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**Alameda County  
Environmental Health**

February 5, 2010

**VIA ALAMEDA COUNTY FTP SITE**

Mr. Paresh Kharti  
Alameda County Health Care Services Agency  
Department of Environmental Health  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502-6577

Re: **Remediation Well Installation Report**  
Former Exxon Station  
5175 Broadway Street  
Oakland, California  
ACEH Fuel Leak Case No. RO0000139

Dear Mr. Kharti:

On behalf of Rockridge Heights, LLC, Pangea Environmental Services, Inc. has prepared this *Remediation Well Installation Report* for the subject site. This report describes the installation and development of six dual-phase extraction (DPE) wells and one air sparging (AS) well. This work was outlined in Pangea's *Final Corrective Action Plan Addendum*, which was approved by the Alameda County Health Care Services Agency in a letter dated June 18, 2009.

If you have any questions or comments, please call me at (510) 435-8664 or email [briddell@pangeaenv.com](mailto:briddell@pangeaenv.com).

Sincerely,  
**Pangea Environmental Services, Inc.**

Bob Clark-Riddell, P.E.  
Principal Engineer

Attachment: *Remediation Well Installation Report*

cc: Rockridge Heights, LLC, C/O Gary Feiner, 34 Schooner Hill, Oakland, California 94618  
Vera Stanovich, 1956 Stratton Circle, Walnut Creek, California 94598  
SWRCB Geotracker (Electronic copy)

**PANGEA Environmental Services, Inc.**

1710 Franklin Street, Suite 200, Oakland, California 94612 Telephone 510.836.3700 Facsimile 510.836.3709 [www.pangeaenv.com](http://www.pangeaenv.com)



## REMEDIATION WELL INSTALLATION REPORT

Former Exxon Station  
5175 Broadway  
Oakland, California

February 5, 2010

*Prepared for:*

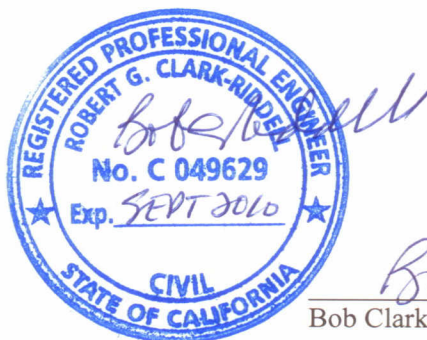
Rockridge Heights, LLC  
C/O Gary Feiner  
34 Schooner Hill  
Oakland, California 94618


*Prepared by:*

Pangea Environmental Services, Inc.  
1710 Franklin Street, Suite 200  
Oakland, California 94612

*Written by:*

  
Morgan Gillies  
Project Manager



  
Bob Clark-Riddell, P.E.  
Principal Engineer

**PANGEA Environmental Services, Inc.**

## **INTRODUCTION**

On behalf of Rockridge Heights, LLC, Pangea Environmental Services, Inc. (Pangea) prepared this *Remediation Well Installation Report* (report) for the subject site. The scope of work was outlined in Pangea's *Final Corrective Action Plan Addendum* dated May 18, 2009. The report describes the installation of six dual-phase extraction (DPE) wells and one air sparge (AS) well to facilitate implementation of the approved corrective action plan (CAP). The following sections describe the site background and remediation well installation.

## **SITE BACKGROUND**

### **Site Location and Description**

The subject property is located at 5175 Broadway Street, at the southwest corner of the intersection of Broadway and Coronado Avenue in Oakland, California in Alameda County (Figure 1). The site is approximately 0.6 miles south-southeast of Highway 24 and approximately 2.3 miles east of Interstate 80 and the San Francisco Bay. The property is relatively flat lying, with a slight slope to the south-southwest, and lies at an elevation of approximately 160 feet above mean sea level. Topographic relief in the area surrounding the site also slopes generally towards the south-southwest. The western site boundary is the top of an approximately 10 foot high retaining wall that separates the site from an adjacent apartment complex.

The property has been vacant since 1979 and was formerly occupied by an Exxon Service Station used for fuel sales and automobile repair. The site is approximately 13,200 square feet in area with about 10% of the area occupied by a vacant station/garage structure. The majority of the ground surface is paved with concrete and/or asphalt. Land use to the west and northwest is residential, including apartment buildings and single family homes. Properties to the northeast, east and south of the site are commercial. The site and adjacent properties are shown on Figure 2.

### **Summary of Previous Environmental Investigations**

Environmental compliance work commenced when three 8,000-gallon steel single-walled USTs, associated piping, and a 500-gallon steel single-walled waste oil tank were removed in January 1990. Tank Protect Engineering, Inc. (TPE) conducted the tank removal and observed holes in all four tanks. Groundwater was reportedly observed to stabilize in the UST excavation between 10.5 and 11 feet bgs. Approximately 700 tons of contaminated soil was excavated during tank removal and was subsequently remediated and reused for onsite backfill by TPE. In April 1990, TPE installed and sampled monitoring wells MW-1, MW-2 and MW-3. In June 1991, Soil Tech Engineering (STE), subsequently renamed Environmental Soil Tech Consultants (ESTC), installed monitoring wells STMW-4 and STMW-5. Groundwater monitoring was conducted on the

site intermittently until October 2002. Golden Gate Tank Removal (GGTR) performed additional assessment in January and February 2006, including collection of soil and/or groundwater samples from ten onsite soil borings. In June 2006, the property was purchased by Rockridge Heights, LLC. Pangea commenced quarterly groundwater monitoring at the site in July 2006. Additional assessment was performed by Pangea in January, March and April 2007, including the destruction of four monitoring wells and installation of twelve new wells to help define the vertical and lateral extent of groundwater contamination. In April 2007, Pangea conducted a dual phase extraction/air sparging test (DPE/AS) to evaluate potentially applicable remedial alternatives for remediating residual site contaminants. Details of the additional assessment are included in Pangea's *Site Investigation Report* dated July 17, 2007, while the DPE/AS testing findings are reported in Pangea's *Feasibility Test Report and Interim Remedial Action Plan (IRAP)* dated July 20, 2007. Pangea submitted a *Final Corrective Action Plan - Addendum* on May 18, 2009. ACEH approved the CAP in a letter dated June 18, 2009.

## **Regional Geology and Hydrogeology**

The site lies at the foot of the Oakland Hills on a low ridge composed of Cretaceous sandstone, siltstone, and serpentinite of the Franciscan Complex, as mapped by Graymer (2000). The bedrock is overlapped several hundred feet to the west and southwest of the site by Pleistocene and younger alluvial and fluvial deposits derived from westward flowing streams draining the hills to the east. The Hayward Fault, a major active regional fault of the San Andreas fault system, lies 1.5 miles northeast of the site.

The site lies immediately east of the East Bay Plain groundwater basin. Most of the East Bay Plain is underlain by deep Tertiary depositional basins whose current depocenters are the San Francisco Bay (the San Francisco Basin) and San Pablo Bay (San Pablo Basin) (Figuers, 1998). The site lies on bedrock forming the eastern boundary of the San Francisco Basin. Groundwater in the San Francisco Basin is designated beneficial for municipal and domestic water supply and industrial process, service water, and agricultural water supply.

## **Local Hydrogeology**

Most of the site is underlain at relatively shallow depths by impermeable bedrock composed of fractured Cretaceous sandstone, serpentinite and siltstone of the Franciscan Complex. The bedrock is overlain by variable thicknesses (from 2 to 20+ feet) of native soil and artificial fill, consisting of unconsolidated clay, silt, sand and gravel. Prior investigations indicate that the water table intersects the contact between the unconsolidated units and bedrock units, so in some areas shallow groundwater is present in both the unconsolidated units and the bedrock, and in other areas groundwater is present only within the bedrock. The only newly installed monitoring well where shallow groundwater was encountered during drilling was well MW-6A, drilled through the backfill of the former UST excavation, where it was encountered at approximately 8 ft bgs and was measured at a depth of 7.17 ft on March 26, 2007. This observation, and similar observations made during prior drilling of shallow wells at the site, indicates that groundwater is present under unconfined

conditions within the shallow soil/fill units, and possibly present under unconfined conditions within the shallowest portion of the underlying bedrock.

All of the other newly installed monitoring wells (MW-2C, MW-3A, MW-3C, MW-4A, MW-5A, MW-5B, MW-5C, MW-7B, MW-7C, MW-8A, MW-8C, MW-9A, MW-9C and MW-10A) were installed into relatively impermeable clay or bedrock that did not yield evidence of the presence of groundwater during well installation, or were not logged because they were installed within the borings of existing monitoring wells. In general, past investigations have reported that the clay or bedrock sections do not yield appreciable volumes of groundwater, with the exception of thin zones within the bedrock. During drilling of the onsite monitoring wells for which the entire saturated zone is in bedrock (MW-1, MW-2 [now reconstructed as MW-2C] and MW-3 [now reconstructed as MW-3C]), prior consultants reported that bedrock yielded no water, with the exception of thin, discrete, slightly productive water-bearing zones encountered between 20 and 22 feet bgs in MW-1 and MW-2. Water levels rose substantially in these deep wells shortly after completion, and appear to define a southward to southwestward sloping piezometric surface. These observations indicate that the bedrock is relatively impermeable, and that the thin water-bearing zones within the bedrock are permeable layers or fracture zones (i.e., fracture porosity) of unknown continuity and orientation. Field observations of nearby bedrock outcrops east of the site on the opposite side of Broadway corroborate this interpretation. These thin zones are under *confined* or *semi-confined* conditions on the scale of the well borings, but may be *unconfined* at the scale of the site.

## **Groundwater Flow**

***Shallow Groundwater:*** As shown on Figure 2, groundwater in shallow A-zone appears to have mounded in the former UST excavation, and the apparent gradient radiates outwards towards the east and south, although regional groundwater flow is generally towards the south and southwest. This observation suggests that the unpaved former UST excavation has acted as a collector for rainwater during the rainy season, and that the asphalt pavement covering the remainder of the site serves to reduce infiltration elsewhere and likely directs rainwater to the unpaved UST excavation area.

***Deep Groundwater:*** As shown on Figure 3, the horizontal component of flow for the C-zone groundwater is southwestwards to southwards. The elevation of the piezometric surface for deep C-zone wells is lower than elevations for A-zone wells, indicating that a downward gradient is present.

## **WELL INSTALLATION**

On August 19, 2009, Pangea oversaw installation of six dual-phase extraction (DPE) wells and one air sparge (AS) well to facilitate implementation of the approved corrective action plan. The dual-phase extraction wells (DPE-1 through DPE-6) were constructed to help dewater the hydrocarbon smear zone and expose hydrocarbons for vapor extraction in the shallower water-bearing zone. DPE will not take place in the deeper zones to minimize the potential to induce downward migration of SPH and dissolved hydrocarbons. The air sparge well (AS-1) was constructed to allow compressed air injection into the saturated zone to ‘strip’ hydrocarbons from saturated soil and groundwater for capture by DPE. AS also oxygenates groundwater, and thereby stimulates hydrocarbon degradation. Site well locations are shown on Figure 4.

### **Pre-Drilling Activities**

A comprehensive Site Safety Plan was prepared to protect site workers and the plan was kept onsite during all field activities. Well installation permits were obtained from the Alameda County Public Works Agency (ACPWA). Copies of the permits are presented in Appendix A. The proposed drilling locations were marked and Underground Service Alert was notified at least 48 hours before the proposed field activities.

### **Drilling Procedures**

All monitoring wells were installed in general accordance with the procedures described in Pangea’s *Final CAP* dated March 25, 2009. Pangea retained RSI Drilling of Woodland, California, to install the remediation wells. The DPE wells were drilled with 10-inch diameter hollow-stem augers. DPE-1 through DPE-3 and DPE-5 were screened to a depth of approximately 10-20 feet below ground surface (bgs), while DPE-4 and DPE-6 were screened to a depth of approximately 13-19 feet bgs. The AS well was drilled with 6-inch diameter hollow-stem augers and was screened at a depth of 16-20 feet bgs. The drilling and well installation was observed in the field by Pangea project manager Morgan Gillies and supervised by Bob Clark-Riddell, a California Professional Civil Professional Engineer (P.E.).

Soil characteristics such as color, texture, and relative water contents were described in the field using the Unified Soil Classification System (USCS) and entered onto a field boring log. Field screening of groundwater for potential hydrocarbons and volatile organic compounds included visual and olfactory observations.

### **Well Construction**

The six DPE wells were constructed of 4-inch diameter, Schedule 40 PVC casing with 0.02-inch slotted PVC screen and #3 sand with a bentonite seal and grout to the surface. The DPE wells were protected by traffic-rated vaults and locking well caps. The AS well was constructed of 1-inch diameter, Schedule 80 PVC casing with 0.02-inch slotted PVC screen and #3 sand with a bentonite seal and grout to the surface. The soil

characteristics and hydrogeology are detailed in the boring logs (Appendix B). Additional soil logging and sampling procedures are presented in Pangea's Standard Operating Procedures for soil borings in Appendix C.

### **Well Development & Sampling Procedures**

Pangea conducted well development by surge block agitation and evacuation on October 3, 2009. Groundwater evacuation continued until each well dewatered. All of the wells dewatered during development and were slow to recharge. After allowing the wells to recharge overnight, groundwater samples were collected from the newly installed and developed remediation wells. Pangea collected samples the day after well development instead of waiting 3 days after development to help control cost. The investigation-derived waste generated during drilling and development was temporarily stored onsite in DOT approved 55-gallon drums pending analysis. Additional well installation and development procedures are presented in Pangea's Standard Operating Procedures for monitoring wells in Appendix C. The well development and sampling field data sheets are presented in Appendix D.

### **Groundwater Analytical Results**

As shown on Table 1 and Figure 4, elevated concentrations of petroleum hydrocarbons were detected in all six (6) of the new DPE wells. Well AS-1 contained no detectable concentrations of petroleum hydrocarbons, except for 3.6 micrograms per liter ( $\mu\text{g/L}$ ) benzene. Analytical results from the new remediation wells provide significant additional data for estimating the extent of contaminants at the site. The distribution of TPHg and benzene concentrations in *shallow* groundwater is shown on Figures 5 and 6, respectively. Based on remediation well data the primary TPHg and benzene impact now extends further north and south of well MW-3A. The laboratory analytical report is included in Appendix E.

### **Hydrocarbon Distribution in Groundwater**

The primary groundwater contaminants at the site are gasoline-range hydrocarbons and benzene. Both TPHg and benzene concentrations substantially exceed RWQCB Tier 1 Final ESLs for groundwater that is a potential source of drinking water. Secondary contaminants that also exceed ESLs are toluene, ethylbenzene, xylenes, and 1,2-dichloroethane (EDC).

***Contaminant Distribution in Shallow Groundwater:*** *Shallow* (A-zone) unconfined groundwater contains petroleum hydrocarbons at elevated concentrations in the following two primary areas near the former UST excavation: 1) a northern area in the vicinity of well MW-4A (where free product has previously been observed), and 2) the south/central portion of the site from near wells MW-3A and MW-8A and extending towards the south to wells DPE-3 and MW-7B. This distribution of hydrocarbons in shallow A-zone groundwater is tentatively interpreted to be due to the mounding of groundwater within the uncapped former UST excavation during the rainy season, likely encouraging plume migration radially away from the excavation area into areas that are protected from infiltration by paved surfaces. As shown on Figures 5 and 6,

analytical data from the new remediation wells indicates that impact along the southern property boundary extends further east than previously estimated. The southward offsite extent of the southernmost area appears *not* to extend a significant distant offsite since wells MW-9A and MW-9C did not contain significant concentrations of TPHg or benzene.

***Contaminant Distribution in Deeper Groundwater:*** The distribution of *deep* groundwater containing elevated concentrations of petroleum hydrocarbons differs from the distribution of hydrocarbons in shallow groundwater. High levels of contamination within deeper (B- and C-zone) groundwater only appear to be present in the central and southern, downgradient portion of the site, based on elevated hydrocarbon concentrations detected in wells MW-3C, MW-7B and MW-7C. The hydrocarbon impact in the deeper wells may be explained by the apparent downward vertical gradient indicated by elevation data from the clustered shallow and deep wells. It should also be noted that because permeable zones within the bedrock are thin, discrete permeable layers and fractures, the impacted groundwater within the bedrock is likely to be present only within narrow permeable preferential pathways.

***MTBE Not a Concern:*** MTBE was *not* detected in sampled groundwater and it is not a compound of concern at this site.

## CONCLUSIONS AND RECOMMENDATIONS

Based on groundwater analytical results from the new remediation wells, Pangea offers the following conclusions and recommendations:

- The primary TPHg and benzene impact now extends further north and south of well MW-3A, as shown on Figures 5 and 6. The estimated extent of elevated TPHg and benzene in groundwater at the site is primarily located in two areas; the northeastern most corner of the site near MW-4A; and the south/central portion of the site extending from near wells MW-8A and DPE-4 towards the south to well DPE-3 and MW-7B.
- The new remediation wells are appropriately located and screened to initiate the approved remedial action.



