

Detterman, Mark, Env. Health

From: Sami Malaeb [s.malaeb@comcast.net]
Sent: Monday, May 28, 2012 3:28 PM
To: Detterman, Mark, Env. Health
Cc: rbatiste@eec-corp.com; colisa@me.com; britpete@aol.com
Subject: 2145 35th Avenue, Oakland, CA - Petroleum Hydrocarbons in Water - Calculated Groundwater Flow Direction - Proposed Well Locations - Well Diagram -
Attachments: Figure 5 Proposed Well Locations.pdf; Figure 3 Groundwater Elevations and Flow Directions.pdf; Figure 4 Depiction of Petroleum Hydrocarbons in Groundwater.pdf; Figure 6 PROPOSED WELL DIAGRAM REV 05.28.12.pdf

Hi Mark:

I think you are correct. There is more than one groundwater flow direction calculated from the temporary piezometers (see the attached Figure 3). The calculated flow direction ranges from southeast to northeast. However, the topographic slope is towards southwest. I believe the calculated groundwater flow direction from these temporary piezometers is inconclusive. There is a possibility that there was no full recovery of water in one or more of these temporary piezometers. It is likely that the groundwater flow will follow the topography of the area, towards the southwest.

I proposed the locations of the four wells in the attached Figure 5. Additional wells are needed in the future. Please note the locations of the well are slightly different from what I proposed in a previous email. I placed a well near the center of the main plume. Also, I placed a well upgradient for better triangulation and calculation of the groundwater flow direction.

Also, I proposed the well diagram in the attached Figure 6.

For your reference, Figure 4 depicts petroleum hydrocarbons in groundwater.

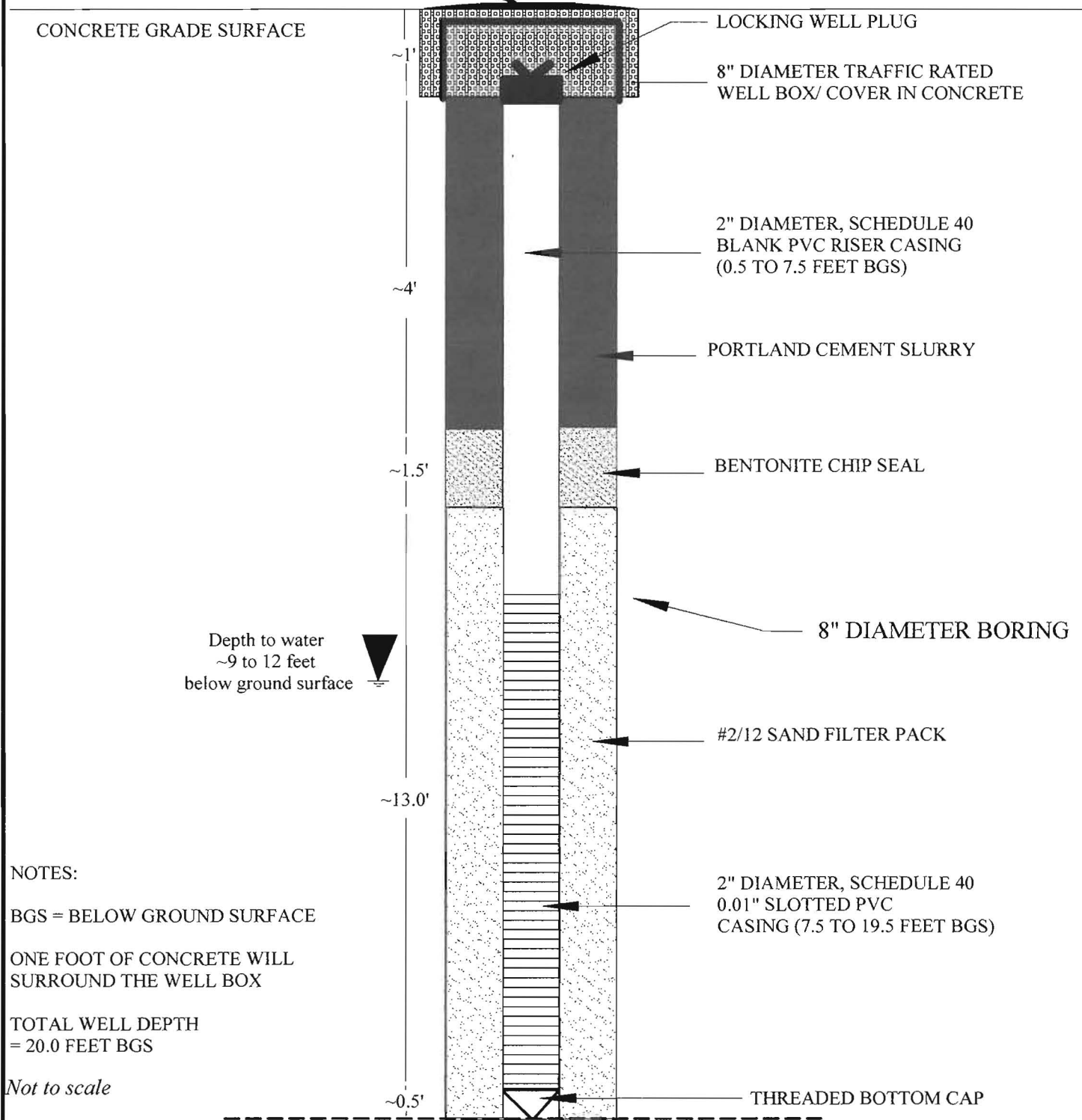
Let us discuss at your convenience.

