CONESTOGA-ROVERS & ASSOCIATES

5900 Hollis Street, Suite A
Emeryville, California 94608
Telephone: (510) 420-0700 Fax: (510) 420-9170
www.CRAworld.com

TRANSMITTAL

DATE: October 5, 2010

REFERENCE NO.: 240781

PROJECT NAME: 2703 Martin Luther King Jr. Way, Oakland

TO: Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

RECEIVED
8:38 am, Oct 06, 2010
Alameda County
Environmental Health

Please find enclosed:
- ☐ Draft
- ☐ Originals
- ☐ Prints
- ☒ Final
- ☐ Other

Sent via:
- ☐ Mail
- ☐ Overnight Courier
- ☐ Same Day Courier
- ☒ Other GeoTracker and Alameda County FTP

QUANTITY	DESCRIPTION
1	Subsurface Investigation Work Plan

- ☐ As Requested
- ☐ For Your Use
- ☒ For Review and Comment
- ☐
- ☐

COMMENTS:
If you have any questions regarding the contents of this document, please contact Peter Schaefer at (510) 420-3319.

Copy to: Denis Brown, Shell Oil Products US (electronic copy)
Rodney & Janet Kwan, Auto Tech West, 2703 Martin Luther King Jr. Way, Oakland, CA 94612
Scott Merillat, 664 27th Street, Oakland, CA 94612
Monique Oatis, 670 27th Street, Oakland, CA 94612
Jack Chang, 559 9th Avenue, San Francisco, CA 94118-3716

Completed by: Peter Schaefer Signed: Peter Schaefer

Filing: **Correspondence File**

Denis L. Brown
Shell Oil Products US
HSE – Environmental Services
20945 S. Wilmington Ave.
Carson, CA 90810-1039
Tel (707) 865 0251
Fax (707) 865 2542
Email denis.l.brown@shell.com

Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: Former Shell Service Station
2703 Martin Luther King Jr. Way
Oakland, California
SAP Code 129449
Incident No. 97093397
ACEH Case No. RO0000145

Dear Mr. Wickham:

The attached document is provided for your review and comment. Upon information and belief, I declare, under penalty of perjury, that the information contained in the attached document is true and correct.

If you have any questions or concerns, please call me at (707) 865-0251.

Sincerely,

Denis L. Brown
Project Manager

SUBSURFACE INVESTIGATION WORK PLAN

FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY
OAKLAND, CALIFORNIA

SAP CODE	129449
INCIDENT NO.	97093397
AGENCY NO.	RO0000145

Prepared by:
Conestoga-Rovers & Associates

5900 Hollis Street, Suite A
Emeryville, California
U.S.A. 94608

Office: (510) 420-0700
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web: http://www.CRAworld.com

OCTOBER 5, 2010
REF. NO. 240781 (11)
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LIST OF APPENDICES

1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) prepared this work plan on behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell) to assess current soil conditions in the excavation area proposed in CRA's February 5, 2008 *Site Conceptual Model and Feasibility Study/Corrective Action Plan* and to delineate the extent of elevated lead concentrations in soil on properties adjacent to the former waste oil aboveground storage tank prior to completing the proposed excavation. This work plan was requested in Alameda County Environmental Health's (ACEH's) August 5, 2010 electronic correspondence.

The subject site is a former service station located on the northwest corner of Martin Luther King Jr. Way and 27th Street in a mixed commercial and residential area of Oakland, California (Figure 1). Currently, the site is occupied by Auto Tech West and is used as an automotive repair shop (Figure 2).

A summary of previous work performed at the site and additional background information is contained in Appendix A.

2.0 WORK TASKS

2.1 PERMITS

CRA will obtain the required permit from Alameda County Public Works Agency for the boring locations.

CRA received an executed access agreement from the owner of 665 28th Street, Oakland and requested access to the property located at 663 28th Street, Oakland. To date, this property owner has not responded to CRA's or ACEH's requests for access. If the owner of 663 28th Street, Oakland does not respond prior to CRA mobilizing the field investigation, the five proposed hand auger borings on the property (HA-14 through HA-18) will not be included in this investigation.

2.2 HEALTH AND SAFETY PLAN (HASP)

CRA will prepare a HASP to protect site workers. The plan will be reviewed and signed by each site worker and kept on the site during field activities.

2.3 UTILITY CLEARANCE

CRA will mark the proposed boring locations and will clear the locations through Underground Service Alert and a private utility locating service prior to drilling.

2.4 SUBSURFACE INVESTIGATION

2.4.1 HAND AUGER SOIL BORINGS

Soil generated during the installation of vapor probe VP-9 was sampled and profiled for disposal. The soil sample contained 2,630 milligrams per kilogram (mg/kg) total lead. To investigate the extent of lead in soil, eight borings were advanced on site behind the station building, near vapor probe VP-9 (Figure 2). Up to 1,060 mg/kg lead, 4,500 mg/kg total petroleum hydrocarbons as diesel (TPHd), and 11,000 mg/kg total petroleum hydrocarbons as motor oil (TPHmo) were detected in soil samples from the hand auger borings (Table 1). Based on these results, CRA will drill ten additional hand auger borings (HA-9 through HA-18) on the two adjacent properties to assess the extent of lead and hydrocarbon in soil prior to initiating proposed remedial excavation. The borings will be advanced to approximately 5 feet below grade (fbg).

