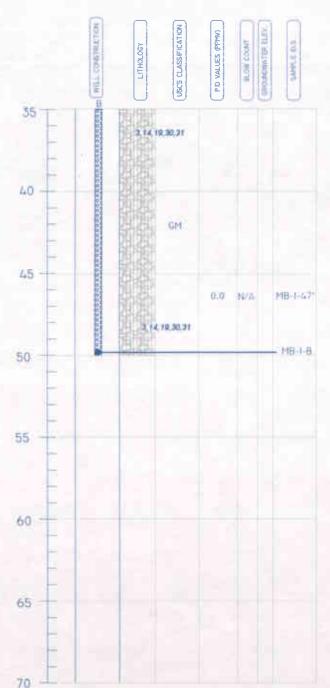
1	DARK BROWN	12	<ht clay="" set<="" th="" wo=""><th>23</th><th>NOT LEED</th></ht>	23	NOT LEED
2	MEDIUM BROWN	13	CEON, CLAY AND SILT	24	NOT LINED
3	LIGHT BROWN	14	435% CLAY AND SILT	25	NOT USED
4	LIGHT RUST	15	KIGH, CLAY AND BLT	26	FRACTURED ROOK
5	RUST	16	< 5% COARSE MATERIAL < 1,75 MH	27	WEATHERED ROOK
6	RUSTY BROWN	17	< JON COARSE MATERIAL < 4.76 MM	28	DFDr
7	DARK OLIVE	18	< 35% COARSE HATERIAL CAUTS IN	29	HOST
8	MFL LM OLIVE	19	< ASS COMPRE HATERIAL CALTS HE	30	WET (FIREE WATER)
9	LIGHT OLIVE	20	< 5% COARSE MATERIAL > 4.75 HH	31	NO PRIODUCT ODOR
10	GREY BROWN	21	< 20% COASSE HATERIAL > 4.75 HH	32	HOSERATE PROOFE OROR
11	LI GREY BROWN	22	< 55% COASRE MATERIAL II 4,75 HM	33	STRONG PRODUCT COOR



BORING LOG MB-I

180 HOLPES STREET LIVERPORE, CALIFORNIA





	BORING INF	ORMATION
WELL I.D.	MB-2A,B	TOTAL DEPTH 50'
LOGGED BY:	JAMES ALLEN	CASING DIA. NONE
CONTRACTOR	ECA	DRILLED DEPTH 50'
METHODE	GEO PROBE	START DATE 11/10/05
BORING DIA.	2 1/2"	COMPLETION II/II/05

			LEGEND		
W	ELL CONSTRUCTION		USCS CLASSIFICATIONS	t	ISCS CLASSIFICATIONS
	BENTONITE	PT	PEET	SP	POORLY GRADED SAND
延	NO. 2 SAND	OL	ORGANIC SILT OF CLAY	SW	WELL GRADED SAND
	CONCRETE	CL	SILTY OR SANDY CLAY	GC R	CLAYEY GRAVEL
	LANDSCAPE	ML.	CLAYEY SILT	GH E	SILTY GRAVEL
	ASPHALT	SC	CLAYEY SAND	GP E	POORLY GRADED GRAYEL
器	NEAT CEMENT	SM	SILTY SAND	GW E	WELL GRADED GRAVEL

HOTEL THE CASE WHEACH OF "L" FOR THE SECOND LETTER OF THE ABOVE DENOTES LIQUID LIMITS OF \$6% ON GREATER.

GROUNDWATER ELEV. (MITHL)

N/A NOT APPLICABLE

GROUNDWATER ELEV. (STATIC)