Regards,

Sami Malaeb, P.E., R.E.A.
TEL: (925) 858-9608
Email: s.malaeb@comcast.net

**GROUNDWATER MONITORING WELL
CONSTRUCTION SPECIFICATIONS**

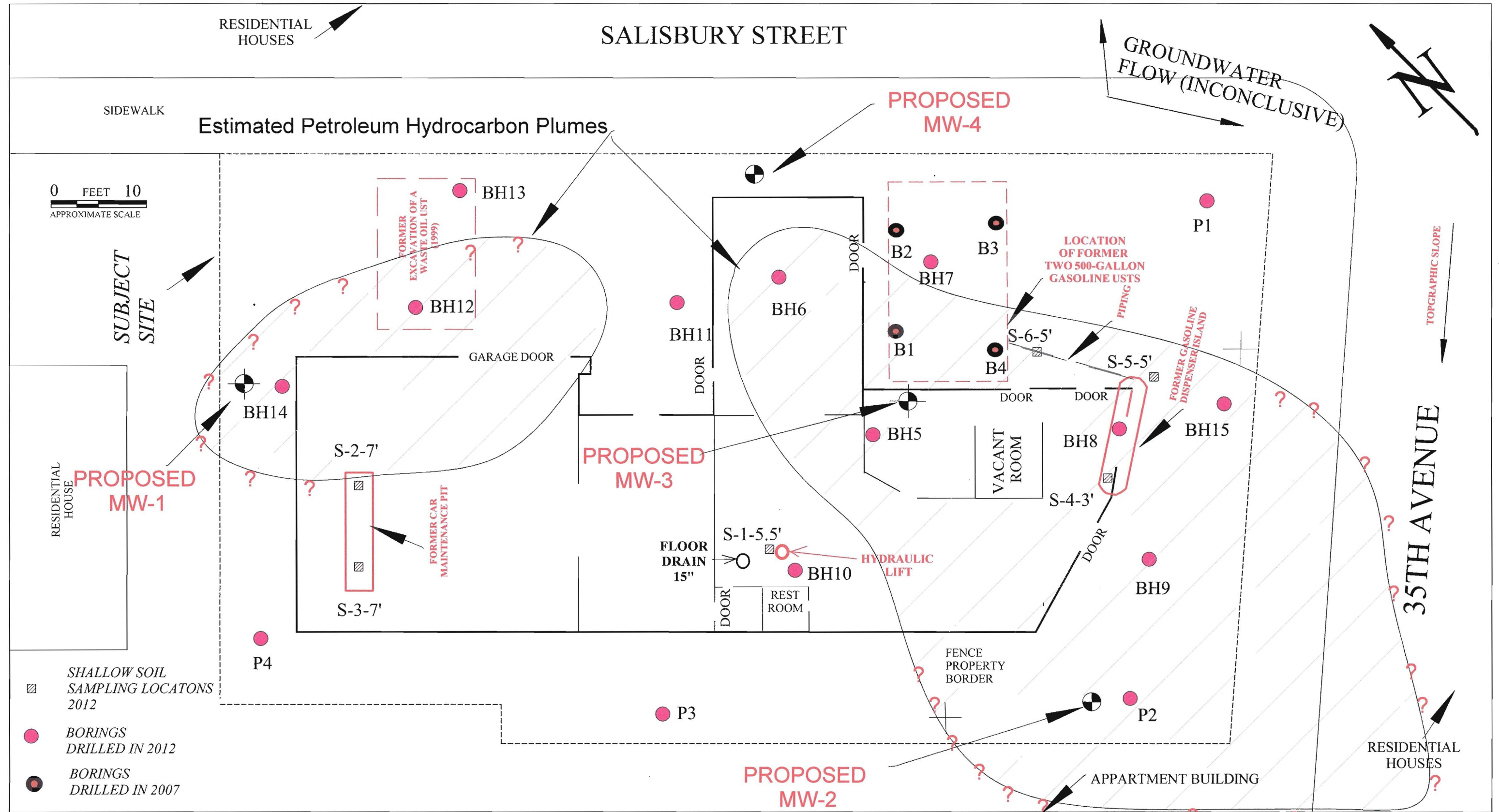
POSITIVE GRADE FOR WATER
TO FLOW AWAY FROM THE WELL BOX