A CRA geologist will supervise the hand auguring. Soil samples will be collected from the borings using a hand auger at approximately 0 to 0.5 fbg, 1 to 1.5 fbg, and 4.5 to 5 fbg for chemical analysis and screening in the field for organic vapors using a photo-ionization detector (PID). No groundwater samples will be collected, and CRA will not prepare boring logs for the hand auger borings.

Soil samples designated for chemical analyses will be retained in stainless steel or brass sample tubes. The tubes will be covered on both ends with Teflon sheets and plastic end caps. Soil samples will be labeled, entered onto a chain-of-custody record, and placed into a cooler with ice for transport to a State of California certified laboratory for analysis. CRA will request a standard 2-week turn around time for the laboratory results.

CRA will perform this work under the supervision of a professional geologist or engineer.

2.4.2 DIRECT PUSH SOIL BORINGS

To refine the extent of the excavation area proposed in CRA's February 5, 2008 *Site Conceptual Model and Feasibility Study/Corrective Action Plan* using current data, CRA will drill 25 exploratory soil borings (B-24 through B-48, Figure 2).

The borings will be advanced using a Geoprobe® rig, and each boring will be advanced to 20 fbg.

A CRA geologist will supervise the drilling and describe encountered soils using the Unified Soil Classification System and Munsell Soil Color Charts. After clearing the borings to 5 fbg with an air- or water-knife, soil samples will be collected continuously for soil description. At a minimum, soil samples will be collected at 5-foot intervals, starting at 5 fbg, for possible chemical analyses and screening in the field for organic vapors using a PID. Soil sample selection will be based on field observations (including PID readings and soil types) and previous soil data (concentrations, depths, and locations). No groundwater samples will be collected. CRA will prepare a boring log for each boring, and PID measurements will be recorded on the boring logs.

Soil samples designated for chemical analyses will be retained in stainless steel sample tubes, brass sample tubes, or plastic sleeves. If plastic sleeves are used, they will be cut into 6-inch lengths. The tubes or sleeves will be covered on both ends with Teflon sheets and plastic end caps. Soil samples will be labeled, entered onto a chain-of-custody record, and placed into a cooler with ice for transport to a State of California certified laboratory for analyses. CRA will request a standard 2-week turn around time for laboratory results.

CRA will perform this work under the supervision of a professional geologist or engineer.

2.5 CHEMICAL ANALYSIS

Hand auger soil samples will be analyzed for total lead by EPA Method 6010B, TPHd and TPHmo by EPA Method 8015B, and polycyclic aromatic hydrocarbons by EPA Method 8270C SIM PAHS.

Selected Geoprobe® soil samples will be analyzed for total petroleum hydrocarbons as gasoline, benzene, toluene, ethylbenzene, and xylenes by EPA Method 8260B.

2.6 REPORT PREPARATION

Following the receipt of analytical results from the laboratory, CRA will prepare a written report which will include field procedures, laboratory results, and boring logs.

3.0 SCHEDULE

CRA will begin work upon receiving ACEH's written approval of this work plan and the appropriate permits. CRA requests ACEH grant an extension of the October 29, 2010 deadline for the off-site shallow soil investigation and excavation area soil investigation report to February 28, 2011.

CRA sent two requests for access to the property owner of 663 28th Street (dated February 25, 2010 and May 18, 2010) in order to conduct the proposed off-site shallow soil investigation activities but received no response. CRA requested ACEH's assistance in completing this agreement, and ACEH sent a letter to the property owner on July 20, 2010, requesting that he cooperate with ACEH and Shell to allow this investigation to be completed. To date, CRA has not received any communication from the owner. If he does not respond prior to CRA mobilizing the field investigation, the five proposed hand auger borings on the property (HA-14 through HA-18) will not be included in this investigation.