## **ATTACHMENTS**

Figure 1 – Site Vicinity Map

Figure 2 – Groundwater Elevation Contour and Hydrocarbon Concentration Map (Shallow)

Figure 3 – Groundwater Elevation Contour and Hydrocarbon Concentration Map (Deep)

Figure 4 – Remediation Well Hydrocarbon Concentration Map

Figure 5 – Distribution of TPHg in Groundwater (Shallow)

Figure 6 – Distribution of Benzene in Groundwater (Shallow)

Table 1 – Groundwater Elevation and Analytical Data

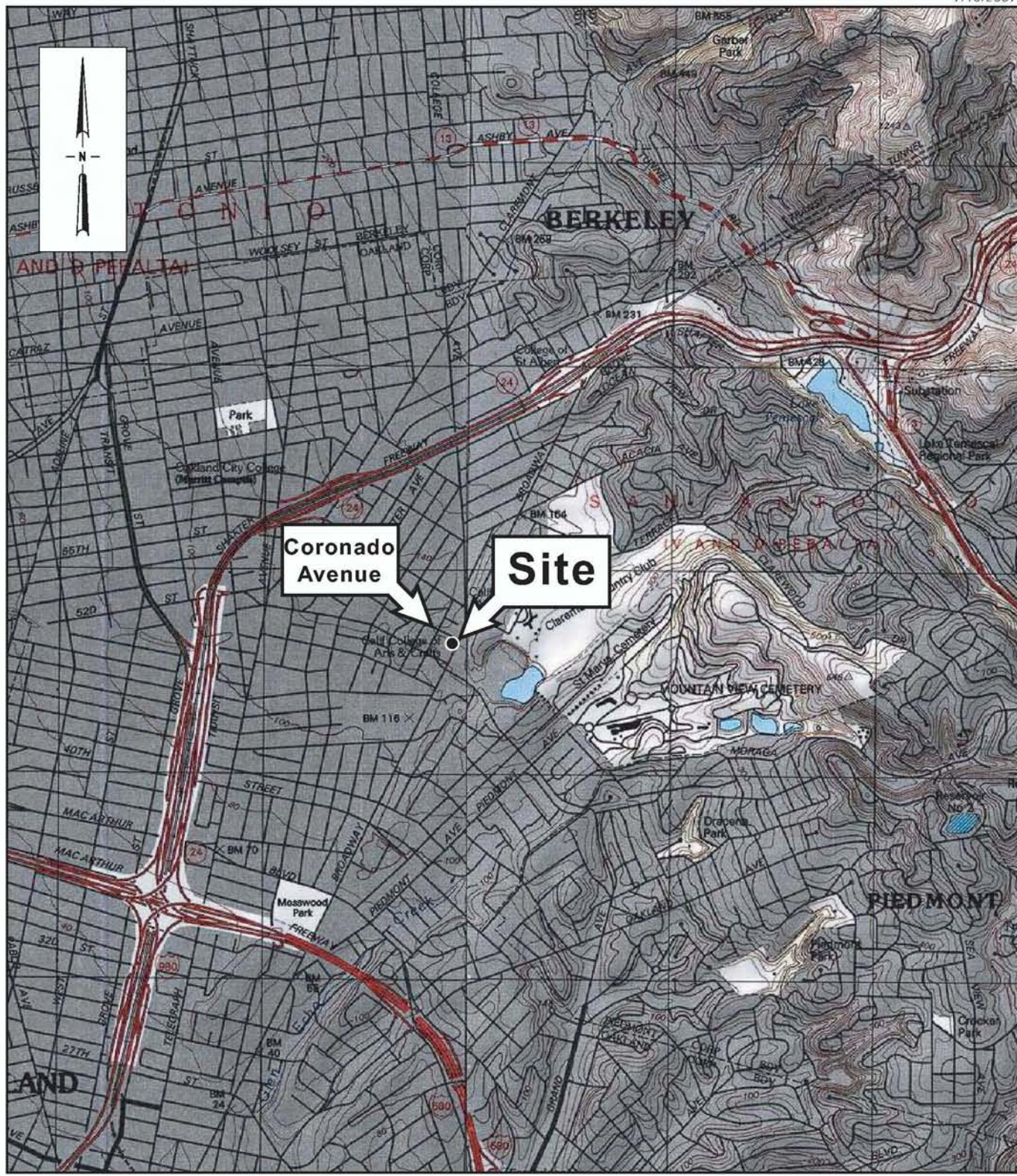
Appendix A – Permits

Appendix B – Boring Logs

Appendix C – Standard Operating Procedures

Appendix D – Well Development and Sampling Field Data Sheets

Appendix E – Laboratory Analytical Report



SOURCE: TOPOI MAPS

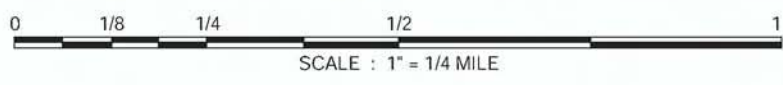


Figure 1

Former Exxon Station  
 5175 Broadway  
 Oakland, California



Site Location Map



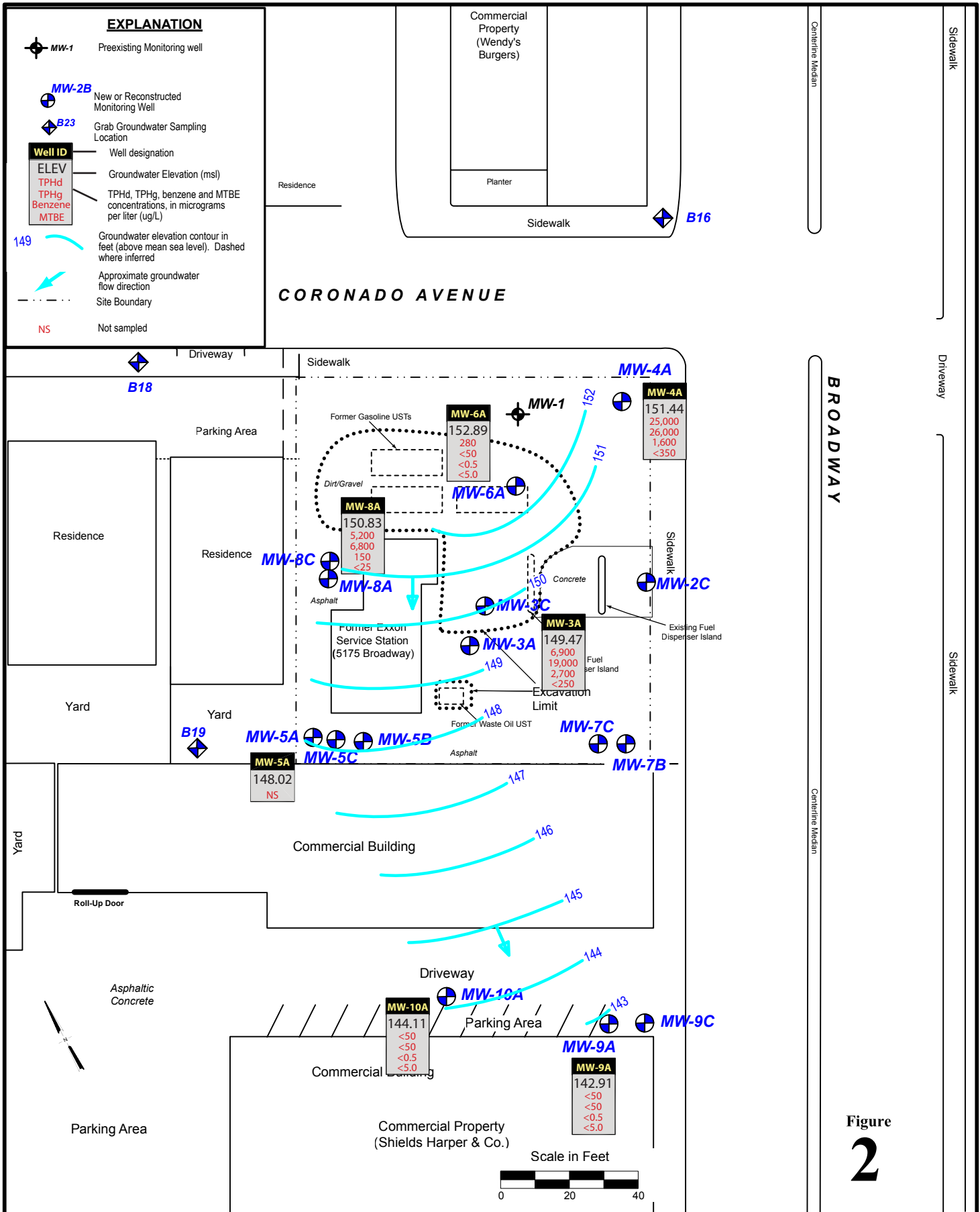


Figure  
**2**

**Former Exxon Station**  
5175 Broadway  
Oakland, California

**Groundwater Elevation Contour and Hydrocarbon Concentration Map (Shallow)**  
September 17, 2009



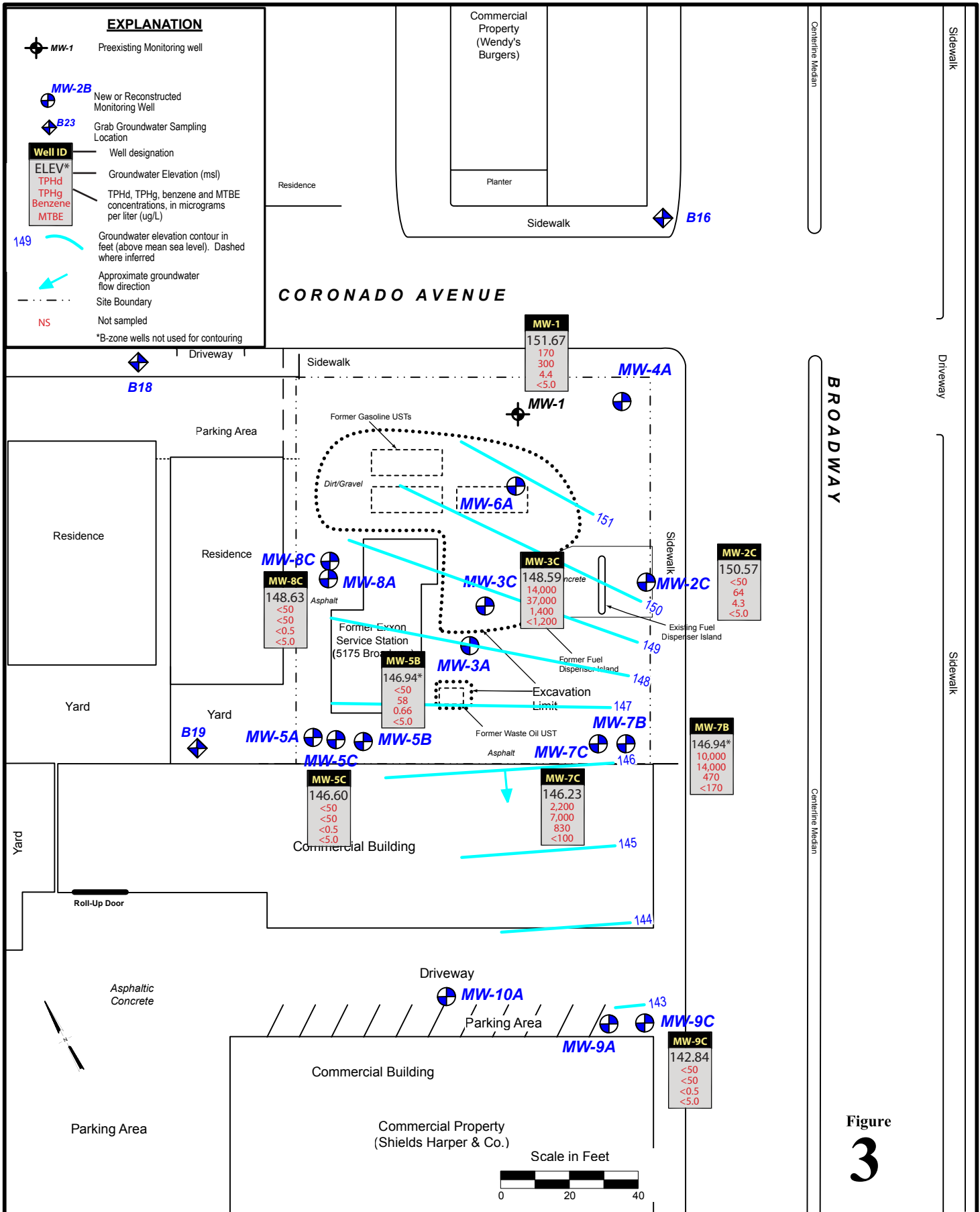
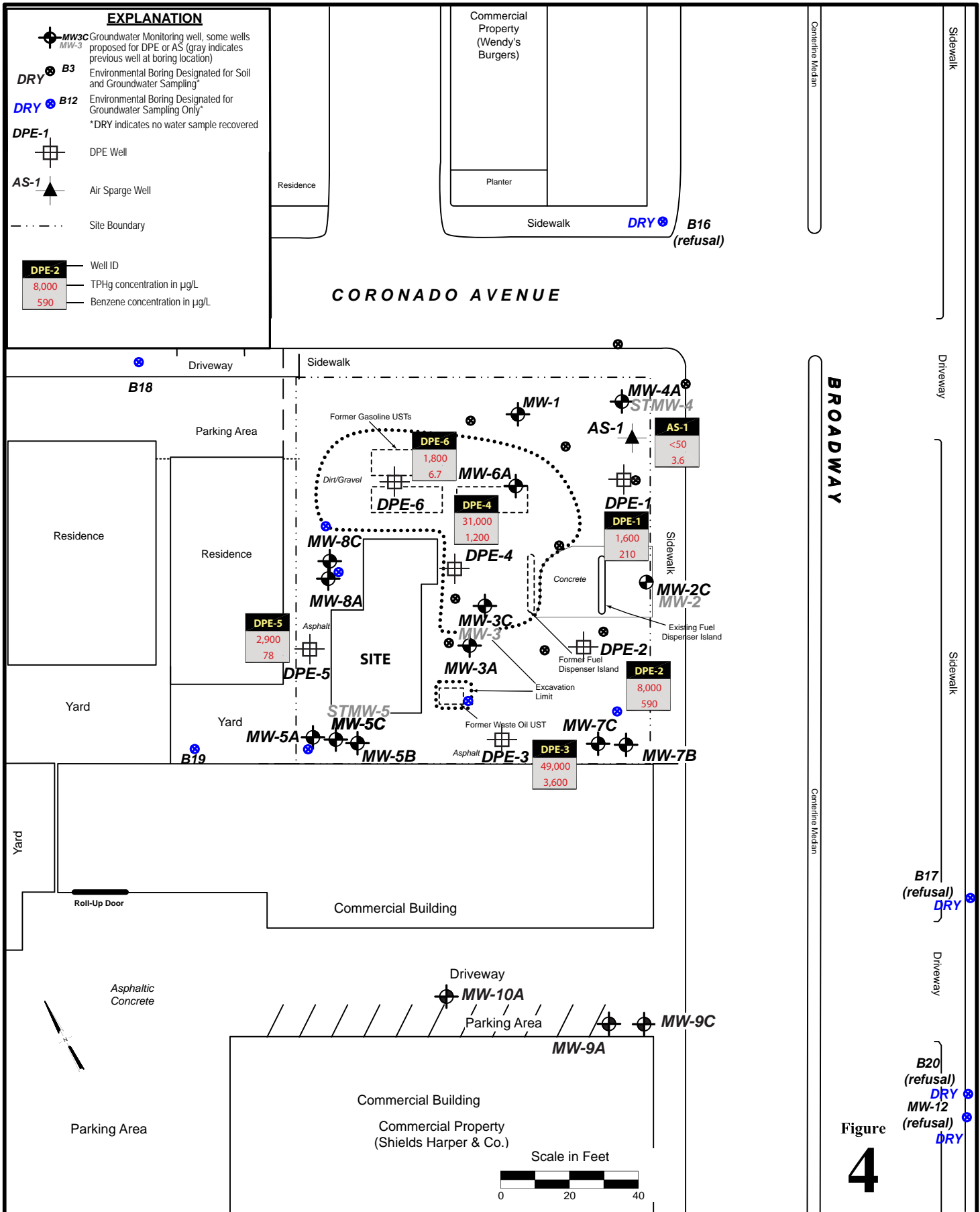


Figure  
**3**

Former Exxon Station  
5175 Broadway  
Oakland, California

Groundwater Elevation Contour and  
Hydrocarbon Concentration Map (Deep)  
September 17, 2009

