CONESTOGA-ROVERS
& ASSOCIATES

5900 Hollis Street, Suite A, Emeryville, California 94608
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www.CRAworld.com

July 09, 2008

Mr. Jerry Wickham
Alameda County Environmental Health Services (ACEHS)
1131 Harbor Bay Parkway
Alameda, CA 94502

Re: **Soil Boring Workplan**
Former Texaco Service Station (Chevron Site # 307233)
2259 First Street
Livermore, CA
RO #2908

Dear Mr. Wickham:

On behalf of Chevron Environmental Management Company (Chevron), Conestoga-Rovers & Associates, Inc. (CRA), is submitting this *Soil Boring Workplan* for the site referenced above. In a letter dated May 9, 2008, ACEHS requested additional horizontal and vertical delineation of petroleum hydrocarbons detected during previous subsurface investigations (Attachment A). On March 27, 2008, CRA submitted the *Subsurface Investigation and Well Installation Workplan* that proposed the installation of three groundwater monitoring wells. After further evaluation, CRA proposes to advance soil borings to further delineate petroleum hydrocarbons vertically and horizontally prior to installing monitoring wells. This approach will ensure wells are best located for plume monitoring. Presented below are a summary of the site background, previous environmental work, and the proposed scope of work.

SITE BACKGROUND

The former service station site is now Mills Square Park, owned by the City of Livermore and located on the east corner of First Street and North Livermore Avenue in Livermore, California. The site is approximately 485 feet above mean sea level and topography around the site slopes gently to the north (Figure 1). The park consists of grass and trees with a concrete walkway.

Sanborn maps indicate the site was a retail service station prior to 1929. The original configuration depicts one small building labeled 'Gasol. & Oils' in the southwestern portion of the site and another building along the northeastern property line that was labeled 'Tire Shop & Grease.' By 1944, the configuration of the 'Gas & Oils' building had changed slightly, but was still located in the southwestern portion of the site. The earliest available aerial photograph was from 1959. This photo shows a station building located on the southern edge of the property and two dispenser islands located on the western portion of the property (Figure 2). The 1973 aerial photograph indicates the station building and dispenser island had been removed and only a paved lot remained. By 1978, the property had been redeveloped as a park. The park remains in the same configuration as shown on the 1978 aerial photo.

Based on the aerial photographs and Sanborn maps, the site has had at least three configurations, which may have included multiple underground storage tank (UST) pits. The USTs removed in 2005 and 2007 from the southern corner of the site most likely represent an earlier generation of USTs based on their location, size (estimated 750-1,000 gallons), and type (steel). It is probable there was another UST pit in the northeastern half of the site, based on the final dispenser islands and building configuration.

Groundwater flow direction is believed to be west to northwest based on groundwater monitoring data reported from four other service stations in the area. Fluctuations of groundwater elevation of approximately 12 to 45 feet have been reported in the monitoring wells at these nearby sites.

PREVIOUS ENVIRONMENTAL WORK

September 2003 Investigation: The City of Livermore Engineering Division, as part of a redevelopment plan, retained Fugro West, Inc. (Fugro) to investigate soil and groundwater conditions beneath Mills Square Park to evaluate the potential presence of petroleum hydrocarbons resulting from the historic use of the site as a service station. Fugro advanced borings B1 through B-3 on-site.[1] Hydrocarbons were only detected in one soil sample, which contained 3.5 milligrams per kilogram (mg/kg) total petroleum hydrocarbons as gasoline (TPHg) and 9.6 mg/kg total petroleum hydrocarbons as diesel (TPHd). Groundwater samples contained up to 18,000 micrograms per liter (µg/l) TPHg and 42,000 µg/l TPHd. No benzene was detected in soil, but was detected in groundwater up to 140 µg/l. Total lead concentrations up to 3,700 mg/kg were detected in all soil samples at 3 feet below grade (fbg).

September 2005 UST Removal: In September 2005, an orphan UST was encountered beneath the sidewalk on the southwest corner of the site. At the direction of the Livermore-Pleasanton Fire Department, the UST was removed, soil samples were collected, and the excavated soil was backfilled into the UST pit. According to Consolidated Engineering Laboratories' October 4, 2005, *Environmental Sampling, Testing and Evaluation of Soil* report, soil beneath the UST contained up to 1,200 mg/kg TPHg, 4,100 mg/kg TPHd, and 54 mg/kg total petroleum hydrocarbons as motor oil (TPHmo). Chevron was not involved with the tank removal and was contacted later by ACEHS to investigate whether any other USTs remained in Mills Square Park.

August 2006 Geophysical Investigation: Cambria Environmental Technology, Inc. (Cambria), now CRA, contracted NORCAL Geophysical Consultants, Inc. to determine if any USTs still remained in place. Two

1 *Soil and Groundwater Investigation Report,* Fugro, January 6, 2004,

suspected tanks were identified in the southwest corner of the park, measuring approximately 5 by 7 feet and located approximately 3 fbg.

September and October 2006 Site Investigation: Cambria observed Woodward Drilling Company, Inc. advance borings B1 though B5 in the vicinity of the former dispenser islands and suspected USTs. Up to 8,700 mg/kg TPHg, 3,000 mg/kg TPHd, 1,400 mg/kg TPHmo and 14 mg/kg benzene were detected in soil. The maximum lead concentration was 65.4 mg/kg at 5 fbg. No groundwater was encountered to the total explored depth of 40 fbg.

June 2007 Tank Removal: On June 20, 2007, CRA observed Gettler-Ryan Inc. (Gettler-Ryan) remove two 750-gallon single-wall steel gasoline USTs (Tank 1 and Tank 2) and approximately 27 feet of associated product piping. CRA collected seven compliance soil samples from beneath the ends and middle of both Tank 1 and Tank 2 and from below the pipes protruding into the northwestern wall of the tank pit. No TPHg was detected in any sample. Up to 2,800 mg/kg TPHd and 11,000 mg/kg TPHmo were detected. Lead was detected at a maximum concentration of 1,170 mg/kg at 8 fbg.