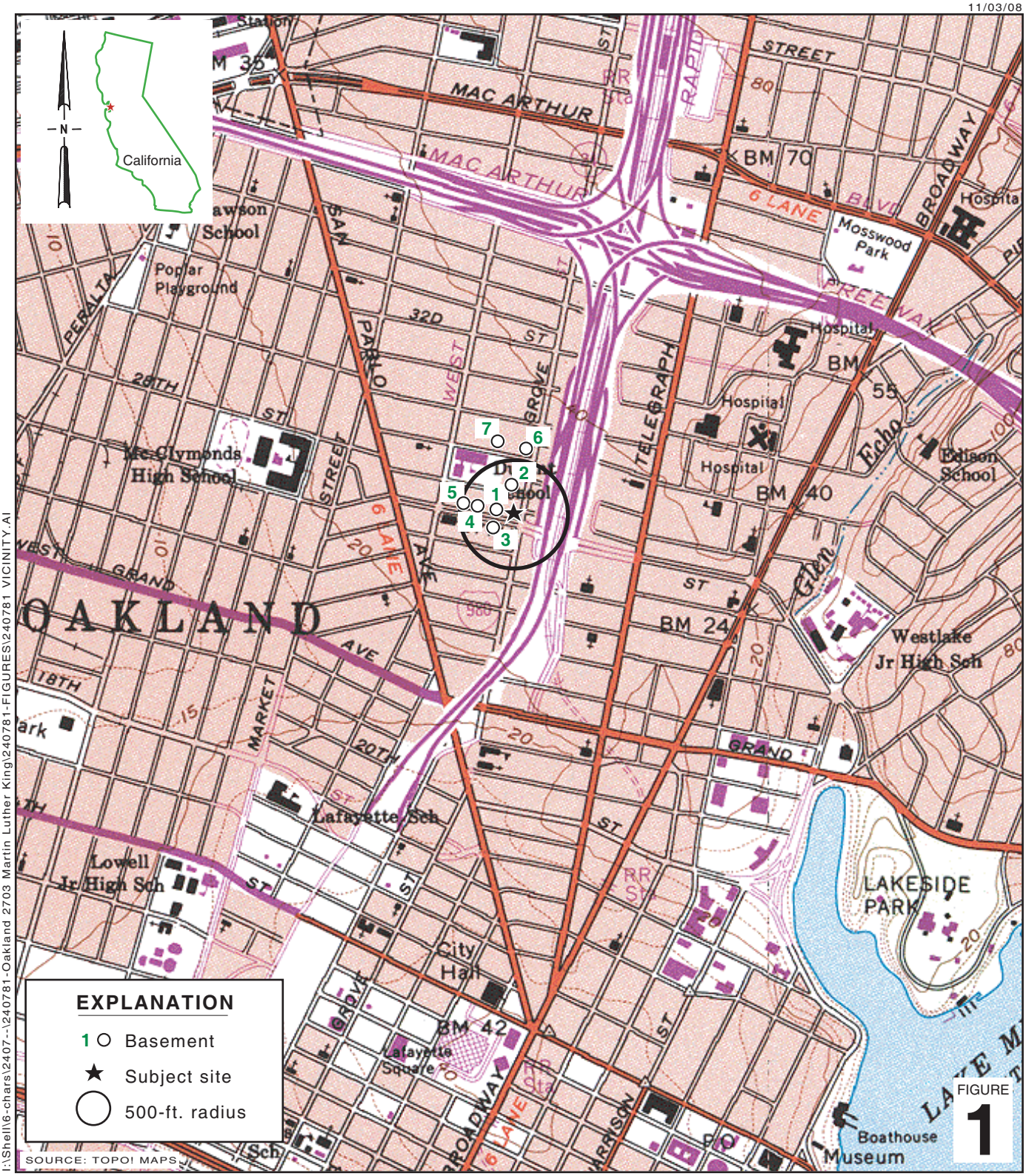
All of Which is Respectfully Submitted,
CONESTOGA-ROVERS & ASSOCIATES

Peter Schaefer, CEG, CHG

Aubrey K. Cool, PG

FIGURES

11/03/08



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0 1/8 1/4 1/2 1

SCALE (MILES)

