Mr. Lee Douglas
Douglas Parking Company
1721 Webster Street
Oakland, California 94612

Ms. Barbara Jakub
Alameda County Environmental Health
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502-6577

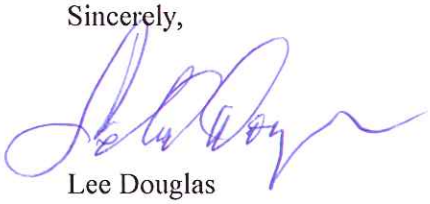
Re: Douglas Parking Company
1721 Webster Street
Oakland, California
ACEH File No. 129

Dear Ms. Jakub:

I, Mr. Lee Douglas, have retained Pangea Environmental Services, Inc. (Pangea) as the environmental consultant for the project referenced above. Pangea is submitting the attached report on my behalf.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached report are true and correct to the best of my knowledge.

Sincerely,



Lee Douglas

January 22, 2014

VIA ALAMEDA COUNTY FTP SITE

Ms. Dilan Roe
Alameda County Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Re: **Data Gap Site Assessment Report**
Douglas Parking Company
1721 Webster Street
Oakland, California
ACEH File No. 129

Dear Ms. Roe:

On behalf of Douglas Parking Company, Pangea Environmental Services, Inc. (Pangea) has prepared this *Data Gap Site Assessment Report* for the subject site. This report documents implementation of the *Revised Data Gap Workplan* dated July 25, 2013 and the *Addendum to Revised Data Gap Workplan* dated October 21, 2013, which were approved in a September 13, 2013 Alameda County Environmental Health (ACEH) letter and an October 16, 2013 email. As requested by ACEH, this report includes an updated site conceptual model (SCM) in tabular format describing major SCM elements and potential data gaps.

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

Sincerely,
Pangea Environmental Services, Inc.

Bob Clark-Riddell, P.E.
Principal Engineer

Attachment: *Data Gap Site Assessment Report*

cc: Mr. Lee Douglas, Douglas Parking Company, 1721 Webster Street, Oakland, California 94612
SWRCB Geotracker Database (electronic copy)

DATA GAP SITE ASSESSMENT REPORT

Douglas Parking Company
1721 Webster Street
Oakland, California
ACEH File No. 129

January 22, 2014

Prepared for:

Mr. Lee Douglas
1721 Webster Street
Oakland, California 94612

Prepared by:

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

Written by:

REGISTERED PROFESSIONAL ENGINEER
ROBERT G. CLARK-RIDDELL
No. C 049629
Exp. SEPT 2014
CIVIL
STATE OF CALIFORNIA

Tina de la Fuente
Project Scientist

Bob Clark-Riddell, P.E.
Principal Engineer

INTRODUCTION

On behalf of Douglas Parking Company, Pangea Environmental Services, Inc. (Pangea) has prepared this *Data Gap Site Assessment Report* for the subject site. This report documents implementation of the *Revised Data Gap Workplan* (Workplan) dated July 25, 2013 and the *Addendum to Revised Data Gap Workplan* (Addendum) dated October 21, 2013, which were approved in the September 13, 2013 Alameda County Environmental Health (ACEH) letter and an October 16, 2013 email. The purpose of this investigation was to evaluate site conditions with respect to criteria of the Low Threat Closure Policy (LTCP) adopted by the State Water Resources Control Board. As requested by ACEH, this report includes an updated site conceptual model (SCM) in tabular format describing major SCM elements and potential data gaps (Appendix A).

SITE BACKGROUND

Site Description

The site is currently being utilized as a parking garage, and is located between 17th and 19th Streets in downtown Oakland, California, approximately four miles east of San Francisco Bay and one quarter mile west of Lake Merritt (Figure 1). The site is relatively flat with an elevation of approximately 30 feet (ft) above mean sea level (msl).

Several former underground storage tank (UST) sites are located close to the site, including Prentiss Properties to the northeast at 1750 Webster Street, a former gas station to the east at 1700 Webster, and a former Chevron service station which is located approximately 400 feet to the southwest on the corner of 17th Street and Harrison Street.

On August 3 and 6, 1992, Parker Environmental Services removed one 1,000-gallon and two 500-gallon gasoline underground storage tanks (USTs) from the site. Up to 1,500 milligrams per kilogram (mg/kg) total petroleum hydrocarbons as gasoline (TPHg) and up to 12 mg/kg benzene were detected in the soil samples collected from the UST excavation.

Several investigations have been completed at the site. On July 8 and September 8, 1994, Gen Tech/Piers Environmental, Inc. (Gen Tech) of San Jose, California drilled six exploratory borings and installed three groundwater monitoring wells (MW-1 through MW-3). In February and May 1996, Cambria Environmental Technology (Cambria) of Emeryville, California advanced seven geoprobe soil borings and installed two groundwater monitoring wells (MW-4 and MW-5). On August 8, 2000, *Conduit Study and File Review Report* was submitted by Cambria Environmental Technology. The report provided significant information about offsite hydrocarbon impact and offsite sources, and concluded that there were no identified conduits for contaminant migration in groundwater. On June 27, 2003 Cambria installed two additional offsite monitoring wells (MW-6 and MW-7) to facilitate additional plume delineation.

Limited site remediation has been conducted at the site. In January 1998, Cambria installed ORC socks in well MW-2 to enhance the natural attenuation of dissolved-phase hydrocarbons. Dissolved oxygen (DO) concentrations temporarily increased in well MW-2 following the ORC sock installation. In February and March 1999, a total of 120 gallons of 7.5% hydrogen peroxide solution was added into monitoring wells MW-2 and MW-3 to oxidize hydrocarbons and also increase DO levels to enhance biodegradation of dissolved-phase hydrocarbons. The hydrogen peroxide *temporarily* increased groundwater DO levels, but hydrocarbon concentrations remained at elevated levels.

On March 4, 2003, Cambria installed a co-axial air sparging/soil vapor extraction well (SV-1/AS-1) and two angled air sparging wells (AS-2 and AS-3) to approximately 30 ft below grade surface (bgs). The wells were installed to facilitate feasibility testing and future site remediation. Site remediation via soil vapor extraction and air sparging began in October 2007. To improve system performance and further evaluate site conditions, Pangea submitted an *Investigation and Remediation Workplan* dated March 5, 2009, which proposed additional investigation, remediation system expansion, and evaluation of groundwater geochemistry.

On November 19, 2010, ACEH issued a letter requesting a cross section, additional information regarding a potential offsite source and a preferential pathway survey. In December 2010, Pangea informed the ACEH that significant information about the offsite hydrocarbon impact was presented in the August 8, 2000 *Conduit Study and File Review Report* prepared by Cambria. In December 2010, the UST Cleanup Fund prepared a 5 Year Review that recommended a site conceptual model (SCM), risk assessment, and sensitive receptor survey to help facilitate selection of an enhanced remediation technique. In a letter dated June 17, 2011, ACEH requested a site conceptual model with a preferential pathway evaluation. Pangea submitted a *Sensitive Receptor Survey, Conduit Study and Site Conceptual Model* (SCM) dated March 26, 2012. In a letter dated December 21, 2012, ACEH requested a workplan for vapor intrusion evaluation and investigation of potential secondary source near well MW-2. Pangea submitted the requested *Workplan for Additional Assessment and Soil Gas Sampling* on April 4, 2013. In a meeting on May 28, 2013, ACEH identified media-specific criteria data gaps related to the State Water Resources Control Board's Low Threat Closure Policy. Following the meeting, ACEH requested a revised workplan to address these data gaps. Pangea subsequently submitted the *Revised Data Gap Workplan* dated July 25, 2013 and the *Addendum to Revised Data Gap Workplan* dated October 21, 2013.

CONFIRMATION SOIL BORINGS

The purpose of the confirmation soil borings was to evaluate soil concentrations near the previously collected UST confirmation samples. The confirmation borings included soil sampling from two soil borings (CB-1 and CB-2). The confirmation borings locations are shown on Figures 2 and 3.

Pre-Drilling Activities

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

Drilling Procedures

All soil borings were installed in general accordance with the procedures described in Pangea's Workplan and Addendum. Pangea retained Confluence Environmental Field Services (Confluence) of Sacramento, California, to install the borings. The drilling was observed in the field by Pangea Project Manager Morgan Gillies, and supervised by Bob Clark-Riddell, a California Registered Civil Professional Engineer (P.E.).

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

Boring Activities

On December 10, 2013, Pangea coordinated the installation of the confirmation borings using hand auger techniques. The soil borings were advanced and sampled in general accordance with Pangea's Standard Field Procedures for Hand Auger Soil Borings in Appendix C. Boring CB-1 was installed to a total depth of approximately 12 ft below grade surface and boring CB-2 was installed at angle of approximately 25˚ from vertical towards the southeast (Webster Street) to approximately 9.0 ft bgs (10 ft long). Boring CB-2 was angled to allow for soil assessment between the two former excavation areas; more specifically, assessment was performed between former UST confirmation samples T1 and SW2 (Figure 3). Pangea was unable to install boring CB-2 vertically between these former sampling locations due to subgrade concrete in the proposed location (SVE/AS-1 well vault) and utilities located in the sidewalk. Confirmation soil boring locations are shown of Figures 2 and 3. Boring logs are included in Appendix D.

Sample Analyses

Soil samples were collected for analysis from boring CB-1 at approximately 4, 8 and 12 ft bgs, and from boring CB-2 at the approximate vertical depths of 3.5, 7, and 8.5 ft bgs. All soil samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) by EPA Method 8015Cm; and benzene, toluene, ethylbenzene, xylenes (BTEX), methyl tertiary butyl ether (MTBE), and naphthalene by EPA Method 8260B. All samples were shipped under chain of custody to McCampbell Analytical, Inc., of Pittsburg, California, a California-certified laboratory. The laboratory analytical reports are included in Appendix F.

Site Geology and Hydrogeology

Soil from site borings consisted primarily of sand to a depth of approximately 3 ft bgs, underlain by silty clay or sandy clay to the maximum explored depth of 12 ft bgs. Soils encountered during this shallow investigation are consistent with those encountered in previous borings.

Based off previous investigations, unconfined groundwater conditions exist at the site. A shallow water-bearing zone consisting of highly permeable sand is present from approximately 14 to 30 feet bgs, and is underlain by a silty clay layer. Groundwater beneath the site generally flows *northwards* to *north-northeastwards*, consistent with the local topography. Since 1994, the depth to groundwater beneath and surrounding the site has ranged from approximately 13.6 feet bgs (MW-5) to 23.6 feet bgs (MW-1), equivalent to a groundwater elevation range from 9 to 11 feet above msl over nineteen years of monitoring. For source area well MW-2, groundwater depth has fluctuated approximately three feet, from 17.8 to 20.8 ft bgs (hydrocarbon concentrations generally decrease during low groundwater depth in well MW-2). Therefore, the current soil sampling was within the unsaturated zone soil.

Soil Analytical Results

No contaminant concentrations were detected in any of the soil samples collected from the confirmation borings. Soil sample results indicate that the direct contact and outdoor air criteria of the LTCP have been met. Soil analytical results are summarized in Table 1. The laboratory analytical reports are included in Appendix F.

SUBSLAB GAS SAMPLING

To evaluate shallow subsurface gas conditions below the onsite building and adjacent buildings, Pangea coordinated installation and soil gas sampling from three subslab probe locations (SS-1 through SS-3). The three probes were installed on November 6, 2013. Probes SS-2 and SS-3 were sampled on November 13, 2013 (cold season), but probe SS-1 could not be sampled until November 14, 2013 due to access limitations. Sampling locations SS-1 through SS-3 are shown on Figure 2. Sample depth intervals and subslab gas analytical results are summarized on Table 2.

The subslab gas sampling was conducted in general accordance with procedures described in Pangea's Standard Operating Procedures (SOPs) for Subslab Gas Sampling in Appendix D. Subslab gas probe SS-1 was

installed in the southwest portion of the site inside the building at 1715 Webster Street, near the southwest corner of the former UST excavation. Probe SS-2 was installed in the driveway of the site near the source area and probe SS-3 was installed north of the former USTs in the parking garage structure, near key well MW-2. The soil gas sampling was performed by Pangea Technician Scott Polston and Project Scientist Tina de la Fuente, under the supervision of Pangea's Bob Clark-Riddell, a California Registered Professional Civil Engineer.

The subslab gas probe installation procedure involved using a rotohammer to drill a 1 ½-inch diameter hole part way through the approximately 5-inch (SS-1), 4-inch (SS-2), and 10-inch (SS-3) thick concrete slab of the building, drilling a 5/8-inch diameter hole through the remaining concrete, installing a rubber stopper with stainless steel tubing (capped on one end with a Swagelok fitting) and placing a bentonite seal topped with cement to within an inch of the surface. A second rubber stopper was placed over the subslab probe to protect it and the probes were allowed to equilibrate for one week, prior to sampling.

McCampbell Analytical provided sampling assemblies and certified Summa canisters for sampling. The Summa canisters were supplied under a vacuum of approximately 30 inches of mercury. Prior to sample collection from the probes, vacuum/leak tests were conducted on the sampling assembly with a vacuum pump. The vacuum/leak tests confirmed no leakage and maintained the initial vacuum in the sampling manifold system. After a minimum of 5 minutes of vacuum/leak testing, the vacuum pump was opened to purge the manifold/probe assembly. Upon completion of purging of approximately three times the ambient volume of air in the assembly/probe, the sampling Summa canister was opened for sample collection. The pre-set valve regulated the vapor flow to approximately 150 milliliters of air per minute. After approximately 5 or more minutes, the vacuum within the Summa canisters decreased to or below 5 inches of mercury but not below 3 inches of mercury and the canister valve was closed.

To evaluate potential leakage within the sampling system, a leak-check enclosure was placed over the s*ampling point* and helium was introduced to the leak-check enclosure. A helium detector was used to monitor the concentration of helium within the enclosure during sample collection. The field data sheets are included in Appendix E.

Subslab Vapor Analytical Results

Subslab vapor samples were collected within Summa canisters and submitted for analysis to McCampbell Analytical, Inc., of Pittsburg, California, a State-certified laboratory. Subslab gas samples were analyzed by Total Organics Method 15 (TO-15) for total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, xylenes (BTEX), and naphthalene; and by ASTM D-1946 for percent oxygen and helium. Subslab samples SS-1 and SS-2 were collected from approximately 0.5 ft bgs and subslab sample SS-3 was collected from approximately 0.8 ft bgs. Subslab analytical results and sample depth intervals are summarized on Table 2. The laboratory analytical report is included in Appendix F.

The maximum TPHg concentration detected in soil gas was 2,300 µg/m^3 in subslab probe SS-1. This detection is well below Environmental Screening Levels (ESLs) established by the San Francisco Regional Water Quality Control Board (RWQCB) for shallow soil gas for residential site use (150,000 µg/m^3 TPH) and for commercial site use (1,200,000 µg/m^3 TPH). The maximum benzene concentration detected was 71 µg/m^3 in subslab probe SS-3. This benzene detection is slightly above the residential ESL of 42 µg/m^3, but well below the commercial ESL of 420 µg/m^3 for shallow soil gas. Additionally, benzene was detected in subslab probe SS-2 at a concentration of 58 µg/m^3. The only other hydrocarbon detected in subslab gas was toulene at concentrations of 2.7 µg/m^3 (SS-2) and 2.6 µg/m^3(SS-3). Naphthalene was not detected in any of the subslab samples using Method TO-15.

Oxygen percentage was reported at 16% for subslab probe SS-2 and 17% for probes SS-1 and SS-3. The SWRCB's Low Threat Closure Policy (LTCP), adopted in August 2012, refers to the presence of a bioattenuation zone if oxygen concentrations detected in soil gas ≥4%. *Without* the presence of a bioattenuation zone, applicable LTCP soil gas criteria for benzene is 85 µg/m^3 (residential use) and 280 µg/m^3 (commercial use). *With* the presence of a bioattenuation zone, applicable LTCP soil gas criteria for benzene increases 1,000-fold to 85,000 µg/m^3 (residential) and 280,000 µg/m^3 (commercial use). Benzene concentrations in subslab soil gas were below media-specific LTCP criteria; however, LTCP criteria references soil gas sample collection from 5 ft below a building foundation yet the subslab gas sampling referenced herein was performed directly beneath the slab.

The leak check compound helium was detected in samples SS-1 (0.13%), SS-2 (0.48%) and SS-3 (0.13%). These detections are well below the helium concentrations of 23% to 40% detected in the shroud using the helium meter. All subslab samples appear to be representative of subsurface conditions based on the relatively low concentrations of helium within the samples.

CONCLUSIONS AND RECOMMENDATIONS

Based on the above information, Pangea offers the following conclusions and recommendations:

- The soil and subslab gas assessment indicates that SVE/AS remediation has effectively remove source area source material.

- The non-detect hydrocarbon concentrations in soil samples from the confirmation borings near former the excavation limits and former UST compliance samples suggest that direct contact and outdoor air criteria of the LTCP have been met.

- Hydrocarbon concentrations (TPHg, benzene and toluene) in the cold-season subslab gas samples were below applicable ESLs. Benzene concentrations as high as 71 µg/m^3 (SS-3) in subslab soil gas were below media-specific LTCP criteria; however, LTCP criteria references soil gas sample collection from 5 ft below a building foundation yet the subslab gas sampling referenced herein was

performed directly beneath the slab. This *may* suggest that vapor intrusion does not pose a significant threat to the onsite and adjacent buildings. Indoor air testing could be performed to confirm that benzene concentrations in indoor air near probes SS-2 and SS-3 are below the ESL of 2.1 µg/m^3. This could be considered a potential data gap.

- Based on our data gap evaluation in the revised, tabulated SCM (Appendix A), the only remaining data gap is further evaluation of potential vapor intrusion to indoor air. Therefore, Pangea recommends collection of subslab gas samples during the upcoming warm/dry season of 2014, including naphthalene 'confirmation' analysis from at least one subslab probe using Method TO-17, and possible indoor air testing to confirm that benzene concentrations in indoor air near probes SS-2 and SS-3 are below the ESL of 2.1 µg/m^3.

- Pangea recommends continued semi-annual groundwater monitoring to confirm plume stability during ongoing data gap assessment.