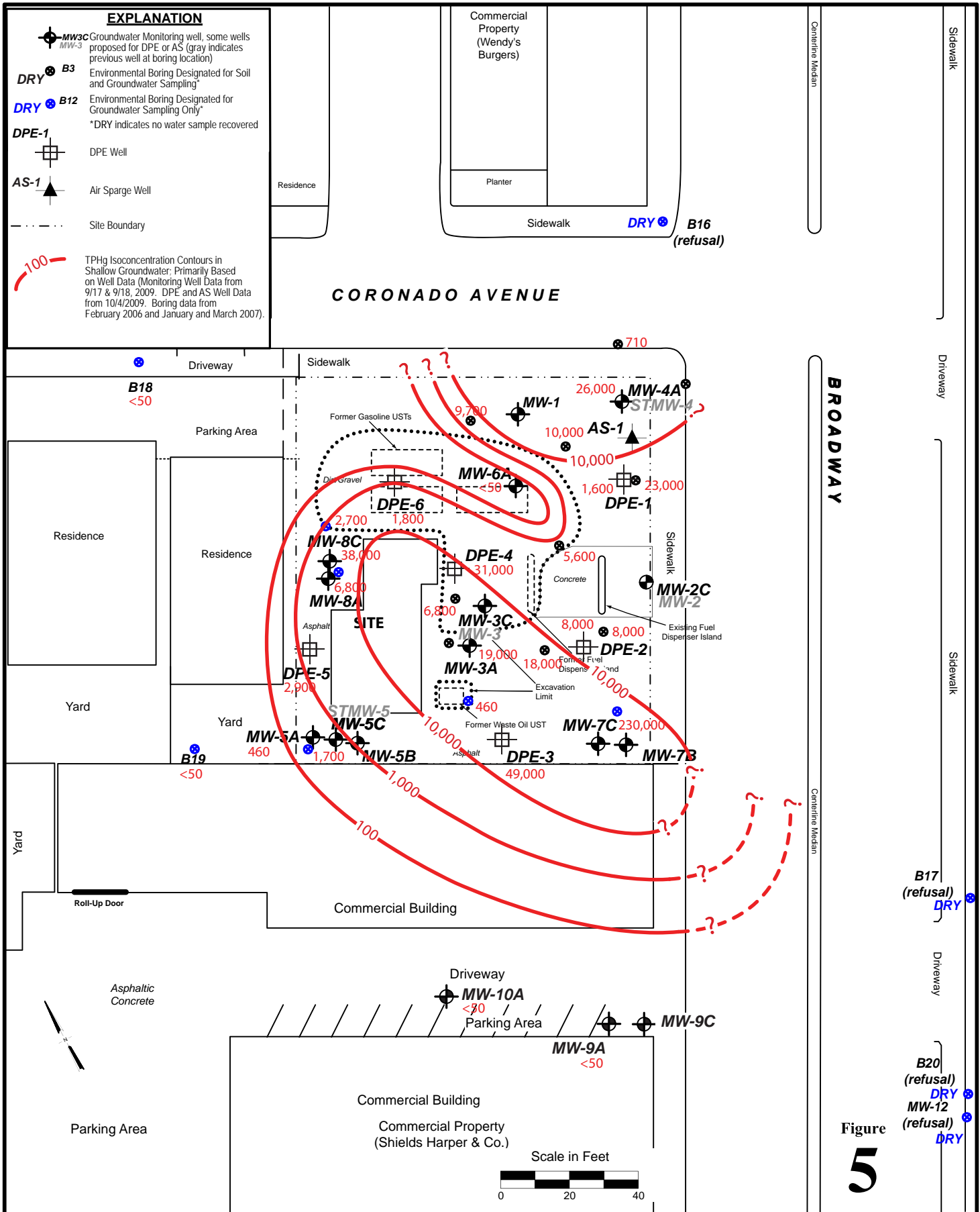




Former Exxon Station  
5175 Broadway  
Oakland, California

Remediation Well Hydrocarbon  
Concentration Map

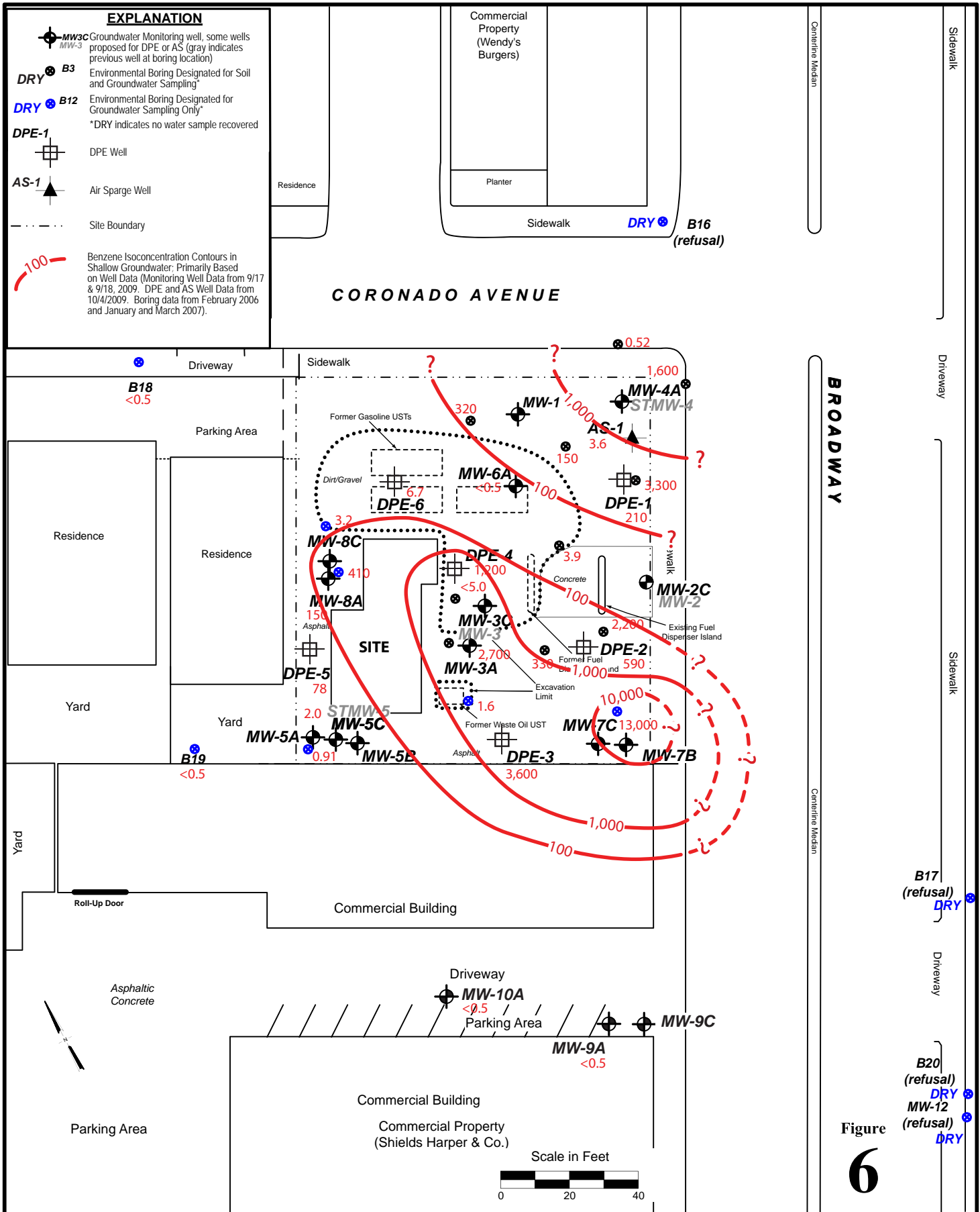




Former Exxon Station  
5175 Broadway  
Oakland, California

Distribution of TPHg in Shallow  
Groundwater





Former Exxon Station  
5175 Broadway  
Oakland, California

Distribution of Benzene in Shallow  
Groundwater



# Pangea

**Table 1. Groundwater Analytical Data** - Former Exxon Station, 5175 Broadway, Oakland, CA

Well ID	Date	Groundwater	Depth	TPHd	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DIPE	1,2-DCA	Dissolved	
TOC Elev (ft)	Sampled	SPH (ft)	Elevation (ft)	to Water (ft)	←----- μg/L -----→								Oxygen mg/L	
<b>Remediation Wells</b>														
AS-1	10/04/09	--	--	11.38	--	<50	3.6	<0.5	<0.5	<0.5	<5.0	--	--	--
DPE-1	10/04/09	--	--	10.38	--	1,600	210	4.4	5.1	34	<35	--	--	--
DPE-2	10/04/09	--	--	11.33	--	8,000	590	220	92	760	<250	--	--	--
DPE-3	10/04/09	--	--	11.85	--	49,000	3,600	4,400	1,300	6,500	<2,500	--	--	--
DPE-4	10/04/09	--	--	11.50	--	31,000	1,200	2,900	530	4,700	<1,200	--	--	--
DPE-5	10/04/09	--	--	14.46	--	2,900	78	71	29	260	<50	--	--	--
DPE-6	10/04/09	--	--	11.05	--	1,800	6.7	5.2	2.6	34	<5.0	--	--	--
<b>GRAB GROUNDWATER SAMPLING - 2007</b>														
B-18	01/23/07	--	--	7.1	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--
B-19	03/19/07	--	--	4	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	--
<b>GRAB GROUNDWATER SAMPLING - 2006</b>														
B1-W	02/01/06	--	--	9.5	<84	710	(0.52)	(0.59)	(<0.50)	(0.66)	<1.0	<5.0	<0.50	--
B3-W	02/08/06	--	--	9.63	<280	23,000	(3,300)	(660)	(170)	(910)	<50	380	<25	--
B4-W	02/08/06	--	--	8.24	--	9,700	(320)	(13)	(200)	(180)	<20	1,300	12	--
B5-W	02/08/06	--	--	6.96	--	10,000	(150)	(11)	(210)	(190)	<10	<50	<5.0	--
B6-W	02/06/06	--	--	12.1	--	5,600	(3.9)	(3.1)	(54)	(61)	<5.0	<25	<2.5	--
B7-W	02/08/06	--	--	11.72	--	8,000	(2,200)	(300)	(240)	(830)	<20	<100	53	--
B8-W	02/08/06	--	--	9.97	--	18,000	(330)	(53)	(440)	(1,200)	<20	<100	11	--
B10-W	02/06/06	--	--	13.3	--	6,800	(<5.0)	(5.7)	(170)	(69)	<10	<50	<5.0	--
B11-W	02/10/06	--	--	14.3	--	230,000	(13,000)	(19,000)	(960)	(20,000)	<200	<1,000	150	--
B12-W	02/03/06	--	--	7.92	--	460	(1.6)	(2.1)	(1.6)	(3.5)	<1.0	<5.0	0.62	--
B13-W	02/03/06	--	--	11.67	<60	1,700	(12)	(9.4)	(18)	(22)	<5.0	<25	<2.5	--
B14-W	02/06/06	--	--	13.1	--	38,000	(410)	(25)	(290)	(95)	<50	<250	<25	--
B15-W	02/01/06	--	--	8.75	<620	2,700	(3.2)	(2.7)	(22)	(4.3)	<5.0	<25	<2.5	--



# Pangea

**Table 1. Groundwater Analytical Data** - Former Exxon Station, 5175 Broadway, Oakland, CA

Well ID	Date	Groundwater	Depth	TPHd	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DIPE	1,2-DCA	Dissolved
TOC Elev	Sampled	SPH	Elevation	to Water	← μg/L →								Oxygen
(ft)	(ft)	(ft)	(ft)	(ft)									mg/L
<b>Monitoring Wells</b>													
MW-1	04/30/89	--	--	--	--	200	18	5	2	12	--	--	--
(97.71)	05/17/90	--	88.45	9.26	--	--	--	--	--	--	--	--	--
	09/26/90	--	87.79	9.92	--	1,300	55	31	120	100	--	--	--
	01/14/91	--	88.17	9.54	--	3,100	350	83	86	130	--	--	--
(102.04)	07/03/91	--	92.62	9.42	--	580	32	41	40	55	--	--	--
	11/11/91	--	92.59	9.45	--	330	20	2	2	11	--	--	--
(101.83)	03/04/92	--	93.90	7.93	--	810	11	5	10	23	--	--	--
	06/02/92	--	92.85	8.98	--	2,200	93	32	40	120	--	--	--
	09/28/92	--	92.54	9.29	--	2,900	24	78	19	37	--	--	--
	01/11/93	--	94.27	7.56	--	1,700	5.7	6	11	28	--	--	--
	08/15/94	--	92.64	9.19	--	2,000	120	3	6	16	--	--	--
(97.50)	11/07/96	--	88.77	8.73	270	1,200	3	1.1	1.5	3.8	<0.5	--	--
	02/12/97	--	89.58	7.92	<50	1,800	13	5.7	4.8	17	<0.5	--	--
	06/16/97	--	88.46	9.04	<50	330	27	<0.5	<0.5	1.2	<0.5	--	--
	09/30/97	--	89.94	7.56	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--
(97.50)	01/27/98	--	89.54	7.96	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--
	04/24/98	--	89.52	7.98	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--
	08/17/98	--	88.52	8.98	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--
	11/16/98	--	88.60	8.90	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--
	02/16/99	--	88.86	8.64	<50	110	<0.5	<0.5	<0.5	<0.5	<0.5	--	--
	05/17/99	--	89.00	8.50	--	280	1.1	0.6	<0.5	<0.5	<0.5	--	--
	08/17/99	--	88.26	9.24	86	790	5.6	4.3	4.5	11	<5.0	--	--
	11/17/99	--	87.06	10.44	--	1,300	3.6	1.9	2.7	6.6	<1.0	--	--
	02/17/00	--	89.02	8.48	--	580	1.1	2.3	3.6	4.9	<5.0	--	--
	05/17/00	--	89.26	8.24	--	1,500	130	6.8	6.1	<5.0	<5.0	--	--
	08/17/00	--	88.73	8.77	--	550	160	<25	<25	<25	<25	--	--
	11/15/00	--	88.46	9.04	--	130	<5.0	<5.0	<5.0	<5.0	<5.0	--	--
	02/16/01	--	89.90	7.60	--	400	26	<5.0	<5.0	<5.0	<5.0	--	--
	01/11/02	--	89.42	8.08	160	600	74	53	14	52	110	--	--
(161.03)	07/01/02	--	152.01	9.02	280	670	25	<5.0	<5.0	<5.0	<5.0	--	--
	10/04/02	--	151.29	9.74	520	1,800	130	7.8	8.1	14	<5.0	--	--
	07/28/06	--	151.93	9.10	86	250	42	1.7	1.4	3.1	<1.0	51	1.5
	10/16/06	--	151.98	9.05	110	390	16	<0.5	1.5	2.2	<0.5	41	1.6
(161.10)	01/09/07	--	152.90	8.20	160	530	21	1.7	2.8	5.1	--	--	0.22
	03/26/07	--	152.84	8.26	--	--	--	--	--	--	--	--	--
	06/24/07	--	152.12	8.98	220	500	24	1.1	2.2	4.2	<5.0	--	--
	09/29/07	--	151.44	9.66	180	540	19	1.2	2.3	5.3	<5.0	--	--
	12/27/07	--	152.60	8.50	200	290	10	0.65	1.2	3.0	<5.0	--	--
	03/15/08	--	152.72	8.38	340	680	24	1.1	1.9	2.9	<10	--	--
	09/12/08	--	151.86	9.24	320	1,000	13	<0.5	0.61	1.4	<5.0	--	--
	03/06/09	--	154.40	6.70	2,700	2,500	28	3.2	4.8	10	<17	--	--
	<b>09/17/09</b>	--	<b>151.67</b>	<b>9.43</b>	<b>170</b>	<b>300</b>	<b>4.4</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>2.3</b>	<b>&lt;5.0</b>	--	--

# Pangea

**Table 1. Groundwater Analytical Data - Former Exxon Station, 5175 Broadway, Oakland, CA**

Well ID	Date	Groundwater	Depth	TPHd	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DIPE	1,2-DCA	Dissolved		
TOC Elev (ft)	Sampled	SPH (ft)	Elevation (ft)	to Water (ft)	←----- μg/L -----→									Oxygen mg/L	
MW-2	04/30/89	--	--	--	--	230	39	18	5	23	--	--	--		
(97.78)	05/17/90	--	87.78	10.00	--	--	--	--	--	--	--	--	--		
	09/29/90	--	86.95	10.83	--	850	970	5	25	47	--	--	--		
	01/14/91	--	87.15	10.63	--	3,100	30	52	24	34	--	--	--		
(102.02)	07/03/91	--	91.94	10.08	--	1,590	30	52	24	34	--	--	--		
	11/11/91	--	91.81	10.21	--	960	320	15	4	29	--	--	--		
	03/04/92	--	93.32	8.70	--	1,500	9.5	8.4	9.8	22	--	--	--		
	06/02/92	--	92.50	9.52	--	2,800	84	41	59	95	--	--	--		
	09/28/92	--	91.93	10.09	--	1,600	47	20	47	97	--	--	--		
	01/11/93	--	93.50	8.52	--	2,500	8.6	10	17	32	--	--	--		
(97.49)	08/15/94	--	87.58	9.91	--	6,000	450	60	100	95	--	--	--		
	11/07/96	--	87.47	10.02	780	4,200	25	4.9	8.1	14	<0.5	--	--		
	02/12/97	--	88.58	8.91	5,700	1,800	16	3.1	3.4	8.8	<0.5	--	--		
	06/16/97	--	87.74	9.75	<50	2,500	22	5.1	7.8	11	<0.5	--	--		
	09/30/97	--	89.60	7.89	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--		
	01/27/98	--	89.11	8.38	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--		
	04/24/98	--	88.81	8.68	1,400	2,100	18	6.5	4.8	21	<0.5	--	--		
	08/17/98	--	87.75	9.74	<50	2,900	5.1	4.5	5.8	17	<0.5	--	--		
	11/16/98	--	87.35	10.14	<50	1,400	2.1	1.9	2.3	4.8	<0.5	--	--		
	02/16/99	--	88.57	8.92	<50	1,600	82	16	<2.5	40	59	--	--		
	05/17/99	--	88.23	9.26	--	8,200	43	73	140	100	<250	--	--		
	08/17/99	--	87.45	10.04	260	2,900	20	81	17	38	<5.0	--	--		
	11/17/99	--	85.97	11.52	<50	2,600	7	3.7	5.3	12.9	<1.0	--	--		
	02/17/00	--	87.99	9.50	--	1,700	3.2	6.8	11	12.3	<5.0	--	--		
	05/17/00	--	88.65	8.84	--	3,800	450	65	110	80	<25	--	--		
	08/17/00	--	88.99	8.50	--	4,300	440	<50	78	<50	<50	--	--		
	11/15/00	--	87.55	9.94	--	5,800	320	41	78	64	<25	--	--		
	02/16/01	--	88.97	8.52	--	2,200	110	20	38	33	<5.0	--	--		
	01/11/02	--	88.67	8.82	620	3,100	280	86	84	110	<50	--	--		
(160.98)	07/01/02	--	151.34	9.64	940	2,600	300	29	45	27	<10	--	--		
	10/04/02	--	150.46	10.52	390	4,000	440	66	140	120	<25	--	--		
	07/28/06	--	150.96	10.02	340	1,300	150	9.9	6	18	<0.5	3.6	<0.5	0.17	
	10/16/06	--	150.45	10.53	76	150	16	1.0	3.5	2.2	<0.5	1.2	<0.5	0.19	
	01/09/07	--	151.65	9.33	84	210	27	2.6	8.1	6.8	--	--	--	0.14	
	01/25/07	--				Well Abandoned									

# Pangea

**Table 1. Groundwater Analytical Data - Former Exxon Station, 5175 Broadway, Oakland, CA**

Well ID	Date	Groundwater	Depth	TPHd	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DIPE	1,2-DCA	Dissolved
TOC Elev (ft)	Sampled	SPH (ft)	Elevation (ft)	to Water (ft)	← μg/L →								Oxygen mg/L
MW-3	04/30/90	--	--	--	--	56,000	3,600	8,600	1,300	7,200	--	--	--
(98.14)	05/17/90	--	85.72	12.42	--	--	--	--	--	--	--	--	--
	09/26/90	--	84.64	13.50	--	54,000	5,100	420	1,600	8,000	--	--	--
	01/14/91	--	85.56	12.58	--	35,000	2,600	6,600	1,500	5,700	--	--	--
(102.46)	07/03/91	--	90.38	12.08	--	33,000	4,120	4,300	1,400	4,800	--	--	--
	11/11/91	--	90.17	12.29	--	57,000	3,900	8,400	2,100	14,000	--	--	--
(102.18)	03/04/92	--	91.92	10.26	--	57,000	720	870	81	3,100	--	--	--
(97.94)	06/02/92	--	86.54	11.40	--	50,000	240	240	220	740	--	--	--
	09/28/92	--	85.30	12.64	--	64,000	110	93	97	250	--	--	--
	01/11/93	--	87.84	10.10	--	68,000	210	280	360	990	--	--	--
	08/15/94	--	85.74	12.20	--	50,000	870	1,200	1,300	3,000	--	--	--
	11/07/96	--	85.54	12.40	470	68,000	33	27	63	120	<0.5	--	--
	02/12/97	--	87.71	10.23	3,500	25,000	39	43	15	91	<0.5	--	--
	06/16/97	--	86.15	11.79	<50	9,700	26	29	45	81	<0.5	--	--
	09/30/97	--	88.54	9.40	1,600	6,000	43	36	12	11	<0.5	--	--
	01/27/98	--	88.14	9.80	560	380	5.7	4.1	1.7	9.1	<0.5	--	--
	04/24/98	--	88.04	9.90	680	<50	<0.5	<0.5	<0.5	<0.5	--	--	--
	08/17/98	--	86.48	11.46	<50	16,000	200	18	31	82	<0.5	--	--
	11/16/98	--	85.54	12.40	<50	68,000	86	54	69	130	<0.5	--	--
	02/16/99	--	87.22	10.72	<50	33,000	270	110	<5.0	770	170	--	--
	05/17/99	--	87.40	10.54	--	72,000	280	230	320	890	<250	--	--
	08/17/99	--	85.99	11.95	1,800	20,000	51	41	61	130	<5.0	--	--
	11/17/99	--	84.34	13.60	--	1,700	39	22	31	84	<1.0	--	--
	02/17/00	--	87.26	10.68	--	8,800	16	39	74	90	<5.0	--	--
	05/17/00	--	87.69	10.25	--	22,000	300	260	410	940	<5.0	--	--
	08/17/00	--	86.10	11.84	--	15,000	230	140	470	750	<5.0	--	--
	11/15/00	--	86.12	11.82	--	12,000	250	210	390	700	<25	--	--
	02/16/01	--	88.26	9.68	--	7,400	40	72	700	250	<25	--	--
	01/11/02	--	88.36	9.58	1,900	9,300	230	200	290	580	<25	--	--
(161.43)	07/01/02	--	150.29	11.14	5,200	13,000	230	220	450	890	<13	--	--
	10/04/02	--	148.61	12.82	4,900	11,000	280	170	450	730	<25	--	--
	07/28/06	--			Not Sampled - Unable to locate well								
	10/16/06	--			Not Sampled - Unable to locate well								
	01/09/07	--			Not Sampled - Unable to locate well								
	01/22/07	--	149.81	11.62	93,000	34,000	770	250	760	2,000	<1,000	--	--
	03/16/07	--			Well Abandoned								
STMW-4	07/03/91	--	92.58	11.00	--	3,100	610	62	39	150	--	--	--
(103.58)	11/11/91	--	92.50	11.08	--	3,600	990	15	2.6	180	--	--	--
(101.08)	03/04/92	--	91.64	9.44	--	5,000	35	20	22	71	--	--	--
(98.80)	06/02/92	--	88.48	10.32	--	13,000	140	45	63	210	--	--	--
	09/28/92	--	88.04	10.76	--	40,000	35	20	48	110	--	--	--

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**Table 1. Groundwater Analytical Data - Former Exxon Station, 5175 Broadway, Oakland, CA**