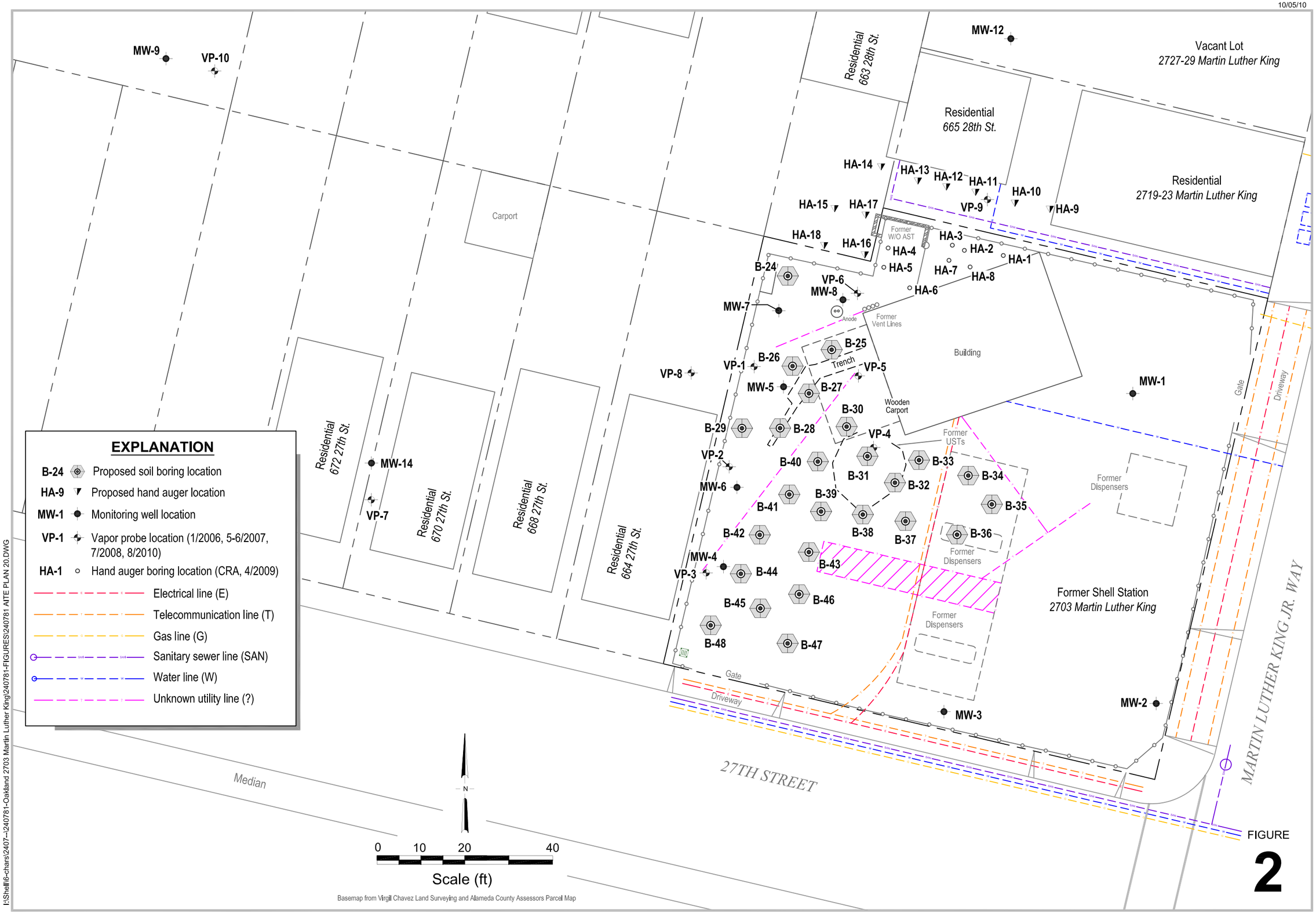
Former Shell Service Station
2703 Martin Luther King Jr. Way
Oakland, California

CONESTOGA-ROVERS & ASSOCIATES

Vicinity Map

10/05/10

Site Plan



EXPLANATION

- B-24 — Proposed soil boring location
- HA-9 — Proposed hand auger location
- MW-1 — Monitoring well location
- VP-1 — Vapor probe location (1/2006, 5-6/2007, 7/2008, 8/2010)
- HA-1 — Hand auger boring location (CRA, 4/2009)
- Electrical line (E)
- Telecommunication line (T)
- Gas line (G)
- Sanitary sewer line (SAN)
- Water line (W)
- Unknown utility line (?)

N

0 10 20 40

Scale (ft)

Basemap from Virgil Chavez Land Surveying and Alameda County Assessors Parcel Map

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CONESTOGA-ROVERS & ASSOCIATES

Former Shell Service Station

2703 Martin Luther King Jr. Way

Oakland, California

FIGURE

2

TABLE

TABLE 1

SOIL ANALYTICAL DATA
FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY, OAKLAND, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*Lead*	*TPHd*	*TPHmo*	*Naphthalene*	*2-Methylnaphthalene*	*Acenaphthylene*	*Acenaphthene*	*Fluorene*	*Phenanthrene*	*Anthracene*	*Fluoranthene*	*Pyrene*	*Benzo(a) Anthracene*	*Chrysene*	*Benzo(k) Fluoranthene*	*Benzo(b) Fluoranthene*	*Benzo(a) Pyrene*	*Benzo(g,h,i) Perylene*	*Indeno(1,2,3-cd) Pyrene*	*Dibenz(a,h) Anthracene*	*1-Methylnaphthalene*
HA-1-0.7'	4/8/2009	0.7	24.5	**1,300** [a]	**7,900**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	**0.18**	<0.040	<0.040	<0.040	<0.040
HA-1-1.5'	4/8/2009	1.5	7.73	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-1-5'	4/8/2009	5	7.74	19 [a]	97	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-2-0.7'	4/8/2009	0.7	44.0	**560** [a]	**6,700**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	**0.19**	<0.040	<0.040	<0.040	<0.040
HA-2-1.5'	4/8/2009	1.5	29.5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-2-5'	4/8/2009	5	19.4	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-3-0.7'	4/8/2009	0.7	59.9	**570** [a]	**6,300**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.070	<0.040	<0.040	**0.16**	<0.040	<0.040	<0.040	<0.040
HA-3-1.5'	4/8/2009	1.5	20.8	<5.0	50	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-3-5'	4/8/2009	5	6.65	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-4-0.7'	4/8/2009	0.7	43.5	**4,500** [a]	**7,800**	1.2	<1.0	<1.0	1.6	1.7	8.5	2.6	7.9	8.1	**3.6**	4.0	**7.1**	<1.0	**4.2**	1.6	**2.2**	<1.0	<1.0
HA-4-1.5'	4/8/2009	1.5	10.1	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-4-5'	4/8/2009	5	5.81	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-5-0.7'	4/8/2009	0.7	46.0	**700** [a]	**5,800**	<0.040	<0.040	<0.040	<0.040	<0.040	0.25	0.075	0.39	0.98	0.29	0.48	0.61	0.56	**0.51**	0.18	0.16	0.048	<0.040
HA-5-1.5'	4/8/2009	1.5	8.14	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-5-5'	4/8/2009	5	7.85	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-6-0.7'	4/8/2009	0.7	40.3	**1,800** [a]	**7,400**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.077	<0.040	0.12	<0.040	<0.040	**0.21**	0.077	<0.040	<0.040	<0.040
HA-6-1.5'	4/8/2009	1.5	11.3	**110** [a]	290	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-6-5'	4/8/2009	5	12.1	**130** [a]	230	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020