January and February 2008 Site Investigation: CRA observed Gregg Drilling & Testing, Inc., RSI Drilling, and Vironex Environmental Field Services advance soil borings CPT1, CPT2 and SB6 through SB9, shallow soil borings SSB1 through SSB11, and install vapor probes VP-1 through VP-3, both on-site and off-site. The highest concentrations detected were 530 mg/kg TPHg in SB8 at 34.5 fbg, 100 mg/kg TPHd and 380 mg/kg TPHmo in CPT1 at 36 fbg, and 0.007 mg/kg benzene in SB8 at 39.5 fbg. The highest concentrations detected in groundwater were 18,000 µg/L TPHg in SB8, 52,000 µg/L TPHd in SB8, 1,500 µg/L TPHmo in both CPT1 and CPT2, and 14 µg/L benzene in CPT2., No benzene was detected in soil vapor and no other constituents were detected or were at least two orders of magnitude below the shallow soil gas screening levels for evaluation of potential vapor intrusion concerns for commercial/industrial land use.

PROPOSED SCOPE OF WORK

CRA proposes to further delineate the plume horizontally and vertically prior to installing groundwater monitoring wells. To meet this objective, CRA will advance four cone penetration testing (CPT) borings off-site (Figure 3). Borings CPT3 and CPT4 will be advanced down-gradient of the USTs removed in 2005 and 2007, CPT5 will be down-gradient of the potential later generation UST pit, and CPT6 will be cross-gradient of the site. Due to drilling equipment size and safety concerns, all borings will be advanced within parking lanes and not in any through traffic lanes.

CRA also proposes to advance three soil borings within the park (Figure 3). Borings SB10 and SB11 will be drilled using a hollow stem auger near previously sampled boring SB8 to assess whether there is an additional hydrocarbon source in the northern corner of the site. Boring SB12 will be drilled in the vicinity of CRA boring

SB6 (2008) and Fugro boring B-3 (2003) to confirm the depth of first encountered groundwater and previous groundwater sampling results. Cross-sections A-A' and B-B' (Figures 4 and 5), show no perched water zone in this area that would account for a shallower groundwater depth in boring SB6 as compared to the depth of groundwater encountered in all other borings.

CRA will resample vapor probe VP1 at 5 and 10 fbg by the previously approved methods with the addition of specific chlorinated solvents by Environmental Protection Agency (EPA) Method TO-15.

Site Health and Safety Plan: CRA will prepare a site health and safety plan to protect site workers. The plan will be reviewed and signed by all site workers/visitors and kept on-site at all times.

Permits: CRA will obtain boring permits from the Zone 7 Water District and any other required permits from the City of Livermore prior to field activities.

Underground Utility Location: CRA will contact Underground Service Alert to identify potential utilities in the vicinity of all proposed boring locations. A subsurface utility locating contractor will be retained to clear each individual boring location. Per Chevron safety standards, each boring will be cleared to eight fbg using an air-knife assisted vacuum rig or hand auger.

CPT Borings: CRA proposes to advance CPT3 through CPT6 to approximately 80 fbg. CRA will attempt to collect multiple grab groundwater samples from water bearing zones identified by the CPT. Soil samples will be collected at the capillary fringe zone and at intervals of distinct lithologic change where potential hydrocarbons could become perched. Upon completion, the borings will be filled with Portland type I/II grout using a tremie pipe and patched to match the existing surface. CRA's *Standard Field Procedures for Cone Penetrometer Testing and Sampling* is presented as Attachment B.

Soil Borings: CRA will use a 4-inch diameter hollow stem auger to advance soil borings B10 through B12 within Mills Square Park to approximately 10 feet below the first occurrence of groundwater or 40 fbg, whichever is deeper. Boring depth will be extended if hydrocarbons are observed at the total proposed depth of the boring. Grab groundwater samples will be collected from each boring. The soil borings will be logged continuously in the field using the Unified Soil Classification System (USCS) and will be screened with a photo-ionization detector (PID). Soil samples will be collected for laboratory analysis at depths where visible staining, odor or elevated PID readings are observed. If visible staining, odor, or elevated PID readings are observed, a sufficient number of soil samples will be collected to characterize the vertical extent of impact. If no visible staining, odor or elevated PID readings are observed, soil samples will be collected for laboratory analysis at 10 foot intervals starting from 5 fbg to the total depth of the boring. Samples will be labeled, placed on ice and transported to a Chevron-approved laboratory under proper chain of custody. Upon completion, the borings will be filled with

Portland type I/II grout using a tremie pipe and patched to match the existing surface. CRA's *Standard Field Procedures for Soil Borings* is presented at Attachment C.

Chemical Analysis: Select soil and groundwater samples will be analyzed for the following:

- TPHg and TPHd with silica gel cleanup, and TPHmo by modified EPA Method 8015M;
- Benzene, toluene, ethylbenzene and xylenes (BTEX), methyl tertiary butyl ether (MTBE), di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), tertiary butyl alcohol (TBA), 1,2-dichloroethane (1,2-DCA) and 1,2-dibromoethane (EDB) by EPA Method 8260B.

Soil Vapor Chemical Analysis: Soil vapor samples will be analyzed for the following:

- TPHg by EPA Method TO-3;
- BTEX, MTBE, DIPE, ETBE, TAME, TBA, 1,2-DCA, EDB, naphthalene, and chlorinated solvents [tetrachloroethene (PCE), trichloroethene (TCE), trans-1,2-dichloroethene (t-1,2-DCE), cis-1,2-dichloroethene (c-1,2-DCE) 1,1,1-trichloroethane (1,1,1-TCA), 1,2-dichloroethane (1,2-DCA), 1,2-dichloropropane (1,2-DCP), 1,1-dichloroethene (1,1-DCE)] by EPA Method TO-15; and
- O_2, CO_2, CH_4 and helium by ASTM D-1946 (GC/TCD).

Soil Disposal: Soil cuttings produced during field activities will be temporarily stored on-site. Soil cuttings will be profiled and transported to a Chevron-approved facility for disposal.

Reporting: Upon completion of field activities and review of the analytic results, we will prepare an investigation report that, at a minimum, will contain:

- Descriptions of the drilling and sampling methods;
- Boring logs;
- Tabulated soil, groundwater and soil vapor analytical results;
- Analytic reports and chain-of-custody forms;
- Disposal methods for soil and any produced water;
- An evaluation of the extent of hydrocarbons in the subsurface; and
- Conclusions and recommendations.