Well ID	Date	Groundwater	Depth	TPHd	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DIPE	1,2-DCA	Dissolved	
TOC Elev (ft)	Sampled	Elevation (ft)	to Water (ft)	← μg/L →									Oxygen mg/L	
STMW-4 (cont.)	01/11/93	--	89.52	9.28	--	24,000	26	88	92	280	--	--	--	
	08/15/94	--	88.26	10.54	--	9,000	500	34	46	130	--	--	--	
	11/07/96	--	88.43	10.37	180	13,000	40	2.9	7.8	19	<0.5	--	--	
	02/12/97	--	89.44	9.36	5,700	5,300	95	5.3	5.9	18	<0.5	--	--	
	06/16/97	--	88.40	10.40	<50	5,300	37	6.2	1.7	11	<0.5	--	--	
	09/30/97	--	90.30	8.50	<50	2,700	42	7.7	5.7	26	<0.5	--	--	
	01/27/98	--	89.90	8.90	300	3,000	60	17	12	49	<0.5	--	--	
	04/24/98	--	89.30	9.50	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	
	08/17/98	--	88.44	10.36	<50	29,000	36	24	59	160	<0.5	--	--	
	11/16/98	--	88.24	10.56	<50	13,000	26	21	20	41	--	--	--	
	02/16/99	--	89.16	9.64	<50	32,000	660	16	16	150	<100	--	--	
	05/17/99	--	88.84	9.96	--	13,000	1600	30	45	78	<250	--	--	
	08/17/99	--	88.16	10.64	990	12,000	260	22	33	72	<5.0	--	--	
	11/17/99	--	86.78	12.02	--	7,900	21	12	17	40	<1.0	--	--	
	02/17/00	--	89.48	9.32	--	4,900	8.9	21	38	50	<5.0	--	--	
	05/17/00	--	89.15	9.65	--	9,600	840	<50	61	<50	<50	--	--	
	08/17/00	--	88.46	10.34	--	5,100	680	<50	62	<50	<50	--	--	
	11/15/00	--	88.28	10.52	--	3,900	640	<25	26	27	<25	--	--	
	02/16/01	--	89.60	9.20	--	5,700	560	<25	<25	<25	<25	--	--	
	(162.13)	01/11/02	--	89.22	9.58	930	4,900	560	59	25	<25	<250	--	--
07/01/02		--	151.85	10.28	6,700	6,700	470	18	32	45	<13	--	--	
10/04/02		--	151.05	11.08	2,900	13,000	590	26	65	110	<25	--	--	
07/28/06		0.04	151.53	10.60	39,000	25,000	960	21	73	130	<5.0	65	<5.0	0.22
10/16/06		0.06	151.30	10.83	14,000	14,000	790	28	81	130	<5.0	30	<5.0	0.26
01/09/07		0.03	152.20	9.93	Not Sampled - SPH								0.24	
01/26/07					Well Abandoned								0.24	
STMW-5 (101.99) (101.36)	07/03/91	--	88.70	13.29	--	690	99	81	19	98	--	--	--	
	11/11/91	--	87.99	14.00	--	410	61	2.4	1.4	20	--	--	--	
	03/04/92	--	89.56	11.80	--	460	13	6.5	11	18	--	--	--	
	06/02/92	--	88.30	13.06	--	1,800	27	20	21	43	--	--	--	
	09/28/92	--	87.32	14.04	--	1,500	14	6.1	18	22	--	--	--	
	01/11/93	--	89.75	11.61	--	800	1.8	3	3.1	9.4	--	--	--	
	08/15/94	--	87.51	13.85	--	3,000	320	62	34	220	--	--	--	
	(97.14)	11/07/96	--	83.47	13.67	330	1,200	11	1.7	4.4	13	<0.5	--	--
		02/17/97	--	85.07	12.07	3,700	1,000	11	17	1.7	9.7	<0.5	--	--
		06/19/97	--	83.81	13.33	2,300	950	7.4	1	1	7.2	<0.5	--	--
		09/30/97	--	85.90	11.24	1,100	710	5.8	4	1	1	<0.5	--	--
		01/27/98	--	85.50	11.64	1,100	340	2	1.8	1.6	8.2	<0.5	--	--
		04/24/98	--	85.30	11.84	<50	3,300	12	9.4	8.5	37	<0.5	--	--
		08/17/98	--	83.94	13.20	<50	5,300	26	17	14	39	<0.5	--	--
11/16/98	--	83.40	13.74	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	--	--		

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**Table 1. Groundwater Analytical Data - Former Exxon Station, 5175 Broadway, Oakland, CA**

Well ID	Date	Groundwater	Depth	TPHd	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DIPE	1,2-DCA	Dissolved	
TOC Elev	Sampled	SPH	Elevation	to Water	← μg/L →								Oxygen	
(ft)	(ft)	(ft)	(ft)	(ft)									mg/L	
STMW-5 (cont.)	02/16/99	--	84.92	12.22	<50	950	150	3.8	1.4	14	11	--	--	
	05/17/99	--	84.56	12.58	--	2,800	67	9.4	<2.5	16	30	--	--	
	08/17/99	--	83.66	13.48	230	2,800	18	17	18	36	<5.0	--	--	
	11/17/99	--	82.26	14.88	--	1,600	3.9	2.3	3.2	7.5	<1.0	--	--	
	02/17/00	--	84.58	12.56	--	770	1.5	3.2	5.8	7	<5.0	--	--	
	05/17/00	--	85.06	12.08	--	4,500	<25	<25	<25	<25	<25	--	--	
	08/17/00	--	83.58	13.56	--	2,900	170	64	100	250	<10	--	--	
	11/15/00	--	83.86	13.28	--	2,100	120	24	40	54	<5.0	--	--	
	02/16/01	--	85.54	11.60	--	850	58	9.8	9.4	18	<5.0	--	--	
	01/11/02	--	85.42	11.72	<50	920	76	16	16	28	13	--	--	
	(160.65)	07/01/02	--	147.51	13.14	1,500	4,300	71	14	14	36	<5.0	--	--
		10/04/02	--	146.13	14.52	60	1,400	71	17	26	35	<5.0	--	--
		07/28/06	--	147.30	13.35	370	700	22	4.3	1.2	6.6	<0.5	<0.5	0.24
		10/16/06	--	146.91	13.74	240	590	14	1.6	1.3	3.2	<0.5	<0.5	0.21
01/09/07		--	148.19	12.46	180	390	30	3.2	1.8	3.2	--	--	0.17	
01/18/07				Well Abandoned										
MW-2C (160.65)	03/09/07	--	152.24	8.41	140	450	40	9.3	2.9	16	<10	--	--	
	03/26/07	--	151.93	8.72	--	--	--	--	--	--	--	--	--	
	06/24/07	--	151.21	9.44	160	440	30	1.8	5.9	7.4	<5.0	--	--	
	09/29/07	--	150.45	10.20	120	200	13	<0.5	<0.5	2.0	<5.0	--	--	
	12/27/07	--	151.42	9.23	83	190	13	0.83	<0.5	1.9	<5.0	--	--	
	03/15/08	--	151.83	8.82	120	250	24	2.2	5.2	4.5	<5.0	--	--	
	09/12/08	--	150.73	9.92	<50	130	7.1	<0.5	1.2	0.83	<5.0	--	--	
	03/06/09	--	153.21	7.44	95	180	8.0	1.1	1.5	2.8	<5.0	--	--	
	09/17/09	--	150.57	10.08	<50	64	4.3	<0.5	0.62	0.88	<5.0	--	--	
MW-3A (161.55) (161.57)	03/09/07	--	152.20	9.35	4,500	39,000	3,800	220	830	2,800	<500	--	--	
	03/26/07	--	152.33	9.22	--	--	--	--	--	--	--	--	--	
	06/24/07	--	151.61	9.94	11,000	34,000	3,200	330	990	3,200	<250	--	--	
	09/29/07	--	150.21	11.36	11,000	43,000	3,500	150	730	2,200	<1,000	--	--	
	12/27/07	--	150.20	11.37	8,700	30,000	2,500	24	520	930	<100	--	--	
	03/15/08	--	152.27	9.30	10,000	26,000	2,400	110	700	1,200	<250	--	--	
	09/12/08	--	149.57	12.00	9,000	26,000	2,100	29	560	280	<100	--	--	
	03/06/09	--	152.66	8.91	6,500	20,000	2,300	59	740	410	<180	--	--	
	09/17/09	--	149.47	12.10	6,900	19,000	2,700	33	660	110	<250	--	--	
MW-3C (161.79)	03/26/07	--	151.15	10.64	--	--	--	--	--	--	--	--	--	
	04/16/07	--	150.87	10.92	36,000	32,000	1,200	710	600	1,900	<500	--	--	
	06/24/07	--	149.43	12.36	200,000	50,000	2,200	4,100	860	6,100	<500	--	--	
	09/29/07	--	148.33	13.46	48,000	37,000	1,700	3,300	830	4,800	<1,000	--	--	
12/27/07	--	149.79	12.00	29,000	28,000	590	900	630	2,000	<500	--	--		

# Pangea

**Table 1. Groundwater Analytical Data** - Former Exxon Station, 5175 Broadway, Oakland, CA

Well ID	Date	Groundwater	Depth	TPHd	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DIPE	1,2-DCA	Dissolved	
TOC Elev (ft)	Sampled	SPH (ft)	Elevation (ft)	to Water (ft)	← μg/L →									Oxygen mg/L
MW-3C	03/15/08	--	150.70	11.09	21,000	36,000	1,500	2,400	570	3,700	<500	--	--	
(cont.)	09/12/08	--	148.37	13.42	11,000	40,000	1,100	1,200	600	3,000	<500	--	--	
	03/06/09	--	152.04	9.75	13,000	31,000	860	420	540	2,200	<500	--	--	
	<b>09/17/09</b>	<b>--</b>	<b>148.59</b>	<b>13.20</b>	<b>14,000</b>	<b>37,000</b>	<b>1,400</b>	<b>690</b>	<b>400</b>	<b>4,300</b>	<b>&lt;1,200</b>	<b>--</b>	<b>--</b>	
MW-4A	03/09/07	--	152.88	9.56	3,600	16,000	1,600	36	37	150	<250	--	--	
(162.44)	03/26/07	--	152.56	9.88	--	--	--	--	--	--	--	--	--	
	06/24/07	--	152.02	10.42	110,000	87,000	1,500	59	290	800	<500	--	--	
	09/29/07	--	151.33	11.11	170,000	130,000	2,700	69	400	1,400	<240	--	--	
	12/27/07	--	152.33	10.11	19,000	27,000	1,600	31	100	320	<90	--	--	
	03/15/08	--	152.51	9.93	38,000	17,000	1,300	<50	120	380	<500	--	--	
	09/12/08	--	151.72	10.72	120,000	110,000	1,400	<50	210	660	<500	--	--	
	03/06/09	--	153.84	8.60	32,000	17,000	1,100	15	<10	190	<100	--	--	
	<b>09/17/09</b>	<b>--</b>	<b>151.44</b>	<b>11.00</b>	<b>25,000</b>	<b>26,000</b>	<b>1,600</b>	<b>63</b>	<b>140</b>	<b>320</b>	<b>&lt;350</b>	<b>--</b>	<b>--</b>	
MW-5A	03/09/07	--	150.40	10.42	56	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
(160.82)	03/26/07	--	150.00	10.82	--	--	--	--	--	--	--	--	--	
	06/24/07	--	148.94	11.88	<50	180	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	09/29/07	--	147.86	12.96	--	--	--	--	--	--	--	--	--	
	12/27/07	--	148.40	12.42	--	--	--	--	--	--	--	--	--	
	03/15/08	--	149.96	10.86	<50	180	0.91	<0.5	<0.5	<0.5	<5.0	--	--	
	09/12/08	--	147.50	13.32	Insufficient water to sample									
	03/06/09	--	151.33	9.49	230	460	2.0	3.0	0.68	1.9	<5.0	--	--	
	<b>09/17/09</b>	<b>--</b>	<b>148.02</b>	<b>12.80</b>	Insufficient water to sample									
MW-5B	03/09/07	--	146.42	15.08	59	140	1.3	0.77	<0.5	1.6	<5.0	--	--	
(161.50)	03/26/07	--	148.88	12.62	--	--	--	--	--	--	--	--	--	
	06/24/07	--	147.98	13.52	53	52	1.1	<0.5	<0.5	<0.5	<5.0	--	--	
	09/29/07	--	146.60	14.90	<50	<50	0.95	<0.5	<0.5	<0.5	<5.0	--	--	
	12/27/07	--	148.41	13.09	<50	58	1.4	<0.5	0.60	<0.5	<5.0	--	--	
	03/15/08	--	148.95	12.55	<50	61	2.6	1.1	1.1	3.0	<5.0	--	--	
	09/12/08	--	146.35	15.15	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/06/09	--	150.36	11.14	<50	67	2.0	1.4	1.3	3.3	<5.0	--	--	
	<b>09/17/09</b>	<b>--</b>	<b>146.94</b>	<b>14.56</b>	<b>&lt;50</b>	<b>58</b>	<b>0.66</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;5.0</b>	<b>--</b>	<b>--</b>	
MW-5C	03/09/07	--	148.12	12.91	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
(161.03)	03/26/07	--	148.41	12.62	--	--	--	--	--	--	--	--	--	
	06/24/07	--	147.58	13.45	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	09/29/07	--	146.41	14.62	66	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	12/27/07	--	148.10	12.93	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/15/08	--	148.48	12.55	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	09/12/08	--	146.04	14.99	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	

# Pangea

**Table 1. Groundwater Analytical Data** - Former Exxon Station, 5175 Broadway, Oakland, CA

Well ID	Date	Groundwater	Depth	TPHd	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DIPE	1,2-DCA	Dissolved	
TOC Elev (ft)	Sampled	SPH (ft)	Elevation (ft)	to Water (ft)	← μg/L →									Oxygen mg/L
MW-5C (cont.)	03/06/09	--	149.73	11.30	<50	<50	0.52	<0.5	<0.5	<0.5	<5.0	--	--	
	<b>09/17/09</b>	--	<b>146.60</b>	<b>14.43</b>	<b>&lt;50</b>	<b>&lt;50</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;5.0</b>	--	--	
MW-6A (161.58)	03/09/07	--	154.91	6.67	380	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/26/07	--	154.41	7.17	--	--	--	--	--	--	--	--	--	
	06/24/07	--	153.79	7.79	590	140	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	09/29/07	--	152.84	8.74	540	52	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	12/27/07	--	154.27	7.31	170	94	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/15/08	--	154.42	7.16	150	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	09/12/08	--	152.92	8.66	510	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/06/09	--	155.76	5.82	110	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	<b>09/17/09</b>	--	<b>152.89</b>	<b>8.69</b>	<b>280</b>	<b>&lt;50</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;5.0</b>	--	--	
MW-7B (159.15)	03/09/07	--	147.97	11.18	930	18,000	1,500	1,600	140	1,800	<600	--	--	
	03/26/07	--	148.10	11.05	--	--	--	--	--	--	--	--	--	
	06/24/07	--	147.54	11.61	40,000	30,000	1,800	2,400	240	2,800	<700	--	--	
(159.02)	09/29/07	--	146.91	12.11	16,000	37,000	1,300	1,500	180	2,700	<500	--	--	
	12/27/07	--	147.37	11.65	7,700	18,000	810	880	38	1,600	<50	--	--	
	03/15/08	--	147.66	11.36	7,900	14,000	730	820	110	1,200	<250	--	--	
	09/12/08	--	146.87	12.15	27,000	16,000	450	340	19	1,300	<120	--	--	
	03/06/09	--	147.90	11.12	15,000	15,000	370	270	13	1,000	<150	--	--	
	<b>09/17/09</b>	--	<b>146.94</b>	<b>12.08</b>	<b>10,000</b>	<b>14,000</b>	<b>470</b>	<b>330</b>	<b>44</b>	<b>1,100</b>	<b>&lt;170</b>	--	--	
MW-7C (158.53)	03/09/07	--	145.44	13.09	190	3,600	970	100	12	90	<120	--	--	
	03/26/07	--	147.53	11.00	--	--	--	--	--	--	--	--	--	
	06/24/07	--	146.65	11.88	7,100	16,000	510	520	190	1,300	<100	--	--	
	09/29/07	--	146.21	12.32	11,000	29,000	580	1,400	600	4,800	<1,000	--	--	
	12/27/07	--	146.74	11.79	56,000	29,000	250	410	430	3,300	<50	--	--	
	03/15/08	--	147.45	11.08	7,000	13,000	170	58	170	1,300	<100	--	--	
	09/12/08	--	146.02	12.51	2,600	7,600	260	38	76	330	<50	--	--	
	03/06/09	--	147.65	10.88	1,900	4,600	140	21	15	93	<15	--	--	
	<b>09/17/09</b>	--	<b>146.23</b>	<b>12.30</b>	<b>2,200</b>	<b>7,000</b>	<b>830</b>	<b>38</b>	<b>23</b>	<b>90</b>	<b>&lt;100</b>	--	--	
MW-8A (161.57)	03/09/07	--	152.05	9.52	4,200	10,000	430	18	<10	88	<100	--	--	
	03/26/07	--	151.74	9.83	--	--	--	--	--	--	--	--	--	
	06/24/07	--	151.40	10.17	17,000	12,000	720	500	230	880	<300	--	--	
	09/29/07	--	150.64	10.95	5,300	7,500	440	67	26	240	<90	--	--	
(161.59)	12/27/07	--	152.00	9.59	13,000	9,600	290	100	90	360	<100	--	--	
	03/15/08	--	152.00	9.59	7,500	7,200	170	28	270	110	<100	--	--	
	09/12/08	--	150.27	11.32	9,900	11,000	220	31	110	180	<50	--	--	
	03/06/09	--	153.01	8.58	5,500	6,700	98	17	57	63	<50	--	--	
	<b>09/17/09</b>	--	<b>150.83</b>	<b>10.76</b>	<b>5,200</b>	<b>6,800</b>	<b>150</b>	<b>19</b>	<b>10</b>	<b>35</b>	<b>&lt;25</b>	--	--	

# Pangea

**Table 1. Groundwater Analytical Data** - Former Exxon Station, 5175 Broadway, Oakland, CA

Well ID	Date	Groundwater	Depth	TPHd	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	DIPE	1,2-DCA	Dissolved	
TOC Elev (ft)	Sampled	SPH (ft)	Elevation (ft)	to Water (ft)	← μg/L →									Oxygen mg/L
MW-8C (161.33)	03/09/07	--	149.18	12.15	<50	150	9.8	1.3	2.0	3.9	<5.0	--	--	
	03/26/07	--	149.56	11.77	--	--	--	--	--	--	--	--	--	
	06/24/07	--	148.96	12.37	<50	<50	0.57	<0.5	<0.5	<0.5	<5.0	--	--	
	09/29/07	--	148.35	12.98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	12/27/07	--	149.84	11.49	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/15/08	--	149.94	11.39	<50	110	6.0	1.7	2.4	2.4	<5.0	--	--	
	09/12/08	--	148.18	13.15	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/06/09	--	151.25	10.08	<50	<50	2.1	<0.5	0.87	0.76	<5.0	--	--	
	<b>09/17/09</b>	--	<b>148.63</b>	<b>12.70</b>	<b>&lt;50</b>	<b>&lt;50</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;5.0</b>	--	--	
MW-9A (155.37)	09/29/07	--	142.76	12.61	86	<50	2.6	<0.5	<0.5	<0.5	<5.0	--	--	
	12/27/07	--	143.51	11.86	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/15/08	--	143.35	12.02	<50	<50	0.85	<0.5	<0.5	<0.5	<5.0	--	--	
	09/12/08	--	142.60	12.77	<50	<50	1.2	<0.5	<0.5	<0.5	<5.0	--	--	
	03/06/09	--	144.18	11.19	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
		<b>09/17/09</b>	--	<b>142.91</b>	<b>12.46</b>	<b>&lt;50</b>	<b>&lt;50</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;5.0</b>	--	--
MW-9C (154.94)	09/29/07	--	142.67	12.27	390	68	2.2	0.88	<0.5	<0.5	<5.0	--	--	
	12/27/07	--	143.40	11.54	<50	<50	0.84	<0.5	<0.5	<0.5	<5.0	--	--	
	03/15/08	--	143.98	10.96	<50	<50	0.55	<0.5	<0.5	<0.5	<5.0	--	--	
	09/12/08	--	142.53	12.41	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/06/09	--	144.09	10.85	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
		<b>09/17/09</b>	--	<b>142.84</b>	<b>12.10</b>	<b>&lt;50</b>	<b>&lt;50</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;5.0</b>	--	--
MW-10A (154.88)	09/29/07	--	144.35	10.53	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	12/27/07	--	145.50	9.38	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/15/08	--	145.96	8.92	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	09/12/08	--	143.82	11.06	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
	03/06/09	--	147.45	7.43	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--	--	
		<b>09/17/09</b>	--	<b>144.11</b>	<b>10.77</b>	<b>&lt;50</b>	<b>&lt;50</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;0.5</b>	<b>&lt;5.0</b>	--	--

**Abbreviations:**

μg/L = Micrograms per liter - approximately equal to parts per billion = ppb.

mg/L = Milligrams per liter - approximately equal to parts per million = ppm.