TABLE 1

SOIL ANALYTICAL DATA
FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY, OAKLAND, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*Lead*	*TPHd*	*TPHmo*	*Naphthalene*	*2-Methylnaphthalene*	*Acenaphthylene*	*Acenaphthene*	*Fluorene*	*Phenanthrene*	*Anthracene*	*Fluoranthene*	*Pyrene*	*Benzo(a) Anthracene*	*Chrysene*	*Benzo(k) Fluoranthene*	*Benzo(b) Fluoranthene*	*Benzo(a) Pyrene*	*Benzo(g,h,i) Perylene*	*Indeno(1,2,3-cd) Pyrene*	*Dibenz(a,h) Anthracene*	*1-Methylnaphthalene*
HA-7-0.7'	4/8/2009	0.7	37.1	**910** [a]	**11,000**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.091	<0.040	<0.040	**0.18**	<0.040	<0.040	<0.040	<0.040
HA-7-1.5'	4/8/2009	1.5	8.82	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-7-5'	4/8/2009	5	7.45	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
HA-8-0.7'	4/8/2009	0.7	32.8	**810** [a]	**9,600**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.079	<0.040	<0.040	**0.17**	<0.040	<0.040	<0.040	<0.040
HA-8-1.5'	4/8/2009	1.5	**1,060**	11 [a]	74	<0.020	<0.020	<0.020	<0.020	<0.020	0.10	0.027	0.29	0.31	0.17	0.18	0.18	0.15	**0.20**	0.045	0.061	<0.020	<0.020
HA-8-5'	4/8/2009	5	19.7	35 [a]	190	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Shallow Soils (≤10 fbg) ESL [b]			750	83	2,500	2.8	0.25	13	16	8.9	11	2.8	40	85	1.3	23	1.3	1.3	0.13	27	2.1	0.21	NA

Notes:

All results in miligrams per kilogram (mg/kg) unless otherwise indicated.
fbg = feet below grade
Lead analyzed by EPA Method 6010B
TPHd = Total petroleum hydrocarbons as diesel analyzed by EPA Method 8015B
TPHmo = Total petroleum hydrocarbons as motor oil analyzed by EPA Method 8015B (M)
Polycyclic aromatic hydrocarbons (PAHs) analyzed by EPA Method 8270C SIM PAHS. Individual constituents tablulated above.
<x = Not detected at reporting limit x
ESLs = Environmental screening levels
NA = No applicable ESL
Bold values exceed ESLs.

a = The sample chromatographic pattern for TPH does not match the chromatographic pattern of the specified standard. Quantitation of the unknown hydrocarbon(s) in the sample was based upon the specified standard.
b = San Francisco Bay Regional Water Quality Control Board Environmental Screening Level for shallow soil where groundwater is a current or potential source of drinking water. Commercial land use. Ref: Table A in Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater -Interim Final -November 2007 (Revised May 2008).

APPENDIX A

SITE HISTORY

SITE HISTORY

1979 Underground Storage Tank (UST) Removal: Prior to vacating the property in 1979, Shell Oil Products US (Shell) reportedly removed three fuel USTs and a waste oil storage tank.

1994 UST Removal: On October 11, 1994, KTW & Associates removed a 2,000-gallon UST on behalf of Auto Tech West (ATW). Two soil samples (TP-1-N and TP-2-S) collected from beneath the tank contained up to 18,000 milligrams per kilogram (mg/kg) total petroleum hydrocarbons as gasoline (TPHg) and 100 mg/kg benzene.

1995 Phase I Environmental Site Assessment (ESA): In August and September 1995, Enviros Inc. (Enviros) performed a Phase I ESA for this site. The Phase I ESA indicated that the site was occupied by housing prior to approximately 1959.

