Aaron Costa
Project Manager
Marketing Business Unit

Chevron Environmental Management Company
6111 Bollinger Canyon Road
San Ramon, CA 94583
Tel (925) 543-2961
Fax (925) 543-2324
acosta@chevron.com

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

Re: Former Chevron Service Station No. 9-0020
1633 Harrison Street
Oakland, CA

I have reviewed the attached work plan dated June 11, 2009.

I agree with the conclusions and recommendations presented in the referenced work plan. This information in this work plan is accurate to the best of my knowledge and all local Agency/Regional Board guidelines have been followed. This work plan was prepared by Conestoga Rovers Associates, upon who assistance and advice I have relied.

This letter is submitted pursuant to the requirements of California Water Code Section 13267(b)(1) and the regulating implementation entitled Appendix A pertaining thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Sincerely,

Aaron Costa
Project Manager

Attachment: Work Plan

CONESTOGA-ROVERS
& ASSOCIATES

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

June 11, 2009

Reference No. 311956

Mr. Steven Plunkett
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: Work Plan for Monitoring Well Installation and Offsite Investigation
Former Chevron Service Station 9-0020
1633 Harrison Street
Oakland, California
Fuel Leak Case RO0000143

Dear Mr. Plunkett:

Conestoga-Rovers & Associates (CRA) is submitting this *Work Plan for Monitoring Well Installation and Offsite Investigation* on behalf of Chevron Environmental Management Company (Chevron) for the site referenced above. Alameda County Environmental Health Services (ACEH) has requested the installation of one groundwater monitoring well and additional offsite investigation in a letter dated February 9, 2009 (Attachment A). CRA proposes to install one groundwater monitoring well near the corner of 17th and Harrison Streets to replace the onsite monitoring well destroyed during 2008 remedial activities. CRA also proposes to advance two soil borings to investigate elevated hydrocarbon concentrations in the vicinity of offsite monitoring well MW-16. Presented below are a summary of the site background and the proposed scope of work.

SITE BACKGROUND

The site is a former Chevron service station located at the southwest corner of the intersection of Harrison Street and 17th Street in Oakland, California. The site is located in downtown Oakland in an area of commercial and multi-unit residential land use (Figure 1). Chevron operated a service station on the site until 1972. There have been at least two different configurations of the facilities at the site (Figure 2). All facilities were removed at the time of station closure. Since December 1, 1975, the site has been used as a parking lot, currently operated by Central Parking. The site is slated for future redevelopment as a multi-story senior housing facility.

A total of 21 soil borings, 16 groundwater monitoring wells and 6 soil vapor wells have been installed at the site. A summary of environmental investigations conducted to date at the site is included as Attachment B.

SITE GEOLOGY AND HYDROGEOLOGY

The City of Oakland is located along the eastern margin of the San Francisco Bay and is within the East Bay Plain. The East Bay Plain lies within the Coast Range Geomorphic Province and is characterized by broad alluvium fan margins slopping westward towards the San Francisco Bay. The eastern part of the plain in the Oakland area is marked by the Hayward fault, which runs along the base of the Diablo Range escarpment. The site is underlain by the upper Holocene alluvial fan deposits that overlay Pleistocene alluvial fan deposits. Franciscan Formation bedrock underlies the alluvial deposits at depth. The site is underlain by Holocene and Pleistocene Merritt sands. Unconsolidated sediments beneath the site and site vicinity consist primarily of silty sands with some intermittent sandy, clayey and gravelly silts to approximately 30 feet below grade (fbg).

Local topography is flat and the site is approximately 40 feet above mean sea level. Historical depth to groundwater onsite has ranged from approximately 11 to 22 fbg. Groundwater flow direction is typically east to northeast at a gradient of 0.008 to 0.01. The regional groundwater flow direction, based on the topography and natural drainage patterns in the area, appears to be towards Lake Merritt, located approximately 1,600 feet east of the site.

PROPOSED SCOPE OF WORK

To further delineate and monitor the hydrocarbon impact to groundwater and soil offsite, CRA proposes to drill and install groundwater monitoring well MW-17, and soil borings SB5 and SB6 (Figure 2). To accomplish the scope of work, CRA proposes to conduct the following:

Health and Safety Plan: CRA will prepare a health and safety plan to protect site workers. The plan will be reviewed and signed by all site workers and visitors. The plan will remain onsite during all field activities.