SCHEDULE

CRA will proceed with the proposed scope of work upon receipt of written approval from the ACEHS. After approval, CRA will take approximately four to six weeks to obtain the necessary drilling permits, schedule the subcontractors at their earliest availability, and coordinate with the City of Livermore. We will submit our investigation report approximately six to eight weeks after completion of field activities.

CLOSING

We appreciate the opportunity to work with you on this project. Please contact Charlotte Evans of CRA at (510) 420-3351 or Ian Robb of Chevron at (925) 543-2375 if you have any questions or comments regarding this work.

Sincerely,
Conestoga-Rovers & Associates

Charlotte Evans

Brandon S. Wilken, P.G. #7564

Figures:
1 – Vicinity Map
2 – Site Plan
3 – Site Plan with Proposed Soil Boring Locations
4 – Cross Section A-A'
5 – Cross Section B-B'

Attachments:
A – Regulatory Correspondence
B – Standard Field Procedures for Cone Penetrometer Testing and Sampling
C – Standard Field Procedures for Soil Borings

cc: Mr. Ian Robb, Chevron Environmental Management Company, 6111 Bollinger Canyon Road, San Ramon, CA 94583
Chris Davidson, City of Livermore Economic and Redevelopment, 1052 South Livermore Avenue, Livermore, CA 94550
Wyman Hong, Zone 7 Water Agency, 100 North Canyons Parkway, Livermore, CA 94551

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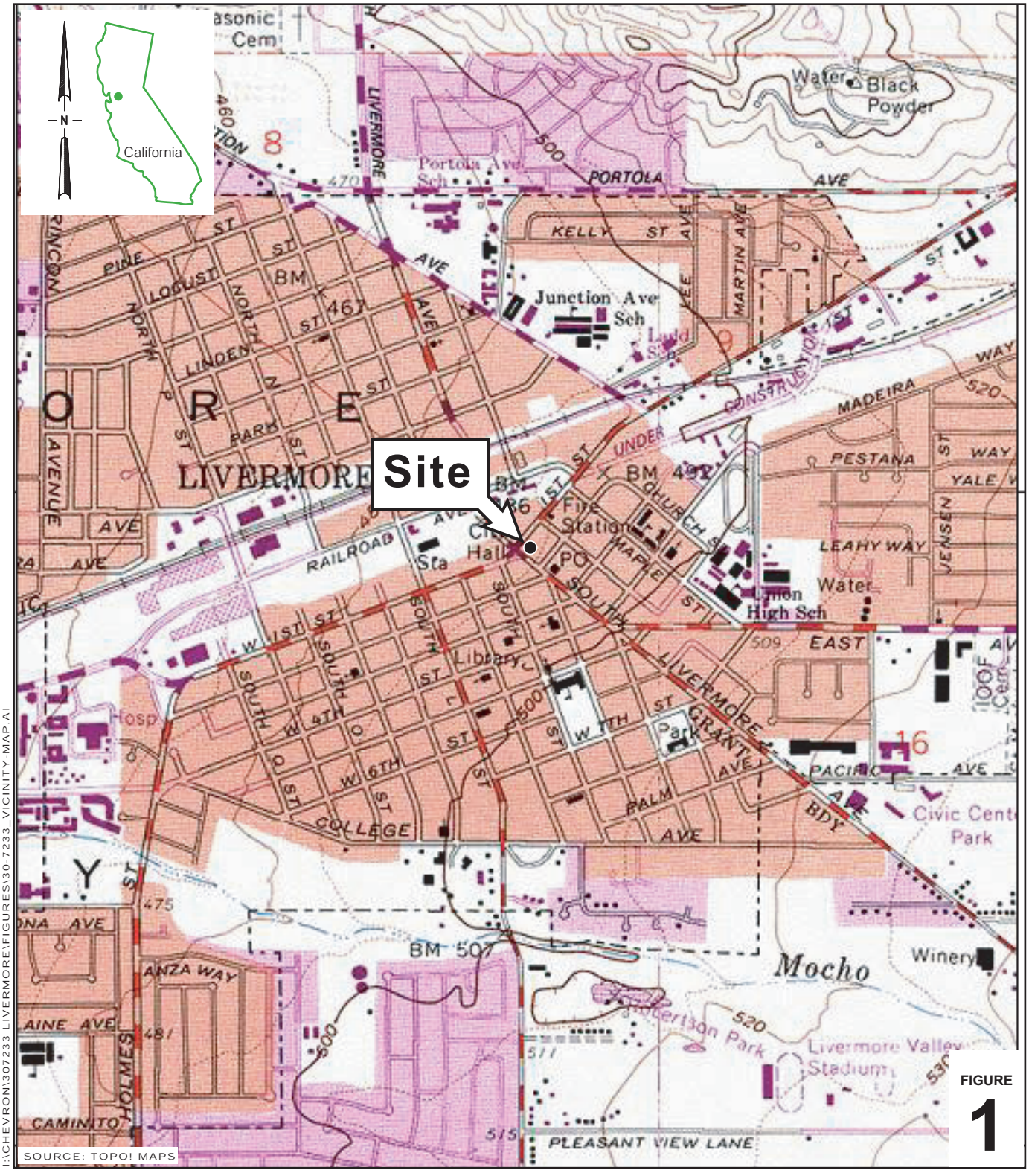


