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July 27, 2005

Jerry Wickham
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: Subsurface Investigation Work Plan
Former Shell Service Station
4255 MacArthur Blvd.
Oakland, California
SAP Code 135701
Incident No. 98995758
ACHCSA # 3769

Dear Mr. Wickham:

Attached for your review and comment is a copy of the *Subsurface Investigation Work Plan* for the above referenced site. 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
Sr. Environmental Engineer

CAMBRIA

July 27, 2005

Mr. Jerry Wickham
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: **Subsurface Investigation Work Plan**
Former Shell Service Station
4255 MacArthur Boulevard
Oakland, California
Incident # 98995758
Cambria Project #247-0524-007
ACEH Case #3769

Dear Mr. Wickham:

On behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell), Cambria Environmental Technology, Inc. (Cambria) prepared this *Subsurface Investigation Work Plan.* The work plan details field activities recommended by Cambria in its June 6, 2005 *Subsurface Investigation Report* which presented the results of an investigation to determine the source and extent of the separate phase hydrocarbons (SPH) beneath the site using cone penetration testing (CPT) and ultraviolet induced fluorescence (UVIF). Because the borings advanced were terminated at 25 feet below grade (fbg) and impacted media were still present at this depth, Cambria proposed advancing additional, deeper borings and collecting depth-discrete soil and groundwater samples. This was proposed to complete the vertical and lateral delineation of hydrocarbon impacts and to determine screened intervals for additional monitoring wells. The site background and proposed activities are presented below.

SITE BACKGROUND

Site Location: The site is a former Shell-branded service station located at the MacArthur Boulevard and High Street intersection in a mixed commercial and residential area of Oakland, California (Figures 1 and 2). The site is currently an undeveloped, unpaved lot. An active 76 service station and a former Chevron service station, currently a Subway Sandwiches and Salads, are located east of the site. A trailer park and adjacent California Department of Transportation (Caltrans) access to Interstate 580 are located immediately southwest of the site. Topography slopes toward the west, with a 5-foot (ft) elevation difference between grade at the site and the trailer park property, and an additional 5-ft elevation difference between grade at the trailer park property and the Caltrans property.

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Soil Lithology: The lithology beneath the site and vicinity typically consists of 12 to 15 ft of silts and clays, underlain by sandy clay, clayey and silty sands, and sand to the total explored depth of 25 fbg.

Groundwater Depth and Flow Direction: Quarterly groundwater monitoring has been conducted at the site since November 1993. The historical depth to groundwater on site has ranged from approximately 4 to 17 fbg, and currently (third quarter of 2005) ranges from 6.78 to 13.46 fbg on site. Groundwater typically flows in a west-southwesterly direction.

June 1985 Subsurface Investigation: In June 1985, Emcon Associates of San Jose, California drilled three soil borings and installed one groundwater monitoring well adjacent to the underground storage tanks (USTs). Up to 15,800 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPHg) were detected in the shallow soil samples from inside the UST area. In July 1992, GeoStrategies, Inc. of Hayward, California performed a site reconnaissance and verified that the original monitoring well had been destroyed during the 1985 UST replacement activities.

December 1985 UST Replacement: In December 1985, the USTs were replaced, and approximately 810 cubic yards of hydrocarbon-bearing soil were transported to a disposal facility. Up to 22,000 ppm total volatile hydrocarbons and 500 ppm benzene were detected in the soil samples from the excavation.

November 1993 Subsurface Investigation: In November 1993, Weiss Associates (WA) of Emeryville, California drilled soil borings BH-A, BH-B and BH-C, which were converted into monitoring wells MW-1, MW-2 and MW-3, respectively. Up to 1,700 ppm TPHg and 3.3 ppm benzene were detected in soil boring BH-C (MW-3) between the 11-ft and 16-ft depth. Up to 66 ppm TPHg and 0.07 ppm benzene were detected in soil boring BH-B (MW-2) between the 9-ft and 14-ft depth.