Permits: CRA will obtain the necessary permits from Alameda County Public Works Agency and the City of Oakland prior to beginning field operations.

Underground Utility Location: CRA will contact Underground Services Alert (USA) and use a private utility locator to confirm that no utilities are present at or near the boring locations. Per Chevron safety standards, each boring will be cleared to 8 fbg using an air-knife assisted vacuum rig or hand auger.

Well Installation: After clearing to 8 fbg using a hand auger or air-knife assisted vacuum rig, the well boring will be advanced with 8-inch diameter hollow-stem augers to 30 fbg and completed as monitoring well MW-17. The well will be completed using 4-inch diameter

Schedule 40 PVC casing with a 0.010-inch slotted screen and screened from approximately 15 to 25 fbg. The filter pack will consist of #2/12 sand from the bottom of the boring to approximately 2 feet above the screened interval. A 2-foot bentonite seal will be placed above the sand pack and the remaining space will be filled with Portland Type I/II grout to approximately 1 fbg. The top of the well will be finished with a traffic-grade well box, which will be level with existing surface. Well location and top-of-casing elevation will be surveyed by a licensed land surveyor. Well development will be completed at least two days after installation and groundwater sampling will be initiated on a semi-annual basis. CRA's Standard Field Procedures for Well Installation is presented as Attachment C.

Geoprobe® Soil Borings: Soil borings SB5 and SB6 will be advanced within the vicinity of well MW 16, at the northeastern corner of the intersection of Harrison and 17th Streets to a depth of approximately 30 fbg. Exact soil boring locations will be based on utility constraints. After clearing to 8 fbg using a hand auger or air-knife assisted vacuum rig, borings will be advanced using hydraulic push rods lined with 4-foot macroliners into undisturbed sediments. Upon completion, the borings will be backfilled to grade with Portland Type I/II grout using a tremie pipe and patched to match the existing surface. CRA's Standard Filed Procedures for Soil Borings is presented as Attachment D.

Soil Sampling Protocol: Soil samples will be collected for laboratory analysis at approximately 5-foot intervals, at obvious changes in soils, and where hydrocarbon staining or odors are observed, to the bottom of the boring. CRA geologists will log collected soils using the modified Unified Soil Classification System. Soil will be field-screened using a photo-ionization detector (PID) and visual observations. All samples will be sealed, capped, labeled, logged on a chain-of-custody form, placed on ice and transported to a Chevron and State-approved laboratory for analysis.

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

- Total Petroleum Hydrocarbons as diesel (TPHd) and Total Petroleum Hydrocarbons as gasoline (TPHg) by EPA Method 8015 modified; and
- Benzene, toluene, ethylbenzene and xylenes (BTEX), methyl tert-butyl ether (MTBE), di-isopropyl ether (DIPE), ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME) and tertiary butyl alcohol (TBA) by EPA Method 8260B.

Waste Disposal: Soil cuttings generated will be placed in drums and labeled appropriately. These wastes will be transported to the appropriate Chevron-approved disposal facility following receipt of analytical profile results.

Well Development and Sampling: The well will be developed using agitation and evacuation prior to placing the sanitary surface seals to settle the sand pack. Blaine Tech Services, Inc. of San Jose, California will sample the well after installation.

Well Elevation Survey: The well top-of-casing elevation will be surveyed with respect to mean sea level by a California Registered Surveyor.

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

- Descriptions of the drilling and sampling methods;
- Boring logs;
- Tabulated soil and groundwater analytical results;
- Analytical reports and chain-of-custody forms;
- Soil disposal details;
- 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 ACEH. After approval, CRA will obtain the necessary drilling permits, access agreements, and schedule the subcontractors at their earliest availability. We will submit our investigation report approximately 8 weeks after completion of field activities.

CONESTOGA-ROVERS
& ASSOCIATES

June 11, 2009 Reference No. 311956

We appreciate the opportunity to work with you on this project. If you have any additional questions or comments, please contact Ms. Charlotte Evans at (510) 420-3351 or Mr. Aaron Costa at (925) 543-2961.