I:\CHEVRON\307233 LIVERMORE\FIGURES\30-7233_VICINITY-MAP.AI

FIGURE
1

0 1/8 1/4 1/2 1

SCALE : 1" = 1/4 MILE

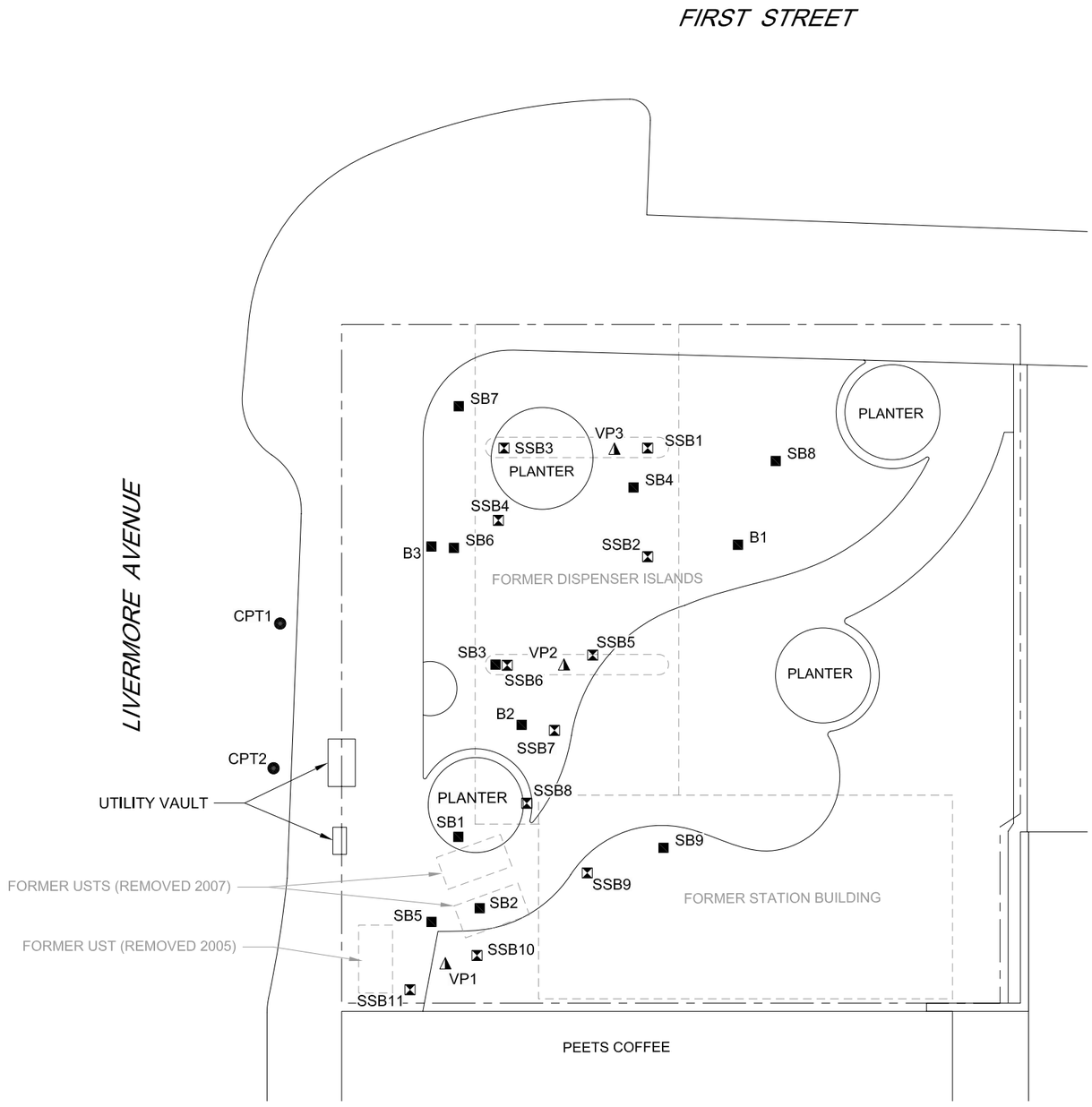
Chevron Service Station 30-7233

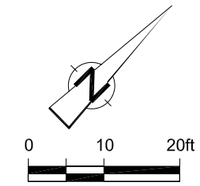
2259 First Street

Livermore, California

CONESTOGA-ROVERS & ASSOCIATES

Vicinity Map





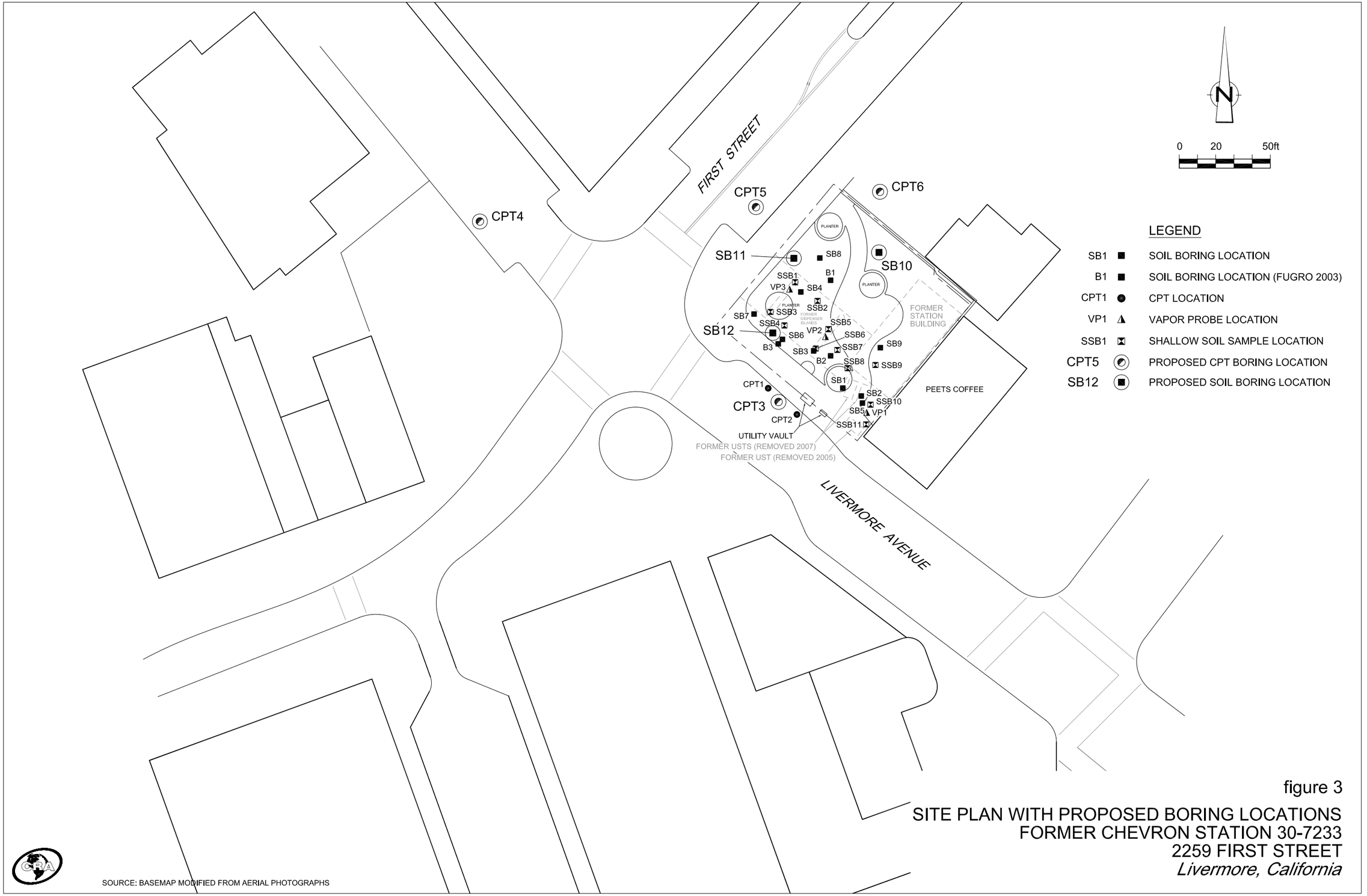
LEGEND

SB1	■	SOIL BORING LOCATION
B1	■	SOIL BORING LOCATION (FUGRO 2003)
CPT1	●	CPT LOCATION