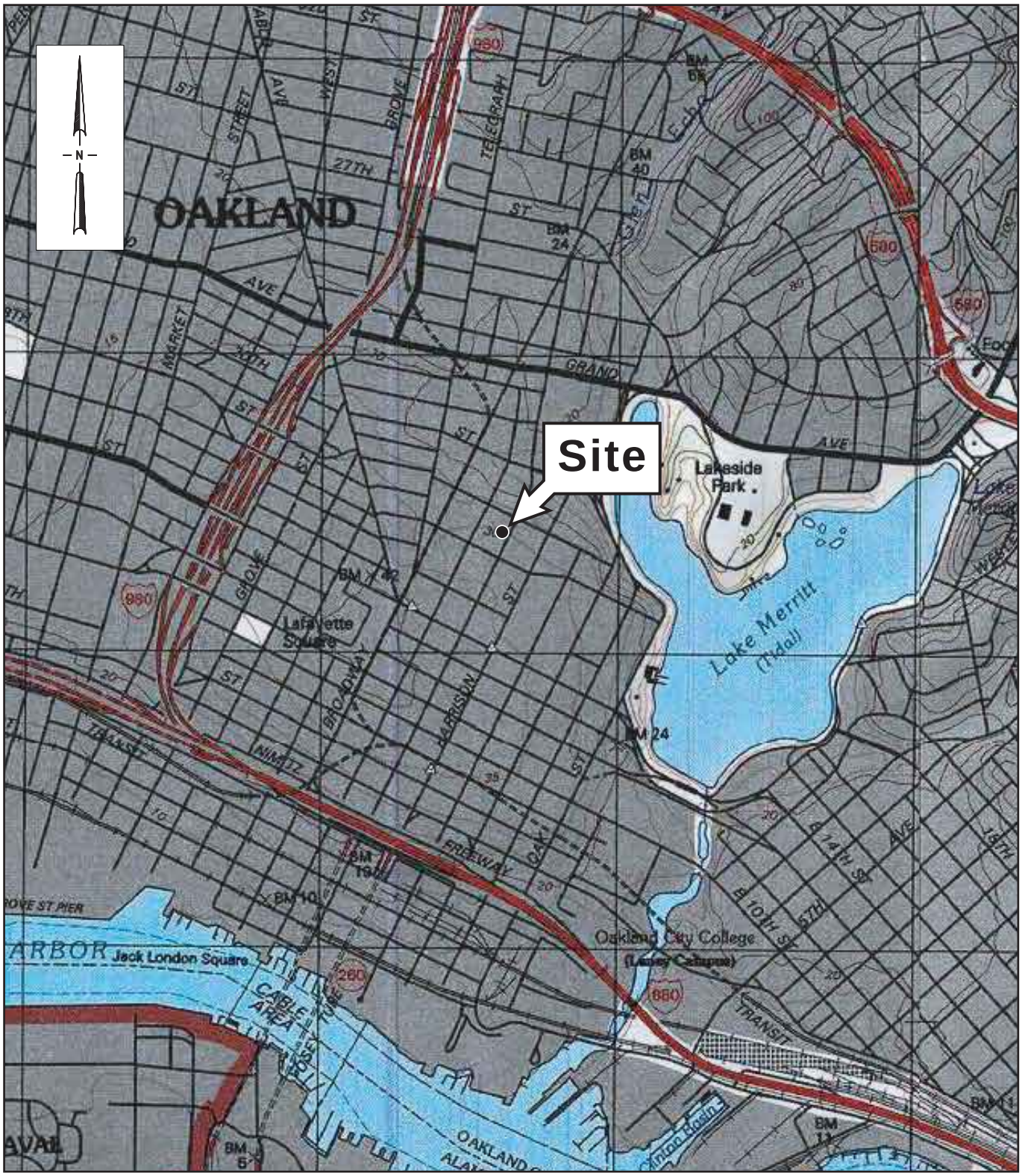
ATTACHMENTS

Figure 1 – Site Location Map
Figure 2 – Boring & Subslab Location Map
Figure 3 - Excavation Samples & Confirmation Borings Location Map

Table 1 – Soil Analytical Data
Table 2 – Subslab Gas Analytical Data

Appendix A – Site Conceptual Model in Tabular Format
Appendix B – Permits
Appendix C – Standard Operating Procedures
Appendix D – Boring Logs
Appendix E - Subslab Sampling Field Data Sheets
Appendix F – Laboratory Analytical Report

10/7/2006



SOURCE: TOPO! MAPS

0 1/8 1/4 1/2 1

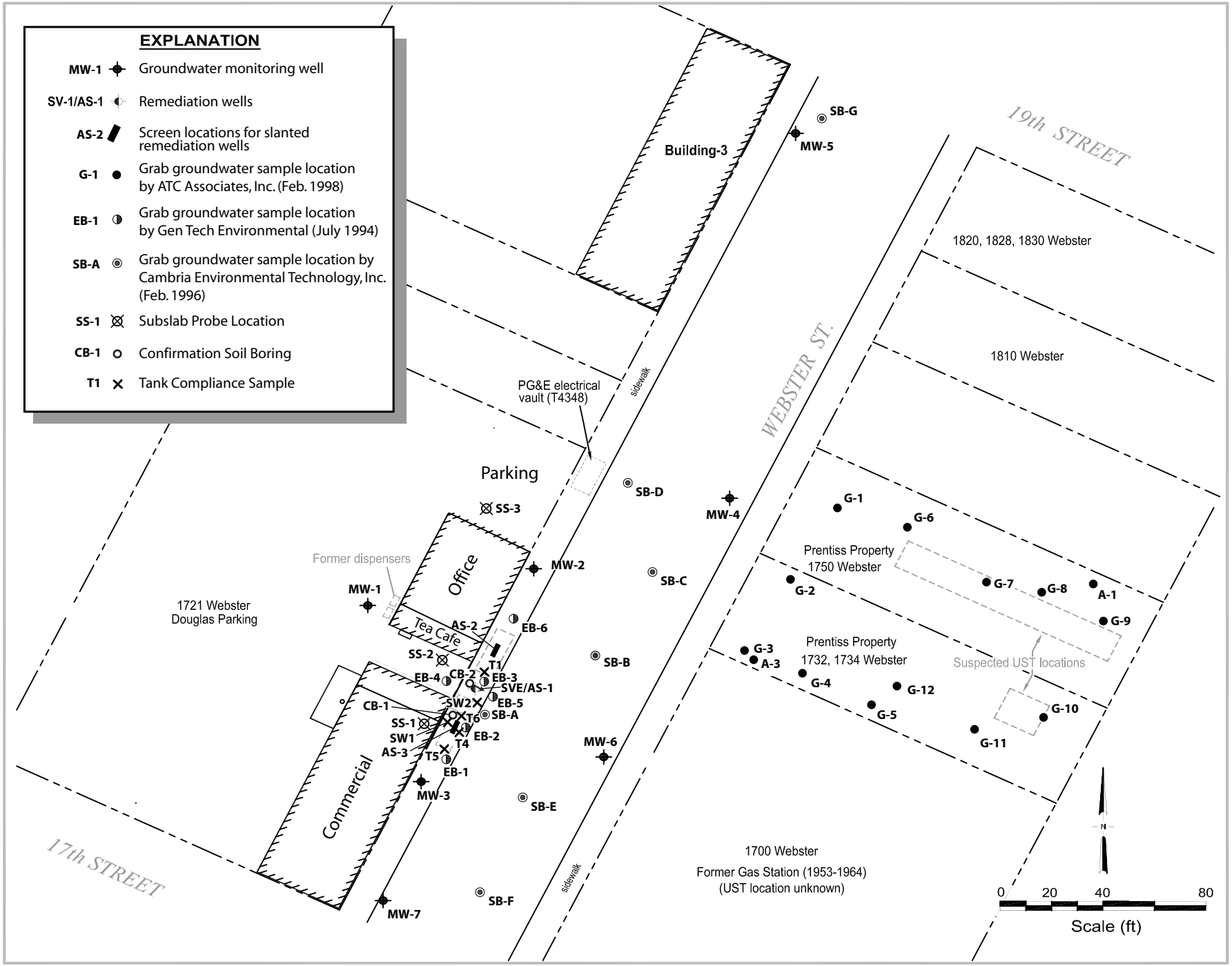
SCALE : 1" = 1/4 MILE

Figure 1

Douglas Parking Facility
1721 Webster Street
Oakland, California

PANGEA

Vicinity Map



Douglas Parking
1721 Webster Street
Oakland, California

PANGEA

Boring & Subslab Probe Location Map

FIGURE
2

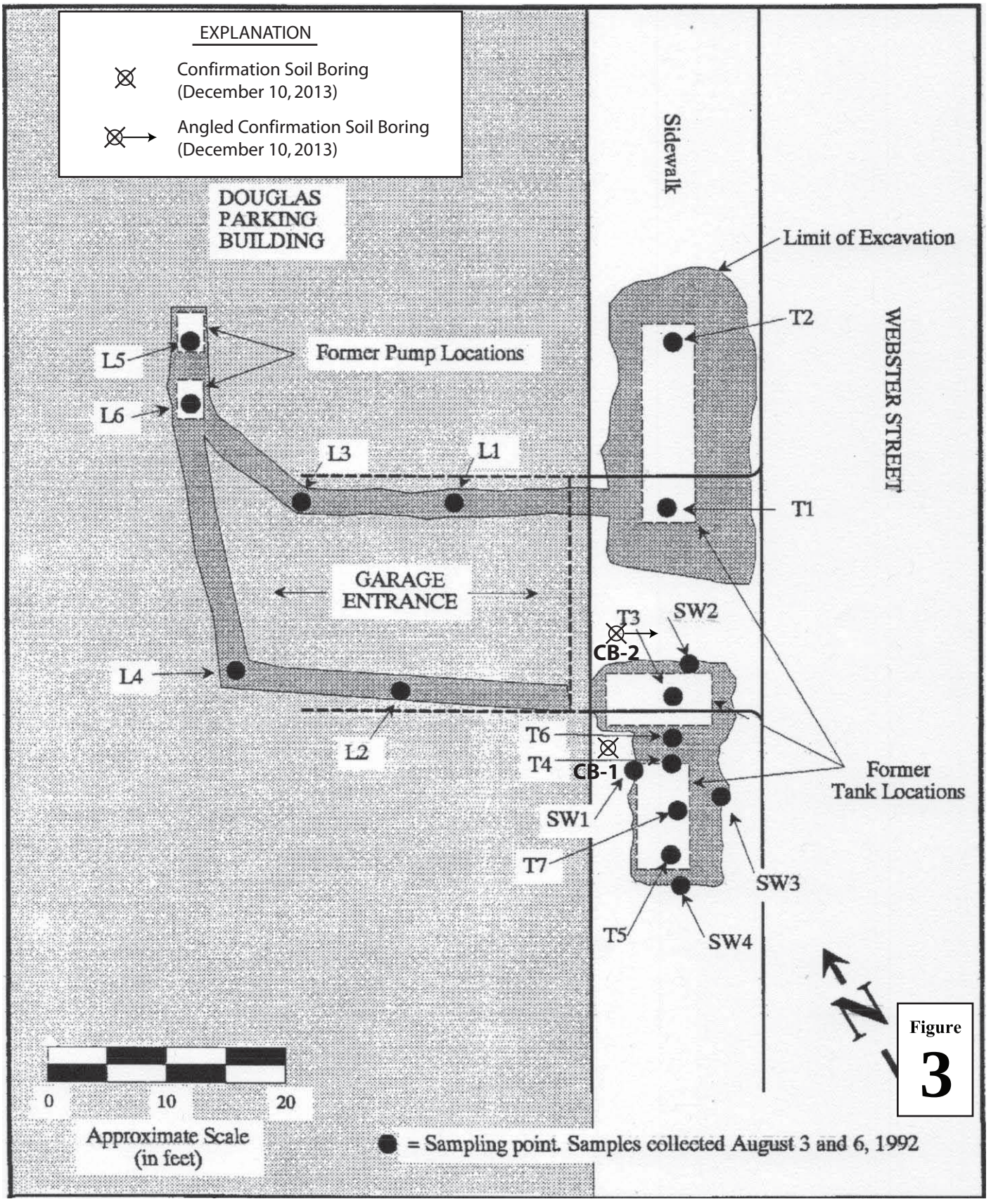


Figure 3

Douglas Parking
1721 Webster Street
Oakland, California

PANGEA

Excavation Soil Samples & Confirmation Borings Map

Pangea

Table 1. Soil Analytical Data: Petroleum Hydrocarbons - 1721 Webster Street, Oakland, California

Sample ID	Date Sampled	Sample Depth (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthanlene	Notes
			← mg/kg →							
Residential ESL for shallow soil dw(<3 m bgs):			100	0.044	2.9	2.9	2.3	0.023	1.2	
Residential ESL for deep soil dw(>3 m bgs):			580	0.044	2.9	3.3	2.3	0.023	1.2	
Residential ESL for shallow soil non-dw(<3 m bgs):			100	0.54	9.3	2.9	11	8.4	3.1	
Residential ESL for deep soil non-dw(>3 m bgs):			1,800	1.2	9.3	4.7	11	8.4	4.8	
Commercial ESL for shallow soil non-dw (<3 m bgs):			**500**	**1.2**	9.3	4.7	11	8.4	4.8	
Commercial ESL for deep soil non-dw (>3 m bgs):			**1,800**	**1.2**	9.3	4.7	11	8.4	4.8	
Residential LTCP outdoor air criteria (0 to 5 ft bgs):			--	1.9	--	21	--	--	9.7	
Residential LTCP outdoor air criteria (5 to 10 ft bgs):			--	2.8	--	32	--	--	9.7	
Commercial LTCP outdoor air criteria (0 to 5 ft bgs):			--	8.2	--	89	--	--	45	
Commercial LTCP outdoor air criteria (5 to 10 ft bgs):			--	12	--	134	--	--	219	
Pangea Environmental Services, Inc. - 2013										
Confirmation Soil Borings										
CB-1-4	12/10/2013	4.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
CB-1-8	12/10/2013	8.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
CB-1-12	12/10/2013	12.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
CB-2-4	12/10/2013	3.5 - 4.0*	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
CB-2-8	12/10/2013	7.0 - 7.5*	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
CB-2-10	12/10/2013	8.5 - 9.0*	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	
Cambria Environmental Technology, Inc. - 2003										
MW-6	6/27/2003	20.0	220	<0.10	0.14	<0.10	0.35	<1.0	--	
Cambria Environmental Technology, Inc. - 1996										
SB-A	2/22/1996	19.5	<1.0	<0.005	0.007	<0.005	<0.005	--	--	
SB-B	2/22/1996	20.5	580	<0.3	1.3	1.8	4.2	--	--	
SB-C	2/22/1996	19.5	1.4	<0.005	0.013	0.027	0.12	--	--	
SB-D	2/22/1996	20.5	660	<0.2	2.3	<0.2	5.2	--	--	
SB-E	2/23/1996	20.5	<1.0	<0.005	0.009	<0.005	<0.005	--	--	
SB-F	2/23/1996	20.0	<1.0	<0.005	0.006	<0.005	<0.005	--	--	
SB-G	2/23/1996	20.0	<1.0	<0.005	0.009	<0.005	<0.005	--	--	
SB-H	5/3/1996	20.5	1.2	<0.005	0.006	0.025	0.038	--	--	
(MW-4)	5/3/1996	31.0	<1.0	<0.005	<0.005	<0.005	<0.005	--	--	
SB-I	5/3/1996	15.5	<1.0	<0.005	<0.005	<0.005	<0.005	--	--	
(MW-5)	5/3/1996	26.0	<1.0	<0.005	<0.005	<0.005	<0.005	--	--	
Gen-Tech Environmental - 1994										
EB-1@20	7/8/1994	20.0	<1.0	<0.005	<0.005	<0.005	<0.005	--	--	
EB-2@20	7/8/1994	20.0	300	0.2	**17**	0.26	3.0	--	--	
EB-3@20	7/8/1994	20.0	51	0.039	0.56	0.32	2.9	--	--	
EB-4@20	7/8/1994	20.0	<1.0	<0.005	<0.005	<0.005	<0.005	--	--	
EB-5@20	7/8/1994	20.0	650	0.17	5.2	**4.4**	**48**	--	--	
EB-6@20	7/8/1994	20.0	68	<0.005	**22**	**4.3**	**23**	--	--	

Pangea

Table 1. Soil Analytical Data: Petroleum Hydrocarbons - 1721 Webster Street, Oakland, California

Sample ID	Date Sampled	Sample Depth (ft)	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE	Naphthanlene	Notes
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Commercial LTCP outdoor air criteria (5 to 10 ft bgs):			--	12	--	134	--	--	219	
Parker Environmental - 1992										
Beneath UST Samples										
T-1	8/3/1992	9.0	150	**2.2**	2.9	1.8	**13**	--	--	
T-2	8/3/1992	9.0	120	0.62	0.56	0.87	2.2	--	--	
T-3	8/6/1992	8.0	**580**	**1.7**	5.9	**5.6**	**43**	--	--	Overexcavated
T-4	8/6/1992	8.0	**1,500**	**11**	**140**	**48**	**280**	--	--	Overexcavated
T-5	8/6/1992	8.0	410	**6.7**	**22**	**6.2**	**35**	--	--	Overexcavated
T-6	8/6/1992	12.0	1,400	**12**	**70**	**29**	**150**	--	--	
T-7	8/6/1992	14.0	2.3	0.11	0.19	0.05	0.31	--	--	
South Excavation Sidewall Samples										
SW1	8/6/1992	9.5	280	**2.9**	5.8	3.2	**15**	--	--	
SW2	8/6/1992	7.0	**1,500**	**5.7**	**40**	**18**	**150**	--	--	
SW3	8/6/1992	8.0	400	**2.7**	5.8	**4.0**	**21**	--	--	
SW4	8/6/1992	9.0	2.3	0.42	0.028	0.077	0.18	--	--	
Piping and Dispenser Samples										
L-1	8/3/1992	1.5	2.6	<0.005	0.01	<0.005	0.03	--	--	
L-2	8/3/1992	1.5	<1.0	<0.005	<0.005	<0.005	<0.005	--	--	
L-3	8/3/1992	1.5	<1.0	<0.005	<0.005	<0.005	<0.005	--	--	
L-4	8/3/1992	1.5	<1.0	<0.005	<0.005	<0.005	<0.005	--	--	
L-5	8/3/1992	2.0	8.2	0.01	0.02	0.012	0.092	--	--	
L-6	8/3/1992	2.0	<1.0	<0.005	0.007	<0.005	<0.034	--	--	
Stockpile Samples										
C1	8/6/1992	1.5	**560**	<0.1	5.0	3.1	**24**	--	--	

Notes, Abbreviations and Methods:

mg/kg = Milligrams per kilogram, approximately equivalent to parts per million (ppm).

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

TPHg = Total petroleum hydrocarbons by EPA Method 8015.

BTEX = Benzen, toluene, ethylbenzene, xylenes by EPA Method 8020/8021.

MTBE = Methyl tertiary-butyl ether by EPA Method 8020.

ESL = Environmental Screening Levels for shallow soil with commercial/industrial land use where groundwater is a current or potential drinking water resource from Table A-2, established by the SFBRWQCB, Interim Final - November 2007 (Revised May 2013).

LTCP = Low Threat Closure Policy

Bold = Concentration above ESLs for Commercial Land Use, groundwater is not a current or potential source of drinking water.

-- = Not available or not analyzed.

< n = Chemical not present at a concentration in excess of detection limit shown.

* Boring installed at 25º angle from vertical. Listed and calculated sample depth is rounded to the nearest 0.5 ft.

Pangea

Table 2. Subslab Gas Analytical Data - Douglas Parking, 1721 Webster Street, Oakland, California

Boring/ Sample ID	Date Sampled	Sample Depth (ft - ft bgs)	Benzene	Toluene	Ethylbenzene	Xylenes	TPH Gasoline	MTBE	Naphalene	Isopropanol	Helium	Oxygen	Notes
			← ug/m³ →								%	%	
Residential ESL for shallow soil gas:			42	160,000	490	52,000	150,000	4,700	36	--	--	--	
Commercial ESL for shallow soil gas:			420	1,300,000	4,900	440,000	1,200,000	47,000	360	--	--	--	
No Bio-Attenuation Zone, **Residential** (LTCP)			85	--	1,100	--	--	--	93	--	--	--	
No Bio-Attenuation Zone, **Commercial** (LTCP)			280	--	3,600	--	--	--	310	--	--	--	
With Bio-Attenuation Zone, **Residential** (LTCP)			85,000	--	1,100,000	--	--	--	93,000	--	--	--	
With Bio-Attenuation Zone, **Commercial** (LTCP)			280,000	--	3,600,000	--	--	--	310,000	--	--	--	
Subslab Gas Samples													
SS-1	11/14/2013	0.5 - 0.7	<1.6	<1.9	<2.2	<6.6	2,300	<1.8	<5.3	--	0.13	17	For other VOC detections see the lab report.
SS-2	11/13/2013	0.5 - 0.7	58	2.7	<2.2	<6.6	2,000	<1.8	<5.3	--	0.48	16	For other VOC detections see the lab report.
SS-3	11/13/2013	0.8 - 1.0	71	2.6	<2.2	<6.6	1,400	<1.8	<5.3	--	0.13	17	For other VOC detections see the lab report.

Abbreviations:

SG-1 = Soil Gas Sample

SS-1 = Subslab Sample

ug/m3 = Micrograms per cubic meter of air results calculated by laboratory from parts per billion results using normal temperature and pressure (NPT).

ft - ft bgs = Depth interval below ground surface (bgs) in feet.

% = Percent of total sample volume.