GROUNDWATER SAMPLE

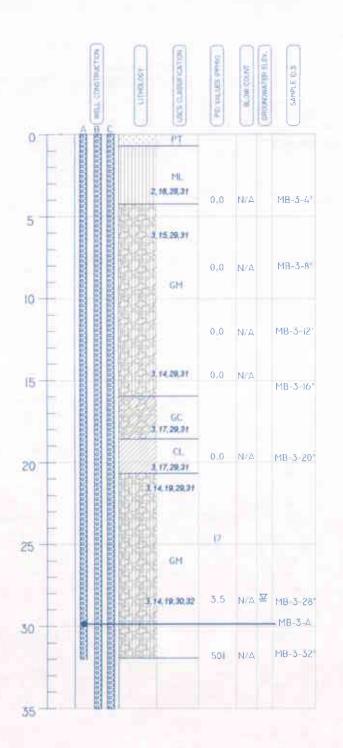
# SOIL DESCRIPTION KEY

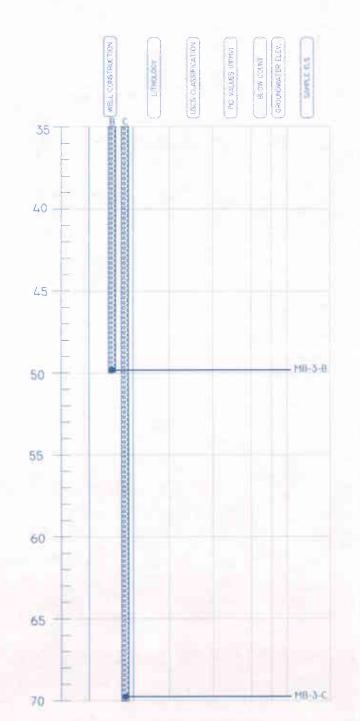
1	DARK BROWN	12	<5% CLAY ##0 54.1	23	NOT USED
2	MEDIUM BROWN	13	<20% CLAY AND SILT	24	NOT USED
3	LIGHT BROWN	14	<35% CLAY AND SILT	25	NOT USED
4	LIGHT RUE!	15	<45% CLAY AND SILT	26	FRACTURED ROCK
5	MUST	16	4 5% COARSE PLATERIAL 4 AUTS HE	27	WEATHERED ROCK
6	RUSTY BROWN	17	< 20% COARSE MATERIAL < 4.75 MM	28	DRY
7	DANK DOWE	18	< 35% COARSE MATERIAL < 4,75 MM	29	MOIST
8	HEDIOH DUVE	19	< 45% COARSE MATERIAL < 4.75 HM	30	WET (FREE WATER)
9	LIGHT OLIVE	20	< 5% COARSE MATER AL > 4.75 MM	31	NO PRODUCT ODOR
10	GREY BROWN	21	< 20% COASRE MATERIAL > 4.75 MM	32	MODERATE PRODUCT OROR
11	LT DREY BROWN:	22	< 35% COASRE MATERIAL > 4,75 mm	33	STRONG PRODUCT ODOR



SUNTA CRUZ, CALFORNIA WWW.ALLTERNIAWA.COM BORING LOG MB-2

100 HOLNES STREET LIVERTORE, CALIFORNIA





#### BORING INFORMATION MB-3A,B,C TOTAL DEPTH 70' WELL I.D. LUGGED BY: ERIK ALLEN CASING DIA. NONE ECA DRILLED DEPTH 70' CONTRACTOR START DATE 11/11/05 GEO PROBE METHODE COMPLETION 11/12/05 BORING DIA.

WELL CONSTRUCTION		Į.	USCS CLASSIFICATIONS	USCS CLASSIFICATIONS		
	BENTONITE	PT	PEET	SP	POORLY GRADED SAND	
	NO. 2 5/40	OL	ORGANIC SILT OR CLAY	SW	WELL GRADED SAND	
	CONCRETE	CL	SILTY OF SANDY CLAY	GC	CLAYEY GRAVEL	
	LANDSCAPE	ML	CLAYEY SILT	GM	SILTY GRAVEL	
	ASPHALT	sc 🛭	CLAYEY SAND	GP	POORLY GRADED GRAYE	
0000	NEAT CEHENT	SH	SILTY SAND	GW	WELL GRADED GRAVEL	

LEGEND

NOTE "H" USED INPLACE OF "L" FOR THE SECOND LETTER OF THIS SHOULD LIMITS OF 50% OR GREATER

☑ GOUNDWATER ELEV (INITIAL)

N/A NOT APPLICABLE

■ GPOUNDWATER ELEV (STATIC)