November 1994 Subsurface Investigation: In November 1994, WA drilled on-site soil borings BH-D and BH-E, located on the northeastern end of the lot, and off-site boring BH-F (MW-4), located near the Highway 580 on-ramp. Up to 5,900 ppm TPHg and 23 ppm benzene were detected at 5 fbg in soil boring BH-E, located adjacent to the central eastern pump island. Trace hydrocarbon concentrations were detected in the capillary fringe soil samples collected from each of the borings.

November 1995 Dispenser and Piping Removal and Sampling: In November 1995, WA collected 15 soil samples during dispenser and piping replacement activities. Up to 7,800 ppm TPHg were detected in samples collected from beneath the former middle dispenser, and up to 2,800 ppm TPHg were detected in the sample collected from beneath the adjacent product piping. Up to 7,300 ppm TPHg were detected in the sample collected from beneath the northeast

dispenser island. No benzene above 1 ppm was detected in any of the 15 samples. During the dispenser replacements, horizontal wells HW-1 through HW-4 were installed in the vadose zone about 5 ft below ground surface and adjacent to the former piping and dispensers to facilitate future removal of petroleum hydrocarbons from the impacted soil.

August 1997 Soil Vapor Extraction (SVE) Test: In August 1997, Cambria performed short-term SVE tests using a VR Systems Model V3 internal combustion engine on horizontal vapor extraction wells HW-1 through HW-4 and on monitoring wells MW-2 and MW-3. Cambria measured vapor extraction flow rates, the vacuum applied to the wellheads, and the vacuum influence in nearby wells. Cambria calculated an effective radius of influence of 35 to 50 ft during testing of wells MW-3 and MW-2. The relatively high TPHg removal rates measured in horizontal wells HW-1 through HW-4 were most likely temporary and are not believed to be representative of site conditions due to extensive well screen in permeable fill material. The results of the short-term testing indicated that SVE achieves only low hydrocarbon removal rates in wells MW-2 and MW-3, which are more representative of native soil conditions.

February 1998 Subsurface Investigation: In February 1998, Cambria drilled two off-site borings (SB-1 and SB-2) in the trailer park adjacent to the Shell site. No TPHg or benzene was detected in the soil samples collected from the two borings. The highest methyl-tert-butyl ether (MTBE) concentration detected in soil was 1.4 ppm detected in soil boring SB-2 at a depth of 7 fbg. Up to 7,700 parts per billion (ppb) TPHg, 210 ppb benzene, and 46,000 ppb MTBE were detected in the grab groundwater sample collected from soil boring SB-2. In sample analysis of soil physical parameters, total organic carbon was detected at 2,140 ppm and 7,210 ppm at a depth of 5.5 fbg in borings SB-1 and SB-2, respectively, and total porosity was measured as 35.2% and 37.4%, respectively. Specific permeability values were 181 millidarcies (md) for SB-1-5.5 and 71 md for SB-2-5.5, but the lab noted that due to fine fractures developed in the samples upon drying, the measured values were an order or more of magnitude too high. Permeability measurements confirmed the low permeability of the shallow soils beneath the site.

2001 Sensitive Receptor Survey, Conduit Study and Site Conceptual Model (SCM): Cambria included a sensitive receptor survey, conduit study results, and an SCM in the *First Quarter 2001 Monitoring Report.* The sensitive receptor survey identified 25 monitoring wells, 4 cathodic protection wells, and 1 domestic well within ½ mile of the site. Given the conduit study results, Cambria concluded that nearby sewer, storm drain, and water lines located between 8 to 13 fbg could serve as preferential pathways for the migration of petroleum hydrocarbons and MTBE. However, Cambria did not identify any conduits in the nearby downgradient direction.