**1485 BAYSHORE BOULEVARD, SUITE 374
SAN FRANCISCO, CA 94124**

2145 35th AVENUE
OAKLAND, CALIFORNIA

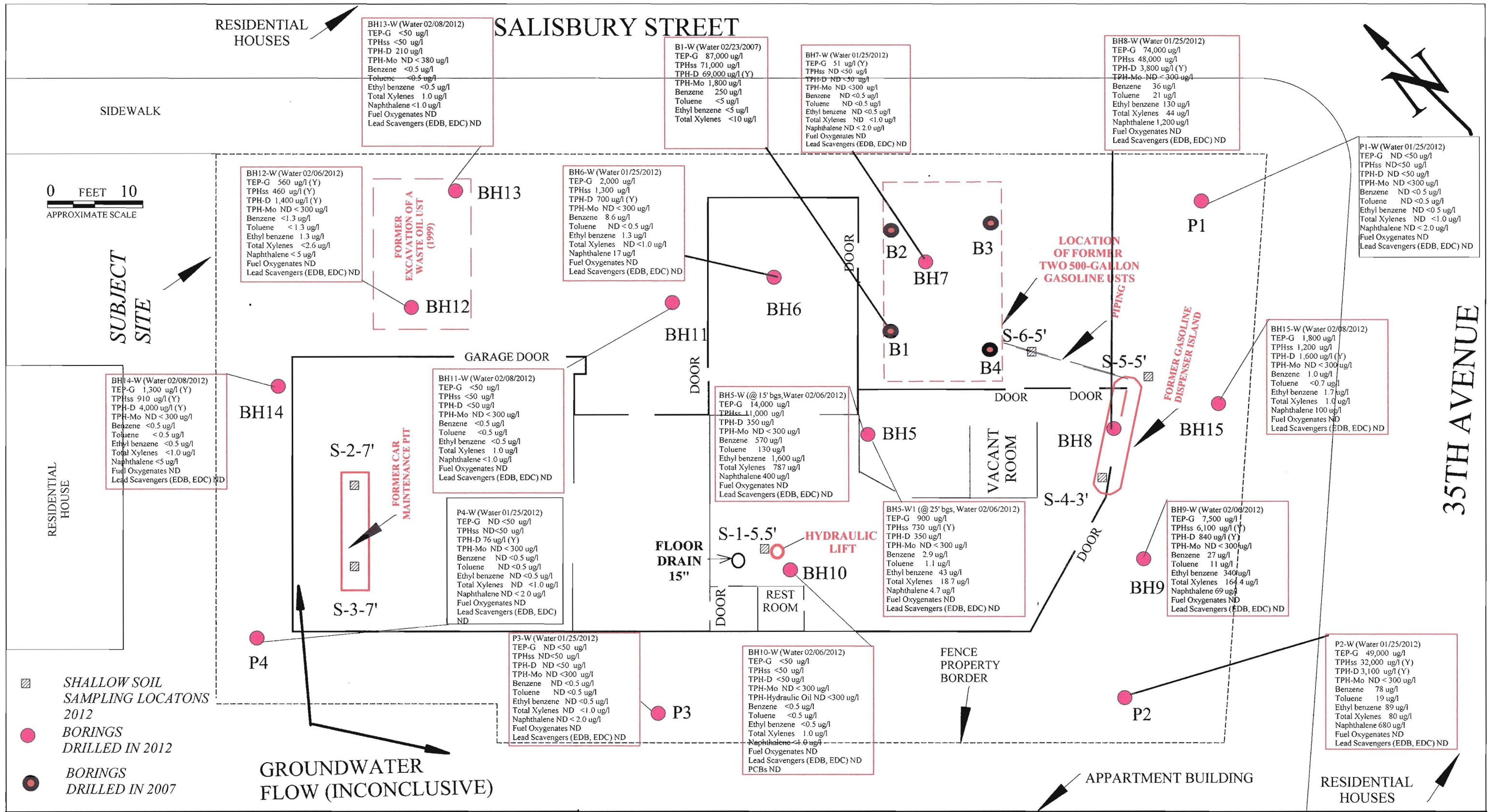
**FIGURE 6
PROPOSED WELL
CONSTRUCTION DIAGRAM**