VP1	◭	VAPOR PROBE LOCATION
SSB1	⊠	SHALLOW SOIL SAMPLE LOCATION

SOURCE: BASEMAP MODIFIED FROM AERIAL PHOTOGRAPHS

figure 2

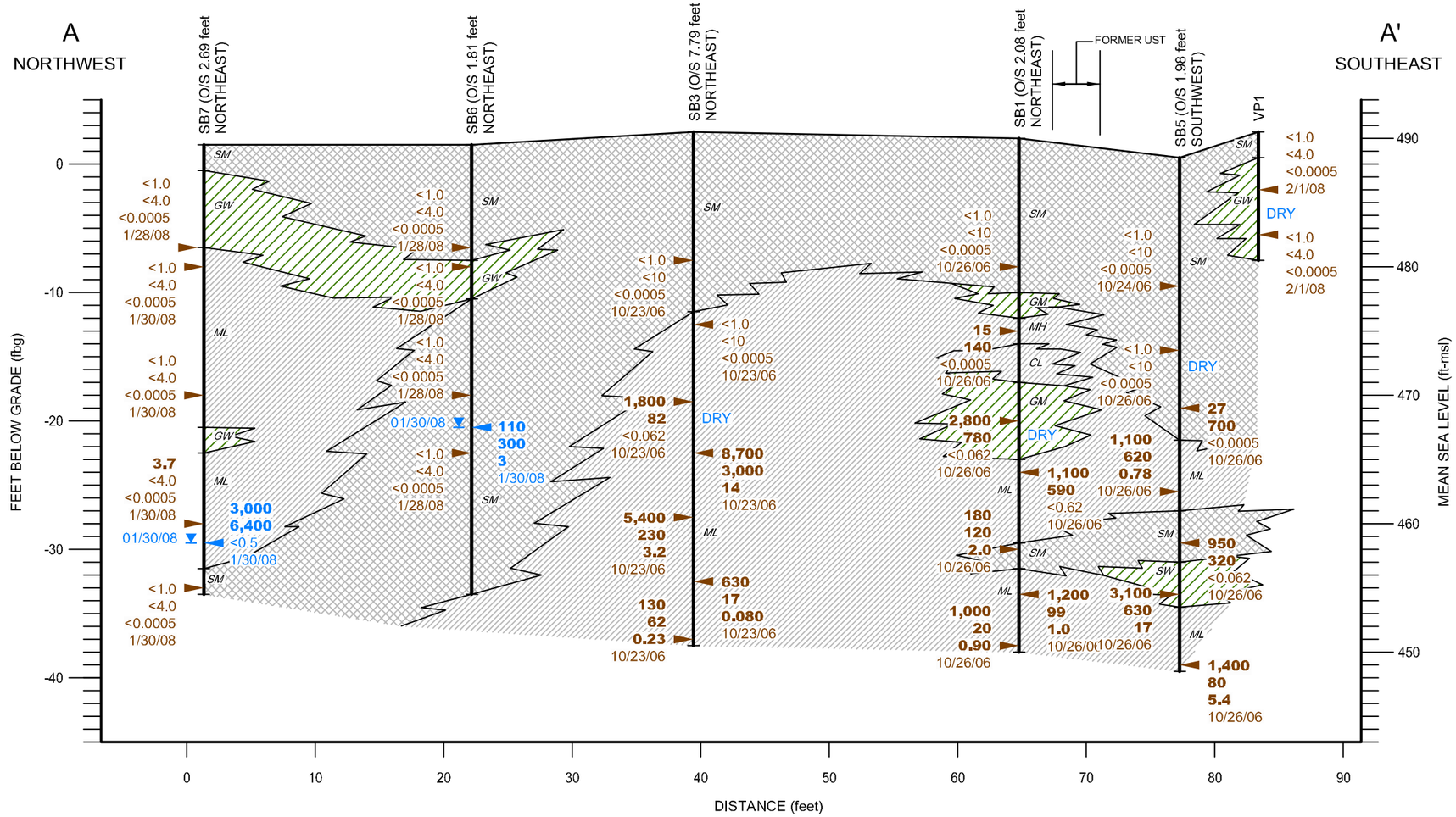
SITE PLAN
FORMER CHEVRON STATION 30-7233
2259 FIRST STREET
Livermore, California

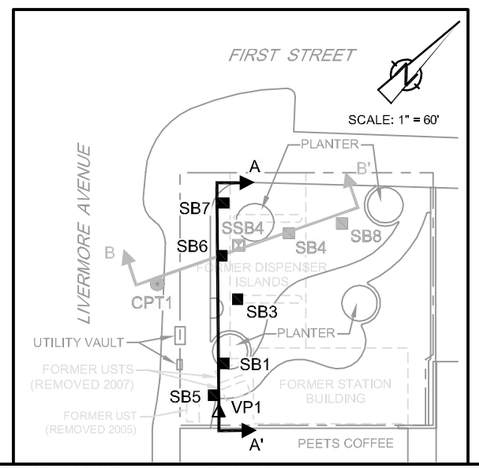


SOURCE: BASEMAP MODIFIED FROM AERIAL PHOTOGRAPHS

figure 3

SITE PLAN WITH PROPOSED BORING LOCATIONS
FORMER CHEVRON STATION 30-7233
2259 FIRST STREET
Livermore, California