GROUNDWATER SAMPLE

# SOIL DESCRIPTION KEY

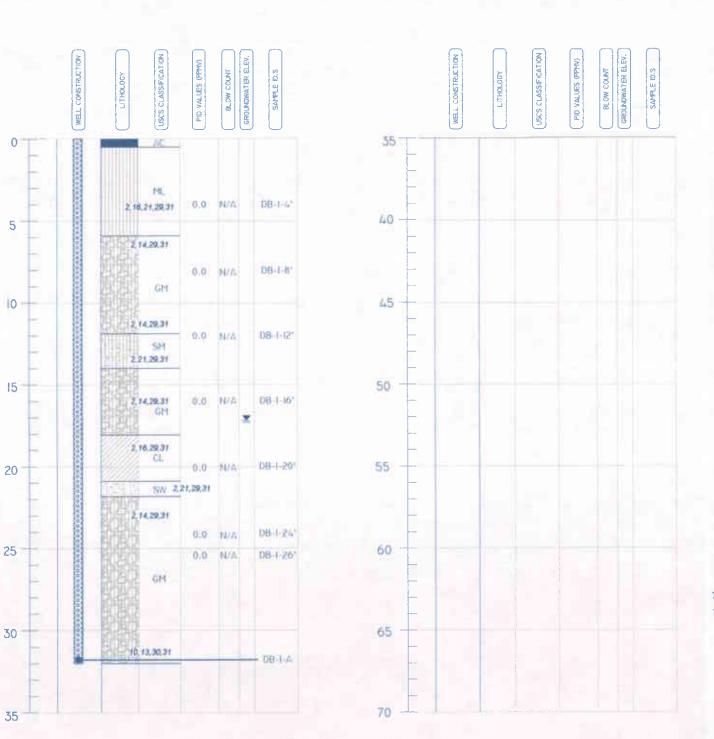
DARK BROWN	12	KER CLAY MO SLT	23	NOT USED
MED UM BROWN	13	CROW CLAY AND SELT	24	NOT USED
LIGHT BROWN	14	<55% CLAY MODIFIET	25	NOT LISED
LIGHT RUST	15	KASIN CLAY AND BILT	26	FRACTURED ROOK
RUST	16	< 5% COARSE MATERIAL < 4.75 HH	27	WEATHERED ROCK
RUSTY BROWN	17	< TON, COMPSE MATERIAL, < 4,75 MM.	28	DRY
DARK OLIVE	18	< 35% COARSE HATERIAL C'ALPS HH	29	H067
MEDIUM OLIVE	19	CASTA COASSE HATERIAL IS \$175 PM	30	WET O'REE WATER
LIGHT OLIVE	20	C SHE COURSE MATERIAL > 4.75 HH	31	NO PRODUCT COOR
GREY BROWN	21	< 20% COMPRE HATERIAL > 4.75 MM	32	MOCERATE PRODUCT ORDR
LT GREY BROWN	22	< 36% COASRE NATERIAL > 6.76 HH	33	STROVE PRODUCT COOR
	MED UM BROWN LIGHT BROWN LIGHT RUST RUST RUSTY BROWN DARK OLIVE MEDIUM OLIVE LIGHT OLIVE GREY BROWN	MED UM BROWN       13         LIGHT BROWN       14         LIGHT RUST       15         RUST       16         RUSTY BROWN       17         DARK OLIVE       18         MEDIUM OLIVE       19         LIGHT OLIVE       20         GREY BROWN       21	MED UM BROWN         13           LIGHT BROWN         14           LIGHT RUST         15           RUST         16           RUSTY BROWN         17           DARK OLIVE         18           MEDIUM CLIVE         19           LIGHT OLIVE         20           SREY BROWN         21	MED UM BROWN       13       24         LIGHT BROWN       14       25         LIGHT RUST       15       26         RUST       16       27         RUSTY BROWN       17       26         DARK OLIVE       18       29         MEDIUM CLIVE       19       30         LIGHT OLIVE       20       31         GREY BROWN       21       32



Boring Log MB-3

160 HOLPES STREET LIVENPORE, CALIFORNIA

# DEPTH BELOW GROUND SURFACE



### 

# LEGEND

WELL CONSTRUCTION		U	SCS CLASSIFICATIONS	USCS CLASSIFICATIONS		
	BENTONITE	PT 🛅	PEET	SP	POOPLY GRADED SAND	
至	NO. 2 SAND	OL -	ORGANIC SILT OF CLAY	sw	WELL GRADED SAND	
10) 2 3	CONCRETE	CL 🛮	SILTY OR SANDY CLAY	GC	CLAYEY GRAVEL	
	LANDSCAPE	ML III	CLAVEY SILT	GM 🖁	SILTY GRAVEL	
	ASPHALT	sc 🛭	CLAYEY SAND	GP 🛜	POOPLY GRADED GRAVEL	
50 80 80	NEAT CEMENT	SM 🔢	SILTY SAND	GW S	WELL GRADED CRAVEL	

NOTE: "H" USED INPLACE OF "L" FOR THE SECOND LETTER OF THE ABOVE DENOTES LIQUIDED TO THE OF GREATER

☑ GROUNDWATER ELEV. (MITTIAL)

WELL I.D.