Volatile organic compounds (VOCs) by EPA Method TO-15 (partial list), uses GC/MS scan.

Oxygen by Modified ASTM Method D-1946, uses GC/TCD scan.

< n = Chemical not present at a concentration in excess of detection limit shown.

MRL = Method reporting limit. Laboratory reporting limit based on parts per billion on volume to volume basis (ppbv/v) and converted to ug/m3.

ESL = Environmental Screening Level for Shallow Soil Gas with Residential and Commercial/Industrial Land Use, for samples less than five feet below a building foundation or ground surface, established by the SFBRWQCB, Interim Final - November 2007, and amended in May 2013 (Table E-2).

ESL established by the SFBRWQCB, Interim Final - November 2007, and amended in May 2013.

LTCP = Low Threat Closure Policy

Bold = Concentrations above Lowest ESLs for Commercial Land Use for shallow soil gas (SG & SS samples).

APPENDIX A

Site Conceptual Model in Tabular Format

SITE CONCEPTUAL MODEL

The following table presents the site conceptual model (SCM) in tabular format.

Site Address:	1721 Webster Street	**ACEH Case No.**		RO0000129
City:	Oakland	**Regulator:**		Barbara Jakub
SCM Element/ *Sub-Element*	**Description**	**Data Gap No. and Description**	**Proposed Investigation**	**Rationale**
Site Description				
Land Use and Site History	The site is currently being utilized as a parking garage, and is located between 17th and 19th Streets in uptown Oakland, California, approximately four miles east of San Francisco Bay and one quarter of a mile west of Lake Merritt. The site is relatively flat with an elevation of approximately 30 feet (ft) above mean sea level (msl). The site formerly contained one 1,000-gallon and two 500-gallon gasoline underground storage tanks (USTs) and piping and dispensers.	None	NA	NA
Nearby Sites	Based on Geotracker information, several former underground storage tank (UST) sites are located close to the site, including Prentiss Properties to the northeast at 1750 Webster Street, a former gas station to the east at 1700 Webster, and a former Chevron service station which is located approximately 450 feet to the southwest on the corner of 17th Street and Harrison Street. There are also several closed leaking underground storage tank (LUST) sites within a 1,000 foot radius of the site.	None	NA	NA
Geology and Hydrogeology				
Regional	The site is situated in the Coast Range Physiograpic Province, which is an area characterized by northwest-southeast running valleys and ridges. Geologic formations of the San Francisco Bay Region range from the Jurassic Period to the Holocene epoch (end of the Pleistocene era). Tectonic activity during the Plio-Pleistocene era formed a structural depression (San Francisco Bay) through subsidence and uplift along the San Andreas, Hayward and Calaveras fault zones. The Bay filled with alluvial deposits of gravel, sand, silt and clay from the surrounding highlands and sea level fluctuation deposited bay muds all around San Francisco Bay (Radbruch, 1957). The alluvial deposits generally become finer closer to the Bay, where they	None	NA	NA

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SCM Element/ *Sub-Element*	**Description**	**Data Gap No. and Description**	**Proposed Investigation**	**Rationale**
	interbed with predominately fine-grain sediment deposited by the Bay.			
Local Geology and Hydrogeology	Unconfined groundwater conditions exist at the site. A shallow water-bearing zone consisting of highly permeable sand is present from approximately 14 to 30 feet bgs, and is underlain by a silty clay layer. Since 1994, the depth to groundwater beneath and surrounding the site has ranged from approximately 13.6 feet bgs (MW-5) to 23.6 feet bgs (MW-1), equivalent to a groundwater elevation range from 9 to 11 feet above msl over nineteen years of monitoring. Rainfall in this area occurs primarily between November and March and the average rainfall is approximately 23 inches per year. Groundwater elevation data indicates that the groundwater beneath the site generally flows *northwards* to *northeastwards*, consistent with the local topography. The *northwards* to *northeastwards* flow direction is generally consistent with the inferred groundwater flow directions at the nearby LUST site at 1633 Harrison Street.	None	NA	NA
Surface Water	The closest surface water to the site is Lake Merritt, which is located approximately 1,295 feet (approximately ¼ mile) east-northeast of the site.	None	NA	NA

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City:	Oakland	**Regulator:**		Barbara Jakub
SCM Element/ *Sub-Element*	**Description**	**Data Gap No. and Description**	**Proposed Investigation**	**Rationale**
Nearby Wells	Based on our review of well information provided by the Department of Water Resources (DWR) and Alameda County Public Works Agency (ACPWA), Pangea identified several permitted wells within approximately a ¼ mile radius of the site. Permitted domestic well information provided by the DWR and ACPWA is considered confidential and is not disclosed herein. Two locations are listed as irrigation wells. One location is listed as having 10 irrigation wells with total depths of approximately 280 ft bgs and is situated approximately 1,360 ft northeast (downgradient) of the site. The second is listed as having 6 irrigation wells with total depths of approximately 95 ft bgs and is situated approximately 1,080 ft east (crossgradient) of the site. Pangea identified thirteen additional permitted well locations within the ¼ mile radius search of the site using DWR/ACPWA information. Seven of the thirteen locations were listed as groundwater monitoring wells and 6 are listed as test wells for the City of Oakland Redevelopment Agency. Pangea also reviewed the State Water Resources Control Board (SWRCB) GeoTracker database for nearby wells. Three well locations were identified on Geotracker within a ¼ mile of the site. The identified monitoring wells are associated with 1633 Harrison Street, 1432 Harrison Street, and the closed LUFT site at 301 14th Street (Chevron Station).	None	NA	NA
Groundwater Beneficial Use	According to the Basin Plan from the California Regional Water Quality Control Board (RWQCB), the site lies near the northern end of the East Bay Plain Subbasin of the Santa Clara Valley Basin. The *existing* beneficial uses for this basin include (1) municipal and domestic water supply, (2) industrial process water supply, (3) industrial service water supply and (4) agricultural water supply.	None	NA	NA

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SCM Element/ *Sub-Element*	**Description**	**Data Gap No. and Description**	**Proposed Investigation**	**Rationale**
Contaminant Source and Release Information				
Source/ Release Information	On August 3 and 6, 1992, Parker Environmental Services removed one 1,000-gallon and two 500-gallon gasoline underground storage tanks (USTs) from the site. Up to 1,500 milligrams per kilogram (mg/kg) total petroleum hydrocarbons as gasoline (TPHg) and up to 12 mg/kg benzene were detected in the soil samples collected from the UST excavation (Parker, 1992).	None	NA	NA
Chemicals of Concern	The chemicals of concern (COC) in site soil and groundwater are the following petroleum hydrocarbons: TPHg; benzene, toluene, ethylbenzene, and xylenes (BTEX).	None	NA	NA
Soil and Groundwater Investigations	Several investigations have been completed at the site. On July 8 and September 8, 1994, Gen Tech/Piers Environmental, Inc. (Gen Tech) of San Jose, California drilled six exploratory borings and installed three groundwater monitoring wells (MW-1 through MW-3). Gen Tech reported the investigation work in its *Soil and Groundwater Investigation and Quarterly Monitoring Report* dated December 2, 1994. In February and May 1996, Cambria Environmental Technology (Cambria) of Emeryville, California advanced seven geoprobe soil borings and installed two groundwater monitoring wells (MW-4 and MW-5), which was reported in the *Subsurface Investigation Report* dated July 16, 1996. On August 8, 2000, *Conduit Study and File Review Report* was submitted by Cambria Environmental Technology. The report provided significant information about offsite hydrocarbon impact and offsite sources, and concluded that there were no identified conduits for contaminant migration in groundwater. On June 27, 2003 Cambria installed two additional offsite monitoring wells (MW-6 and MW-7) to facilitate additional plume delineation. Pangea began periodic groundwater monitoring at the site in July 2006. In November and December 2013, Pangea installed and sampled three subslab gas probes and drilled two confirmation soil borings. The subslab gas probes contained no contaminant concentrations	None	NA	NA

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SCM Element/ *Sub-Element*	**Description**	**Data Gap No. and Description**	**Proposed Investigation**	**Rationale**
	above commercial Environmental Screening Levels (ESLs) for shallow soil gas. Soil samples collected from the two borings contained no detectable concentrations of contaminants.			
Free Product	No free product has been encountered in any site monitoring wells, but a sheen was noted historically by the laboratory in several grab groundwater samples collected from site borings. Based on results from site borings and monitoring wells it appears that no free product is currently present at the site.	None	NA	NA
Soil	In August 1992, elevated contaminant concentrations were detected in source area soil near the former USTs. In July 1994, elevated contaminant concentrations were detected and east and northeast of the USTs at depths of approximately 20 and 20.5 ft bgs in predominately sandy soil. In February and May 1996, soil samples from borings SB-A through SB-I did not contain any contaminant concentrations above applicable ESLs. Additionally, source area soil borings CB-1 and CB-2, drilled in December 2013and analyzed for TPHg, BTEX, MTBE and Naphthalene did not contain any detectable contaminant concentrations. The extent of soil contamination at the site is well defined by the existing soil sample data.	None	NA	NA
Groundwater	The downgradient extent of TPHg and benzene contamination in groundwater is fairly well defined by monitoring well MW-5. Contaminant concentrations are generally highest in source wells MW-2 and MW-3, which are both located near the former USTs, and in offsite wells MW-4 and MW-6 located down/crossgradient from the source area. Hydrocabons in wells MW-4 and MW-6 located across the street may be from an offsite source. Groundwater analytical data indicates that the contaminant plume is stable to decreasing. The vertical extent of contamination at the site is fairly well defined by samples collected from wells AS-1 through AS-3 in January 2013. Wells AS-1 through AS-3 are screened from approximately 27 to 30 ft bgs and did not contain any contaminant concentrations	None	NA	NA

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SCM Element/ *Sub-Element*	**Description**	**Data Gap No. and Description**	**Proposed Investigation**	**Rationale**
	above applicable ESLs except 10 µg/L benzene in well AS-1. The maximum explored depth at the site is approximately 30 ft bgs. There is a layer of clay at approximately 30 ft bgs near the former USTs. This clay layer may be preventing contaminants from migrating into deeper water-bearing zones.			
Subslab Gas	On November 6, 2013, Pangea installed three subslab probes at the subject site. Subslab probe SS-1 was installed near the source area in an adjacent retail building. Probe SS-2 was installed in the driveway near the source area onsite and probe SS-3 was installed near key well MW-2 inside the parking garage near the office. The first round of subslab vapor sampling (cold season) was completed on November 13 and 14, 2013. The only site constituents of concern detected during this sampling event were TPHg and benzene: these concentrations were below applicable commercial ESLs. Benzene concentrations [as high as 71 µg/m^3 (SS-3)] in subslab soil gas were also below media-specific LTCP criteria; however, LTCP criteria references soil gas sample collection from 5 ft below a building foundation yet the subslab gas sampling referenced herein was performed directly beneath the slab. This *may* suggest that vapor intrusion does not pose a significant threat to the onsite and adjacent buildings. Indoor air testing could be performed to confirm that benzene concentrations in indoor air near probes SS-2 and SS-3 are below the ESL of 2.1 µg/m^3. This could be considered a potential data gap.	1 - Naphthalene confirmation by TO17 and warm season sampling. Possible indoor air testing.	To be completed as part of the already approved *Revised Data Gap Workplan* dated July 25, 2013. Warm season and naphthalene results to be reported in 2014. Possible indoor air testing.	NA
Remediation Activities				
Remedial Activities	Several remedial techniques have been utilized at the subject site. In January 1998, Cambria installed ORC socks in well MW-2 to enhance the natural attenuation of dissolved-phase hydrocarbons. Dissolved oxygen (DO) concentrations temporarily increased in well MW-2 following the ORC sock installation. In February and March 1999, a total of 120 gallons of 7.5% hydrogen peroxide solution was added into monitoring wells MW-2 and MW-3 to oxidize hydrocarbons and also increase DO levels to enhance biodegradation of dissolved-phase hydrocarbons. While hydrogen peroxide	None	NA	NA

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SCM Element/ *Sub-Element*	**Description**	**Data Gap No. and Description**	**Proposed Investigation**	**Rationale**
	temporarily increased groundwater DO levels, hydrocarbon concentrations fluctuated (even increased) before returning to pre-remediation levels. On March 4, 2003, Cambria installed a co-axial air sparging/soil vapor extraction well (SV-1/AS-1) and two angled air sparging wells (AS-2 and AS-3) to approximately 30 ft bgs. The wells were installed to facilitate feasibility testing and future site remediation. The SVE system ran from October 2007 to November 2010 and the AS system operated from November 2007 to April 2010. The soil vapor extraction (SVE) remediation system consisted of a blower that extracted soil vapor from well SVE-1. Extracted vapors were routed through a moisture separator then treated by two 2,000-lb canisters of granular activated carbon plumbed in series. The treated vapor was discharged to the atmosphere in accordance with Bay Area Air Quality Management District (BAAQMD) requirements. The air sparging (AS) system consisted of a compressor for injecting air into wells AS-1, AS-2 and/or AS-3. Injection into AS wells was controlled by timer-activated solenoid valves. On August 8, 2008, air sparge wells AS-1 and AS-3 were disconnected from the air compressor and air sparging was conducted solely in well AS-2 to target hydrocarbons in nearby well MW-2. As of October 26, 2010, the SVE system operated for a total of about 19,396 hours (approximately 808 days). Laboratory analytical data indicates that the system removed a total of approximately 3,212 lbs TPHg and 6.88 lbs benzene. The SVE system was restarted and subsequently shutdown on November 23, 2010 due to low removal rates.			

APPENDIX B

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: 11/07/2013 By jamesy

Permit Numbers: W2013-0905
Permits Valid from 11/21/2013 to 12/13/2013

Application Id:	1383158652149	**City of Project Site:**	Oakland
Site Location:	1721 Webster Street, Oakland, CA 94612 - Sidewalk in front of address		
Project Start Date:	11/13/2013	**Completion Date:**	11/13/2013
Assigned Inspector:	Contact Steve Miller at (510) 670-5517 or stevem@acpwa.org		
Extension Start Date:	11/21/2013	**Extension End Date:**	12/13/2013
Extension Count:	1	**Extended By:**	priest

Applicant:	Pangea Environmental Services Inc - Tina de la Fuente 1710 Franklin Street, Suite 200, Oakland, CA 94612	**Phone:**	510-836-3700
Property Owner:	City of Oakland 250 Frank Ogawa Plaza, Oakland, CA 94612	**Phone:**	--
Client:	Douglas Parking 1721 Webster Street, Oakland, CA 94612	**Phone:**	--

	Total Due:	$265.00
Receipt Number: WR2013-0419	**Total Amount Paid:**	$265.00
Payer Name : Bob Clark-Riddell	Paid By: VISA	**PAID IN FULL**

Works Requesting Permits:

Borehole(s) for Investigation-Contamination Study - 2 Boreholes
Driller: Confluence Environmental Field Services - Lic #: 913194 - Method: Hand **Work Total: $265.00**

Specifications

Permit Number	Issued Dt	Expire Dt	# Boreholes	Hole Diam	Max Depth
W2013-0905	11/07/2013	02/11/2014	2	3.25 in.	12.00 ft

Specific Work Permit Conditions

1. Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings. All cuttings remaining or unused shall be containerized and hauled off site. The containers shall be clearly labeled to the ownership of the container and labeled hazardous or non-hazardous.

2. Boreholes shall not be left open for a period of more than 24 hours. All boreholes left open more than 24 hours will need approval from Alameda County Public Works Agency, Water Resources Section. All boreholes shall be backfilled according to permit destruction requirements and all concrete material and asphalt material shall be to Caltrans Spec or County/City Codes. No borehole(s) shall be left in a manner to act as a conduit at any time.

3. 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.

4. Prior to any drilling activities, it shall be the applicant's responsibility to contact and coordinate an Underground Service Alert (USA), obtain encroachment permit(s), excavation permit(s) or any other permits or agreements required for that Federal, State, County or City, and follow all City or County Ordinances. No work shall begin until all the permits and requirements have been approved or obtained. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County an 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.

5. Applicant shall contact Steve Miller for an inspection time at (510) 670-5517 or email to stevem@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. 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.

7. NOTE:
Under California laws, the owner/operator are responsible for reporting the contamination to the governmental regulatory agencies under Section 25295(a). The owner/operator is liable for civil penalties under Section 25299(a)(4) and criminal penalties under Section 25299(d) for failure to report a leak. The owner/operator is liable for civil penalties under Section 25299(b)(4) for knowing failure to ensure compliance with the law by the operator. These penalty provisions do not apply to a potential buyer.

8. Permit is valid only for the purpose specified herein. No changes in construction procedures, as described on this permit application. Boreholes shall not be converted to monitoring wells, without a permit application process.

CITY OF OAKLAND • Department of Planning, Building and Neighborhood Preservation
250 Frank H. Ogawa Plaza, 2nd Floor, Oakland, CA 94612 • Phone (510) 238-3443 • Fax (510) 238-2263

Applications for which no permit is issued within 180 days shall expire by limitation. No refund more than 180 days after expiration or final.

Appl# X1302950 Job Site 1721 WEBSTER ST Parcel# 008 -0624-007-00

Descr Soil boring(s) on sidewalk. Justified by location of contamination. No impact on traffic lane allowed.
Call PWA INSPECTION prior to start: 510-238-3651. 4th FLOOR.
Work Type EXCAVATION-PRIVATE P

Permit Issued 11/13/13

FIRE MARSHAL
3rd Floor

USA # Util Co. Job # 1721 WEBS Acctg#:
Util Fund #:

		Applcnt	Phone#	Lic#	--License Classes--
Owner	DOUGLAS MOTOR SERVICE & DOUGLA				
Contractor	CONFLUENCE ENVIRONMENTAL INC	X	(916)760-7641	913194	C8 C57
Arch/Engr					
Agent	PANGEA ENVIRO/C DE LA FUENTE		(510)759-8000		

Applic Addr 3308 EL CAMINO AVE, SACRAMENTO, CA 95821, 95821

JOB SITE

$436.05 FEES TO BE PAID AT ISSUANCE

$71.00 Applic	$309.00 Permit
$.00 Process	$36.10 Rec Mgmt
$.00 Gen Plan	$.00 Invstg
$.00 Other	$19.95 Tech Enh

Application Processed By _____ Date: _____

Permit Issued By _____ Date: _____

Finaled By _____ Date: _____

Application Docs Forwarded To _____ Date: _____

ADDRESS:

DIST:

APPENDIX C

Standard Operating Procedures

STANDARD FIELD PROCEDURES FOR HAND-AUGER SOIL BORINGS

This document describes Pangea Environmental Services' standard field methods for drilling and sampling soil borings using a hand-auger. 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 or engineer working under the supervision of a California Registered Geologist (RG), Certified Engineering Geologist (CEG), or Professional Engineer. 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

Hand-auger borings are typically drilled using a hand-held bucket auger to remove soil to the desired sampling depth. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments beyond the bottom of the augered hole. The vertical location of each soil sample is determined using a tape measure. 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.

Augering and sampling equipment is steam-cleaned or washed prior to drilling, between samples and between borings to prevent cross-contamination with alconox/liquinox or an equivalent EPA-approved detergent.

Sample Storage, Handling and Transport

Sampling tubes 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

One of the remaining tubes is partially emptied into a re-sealable plastic bag. The bag of soil is placed in the sun to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the bag headspace, extracting the vapor through a slit in the bag. 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, if they are collected from the boring, are collected from screened PVC casing installed in the hole or from the open borehole using bailers. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in re-sealable plastic bags, stored on crushed ice at or below 4°C, and transported under chain-of-custody to the laboratory.

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 can be used 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 sample may also be analyzed if non-dedicated sampling equipment is used.