LEGEND

- SB7 — WELL DESIGNATION
- GROUND SURFACE
- OBSERVATION WELL INSTALLATION
- STRATIGRAPHIC BOUNDARY
- CL — TYPICAL SOIL CLASSIFICATION
- BOTTOM OF BORING
- TPHg / TPHd / BENZENE / DATE — APPROXIMATE SAMPLE LOCATION (mg/kg) HYDROCARBON CONCENTRATIONS IN SOIL
- TPHg / TPHd / BENZENE / DATE — APPROXIMATE GROUNDWATER SAMPLE LOCATION (µg/L) HYDROCARBON CONCENTRATIONS IN GROUNDWATER

SCALE: HORZ. 1" = 10'
VERT. 1" = 10'

- COARSE GRAINED SOILS : GRAVELS, SANDY GRAVELS
- MEDIUM GRAINED SOILS : SANDS, GRAVELY SANDS
- FINE GRAINED SOILS : SILTS, CLAYS AND SILTY CLAYS
- GROUNDWATER DEPTH

SOURCE: BASEMAP MODIFIED FROM GEOPHYSICAL REPORT.

figure 4

CROSS SECTION A-A'
FORMER CHEVRON STATION 30-7233
2259 FIRST STREET
Livermore, California

LEGEND

SB6 — WELL DESIGNATION

GROUND SURFACE

— OBSERVATION WELL INSTALLATION

— STRATIGRAPHIC BOUNDARY

CL — TYPICAL SOIL CLASSIFICATION

— BOTTOM OF BORING

TPHg
TPHd
BENZENE
DATE — APPROXIMATE SAMPLE LOCATION (mg/kg) HYDROCARBON CONCENTRATIONS IN SOIL

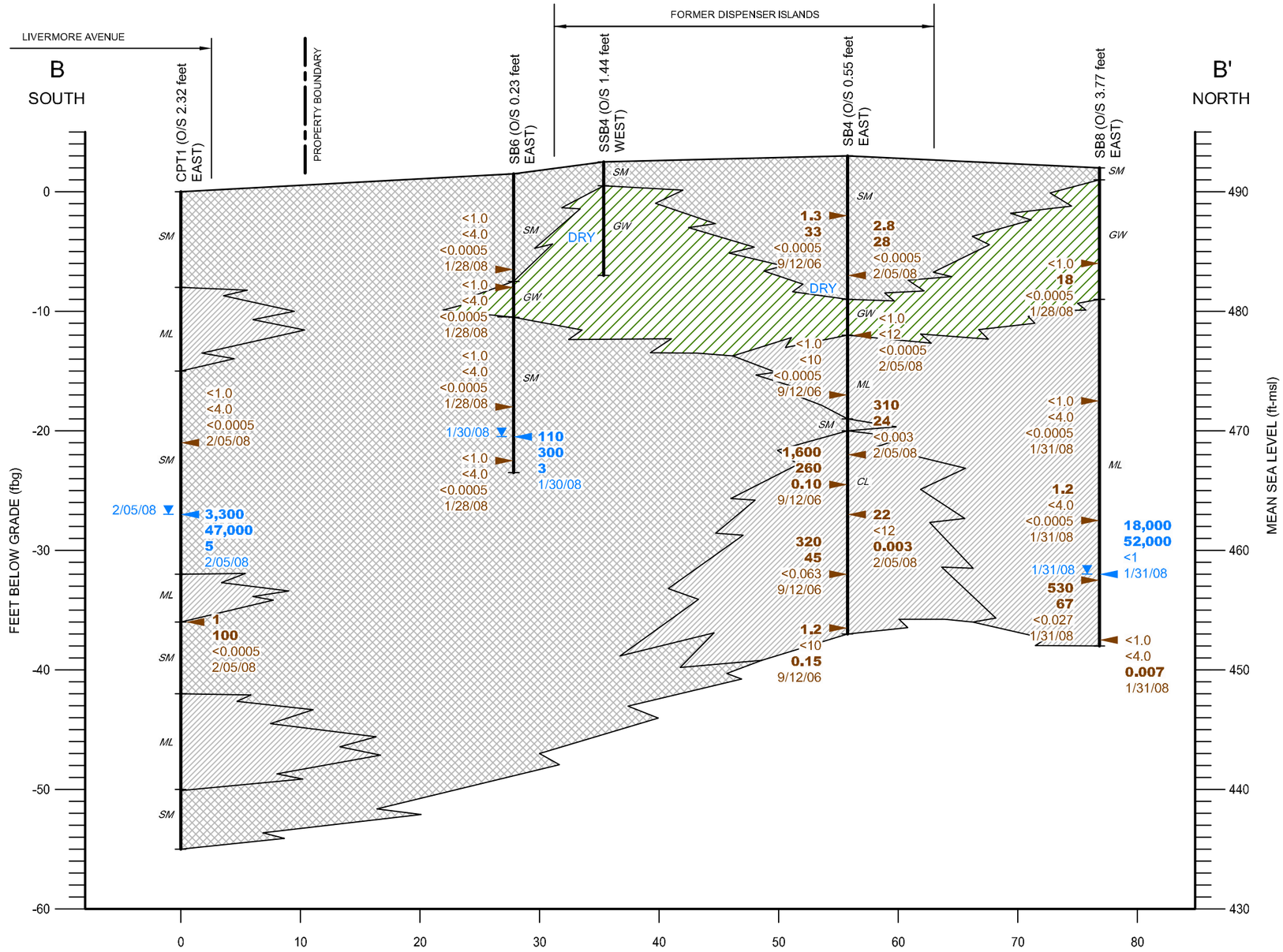
TPHg
TPHd
BENZENE
DATE — APPROXIMATE GROUNDWATER SAMPLE LOCATION (µg/L) HYDROCARBON CONCENTRATIONS IN GROUNDWATER