1485 BAYSHORE BOULEVARD, SUITE 374
SAN FRANCISCO, CA 94124

PETROLEUM HYDROCARBONS IN GROUNDWATER
AND PROPOSED MONITORING WELLS
2145 35TH AVENUE, OAKLAND, CALIFORNIA

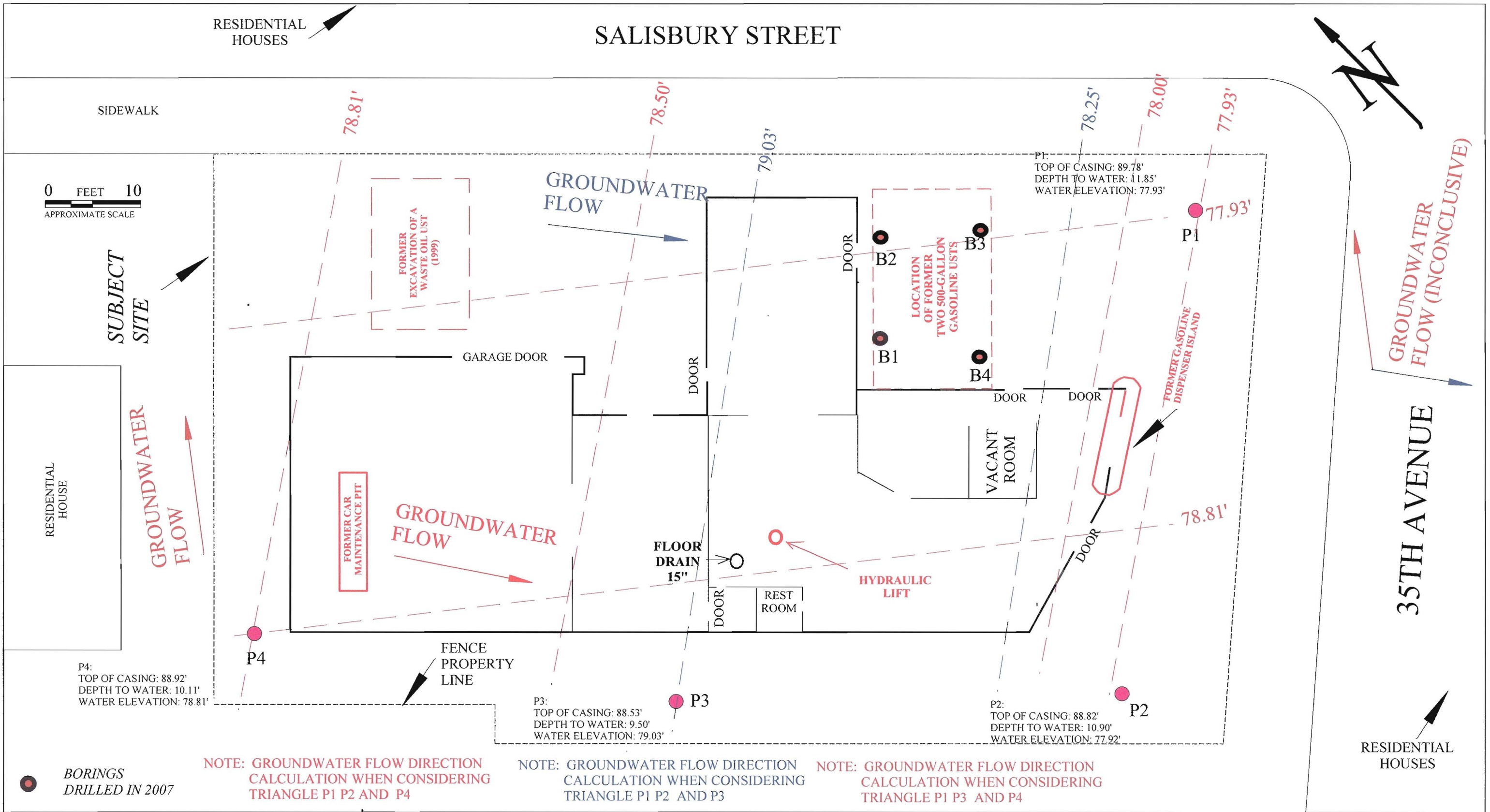
FIGURE 5
APRIL 2012



1485 BAYSHORE BOULEVARD, SUITE 374
SAN FRANCISCO, CA 94124

DEPICTION OF THE HYDROCARBONS IN GROUNDWATER
2145 35TH AVENUE, OAKLAND, CALIFORNIA

FIGURE 4
APRIL 2012





DRILLING DATE: 01/25/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: Sami Malaeb, PE, REA
 CHECKED BY: David Hoexter, PG, CEG, REA

LOG OF BORING P1

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	Temporary Casing	COMMENTS
1			•••••	Dark gray to black Clayey Sand (SC), medium dense, moist (less than 10% gravel, no odor of petroleum hydrocarbons, fill materials to ~ 5')	0' to 5'	0 ppm		Temporary Street Box Cover
2			•••••					
3			•••••					
4			•••••					
5		P1-5	•••••					~ Base of fill
6			/ / / / /	Brown Sandy Clay (CL), medium stiff, moist (less than 5% gravel, no odor of petroleum hydrocarbons or staining)	5' to 14'		(Top of Casing was surveyed before grouting boring)	
7			/ / / / /					
8			/ / / / /					
9			/ / / / /					
10			/ / / / /					
11			/ / / / /					
12			/ / / / /					
13			/ / / / /					
14		P1-14	/ / / / /	Measured Depth to Water 11.85'				
15			•••••	Gray Clayey Sand (SC), medium dense, moist (less than 5% gravel, no odor of petroleum hydrocarbons or staining)	14' to 16'		(Initial water was at ~ 13'; then, water stabilized at 11.85')	
16			•••••					
17			•••••	Brown Clayey Sand (SC), medium dense, wet (no odor of petroleum hydrocarbons or staining)	16' to 20'			
18			•••••					
19			•••••					
20			•••••					
				BOTTOM OF BORING at 20'				
				Note: Boring was grouted to surface, following removal of temporary casing.				