November 2001 Off-Site Monitoring Well Installation: Shell voluntarily instructed Cambria to delineate the off-site plume, and on November 12, 2001, Cambria supervised the installation of one downgradient monitoring well (MW-5) approximately 200 ft southwest of the site, on the Caltrans right-of-way adjacent to the I-580 on-ramp. No TPHg, benzene, toluene, ethylbenzene

and xylenes (BTEX) or MTBE were detected in the soil sample collected during the investigation. MW-5 has been included in the quarterly groundwater monitoring schedule since the first quarter of 2002. MTBE concentrations have ranged from 32 to 110 ppb. No other hydrocarbons have been detected in groundwater from this well.

January 2003 Tank Removal and Soil Excavation: Between January 27 and February 7, 2003, all surface features, USTs, fuel dispensers, and associated product piping were removed from the site. Cambria conducted soil and groundwater sampling, and supervised over-excavation to remove hydrocarbon-impacted soils to the practical extents. Approximately 875 cubic yards of soil were removed from the site during the tank-pull and over-excavation activities. Approximately 4,600 gallons of groundwater were pumped to dewater the UST excavation prior to removing the tanks. The highest chemical concentrations in soil in the former UST area were 380 ppm TPHg, 1.7 ppm benzene and 1.2 ppm MTBE, detected in the southeast corner of the tank pit in sample TP-5. The grab groundwater sample from the former tank pit area (TP-1-Water) contained 11,000 ppb TPHg, 410 ppb benzene and 5,200 ppb MTBE. The highest hydrocarbon concentrations remaining in soil in any of the former dispenser areas were 980 ppm TPHg and 1.2 ppm benzene, detected in sample P-2-8 at 8 fbg. The highest detected MTBE concentration remaining in soil in any of the former dispenser areas was 0.9 ppm, detected in sample D-5-S10. Following over-excavation, approximately 720 pounds of oxygen-releasing compound were mixed in the excavation base before backfilling with 1.5-inch drain rock to 4 fbg. The remainder of the tank pit and the over-excavation was backfilled and compacted with Class II road base material. In the April 28, 2003 *Tank Closure and Soil Excavation Report,* Cambria recommended installing one additional groundwater monitoring well in the southern corner of the former tank pit. Cambria submitted a September 22, 2003, *Subsurface Investigation Work Plan* detailing the proposed monitoring well installation activities.

April 2005 Subsurface Investigation: On April 5 and 6, 2005, Cambria oversaw the advancement of 11 CPT soil borings (CPT-1 through CPT-11) and two direct-push Geoprobe® soil borings (SB-3 and SB-4). Soils from borings SB-3 and SB-4 were logged continuously to confirm the CPT logs. At each CPT location, a UVIF module was used to identify hydrocarbons in the subsurface. No soil samples were submitted for laboratory analysis. Based on the data collected during this investigation, it appeared that no SPH was present at these locations but that dissolved-phase hydrocarbons are present at most locations at two distinct depths: a shallow zone in the silt and clay above 17 fbg, and a deeper zone in the silt, clay, and sand from approximately 19 to 20 fbg to the bottom of the borings at 25 fbg. Details of this investigation are included in Cambria's June 6, 2005 *Subsurface Investigation Report.*

TECHNICAL RATIONALE FOR PROPOSED SCOPE OF WORK

The vertical and lateral extent of petroleum hydrocarbons in groundwater has not been determined. The proposed discrete-depth soil and groundwater investigation will provide additional information on the site's lithology and vertically profile the dissolved hydrocarbons. This information will then be used to determine the screened intervals for any new wells deemed necessary to provide monitoring of dissolved hydrocarbon concentrations for each location.

WORK TASKS

Permits: Cambria will obtain required permits for soil boring advancement.

Site Safety Plan: Cambria will prepare a comprehensive site safety plan to protect site workers. The plan will be kept on site during field activities and signed by each site worker.

Utility Clearance: Cambria will mark proposed drilling locations, and the locations will be cleared through Underground Service Alert prior to drilling. Additionally, a private utility locator will be used to identify subsurface obstacles to drilling.