SPH = Separate-phase hydrocarbons encountered in well (value in parentheses is thickness in feet).

Groundwater elevation is calculated according to the relationship: groundwater elevation = TOC (elevation) - (depth to water) + (0.8)(SPH thickness).

TPHg = Total petroleum hydrocarbons as gasoline by EPA Method 8015Cm.

TPHd = Total petroleum hydrocarbons as diesel by EPA Method 8015C.

BTEX = Benzene, toluene, ethylbenzene, xylenes by EPA Method 8021B.

MTBE = Methyl tertiary-butyl ether by EPA Method 8021B. (Concentrations in parentheses are by EPA Method 8260B).

DIPE = Diisopropyl ether by EPA Method 8260B.

1,2-DCA = 1,2-Dichloroethane by EPA Method 8260B.



## **APPENDIX A**

Permits

# Alameda County Public Works Agency - Water Resources Well Permit



399 Elmhurst Street  
Hayward, CA 94544-1395  
Telephone: (510)670-6633 Fax:(510)782-1939

**Application Approved on: 07/16/2009 By jamesy**

**Permit Numbers: W2009-0641 to W2009-0642**  
**Permits Valid from 08/19/2009 to 08/21/2009**

**Application Id:** 1247255140051  
**Site Location:** 5175 Broadway  
**Project Start Date:** 08/05/2009  
**Assigned Inspector:** Contact Vicky Hamlin at (510) 670-5443 or vickyh@acpwa.org  
**Extension Start Date:** 08/19/2009  
**Extension Count:** 1

**City of Project Site:**Oakland

**Completion Date:**08/07/2009

**Extension End Date:** 08/21/2009  
**Extended By:** vickyh1

**Applicant:** Pangea Environmental Services, Inc. - Morgan  
Gillies

**Phone:** 510-836-3702

**Property Owner:** Rockridge Heights, LLC  
C/O Gary Feiner, 34 Schooner Hill, Oakland, CA 94618

**Phone:** --

**Client:** \*\* same as Property Owner \*\*

	<b>Total Due:</b>	\$530.00
<b>Receipt Number: WR2009-0256</b>	<b>Total Amount Paid:</b>	\$530.00
<b>Payer Name : Robert Clark-Riddell</b>	<b>Paid By: VISA</b>	<b>PAID IN FULL</b>

**Works Requesting Permits:**

Remediation Well Construction-Extraction - 6 Wells  
Driller: RSI Drilling - Lic #: 802334 - Method: hstem

**Work Total: \$265.00**

**Specifications**

Permit #	Issued Date	Expire Date	Owner Well Id	Hole Diam.	Casing Diam.	Seal Depth	Max. Depth
W2009-0641	07/16/2009	11/03/2009	DPE-1	10.00 in.	4.00 in.	9.00 ft	20.00 ft
W2009-0641	07/16/2009	11/03/2009	DPE-2	10.00 in.	4.00 in.	9.00 ft	20.00 ft
W2009-0641	07/16/2009	11/03/2009	DPE-3	10.00 in.	4.00 in.	9.00 ft	20.00 ft
W2009-0641	07/16/2009	11/03/2009	DPE-4	10.00 in.	4.00 in.	9.00 ft	20.00 ft
W2009-0641	07/16/2009	11/03/2009	DPE-5	10.00 in.	4.00 in.	9.00 ft	20.00 ft
W2009-0641	07/16/2009	11/03/2009	DPE-6	10.00 in.	4.00 in.	9.00 ft	20.00 ft

**Specific Work Permit Conditions**

1. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost, liability in connection with or resulting from the exercise of this Permit including, but not limited to, properly damage, personal injury and wrongful death.

2. Permitte, permittee's contractors, consultants or agents shall be responsible to assure that all material or waters generated during drilling, boring destruction, and/or other activities associated with this Permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case shall these materials and/or waters be allowed to enter, or potentially enter, on or off-site storm sewers, dry wells, or waterways or be allowed to move off the property where work is being completed.

## Alameda County Public Works Agency - Water Resources Well Permit

3. Compliance with the well-sealing specifications shall not exempt the well-sealing contractor from complying with appropriate State reporting-requirements related to well construction or destruction (Sections 13750 through 13755 (Division 7, Chapter 10, Article 3) of the California Water Code). Contractor must complete State DWR Form 188 and mail original to the Alameda County Public Works Agency, Water Resources Section, within 60 days. Including permit number and site map.
4. Applicant shall submit the copies of the approved encroachment permit to this office within 60 days.
5. Applicant shall contact Vicky Hamlin for an inspection time at 510-670-5443 or email to vickyh@acpwa.org at least five (5) working days prior to starting, once the permit has been approved. Confirm the scheduled date(s) at least 24 hours prior to drilling.
6. Minimum seal depth (Neat Cement Seal) is 2 feet below ground surface (BGS).
7. Minimum surface seal thickness is two inches of cement grout placed by tremie
8. Copy of approved drilling permit must be on site at all times. Failure to present or show proof of the approved permit application on site shall result in a fine of \$500.00.
9. Prior to any drilling activities onto any public right-of-ways, it shall be the applicants responsibilities to contact and coordinate a Underground Service Alert (USA), obtain encroachment permit(s), excavation permit(s) or any other permits required for that City or to the County and follow all City or County Ordinances. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County a Traffic Safety Plan for any lane closures or detours planned. No work shall begin until all the permits and requirements have been approved or obtained.

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Remediation Well Construction-Injection - 1 Wells

Driller: RSI Drilling - Lic #: 802334 - Method: hstem

**Work Total: \$265.00**

### Specifications

Permit #	Issued Date	Expire Date	Owner Well Id	Hole Diam.	Casing Diam.	Seal Depth	Max. Depth
W2009-0642	07/16/2009	11/03/2009	AS-1	6.00 in.	1.00 in.	15.00 ft	20.00 ft

### Specific Work Permit Conditions

1. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost, liability in connection with or resulting from the exercise of this Permit including, but not limited to, properly damage, personal injury and wrongful death.
2. Permittee, permittee's contractors, consultants or agents shall be responsible to assure that all material or waters generated during drilling, boring destruction, and/or other activities associated with this Permit will be safely handled, properly managed, and disposed of according to all applicable federal, state, and local statutes regulating such. In no case shall these materials and/or waters be allowed to enter, or potentially enter, on or off-site storm sewers, dry wells, or waterways or be allowed to move off the property where work is being completed.
3. Compliance with the well-sealing specifications shall not exempt the well-sealing contractor from complying with appropriate State reporting-requirements related to well construction or destruction (Sections 13750 through 13755 (Division 7, Chapter 10, Article 3) of the California Water Code). Contractor must complete State DWR Form 188 and mail original to the Alameda County Public Works Agency, Water Resources Section, within 60 days. Including permit

## Alameda County Public Works Agency - Water Resources Well Permit

number and site map.

4. Applicant shall submit the copies of the approved encroachment permit to this office within 60 days.
  5. Applicant shall contact Vicky Hamlin for an inspection time at 510-670-5443 or email to vickyh@acpwa.org at least five (5) working days prior to starting, once the permit has been approved. Confirm the scheduled date(s) at least 24 hours prior to drilling.
  6. Minimum seal depth (Neat Cement Seal) is 2 feet below ground surface (BGS).
  7. Minimum surface seal thickness is two inches of cement grout placed by tremie
  8. Copy of approved drilling permit must be on site at all times. Failure to present or show proof of the approved permit application on site shall result in a fine of \$500.00.
  9. Prior to any drilling activities onto any public right-of-ways, it shall be the applicants responsibilities to contact and coordinate a Underground Service Alert (USA), obtain encroachment permit(s), excavation permit(s) or any other permits required for that City or to the County and follow all City or County Ordinances. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County a Traffic Safety Plan for any lane closures or detours planned. No work shall begin until all the permits and requirements have been approved or obtained.
-

## **APPENDIX B**

Boring Logs

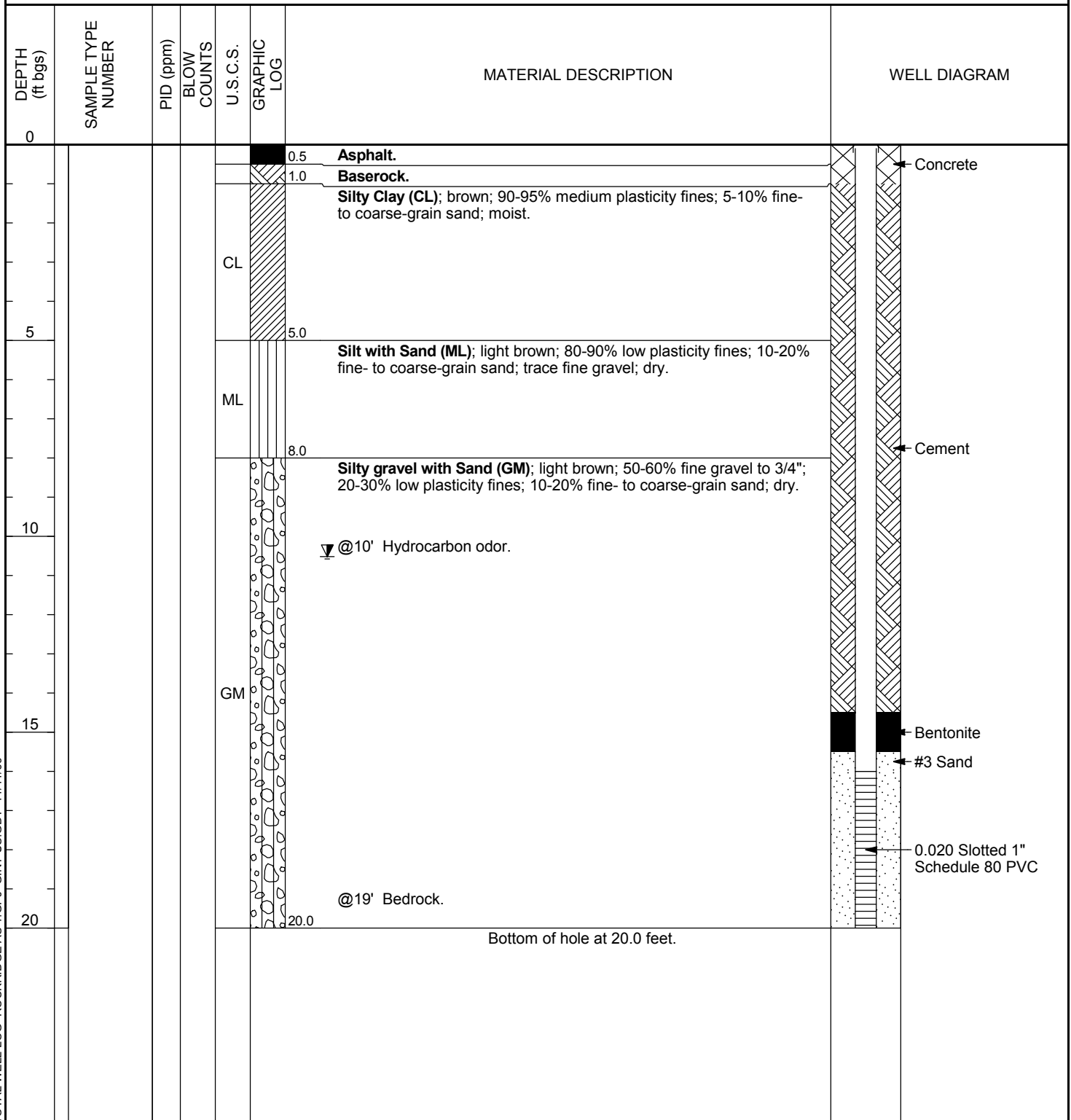


Pangea Environmental Services, Inc.  
 1710 Franklin Street Suite 200  
 Oakland, CA 94612

# WELL NUMBER AS-1

PAGE 1 OF 1

<b>CLIENT</b> <u>Feiner</u>	<b>PROJECT NAME</b> <u>Rockridge Heights</u>
<b>PROJECT NUMBER</b> <u>1145.001</u>	<b>PROJECT LOCATION</b> <u>5175 Broadway</u>
<b>DATE STARTED</b> <u>8/19/09</u> <b>COMPLETED</b> <u>8/20/09</u>	<b>GROUND ELEVATION</b> _____ <b>HOLE SIZE</b> <u>6"</u>
<b>DRILLING CONTRACTOR</b> <u>RSI</u>	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> <u>Hollow Stem Auger - 6"</u>	<b>AT TIME OF DRILLING</b> <u>---</u>
<b>LOGGED BY</b> <u>Morgan Gillies</u> <b>CHECKED BY</b> <u>Bob Clark-Riddell</u>	<b>AT END OF DRILLING</b> <u>---</u>
<b>NOTES</b> <u>Logged from cuttings.</u>	<b>4hrs AFTER DRILLING</b> <u>10.5 ft</u>



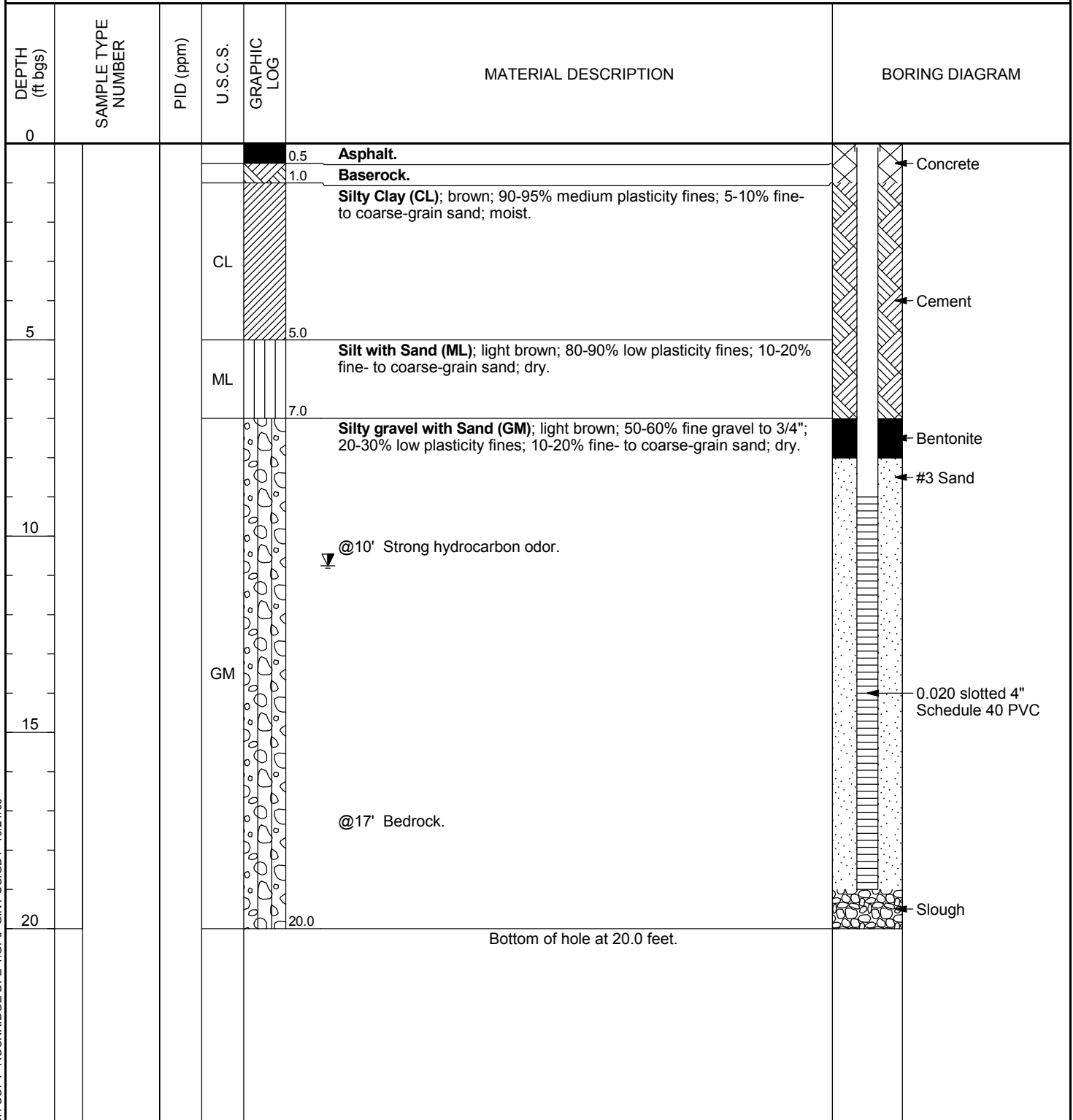
TOTAL WELL LOG ROCKRIDGE AS-1.GPJ GINT US GDT 11/11/09



Pangea Environmental Services, Inc.  
 1710 Franklin Street Suite 200  
 Oakland, CA 94612

# BORING NUMBER DPE-1

<b>CLIENT</b> Feiner	<b>PROJECT NAME</b> Rockridge Heights
<b>PROJECT NUMBER</b> 1145.001	<b>PROJECT LOCATION</b> 5175 Broadway
<b>DATE STARTED</b> 8/19/09	<b>COMPLETED</b> 8/20/09
<b>DRILLING CONTRACTOR</b> RSI	<b>GROUND ELEVATION</b> _____
<b>DRILLING METHOD</b> Hollow Stem Auger - 10"	<b>HOLE SIZE</b> 10"
<b>LOGGED BY</b> Morgan Gillies	<b>CHECKED BY</b> Bob Clark-Riddell
<b>NOTES</b> Logged from cuttings.	<b>GROUND WATER LEVELS:</b>
	<b>AT TIME OF DRILLING</b> ---
	<b>AT END OF DRILLING</b> ---
	<b>8.5hrs AFTER DRILLING</b> 10.8 ft