Sincerely,

CONESTOGA-ROVERS & ASSOCIATES

Charlotte Evans

Brandon S. Wilken, P.G. # 7564

CE/doh/3

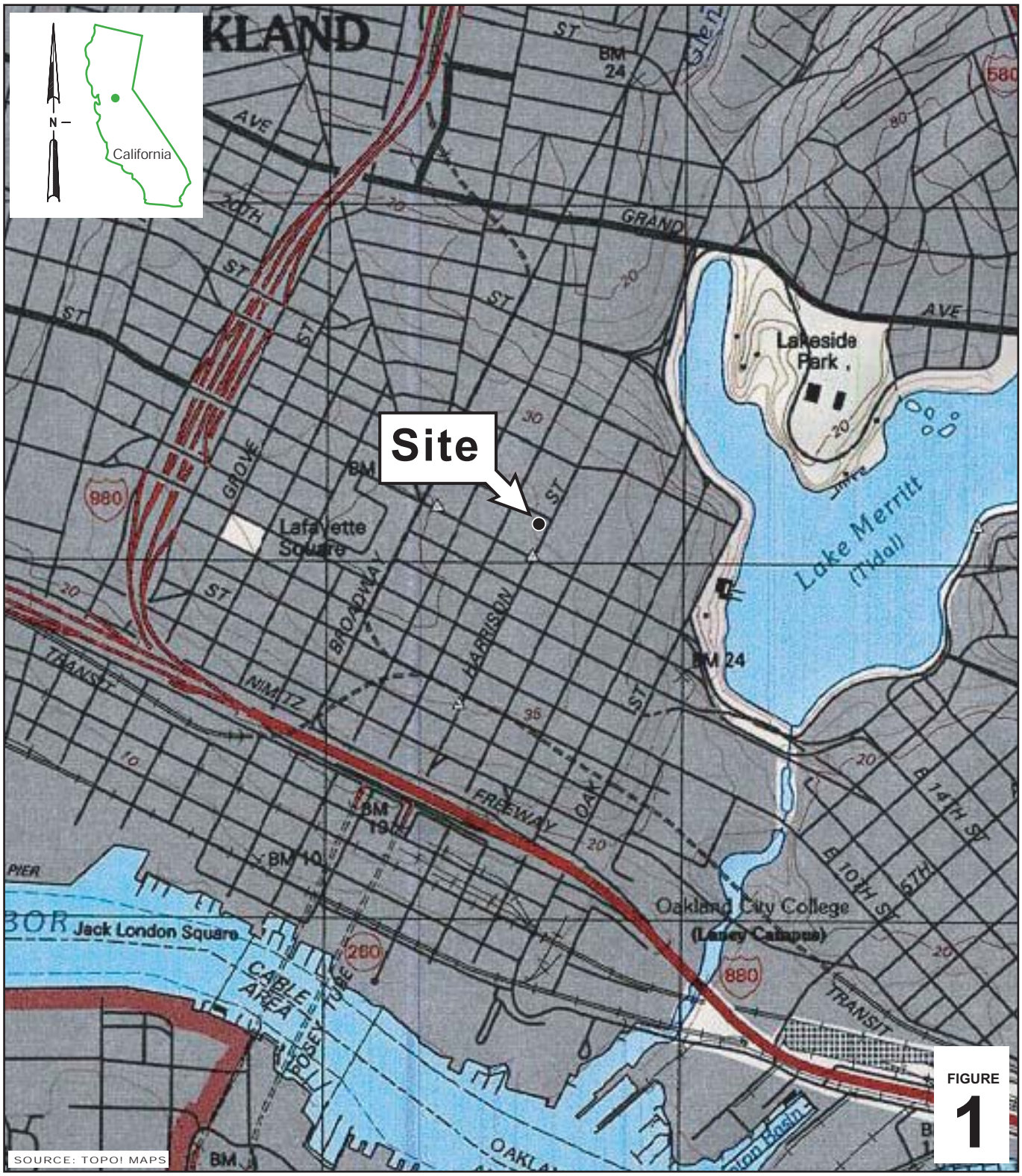
Encl.