Grouting

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 OPERATING PROCEDURE FOR SUBSLAB VAPOR SAMPLING

1.0 PURPOSE

This standard operating procedure (SOP) describes the procedures for collecting subslab vapor samples using evacuated stainless-steel Summa canisters (TO-15) or sorbent tubes (TO-17) for the purpose of assessing risk to building occupants. The SOP is modified from procedures and information presented in Cal/EPA 2012 (*Advisory-Active Soil Investigations)*; Cal/EPA 2011; Cal/EPA 2010; U.S. EPA, 2006; DiGiulio, 2003; and U.S. EPA 1999. This SOP includes (a) real-time leak-check procedures to evaluate integrity of the soil gas probe and sampling assembly during probe purging and post sampling, and (b) real-time field screening of soil gas concentrations during probe purging and post sampling.

2.0 REQUIRED EQUIPMENT

- Hammer drill with 1" bit and smaller bits (slightly larger than vapor probe tubing)
- Tubing for cleaning boring
- Stainless-steel or Teflon vapor probe tubing with Swagelok threaded compression fitting, vapor-tight cap, and valves.
- Rubber stopper or Teflon disk
- Granulated bentonite, bentonite pellets and cement
- Vacuum pump with adjustable rotameter for purging and leak testing
- 1-Liter Summa canister for each sample
- Stainless-steel sampling manifold with vacuum gauges and critical orifice flow restrictor (request that laboratory leak-check sampling manifold prior to mobilization)
- Leak-check compound (e.g. helium)
- Helium gas analyzer (calibrated)
- Calibrated photoionization detector (PID) or other organic vapor analyzer
- Isobutylene for PID calibration
- Tedlar bags (for helium measurement and vapor screening)
- Vacuum chamber (iron lung) for pre- and post-sampling leak-check
- Leak-check enclosure (bucket with hydrated bentonite pellets [or weather stripping] for sealing enclosure to surface and openings for vapor probe tubing, helium and for sampling enclosure atmosphere)
- Recordkeeping materials
- Latex or nitrile gloves

3.0 PROCEDURES

3.1 Boring Clearance

Prior to installing subslab vapor probes, ensure that a utility clearance has been conducted to ensure that potential subsurface utility and rebar locations have been identified and marked.

3.2 Vapor Probe Construction

1. To protect interior surfaces, lay plastic sheeting around the probe location.
2. Use a rotary hammer drill to create an approximately 3-inch deep, 1 1/2 -inch diameter hole that *partially* penetrates the slab. Use a piece of flexible tubing to blow or vacuum concrete debris and dust from the hole. Do not blow or vacuum after the slab has been completely penetrated.
3. Drill a smaller diameter *inner hole* in the center of the outer hole, periodically blowing dust and debris from the hole until the slab is penetrated. The diameter of the inner hole should exceed the diameter of the vapor probe tubing by the minimum amount practicable. The inner hole should be drilled completely through the slab and 3 to 4 inches into the subslab material (baserock or soil) to form a cavity (**Figure 1**).
4. Insert the capped vapor probe tubing through a tightly fitting rubber stopper or a Teflon disk and insert the stopper or disk into the bottom of the outer hole. The purpose of the stopper is to stop moisture from the annular seal from leaking into subslab materials. The fitting may either be constructed flush, or may protrude above the slab, depending on location and susceptibility to damage. If a lubricant is needed, use only high-vacuum silicone grease.
5. Clean the concrete surfaces in the borehole with a dampened towel to increase the potential of a good seal. Fill the remainder of the hole with hydrated bentonite (temporary probe) or hydrated bentonite topped with expanding cement (semi-permanent probe). Place a protective cap (temporary probe) or flush mounted well box (semi-permanent probe) over the probe to protect it from damage.

3.3 Vapor Sampling Using Method TO-15

During vapor sampling, record all valve open/close times and canister/manifold vacuum readings at each step. Do not conduct sampling within **5 days following a significant rain event** (0.5 inches of rainfall during any 24-hour period) or signficant irrigation adjacent to the building.

<u>Setup</u>

1. Calculate and record the volume of the sampling assembly, tubing, vapor probe and void space created in subslab material.

   Volume = $\pi * r^2 * L$ = 3.14 x (1/2*ID) x (1/2*ID) *L,

   where ID = cavity, tubing or manifold inside diameter and L = length of cavity or tubing/manifold segment.
2. Wear latex or nitrile gloves while handling sampling equipment. Change gloves whenever a new sample is collected and after handling leak-check compound.
3. Replace the vapor probe cap with a closed Swagelok valve. Connect the sampling manifold to the vapor probe, sample Summa canister and vacuum pump using Swagelok fittings and stainless-steel, Teflon or Tygon tubing. Check all fittings for tightness (do not overtighten).
4. Close all valves. Record pre-test vacuum readings on summa canister.

Manifold Shut-In Check

1. Open valve on vapor sampling manifold and open 3-way valve #1 so the vacuum pump of the purging assembly can evacuate the vapor sampling manifold assembly (keep valves #2 and #3 closed to the Tedlar bag/vacuum chamber of the vapor screening assembly) (**Figure 2**). Start the vacuum pump. Do *not* open #1 valve to the probe assembly, or the valve on the sample Summa canister. Allow manifold/tubing vacuum to stabilize at approximately 10" Hg.
2. Stop the vacuum pump, close 3-way valves #2 and #3 (to allow shut-in testing of vapor sampling manifold), and conduct a shut-in test by waiting at least **5 minutes** (if using 150 inches of water gauge) or **10 minutes** (if using 30 inches of mercury gauge). Monitor manifold vacuum gauge to test for leaks. If the vacuum decreases, rectify the leak before proceeding.

Purge, Flow and Leak Check

1. **Calculate purge volume and duration**. Determine the desired total purge volume and purging duration for the equipment setup. A critical orifice flow restrictor is intended to limit the maximum purge and sampling flow rate (approximately 150 ml/min). If step testing is not required to better determine optimal purge volume, **purge approximately 3 times** the volume of the sampling assembly, tubing, vapor probe and void space or any probe/filter pack material below the concrete slab.
2. **Leak-check enclosure.** Place leak-check enclosure over vapor probe and seal to floor using hydrated bentonite or weather stripping. Introduce helium gas into the leak-check enclosure and monitor with the helium gas analyzer until it reads between 20% and 30% helium.
3. **Conduct purging.** Start vacuum pump and open 3-way valve #1 (and 3-way valves #2 and #3) so the vacuum pump can evacuate the probe. Do *not* over-purge. Closely monitor the flow on the rotameter and the vacuum on the vacuum gauge. For most samples flow should be limited to 150mL/min or less. If the vacuum remains below approximately 7" Hg, then sufficient flow is present to collect a representative sample (Cal/EPA 2012) and continue purging for the planned purge duration.
4. If the probe-side vacuum exceeds approximately 7" Hg, then insufficient flow may be present to collect a representative sample and this condition should be noted. Evaluate probe integrity or consider re-installation of probe, especially if probe installed in coarse-grain material. If no significant flow is attained, the sampling line may be plugged or the vapor probe may be positioned in a low permeability or saturated layer. If the probe cap is opened for probe inspection, record the inspection procedures and duration. If purging and sampling is resumed after opening the probe cap, this information will help determine the representativeness of the sample. **To sample subslab gas under low flow conditions, follow this alternate sampling method** derived from Appendix D, Cal/EPA 2012. Make a reasonable attempt to purge one purge volume. After purging, open sample Summa canister until sampling manifold vacuum threshold is achieved, then close Summa sample valve until probe vacuum dissipates. Repeat this sampling procedure as necessary to sufficiently fill the sample Summa canister. Alternatively, consider installing a subslab gas probe with a larger probe annulus space, or employing passive soil gas sampling methods.
5. When purge duration complete and ready to discontinue purging, close 3-way valve #1 so that the probe is connected to the sampling manifold, and then stop the vacuum pump.
6. Record helium reading for leak-check enclosure at least once every minute during purging and sampling.

Sample Collection

1. **Opening Sample Canister.** Once a helium reading of at least 20% has been reached, open sample canister valve. **Sampling takes approximately 5 minutes for a 1-liter Summa canister** (at 150 ml/min sampling flow rate).
2. Close sampling canister valve when vacuum decreases to 5" mercury. Do *not* allow vacuum to fall below this range.
3. **Post-Sample Vapor Screening.** After sampling, open 3-way valve #1 so that the vapor screening assembly is connected to the probe, turn on the vacuum pump, and open 3-way valves #2 and #3 to partially fill the Tedlar bag within the vacuum chamber (iron lung). When Tedlar bag is sufficiently filled, return valves #2 and #3 to purging position. Check Tedlar bag for indication of sampling leakage using the helium gas analyzer. If helium concentration is below 1% then sample is sufficiently representative. If helium concentration is above 1%, then the sample may not be sufficiently representative; the probe may need to be repaired or re-installed and re-sampled. Additionally, check the Tedlar bag for contaminants using the PID for qualitative contaminant assessment (optional).
4. **Shroud Sample.** To confirm helium meter readings collect one shroud sample per day to analyze for percent helium. Connect the shroud sample summa canister and manifold to a port near the bottom of the shroud and open the canister valve at the beginning of sampling. Close sampling canister valve when vacuum decreases to 5" mercury. Do *not* allow vacuum to fall below this range. Disassemble sampling assembly, and cap (or remove and restore) vapor sampling point.
5. **Analyses.** Fill out chain-of-custody form for analysis for **chemicals of concern (i.e. TO-15)**, and for **leak-check compound** for at least 10% of samples. For naphthalene analysis, the analytical laboratory will utilize procedures for recovery, carryover, canister cleanliness, age, and matrix spikes and matrix spike duplicates as outlined in the *April 2012 Cal/EPA Advisory - Active Soil Gas Investigation*, Appendix E. Analyze all samples for **percent oxygen** by ASTM D1946-90**.** Additionally, samples may be analyzed for **percent methane and carbon dioxide** by ASTM D1946-90 when in support of sensitive human health risk assessments for regulatory review. Include final vacuum reading and serial numbers of canister and flow restrictor on chain-of-custody form.
6. For vapor sampling in support of sensitive human health risk assessments for regulatory review, collect at least one *duplicate* sample per site per sampling event from the sampling point with the anticipated highest vapor concentrations. The duplicate sample should be collected by attaching a fresh sample canister following collection of the initial sample. If a new manifold is used, follow the same purging and sampling procedures used for the original sample. If the same manifold is used, collect a sample without further purging, using the same sampling procedures used for the original sample.

Decontamination and Decommissioning

1. Use a decontaminated sampling manifold and new tubing for each sample location. Return equipment to laboratory for decontamination.
2. Backfill any open soil vapor probe holes with bentonite slurry or Portland cement and cap with concrete or other surface material to match the area.
3. To retain the subslab probe for future sampling, cap the Swagelock fitting and cover the probe with a small vault or other protective device.

3.4 Vapor Sampling Using Method TO-17

Required Equipment

- Swagelok sealed tubes packed with an appropriate sorbent material for the target compounds (confirm with sorbent tube supplier). Bring extra tubes for laboratory and field blanks (if merited).
- Air pump with mass flow monitor.
- Swagelok fittings with ferrules.
- ¼-inch diameter Teflon tubing.
- Isopropyl alcohol (IPA) and small jar with gauze pads (for leak-check compound)
- Photo-ionization detector (PID)
- Shroud with pass-through fitting for sample train and topside port for IPA monitoring.

Procedures

1. Use a Swagelok fitting to attach Teflon tubing to the probe. Place the small jar with isopropyl alcohol (IPA) near the probe and put the shroud over the probe and jar. Seal the shroud to the ground using weather stripping. Monitor the air inside the top of the shroud using the PID to check for sufficient IPA concentration.
2. Note that the IPA response factor is approximately 5.6 (i.e. a reading of 2 ppm on the PID indicates 5.6 x 2 = 11.2 ppm of IPA in the sample). Record both the observed PID reading and the calculated IPA. If the PID reading is below 10 ppm, slowly reapply leak-check compound.
3. Uncap and immediately reseal the required number of field blank tubes (optional).
4. Calibrate the pump using a "dummy" tube. Connect the sampling pump with mass flow monitor to the outlet of the "dummy" tube using a Swagelok fitting. The inlet of the "dummy tube" should be connected to the probe via Teflon tubing using a Swagelok connector.
5. Set the flow rate on the pump to the desired rate (typically 50mL/min). Leave the pump on for approximately one minute to establish the approximate flow rate. Record the flow rate on the data sheet.
6. Replace the "dummy" tube with the sampling tube(s) and adjust the flow rate to the desired rate quickly, and record flow rate and start time on the field data sheet.
7. Continue sampling for the pre-determined duration (typically 20 min for 1L sample). Recheck the flow rate at the end of the sampling period (i.e. 20 minutes) prior to turning off the pump and record the field data sheet.
8. After turning off the pump, immediately remove the sampling tube(s) and cap both ends with Swagelok fittings. Store the sampling tube(s) in sealable plastic bags on ice in an ice chest.
9. Note tube identification numbers, pump flow rates, dates, times, sampled volume (using the average of the pre and post flow rates) and ambient conditions on the data sheet. Submit this information to the laboratory with the samples.

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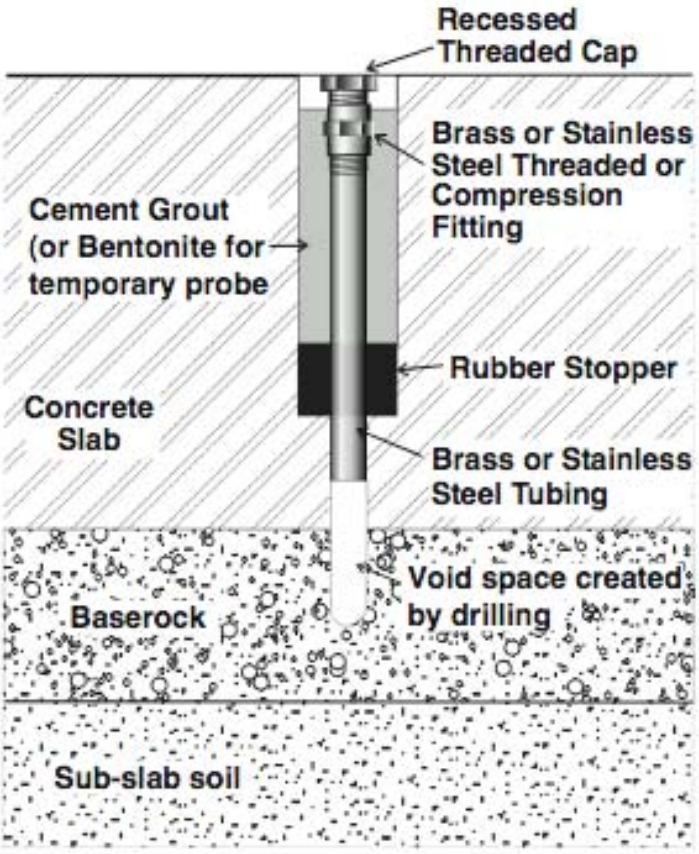
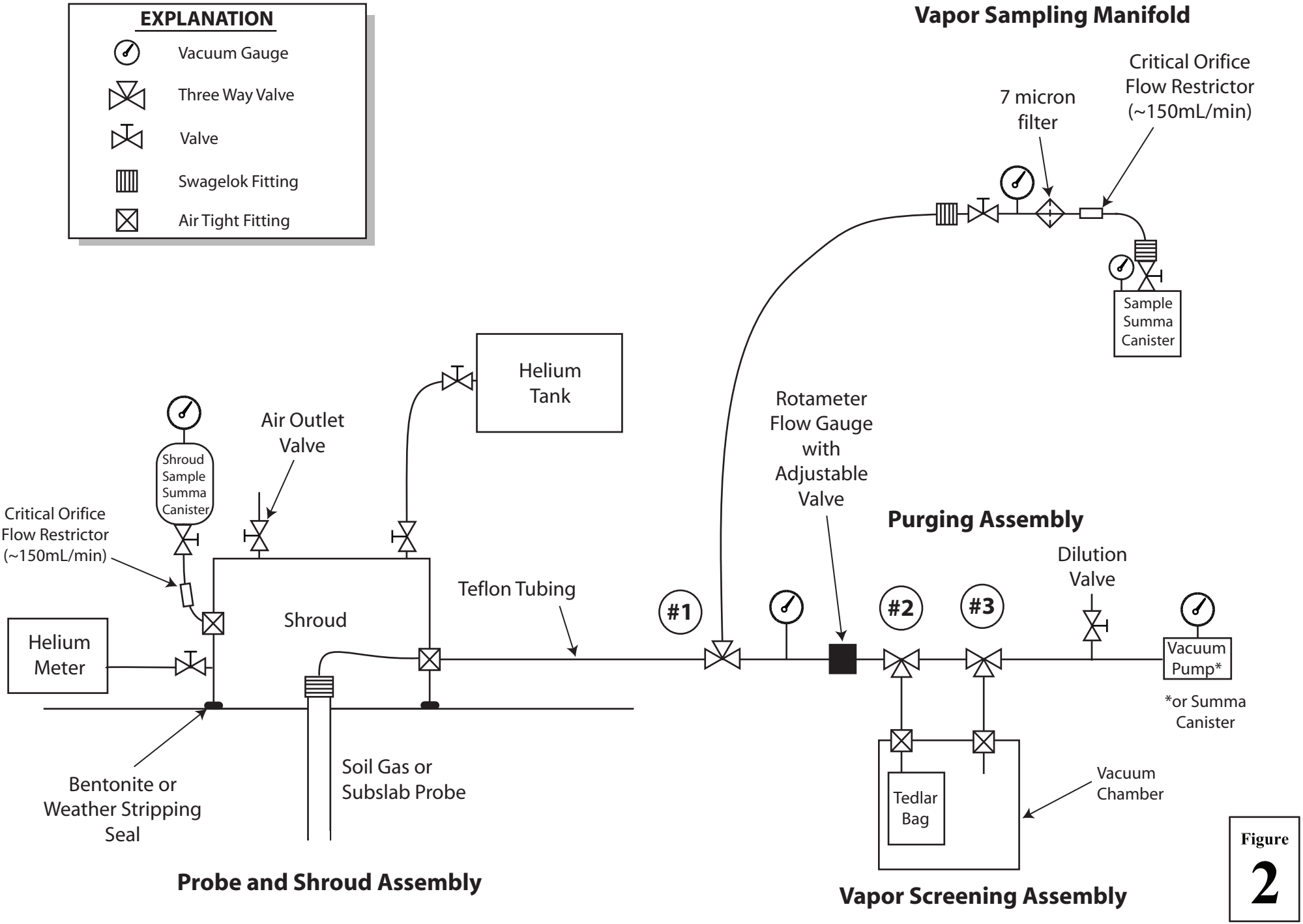


Figure
1

Subslab Vapor Probe Schematic

PANGEA



PANGEA

Subslab Vapor Sampling Manifold Schematic

APPENDIX D

Boring Logs

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

BORING NUMBER CB-1

CLIENT Douglas Parking **PROJECT NAME** Douglas Parking
PROJECT NUMBER **PROJECT LOCATION** 1721 Webster Street
DATE STARTED 12/10/13 **COMPLETED** 12/10/13 **GROUND ELEVATION** **HOLE SIZE** 3.25"
DRILLING CONTRACTOR Confluence Environmental **GROUND WATER LEVELS:**
DRILLING METHOD Hand Auger **AT TIME OF DRILLING** ---
LOGGED BY Morgan Gillies **CHECKED BY** Bob Clark-Riddell **AT END OF DRILLING** ---
NOTES **AFTER DRILLING** ---

DEPTH (ft bgs)	SAMPLE TYPE NUMBER	PID (ppm)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	BORING DIAGRAM
0					**Concrete.** 1.0	
			SP		**Sand (SP)**; brown; 100% fine to medium sand; moist. 3.0	
	CB-1-4		CL		**Silty Clay (CL)**; brown and grey; 100% medium plasticity fines; moist.	
5						
	CB-1-8				8.0	
			SC		**Clayey Sand (SC)**; grey and brown; 80-90% fine to medium sand; 10-20% medium plasticity fines; moist.	
10						
	CB-1-12				12.0	
					Bottom of hole at 12.0 feet.	