During a site survey conducted in conjunction with the Phase I ESA, an excavation was observed near the southwest corner of the service building. The excavation's location was consistent with the location of 2,000-gallon UST removed in 1994 by ATW, with a large concrete slab observed in aerial photographs taken in 1971 and 1973, and with a smaller concrete slab observed in aerial photographs taken in 1981 and 1985. The concrete slabs observed in the aerial photographs were likely covering the USTs operated by Shell from 1959 to 1979, and after 1979 by Acme Ambulance Company (Acme).

1995 Phase II ESA: On May 23, 1995, ACC Environmental Consultants (ACC) drilled nine soil borings (B-1 through B-9) using a pneumatic sampling tool in the vicinity of the UST excavation and the product dispenser islands. Soil samples contained up to 830 mg/kg TPHg and 1.8 mg/kg benzene. Separate phase hydrocarbons (SPHs) were identified in water samples collected from four of the soil borings (B-1, B-5, B-6, and B-9). Grab groundwater samples collected from borings without SPH contained up to 89,000 micrograms per liter (µg/l) TPHg and 21,000 µg/l benzene. Results of the investigation were presented in ACC's June 1995 *Phase II- Environmental Site Investigation* report.

1996 Over-Excavation: On March 19, 1996, Acme's former UST excavation was over-excavated and backfilled. The excavation, originally left open to 9 feet below grade (fbg), was over-excavated to approximately 11 fbg. Two soil samples (TP-3-W and TP-4-E) were collected after over-excavation was completed. The soil samples contained up to 2,700 mg/kg TPHg and 3.1 mg/kg benzene. Soil sampling and backfilling are documented in Enviros' May 10, 1996 correspondence.

1996 Subsurface Investigation: On July 17 and 19, 1996, Enviros drilled six exploratory borings (B-10, B-11, B-12, B-13, V-1, and V-2). Borings B-11 and B-12 were completed as groundwater monitoring wells MW-1 and MW-2, and borings V-1 and V-2 were completed as soil vapor extraction wells V-1 and V-2. TPHg and benzene were not detected in soil samples collected from MW-1, MW-2, and B-13. Soil samples collected from B-10 and V-2 contained up to 110 mg/kg TPHg and 0.29 mg/kg benzene. Grab groundwater samples collected from borings B-10, MW-2, and B-13 contained up to 290,000 µg/l TPHg and 34,000 µg/l benzene. The investigation results were presented in Enviros' October 30, 1996 *Soil Boring and Well Installation Report.*

1997 Modified Phase I ESA: In February 1997, Enviros performed a modified Phase I ESA for the subject facility. A review of aerial photographs (1952 to 1994), city directories (1967 to 1993) and Sanborn maps (1912 to 1970) did not reveal evidence of an off-site source of petroleum hydrocarbons, which would have impacted groundwater on site. The properties located north and west of the subject facility appear to have been occupied by residential houses from at least 1912 to the present. The nearest gasoline stations identified in the vicinity of the subject facility were a former Chevron station (740 27th Street at West Street) approximately 450 feet to the west, a former station (26th Street and Martin Luther King Jr. Way) approximately 300 feet to the south, and a former Mobil station (554 27th Street) approximately 950 feet to the east.

2000 Sensitive Receptor Survey (SRS): In 2000, Cambria Environmental Technology, Inc. (Cambria) performed a SRS to identify wells and underground utility conduits. Cambria identified the local sanitary and storm sewer systems as the only utility conduits which may act as preferential pathways for groundwater and soil vapor migration. Conduits identified in the area are located at depths of approximately 3.5 to 9 fbg. Therefore, the potential does exist for groundwater to flow within these conduit trenches since groundwater depth on site historically ranges from approximately 4.5 to 10 fbg. However, since the typical groundwater flow direction on site has generally been to the south, it is likely that any contaminant migration within the utility conduits would be limited, since the utility conduits located to the south of the site are the shallowest of all the conduits identified adjacent to the site at depths of 3.5 to 5.5 fbg.

Cambria also obtained well installation and destruction records from the California Department of Water Resources (DWR) in order to identify any active water-producing wells in the vicinity of the site, which may be at risk to petroleum hydrocarbon impact due to contaminant migration from the subsurface of the site. DWR records did not identify any existing wells within a ½-mile radius of the site. The SRS results are presented in Cambria's May 16, 2001 *Subsurface Investigation Report.*

2000 Subsurface Investigation: On November 21 and 22, 2000, Cambria drilled three soil borings (B-17, B-18, and B-19) and installed three groundwater monitoring wells (MW-3, MW-4, and MW-5). Soil samples contained up to 2,100 mg/kg TPHg and 3.3 mg/kg benzene. Methyl tertiary-butyl ether (MTBE) was detected in one soil sample at a concentration of 0.0070 mg/kg. Tertiary-butyl alcohol (TBA) was detected in two soil samples at concentrations up to 0.0079 mg/kg. No SPHs were observed during the investigation. Grab groundwater samples were collected from borings B-17 through B-19 contained up to 190,000 µg/l TPHg, 13,000 µg/l benzene, and 300 µg/l MTBE. TBA was detected at a concentration of 240 µg/l in B-19. Results from this investigation are presented in Cambria's May 16, 2001 *Subsurface Investigation Report.*

2001 Oxygen Releasing Compound (ORC) Installation: On May 2, 2001, Blaine Tech Services, Inc. (Blaine) installed ORC socks in wells V-1 and V-2. The ORC socks were removed during the fourth quarter 2001 monitoring event. Details of the ORC installation activities are presented in Cambria's quarterly groundwater monitoring reports for the second through the fourth quarter of 2001.