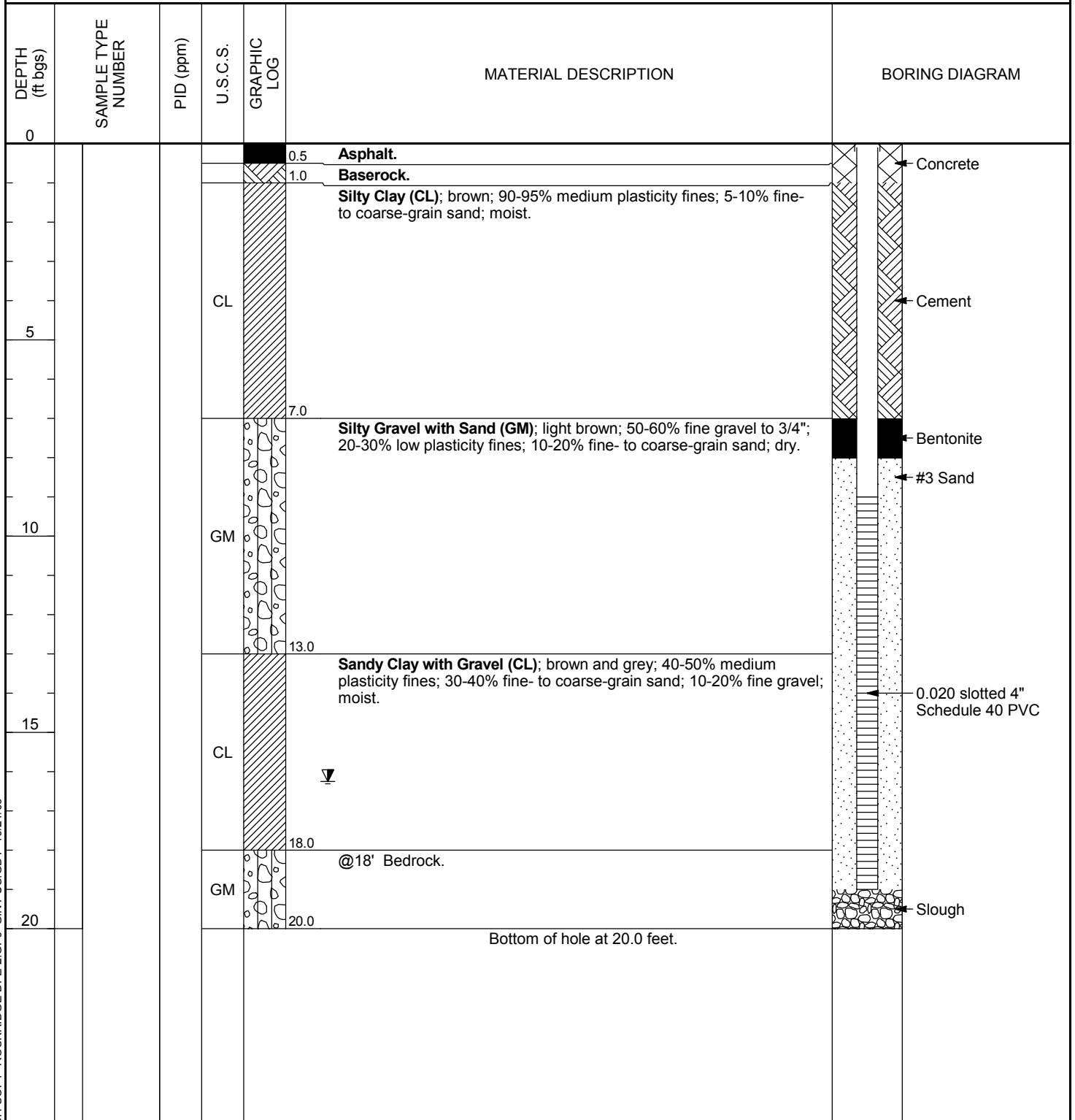
BH COPY ROCKRIDGE DPE-1.GPJ GINT US.GDT 10/21/09



Pangea Environmental Services, Inc.  
 1710 Franklin Street Suite 200  
 Oakland, CA 94612

# BORING NUMBER DPE-2

<b>CLIENT</b> <u>Feiner</u>	<b>PROJECT NAME</b> <u>Rockridge Heights</u>
<b>PROJECT NUMBER</b> <u>1145.001</u>	<b>PROJECT LOCATION</b> <u>5175 Broadway</u>
<b>DATE STARTED</b> <u>8/19/09</u> <b>COMPLETED</b> <u>8/20/09</u>	<b>GROUND ELEVATION</b> _____ <b>HOLE SIZE</b> <u>10"</u>
<b>DRILLING CONTRACTOR</b> <u>RSI</u>	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> <u>Hollow Stem Auger - 10"</u>	<b>AT TIME OF DRILLING</b> <u>---</u>
<b>LOGGED BY</b> <u>Morgan Gillies</u> <b>CHECKED BY</b> <u>Bob Clark-Riddell</u>	<b>AT END OF DRILLING</b> <u>---</u>
<b>NOTES</b> <u>Logged from cuttings.</u>	<b>4hrs AFTER DRILLING</b> <u>16.3 ft</u>



BH COPY ROCKRIDGE DPE-2.GPJ GINT US.GDT 10/21/09

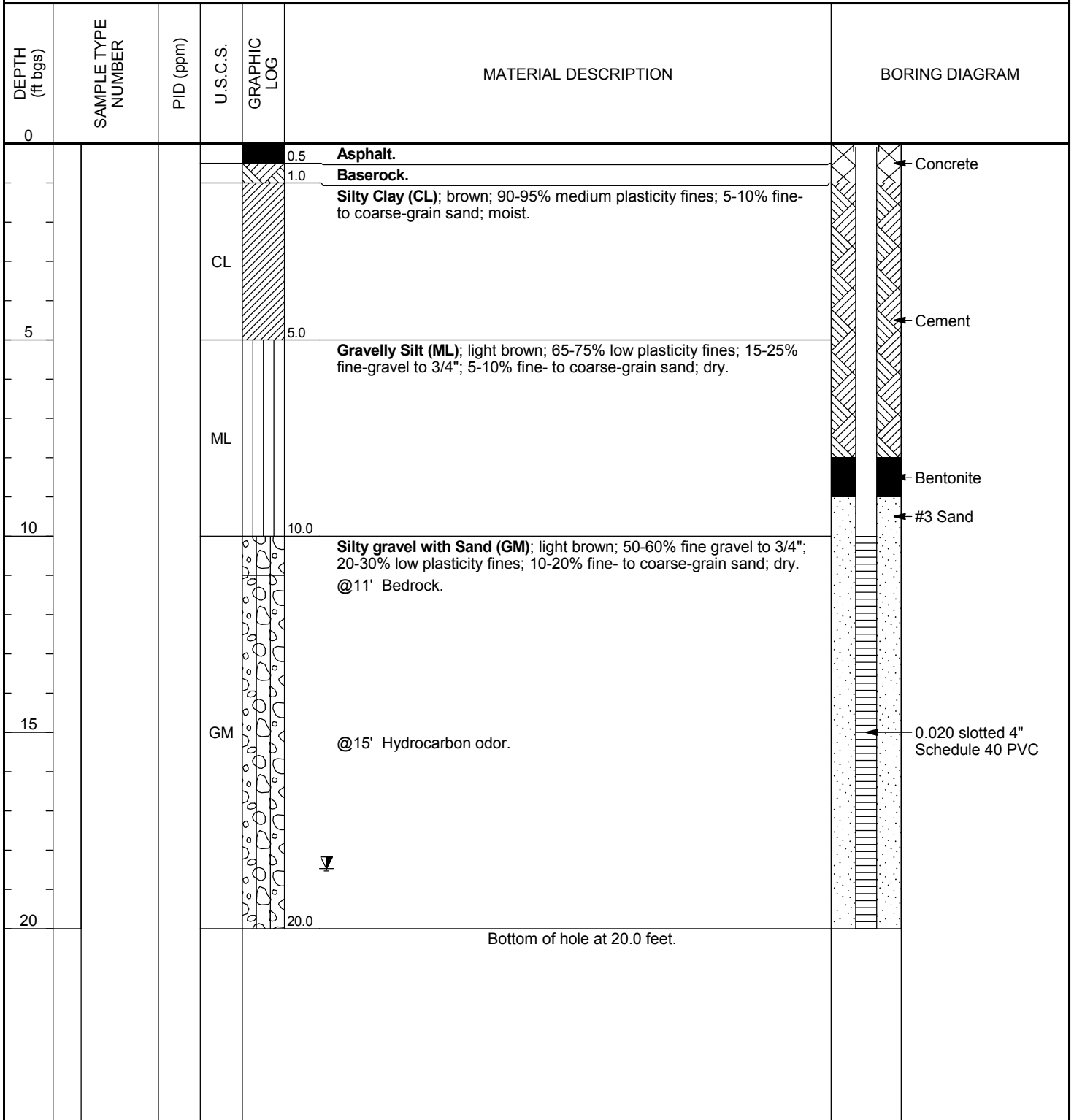




Pangea Environmental Services, Inc.  
 1710 Franklin Street Suite 200  
 Oakland, CA 94612

# BORING NUMBER DPE-3

<b>CLIENT</b> <u>Feiner</u>	<b>PROJECT NAME</b> <u>Rockridge Heights</u>
<b>PROJECT NUMBER</b> <u>1145.001</u>	<b>PROJECT LOCATION</b> <u>5175 Broadway</u>
<b>DATE STARTED</b> <u>8/19/09</u> <b>COMPLETED</b> <u>8/20/09</u>	<b>GROUND ELEVATION</b> _____ <b>HOLE SIZE</b> <u>10"</u>
<b>DRILLING CONTRACTOR</b> <u>RSI</u>	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> <u>Hollow Stem Auger - 10"</u>	<b>AT TIME OF DRILLING</b> <u>---</u>
<b>LOGGED BY</b> <u>Morgan Gillies</u> <b>CHECKED BY</b> <u>Bob Clark-Riddell</u>	<b>AT END OF DRILLING</b> <u>---</u>
<b>NOTES</b> <u>Logged from cuttings.</u>	<b>2.5hrs AFTER DRILLING</b> <u>18.5 ft</u>



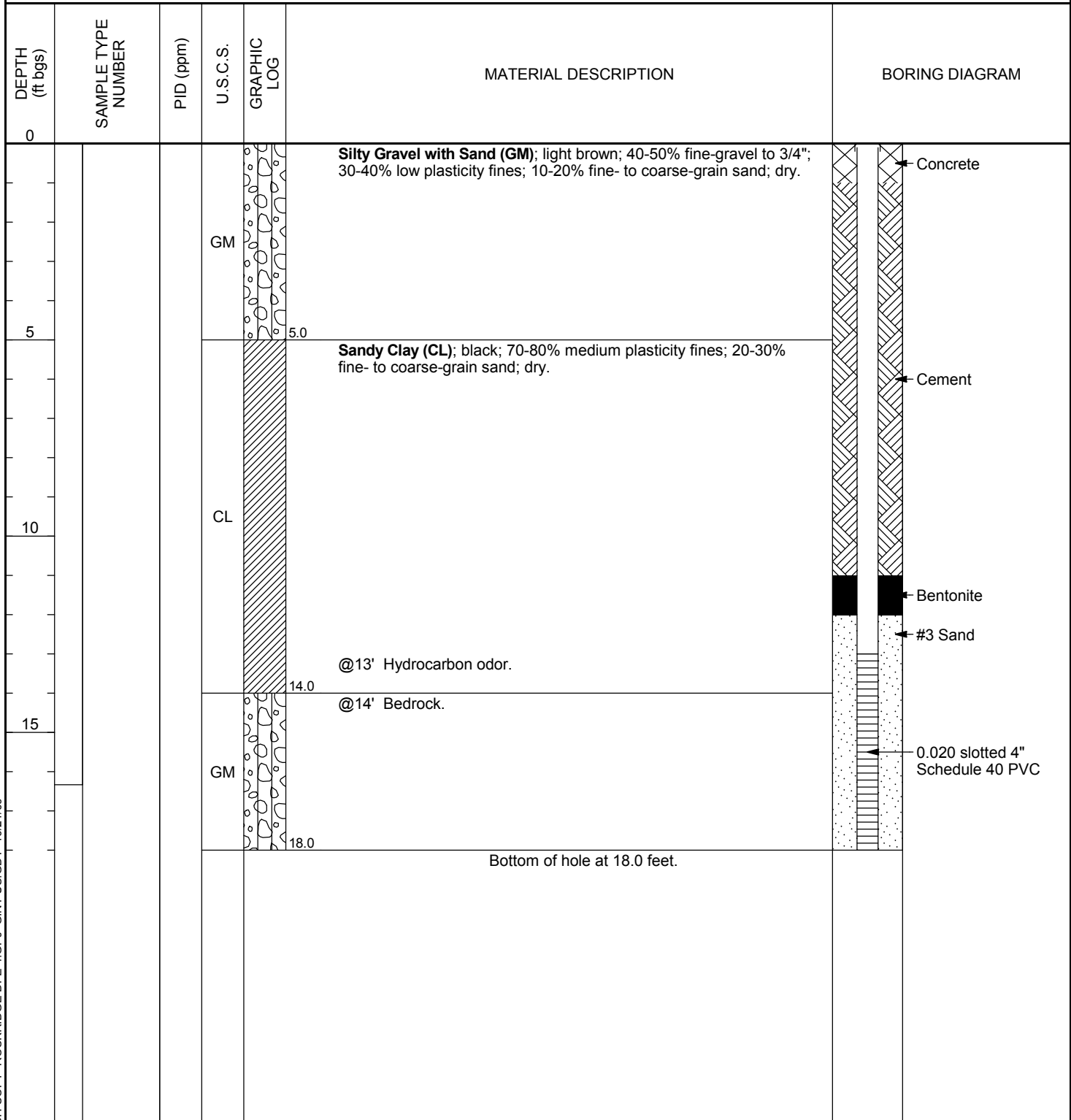
BH COPY ROCKRIDGE DPE-3.GPJ GINT US.GDT 10/21/09



Pangea Environmental Services, Inc.  
 1710 Franklin Street Suite 200  
 Oakland, CA 94612

# BORING NUMBER DPE-4

<b>CLIENT</b> <u>Feiner</u>	<b>PROJECT NAME</b> <u>Rockridge Heights</u>
<b>PROJECT NUMBER</b> <u>1145.001</u>	<b>PROJECT LOCATION</b> <u>5175 Broadway</u>
<b>DATE STARTED</b> <u>8/19/09</u> <b>COMPLETED</b> <u>8/20/09</u>	<b>GROUND ELEVATION</b> _____ <b>HOLE SIZE</b> <u>10"</u>
<b>DRILLING CONTRACTOR</b> <u>RSI</u>	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> <u>Hollow Stem Auger - 10"</u>	<b>AT TIME OF DRILLING</b> <u>---</u>
<b>LOGGED BY</b> <u>Morgan Gillies</u> <b>CHECKED BY</b> <u>Bob Clark-Riddell</u>	<b>AT END OF DRILLING</b> <u>---</u>
<b>NOTES</b> <u>Logged from cuttings. Concrete cored.</u>	<b>AFTER DRILLING</b> <u>---</u>



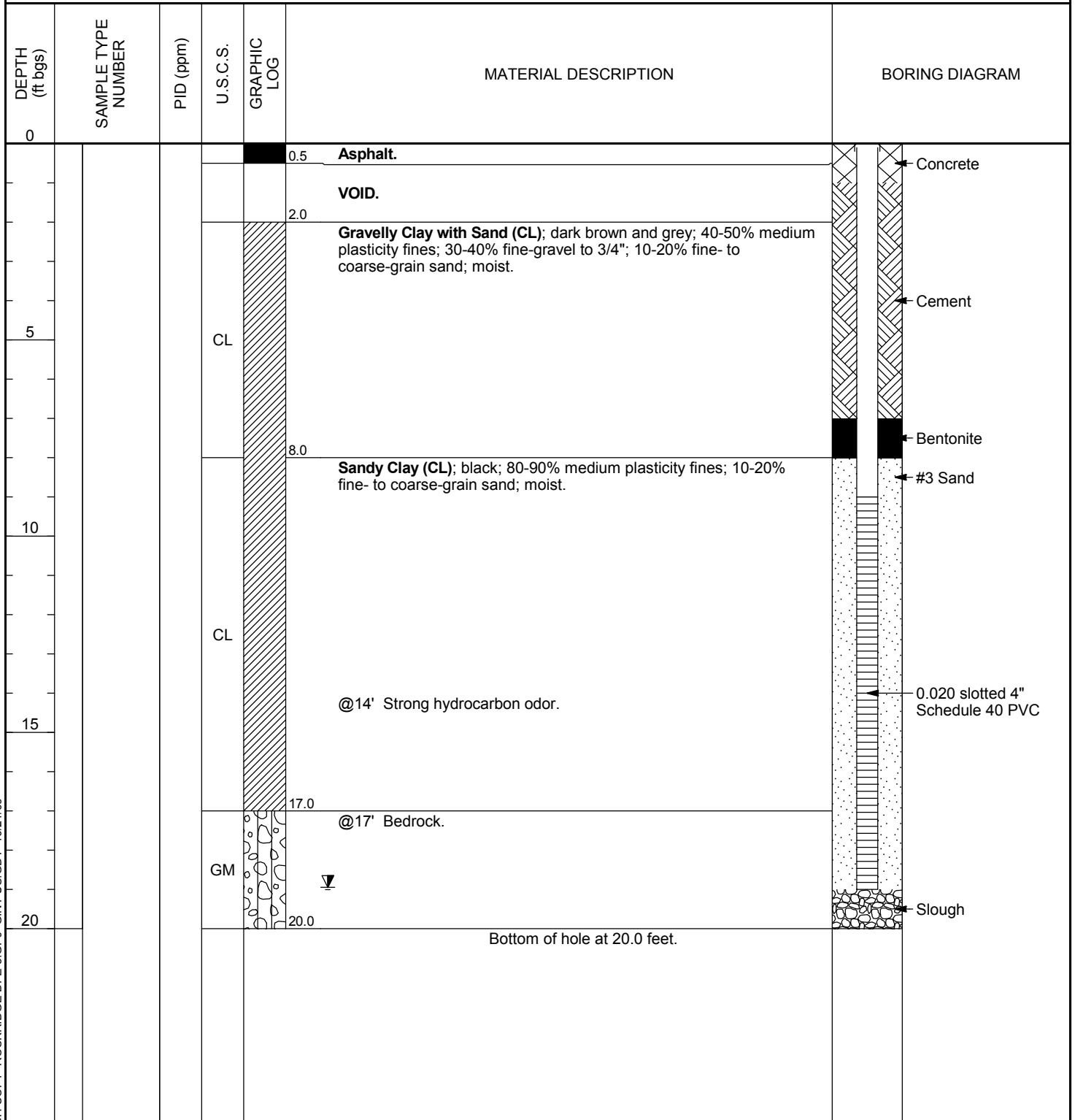
BH COPY ROCKRIDGE DPE-4.GPJ GINT US.GDT 10/21/09



Pangea Environmental Services, Inc.  
 1710 Franklin Street Suite 200  
 Oakland, CA 94612

# BORING NUMBER DPE-5

<b>CLIENT</b> <u>Feiner</u>	<b>PROJECT NAME</b> <u>Rockridge Heights</u>
<b>PROJECT NUMBER</b> <u>1145.001</u>	<b>PROJECT LOCATION</b> <u>5175 Broadway</u>
<b>DATE STARTED</b> <u>8/19/09</u> <b>COMPLETED</b> <u>8/20/09</u>	<b>GROUND ELEVATION</b> _____ <b>HOLE SIZE</b> <u>10"</u>
<b>DRILLING CONTRACTOR</b> <u>RSI</u>	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> <u>Hollow Stem Auger - 10"</u>	<b>AT TIME OF DRILLING</b> <u>---</u>
<b>LOGGED BY</b> <u>Morgan Gillies</u> <b>CHECKED BY</b> <u>Bob Clark-Riddell</u>	<b>AT END OF DRILLING</b> <u>---</u>
<b>NOTES</b> <u>Logged from cuttings.</u>	<b>2hrs AFTER DRILLING</b> <u>19.0 ft</u>