COARSE GRAINED SOILS : GRAVELS, SANDY GRAVELS

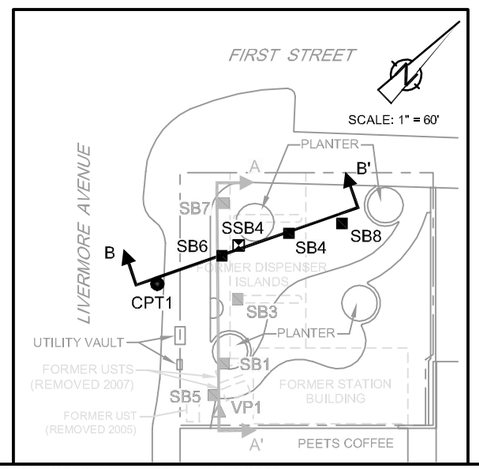
MEDIUM GRAINED SOILS : SANDS, GRAVELY SANDS

FINE GRAINED SOILS : SILTS, CLAYS AND SILTY CLAYS

GROUNDWATER DEPTH



SCALE: HORZ. 1" = 10'
VERT. 1" = 10'



SOURCE: BASEMAP MODIFIED FROM GEOPHYSICAL REPORT.

figure 5

CROSS SECTION B-B'
FORMER CHEVRON STATION 30-7233
2259 FIRST STREET
Livermore, California

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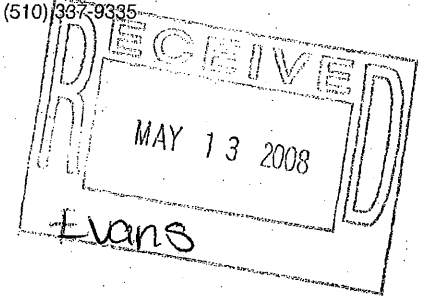
& ASSOCIATES

ATTACHMENT A

Regulatory Correspondence

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335



May 9, 2008

Mr. Ian Robb
Chevron Environmental Management Company
6001 Bollinger Canyon Road
San Ramon, CA 94583-2324

Ms. Chris Davidson
City of Livermore Economic Development
1052 S. Livermore Ave.
Livermore, CA 94550

Subject: Fuel Leak Case No. RO0002908 and Geotracker Global ID T0600196622, Miller Square Park, 2259 First Street, Livermore, CA 94550

Dear Mr. Robb and Ms. Davidson:

Alameda County Environmental Health (ACEH) staff has reviewed the fuel leak case file for the above referenced site including the recently submitted document entitled, "*Subsurface Investigation Report and Well Installation Workplan*," dated March 27, 2008, which was prepared on behalf of Chevron by Conestoga-Rovers & Associates. The "*Subsurface Investigation Report and Well Installation Workplan*," presents the results of soil, soil vapor, and grab groundwater sampling. Fuel hydrocarbons were detected at elevated concentrations in soil and groundwater Based on these results, the "*Subsurface Investigation Report and Well Installation Workplan*," proposes the installation of three monitoring wells and resampling of soil vapor probe VP1 at 5 and 10 feet bgs.

The proposed installation of three monitoring wells and re-sampling of soil vapor probe VP1 is generally acceptable. However, we have several comments on the results of the site investigation and proposed scope of work that require additional evaluation and/or investigation. Therefore, we request that you submit a Work Plan that addresses the technical comments below **no later than July 11, 2008**.

TECHNICAL COMMENTS

1. **Soil Vapor Sampling.** We concur with the proposal to re-sample soil vapor probe VP1. Based on the unknown contents of the former USTs, we request that you expand the analyte list for the proposed TO-15 analysis to include chlorinated solvents. Please present the results of the re-sampling and analyses in the Work Plan or Site Investigation Report requested below.

2. **Horizontal Extent of Contamination.** Elevated concentrations of fuel hydrocarbons were detected in groundwater samples collected from the CPT borings in Livermore Avenue. The horizontal extent of groundwater contamination has not been defined. Please present plans to define the horizontal extent of contamination in the Work Plan requested below.

3. **Contamination in Area of SB8.** Soil boring SB8 is located northeast of the former dispenser islands and north of the former USTs. Based on water level data from other sites, the hydraulic gradient in this area of Livermore is to the west to northwest. Therefore, boring SB8 is apparently cross gradient from the suspected sources of fuel releases at the site. However, the concentrations of total petroleum hydrocarbons as gasoline and diesel detected in the grab groundwater sample from SB8 were higher than the concentrations of TPHg and TPHd detected in grab groundwater samples from the other soil borings and cone penetrometer borings advanced in suspected source areas or downgradient from source areas. Please review these data to develop a proposed scope of work to assess whether contamination in the area of boring SB8 is from the suspected sources located in cross gradient directions or whether a contaminant source exists within the area of or upgradient from boring SB8. Please present your analysis and proposed scope of work in the Work Plan requested below.

4. **Vertical Extent of Contamination and CPT Borings.** The cone penetrometer (CPT) borings were stopped at approximately 55 feet bgs rather than the planned 80 feet bgs. The purpose of the CPT borings was to define the vertical extent of contamination. Fuel hydrocarbons were detected at elevated concentrations in the grab groundwater samples collected from first-encountered groundwater in the CPT borings. Based on these results, it is necessary to extend the CPT borings to a depth of 80 feet bgs to define the vertical extent of contamination. Groundwater samples are to be collected from each significant water-bearing zone identified on the CPT log below first encountered groundwater. Please include plans to extend the CPT borings in the Work Plan requested below.

5. **Proposed Well Installation.** We have no objection to the proposed monitoring well locations. However, the proposed well screen interval for the wells is 20 to 45 feet bgs. A review of the CPT logs indicates that a sandy silt & clayey silt layer that separates overlying and underlying coarse-grained soils, is present from approximately 32 to 36 feet bgs. We request that the monitoring wells not be installed within long well screens that may hydraulically connect separate water-bearing layers. Please review the CPT logs and cross sections to propose shorter well screen intervals that target discrete water-bearing zones.

6. **Grab Groundwater Sample from SB6.** The grab groundwater sampling results from soil boring SB6 appear anomalous. Soil boring SB6 was advanced adjacent to boring B3. Boring B3 was advanced by Fugro West, Inc. in September 2003. The grab groundwater sample from SB6 contained TPHg at a concentration of 110 milligrams per kilogram while the grab groundwater sample from Fugro West, Inc. contained TPHg at a concentration of 18,000 mg/kg. The depth to first encountered groundwater in boring SB6 is reported as 22 feet bgs, which is significantly less than the depth to groundwater elsewhere at the site. Furthermore, we are not aware of groundwater being encountered at depths as shallow as 22 feet bgs in this area of Livermore during the January to February 2008 time period. In the Work Plan requested below, please discuss the likely source of shallow groundwater in SB6 and whether the sample is representative. Cross sections of the site are required in order to help in this evaluation.