Figure 1	Site Vicinity Map
Figure 2	Site Plan with Proposed Monitoring Well and Soil Boring Locations
Attachment A	ACEH February 9, 2009 Letter
Attachment B	Summary of Previous Environmental Work
Attachment C	Standard Field Procedures for Well Installation
Attachment D	Standard Field Procedures for Soil Borings

cc: Mr. Aaron Costa, Chevron Environmental Management Company
Mr. Shad Small, Oakland Housing Authority
Mr. Karl Lauff, Christian Church Homes
Ms. Jeriann Alexander, FugroWest

FIGURES

04/23/07



I:\9-0020 OAKLAND\FIGURES\VICINITY-MAP.AI

FIGURE 1

0 1/8 1/4 1/2 1

SCALE : 1" = 1/4 MILE

Former Chevron Station 9-0020

1633 Harrison Street

Oakland, California

CONESTOGA-ROVERS & ASSOCIATES

Vicinity Map

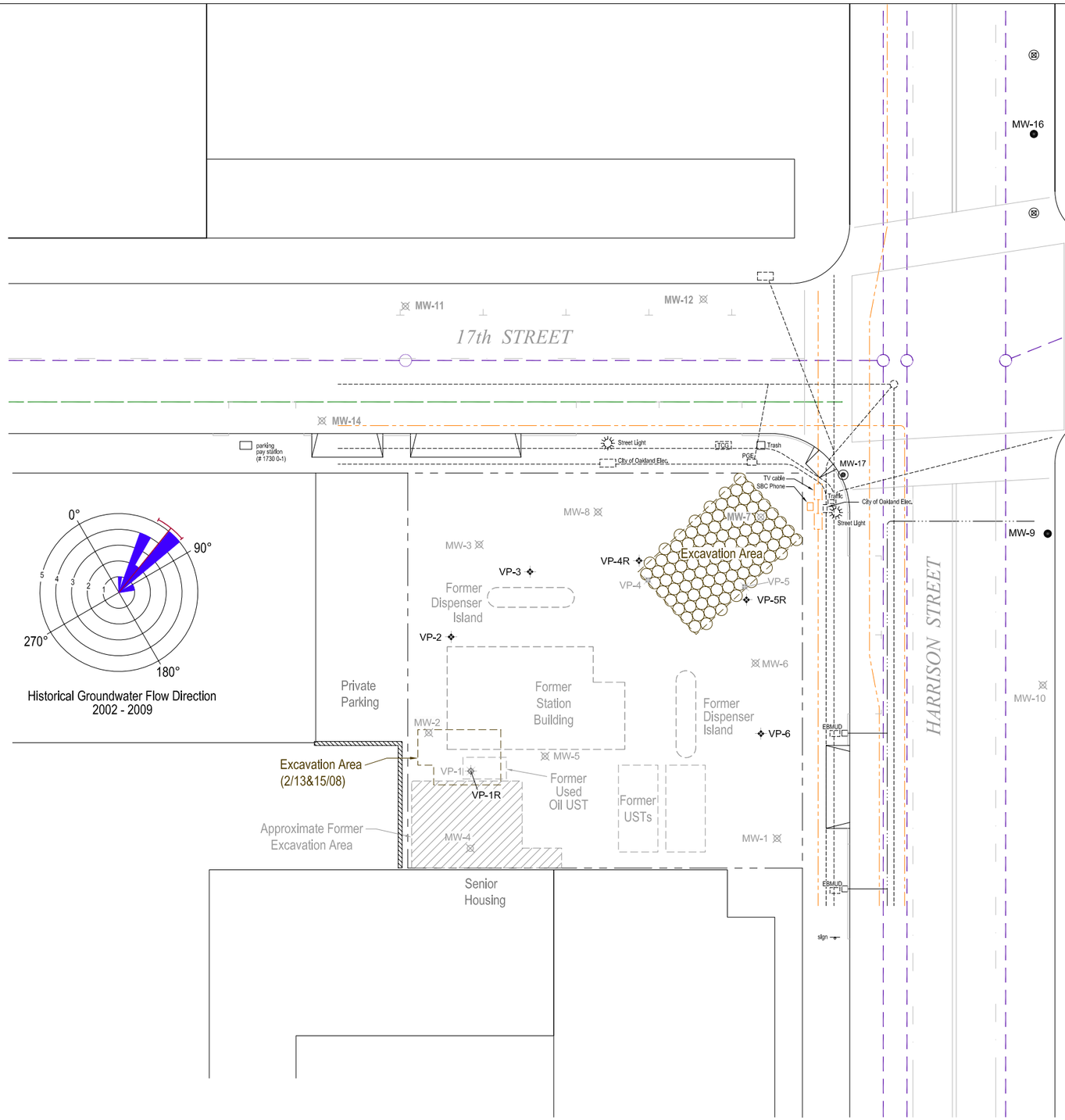


Figure 2

SITE PLAN WITH PROPOSED OFFSITE MONITORING WELL AND SOIL BORINGS
FORMER CHEVRON STATION 9-0020
1633 HARRISON STREET
Oakland, California