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

BORING NUMBER CB-2

CLIENT Douglas Parking **PROJECT NAME** Douglas Parking

PROJECT NUMBER **PROJECT LOCATION** 1721 Webster Street

DATE STARTED 12/10/13 **COMPLETED** 12/10/13 **GROUND ELEVATION** **HOLE SIZE** 3.25"

DRILLING CONTRACTOR Confluence Environmental **GROUND WATER LEVELS:**

DRILLING METHOD Hand Auger **AT TIME OF DRILLING** ---

LOGGED BY Morgan Gillies **CHECKED BY** Bob Clark-Riddell **AT END OF DRILLING** ---

NOTES Hand Auger @ ~ 25 degree angle from vertical toward Webster St (SE) **AFTER DRILLING** ---

DEPTH (ft bgs)	SAMPLE TYPE NUMBER	PID (ppm)	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	BORING DIAGRAM
0				0.5	**Concrete.**	
				1.5	**Fill Material.**	
			SP	3.0	**Sand (SP)**; brown; 100% fine to medium sand; moist.	
5	CB-2-4		CL		**Sandy Clay (CL)**; brown; 70-80% medium plasticity fines; 20-30% fine sand; moist.	
	CB-2-8					
10	CB-2-10			10.0	*Boring Drilled at 25 degree angle from vertical. Depths shown are approximately 10% deeper than vertical depth bgs.)* Bottom of hole at 10.0 feet.	

APPENDIX E

Subslab Sampling Field Data Sheets

Soil Vapor Probe Purging/Sampling Log

Project Name: DOUGLAS PARCEL
Job Number: 1135.001
Date: 11/19/13
Sampler(s): Scott Polston, ~~TINA DE LA FUENTE~~
Sample ID and Time:
Notes: Held 150" for 5 min ✓

Sub-Slab Probe ID: SS-1
Suma Can Serial #: 643
Flow Controller #: 980
Initial Vacuum: -30
Final Vacuum: -4

Specifications 104

Tubing length:	~~12.7~~	cm
Tubing inner diameter:	0.32	cm
Boring diameter:	0.1	cm
Sandpack height:	0.1	cm
Probe length:	2.54	cm
Probe diameter:	0.635	cm
Summa flow rate:	150	mL/min
Purge flow rate:	~~100~~ 50	mL/min

Purge Volume Calculation

Purge volume = tubing + sandpack
Tubing = Pi * (inner diameter/2)^2 * length
= ~~1.02~~ cm3 8.3
Sandpack = Pi * (boring diameter/2)^2 * sandpack height * porosity
= 0.0004 cm3
Single purge volume: ~~1.02~~ cm^3 8.3 Start Time:
Total purge volumes extracted: Total Purge Time: 30 sec
Pi = 3.1416 1 inch = 2.54 cm Est. max. porosity = 0.45
1 ml = 1 cm3

Time	He Delivery Pressure (psi)	He in Shroud (% or ppm)	Purge Time (min./sec.)	He in Purge Sample (% or ppm)	VOCs (ppmv)	O_2 (%)	CO_2 (%)	CH_4 (%)	Comments
~~7.68~~									
0809		27.6	0	0	N/a				
0810		27.2	15	0	0				
811		27.1							
0813		26.9							
0815		25.7							
0817		24.2							
Post		23.1		0%	0 ppm				

Soil Vapor Probe Purging/Sampling Log

Project Name: DOUGLAS PARKING
Job Number: 1135.001
Date: 11/13/13
Sampler(s): **Scott Polston**, TINA DE LA FUENTE
Sample ID and Time: SS-3, 0917
Notes: Held 150" of H_2O for 5 min

Sub-Slab Probe ID: SS-3
Suma Can Serial #: 6167
Flow Controller #: 588
Initial Vacuum: -30
Final Vacuum: -5

Specifications ~~102~~ 116

Tubing length:	~~25.4~~	cm
Tubing inner diameter:	0.32	cm
Boring diameter:	0.1	cm
Sandpack height:	0.1	cm
Probe length:	2.54	cm
Probe diameter:	0.635	cm
Summa flow rate:	150	mL/min
Purge flow rate:	~~100~~ 50	mL/min

Purge Volume Calculation

Purge volume = tubing + sandpack

Tubing = Pi * (inner diameter/2)^2 * length

= ~~2.01~~ cm3 ~~8.7~~ 9.3

Sandpack = Pi * (boring diameter/2)^2 * sandpack height * porosity

= 0.0004 cm3 9.3

Single purge volume: ~~2.01~~ cm^3 ~~8.7~~ Start Time: 0916

Total purge volumes extracted: ~~1~~ Total Purge Time: 30 sec

Pi = 3.1416 1 inch = 2.54 cm Est. max. porosity = 0.45

1 ml = 1 cm3

Time	He Delivery Pressure (psi)	He in Shroud (% or ppm)	Purge Time (min./sec.)	He in Purge Sample (% or ppm)	VOCs (ppmv)	O_2 (%)	CO_2 (%)	CH_4 (%)	Comments
~~7:68~~	N/A	40%	✓						
0916				0%	N/A				PRE-SAMPLE
0917		33.6							
0919		32.3							
0921		31.4							
0923		29.2							
0924		27.5							
0926				0%	0				POST-SAMPLE

Soil Vapor Probe Purging/Sampling Log

Project Name: DOUGLAS PARKING
Job Number: 1135.001
Date: 11/13/13
Sampler(s): **Scott Polston,** TINA DE LA FUENTE
Sample ID and Time: SS-2 0946
Notes: Held 150" Vac for 5min

Sub-Slab Probe ID: SS-2
Suma Can Serial #: 757.3
Flow Controller #: 986
Initial Vacuum: -27
Final Vacuum: -5

Specifications

Tubing length: 10.1 cm
Tubing inner diameter: 0.32 cm
Boring diameter: 0.1 cm
Sandpack height: 0.1 cm
Probe length: 2.54 cm
Probe diameter: 0.635 cm
Summa flow rate: 150 mL/min
Purge flow rate: ~~100~~ 50 mL/min

Purge Volume Calculation

Purge volume = tubing + sandpack
Tubing = Pi * (inner diameter/2)^2 * length
= 8.1 cm3
Sandpack = Pi * (boring diameter/2)^2 * sandpack height * porosity
= 0.0004 cm3
Single purge volume: 8.1 cm^3
Start Time: 0947
Total purge volumes extracted:
Total Purge Time: 30 secs
Pi = 3.1416 1 inch = 2.54 cm Est. max. porosity = 0.45
1 ml = 1 cm3

Time	He Delivery Pressure (psi)	He in Shroud (% or ppm)	Purge Time (min./sec.)	He in Purge Sample (% or ppm)	VOCs (ppmv)	O_2 (%)	CO_2 (%)	CH_4 (%)	Comments
~~1108~~	N/A	28%							
0946		27%		0%	N/A				PRE-SAMPLE
0947		26.8%							
0949		25.8%							
0951		24.5%							
0954				0%	1				POST-SAMPLE

APPENDIX F

Laboratory Analytical Reports

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1311477 **Amended:** 11/22/2013

Report Created for: Pangea Environmental Svcs., Inc.
1710 Franklin Street, Ste. 200
Oakland, CA 94612

Project Contact: Tina De La Fuente
Project P.O.:
Project Name: #1135.001; Douglas Parking

Project Received: 11/14/2013

Analytical Report reviewed & approved for release on 11/21/2013 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

The report shall not be reproduced except in full, without the written approval of the laboratory. The analytical results relate only to the items tested. Results reported conform to the most current NELAP standards, where applicable, unless otherwise stated in the case narrative.

1534 Willow Pass Rd. Pittsburg, CA 94565 ♦ TEL: (877) 252-9262 ♦ FAX: (925) 252-9269 ♦ www.mccampbell.com
NELAP: 12283CA ♦ ELAP: 1644 ♦ ISO/IEC: 17025:2005 ♦ WSDE: C972-11 ♦ ADEC: UST-098 ♦ UCMR3

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Pangea Environmental Svcs., Inc.
Project: #1135.001; Douglas Parking
WorkOrder: 1311477

Glossary Abbreviation	Description
95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	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.
RD	Relative Difference
RL	Reporting Limit
RPD	Relative Percent Deviation
SPK Val	Spike Value
SPKRef Val	Spike Reference Value

Analytical Qualifier	
j1	see attached narrative

McCampbell Analytical, Inc.
"When Quality Counts"

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Case Narrative

Client: Pangea Environmental Svcs., Inc.
Project: #1135.001; Douglas Parking

Work Order: 1311477
November 21, 2013

TO-15 ANALYSIS

All summa canisters are EVACUATED 5 days after the reporting of the results. Please call or email if a longer retention time is required.

In an effort to attain the lowest reporting limits possible for the majority of the TO-15 target list, high level compounds may be analyzed using EPA Method 8260B.

Polymer (Tedlar) bags are not recommended for TO15 samples. The disadvantages are listed in Appendix B of the DTSC Advisory of April 2012.

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
"When Quality Counts"

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Case Narrative

Client: Pangea Environmental Svcs., Inc.
Project: #1135.001; Douglas Parking

Work Order: 1311477
November 21, 2013

RE: MAI Sample ID 1311477-003A
Client ID: SS-1

The compound Tetrahydro-Furan (THF)'s reporting limit was raised due to co-elution with non-target peak interfering with quantitative value.

McCampbell Analytical, Inc.
"When Quality Counts"

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Project:	#1135.001; Douglas Parking	**Extraction Method**	ASTM D 1946-90
Date Received:	11/14/13 19:40	**Analytical Method:**	ASTM D 1946-90
Date Prepared:	11/19/13	**Unit:**	%

Helium

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-3	**1311477-001A**	**Soil Gas/DISS.**	**11/13/2013 09:17**	**GC26**	**84196**

Initial Pressure (psia)	Final Pressure (psia)
13.53	**26.98**

Analytes	Result	RL	DF	Date Analyzed
Helium	**0.12**	0.0050	1	11/19/2013 15:37

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-2	**1311477-002A**	**Soil Gas/DISS.**	**11/13/2013 09:46**	**GC26**	**84196**

Initial Pressure (psia)	Final Pressure (psia)
11.24	**22.39**

Analytes	Result	RL	DF	Date Analyzed
Helium	**0.48**	0.0066	1.3	11/19/2013 15:50

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-1	**1311477-003A**	**Soil Gas/DISS.**	**11/14/2013 08:19**	**GC26**	**84196**

Initial Pressure (psia)	Final Pressure (psia)
13.10	**26.11**

Analytes	Result	RL	DF	Date Analyzed
Helium	**0.13**	0.0077	1.5	11/19/2013 16:03

McCampbell Analytical, Inc.
"When Quality Counts"

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Project:	#1135.001; Douglas Parking	**Extraction Method**	ASTM D 1946-90
Date Received:	11/14/13 19:40	**Analytical Method:**	ASTM D 1946-90
Date Prepared:	11/20/13	**Unit:**	%

Light Gases

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-3	**1311477-001A**	**Soil Gas/DISS.**	**11/13/2013 09:17**	**GC26**	**84251**

Initial Pressure (psia)	Final Pressure (psia)
13.53	**26.98**

Analytes	Result	RL	DF	Date Analyzed
Oxygen	**17**	0.40	1	11/20/2013 11:52

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-2	**1311477-002A**	**Soil Gas/DISS.**	**11/13/2013 09:46**	**GC26**	**84251**

Initial Pressure (psia)	Final Pressure (psia)
11.24	**22.39**

Analytes	Result	RL	DF	Date Analyzed
Oxygen	**16**	0.52	1.3	11/20/2013 12:13

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-1	**1311477-003A**	**Soil Gas/DISS.**	**11/14/2013 08:19**	**GC26**	**84251**

Initial Pressure (psia)	Final Pressure (psia)
13.10	**26.11**

Analytes	Result	RL	DF	Date Analyzed
Oxygen	**17**	0.62	1.5	11/20/2013 12:34

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Project:	#1135.001; Douglas Parking	**Extraction Method**	TO15
Date Received:	11/14/13 19:40	**Analytical Method:**	TO15
Date Prepared:	11/16/13-11/18/13	**Unit:**	µg/m³

Volatile Organic Compounds in µg/m³

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-3	**1311477-001A**	**Soil Gas**	**11/13/2013 09:17**	**GC24**	**84296**

Initial Pressure (psia)	Final Pressure (psia)
13.53	**26.98**

Analytes	Result	RL	DF	Date Analyzed
Acetone	**110**	60	1	11/18/2013 19:39
Acrolein	**13**	1.2	1	11/18/2013 19:39
Acrylonitrile	ND	1.1	1	11/18/2013 19:39
tert-Amyl methyl ether (TAME)	ND	2.1	1	11/18/2013 19:39
Benzene	**71**	1.6	1	11/18/2013 19:39
Benzyl chloride	ND	2.6	1	11/18/2013 19:39
Bromodichloromethane	ND	3.5	1	11/18/2013 19:39
Bromoform	ND	5.2	1	11/18/2013 19:39
Bromomethane	ND	2.0	1	11/18/2013 19:39
1,3-Butadiene	ND	1.1	1	11/18/2013 19:39
2-Butanone (MEK)	ND	75	1	11/18/2013 19:39
t-Butyl alcohol (TBA)	ND	31	1	11/18/2013 19:39
Carbon Disulfide	**5.6**	1.6	1	11/18/2013 19:39
Carbon Tetrachloride	ND	3.2	1	11/18/2013 19:39
Chlorobenzene	ND	2.4	1	11/18/2013 19:39
Chloroethane	ND	1.3	1	11/18/2013 19:39
Chloroform	ND	2.4	1	11/18/2013 19:39
Chloromethane	ND	1.0	1	11/18/2013 19:39
Cyclohexane	ND	18	1	11/18/2013 19:39
Dibromochloromethane	ND	4.4	1	11/18/2013 19:39
1,2-Dibromo-3-chloropropane	ND	0.12	1	11/18/2013 19:39
1,2-Dibromoethane (EDB)	ND	3.9	1	11/18/2013 19:39
1,2-Dichlorobenzene	ND	3.0	1	11/18/2013 19:39
1,3-Dichlorobenzene	ND	3.0	1	11/18/2013 19:39
1,4-Dichlorobenzene	ND	3.0	1	11/18/2013 19:39
Dichlorodifluoromethane	**2.8**	2.5	1	11/18/2013 19:39
1,1-Dichloroethane	ND	2.0	1	11/18/2013 19:39
1,2-Dichloroethane (1,2-DCA)	ND	2.0	1	11/18/2013 19:39
1,1-Dichloroethene	ND	2.0	1	11/18/2013 19:39
cis-1,2-Dichloroethene	ND	2.0	1	11/18/2013 19:39
trans-1,2-Dichloroethene	ND	2.0	1	11/18/2013 19:39
1,2-Dichloropropane	ND	2.4	1	11/18/2013 19:39
cis-1,3-Dichloropropene	ND	2.3	1	11/18/2013 19:39
trans-1,3-Dichloropropene	ND	2.3	1	11/18/2013 19:39

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Project:	#1135.001; Douglas Parking	**Extraction Method**	TO15
Date Received:	11/14/13 19:40	**Analytical Method:**	TO15
Date Prepared:	11/16/13-11/18/13	**Unit:**	µg/m³

Volatile Organic Compounds in µg/m³

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-3	**1311477-001A**	**Soil Gas**	**11/13/2013 09:17**	**GC24**	**84296**

Initial Pressure (psia)	Final Pressure (psia)
13.53	**26.98**

Analytes	Result	RL	DF	Date Analyzed
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	3.6	1	11/18/2013 19:39
Diisopropyl ether (DIPE)	ND	2.1	1	11/18/2013 19:39
1,4-Dioxane	ND	1.8	1	11/18/2013 19:39
Ethanol	ND	96	1	11/18/2013 19:39
Ethyl acetate	ND	1.8	1	11/18/2013 19:39
Ethyl tert-butyl ether (ETBE)	ND	2.1	1	11/18/2013 19:39
Ethylbenzene	ND	2.2	1	11/18/2013 19:39
4-Ethyltoluene	ND	2.5	1	11/18/2013 19:39
Freon 113	ND	3.9	1	11/18/2013 19:39
Heptane	ND	21	1	11/18/2013 19:39
Hexachlorobutadiene	ND	5.4	1	11/18/2013 19:39
Hexane	ND	18	1	11/18/2013 19:39
2-Hexanone	**22**	2.1	1	11/18/2013 19:39
4-Methyl-2-pentanone (MIBK)	ND	2.1	1	11/18/2013 19:39
Methyl-t-butyl ether (MTBE)	ND	1.8	1	11/18/2013 19:39
Methylene chloride	ND	1.8	1	11/18/2013 19:39
Methyl methacrylate	**12**	2.1	1	11/18/2013 19:39
Naphthalene	ND	5.3	1	11/18/2013 19:39
Propene	ND	88	1	11/18/2013 19:39
Styrene	ND	2.2	1	11/18/2013 19:39
1,1,1,2-Tetrachloroethane	ND	3.5	1	11/18/2013 19:39
1,1,2,2-Tetrachloroethane	ND	3.5	1	11/18/2013 19:39
Tetrachloroethene	**31**	3.4	1	11/18/2013 19:39
Tetrahydrofuran	**2.4**	1.5	1	11/18/2013 19:39
Toluene	**2.6**	1.9	1	11/18/2013 19:39
TPH(g)	**1400**	720	1	11/16/2013 01:37
1,2,4-Trichlorobenzene	ND	3.8	1	11/18/2013 19:39
1,1,1-Trichloroethane	ND	2.8	1	11/18/2013 19:39
1,1,2-Trichloroethane	ND	2.8	1	11/18/2013 19:39
Trichloroethene	ND	2.8	1	11/18/2013 19:39
Trichlorofluoromethane	ND	2.8	1	11/18/2013 19:39
1,2,4-Trimethylbenzene	**4.2**	2.5	1	11/18/2013 19:39
1,3,5-Trimethylbenzene	ND	2.5	1	11/18/2013 19:39
Vinyl Acetate	**6.1**	1.8	1	11/18/2013 19:39

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Analytical Report

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Date Received:	11/14/13 19:40	**Analytical Method:**	TO15
Date Prepared:	11/16/13-11/18/13	**Unit:**	µg/m³

Volatile Organic Compounds in µg/m³

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-3	**1311477-001A**	**Soil Gas**	**11/13/2013 09:17**	**GC24**	**84296**

Initial Pressure (psia)	Final Pressure (psia)
13.53	**26.98**

Analytes	Result	RL	DF	Date Analyzed
Vinyl Chloride	ND	1.3	1	11/18/2013 19:39
Xylenes, Total	ND	6.6	1	11/18/2013 19:39

Surrogates	REC (%)	Limits	
1,2-DCA-d4	96	70-130	11/18/2013 19:39
Toluene-d8	99	70-130	11/18/2013 19:39
4-BFB	99	70-130	11/18/2013 19:39

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CDPH ELAP 1644 ♦ NELAP 12283CA BB Analyst's Initial Angela Rydelius, Lab Manager

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Project:	#1135.001; Douglas Parking	**Extraction Method**	TO15
Date Received:	11/14/13 19:40	**Analytical Method:**	TO15
Date Prepared:	11/16/13-11/18/13	**Unit:**	µg/m³

Volatile Organic Compounds in µg/m³

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-2	**1311477-002A**	**Soil Gas**	**11/13/2013 09:46**	**GC24**	**84296**