METHODE BORING DIA.

LOGGED BY:

CONTRACTOR

N/A NOT APPLICABLE

COMPLETION 11/10/05

■ GROUNDWATER ELEV. (STATIC)

GROUNDWATER SAMPLE

# SOIL DESCRIPTION KEY

DARK BROWN	12	<5% CLAY MAD SET	23	NOT USED
MEDIUM BROWN	13	KIRN, CLAY AND SILT	24	NOT USED
LIGHT BROWN	14	KSSW CLAY AND BILT	25	NOT, USED
LIGHT RUST	15	CASH CLAY AND BAT	26	FRACTURED ROCK
FILET	16	4 BYS COMPSE HATERIAL 4 L.75 HR	27	WEATHERED ROCK
RUSTY BROWN	17	C 20% COARSE MATERIAL < 4.75 HH	28	ber
DARK OLIVE	18	< 38% COMESE MATERIAL < 4.75 HH	29	MORE
MEDIUM OLIVE	19	< 45% CEMPSE HATERIAL C \$275 HIII	30	WET (FREE WATER)
LIGHT OLIVE	20	1 3% COMPSE MATERIAL > 1.75 PM	31	NO PRODUCT GOOR
GREY BROWN	21	< 20% COASRE MATERIAL > 4.75 HM	32	MODERATE PRODUCT OFOR
LT GREY BROWN	22	CONN. COASRE PATERIAL > 4.75 MH	33	STRONG PRODUCT GOOR
	MEDIUM BROWN LIGHT BROWN LIGHT BROWN RUSTY BROWN DARK OLIVE MEDIUM OLIVE LIGHT OLIVE SREY BROWN	MEDIUM BROWN 13 LIGHT BROWN 14 LIGHT BEST 15 HUST 16 RUSTY BROWN 17 DARK OLIVE 18 MEDIUM OLIVE 19 LIGHT OLIVE 20 SREY BROWN 21	MEDIUM BROWN	MEDIUM BROWN



849 ALMAR AVE., SUITE C. NO. 251 SANTA CRUZ, CALIFORNIA WWW.ALLTERNAZWA.COM BORING LOG DB-I

LIVERSON, DALFGRAD

# DEPTH BELOW GROUND SURFACE

10

20

25

30

35

ML

1,28,31

2,21,29,31 SH

2,29,31

SC

2,29,31

2,21,29,31

CL

2,21,29,51

0.0 N/A DB-2-41

0.0 N/A DB-2-81

0.0 N/A DB 2-12'

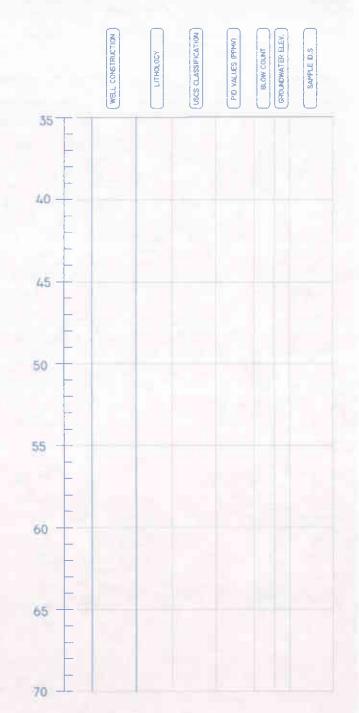
0.0 N/A DB-2-161

0.0 N/A DB-2-20\*

0.0 N/A DB-2-27

4-5-80

121,29.31 0.0 N/A DB-2-23\*



### BORING INFORMATION DB-2 TOTAL DEPTH 32" WELL I.D. LOGGED BY: ERIK ALLEN CASING DIA. NONE ECA DRILLED DEPTH 32" CONTRACTOR GEO PROBE 11/11/05 START DATE METHODE 2 1/2" COMPLETION 11/11/05 BORING DIA.