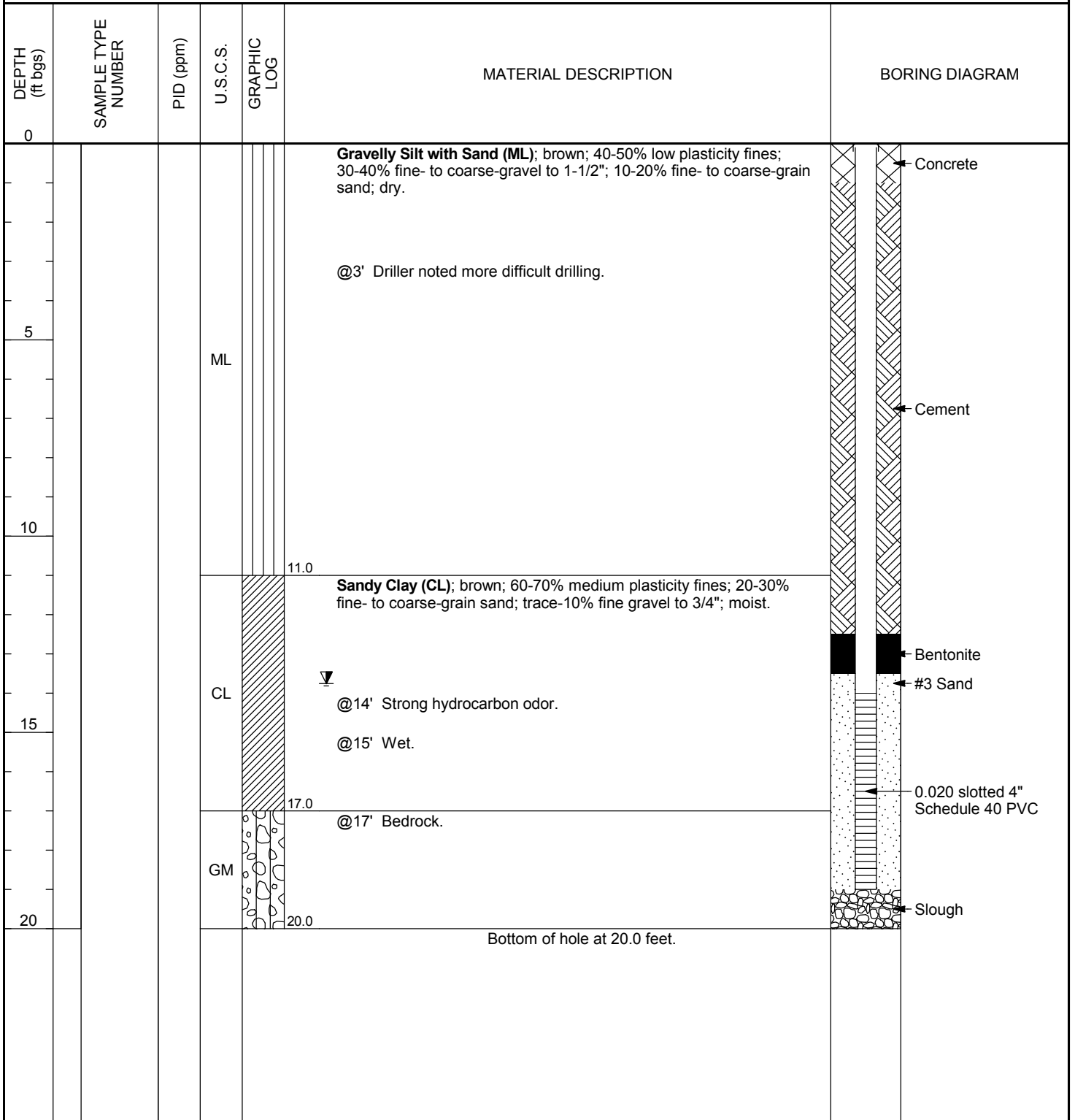
BH COPY ROCKRIDGE DPE-5.GPJ GINT US.GDT 10/21/09



Pangea Environmental Services, Inc.  
 1710 Franklin Street Suite 200  
 Oakland, CA 94612

# BORING NUMBER DPE-6

<b>CLIENT</b> <u>Feiner</u>	<b>PROJECT NAME</b> <u>Rockridge Heights</u>
<b>PROJECT NUMBER</b> <u>1145.001</u>	<b>PROJECT LOCATION</b> <u>5175 Broadway</u>
<b>DATE STARTED</b> <u>8/19/09</u> <b>COMPLETED</b> <u>8/20/09</u>	<b>GROUND ELEVATION</b> _____ <b>HOLE SIZE</b> <u>10"</u>
<b>DRILLING CONTRACTOR</b> <u>RSI</u>	<b>GROUND WATER LEVELS:</b>
<b>DRILLING METHOD</b> <u>Hollow Stem Auger - 10"</u>	<b>AT TIME OF DRILLING</b> <u>---</u>
<b>LOGGED BY</b> <u>Morgan Gillies</u> <b>CHECKED BY</b> <u>Bob Clark-Riddell</u>	<b>AT END OF DRILLING</b> <u>---</u>
<b>NOTES</b> <u>Logged from cuttings.</u>	<b>6hrs AFTER DRILLING</b> <u>13.8 ft</u>



BH COPY ROCKRIDGE DPE-6.GPJ GINT US.GDT 10/21/09

## **APPENDIX C**

Standard Operating Procedures

## STANDARD FIELD PROCEDURES FOR SOIL BORINGS

This document describes Pangea Environmental Services' standard field methods for drilling and sampling soil borings. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

### Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate ground water depth and quality, and to submit samples for chemical analysis.

### Soil Classification/Logging

All soil samples are classified according to the Unified Soil Classification System by a trained geologist, scientist or engineer working under the supervision of a California Registered Engineer, California Registered Geologist (RG) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

- Principal and secondary grain size category (i.e. sand, silt, clay or gravel)
- Approximate percentage of each grain size category,
- Color,
- Approximate water or product saturation percentage,
- Observed odor and/or discoloration,
- Other significant observations (i.e. cementation, presence of marker horizons, mineralogy), and
- Estimated permeability.

### Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or hydraulic-push technologies. At least one and one half ft of the soil column is collected for every five ft of drilled depth. Additional soil samples are collected near the water table and at lithologic changes. With hollow-stem drilling, samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments beyond the bottom of the borehole. With hydraulic-push drilling, samples are typically collected using acetate liners. The vertical location of each soil sample is determined by measuring the distance from the middle of the soil sample tube to the end of the drive rod used to advance the split barrel sampler. All sample depths use the ground surface immediately adjacent to the boring as a datum. The horizontal location of each boring is measured in the field from an onsite permanent reference using a measuring wheel or tape measure.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

### Sample Storage, Handling and Transport

Sampling tubes or cut acetate liners chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

## **Field Screening**

Soil samples collected during drilling will be analyzed in the field for ionizable organic compounds using a photo-ionization detector (PID) with a 10.2 eV lamp. The screening procedure will involve placing an undisturbed soil sample in a sealed container (either a zip-lock bag, glass jar, or a capped soil tube). The container will be set aside, preferably in the sun or warm location. After approximately fifteen minutes, the head space within the container will be tested for total organic vapor, measured in parts per million on a volume to volume basis (ppmv) by the PID. The PID instrument will be calibrated prior to boring using hexane or isobutylene. PID measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

## **Water Sampling**

Water samples collected from borings are either collected from the open borehole, from within screened PVC inserted into the borehole, or from a driven Hydropunch-type sampler. Groundwater is typically extracted using a bailer, check valve and/or a peristaltic pump. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory.

Pangea often performs electrical conductivity (EC) logging and/or continuous coring to identify potential water-bearing zones. Hydropunch-type sampling is then performed to provide discrete-depth grab groundwater sampling within potential water-bearing zones for vertical contaminant delineation. Hydropunch-type sampling typically involves driving a cylindrical sheath of hardened steel with an expendable drive point to the desired depth within undisturbed soil. The sheath is retracted to expose a stainless steel or PVC screen that is sealed inside the sheath with Neoprene O-rings to prevent infiltration of formation fluids until the desired depth is attained. The groundwater is extracted using tubing inserted down the center of the rods into the screened sampler.

## **Duplicates and Blanks**

Blind duplicate water samples are usually collected only for monitoring well sampling programs, at a rate of one blind sample for every 10 wells sampled. Laboratory-supplied trip blanks accompany samples collected for all sampling programs to check for cross-contamination caused by sample handling and transport. These trip blanks are analyzed if the internal laboratory QA/QC blanks contain the suspected field contaminants. An equipment blank may also be analyzed if non-dedicated sampling equipment is used.

## **Grouting**

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

## **Waste Handling and Disposal**

Soil cuttings from drilling activities are usually stockpiled onsite on top of and covered by plastic sheeting. At least four individual soil samples are collected from the stockpiles for later compositing at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Ground water removed during sampling and/or rinsate generated during decontamination procedures are stored onsite in sealed 55 gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Disposal of the water is based on the analytic results for the well samples. The water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.

## **STANDARD FIELD PROCEDURES FOR MONITORING WELLS**

This document describes Pangea Environmental Services' standard field methods for drilling, installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

### **Well Construction and Surveying**

Groundwater monitoring wells are installed in soil borings to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 feet below and 5 feet above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three feet thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two feet thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I, II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security. The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

### **Well Development**

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. Wells may be surged prior to installation of the well seal to ensure that there are no voids in the sand pack. Development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

### **Groundwater Sampling**

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.



## **APPENDIX D**

Well Development and Sampling Field Data Sheets

**MONITORING FIELD DATA SHEET**

Well ID: **AS-1**

Project.Task #: 1145.001 220      Project Name: Feiner - 5175 Broadway

Address: 5175 Broadway Oakland, CA

Date: ~~9/17/09~~ **10/13/09**

Weather: **Sunny**

Well Diameter: **1"**

Volume/ft.    1" = 0.04    3" = 0.37    6" = 1.47  
2" = 0.16    4" = 0.65    radius<sup>2</sup> \* 0.163

Total Depth (TD): **19.45**

Depth to Product:

Depth to Water (DTW): **11.38**

Product Thickness:

Water Column Height: **8.07**

1 Casing Volume: **0.32** gallons

Reference Point: TOC

**10** Casing Volumes: **3.2** gallons

Purging Device: ~~Disposable Bailer, 3" PVC Bailer, Parallel Pump, Wash Pump~~ **check valve tubing**


Sampling Device: Disposable Bailer

Time	Temp (°C)	pH	Cond (µs)	NTU	DO(mg/L)	ORP (mV)	Vol(gal)	DTW
6:30								
6:50								11.46
6:52	18.4	7.35	1067	very silty dark brown			0.5	14.10
6:54	18.6	7.31	1094	" " " "			1.0	15.70
6:56	18.9	7.55	1094	" " " "			1.5	15.90
7:00								15.61
7:20								13.11
7:22	18.8	7.30	1070	very silty dark brown			2.0	14.19
7:24	19.2	7.31	1112	" " " "			2.5	14.90
7:26	19.4	7.31	1133	" " " "			3.0	14.97
7:30								

Comments: YSI 550A DO meter

pre purge DO =      mg/l

post purge DO =      mg/l

Sample ID:	Sample Time:
Laboratory: McCampbell Analytical, INC. <b>see pg 2</b>	Sample Date: 9/ /09
Containers/Preservative: Voa/HCl, Amber Liter/HCl	
Analyzed for: 8015, 8021	
Sampler Name: Sanjiv Gill	Signature: 

**MONITORING FIELD DATA SHEET**

Well ID: **AS-1**


Project.Task #: 1145.001 220		Project Name: Feiner - 5175 Broadway	
Address: 5175 Broadway Oakland, CA			
Date: <del>9/17/09</del> 10/13/09		Weather: Sunny	
Well Diameter: 1"		Volume/ft. 1" = 0.04 3" = 0.37 6" = 1.47 2" = 0.16 4" = 0.65 radius <sup>2</sup> * 0.163	
Total Depth (TD): 19.45		Depth to Product:	
Depth to Water (DTW): 11.38		Product Thickness:	
Water Column Height: 8.07		1 Casing Volume: 0.32 gallons	
Reference Point: TOC		10 Casing Volumes: 3.2 gallons	

Purging Device: ~~Disposable Bailer~~ ~~6" PVC Bailer~~ ~~Peristaltic Pump~~ ~~Wing Pump~~ check valve tubing

Sampling Device: Disposable Bailer

Time	Temp (°C)	pH	Cond (µs)	NTU	DO(mg/L)	ORP (mV)	Vol(gal)	DTW
7:45		Began purge						12.96
7:47	19.9	7.29	1136	turbid, slightly brown			3.5	13.11
7:49	19.9	7.24	1143	slightly turbid			4.0	13.74
7:51	19.7	7.21	1159	"	"		4.5	13.95
7:53	19.9	7.24	1164	"	"		5.0	13.99
Had bottom development completed 10/13/09								
								DTW = 19.46

Comments: YSI 550A DO meter pre purge DO = mg/l  
post purge DO = mg/l


Sample ID: <b>AS-1</b>	Sample Time: 9:40
Laboratory: McCampbell Analytical, INC.	Sample Date: <del>9/17/09</del> 10/4/09
Containers/Preservative: Voa/HCl, Amber Liter/HCl	
Analyzed for: 8015, 8021	
Sampler Name: Sanjiv Gill	Signature: 

**MONITORING FIELD DATA SHEET**

Well ID: **DPE-1**

Project.Task #: 1145.001 220			Project Name: Feiner - 5175 Broadway						
Address: 5175 Broadway Oakland, CA									
Date: <del>9/17/09</del> 10/3/04			Weather: <b>Sunny</b>						
Well Diameter: 4"			Volume/ft. 1" = 0.04 3" = 0.37 6" = 1.47 2" = 0.16 4" = 0.65 radius <sup>2</sup> * 0.163						
Total Depth (TD): 19.45			Depth to Product:						
Depth to Water (DTW): 10.39			Product Thickness:						
Water Column Height: 9.06			1 Casing Volume: 5.88 gallons						
Reference Point: TOC			10 Casing Volumes: 58.8 gallons						
Purging Device: <del>Disposable Bailer, 3" PVC Bailer, Peristaltic Pump</del> <b>Whal Pump</b>									
Sampling Device: Disposable Bailer									
Time	Temp @	pH	Cond (µs)	NTU	DO(mg/L)	ORP (mV)	Vol(gal)	DTW	
8:00	surged								
8:20	Began purge							10.42	
8:23	23.4	8.69	2043	dark brown silt, odor			6	10.97	
8:26	23.1	7.90	2110	" " "			12	16.11	
8:27	Dewatered			silty brown, odor			14	Dewatered	
1:25	surged							18.96	
1:40	purge		Dewatered		silty brown, odor		16	Dewatered	
1:58	No recharge hard bottom development complete 10/3/04								
								DTW = 19.45	

Comments: YSI 550A DO meter pre purge DO = mg/l  
post purge DO = mg/l

Sample ID: <b>DPE-1</b>	Sample Time: <b>9:45</b>
Laboratory: McCampbell Analytical, INC.	Sample Date: <del>9/17/09</del> 10/4/09
Containers/Preservative: Voal/HCl, Amber Liter/HCl	
Analyzed for: 8015, 8021	
Sampler Name: Sanjiv Gill	Signature: 

**MONITORING FIELD DATA SHEET**

Well ID: **DPE-2**

Project.Task #: 1145.001 220 Project Name: Feiner - 5175 Broadway

Address: 5175 Broadway Oakland, CA

Date: ~~9/17/09~~ 10/3/09

Weather: **Sunny**

Well Diameter: 4"

Volume/ft. 1" = 0.04 3" = 0.37 6" = 1.47  
2" = 0.16 4" = 0.65 radius \* 0.163

Total Depth (TD): 19.49

Depth to Product:

Depth to Water (DTW): 11.27

Product Thickness:

Water Column Height: 8.22

1 Casing Volume: 5.34 gallons

Reference Point: TOC

10 Casing Volumes: 53.4 gallons

Purging Device: ~~Disposable Bailer, 3" PVC Bailer, Peristaltic Pump, Whal Pump~~


Sampling Device: Disposable Bailer

Time	Temp (°C)	pH	Cond (µs)	NTU	DO(mg/L)	ORP (mV)	Vol(gal)	DTW
8:40								
9:05								11.36
9:08	23.0	9.13	2298	very turbid, brown, silty			5	14.61
9:11	21.6	8.20	2530	brown, less silty			10	16.11
9:12							13	Dewatered
2:15								17.61
2:30								
2:32	22.1	8.19	2170	brown, silty			16.5	19.02
2:33							17.0	Dewatered
3:09								No recharge hard bottom development completed 10/3/09 DTB = 19.50

Comments: YSI 550A DO meter

pre purge DO = mg/l

post purge DO = mg/l


Sample ID: <b>DPE-2</b>	Sample Time: 9:55
Laboratory: McCampbell Analytical, INC.	Sample Date: <del>9/17/09</del> <del>10/6/09</del> 10/4/09
Containers/Preservative: Voa/HCl, Amber Liter/HCl	
Analyzed for: 8015, 8021	
Sampler Name: Sanjiv Gill	Signature: 

**MONITORING FIELD DATA SHEET**

Well ID: DPE-3

Project.Task #: 1145.001 220				Project Name: Feiner - 5175 Broadway				
Address: 5175 Broadway Oakland, CA								
Date: <del>9/17/09</del> 10/3/09				Weather: <u>Sunny</u>				
Well Diameter: <u>4"</u>				Volume/ft. <u>1" = 0.04</u> <u>3" = 0.37</u> <u>6" = 1.47</u> <u>2" = 0.16</u> <u>4" = 0.65</u> radius <sup>2</sup> * 0.163				
Total Depth (TD): <u>19.50</u>				Depth to Product:				
Depth to Water (DTW): <u>11.98</u>				Product Thickness:				
Water Column Height: <u>7.52</u>				1 Casing Volume: <u>4.88</u>		gallons		
Reference Point: TOC				10 Casing Volumes: <u>48.8</u>		gallons		
Purging Device: Disposable Bailer, <del>3" PVC Bailer</del> , <del>Peristaltic Pump</del> , <u>Whal Pump</u>								
Sampling Device: Disposable Bailer								
Time	Temp (°C)	pH	Cond (µs)	NTU	DO(mg/L)	ORP (mV)	Vol(gal)	DTW
9:35								
9:55								11.96
9:58	20.0	8.82	2237	dark grey silty			5	13.10
10:01	20.1	8.60	2142	dark grey silty			10	17.91
10:02							11	De-watered
2:45								17.10
3:05								
3:07				grey silty			14	De-watered
3:35	No recharge hard bottom development completed 10/3/09							DTB = 19.50

Comments: YSI 550A DO meter pre purge DO = mg/l  
post purge DO = mg/l

Sample ID: <u>DPE-3</u>	Sample Time: <u>10:05</u>
Laboratory: McCampbell Analytical, INC.	Sample Date: <del>10/3/09</del> <u>10/4/09</u>
Containers/Preservative: Voa/HCl, Amber Liter/HCl	
Analyzed for: 8015, 8021	
Sampler Name: Sanjiv Gill	Signature: 