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LOG OF BORING P2

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	Temporary Casing	COMMENTS	
1				Dark gray to black Clayey Sand (SC), medium dense, moist (less than 10% gravel, slight odor of petroleum hydrocarbons, fill to ~ 5') ~ Base of fill	0' to 5'	0 ppm		Temporary Street Box Cover Temporary 1" PVC Casing	
2									
3									
4									
5									
6		P2-8		Same as above, except decreased gravel and color turned brown.	5' to 9'			(Top of Casing was surveyed before grouting boring)	
7									
8									
9									
10		P2-12		Brown Clayey Sand (SC), medium dense, moist (less than 5% gravel, slight odor of petroleum hydrocarbons)	9' to 16'			Measured Depth to Water 10.9'	
11									
12									
13		P2-16		Dark gray Clayey Sand (SC), dense, wet (No odor of petroleum hydrocarbons or staining)	16' to 18'			(Initial water was at ~ 12'; then, water stabilized at 10.90')	
14									
15									
16									
17		P2-20		Dark gray Clay (CL), stiff, moist (no odor of petroleum hydrocarbons or staining)	18' to 20'				
18									
19									
20									
				BOTTOM OF BORING at 20' Note: Boring was grouted to surface, following removal of temporary casing.					



DRILLING DATE: 01/25/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: Sami Malaeb, PE, REA
 CHECKED BY: David Hoexter, PG, CEG, REA

LOG OF BORING P3

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	Temporary Casing	COMMENTS
1				Dark gray to black Sandy Clay (CL), medium stiff, moist (less than 10% gravel, no odor of petroleum hydrocarbons, fill to ~ 5') ~ Base of fill	0' to 5'	0 ppm		Temporary Street Box Cover Temporary 1" PVC Casing
2								
3								
4								
5								
6				Same as above, except decreased gravel and color turned brown.	5' to 11'			(Top of Casing was surveyed before grouting boring) Measured Depth to Water 9.5'
7								
8		P3-8						
9				Yellow to brown Sandy Clay (CL), medium stiff, moist (less than 5% gravel, no odor of petroleum hydrocarbons)	11' to 13'	0 ppm		(Initial water was at ~ 13'; then, water stabilized at 9.5')
10								
11				Dark gray to black Sandy Clay (CL), medium stiff wet (no odor of petroleum hydrocarbons or staining)	13' to 18'	0 ppm		
12		P3-12						
13								
14								
15				Yellow to brown Sandy Clay (CL), medium stiff, wet (less than 5% gravel, no odor of petroleum hydrocarbons)	18' to 20'	0 ppm		
16								
17								
18								
19								
20								
				BOTTOM OF BORING at 20' Note: Boring was grouted to surface, following removal of temporary casing.				



DRILLING DATE: 01/25/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
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 CHECKED BY: David Hoexter, PG, CEG, REA

LOG OF BORING P4

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	Temporary Casing	COMMENTS
1			•••••	Dark gray to black Clayey Sand (SC), medium dense, moist (less than 10% gravel, no odor of petroleum hydrocarbons, fill to ~ 4') ~ Base of fill	0' to 4'			Temporary Street Box Cover
2			•••••					
3			•••••					
4			•••••					
5			•••••	Brown Clayey Sand (SC), medium dense, moist (less than 5% gravel, no odor of petroleum hydrocarbons)	4' to 14'	0 ppm		Temporary 1" PVC Casing
6			•••••					
7			•••••					
8	P4-8		•••••					
9			•••••					
10			•••••					
11			•••••					
12	P4-12		•••••					
13			•••••					
14			•••••					
15			•••••	Brown Clayey Sand (SC), medium dense, wet (less than 5% gravel, no odor of petroleum hydrocarbons)	14' to 16'	0 ppm		(Top of Casing was surveyed before grouting boring)
16			•••••					
17			•••••	Brown Clayey Sand (SC), medium dense, moist (less than 5% gravel, no odor of petroleum hydrocarbons)	16' to 20'	0 ppm		Measured Depth to Water 10.11'
18			•••••					
19			•••••					
20			•••••					
				BOTTOM OF BORING Note: Boring was grouted to surface, following removal of temporary casing.				(Initial water was at ~ 13'; then, water stabilized at 10.11')



DRILLING DATE: 02/06/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: Sami Malaeb, PE, REA
 CHECKED BY: David Hoexter, PG, CEG, REA

LOG OF BORING
BH-5

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
1				Dark gray to black Silty Clay (CL/CH), medium stiff, moist (fill materials, ~ 10% gravel, slight odor of petroleum hydrocarbons) ~ Base of fill	0' to 2'		Fill to ~ 5'
2							
3				Dark gray to black Silty Clay (CL), medium stiff, moist (little or no gravel, odor of petroleum hydrocarbons and staining start at 4' of depth)	2' to 5'		
4							
5		BH5-5					
6				Gray gravel sand mixture (SW/GW), medium dense, moist to damp (odor of petroleum hydrocarbons and staining start at 4' of depth)	5' to 8'		First groundwater was at ~ 16' to 18' bgs
7							
8		BH5-8					
9				Gray Sandy Clay (CL), medium stiff, moist (odor of petroleum hydrocarbons and staining)	8' to 11'		
10							
11							
12				Gray gravel sand mixture (SW/GW), medium dense, wet to damp (odor of HC)	11' to 12'		
13		BH5-12					
14				Gray Sandy Clay (CL), medium stiff, moist to damp (<5% gravel, odor of HC)	12' to 13'		
15				Gray Clayey Fine Sand (SC), dense, moist (odor of petroleum hydrocarbons and staining)	13' to 16'		
16							
17				Gray gravel sand mixture (GM), medium dense, wet (abrupt contact at 18')	16' to 18'		
18							
19				Light brown fine Sand (SP/SW), dense, moist (oxidized orange, No odor of HC)	18' to 22'		
20							
21							
22							
23				Light brown Sandy Clay (CL), stiff, wet (No odor of petroleum hydrocarbons or staining)	12' to 25'	0 ppm	Second groundwater was at ~ 25' to 30' bgs
24							
25							
26							
27				CONTINUE ON NEXT PAGE			