WELL CONSTRUCTION		U	SCS CLASSIFICATIONS	USCS CLASSIFICATIONS			
	SIENTONITE	PT -	PEET	SP	POORLY GRADED SAND		
麗	NO. 2 SAND	OL 📳	ORGANIC SILT OF CLAY	SW	WELL GRADED SAND		
	CONCRETE	CL 🛮	SILTY OR SANDY CLAY	GC 🔀	CLAYEY GRAVEL		
	LANDSCAPE	ML.	CLAYEY SILT	GM	SILTY GRAVEL		
	ASPHALT	sc 🛭	CLAYEY SAND	GP P	POOPLY GRADED GRAVEL		
	NEAT CEMENT	SM	SILTY SAND	GW 🗿	WELL GRADED GRAVEL		

LEGEND

HOTE, "IT USED WILKES OF "A" FOR THE SECOND LETTER OF THE HOWE DEPOTED LIGHTS OF 50% OR WHATER

GROUNDWATER ELEV. (INITIAL)

N/A NOT APPLICABLE

SCHOOL GROUNDWATER ELEV. (STATIC)

GROUNDWATER SAMPLE

# SOIL DESCRIPTION KEY

1	DARK BROWN	12	45% CLAT (NO SET	23	NOT LIBED
2	MEDIUM BROWN	13	120% CLAY AND SET	24	NOT USED
3	LIGHT BROWN	14	KSSW CLAY AND SILT	25	NOT LINED
4	LIGHT PLET	15	KUSS CLAY AND SILT	26	FRACTURED ROOK
5	RBT	16	4 5% COARSE HATERIAL 4 6.75 HH	27	WEATHERED HOOK
6	RUSTY BROWN	17	# 20% COARSE HATERIAL # 4 75 HH	28	DRY
7	DARK OUTUI	18	< 35% COARSE MATERIAL < 4.75 HH	29	MOST
8	HERION DUVI	19	< A5% CONSE HATERIAL < 4.75 HH	30	WET OFFICE WATERD
9	LIGHT CLIVE	20	< 5% COARSE HATERIAL > 4.75 HH	31	NO FROMET COOR
10	SHE'Y BROWN	21	1 ZON, COASSIE MATERIAL 3 GUE HA	32	HODERATE PRODUCT OFOR
11	LIT GREY BROWN	22	COOK COASPE MATERIAL > AUTO HH.	33	STRONS PRODUCT COOR

# ALLTERRA

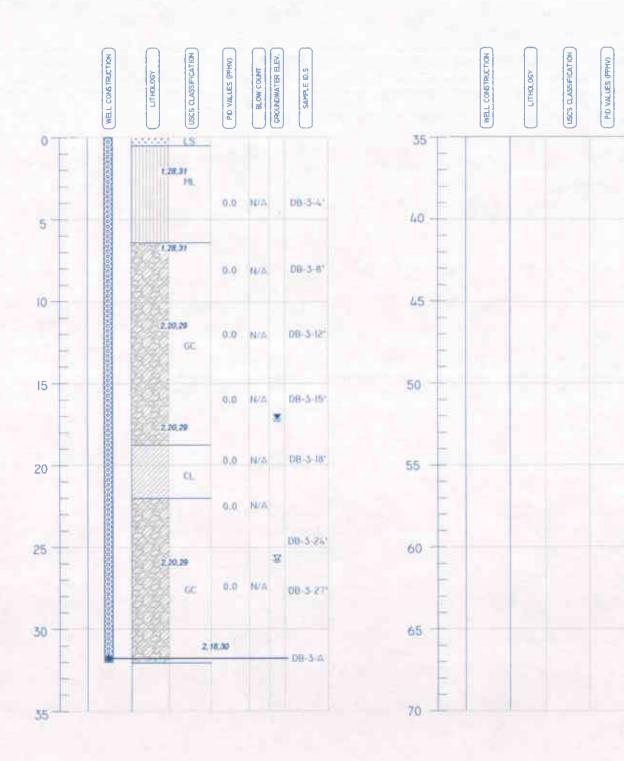
BANTA CRUZ, CALFORNA

WWW.ALLTERWADW.COM

# BORING LOG DB-2

HIS HOLPES STREET LIVERIORE, CALIFORNIA





### BORING INFORMATION DB-3 TOTAL DEPTH 32" WELL I.D. ERIK ALLEN CASING DIA. NONE LOGGED BY: ECA DRILLED DEPTH 32" CONTRACTOR GEO PROBE START DATE 11/14/05 METHODE COMPLETION \_11/14/05 BORING DIA. 2 1/2" LEGEND