I:\CHEVRON\3119--\311956 9-0020 OAKLAND\311956-FIGURES\311956-EM002_PROPOSED-OFFSITE.DWG

ATTACHMENT A

ACEH FEBRUARY 9, 2009 LETTER

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

February 9, 2008

Mr Aaron Costa
6001 Bollinger Canyon Road RM 3360
PO Box 6012
San Ramon, CA 94583-2324

Mr Shaddirck Small
Oakland Housing Authority
1805 Harrison Street
Oakland, CA 94612

Subject Fuel Leak Case No RO0000143 (Global ID # T0600100304), Chevron #9-0020, 1633 Harrison Street, Oakland CA 94612

Dear Mr Costa and Mr Small

Alameda County Environmental Health (ACEH) staff has reviewed the case file for the above referenced site and the document entitled "Remediation Activities Report," dated July 11, 2008, prepared by Conestoga Rovers Associates (CRA) Remediation activities include the excavation of contaminated soil by bucket auger, replacement of soil vapor probes and soil vapor sampling, and excavation of the former used oil tank pit ACEH's technical comments focus on the following issues residual soil contamination associated with the 1st generation USTs on the corner of 17th and Harrison (source area 1), soil excavation and residual contamination associated with the waste oil UST (source area 2), characterization of the 2nd generation USTs system (source area 3) Based on ACEH staff review of the case file, we request that you address the following technical comments and send us the reports described below

Additionally, we understand that the site is proposed for redevelopment as senior housing We have no objections to the proposed plan for redevelopment provided the technical comments below are addressed prior to redevelopment activities

TECHNICAL COMMENTS

1 **Risk Assessment** CRA preformed a Tier II risk assessment to evaluate the human health risk associated with residual contamination in the vadose zone The findings from the risk assessment only address residual contamination in shallow soil onsite, neglecting the residual contamination remaining at depth and any other valid exposure scenario for the site, the potential soil vapor to indoor air migration pathway associated with adjacent buildings (source 2 waste oil UST area), and the potential continuing contribution of residual onsite soil pollution to the offsite dissolved phase contaminant plumes migrating down-gradient

The risk assessment did not include descriptions or figures showing the proposed building construction or include an evaluation of the data with reference to the proposed construction in relation to areas of residual contamination Please include graphics clearly depicting locations of residual pollution in relation to the new building/use to support your evaluation

Table 4 uses residential ESLs where groundwater is not a current or potential source of drinking water Please use the appropriate designation per the Basin Plan which designates this site as being located in an area where

groundwater is a potential drinking water source In addition, in Table 2 uses residential ESLs for direct contact Since direct contact is a highly unlikely exposure scenario, please also evaluate using final ESLs for soil >10 feet bgs

Please address these comments in the Addendum report requested below

2 **1st Generation UST Source Area 1** Soil excavation was performed to remove contaminated soil in the location of the 1st generation USTs Approximately 810 yd^3 of contaminated soil was removed from a total of 105 auger borings Once the maximum depth of between 23 to 25 feet below ground surface (bgs) was reached in each excavation boring, non discrete confirmation soil samples were collected from the auger flights Petroleum hydrocarbon contamination was detected at maximum concentrations of up to 6,400 mg/kg TPHg and 0 235 mg/kg EDB in boring 1 between 23 to 25 feet bgs suggesting that residual contamination remains in place in 13 auger boring locations above residential ESLs Further, we note that non discrete soil samples collected from the auger flight would likely undergo heating and volatilization of contamination and thus may not yield samples representative of soil conditions at depth Please justify if soil samples collected in this manner are representative of actual soil conditions at depth in the Addendum report requested below

Post excavation soil vapor sampling conducted adjacent to the bucket auger excavation detected vapor phase contamination in the vadose zone at maximum concentrations up to 1,100 $\mu g/m^3$ TPHg and 14 $\mu g/m^3$ benzene and the risk evaluated However, other possible risk scenarios including residual soil contamination at depth and the potential for volatilization of dissolved phase contamination were not addressed Also, since direct contact is a highly unlikely exposure scenario, please use final ESLs for soil >10 feet bgs Please address these comments in the Addendum report requested below

Due to the apparent residual pollution in soil and groundwater in the vicinity of Harrison & 17th St we request that soil and vapor sampling be completed in this area We request that you prepare a scope of work that includes the installation of groundwater monitor wells and submit the work plan report requested below