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 DRILLING RIG TYPE: Geoprobe

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 LOGGED BY: Sami Malaeb, PE, REA
 CHECKED BY: David Hoexter, PG, CEG, REA

**LOG OF BORING
 BH-5
 (Continued)**

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
28 29 30 31 32 33		BH5-30		Light brown Clay (CL) stiff, moist, with soft fine wet sand, (no odor of HC) (27.5 to 28.0 feet and 30.0 to 32.0 feet, scattered black charcoal organic fine "blebs" slightly mottled blue gray)	25' to 33'	0 ppm	
34 35				Brown fine gravelly Clay (CL) stiff to hard, slightly moist (No odor of HC or staining)	33' to 35.5'	0 ppm	
36 [unlabeled depth markers]				BOTTOM OF BORING at 35.5' (Refusal) Boring was grouted after sampling.			



DRILLING DATE: 01/25/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: Sami Malaeb, PE, REA
 CHECKED BY: David Hoexter, PG, CEG, REA

LOG OF BORING
BH-6

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
1 2				Dark gray to black gravelly sand (SW), loose, moist (~20% gravel and 80% sand, nor odor of HC) ~ Base of fill	0' to 2'	0 ppm	Fill to ~ 2'
3 4 5 6 7 8 9		BH6-6-8		Dark gray Clayey Sand (SC), medium dense, moist (~ 10 % gravel, no odor of HC or staining)	2' to 15'	0 ppm	
10 11 12 13 14 15		BH6-12				0 ppm	
16 17 18		BH6-16		Brown Sandy Clay (CL), medium stiff, moist to wet (No odor of HC or staining)	15' to 18'	0 ppm	
19 20				Brown Clayey Sand (SC), dense, wet (No odor of HC or staining)	18' to 20'		
				BOTTOM OF BORING at 20' Note: Boring was grouted to surface.			



DRILLING DATE: 01/25/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: Sami Malaeb, PE, REA
 CHECKED BY: David Hoexter, PG, CEG, REA

**LOG OF BORING
BH-7**

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
1 2 3 4 5				Dark gray to black Clayey Sand (SC), medium dense, moist (< 5 % gravel, no odor of HC or staining) ~ Base of fill	0' to 5'	0 ppm	Fill to ~ 5'
6 7 8 9		BH7-7-8		Brown gravelly Clayey Sand (SC), medium dense, moist (~ 20 % gravel, no odor of HC or staining)	5' to 9'		
10 11 12 13 14 15 16 17 18 19 20		BH7-12		Brown Sandy Clay (CL), medium stiff, moist (<5% gravel, no odor of HC or staining)	9' to 20'		
				BOTTOM OF BORING at 20' Note: Boring was grouted to surface.			



DRILLING DATE: 01/25/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: Sami Malaeb, PE, REA
 CHECKED BY: David Hoexter, PG, CEG, REA

**LOG OF BORING
BH-8**

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
1 2 3 4 5				Dark gray to black gravelly Sandy Clay (CL), medium stiff, moist (~ 20 % gravel, no odor of HC)	0' to 5'	0 ppm	Fill to ~ 5'
6 7				Brown gravel sand mixture (GM), medium dense, moist (no odor of HC or staining)	5' to 7'		
8 9 10 11 12		BH8-8 BH8-12		Gray Sandy Clay (CL), medium stiff, moist (~ 10% gravel, no odor of HC)	7' to 12'		
13 14 15				Gray Sandy Clay (CL), medium stiff, moist (< 5% gravel, slight odor of HC and staining noticed)	12' to 15'		
16 17 18 19 20		BH8-16		Gray gravel sand mixture (GM), medium dense, wet (slight odor of HC and staining noticed)	15' to 20'		
				BOTTOM OF BORING at 20' Note: Boring was grouted to surface.			