WELL CONSTRUCTION		U	ISCS CLASSIFICATIONS	USCS CLASSIFICATIONS		
	BENTONITE	PT 📳	PEET	SP	POORLY GRADED SAND	
羅	NO. 2 SAND	OL -	ORGANIC SILT OR CLAY	SW	WELL GRADED SAND	
	CONCRETE	CL 🛛	SILTY OR SANDY CLAY	GC	CLAYEY GRAVEL	
	LANDSCAPE	ML	CLAYEY SILT	GM GM	SILTY GRAVEL	
	ASPHALT	sc 🛭	CLAYEY SAND	GP P	POOPLY GRADED GRAVE	
器	NEAT CEMENT	SM 🔠	SILTY SAND	GW 🚆	WELL GRADED GRAVEL	

HOTEL THE HIRD MINLAGE OF TLY FOR THE RECOND LETTER OF THE MADNE DUNIVES LIQUID LIMITS OF 50% OR GREATER

₩ GROUNDWATER ELEV. (INITIAL)

N/A NOT APPLICABLE

■ GROUNDWATER ELEV. (STATIC)

GROUNDWATER SAMPLE

# SOIL DESCRIPTION KEY

1	DARK BROWN	12	15W CLAY AND SILT	23	NOT LISED
2	MEDIUM BROWN	13	GOW CLAY AND SET	24	NOT USED
3	LIGHT BROWN	14	KS5% CLAY AND SELT	25	NOT LINED
4	LIGHT PLET	15	KASS CLAY AND BILT	26	FRACTURED ROCK
5	HUST	16	4 5% COAPSE MATERIAL 4 4.75 MM	27	WEATHERED ROOK
6	RUSTY BROWN	17	C ZON COARSE MATERIAL C A,75 IN	28	DRY
7	DARK OLIVE	18	< 35% COARSE MATERIAL < 4.75 HH	29	HOIST
8	HEDILIH OLIVE	19	4 A5% COMPRE PATERIAL 4 A.75 PM	30	WET (FREE WATER)
9	CIGHT OLIVE	20	4 5% COARSE MATERIAL 2 4.75 MH	31	NO PRODUCT COOR
10	OFFY BROWN	21	4 20% COASRE MATERIAL = 4.75 Hrs	32	MODERATE PRODUCT DROP
11	ET. (FEY, BROWN	22	< 35% COASRE HATERIAL > A.75 HH	33	STRONG PRODUCT COOR

# ALLTERRA

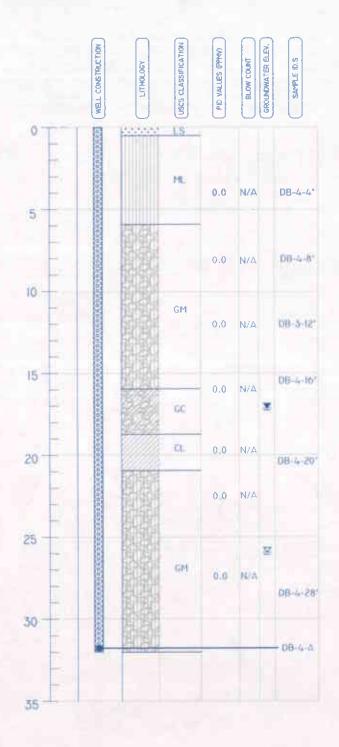
SANTA CRUE, SUITE C. NO. 281 SANTA CRUE, CALIFORNIA

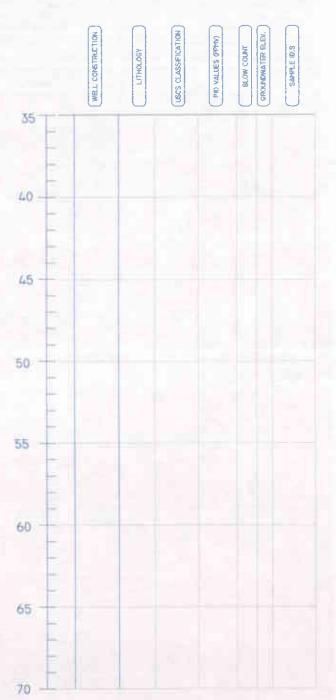
SANTA CRUZ, CACIFORNIA WWW.ALLTESNAEW.COM