## MONITORING FIELD DATA SHEET

Well ID: DPE-41

Project Task #: 1145.001 220				Project Name: Feiner - 5175 Broadway									
Address: 5175 Broadway Oakland, CA													
Date: <del>9/17/09</del> <u>10/3/09</u>				Weather: <u>Sunny</u>									
Well Diameter: <u>4"</u>		Volume/ft. <table border="1"> <tr> <td>1" = 0.04</td> <td>3" = 0.37</td> <td>6" = 1.47</td> </tr> <tr> <td>2" = 0.16</td> <td>4" = 0.65</td> <td>radius** 0.163</td> </tr> </table>						1" = 0.04	3" = 0.37	6" = 1.47	2" = 0.16	4" = 0.65	radius** 0.163
1" = 0.04	3" = 0.37	6" = 1.47											
2" = 0.16	4" = 0.65	radius** 0.163											
Total Depth (TD): <u>16.89</u>				Depth to Product:									
Depth to Water (DTW): <u>11.49</u>				Product Thickness:									
Water Column Height: <u>5.40</u>				1 Casing Volume: <u>3.51</u>		gallons							
Reference Point: TOC				10 Casing Volumes: <u>35.1</u>		gallons							
Purging Device: <u>Disposable Bailer</u> , <u>3" PVC Bailer</u> , <u>Peristaltic Pump</u> , <u>Whal Pump</u>													
Sampling Device: Disposable Bailer													
Time	Temp (°C)	pH	Cond (µs)	NTU	DO (mg/L)	ORP (mV)	Vol (gal)	DTW					
<u>10:25</u>		<u>Surge</u>											
<u>10:50</u>		<u>Began purge</u>						<u>11.52</u>					
<u>10:53</u>	<u>21.9</u>	<u>7.83</u>	<u>2579</u>	<u>dark brown silt</u>			<u>3.5</u>	<u>13.70</u>					
<u>10:56</u>	<u>21.6</u>	<u>7.80</u>	<u>2470</u>	<u>clear</u>			<u>7.0</u>	<u>14.46</u>					
<u>10:58</u>		<u>Dewatered</u>					<u>7.5</u>	<u>Dewatered</u>					
<u>3:15</u>		<u>Surged</u>						<u>15.10</u>					
<u>3:36</u>		<u>purged</u>											
<u>3:37</u>		<u>Dewatered</u>		<u>clear</u>			<u>8.0</u>	<u>dewatered</u>					
<u>4:00</u>		<u>No recharged hard bottom well developed</u>						<u>10/3/09</u>					
								<u>DTB = 16.91</u>					

Comments: YSI 550A DO meter      pre purge DO =      mg/l  
 post purge DO =      mg/l

Sample ID: <u>DPE-41</u>	Sample Time: <u>10:25</u>
Laboratory: McCampbell Analytical, INC.	Sample Date: <del>9/17/09</del> <u>10/4/09</u>
Containers/Preservative: <u>Voal/HCl, Amber Liter/HCl</u>	
Analyzed for: <u>8015, 8021</u>	
Sampler Name: <u>Sanjiv Gill</u>	Signature:



## MONITORING FIELD DATA SHEET


Well ID: **DPE-5**

Project.Task #: 1145.001 220				Project Name: Feiner - 5175 Broadway				
Address: 5175 Broadway Oakland, CA								
Date: <del>01/17/09</del> 10/3/09				Weather: Sunny				
Well Diameter: 4"		Volume/ft.		1" = 0.04		3" = 0.37		
				2" = 0.16		4" = 0.65		
				radius <sup>2</sup> * 0.163				
Total Depth (TD): 19.50				Depth to Product:				
Depth to Water (DTW): 14.60				Product Thickness:				
Water Column Height: 4.90				1 Casing Volume: 3.18		gallons		
Reference Point: TOC				10 Casing Volumes: 31.8		gallons		
Purging Device: Disposable Bailer, 2" PVC Bailer, Peristaltic Pump, (Whal Pump)								
Sampling Device: Disposable Bailer								
Time	Temp ©	pH	Cond (µs)	NTU	DO(mg/L)	ORP (mV)	Vol(gal)	DTW
11:30	Surge							
11:50	Began purge							14.64
11:53	19.9	7.79	2015	dark black silty			3	17.56
11:56	19.8	7.70	2010	clear			6	19.01
11:59	Dewatered						6.5	Dewatered
3:50	Surged							17.19
4:05	purge							
4:06	19.9	7.64	1940	black silty			9	18.78
4:07	Dewatered			clear			9.5	Dewatered
4:39	No recharge hard bottom well developed						10/3/09	DTB = 19.50

Comments: YSI 550A DO meter

pre purge DO = mg/l

post purge DO = mg/l

Sample ID: <b>DPE-5</b>	Sample Time: 10:15
Laboratory: McCampbell Analytical, INC.	Sample Date: <del>01/17/09</del> 10/4/09
Containers/Preservative: Voa/HCl, Amber Liter/HCl	
Analyzed for: 8015, 8021	
Sampler Name: Sanjiv Gill	Signature: 




## MONITORING FIELD DATA SHEET

Well ID: **DPE-6**

Project.Task #: 1145.001 220		Project Name: Feiner - 5175 Broadway						
Address: 5175 Broadway Oakland, CA								
Date: <del>9/17/09</del> 10/3/09		Weather: Sunny						
Well Diameter: 4"		Volume/ft. $\frac{1"}{2} = 0.04$ $\frac{3"}{2} = 0.37$ $\frac{6"}{2} = 1.47$ $\frac{2"}{2} = 0.16$ $\frac{4"}{2} = 0.65$ radius <sup>2</sup> * 0.163						
Total Depth (TD): 19.90		Depth to Product:						
Depth to Water (DTW): 11.14		Product Thickness:						
Water Column Height: 8.76		1 Casing Volume: 5.69 gallons						
Reference Point: TOC		10 Casing Volumes: 56.9 gallons						
Purging Device: Disposable Bailer, <del>3" PVC Bailer</del> , <del>Elastaffic Pump</del> , Whal Pump								
Sampling Device: Disposable Bailer								
Time	Temp (°C)	pH	Cond (µs)	NTU	DO (mg/L)	ORP (mV)	Vol (gal)	DTW
12:25								
12:50								11.07
12:53	21.0	8.47	1450	dark grey			5.5	11.95
12:56	21.3	8.4	1491	clear			11.0	15.70
12:59				silty grey			12.0	Dewater
4:20								17.40
4:40								
4:42				silty grey			15.0	Dewater
5:10				No recharge hard bottom well developed 10/3/09				
								DTB = 19.91

Comments: YSI 550A DO meter pre purge DO = mg/l  
post purge DO = mg/l

Sample ID: <b>DPE-6</b>	Sample Time: <b>10:35</b>
Laboratory: McCampbell Analytical, INC.	Sample Date: <del>9/17/09</del> 10/4/09
Containers/Preservative: Voa/HCl, Amber Liter/HCl	
Analyzed for: 8015, 8021	
Sampler Name: Sanjiv Gill	Signature: 

## **APPENDIX E**

Laboratory Analytical Report



**McC Campbell Analytical, Inc.**

"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701  
Web: www.mcccampbell.com E-mail: main@mcccampbell.com  
Telephone: 877-252-9262 Fax: 925-252-9269

Pangea Environmental Svcs., Inc.  1710 Franklin Street, Ste. 200  Oakland, CA 94612	Client Project ID: #1145.001; Feiner-5175 Broadway	Date Sampled: 10/04/09
	Client Contact: Erica Ray	Date Received: 10/05/09
	Client P.O.:	Date Reported: 10/09/09
		Date Completed: 10/09/09

**WorkOrder: 0910099**

October 09, 2009

Dear Erica:

Enclosed within are:

- 1) The results of the **7** analyzed samples from your project: **#1145.001; Feiner-5175 Broadway,**
- 2) A QC report for the above samples,
- 3) A copy of the chain of custody, and
- 4) An invoice for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing

McC Campbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius  
Laboratory Manager  
McC Campbell Analytical, Inc.

0910099

**McCAMPBELL ANALYTICAL, INC.**

110 2<sup>nd</sup> AVENUE SOUTH, #D7  
PACHECO, CA 94553-5560

Website: [www.mccampbell.com](http://www.mccampbell.com) Email: [main@mccampbell.com](mailto:main@mccampbell.com)  
Telephone: (925) 798-1620 Fax: (925) 798-1622

**CHAIN OF CUSTODY RECORD**

TURN AROUND TIME

RUSH 24 HR 48 HR 72 HR 5 DAY

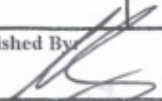
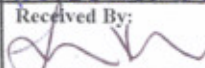
EDF Required?  Goelt (Normal) No Write On (DW) No

Report To: Erica Ray Bill To: Pangea Environmental  
Company: Pangea Environmental Services, Inc.  
1710 Franklin Street, Suite 200  
Oakland, CA 94612 E-Mail: [eray@pangeaenv.com](mailto:eray@pangeaenv.com)  
Tele: 510-836-3702 Fax: (510) 836-3709  
Project #: 1145.001 Project Name: Feiner - 5175 Broadway  
Project Location: 5175 Broadway, Oakland, CA  
Sampler Signature: Muskan Environmental Sampling

Analysis Request Other Comments

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING		# Containers	Type Containers	MATRIX					METHOD PRESERVED				BTEX & TPH as Gas (602/8020 + 8015)/MTBE	TPH as Diesel (8015)	Total Petroleum Oil & Grease (5520 E&F/R&F)	Total Petroleum Hydrocarbons (418.1)	EPA 601 / 8010 / 8021	BTEX ONLY (EPA 602 / 8020)	EPA 608 / 8081	EPA 608 / 8082 PCB'S ONLY	EPA 8140 / 8141	EPA 8150 / 8151	EPA 524.2 / 624 / 8260	EPA 525 / 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals (6010 / 6020)	LUFT 5 Metals (6010 / 6020)	Lead (200.8 / 200.9 / 6010)	Filter Samples for Metals analysis: Yes / No				
		Date	Time			Water	Soil	Air	Sludge	Other	ICE	HCL	HNO <sub>3</sub>	Other																					
ASH		10-4-09	9:40	3	VOA	X					X	X																							
DPE-1			9:45																																
DPE-2			9:55																																
DPE-3			10:05																																
DPE-4			10:25																																
DPE-5			10:15																																
DPE-6		X	10:35	X	X	X					X	X																							

DPE-1 to DPE-6

Relinquished By:  Date: 10-4-09 Time: 14:00 Received By: Brandon Emirotech RC  
Relinquished By: Emirotech RC Date: 10/31/09 Time: 7:50pm Received By: 

ICE# 30105 COMMENTS:  
GOOD CONDITION ✓  
HEAD SPACE ABSENT ✓  
DECHLORINATED IN LAB ✓  
APPROPRIATE CONTAINERS ✓  
PRESERVED IN LAB ✓  
VOAS O&G METALS OTHER  
PRESERVATION pH<2

# McC Campbell Analytical, Inc.



1534 Willow Pass Rd  
Pittsburg, CA 94565-1701  
(925) 252-9262

# CHAIN-OF-CUSTODY RECORD

WorkOrder: 0910099

ClientCode: PEO

WaterTrax   
  WriteOn   
  EDF   
  Excel   
  Fax   
  Email   
  HardCopy   
  ThirdParty   
  J-flag

**Report to:**

Erica Ray  
Pangea Environmental Svcs., Inc.  
1710 Franklin Street, Ste. 200  
Oakland, CA 94612  
(510) 836-3700    FAX (510) 836-3709

Email: eray@pangeaenv.com  
cc:  
PO:  
ProjectNo: #1145.001; Feiner-5175 Broadway

**Bill to:**

Bob Clark-Riddell  
Pangea Environmental Svcs., Inc.  
1710 Franklin Street, Ste. 200  
Oakland, CA 94612

**Requested TAT: 5 days**

**Date Received: 10/05/2009**

**Date Printed: 10/05/2009**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)												
					1	2	3	4	5	6	7	8	9	10	11	12	
0910099-001	AS-1	Water	10/4/2009 9:40	<input type="checkbox"/>	A	A											
0910099-002	DPE-1	Water	10/4/2009 9:45	<input type="checkbox"/>	A												
0910099-003	DPE-2	Water	10/4/2009 9:55	<input type="checkbox"/>	A												
0910099-004	DPE-3	Water	10/4/2009 10:05	<input type="checkbox"/>	A												
0910099-005	DPE-4	Water	10/4/2009 10:25	<input type="checkbox"/>	A												
0910099-006	DPE-5	Water	10/4/2009 10:15	<input type="checkbox"/>	A												
0910099-007	DPE-6	Water	10/4/2009 10:35	<input type="checkbox"/>	A												

**Test Legend:**

1	G-MBTEX_W	2	PREDF REPORT	3		4		5	
6		7		8		9		10	
11		12							

**Prepared by: Samantha Arbuckle**

**Comments:**

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).  
Hazardous samples will be returned to client or disposed of at client expense.



**Sample Receipt Checklist**

Client Name: **Pangea Environmental Svcs., Inc.**

Date and Time Received: **10/5/2009 7:16:34 PM**

Project Name: **#1145.001; Feiner-5175 Broadway**

Checklist completed and reviewed by: **Samantha Arbuckle**

WorkOrder N°: **0910099** Matrix Water

Carrier: EnviroTech (RC)

**Chain of Custody (COC) Information**

- Chain of custody present? Yes  No
- Chain of custody signed when relinquished and received? Yes  No
- Chain of custody agrees with sample labels? Yes  No
- Sample IDs noted by Client on COC? Yes  No
- Date and Time of collection noted by Client on COC? Yes  No
- Sampler's name noted on COC? Yes  No

**Sample Receipt Information**

- Custody seals intact on shipping container/cooler? Yes  No  NA
- Shipping container/cooler in good condition? Yes  No
- Samples in proper containers/bottles? Yes  No
- Sample containers intact? Yes  No
- Sufficient sample volume for indicated test? Yes  No

**Sample Preservation and Hold Time (HT) Information**

- All samples received within holding time? Yes  No
- Container/Temp Blank temperature Cooler Temp: 3°C NA
- Water - VOA vials have zero headspace / no bubbles? Yes  No  No VOA vials submitted
- Sample labels checked for correct preservation? Yes  No
- Metal - pH acceptable upon receipt (pH<2)? Yes  No  NA
- Samples Received on Ice? Yes  No

(Ice Type: WET ICE )

\* NOTE: If the "No" box is checked, see comments below.

-----

Client contacted:

Date contacted:

Contacted by:

Comments:



# McC Campbell Analytical, Inc.

"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701  
Web: www.mcccampbell.com E-mail: main@mcccampbell.com  
Telephone: 877-252-9262 Fax: 925-252-9269

Pangea Environmental Svcs., Inc.  1710 Franklin Street, Ste. 200  Oakland, CA 94612	Client Project ID: #1145.001; Feiner-5175 Broadway	Date Sampled: 10/04/09
	Client Contact: Erica Ray	Date Received: 10/05/09
	Client P.O.:	Date Extracted: 10/07/09
		Date Analyzed: 10/07/09

## Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE\*

Extraction method: SW5030B

Analytical methods: SW8021B/8015Bm

Work Order: 0910099

Lab ID	Client ID	Matrix	TPH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS	Comments
001A	AS-1	W	ND	ND	3.6	ND	ND	ND	1	103	
002A	DPE-1	W	1600	ND<35	210	4.4	5.1	34	2	102	d1
003A	DPE-2	W	8000	ND<250	590	220	92	760	50	103	d1
004A	DPE-3	W	49,000	ND<2500	3600	4400	1300	6500	20	100	d1,b6
005A	DPE-4	W	31,000	ND<1200	1200	2900	530	4700	10	90	d1
006A	DPE-5	W	2900	ND<50	78	71	29	260	10	108	d1
007A	DPE-6	W	1800	ND	6.7	5.2	2.6	34	1	97	d1

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	50	5.0	0.5	0.5	0.5	0.5	µg/L
	S	1.0	0.05	0.005	0.005	0.005	0.005	mg/Kg

\* water and vapor samples are reported in ug/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts in mg/L.

# cluttered chromatogram; sample peak coelutes w/surrogate peak; low surrogate recovery due to matrix interference.

+The following descriptions of the TPH chromatogram are cursory in nature and McC Campbell Analytical is not responsible for their interpretation:

b6) lighter than water immiscible sheen/product is present  
d1) weakly modified or unmodified gasoline is significant



**QC SUMMARY REPORT FOR SW8021B/8015Bm**

W.O. Sample Matrix: Water

QC Matrix: Water

BatchID: 46233

WorkOrder: 0910099

EPA Method SW8021B/8015Bm		Extraction SW5030B							Spiked Sample ID: 0910066-003A			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
TPH(btex) <sub>f</sub>	ND	60	113	119	4.95	113	117	2.98	70 - 130	20	70 - 130	20
MTBE	ND	10	119	117	1.82	119	118	0.819	70 - 130	20	70 - 130	20
Benzene	ND	10	109	108	1.58	104	107	3.40	70 - 130	20	70 - 130	20
Toluene	ND	10	96.7	94.9	1.83	90.6	93.4	3.03	70 - 130	20	70 - 130	20
Ethylbenzene	ND	10	96.7	96.1	0.677	92.4	95.2	3.00	70 - 130	20	70 - 130	20
Xylenes	ND	30	109	109	0	104	107	2.76	70 - 130	20	70 - 130	20
%SS:	105	10	101	102	1.45	98	101	2.66	70 - 130	20	70 - 130	20

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:  
NONE

BATCH 46233 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
0910099-001A	10/04/09 9:40 AM	10/07/09	10/07/09 7:35 PM	0910099-002A	10/04/09 9:45 AM	10/07/09	10/07/09 10:34 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

£ TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content, or inconsistency in sample containers.





**QC SUMMARY REPORT FOR SW8021B/8015Bm**

W.O. Sample Matrix: Water

QC Matrix: Water

BatchID: 46263

WorkOrder: 0910099

EPA Method SW8021B/8015Bm		Extraction SW5030B							Spiked Sample ID: 0910152-002A			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
TPH(btex) <sup>f</sup>	ND	60	107	105	2.35	106	111	4.31	70 - 130	20	70 - 130	20
MTBE	ND	10	94.9	96.6	1.82	93.7	96.4	2.86	70 - 130	20	70 - 130	20
Benzene	ND	10	91	95.8	4.90	93.3	94.7	1.42	70 - 130	20	70 - 130	20
Toluene	ND	10	89.5	94.5	5.14	93.8	95.3	1.55	70 - 130	20	70 - 130	20
Ethylbenzene	ND	10	93.3	98.2	5.12	92.4	94.6	2.32	70 - 130	20	70 - 130	20
Xylenes	ND	30	94.7	99.8	5.19	94.8	97.2	2.49	70 - 130	20	70 - 130	20
%SS:	101	10	98	100	1.93	99	98	1.10	70 - 130	20	70 - 130	20

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:  
NONE

BATCH 46263 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
0910099-003A	10/04/09 9:55 AM	10/07/09	10/07/09 12:49 AM	0910099-004A	10/04/09 10:05 AM	10/07/09	10/07/09 1:19 AM
0910099-005A	10/04/09 10:25 AM	10/07/09	10/07/09 1:49 AM	0910099-006A	10/04/09 10:15 AM	10/07/09	10/07/09 2:48 AM
0910099-007A	10/04/09 10:35 AM	10/07/09	10/07/09 11:03 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 \* (MS-Sample) / (Amount Spiked); RPD = 100 \* (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

£ TPH(btex) = sum of BTEX areas from the FID.

# cluttered chromatogram; sample peak coelutes with surrogate peak.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix interference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content, or inconsistency in sample containers.