Soil Borings: Cambria proposes advancing four borings to further investigate the vertical and lateral extent of petroleum hydrocarbons in groundwater beneath the site. Assuming the absence of overhead and subsurface obstructions, Cambria will advance borings at the approximate locations shown on Figure 2. Using direct push technology and a "dual tube" sampling system, Cambria proposes to advance an initial soil boring at each location to approximately 35 fbg.

"Dual tube" sampling systems use two sets of probe rods to collect continuous soil cores. One set of rods is driven into the ground as an outer casing. These rods receive the driving force from the hammer and provide a sealed hole from which soil samples may be recovered without the threat of cross contamination.

Under the supervision of a California-registered geologist or civil engineer, a Cambria geologist will direct the borings. Borings will be logged continuously to provide detailed lithologic profiles. At a minimum, soil samples will be collected for laboratory analysis every 5 ft above the water table. In addition, depths at which staining or hydrocarbon odor is evident will be targeted for soil sample collection.

A second boring will be advanced adjacent to the initial boring using direct push technology and a 'dual tube' sampling system to collect discrete groundwater samples, where sufficient groundwater is available, at approximately 5-foot intervals from first-encountered groundwater to

approximately 35 fbg. However, zones of high permeability, as identified during lithologic logging of the initial boring at each location, will be targeted for groundwater sample collection and the sampling interval will be adjusted accordingly. At each proposed groundwater sampling depth, a maximum of 30 minutes will be allotted for sample collection. If a water sample cannot be collected within the allotted time, it will be assumed that that zone contains insufficient water for sample collection. Between groundwater sampling events, drill rods and the stainless steel bailer used to collect groundwater samples will be decontaminated to prevent cross contamination from one water-bearing unit to another.

Upon sampling completion, the borings will be grouted from the bottom to the surface with neat Portland cement and surfaced to match the existing grade. Soil and groundwater samples will be transported to a State-of-California-approved analytical laboratory for chemical analysis. Cambria's standard field procedures for Geoprobe® soil and groundwater sampling are presented as Attachment A.

Chemical Analyses: A State-approved analytical laboratory will analyze soil and groundwater samples for TPHg, BTEX, tert-butyl alcohol, di-isopropyl ether, ethyl tert butyl ether, tert amyl methyl ether, and MTBE using EPA Method 8260.

Report Preparation: Within 60 days after receiving analytical results from the laboratory, Cambria will prepare a written report including field procedures, laboratory results, boring logs, conclusions and recommendations.

SCHEDULE

Upon receiving written work plan approval, Cambria will acquire permits and schedule field activities.

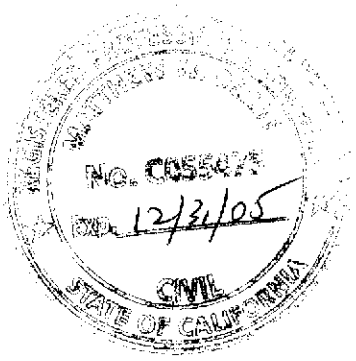
CLOSING

If you have any questions regarding the scope of work outlined in this work plan, please call David Gibbs at (510) 420-3363.

Sincerely,
Cambria Environmental Technology, Inc.

David M. Gibbs, P.G.
Project Geologist

Matthew W. Derby, P.E.
Senior Project Engineer



Figures: 1 - Vicinity/Area Well Survey Map
2 - Site Plan

Attachment: A - Standard Field Procedures for Geoprobe® Soil and Groundwater Sampling

cc: Denis Brown, Shell Oil Products US, 20945 S. Wilmington Ave., Carson, CA 90810
Roland C. Malone, Jr., PO Box 2744, Castro Valley, CA 94546
Kenneth Williams, Mac Arthur/High Trailer Park, c/o Bookkeeping, 332 Peyton Dr., Hayward, CA 94544
Thomas H. Kosel, Conoco-Phillips Company, 76 Broadway, Sacramento, CA 95818