# BORING LOG DB-3

HER HOLHES STREET LIVERNISHE, CALIFORNIA







### BORING INFORMATION TOTAL DEPTH 32" WELL LD. DB:4 LOGGED BY: JAMES ALLEN CASING DIA. NONE CONTRACTOR ECA: DRILLED DEPTH 52" START DATE 11/14/05 METHODE GEO PROBE COMPLETION 11/14/05 2 1/2" BORING DIA.

NS
SANO
CONTO
GRAVEI
SRAVEL

1, 17, 20, 29, 30		SOIL DESCRIPTION KE	Y.	
1 DARK BROWN	12	<5% CLAY AND SILT	23	NOT USED
2 MEDIUM BROWN	13	<20% CLAY AND SILT	24	NOT USED
LIGHT BROWN	14	<35% CLAY AND SILT	25	NOT USED
LIGHT RUST	15	<45% CLAY AND SILT	26	FRACTURED ROCK
H.ST	16	4 5% COARSE MATERIAL 4 4.75 HH	27	WEATHERED ROOK
MUSTY BROWN	17	< 20% COARSE MATERIAL < 4.75 MM	28	DRY
DARK OUVE	18	< 35% COARSE MATERIAL < 4.75 MM	29	MOIST
HEDILM OLIVE	19	< 45% COARSE MATERIAL < 4.75 HH	30	WET (FREE WATER)
LIGHT OLIVE	20	F 5% COAPSE HATERIAL Y A.75 PM	31	NO FREQUET COOR
O GREY BROWN	21	< 20% COASRE MATERIAL > 4.75 mm	32	MODERATE PRODUCT OFFICE
1 LT GREY BROWN	22	< 35% COASRE MATER AL > 4.75 HM	33	STRONG PRODUCT ODOR



BORING LOG DB-4

100 HOLPES STREET LIVERHORE, CALIFORNIA



# BELOW GROUND SURFACE DEPTH

10

15

20

25

30

35

2,79,31

2,29,31

1.17,29.31

3 17,29,31

2,17,29,31

3, 17, 30, 31

2,17,30,31

CL

Ct. 2,17,30,31

GC 3,17,30,31

GM

HL

0.0 N/A

DO NA

0.0 N/A

0.0 N/A

0.0 N/A

0.0 N/A

0.0 N/A

DB-5-4

08-5-01

DB-5-12\*

DB-5-16\*

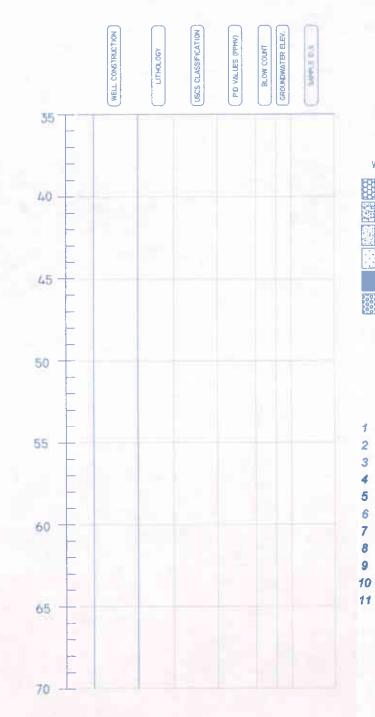
08-5-201

08-5-241

08-5-27

₩ 08-5-301

DB-5-34



#### BORING INFORMATION DB-5 TOTAL DEPTH 34' LOGGED BY: MICHAEL KILLORAN CASING DIA NONE ECA DRILLED DEPTH 34" CONTRACTOR GEO PROBE START DATE 11/11/05

COMPLETION

11/11/05

LEGEND USCS CLASSIFICATIONS WELL CONSTRUCTION USCS CLASSIFICATIONS BENTONITE PEET POORLY GRADED SAND WELL GRADED SAND NO. 2 SAND OL ORGANIC SILT OR CLAY SW CONCRETE CL SILTY OR SANDY CLAY GC -CLAYEY GRAVEL ML CLAYEY SILT GM S SILTY GRAVEL LANDSCAPE GP \_\_\_ POORLY GRADED GRAVEL ASPHALT SÇ CLAYEY SAND WELL GRADED GRAVEL NEAT CEMENT GW SM SILTY SAND

HOTEL "HI, MED INVLACE OF "S." FOR THE SECOND LITTER OF THE ABOVE SOUTHES LISTED LIMITS OF SOPE OR GREATER

GROUNDWATER ELEV. (INITIAL)

WELL I.D.