7. **Grab Groundwater Results for Boring SB-9.** The text on page 3 indicates that grab groundwater samples were collected from each boring except SB9. The boring log also indicates that groundwater was not encountered in the boring. However, groundwater analytical results for SB9 water are included in Table 4 and are presented in Attachment E – Laboratory Analytical Reports. A chain of custody form for a groundwater sample from boring SB9 is also included in Attachment E. Please review the grab groundwater results for SB9 to assure that grab groundwater results are reported accurately in future reports.

TECHNICAL REPORT REQUEST

Please submit technical reports to Alameda County Environmental Health (Attention: Jerry Wickham), according to the following schedule:

- **July 11, 2008** – Work Plan
- **120 days after ACEH approval of Work Plan** – Site Investigation Report

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program FTP site are provided on the attached "Electronic Report Upload Instructions." Submission of reports to the Alameda County FTP site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) Geotracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and other data to the Geotracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is required in Geotracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.swrcb.ca.gov/ust/cleanup/electronic_reporting).

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge." This letter must be

signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

If you have any questions, please call me at (510) 567-6791 or send me an electronic mail message at jerry.wickham@acgov.org.

Sincerely,

Jerry Wickham, California PG 3766, CEG 1177, and CHG 297
Senior Hazardous Materials Specialist

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Cheryl Dizon, QIC 80201
Zone 7 Water Agency
100 North Canyons Parkway
Livermore, CA 94551

CONESTOGA-ROVERS
& ASSOCIATES

ATTACHMENT B

Standard Field Procedures for Cone Penetrometer Testing and Sampling

CRA

STANDARD FIELD PROCEDURES FOR CONE PENETROMETER TESTING AND SAMPLING

This document describes Conestoga-Rovers & Associates (CRA's) standard field methods for Cone Penetrometer Testing (CPT) and direct-push soil and groundwater sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines.

Use of CPT for logging and soil and groundwater sampling requires separate borings. Typically an initial boring is advanced to estimate soil and groundwater characteristics as described below. To collect soil samples a separate boring must be advanced using a soil sampling device. If groundwater samples are collected, another separate boring must be advanced using a groundwater sampling device. Specific field procedures are summarized below.

Cone Penetrometer Testing (CPT)

Cone Penetrometer Testing is performed by a trained geologist or engineer working under the supervision of a California Professional Geologist (PG) or a Certified Engineering Geologist (CEG). Cone Penetrometer Tests (CPT) are carried out by pushing an integrated electronic piezocone into the subsurface. The piezocone is pushed using a specially designed CPT rig with a force capacity of 20 to 25 tons. The piezocones are capable of recording the following parameters:

Tip Resistance (Qc)
Sleeve Friction (Fs)
Pore Water Pressure (U)
Bulk Soil Resistivity (rho) - with an added module

A compression cone is used for each CPT sounding. Piezocones with rated load capacities of 5, 10 or 20 tons are used depending on soil conditions. The 5 and 10 ton cones have a tip area of 10 sq. cm. and a friction sleeve area of 150 sq. cm. The 20 ton cones have a tip area of 15 sq. cm. and a friction sleeve area of 250 sq. cm. A pore water pressure filter is located directly behind the cone tip. Each of the filters is saturated in glycerin under vacuum pressure prior to penetration. Pore Pressure Dissipation Tests (PPDT) are recorded at 5 second intervals during pauses in penetration. The equilibrium pore water pressure from the dissipation test can be used to identify the depth to groundwater.

The measured parameters are printed simultaneously on a printer and stored on a computer disk for future analysis. All CPTs are carried out in accordance with ASTM D-3441. A complete set of baseline readings is taken prior to each sounding to determine any zero load offsets.

The inferred stratigraphic profile at each CPT location is included on the plotted CPT logs. The stratigraphic interpretations are based on relationships between cone bearing (Qc) and friction ratio (Rf). The friction ratio is a calculated parameter (Fs/Qc) used in conjunction with the cone bearing to identify the soil type. Generally, soft cohesive soils have low cone bearing pressures and high friction ratios. Cohesionless soils (sands) have high cone bearing pressures and low friction ratios. The classification of soils is based on correlations developed by Robertson et al (1986). It is not always possible to clearly identify a soil type based on Qc and Rf alone. Correlation with existing soils information and analysis of pore water pressure measurements should also be used in determining soil type.

CPT and sampling equipment are steam-cleaned or washed prior to work and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent. Groundwater samples are decanted into 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.

After the CPT probes are removed, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor odor or staining, estimate groundwater 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 Professional Geologist (PG) 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

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[7] 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 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 groundwater depth to select soil samples for analysis.

Grab Groundwater Sampling

Groundwater samples are collected from the open borehole using bailers, advancing disposable Tygon[7] tubing into the borehole and extracting groundwater using a diaphragm pump, or using a hydro-punch style sampler with a bailer or tubing. The groundwater 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.

CONESTOGA-ROVERS
& ASSOCIATES

ATTACHMENT C

Standard Field Procedures for Soil Borings

CONESTOGA-ROVERS & ASSOCIATES

STANDARD FIELD PROCEDURES FOR SOIL BORINGS

This document describes Conestoga-Rovers & Associates, Inc. (CRA) standard field methods for drilling and sampling soil borings. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

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

Soil Classification/Logging

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

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

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or hydraulic push technologies. Prior to drilling, the first 8 ft of the boring are cleared using an air or water knife and vacuum extraction. This minimizes the potential for impacting utilities.

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

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

Sample Storage, Handling and Transport

Sampling tubes 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 4oC 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 leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside 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 tube headspace, extracting the vapor through a slit in the cap. 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 either collected using a driven Hydropunch type sampler or are collected 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 protective foam sleeves, stored on crushed ice at or below 4oC, and transported under chain-of-custody to the laboratory.

Duplicates and Blanks

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

Grouting

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

Waste Handling and Disposal

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

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

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