2002 Subsurface Investigation: In April 2002, Cambria drilled borings B-20 through B-22. MTBE was not detected in any of the soil or grab groundwater samples. Soil samples contained up to 380 mg/kg TPHg and 0.17 mg/kg benzene. Grab groundwater samples contained up to 160,000 µg/l TPHg and 18,000 µg/l benzene. Results of the investigation were presented in Cambria's June 21, 2002 *Site Investigation Report.*

2003 - 2005 ORC Installation: Blaine installed ORC socks in wells MW-5 and V-2 during first quarter of 2003. The ORCs were replaced on a semiannual basis. The use of ORC was discontinued during the first quarter 2005. Details of the ORC installation activities are presented in Cambria's quarterly groundwater monitoring reports for the first quarter 2003 through the first quarter of 2005.

2005 Soil Vapor Investigation: On August 28 through 31, 2005, Cambria drilled ten soil borings (GP-1 through GP-10). Soil samples contained up to 3,300 mg/kg TPHg and 15 mg/kg benzene. Grab groundwater samples contained up to 140,000 µg/l TPHg and 17,000 µg/l benzene. Soil vapor samples contained up to 71,000,000 micrograms per cubic meter (µg/m^3) TPHg and 170,000 µg/m^3 benzene. Details of these activities are included in Cambria's November 15, 2005 *Site Investigation Report.*

2005 Door to Door Survey: Cambria conducted a door to door survey within 300 feet of the subject site for wells, basements, and foundation type to identify building construction and potential vapor receptors. Questionnaires were sent to 110 properties and responses for 25 properties were received as of January 13, 2006. Of the 25 responses received, none of the properties had basements. Three properties were denoted as vacant; nine properties contained buildings constructed with slab-on-grade

foundations; three contained buildings constructed with perimeter foundations. Tabulated data and a list of properties included in the survey were included in Cambria's January 15, 2006 *Door to Door Survey Report, Access Agreement Update, and Status/Schedule Update.*

2006 Subsurface Investigation: On January 3 and 4, 2006, Cambria installed three monitoring wells (MW-6 through MW-8), drilled one soil boring (B-23), and installed six soil vapor probes (VP-1 through VP-6). Soil samples contained up to 3,800 mg/kg TPHg and 33 mg/kg benzene. Investigation results were presented in Cambria's April 14, 2006 *Site Investigation Report, and First Quarter 2006 – Groundwater Monitoring Report.*

2006 Dual-Phase Extraction (DPE) Pilot Test: Between January 16 and January 20, 2006, Cambria conducted a 5-day DPE pilot test on wells V-1, V-2, MW-6, MW-7, MW-4, MW-5, and MW-8 and a constant vacuum DPE test on well MW-6. The report concluded **1)** the absence of vapor phase concentrations (and groundwater concentrations) from well V-1 indicates that the former UST excavation does not contain residual source material; **2)** high sustained and increasing vapor concentrations suggest source material is present in the vicinity of wells V-2, MW-5, and MW-8; **3)** variability in extraction flow rates across the site may reflect heterogeneities in subsurface soils or may suggest preferential pathways; and **4)** the extremely high effective radius of influence calculated for wells MW-5 and MW-8 during DPE testing on well MW-7 supports the presence of a preferential pathway in the vicinity of these wells. The data from the DPE pilot test suggests that DPE is feasible at this site. The groundwater table was effectively drawn down by DPE and moderate vapor extraction flow rates were yielded from some of the extraction points. Although DPE is deemed feasible, Cambria did not recommend implementing DPE at this site. The extraction points that yielded the highest vapor concentrations did not yield an effective vapor extraction flow rate. Conversely, low vapor concentrations were yielded from the extraction point that did yield an effective vapor extraction flow rate. Therefore, DPE is not considered feasible in the target areas at this site. The pilot test details and results are presented in Cambria's March 14, 2006 *Pilot Test Report.*

2006 Subsurface Investigation: On February 28, 2006, Cambria installed two monitoring wells (MW-12 and MW-14) on off-site properties. TPHg, benzene, toluene, ethylbenzene, and xylenes (BTEX) were not detected in soil samples from well boring MW-12. Soil samples from MW-14 contained up to 970 mg/kg TPHg and 2.3 mg/kg benzene. These activities are documented in Cambria's May 25, 2006 *Subsurface Investigation Report.*