METHODE

BORING DIA.

2 1/2"

N/A NOT AFFLICABLE

GROUNDWATER ELEV. (STATIC)

GROUNDWATER SAMPLE

# SOIL DESCRIPTION KEY

1	DARK BROWN	12	15% CLAY AND SELT	23	NOT USED
2	MEDIUM BROWN	13	COST CLAY AND SET	24	NOT USED
3	LIGHT BROWN	14	K35W CLAY AND SET	25	NOT USED
4	LIGHT RUST	15	CASH, CLAY AND TILY	26	PRACTURES ROOK
5	RUST	16	4 STE COMPSE PATTERIAL 4 L.15 PR	27	WEATHERED ROCK
6	RUSTY BROWN	17	< 20% COMISE MATERIAL < 5.75 HH	28	SET
7	DARK OLIVE	18	< 35% COMME HATERIAL < 4.75 MH	29	HOIST
8	HEDILE OLIVE	19	< 45% COARSE HATERIAL < 4,75 PM	30	WET O'REE WATER)
9	LIGHT OLIVE	20	< 5% LOME HATERAL > 4.75 MM	31	NO PRODUCT DOOR
10	RET BROWN	21	< 20% ( WHE HATTIMAL > 4,75 MM	32	HODERALE HWXLCT OROR
11	LT OREY BROWN	22	< 35% COMPE HATERIAL > 4.75 HH	33	STRONG PRODUCT GOOF

ALLTERRA

SANTA CRUZ, SLITE C. No. 29 SANTA CRUZ, CALFORNA

WWW.ALL.TERGLEW.COM

BORING LOG DB-5

HIG HOLPES STREET LINEWHOLE, CALIFORNIA



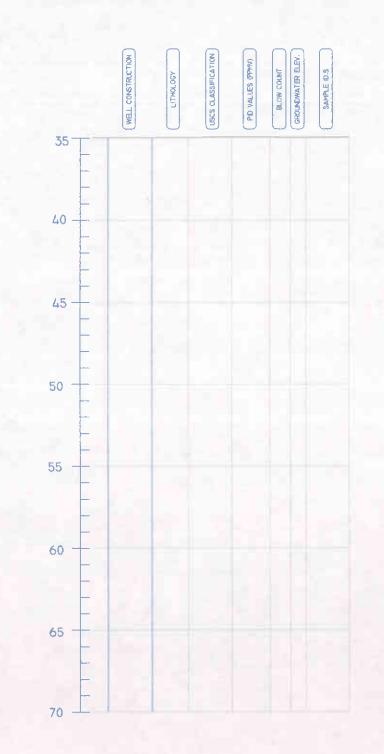
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20

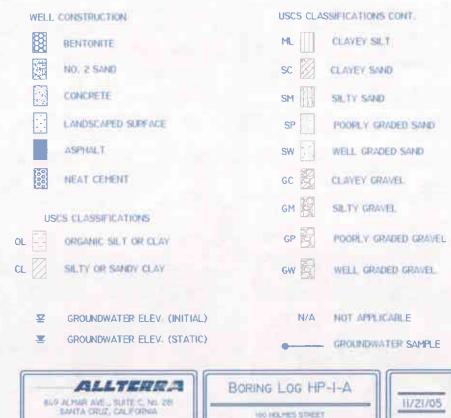
25

30



## BORING INFORMATION HP-I-A TOTAL DEPTH 52' CASING DIA. NONE JAMES ALLEN ECA DRILLED DEPTH 32" CONTRACTOR GEO PROBE START DATE 11/14/05 2 1/2" COMPLETION 11/14/05

# LEGEND



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WELL LD.

METHODE

BORING DIA.

LOGGED BY:

100 HILPES STREET Dyshore, Culyanu.