DRILLING DATE: 02/06/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: David Hoexter, PG, CEG, REA
 CHECKED BY: Sami Malaeb, PE, REA

**LOG OF BORING
BH-9**

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
1 2 3 4				Black Silty Clay (CH), stiff, slightly moist (fill materials, ~ 10% sand and gravel, poor recovery, no odor of petroleum hydrocarbons)	0' to 4'		Fill to ~ 8.5' ~15% recovery'
5 6 7 8		BH9-8		Dark olive gray Gravelly Sand (SW), medium dense, moist (clay ~ 10-15%, gravel 10% to 15% 1.5 " diameter, red rock fragments, poor recovery, odor of petroleum hydrocarbons) ~ Base of fill	5' to 8.5'		
9 10 11 12 13 14 15 16 17 18		BH9-16		Gray Clayey gravelly Sand (SP), variably dense, moist (lenses of medium to coarse gravel and clay/silt, with overall 0-20% gravel, 0-20% Clay-Silt, wet at 17'-18" with abrupt contact at 18')	8.5' to 18'		~90% recovery'
19 20 21				Light brown, mottled blue gray, silty Clay (CL), very stiff, moist (scattered black organic "blebs")	18' to 21'		~100% recovery'
22 23 24 25 26 27				Light brown, Silty Clay/ Clayey Silt (CL), very stiff, moist (5-10% fine sand, minor scattered black organic "blebs". ~ 24.3' to 24.5', encountered medium coarse sandy silt lense)	21' to 25.5'		
				CONTINUE ON NEXT PAGE			
PROJECT NAME: Salisbury Avenue Associates, LLC					SHEET 1 OF 2		



DRILLING DATE: 02/06/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: David Hoexter, PG, CEG, REA
 CHECKED BY: Sami Malaeb, PE, REA

LOG OF BORING BH-9 (Continued)

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
28 29 30 31 32		BH9-30		Light brown Silty Clay (CL), very stiff, moist to damp (5% to 10% fine sand, scattered black charcoal organic fine "blebs")	25.5' to 32.0'	0 ppm	
33 34 35 36 37				Tan to light brown fine gravelly medium coarse Sand (SW), very dense, slightly moist (gravel subangular to subrounded ~ 20% to 30%)	32' to 37.5'	0 ppm	
38 [unlabeled depth markers]				BOTTOM OF BORING at 37.5' (Refusal) Note: Boring was grouted to surface.			



DRILLING DATE: 02/06/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: David Hoexter, PG, CEG, REA
 CHECKED BY: Sami Malaeb, PE, REA

**LOG OF BORING
BH-10**

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
1				Dark gray to black Silty Clay (CH), medium stiff, moist (mixed with ~ 10% coarse sand and hard broken rock, no odor of HC)	0' to 3'	0 ppm	Fill to ~ 5.5'
2							
3				Gray Silty Clay (CL/CH), medium stiff, moist (with ~ 10% sand, no odor of HC) ~ Base of fill	3' to 5.5'		
4							
5				Brown (with orange oxidation) Clayey, Silty Sand (SM), medium dense, moist (~ 25% clay and silt, no odor of HC)	5.5' to 7'	Poor Recovery 0'-4' due to hard rock fragments	
6							
7				Gray Clayey Silty Fine Sand (SM), medium dense, moist (~ 35% to 40 % clay and silt, odor of HC)	7' to 13'		
8							
9		BH10-9		Brown Silty Clayey Sand (SC), dense, moist (rock fragments ~1.5" diameter, no odor of HC)	13' to 15.5'		
10							
11				Gray to brown Silty Clay (CL), hard, moist (no odor of HC)	15.5' to 20'		
12		BH10-12					
13				BOTTOM OF BORING at 20' Note: Boring was grouted to surface.			
14							
15							
16							
17							
18							
19							
20							



DRILLING DATE: 02/08/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: David Hoexter, PG, CEG, REA
 CHECKED BY: Sami Malaeb, PE, REA

**LOG OF BORING
 BH-11**

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
1 2 3				Black Clay (CH), soft, moist ($< 5\%$ fine to coarse sand, lighter color and increasing sand with depth, no odor of HC) ~ Base of possible fill	0' to 3.1'	0 ppm	Possible Fill to ~ 3.1'
4 5 6 7 8 9 10		BH11-8		Brown Silty Sandy Clay (CL), stiff, moist (scattered brown organics, angular, fine to medium sand, increases from 10 to 40% at base, no odor of HC)	3.1' to 9.8'	0 ppm	
11 12 13 14 15		BH11-12		Brown to gray brown Silty Sand (SM), dense, moist (Silt variably 10-25%, sand lenses 11.6'- 12.0', 12.3'- 12.5', 13.1' - 15.1', no odor of HC)	9.8' to 15.2'	0 ppm	
16 17				Brown gravelly, medium coarse Sand (SW), dense, moist (up to 1" gravel, no odor of HC, no free water)	15.2' to 17.0'		
18 19				Brown and blue gray Clayey Silt (ML), stiff to very stiff, moist, mottled, laminated (no odor of HC)	17.0' to 19.2'		
20				Light brown, fine to coarse Sand (SW), dense, moist (mottled blue gray, no odor of HC, free water in boring after completion)	19.2' to 20.0'		
				BOTTOM OF BORING at 20'			
PROJECT NAME: Salisbury Avenue Associates, LLC					SHEET 1 OF 1		



DRILLING DATE: 02/06/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: David Hoexter, PG, CEG, REA
 CHECKED BY: Sami Malaeb, PE, REA