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06/01/05

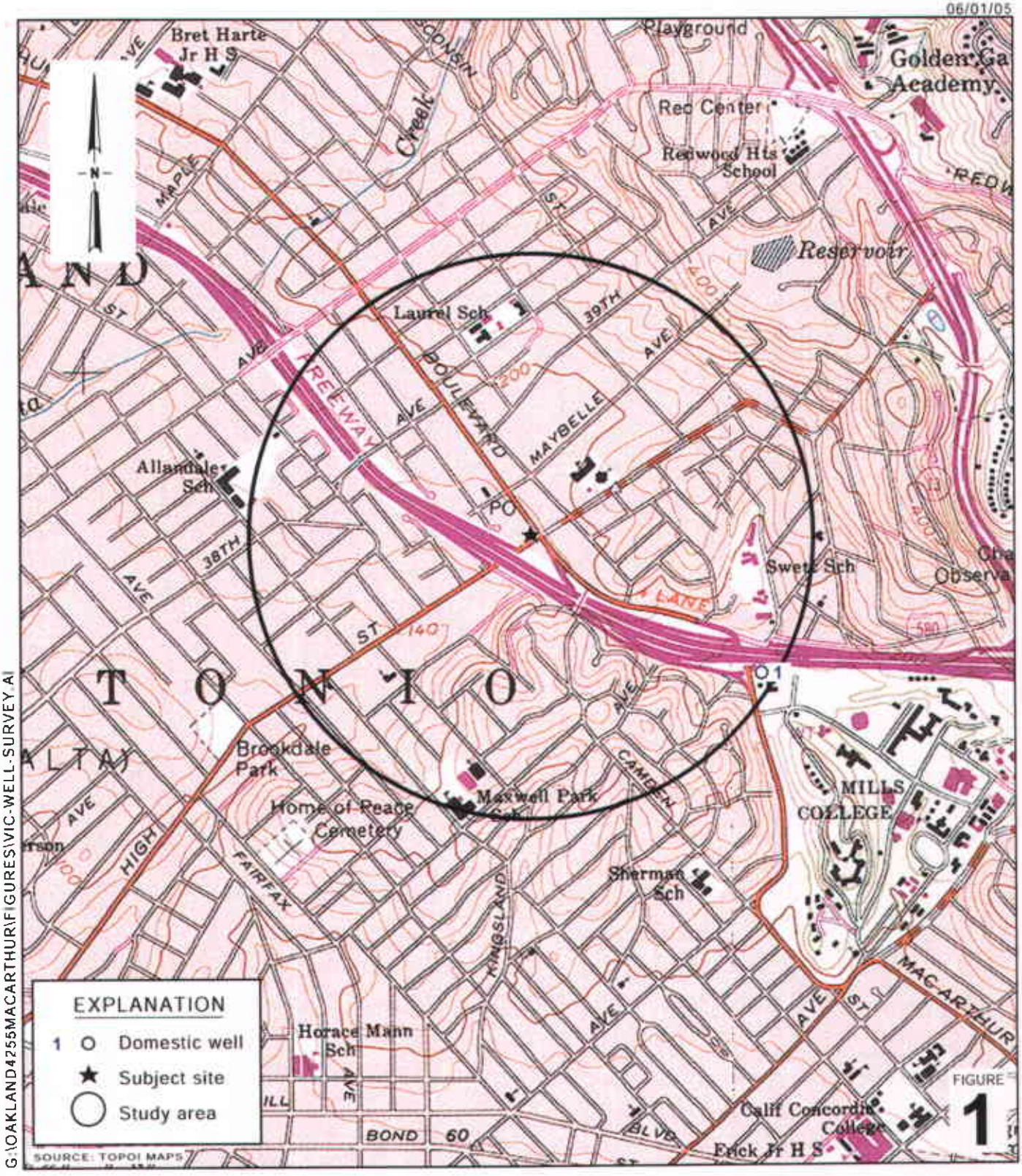

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FIGURE 1

Former Shell Service Station
4255 MacArthur Boulevard
Oakland, California
Incident No.98995758