2006 Site Visit: During the site visit on April 19, 2006, Cambria identified two bathrooms inside the former station building. A floor drain was observed in the northern-most bathroom. Standing liquid was present in the floor drain and automotive parts and cleaners were stored in this area. A water sample from the floor drain contained carbon disulfide (3.69 µg/l), ethylbenzene (0.610 µg/l), and toluene (0.770 µg/l). This information was reported in Cambria's May 25, 2006 *Subsurface Investigation Report.*

2006 Geophysical Survey: On May 22, 2006, Norcal Geophysical Consultants, Inc. (Norcal) conducted a geophysical survey to determine if waste oil UST was present in the northwest portion of the property and to evaluate the presence of subsurface utilities in this area that could act as preferential pathways, including the mapping of the sewer line from the floor drain found inside the northwest corner of the building during the April 19, 2006 site inspection. Norcal did not locate a UST in the northwest corner of the site, but did find a vent line located behind the northeast corner of the station building. A subsurface electric line was traced from the station building to the western property boundary, and an unidentified subsurface utility was traced from the northwest corner of the station building to the southwest, near MW-5 and toward MW-6. The presence of the unknown utility line in the northwest corner confirms the observations of a possible preferential pathway in this area based on the DPE pilot test performed in January 2006. Based on a ground-penetrating radar (GPR) survey that was performed to try to locate a non-metallic sewer line, Norcal concluded that the sewer line from the bathroom could be more than 4 fbg since the GPR was unable to identify the line. This information was presented in Cambria's July 25, 2006 *Status Update, Report of Geophysical Survey, and Request for Agency Meeting.*

2006 Subsurface Investigation and Vapor Probe Installation: On October 16 through 18 and 20, 2006, Cambria drilled cone-penetrometer test (CPT) borings CPT-1 through CPT-5 and installed soil vapor probes VP-1 through VP-6. Due to a lack of adequate groundwater recharge, many of the grab groundwater sampling attempts between 15 and 29 fbg failed. Grab groundwater sample results from between 31-37 fbg confirmed that significant attenuation of contaminants of at least one order of magnitude from the interval monitored by the site wells (5-20 fbg), and therefore no further vertical delineation was warranted. Comparison of data from 1995, 2000, and 2006 in similar locations (B-6, B-9, B-19, and CPT-5) demonstrated attenuation of contaminant concentrations over time was occurring. A site inspection at the neighboring property was performed and revealed that due to significant ventilation and air exchange with outdoor ambient air, vapor sampling within the aboveground basement was no longer warranted. These activities are documented in Cambria's January 31, 2007 *CPT Investigation and Vapor Probe Installation Report.*

2007 Subsurface Investigation and Vapor Probe Installation: In May and June 2007, Conestoga-Rovers & Associates (CRA) drilled two CPT borings (CPT-6 and CPT-7) within 27th Street southwest of the site, one CPT boring (CPT-10) on the Marcus-Foster school property northwest of the site, and installed two soil vapor probes (VP-7 and VP-8) on private properties west-northwest of the site. Soil vapor samples collected from off-site vapor probe pairs VP-7 and VP-8, located on residential property, indicated that the soil gas concentrations immediately adjacent to the subject site and three parcels down gradient do no exceed the residential ESLs. Results of the investigation were presented in CRA's August 27, 2007 *Plume Delineation and Soil Vapor Sampling Report.*

2008 Site Conceptual Model (SCM) and Feasibility Study/Corrective Action Plan (FS/CAP): CRA submitted a February 2, 2008 SCM and FS/CAP for the site. Excavation of source material followed by installation of a bio-sparge curtain to assist biodegradation was the recommended remedial action for the site. CRA's May 28, 2008 *Remedial Action Plan* detailed plans for conducting the excavation and installing the bio-sparge system.

2009 Subsurface Investigation: In April 2009, CRA drilled eight hand auger borings (HA-1 through HA-8) behind the former station building to assess the extent hydrocarbon and lead concentrations in the vicinity of a former waste oil aboveground storage tank located behind the former station building. Up to 1,060 mg/kg lead, 4,500 mg/kg total petroleum hydrocarbons as diesel, and 11,000 mg/kg total petroleum hydrocarbons as motor oil were detected in soil samples from the hand auger borings. Maximum concentrations were all detected in samples from less than 2 fbg. Results of the investigation were presented in CRA's May 12, 2009 *Subsurface Investigation Report.*

Groundwater Monitoring: Groundwater monitoring has been conducted since August 1996. Fuel oxygenates are not a significant component of the groundwater plume, although di-isopropyl ether and TBA have been detected sporadically. Generally, groundwater flow direction is to the west, with some components to the northwest and southwest. Historically, monitoring wells MW-1, MW-2, MW-3, and MW-12 have shown little or no impact from petroleum hydrocarbons.

Vapor Monitoring: Vapor monitoring was conducted between May 2007 and November 2009. BTEX concentrations in off-site soil vapor samples were consistently below residential screening levels.