Initial Pressure (psia)	Final Pressure (psia)
11.24	**22.39**

Analytes	Result	RL	DF	Date Analyzed
Acetone	**98**	60	1	11/18/2013 20:20
Acrolein	ND	1.2	1	11/18/2013 20:20
Acrylonitrile	ND	1.1	1	11/18/2013 20:20
tert-Amyl methyl ether (TAME)	ND	2.1	1	11/18/2013 20:20
Benzene	**58**	1.6	1	11/18/2013 20:20
Benzyl chloride	ND	2.6	1	11/18/2013 20:20
Bromodichloromethane	ND	3.5	1	11/18/2013 20:20
Bromoform	ND	5.2	1	11/18/2013 20:20
Bromomethane	**25**	2.0	1	11/18/2013 20:20
1,3-Butadiene	ND	1.1	1	11/18/2013 20:20
2-Butanone (MEK)	ND	75	1	11/18/2013 20:20
t-Butyl alcohol (TBA)	ND	31	1	11/18/2013 20:20
Carbon Disulfide	**4.7**	1.6	1	11/18/2013 20:20
Carbon Tetrachloride	ND	3.2	1	11/18/2013 20:20
Chlorobenzene	ND	2.4	1	11/18/2013 20:20
Chloroethane	ND	1.3	1	11/18/2013 20:20
Chloroform	**3.1**	2.4	1	11/18/2013 20:20
Chloromethane	ND	1.0	1	11/18/2013 20:20
Cyclohexane	ND	18	1	11/18/2013 20:20
Dibromochloromethane	ND	4.4	1	11/18/2013 20:20
1,2-Dibromo-3-chloropropane	ND	0.12	1	11/18/2013 20:20
1,2-Dibromoethane (EDB)	ND	3.9	1	11/18/2013 20:20
1,2-Dichlorobenzene	ND	3.0	1	11/18/2013 20:20
1,3-Dichlorobenzene	ND	3.0	1	11/18/2013 20:20
1,4-Dichlorobenzene	ND	3.0	1	11/18/2013 20:20
Dichlorodifluoromethane	**2.8**	2.5	1	11/18/2013 20:20
1,1-Dichloroethane	ND	2.0	1	11/18/2013 20:20
1,2-Dichloroethane (1,2-DCA)	ND	2.0	1	11/18/2013 20:20
1,1-Dichloroethene	ND	2.0	1	11/18/2013 20:20
cis-1,2-Dichloroethene	ND	2.0	1	11/18/2013 20:20
trans-1,2-Dichloroethene	ND	2.0	1	11/18/2013 20:20
1,2-Dichloropropane	ND	2.4	1	11/18/2013 20:20
cis-1,3-Dichloropropene	ND	2.3	1	11/18/2013 20:20
trans-1,3-Dichloropropene	ND	2.3	1	11/18/2013 20:20

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Project:	#1135.001; Douglas Parking	**Extraction Method**	TO15
Date Received:	11/14/13 19:40	**Analytical Method:**	TO15
Date Prepared:	11/16/13-11/18/13	**Unit:**	µg/m³

Volatile Organic Compounds in µg/m³

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-2	**1311477-002A**	**Soil Gas**	**11/13/2013 09:46**	**GC24**	**84296**

Initial Pressure (psia)	Final Pressure (psia)
11.24	**22.39**

Analytes	Result	RL	DF	Date Analyzed
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	3.6	1	11/18/2013 20:20
Diisopropyl ether (DIPE)	ND	2.1	1	11/18/2013 20:20
1,4-Dioxane	ND	1.8	1	11/18/2013 20:20
Ethanol	ND	96	1	11/18/2013 20:20
Ethyl acetate	**25**	1.8	1	11/18/2013 20:20
Ethyl tert-butyl ether (ETBE)	ND	2.1	1	11/18/2013 20:20
Ethylbenzene	ND	2.2	1	11/18/2013 20:20
4-Ethyltoluene	ND	2.5	1	11/18/2013 20:20
Freon 113	ND	3.9	1	11/18/2013 20:20
Heptane	ND	21	1	11/18/2013 20:20
Hexachlorobutadiene	ND	5.4	1	11/18/2013 20:20
Hexane	ND	18	1	11/18/2013 20:20
2-Hexanone	**19**	2.1	1	11/18/2013 20:20
4-Methyl-2-pentanone (MIBK)	**2.7**	2.1	1	11/18/2013 20:20
Methyl-t-butyl ether (MTBE)	ND	1.8	1	11/18/2013 20:20
Methylene chloride	**2.5**	1.8	1	11/18/2013 20:20
Methyl methacrylate	**11**	2.1	1	11/18/2013 20:20
Naphthalene	ND	5.3	1	11/18/2013 20:20
Propene	ND	88	1	11/18/2013 20:20
Styrene	ND	2.2	1	11/18/2013 20:20
1,1,1,2-Tetrachloroethane	ND	3.5	1	11/18/2013 20:20
1,1,2,2-Tetrachloroethane	ND	3.5	1	11/18/2013 20:20
Tetrachloroethene	**29**	3.4	1	11/18/2013 20:20
Tetrahydrofuran	ND	1.5	1	11/18/2013 20:20
Toluene	**2.7**	1.9	1	11/18/2013 20:20
TPH(g)	**2000**	720	1	11/16/2013 02:17
1,2,4-Trichlorobenzene	ND	3.8	1	11/18/2013 20:20
1,1,1-Trichloroethane	ND	2.8	1	11/18/2013 20:20
1,1,2-Trichloroethane	ND	2.8	1	11/18/2013 20:20
Trichloroethene	ND	2.8	1	11/18/2013 20:20
Trichlorofluoromethane	ND	2.8	1	11/18/2013 20:20
1,2,4-Trimethylbenzene	**3.8**	2.5	1	11/18/2013 20:20
1,3,5-Trimethylbenzene	ND	2.5	1	11/18/2013 20:20
Vinyl Acetate	ND	1.8	1	11/18/2013 20:20

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Project:	#1135.001; Douglas Parking	**Extraction Method**	TO15
Date Received:	11/14/13 19:40	**Analytical Method:**	TO15
Date Prepared:	11/16/13-11/18/13	**Unit:**	µg/m³

Volatile Organic Compounds in µg/m³

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-2	**1311477-002A**	**Soil Gas**	**11/13/2013 09:46**	**GC24**	**84296**

Initial Pressure (psia)	Final Pressure (psia)
11.24	**22.39**

Analytes	Result	RL	DF	Date Analyzed
Vinyl Chloride	ND	1.3	1	11/18/2013 20:20
Xylenes, Total	ND	6.6	1	11/18/2013 20:20

Surrogates	REC (%)	Limits	
1,2-DCA-d4	94	70-130	11/18/2013 20:20
Toluene-d8	99	70-130	11/18/2013 20:20
4-BFB	99	70-130	11/18/2013 20:20

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Project:	#1135.001; Douglas Parking	**Extraction Method**	TO15
Date Received:	11/14/13 19:40	**Analytical Method:**	TO15
Date Prepared:	11/16/13-11/18/13	**Unit:**	µg/m³

Volatile Organic Compounds in µg/m³

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-1	**1311477-003A**	**Soil Gas**	**11/14/2013 08:19**	**GC24**	**84296**

Initial Pressure (psia)	Final Pressure (psia)
13.10	**26.11**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	60	1	11/18/2013 21:00
Acrolein	ND	1.2	1	11/18/2013 21:00
Acrylonitrile	ND	1.1	1	11/18/2013 21:00
tert-Amyl methyl ether (TAME)	ND	2.1	1	11/18/2013 21:00
Benzene	ND	1.6	1	11/18/2013 21:00
Benzyl chloride	ND	2.6	1	11/18/2013 21:00
Bromodichloromethane	ND	3.5	1	11/18/2013 21:00
Bromoform	ND	5.2	1	11/18/2013 21:00
Bromomethane	ND	2.0	1	11/18/2013 21:00
1,3-Butadiene	ND	1.1	1	11/18/2013 21:00
2-Butanone (MEK)	ND	75	1	11/18/2013 21:00
t-Butyl alcohol (TBA)	ND	31	1	11/18/2013 21:00
Carbon Disulfide	ND	1.6	1	11/18/2013 21:00
Carbon Tetrachloride	ND	3.2	1	11/18/2013 21:00
Chlorobenzene	ND	2.4	1	11/18/2013 21:00
Chloroethane	ND	1.3	1	11/18/2013 21:00
Chloroform	ND	2.4	1	11/18/2013 21:00
Chloromethane	ND	1.0	1	11/18/2013 21:00
Cyclohexane	ND	18	1	11/18/2013 21:00
Dibromochloromethane	ND	4.4	1	11/18/2013 21:00
1,2-Dibromo-3-chloropropane	ND	0.12	1	11/18/2013 21:00
1,2-Dibromoethane (EDB)	ND	3.9	1	11/18/2013 21:00
1,2-Dichlorobenzene	ND	3.0	1	11/18/2013 21:00
1,3-Dichlorobenzene	ND	3.0	1	11/18/2013 21:00
1,4-Dichlorobenzene	ND	3.0	1	11/18/2013 21:00
Dichlorodifluoromethane	ND	2.5	1	11/18/2013 21:00
1,1-Dichloroethane	ND	2.0	1	11/18/2013 21:00
1,2-Dichloroethane (1,2-DCA)	ND	2.0	1	11/18/2013 21:00
1,1-Dichloroethene	ND	2.0	1	11/18/2013 21:00
cis-1,2-Dichloroethene	ND	2.0	1	11/18/2013 21:00
trans-1,2-Dichloroethene	ND	2.0	1	11/18/2013 21:00
1,2-Dichloropropane	ND	2.4	1	11/18/2013 21:00
cis-1,3-Dichloropropene	ND	2.3	1	11/18/2013 21:00
trans-1,3-Dichloropropene	ND	2.3	1	11/18/2013 21:00

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Project:	#1135.001; Douglas Parking	**Extraction Method**	TO15
Date Received:	11/14/13 19:40	**Analytical Method:**	TO15
Date Prepared:	11/16/13-11/18/13	**Unit:**	µg/m³

Volatile Organic Compounds in µg/m³

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-1	**1311477-003A**	**Soil Gas**	**11/14/2013 08:19**	**GC24**	**84296**

Initial Pressure (psia)	Final Pressure (psia)
13.10	**26.11**

Analytes	Result	RL	DF	Date Analyzed
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	3.6	1	11/18/2013 21:00
Diisopropyl ether (DIPE)	ND	2.1	1	11/18/2013 21:00
1,4-Dioxane	ND	1.8	1	11/18/2013 21:00
Ethanol	ND	96	1	11/18/2013 21:00
Ethyl acetate	**25**	1.8	1	11/18/2013 21:00
Ethyl tert-butyl ether (ETBE)	ND	2.1	1	11/18/2013 21:00
Ethylbenzene	ND	2.2	1	11/18/2013 21:00
4-Ethyltoluene	ND	2.5	1	11/18/2013 21:00
Freon 113	ND	3.9	1	11/18/2013 21:00
Heptane	ND	21	1	11/18/2013 21:00
Hexachlorobutadiene	ND	5.4	1	11/18/2013 21:00
Hexane	ND	18	1	11/18/2013 21:00
2-Hexanone	ND	2.1	1	11/18/2013 21:00
4-Methyl-2-pentanone (MIBK)	ND	2.1	1	11/18/2013 21:00
Methyl-t-butyl ether (MTBE)	ND	1.8	1	11/18/2013 21:00
Methylene chloride	ND	1.8	1	11/18/2013 21:00
Methyl methacrylate	ND	2.1	1	11/18/2013 21:00
Naphthalene	ND	5.3	1	11/18/2013 21:00
Propene	ND	88	1	11/18/2013 21:00
Styrene	ND	2.2	1	11/18/2013 21:00
1,1,1,2-Tetrachloroethane	ND	3.5	1	11/18/2013 21:00
1,1,2,2-Tetrachloroethane	ND	3.5	1	11/18/2013 21:00
Tetrachloroethene	**15**	3.4	1	11/18/2013 21:00
Tetrahydrofuran	ND	38	1	11/18/2013 21:00
Toluene	ND	1.9	1	11/18/2013 21:00
TPH(g)	**2300**	720	1	11/16/2013 02:58
1,2,4-Trichlorobenzene	ND	3.8	1	11/18/2013 21:00
1,1,1-Trichloroethane	ND	2.8	1	11/18/2013 21:00
1,1,2-Trichloroethane	ND	2.8	1	11/18/2013 21:00
Trichloroethene	ND	2.8	1	11/18/2013 21:00
Trichlorofluoromethane	ND	2.8	1	11/18/2013 21:00
1,2,4-Trimethylbenzene	ND	2.5	1	11/18/2013 21:00
1,3,5-Trimethylbenzene	ND	2.5	1	11/18/2013 21:00
Vinyl Acetate	ND	1.8	1	11/18/2013 21:00

(Cont.)

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Project:	#1135.001; Douglas Parking	**Extraction Method**	TO15
Date Received:	11/14/13 19:40	**Analytical Method:**	TO15
Date Prepared:	11/16/13-11/18/13	**Unit:**	µg/m³

Volatile Organic Compounds in µg/m³

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
SS-1	**1311477-003A**	**Soil Gas**	**11/14/2013 08:19**	**GC24**	**84296**

Initial Pressure (psia)	Final Pressure (psia)
13.10	**26.11**

Analytes	Result	RL	DF	Date Analyzed
Vinyl Chloride	ND	1.3	1	11/18/2013 21:00
Xylenes, Total	ND	6.6	1	11/18/2013 21:00

Surrogates	REC (%)	Limits	Analytical Comments: j1	
1,2-DCA-d4	92	70-130		11/18/2013 21:00
Toluene-d8	101	70-130		11/18/2013 21:00
4-BFB	99	70-130		11/18/2013 21:00

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Date Prepared:	11/19/13	**BatchID:**	84196
Date Analyzed:	11/19/13	**Extraction Method**	ASTM D 1946-90
Instrument:	GC26	**Analytical Method:**	ASTM D 1946-90
Matrix:	Soilgas	**Unit:**	%
Project:	#1135.001; Douglas Parking	**Sample ID:**	MB/LCS-84196

QC SUMMARY REPORT FOR ASTM D 1946-90

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Helium	ND	0.01042	0.0050	0.010	-	104	60-140

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Date Prepared:	11/20/13	**BatchID:**	84251
Date Analyzed:	11/20/13	**Extraction Method**	ASTM D 1946-90
Instrument:	GC26	**Analytical Method:**	ASTM D 1946-90
Matrix:	SoilGas	**Unit:**	uL/L
Project:	#1135.001; Douglas Parking	**Sample ID:**	MB/LCS-84251

QC Summary Report for ASTM D1946-90

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Oxygen	ND	6811	4000	7000	-	97.3	70-130

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Date Prepared:	11/18/13	**BatchID:**	84296
Date Analyzed:	11/18/13	**Extraction Method:**	TO15
Instrument:	GC24	**Analytical Method:**	TO15
Matrix:	Soilgas	**Unit:**	nL/L
Project:	#1135.001; Douglas Parking	**Sample ID:**	MB/LCS-84296

QC SUMMARY REPORT FOR TO15

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	25	-	-	-	-
Acrylonitrile	ND	22.33	0.50	25	-	89.3	60-140
tert-Amyl methyl ether (TAME)	ND	27.7	0.50	25	-	111	60-140
Benzene	ND	18.87	0.50	25	-	75.5	60-140
Benzyl chloride	ND	36.36	0.50	25	-	145, F2	60-140
Bromodichloromethane	ND	28.31	0.50	25	-	113	60-140
Bromoform	ND	31.58	0.50	25	-	126	60-140
Bromomethane	ND	-	0.50	-	-	-	-
1,3-Butadiene	ND	-	0.50	-	-	-	-
2-Butanone (MEK)	ND	-	25	-	-	-	-
t-Butyl alcohol (TBA)	ND	21.83	10	25	-	87.3	60-140
Carbon Disulfide	ND	26.2	0.50	25	-	105	60-140
Carbon Tetrachloride	ND	32.32	0.50	25	-	129	60-140
Chlorobenzene	ND	25.92	0.50	25	-	104	60-140
Chloroethane	ND	27.65	0.50	25	-	111	60-140
Chloroform	ND	22.34	0.50	25	-	89.3	60-140
Chloromethane	ND	23.93	0.50	25	-	95.7	60-140
Cyclohexane	ND	-	5.0	-	-	-	-
Dibromochloromethane	ND	31.77	0.50	25	-	127	60-140
1,2-Dibromo-3-chloropropane	ND	34.38	0.012	25	-	138	60-140
1,2-Dibromoethane (EDB)	ND	23.29	0.50	25	-	93.2	60-140
1,2-Dichlorobenzene	ND	-	0.50	-	-	-	-
1,3-Dichlorobenzene	ND	26.97	0.50	25	-	108	60-140
1,4-Dichlorobenzene	ND	21.45	0.50	25	-	85.8	60-140
Dichlorodifluoromethane	ND	27.12	0.50	25	-	108	60-140
1,1-Dichloroethane	ND	24.37	0.50	25	-	97.5	60-140
1,2-Dichloroethane (1,2-DCA)	ND	23.25	0.50	25	-	93	60-140
1,1-Dichloroethene	ND	-	0.50	-	-	-	-
cis-1,2-Dichloroethene	ND	26.51	0.50	25	-	106	60-140
trans-1,2-Dichloroethene	ND	26.3	0.50	25	-	105	60-140
1,2-Dichloropropane	ND	21.49	0.50	25	-	86	60-140
cis-1,3-Dichloropropene	ND	28.61	0.50	25	-	114	60-140
trans-1,3-Dichloropropene	ND	26.7	0.50	25	-	107	60-140
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	24.67	0.50	25	-	98.7	60-140
Diisopropyl ether (DIPE)	ND	21.06	0.50	25	-	84.3	60-140
1,4-Dioxane	ND	25.15	0.50	25	-	101	60-140
Ethanol	ND	-	50	-	-	-	-
Ethyl acetate	ND	24.21	0.50	25	-	96.8	60-140
Ethyl tert-butyl ether (ETBE)	ND	26.71	0.50	25	-	107	60-140
Ethylbenzene	ND	26.08	0.50	25	-	104	60-140

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1311477
Date Prepared:	11/18/13	**BatchID:**	84296
Date Analyzed:	11/18/13	**Extraction Method:**	TO15
Instrument:	GC24	**Analytical Method:**	TO15
Matrix:	Soilgas	**Unit:**	nL/L
Project:	#1135.001; Douglas Parking	**Sample ID:**	MB/LCS-84296

QC SUMMARY REPORT FOR TO15

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
4-Ethyltoluene	ND	-	0.50	-	-	-	-
Freon 113	ND	24.99	0.50	25	-	100	60-140
Heptane	ND	-	5.0	-	-	-	-
Hexachlorobutadiene	ND	28.47	0.50	25	-	114	60-140
Hexane	ND	-	5.0	-	-	-	-
2-Hexanone	ND	-	0.50	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	26.24	0.50	25	-	105	60-140
Methyl-t-butyl ether (MTBE)	ND	28.84	0.50	25	-	115	60-140
Methylene chloride	ND	22.03	0.50	25	-	88.1	60-140
Naphthalene	ND	40.26	1.0	50	-	80.5	60-140
Propene	ND	-	50	-	-	-	-
Styrene	ND	28.93	0.50	25	-	116	60-140
1,1,1,2-Tetrachloroethane	ND	26.99	0.50	25	-	108	60-140
1,1,2,2-Tetrachloroethane	ND	20.13	0.50	25	-	80.5	60-140
Tetrachloroethene	ND	24.11	0.50	25	-	96.4	60-140
Tetrahydrofuran	ND	21.19	0.50	25	-	84.8	60-140
Toluene	ND	25.49	0.50	25	-	102	60-140
1,2,4-Trichlorobenzene	ND	28.82	0.50	25	-	115	60-140
1,1,1-Trichloroethane	ND	29.26	0.50	25	-	117	60-140
1,1,2-Trichloroethane	ND	22.06	0.50	25	-	88.2	60-140
Trichloroethene	ND	22.13	0.50	25	-	88.5	60-140
Trichlorofluoromethane	ND	-	0.50	-	-	-	-
1,2,4-Trimethylbenzene	ND	27.15	0.50	25	-	109	60-140
1,3,5-Trimethylbenzene	ND	26	0.50	25	-	104	60-140
Vinyl Acetate	ND	-	0.50	-	-	-	-
Vinyl Chloride	ND	25.31	0.50	25	-	101	60-140
Xylenes, Total	ND	78.88	1.5	75	-	105	60-140
Surrogate Recovery							
1,2-DCA-d4	471.7	472.6		500	94	95	60-140
Toluene-d8	496.8	496.7		500	99	99	60-140
4-BFB	484.9	496.7		500	97	99	60-140

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 1311477 **ClientCode: PEO**

☐ WaterTrax ☐ WriteOn ☑ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Tina De La Fuente
Pangea Environmental Svcs., Inc.
1710 Franklin Street, Ste. 200
Oakland, CA 94612
(510) 836-3700 FAX: (510) 836-3709

Email: tdelafuente@pangeaenv.com
cc:
PO:
ProjectNo: #1135.001; Douglas Parking

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

Requested TAT: **5 days**

Date Received: **11/14/2013**
Date Printed: **11/22/2013**

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
1311477-001	SS-3	Soil Gas	11/13/2013 9:17	☐	A	A		A								
1311477-002	SS-2	Soil Gas	11/13/2013 9:46	☐	A			A								
1311477-003	SS-1	Soil Gas	11/14/2013 8:19	☐	A		A	A								

Test Legend:

1	LG_SUMMA_SOILGAS(%)	2	PREDF REPORT	3	PRUNUSEDSUMMA	4	O15_Scan-SIM_SOIL(UG/M3	5	
6		7		8		9		10	
11		12							

The following SampIDs: 001A, 002A, 003A contain testgroup.