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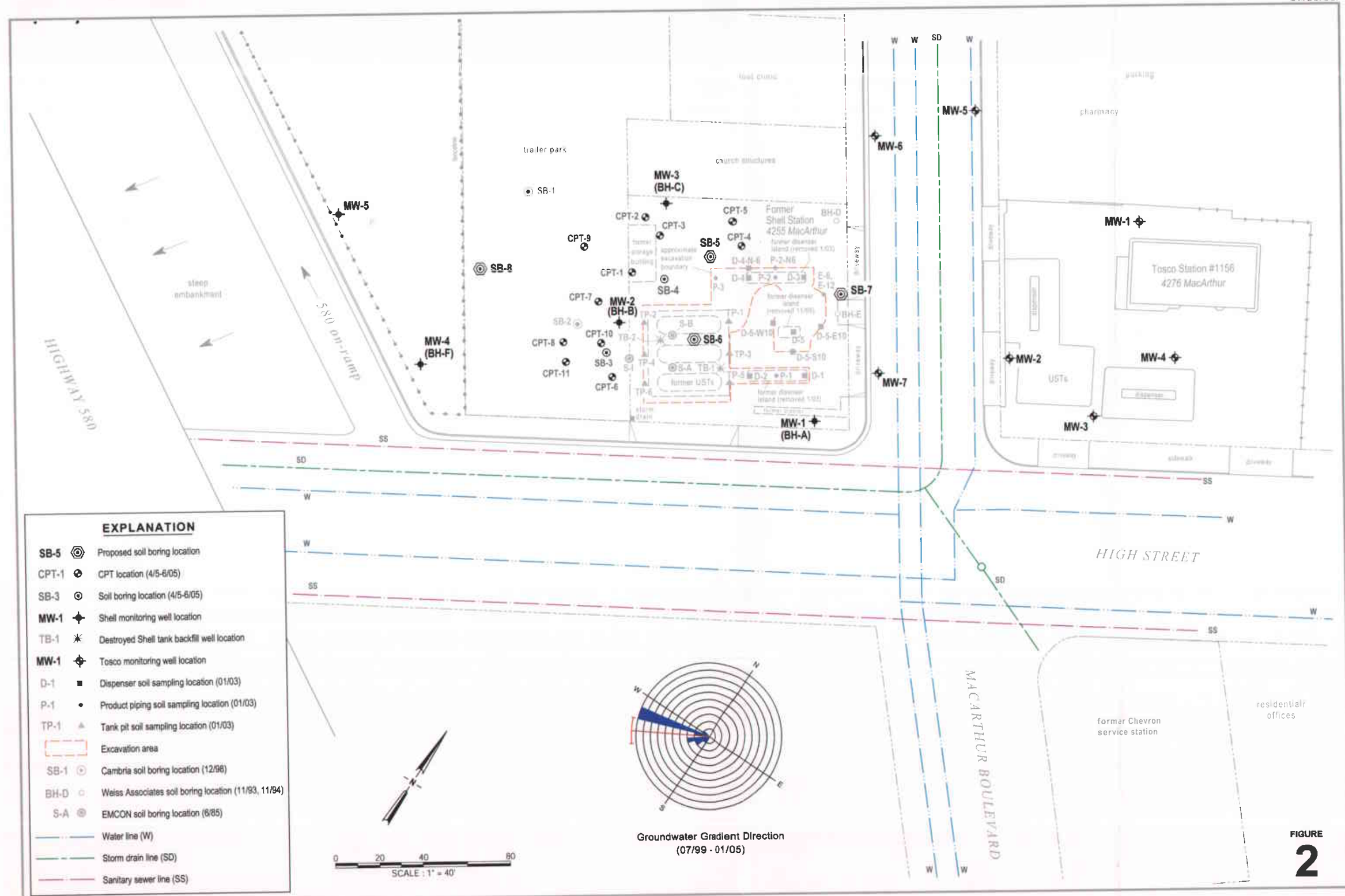
Vicinity/Area Well Survey Map

(1/2 Mile Radius)