LOG OF BORING
BH-12

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS	
1 2 3				Dark gray to black silty Clay (CH), medium stiff, moist (no odor of HC) ~ Base of fill (disturbed possible fill)	0' to 3.0'	0 ppm		
4 5 6 7		BH12-5		Light brown gravelly sand (SW), medium to coarse grained dense, moist (~ 5 to 20% gravel, no odor of HC)	3.0' to 7.0'			
8 9				Olive green Clayey Sandy Silt (ML), moist, very stiff, (no odor of HC)	7.0' to 9.0'			
10 11 12 13 14 15		BH12-12		Brown Gravelly Sand (SW), dense, moist (silty, gravel variable 5-25%, slight odor of HC, stained blue-gray 11' to 12')	9.0' to 15.0'			
16				Light brown silty fine Sand (SM), dense, moist (< 1% gravel, no odor of HC)	15.0' to 16.0'			
17				Light brown Gravel Sand mixture (GM), dense, moist (no odor of HC)	16.0' to 17.0'			
18				Light brown silty Sand (SM), dense, moist (no odor of HC)	17.0' to 18.0'			
19 20				Brown, Clayey Fine Sand (SC), very dense, moist Mottled blue gray (no odor of HC)	18.0' to 20.0'			
21 22 23 24 25				Light brown Fine Sandy Silty Clay (CL), very stiff, moist, (20' to 22' scattered black organics, no odor of HC, mottled blue gray with light brown)	20.0' to 25.0'			0 ppm
				BOTTOM OF BORING at 25' (Refusal) Note: Boring was grouted to surface.				



DRILLING DATE: 02/08/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: David Hoexter, PG, CEG, REA
 CHECKED BY: Sami Malaeb, PE, REA

**LOG OF BORING
BH-13**

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
1				Black Clay (CH), soft, moist (~ 5% sand, no odor of HC)	0' to 1.5'		
2				Olive brown Silty Clay (CL), medium stiff, moist (~ 10% fine sand, no odor of HC)	1.5' to 5.0'		
3							
4							
5		BH13-5					
6				Brown Sand (SW), medium dense, moist (primarily fine-medium with minor coarse sand, 10% 1/2" maximum angular to sub-angular gravel, variable, 1 to 8" lenses of variable grain size medium to coarse wet sand 13.4 to 13.8' and 14.9 to 15.7')	5.0' to 16.0'		
7							
8		BH13-8					
9							
10							
11							
12							
13						0 ppm	
14							
15							
16							
17				BOTTOM OF BORING at 16.0'			
18				Note: Boring was grouted to surface.			
19							
20							



DRILLING DATE: 02/08/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
 LOGGED BY: David Hoexter, PG, CEG, REA
 CHECKED BY: Sami Malaeb, PE, REA

LOG OF BORING
 BH-14

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
1 2				Black Clay (CH), soft, moist (Mixed black clay (CH) and brown clay (CL) at 0 - 0.5' no odor of HC)	0' to 2.5'		Fill to ~ 0.5'
3 4 5 6				Olive brown Silty Clay (CL), soft, moist (~ 5% to 10 % fine sand, no odor of HC)	2.5.' to 5.8'	0 ppm	
7 8 9 10 11 12 13 14 15		BH14-8		Brown Silty Sand and Sand (SW/SM), dense, moist (brown fine gravelly sand lenses 11.1' to 12.0', 14.0' to 14.5', and 15.0' to 15.4', abrupt contact at 15.4)	5.8' to 15.4'		0 ppm
16				Gray fine to medium angular Gravel (GW) (SW/SM), dense/very hard, moist	15.4' to 15.6'		
17 18 19 20				Gray (light brown /tan at 16') Clayey Silt (ML) stiff, moist	15.6' to 16.0'		No Recovery 16-20'
21 22 23 24 25				BOTTOM OF BORING at 20' Note: Boring was grouted to surface. No free water while drilling.			



DRILLING DATE: 02/08/2012
 DRILLING METHOD: Direct Push
 DRILLING RIG TYPE: Geoprobe

DRILLING LOCATION: 2145 35th Avenue, Oakland, CA
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**LOG OF BORING
BH-15**

DEPTH (FEET)	SAMPLE DEPTH	SAMPLE NAME	GRAPHIC LOG	DESCRIPTION AND CLASSIFICATION	LITHOLOGY DESCRIPTION DEPTH	PID READING	COMMENTS
1 2 3				Black Clay (CH), soft to stiff, moist (5% fine to coarse angular sand, no odor of HC)	0' to 3.0'		
4 5		BH15-4		Black Sandy Clay (CH), stiff, moist (15 to 20% sand, no odor of HC)	3.0' to 4.8'	3.6 ppm	
6 7 8 9		BH15-8		Blue gray Clayey Sand (SC), dense, slightly moist (moderate odor of HC)	4.8' to 9.5'	1.9 ppm	
10 11 12		BH15-12		Blue to gray fine to medium Sand (SW). medium dense, moist (<10% coarse sand, lenses 1 to 4" thick, strong odor of HC)	9.5' to 12.3'	350 ppm	
13 14 15 16		BH15-16		Blue gray silty fine to medium Sand (SM), dense, moist (<10% coarse sand, strong odor of HC). 15.5' to 16.0' light brown to tan silty fine sand (SM) SM/SW, slight odor of HC)	12.3' to 16.0'	0.2 ppm	
17 18 19 20 21 22 23 24 25				BOTTOM OF BORING at 16' Note: Boring was grouted to surface.			