Prepared by: Daniel Loa

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.

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WORK ORDER SUMMARY

Client Name: PANGEA ENVIRONMENTAL SVCS., INC. **QC Level:** LEVEL 2 **Work Order:** 1311477

Project: #1135.001; Douglas Parking **Client Contact:** Tina De La Fuente **Date Received:** 11/14/2013

Comments: **Contact's Email:** tdelafuente@pangeaenv.com

☐ WaterTrax ☐ WriteOn ☑ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1311477-001A	SS-3	Soil Gas	TO15 w/ Helium	1	1L Summa	☐	11/13/2013 9:17	5 days		☐	
			ASTM D1946-90 (Light Gases, Atmospheric) <Oxygen>			☐		5 days		☐	
1311477-002A	SS-2	Soil Gas	TO15 w/ Helium	1	1L Summa	☐	11/13/2013 9:46	5 days		☐	
			ASTM D1946-90 (Light Gases, Atmospheric) <Oxygen>			☐		5 days		☐	
1311477-003A	SS-1	Soil Gas	TO15 w/ Helium	1	1L Summa	☐	11/14/2013 8:19	5 days		☐	
			ASTM D1946-90 (Light Gases, Atmospheric) <Oxygen>			☐		5 days		☐	

*** NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

Bottle Legend:

1L Summa = 1L Summa Canister

1311477

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CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☒ 5 DAY

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

Report To: TINA DE LA FUENTE Bill To: PANGEA ENVIRONMENTAL
Company: PANGEA ENVIRONMENTAL SERVICES INC.
1710 FRANKLIN ST, #200
OAKLAND, CA 94612 E-Mail: tdelafuente@pangeaenv.com
Tele: (510) 836-3700 Fax: (510) 836-3709
Project #: 1135.001 Project Name: DOUGLAS PARKING
Project Location: 1721 WEBSTER ST, OAKLAND
Sampler Signature: [signature]

Lab Use Only			
Pressurized By	Date	Pressurization Gas	
		N2	He

Helium Shroud SN#:
Other:
Notes: *

Field Sample ID (Location)	Collection Date	Collection Time	Canister SN#	Manifold / Sampler Kit SN#	Analysis Requested	Indoor Air	Soil Gas	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
			753	988							
SS-3	11/13/13	0917	~~7513~~ ~~861~~ TDLF	~~316/1~~ ~~986~~ TDLF	TO 15, %O2, % Helium		✓	-30	-5		
SS-2	11/13/13	0946	861	986	TO15, %O2, % Helium		✓	-27	-5		
SS-1	11/14/13	0819	043	980	" "		✓	-30	-4		

Relinquished By:	Date:	Time:	Received By:
[signature]	11/14/13	0843	[signature]
[signature]	11/14/13	1600	[signature]

Time: 1450

Temp (°C): ______ Work Order #: ______
Equipment Condition: ______
Shipped Via: ______

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Sample Receipt Checklist

Client Name: **Pangea Environmental Svcs., Inc.**
Date and Time Received: **11/14/2013 7:40:32 PM**

Project Name: **#1135.001; Douglas Parking**
LogIn Reviewed by: Daniel Loa

WorkOrder N°: **1311477** Matrix: Soil Gas
Carrier: Rob Pringle (MAI Courier)

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:		NA ☑
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☐	No ☑	

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

Comments:

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1312325

Report Created for: Pangea Environmental Svcs., Inc.
1710 Franklin Street, Ste. 200
Oakland, CA 94612

Project Contact: Morgan Gillies
Project P.O.:
Project Name: #1135.001; Douglas - Webster St

Project Received: 12/11/2013

Analytical Report reviewed & approved for release on 12/17/2013 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

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Glossary of Terms & Qualifier Definitions

Client: Pangea Environmental Svcs., Inc.
Project: #1135.001; Douglas - Webster St
WorkOrder: 1312325

Glossary Abbreviation	Description
95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	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.
RD	Relative Difference
RL	Reporting Limit
RPD	Relative Percent Deviation
SPK Val	Spike Value
SPKRef Val	Spike Reference Value

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Project:	#1135.001; Douglas - Webster St	**Extraction Method**	SW5030B
Date Received:	12/11/13 20:37	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	12/11/13	**Unit:**	mg/Kg

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

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
CB-1-8	**1312325-002A**	**Soil**	**12/10/2013 10:25**	**GC19**	**85019**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	12/13/2013 07:53
MTBE	---	0.050	1	12/13/2013 07:53
Benzene	---	0.0050	1	12/13/2013 07:53
Toluene	---	0.0050	1	12/13/2013 07:53
Ethylbenzene	---	0.0050	1	12/13/2013 07:53
Xylenes	---	0.0050	1	12/13/2013 07:53

Surrogates	REC (%)	Limits	
2-Fluorotoluene	106	70-130	12/13/2013 07:53

CB-1-12	1312325-003A	Soil	12/10/2013 10:40	GC19	85019

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	12/13/2013 08:23
MTBE	---	0.050	1	12/13/2013 08:23
Benzene	---	0.0050	1	12/13/2013 08:23
Toluene	---	0.0050	1	12/13/2013 08:23
Ethylbenzene	---	0.0050	1	12/13/2013 08:23
Xylenes	---	0.0050	1	12/13/2013 08:23

Surrogates	REC (%)	Limits	
2-Fluorotoluene	106	70-130	12/13/2013 08:23

CB-2-8	1312325-005A	Soil	12/10/2013 11:40	GC19	85019

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	12/13/2013 08:53
MTBE	---	0.050	1	12/13/2013 08:53
Benzene	---	0.0050	1	12/13/2013 08:53
Toluene	---	0.0050	1	12/13/2013 08:53
Ethylbenzene	---	0.0050	1	12/13/2013 08:53
Xylenes	---	0.0050	1	12/13/2013 08:53

Surrogates	REC (%)	Limits	
2-Fluorotoluene	105	70-130	12/13/2013 08:53

(Cont.)

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Project:	#1135.001; Douglas - Webster St	**Extraction Method**	SW5030B
Date Received:	12/11/13 20:37	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	12/11/13	**Unit:**	mg/Kg

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

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
CB-2-10	**1312325-006A**	**Soil**	**12/10/2013 11:55**	**GC7**	**85019**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	12/12/2013 19:53
MTBE	---	0.050	1	12/12/2013 19:53
Benzene	---	0.0050	1	12/12/2013 19:53
Toluene	---	0.0050	1	12/12/2013 19:53
Ethylbenzene	---	0.0050	1	12/12/2013 19:53
Xylenes	---	0.0050	1	12/12/2013 19:53
Surrogates	REC (%)	Limits		
2-Fluorotoluene	106	70-130		12/12/2013 19:53

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Project:	#1135.001; Douglas - Webster St	**Extraction Method**	SW5030B
Date Received:	12/11/13 20:37	**Analytical Method:**	SW8260B
Date Prepared:	12/11/13	**Unit:**	mg/kg

MTBE and BTEX by GC/MS

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
CB-1-8	**1312325-002A**	**Soil**	**12/10/2013 10:25**	**GC16**	**85018**

Analytes	Result	RL	DF	Date Analyzed
Benzene	ND	0.0050	1	12/14/2013 14:01
Ethylbenzene	ND	0.0050	1	12/14/2013 14:01
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	12/14/2013 14:01
Naphthalene	ND	0.0050	1	12/14/2013 14:01
Toluene	ND	0.0050	1	12/14/2013 14:01
Xylenes, Total	ND	0.0050	1	12/14/2013 14:01
Surrogates	REC (%)	Limits		
Dibromofluoromethane	95	70-130		12/14/2013 14:01
Toluene-d8	94	70-130		12/14/2013 14:01

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
CB-1-12	**1312325-003A**	**Soil**	**12/10/2013 10:40**	**GC16**	**85018**

Analytes	Result	RL	DF	Date Analyzed
Benzene	ND	0.0050	1	12/14/2013 14:43
Ethylbenzene	ND	0.0050	1	12/14/2013 14:43
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	12/14/2013 14:43
Naphthalene	ND	0.0050	1	12/14/2013 14:43
Toluene	ND	0.0050	1	12/14/2013 14:43
Xylenes, Total	ND	0.0050	1	12/14/2013 14:43
Surrogates	REC (%)	Limits		
Dibromofluoromethane	95	70-130		12/14/2013 14:43
Toluene-d8	94	70-130		12/14/2013 14:43

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
CB-2-8	**1312325-005A**	**Soil**	**12/10/2013 11:40**	**GC28**	**85018**

Analytes	Result	RL	DF	Date Analyzed
Benzene	ND	0.0050	1	12/15/2013 00:48
Ethylbenzene	ND	0.0050	1	12/15/2013 00:48
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	12/15/2013 00:48
Naphthalene	ND	0.0050	1	12/15/2013 00:48
Toluene	ND	0.0050	1	12/15/2013 00:48
Xylenes, Total	ND	0.0050	1	12/15/2013 00:48
Surrogates	REC (%)	Limits		
Dibromofluoromethane	94	70-130		12/15/2013 00:48
Toluene-d8	102	70-130		12/15/2013 00:48

(Cont.)

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Project:	#1135.001; Douglas - Webster St	**Extraction Method**	SW5030B
Date Received:	12/11/13 20:37	**Analytical Method:**	SW8260B
Date Prepared:	12/11/13	**Unit:**	mg/kg

MTBE and BTEX by GC/MS

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
CB-2-10	**1312325-006A**	**Soil**	**12/10/2013 11:55**	**GC28**	**85018**

Analytes	Result	RL	DF	Date Analyzed
Benzene	ND	0.0050	1	12/15/2013 01:26
Ethylbenzene	ND	0.0050	1	12/15/2013 01:26
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	12/15/2013 01:26
Naphthalene	ND	0.0050	1	12/15/2013 01:26
Toluene	ND	0.0050	1	12/15/2013 01:26
Xylenes, Total	ND	0.0050	1	12/15/2013 01:26
Surrogates	**REC (%)**	**Limits**		
Dibromofluoromethane	94	70-130		12/15/2013 01:26
Toluene-d8	102	70-130		12/15/2013 01:26

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Date Prepared:	12/11/13	**BatchID:**	85019
Date Analyzed:	12/12/13	**Extraction Method:**	SW5030B
Instrument:	GC7	**Analytical Method:**	SW8021B/8015Bm
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#1135.001; Douglas - Webster St	**Sample ID:**	MB/LCS-85019 1312322-001AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	0.6371	0.40	0.60	-	106	70-130
MTBE	ND	0.09444	0.050	0.10	-	94.4	70-130
Benzene	ND	0.115	0.0050	0.10	-	115	70-130
Toluene	ND	0.1145	0.0050	0.10	-	115	70-130
Ethylbenzene	ND	0.1194	0.0050	0.10	-	119	70-130
Xylenes	ND	0.3578	0.0050	0.30	-	119	70-130
Surrogate Recovery							
2-Fluorotoluene	0.1126	0.1131		0.10	113	113	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	NR	NR	0	ND	NR	NR	-	NR	
MTBE	NR	NR	0	ND	NR	NR	-	NR	
Benzene	NR	NR	0	ND	NR	NR	-	NR	
Toluene	NR	NR	0	0.0093	NR	NR	-	NR	
Ethylbenzene	NR	NR	0	ND	NR	NR	-	NR	
Xylenes	NR	NR	0	ND	NR	NR	-	NR	
Surrogate Recovery									
2-Fluorotoluene	NR	NR	0		NR	NR	-	NR	

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Date Prepared:	12/11/13	**BatchID:**	85018
Date Analyzed:	12/11/13 - 12/12/13	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#1135.001; Douglas - Webster St	**Sample ID:**	MB/LCS-85018 1312322-001AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	0.10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	-	0.0050	-	-	-	-
Benzene	ND	0.04552	0.0050	0.050	-	91	70-130
Bromobenzene	ND	-	0.0050	-	-	-	-
Bromochloromethane	ND	-	0.0050	-	-	-	-
Bromodichloromethane	ND	-	0.0050	-	-	-	-
Bromoform	ND	-	0.0050	-	-	-	-
Bromomethane	ND	-	0.0050	-	-	-	-
2-Butanone (MEK)	ND	-	0.020	-	-	-	-
t-Butyl alcohol (TBA)	ND	-	0.050	-	-	-	-
n-Butyl benzene	ND	-	0.0050	-	-	-	-
sec-Butyl benzene	ND	-	0.0050	-	-	-	-
tert-Butyl benzene	ND	-	0.0050	-	-	-	-
Carbon Disulfide	ND	-	0.0050	-	-	-	-
Carbon Tetrachloride	ND	-	0.0050	-	-	-	-
Chlorobenzene	ND	-	0.0050	-	-	-	-
Chloroethane	ND	-	0.0050	-	-	-	-
Chloroform	ND	-	0.0050	-	-	-	-
Chloromethane	ND	-	0.0050	-	-	-	-
2-Chlorotoluene	ND	-	0.0050	-	-	-	-
4-Chlorotoluene	ND	-	0.0050	-	-	-	-
Dibromochloromethane	ND	-	0.0050	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.0040	-	-	-	-
1,2-Dibromoethane (EDB)	ND	-	0.0040	-	-	-	-
Dibromomethane	ND	-	0.0050	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.0050	-	-	-	-
Dichlorodifluoromethane	ND	-	0.0050	-	-	-	-
1,1-Dichloroethane	ND	-	0.0050	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	-	0.0040	-	-	-	-
1,1-Dichloroethene	ND	-	0.0050	-	-	-	-
cis-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
1,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,3-Dichloropropane	ND	-	0.0050	-	-	-	-
2,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,1-Dichloropropene	ND	-	0.0050	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Date Prepared:	12/11/13	**BatchID:**	85018
Date Analyzed:	12/11/13 - 12/12/13	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#1135.001; Douglas - Webster St	**Sample ID:**	MB/LCS-85018 1312322-001AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Diisopropyl ether (DIPE)	ND	-	0.0050	-	-	-	-
Ethylbenzene	ND	-	0.0050	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	-	0.0050	-	-	-	-
Freon 113	ND	-	0.0050	-	-	-	-
Hexachlorobutadiene	ND	-	0.0050	-	-	-	-
Hexachloroethane	ND	-	0.0050	-	-	-	-
2-Hexanone	ND	-	0.0050	-	-	-	-
Isopropylbenzene	ND	-	0.0050	-	-	-	-
4-Isopropyl toluene	ND	-	0.0050	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.05241	0.0050	0.050	-	105	70-130
Methylene chloride	ND	-	0.0050	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.0050	-	-	-	-
Naphthalene	ND	-	0.0050	-	-	-	-
n-Propyl benzene	ND	-	0.0050	-	-	-	-
Styrene	ND	-	0.0050	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
Tetrachloroethene	ND	-	0.0050	-	-	-	-
Toluene	ND	0.05021	0.0050	0.050	-	100	70-130
1,2,3-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.0050	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.0050	-	-	-	-
Trichloroethene	ND	-	0.0050	-	-	-	-
Trichlorofluoromethane	ND	-	0.0050	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.0050	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.0050	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.0050	-	-	-	-
Vinyl Chloride	ND	-	0.0050	-	-	-	-
Xylenes, Total	ND	-	0.0050	-	-	-	-
Surrogate Recovery							
Dibromofluoromethane	0.1178	0.1642		0.18	94	94	70-130
Toluene-d8	0.1351	0.1904		0.18	108	109	70-130
4-BFB	0.01227	-		0.0125	98	-	-

(Cont.)

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Date Prepared:	12/11/13	**BatchID:**	85018
Date Analyzed:	12/11/13 - 12/12/13	**Extraction Method:**	SW5030B
Instrument:	GC16	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#1135.001; Douglas - Webster St	**Sample ID:**	MB/LCS-85018 1312322-001AMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Benzene	0.03959	0.03879	0.050	ND	79.2	77.6	70-130	2.04	30
Methyl-t-butyl ether (MTBE)	0.04501	0.04659	0.050	ND	90	93.2	70-130	3.46	30
Toluene	0.04452	0.04482	0.050	ND	89	89.6	70-130	0.650	30
Surrogate Recovery									
Dibromofluoromethane	0.1557	0.1588	0.18		89	91	70-130	1.97	30
Toluene-d8	0.1774	0.1843	0.18		101	105	70-130	3.84	30

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 1312325 **ClientCode: PEO**

☐ WaterTrax ☐ WriteOn ☑ EDF ☐ Excel ☐ EQuIS ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Morgan Gillies
Pangea Environmental Svcs., Inc.
1710 Franklin Street, Ste. 200
Oakland, CA 94612
(510) 836-3700 FAX: (510) 836-3709

Email: mgillies@pangeaenv.com; tdelafuente@pa
cc:
PO:
ProjectNo: #1135.001; Douglas - Webster St

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

Requested TAT: 5 days

Date Received: **12/11/2013**
Date Printed: **12/11/2013**

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
1312325-002	CB-1-8	Soil	12/10/2013 10:25	☐	A	A	A									
1312325-003	CB-1-12	Soil	12/10/2013 10:40	☐	A	A										
1312325-005	CB-2-8	Soil	12/10/2013 11:40	☐	A	A										
1312325-006	CB-2-10	Soil	12/10/2013 11:55	☐	A	A										

Test Legend:

1	G-MBTEX_S	2	MBTEX-8260B_S	3	PREDF REPORT	4		5	
6		7		8		9		10	
11		12							

Prepared by: Daniel Loa

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.

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WORK ORDER SUMMARY

Client Name: PANGEA ENVIRONMENTAL SVCS., INC.
QC Level: LEVEL 2
Work Order: 1312325
Project: #1135.001; Douglas - Webster St
Client Contact: Morgan Gillies
Date Received: 12/11/2013
Comments:
Contact's Email: mgillies@pangeaenv.com; tdelafuente@pangeaenv.com

☐ WaterTrax ☐ WriteOn ☑ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1312325-001A	CB-1-4	Soil		1	Brass/Stainless Tube	☐	12/10/2013 9:55			☑	
1312325-002A	CB-1-8	Soil	SW8260B (MTBE & BTEX) <Benzene, Ethylbenzene, Methyl-t-butyl ether (MTBE), Naphthalene, Toluene, Xylenes, Total>	1	Brass/Stainless Tube	☐	12/10/2013 10:25	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
1312325-003A	CB-1-12	Soil	SW8260B (MTBE & BTEX) <Benzene, Ethylbenzene, Methyl-t-butyl ether (MTBE), Naphthalene, Toluene, Xylenes, Total>	1	Brass/Stainless Tube	☐	12/10/2013 10:40	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
1312325-004A	CB-2-4	Soil		1	Brass/Stainless Tube	☐	12/10/2013 11:10			☑	
1312325-005A	CB-2-8	Soil	SW8260B (MTBE & BTEX) <Benzene, Ethylbenzene, Methyl-t-butyl ether (MTBE), Naphthalene, Toluene, Xylenes, Total>	1	Brass/Stainless Tube	☐	12/10/2013 11:40	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	
1312325-006A	CB-2-10	Soil	SW8260B (MTBE & BTEX) <Benzene, Ethylbenzene, Methyl-t-butyl ether (MTBE), Naphthalene, Toluene, Xylenes, Total>	1	Brass/Stainless Tube	☐	12/10/2013 11:55	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)			☐		5 days		☐	

*** NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

Bottle Legend:

Brass/Stainless Tube = Brass or Stainless Steel Tube

1312325

McCAMPBELL ANALYTICAL, INC.