07/20/05

Soil and Groundwater Sampling Location Map



EXPLANATION

- SB-5 — Proposed soil boring location
- CPT-1 — CPT location (4/5-6/05)
- SB-3 — Soil boring location (4/5-6/05)
- MW-1 — Shell monitoring well location
- TB-1 — Destroyed Shell tank backfill well location
- MW-1 — Tosco monitoring well location
- D-1 — Dispenser soil sampling location (01/03)
- P-1 — Product piping soil sampling location (01/03)
- TP-1 — Tank pit soil sampling location (01/03)
- Excavation area
- SB-1 — Cambria soil boring location (12/98)
- BH-D — Weiss Associates soil boring location (11/93, 11/94)
- S-A — EMCON soil boring location (6/85)
- Water line (W)
- Storm drain line (SD)
- Sanitary sewer line (SS)

0 20 40 60
SCALE : 1" = 40'

Groundwater Gradient Direction
(07/99 - 01/05)

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Former Shell Service Station
4255 MacArthur Boulevard
Oakland, California
Incident No.98995758

FIGURE
2

G:\OAKLAND 4255 MACARTHUR\FIGURES\SITE PLAN 7-05.AI

ATTACHMENT A

Standard Field Procedures for Geoprobe® Soil and Groundwater Sampling

CAMBRIA

STANDARD FIELD PROCEDURES FOR GEOPROBE® SOIL AND GROUNDWATER SAMPLING

This document describes Cambria Environmental Technology's standard field methods for Geoprobe® soil and ground water sampling. 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) or a Certified Engineering Geologist (CEG). The following soil properties are noted for each soil sample:

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

Soil Sampling

Geoprobe® soil samples are collected from borings driven using hydraulic push technologies. A minimum of one and one half ft of the soil column is collected for every five ft of drilled depth. Additional soil samples can be collected near the water table and at lithologic changes. Samples are collected using samplers lined with polyethylene or brass tubes driven into undisturbed sediments at the bottom of the borehole. The ground surface immediately adjacent to the boring is used as a datum to measure sample depth. The horizontal location of each boring is measured in the field relative to a permanent on-site reference using a measuring wheel or tape measure.

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

Sample Storage, Handling and Transport

Sampling tubes 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

After a soil sample has been collected, soil from the remaining tubing is placed inside a sealed plastic bag and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable GasTech® or photoionization detector measures volatile hydrocarbon vapor concentrations in the bag's headspace, extracting the vapor through a slit in the plastic bag. The measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Grab Ground Water Sampling

Ground water samples are collected from the open borehole using bailers, advancing disposable Tygon® tubing into the borehole and extracting ground water using a diaphragm pump, or using a hydro-punch style sampler with a bailer or tubing. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4° C, and transported under chain-of-custody to the laboratory.

Discrete Depth Soil and Ground Water Sampling

Soil and groundwater samples are collected for lithologic and chemical analysis using a direct driven, dual tube soil coring system. A hydraulic hammer drives sampling rods into he ground to collect continuous soil cores. Two nested sampling rods are driven at the same time: a larger diameter outer rod to act as a temporary drive casing and a smaller inner rod to retrieve soil cores. As the rods are advanced the soil is driven into a sample barrel that is attached to the end of the inner rod. The outer rod ensures that the sample is collected from the desired interval by preventing sloughing of the overlying material. After reaching the desired depth the inner rods are removed from the boring and the sleeves containing the soil sample are removed from the inner sample barrel. 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.

When collecting groundwater samples, the sample barrel and inner rods are removed from the boring once the targeted water bearing zone has been reached. The drive casing is pulled up from 0.5 to 5 feet to allow groundwater to enter the borehole. Small diameter well casing and screen is then installed in the borehole to facilitate sample collection. The drive casing is then pulled up sufficiently to expose the desired length of screen and samples are collected using a bailer, peristaltic, bladder or inertial pump. The ground water samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4° C, and transported under chain-of-custody to the laboratory.

Duplicates and Blanks

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

Grouting

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