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Telephone: (925) 252-9262 Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☒ 5 DAY

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

Report To: Morgan Gillies	Bill To: Pangea
Company: Pangea Environmental Services, Inc.	
1710 Franklin Street, Suite 200, Oakland, CA 94612	
	E-Mail: mgillies@pangeaenv.com
Tele: (510) 836-3702	Fax: (510) 836-3709
Project #: 1135.001	Project Name: Douglas - Webster St
Project Location: 1721 Webster St., Oakland, CA	
Sampler Signature:	

SAMPLE ID	LOCATION (Field Point Name)	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED ICE	METHOD PRESERVED HCL	METHOD PRESERVED HNO_3	METHOD PRESERVED Other	Analysis Request: BTEX & TPH as Gas (602/8020 + 8015)/MTBE	TPH as Diesel (8015) w/ Silica Gel Cleanup	Total Petroleum Oil & Grease (5520 E&F/B&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)	Other: BTEX/MTBE/Naphthalene by 8260	Other: TPHg by 8015	Comments
CB-1-4		12/10	955	1	SS Sleeve		X				X																						Hold
CB-1-8			1025																												X	X	
CB-1-12			1040																												X	X	
CB-2-4			1110																														Hold
CB-2-8			1140																												X	X	
CB-2-10			1155																												X	X	

Relinquished By:	Date: 12/11/13	Time: 1730	Received By:
Relinquished By:	Date: 12/11/13	Time: 1515	Received By:
Relinquished By:	Date:	Time:	Received By:

ICE/t° 4.3 COMMENTS:
GOOD CONDITION_____
HEAD SPACE ABSENT_____
DECHLORINATED IN LAB_____
APPROPRIATE CONTAINERS_____
PRESERVED IN LAB_____

VOAS O&G METALS OTHER
PRESERVATION_____ pH<2_____

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Sample Receipt Checklist

Client Name: **Pangea Environmental Svcs., Inc.**
Date and Time Received: **12/11/2013 8:37:52 PM**

Project Name: **#1135.001; Douglas - Webster St**
LogIn Reviewed by: Daniel Loa

WorkOrder N°: **1312325** Matrix: Soil
Carrier: Rob Pringle (MAI Courier)

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: 4.3°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	NA ☑
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.*

Comments:

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1312325 A

Report Created for: Pangea Environmental Svcs., Inc.
1710 Franklin Street, Ste. 200
Oakland, CA 94612

Project Contact: Morgan Gillies
Project P.O.:
Project Name: #1135.001; Douglas - Webster St

Project Received: 12/11/2013

Analytical Report reviewed & approved for release on 12/16/2013 by:

Question about your data?

Click here to email McCampbell

Angela Rydelius,
Laboratory Manager

McCampbell Analytical, Inc.
"When Quality Counts"

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Pangea Environmental Svcs., Inc.
Project: #1135.001; Douglas - Webster St
WorkOrder: 1312325

Glossary Abbreviation	Description
95% Interval	95% Confident Interval
DF	Dilution Factor
DUP	Duplicate
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ND	Not detected at or above the indicated MDL or RL
NR	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.
RD	Relative Difference
RL	Reporting Limit
RPD	Relative Percent Deviation
SPK Val	Spike Value
SPKRef Val	Spike Reference Value

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Project:	#1135.001; Douglas - Webster St	**Extraction Method**	SW5030B
Date Received:	12/11/13 20:37	**Analytical Method:**	SW8021B/8015Bm
Date Prepared:	12/13/13	**Unit:**	mg/Kg

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

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
CB-1-4	**1312325-001A**	**Soil**	**12/10/2013 09:55**	**GC19**	**85083**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	12/14/2013 01:43
MTBE	---	0.050	1	12/14/2013 01:43
Benzene	---	0.0050	1	12/14/2013 01:43
Toluene	---	0.0050	1	12/14/2013 01:43
Ethylbenzene	---	0.0050	1	12/14/2013 01:43
Xylenes	---	0.0050	1	12/14/2013 01:43
Surrogates	REC (%)	Limits		
2-Fluorotoluene	116	70-130		12/14/2013 01:43

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
CB-2-4	**1312325-004A**	**Soil**	**12/10/2013 11:10**	**GC19**	**85083**

Analytes	Result	RL	DF	Date Analyzed
TPH(g)	ND	1.0	1	12/14/2013 02:12
MTBE	---	0.050	1	12/14/2013 02:12
Benzene	---	0.0050	1	12/14/2013 02:12
Toluene	---	0.0050	1	12/14/2013 02:12
Ethylbenzene	---	0.0050	1	12/14/2013 02:12
Xylenes	---	0.0050	1	12/14/2013 02:12
Surrogates	REC (%)	Limits		
2-Fluorotoluene	120	70-130		12/14/2013 02:12

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Analytical Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Project:	#1135.001; Douglas - Webster St	**Extraction Method**	SW5030B
Date Received:	12/11/13 20:37	**Analytical Method:**	SW8260B
Date Prepared:	12/13/13	**Unit:**	mg/kg

MTBE and BTEX by GC/MS

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
CB-1-4	**1312325-001A**	**Soil**	**12/10/2013 09:55**	**GC16**	**85089**

Analytes	Result	RL	DF	Date Analyzed
Benzene	ND	0.0050	1	12/14/2013 13:18
Ethylbenzene	ND	0.0050	1	12/14/2013 13:18
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	12/14/2013 13:18
Naphthalene	ND	0.0050	1	12/14/2013 13:18
Toluene	ND	0.0050	1	12/14/2013 13:18
Xylenes, Total	ND	0.0050	1	12/14/2013 13:18
Surrogates	**REC (%)**	**Limits**		
Dibromofluoromethane	93	70-130		12/14/2013 13:18
Toluene-d8	96	70-130		12/14/2013 13:18

Client ID	Lab ID	Matrix/ExtType	Date Collected	Instrument	Batch ID
CB-2-4	**1312325-004A**	**Soil**	**12/10/2013 11:10**	**GC16**	**85089**

Analytes	Result	RL	DF	Date Analyzed
Benzene	ND	0.0050	1	12/14/2013 15:26
Ethylbenzene	ND	0.0050	1	12/14/2013 15:26
Methyl-t-butyl ether (MTBE)	ND	0.0050	1	12/14/2013 15:26
Naphthalene	ND	0.0050	1	12/14/2013 15:26
Toluene	ND	0.0050	1	12/14/2013 15:26
Xylenes, Total	ND	0.0050	1	12/14/2013 15:26
Surrogates	**REC (%)**	**Limits**		
Dibromofluoromethane	93	70-130		12/14/2013 15:26
Toluene-d8	85	70-130		12/14/2013 15:26

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Date Prepared:	12/12/13	**BatchID:**	85083
Date Analyzed:	12/13/13	**Extraction Method**	SW5030B
Instrument:	GC7	**Analytical Method:**	SW8021B/8015Bm
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#1135.001; Douglas - Webster St	**Sample ID:**	MB/LCS-85083 1312374-020AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	0.7154	0.40	0.60	-	119	70-130
MTBE	ND	0.1013	0.050	0.10	-	101	70-130
Benzene	ND	0.1191	0.0050	0.10	-	119	70-130
Toluene	ND	0.1176	0.0050	0.10	-	118	70-130
Ethylbenzene	ND	0.1208	0.0050	0.10	-	121	70-130
Xylenes	ND	0.3605	0.0050	0.30	-	120	70-130
Surrogate Recovery							
2-Fluorotoluene	0.1081	0.1148		0.10	108	115	70-130

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	0.629	0.6216	0.60	ND	105	104	70-130	1.19	20
MTBE	0.103	0.0978	0.10	ND	103	97.8	70-130	5.16	20
Benzene	0.1139	0.1116	0.10	ND	114	112	70-130	2.04	20
Toluene	0.1137	0.1106	0.10	ND	114	111	70-130	2.75	20
Ethylbenzene	0.1181	0.1146	0.10	ND	118	115	70-130	3.07	20
Xylenes	0.354	0.3428	0.30	ND	118	114	70-130	3.23	20
Surrogate Recovery									
2-Fluorotoluene	0.1095	0.1065	0.10		110	106	70-130	2.81	20

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Date Prepared:	12/12/13	**BatchID:**	85089
Date Analyzed:	12/14/13	**Extraction Method**	SW5030B
Instrument:	GC28	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#1135.001; Douglas - Webster St	**Sample ID:**	MB/LCS-85089 1312382-001EMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	-	0.10	-	-	-	-
tert-Amyl methyl ether (TAME)	ND	-	0.0050	-	-	-	-
Benzene	ND	0.04422	0.0050	0.050	-	88.4	70-130
Bromobenzene	ND	-	0.0050	-	-	-	-
Bromochloromethane	ND	-	0.0050	-	-	-	-
Bromodichloromethane	ND	-	0.0050	-	-	-	-
Bromoform	ND	-	0.0050	-	-	-	-
Bromomethane	ND	-	0.0050	-	-	-	-
2-Butanone (MEK)	ND	-	0.020	-	-	-	-
t-Butyl alcohol (TBA)	ND	-	0.050	-	-	-	-
n-Butyl benzene	ND	-	0.0050	-	-	-	-
sec-Butyl benzene	ND	-	0.0050	-	-	-	-
tert-Butyl benzene	ND	-	0.0050	-	-	-	-
Carbon Disulfide	ND	-	0.0050	-	-	-	-
Carbon Tetrachloride	ND	-	0.0050	-	-	-	-
Chlorobenzene	ND	-	0.0050	-	-	-	-
Chloroethane	ND	-	0.0050	-	-	-	-
Chloroform	ND	-	0.0050	-	-	-	-
Chloromethane	ND	-	0.0050	-	-	-	-
2-Chlorotoluene	ND	-	0.0050	-	-	-	-
4-Chlorotoluene	ND	-	0.0050	-	-	-	-
Dibromochloromethane	ND	-	0.0050	-	-	-	-
1,2-Dibromo-3-chloropropane	ND	-	0.0040	-	-	-	-
1,2-Dibromoethane (EDB)	ND	-	0.0040	-	-	-	-
Dibromomethane	ND	-	0.0050	-	-	-	-
1,2-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,3-Dichlorobenzene	ND	-	0.0050	-	-	-	-
1,4-Dichlorobenzene	ND	-	0.0050	-	-	-	-
Dichlorodifluoromethane	ND	-	0.0050	-	-	-	-
1,1-Dichloroethane	ND	-	0.0050	-	-	-	-
1,2-Dichloroethane (1,2-DCA)	ND	-	0.0040	-	-	-	-
1,1-Dichloroethene	ND	-	0.0050	-	-	-	-
cis-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
trans-1,2-Dichloroethene	ND	-	0.0050	-	-	-	-
1,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,3-Dichloropropane	ND	-	0.0050	-	-	-	-
2,2-Dichloropropane	ND	-	0.0050	-	-	-	-
1,1-Dichloropropene	ND	-	0.0050	-	-	-	-
cis-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-
trans-1,3-Dichloropropene	ND	-	0.0050	-	-	-	-

(Cont.)

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Date Prepared:	12/12/13	**BatchID:**	85089
Date Analyzed:	12/14/13	**Extraction Method**	SW5030B
Instrument:	GC28	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#1135.001; Douglas - Webster St	**Sample ID:**	MB/LCS-85089 1312382-001EMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Diisopropyl ether (DIPE)	ND	-	0.0050	-	-	-	-
Ethylbenzene	ND	-	0.0050	-	-	-	-
Ethyl tert-butyl ether (ETBE)	ND	-	0.0050	-	-	-	-
Freon 113	ND	-	0.0050	-	-	-	-
Hexachlorobutadiene	ND	-	0.0050	-	-	-	-
Hexachloroethane	ND	-	0.0050	-	-	-	-
2-Hexanone	ND	-	0.0050	-	-	-	-
Isopropylbenzene	ND	-	0.0050	-	-	-	-
4-Isopropyl toluene	ND	-	0.0050	-	-	-	-
Methyl-t-butyl ether (MTBE)	ND	0.04376	0.0050	0.050	-	87.5	70-130
Methylene chloride	ND	-	0.0050	-	-	-	-
4-Methyl-2-pentanone (MIBK)	ND	-	0.0050	-	-	-	-
Naphthalene	ND	-	0.0050	-	-	-	-
n-Propyl benzene	ND	-	0.0050	-	-	-	-
Styrene	ND	-	0.0050	-	-	-	-
1,1,1,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
1,1,2,2-Tetrachloroethane	ND	-	0.0050	-	-	-	-
Tetrachloroethene	ND	-	0.0050	-	-	-	-
Toluene	ND	0.05253	0.0050	0.050	-	105	70-130
1,2,3-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,2,4-Trichlorobenzene	ND	-	0.0050	-	-	-	-
1,1,1-Trichloroethane	ND	-	0.0050	-	-	-	-
1,1,2-Trichloroethane	ND	-	0.0050	-	-	-	-
Trichloroethene	ND	-	0.0050	-	-	-	-
Trichlorofluoromethane	ND	-	0.0050	-	-	-	-
1,2,3-Trichloropropane	ND	-	0.0050	-	-	-	-
1,2,4-Trimethylbenzene	ND	-	0.0050	-	-	-	-
1,3,5-Trimethylbenzene	ND	-	0.0050	-	-	-	-
Vinyl Chloride	ND	-	0.0050	-	-	-	-
Xylenes, Total	ND	-	0.0050	-	-	-	-
Surrogate Recovery							
Dibromofluoromethane	0.1156	0.1605		0.18	92	92	70-130
Toluene-d8	0.1345	0.1917		0.18	108	110	70-130
4-BFB	0.01248	-		0.0125	100	-	-

(Cont.)

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Quality Control Report

Client:	Pangea Environmental Svcs., Inc.	**WorkOrder:**	1312325
Date Prepared:	12/12/13	**BatchID:**	85089
Date Analyzed:	12/14/13	**Extraction Method**	SW5030B
Instrument:	GC28	**Analytical Method:**	SW8260B
Matrix:	Soil	**Unit:**	mg/Kg
Project:	#1135.001; Douglas - Webster St	**Sample ID:**	MB/LCS-85089 1312382-001EMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Benzene	0.0431	0.04447	0.050	ND	86.2	88.9	70-130	3.13	30
Methyl-t-butyl ether (MTBE)	0.04333	0.0451	0.050	ND	86.7	90.2	70-130	3.99	30
Toluene	0.04921	0.0519	0.050	ND	98.4	104	70-130	5.32	30
Surrogate Recovery									
Dibromofluoromethane	0.1588	0.1628	0.18		91	93	70-130	2.52	30
Toluene-d8	0.1846	0.1879	0.18		106	107	70-130	1.76	30

McCampbell Analytical, Inc.
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Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 1312325 A **ClientCode: PEO**

☐ WaterTrax ☐ WriteOn ☑ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Morgan Gillies
Pangea Environmental Svcs., Inc.
1710 Franklin Street, Ste. 200
Oakland, CA 94612
(510) 836-3700 FAX: (510) 836-3709

Email: mgillies@pangeaenv.com; tdelafuente@pa
cc:
PO:
ProjectNo: #1135.001; Douglas - Webster St

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

Requested TAT: 5 days
Date Received: **12/11/2013**
Date Add-On: **12/13/2013**
Date Printed: **12/13/2013**

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
1312325-001	CB-1-4	Soil	12/10/2013 9:55	☐	A	A										
1312325-004	CB-2-4	Soil	12/10/2013 11:10	☐	A	A										

Test Legend:

1	G-MBTEX_S	2	MBTEX-8260B_S	3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Daniel Loa

Comments: Samples 001 & 004 taken off hold 12/13/13 5d.

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.

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WORK ORDER SUMMARY

Client Name: PANGEA ENVIRONMENTAL SVCS., INC.
Project: #1135.001; Douglas - Webster St
Comments: Samples 001 & 004 taken off hold 12/13/13 5d.

QC Level: LEVEL 2
Client Contact: Morgan Gillies
Contact's Email: mgillies@pangeaenv.com; tdelafuente@pangeaenv.com

Work Order: 1312325
Date Received: 12/11/2013
Date Add-On: 12/13/2013

Lab ID	Client ID	Matrix	Test Name	Number of Containers	Bottle & Preservative	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1312325-001A	CB-1-4	Soil	SW8260B (MTBE & BTEX) <Benzene, Ethylbenzene, Methyl-t-butyl ether (MTBE), Naphthalene, Toluene, Xylenes, Total>	1	Brass/Stainless Tube	12/10/2013 9:55	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)				5 days		☐	
1312325-004A	CB-2-4	Soil	SW8260B (MTBE & BTEX) <Benzene, Ethylbenzene, Methyl-t-butyl ether (MTBE), Naphthalene, Toluene, Xylenes, Total>	1	Brass/Stainless Tube	12/10/2013 11:10	5 days		☐	
			SW8021B/8015Bm (G/MBTEX)				5 days		☐	

*** NOTE: STLC and TCLP extractions require 48 hrs to complete; therefore, all TATs begin after the extraction is completed (i.e., 24hr TAT yields results in 72 hrs from sample submission).**

Bottle Legend:

Brass/Stainless Tube = Brass or Stainless Steel Tube

12123325

McCAMPBELL ANALYTICAL, INC.

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Pittsburg, CA 94565
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Telephone: (925) 252-9262 Fax: (925) 252-9269

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☒ 5 DAY

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

Report To: Morgan Gillies	Bill To: Pangea
Company: Pangea Environmental Services, Inc.	
1710 Franklin Street, Suite 200, Oakland, CA 94612	
	E-Mail: mgillies@pangeaenv.com
Tele: (510) 836-3702	Fax: (510) 836-3709
Project #: 1135.001	Project Name: Douglas - Webster St
Project Location: 1721 Webster St., Oakland, CA	
Sampler Signature:	

SAMPLE ID	LOCATION (Field Point Name)	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED ICE	METHOD PRESERVED HCL	METHOD PRESERVED HNO_3	METHOD PRESERVED Other
CB-1-4		12/10	955	1	SS Sleeve		X				X			
CB-1-8			1025											
CB-1-12			1040											
CB-2-4			1110											
CB-2-8			1140											
CB-2-10			1155											

Analysis Request

BTEX & TPH as Gas (602/8020 + 8015)/MTBE	TPH as Diesel (8015) w/ Silica Gel Cleanup	Total Petroleum Oil & Grease (5520 E&F/B&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)

Other

BTEX/MTBE/Naphthalene by 8260	TPHg by 8015
⊗	⊗
X	X
X	X
⊗	⊗
X	X
X	X

Comments

Filter Samples for Metals analysis: Yes / No

Hold

Hold

Relinquished By:	Date:	Time:	Received By:
	12/11/13	1730	
Relinquished By:	Date:	Time:	Received By:
	12/11/13	1515	
Relinquished By:	Date:	Time:	Received By:

ICE/t° 4.3
GOOD CONDITION
HEAD SPACE ABSENT
DECHLORINATED IN LAB
APPROPRIATE CONTAINERS
PRESERVED IN LAB

COMMENTS: Samples off Hold 12/13/13

VOAS O&G METALS OTHER
PRESERVATION pH<2