Please evaluate the potential for continuing contribution of residual onsite soil pollution, at the 1st generation USTs, to the offsite dissolved phase contaminant plumes migrating down-gradient of your site Include your evaluation in the Addendum report requested below

3 **Waste Oil UST Source Area 2** Approximately 112 yd^3 of contaminated soil was excavated from the former waste oil UST location and nine post excavation confirmation soil samples were collected from the excavation sidewalls and bottom Contamination above residential ESLs was detected in sidewall samples at concentrations up to 680 mg/kg TPHG, 7,800 mg/kg TPHd and 8,970 mg/kg TPH oil and grease (TPHo&g) and in bottom samples at 460 mg/kg TPHo&g BTEX was not detected above laboratory reporting limits

Soil vapor sampling completed in the excavation backfill did not detect vapor phase contamination in the vadose zone at concentrations above laboratory reporting limits However, soil vapor sampling was conducted in clean imported Class 2 gravel backfill and would be unlikely to detect residual contamination in the vadose zone Collection of soil vapor samples from undisturbed locations outside of the excavation backfill is needed Also, the potential soil vapor to indoor air migration pathway for the adjacent properties was not considered Additionally, since direct contact is a highly unlikely exposure scenario, please use final ESLs for soil >10 feet bgs Please address these comments in the work plan requested below

An evaluation of the potential for continuing contribution of residual onsite soil pollution, at the waste oil UST, to the dissolved phase contaminant plumes was not performed Please evaluate this in the Addendum report requested below

4 **2nd Generation USTs Source Area 3** ACEH is unable to locate any documentation or information regarding the 2nd generation UST system removal including tank removal permits, tank or soil disposal manifests or confirmation soil sampling data Furthermore, no soil or groundwater data has been collected near the 2nd generation UST system to determine if contamination exists at this location Soil vapor sampling down-gradient of the USTs detected up to 38,000 µg/m^3 TPHg indicating that a source may be present in this area Therefore, we request that you prepare a work plan to evaluate this data gap including the collection of samples at the 2nd generation dispensers and USTs Please submit the work plan by the date below

5 **Dissolved Contaminant Plume Definition** Elevated levels of dissolved phase contamination have been detected in offsite down-gradient well MW-16 (over 100 feet down-gradient of the site) at concentrations of up to 8,000 µg/L TPHg and 300 µg/L benzene Consequently, the lateral extent of dissolved phase contamination down-gradient of your site remains undefined In a directive letter dated July 5, 2007, ACEH requested a work plan for offsite plume characterization be submitted by October 2008 To date, ACEH has not received the previously requested work plan We require that offsite definition be performed and the previously requested work plan be submitted by the date below

TECHNICAL REPORT REQUEST

Please submit technical reports to Alameda County Environmental Health (Attention Mr Steven Plunkett), according to the following schedule

- **March 23, 2009** – Addendum to Remedial Activities Report
- **March 30, 2009** – Work Plan

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/electronic_submittal/report_rqmts shtml

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) 383-1761 or send me an electronic mail message at steven plunkett@acgov org

Sincerely,

Steven Plunkett
Hazardous Materials Specialist

Donna L Drogos, PE
Supervising Hazardous Materials Specialist

cc Charlotte Evans
CRA
2000 Opportunity Drive, Suite 110
Roseville, CA 95678

Leroy Griffin (OFD) via email, Jeff Angell (CEDA) via e-mail
Donna Drogos, Steven Plunkett, File

ATTACHMENT B

SUMMARY OF PREVIOUS ENVIRONMENTAL WORK

SUMMARY OF PREVIOUS ENVIRONMENTAL WORK

1988 Soil Vapor Survey Investigation: EA Engineering, Science, and Technology, Inc. (EA) conducted a soil vapor survey in January 1988. 22 samples were collected at 11 locations throughout the site. The highest hydrocarbon concentrations were detected in the vicinity of the former used oil UST in the southwestern section of the site. Additional information is available in EA's January 27, 1988 *Soil Vapor Contaminant Assessment Report of Investigation*.

1988 Monitoring Well Installation: Western Geologic Resources (WGR) installed wells MW-1 through MW-3 in October 1988. No benzene, toluene, ethylbenzene, and xylenes (BTEX) or total fuel hydrocarbons were detected in groundwater samples from the three wells. However, halogenated volatile organic compounds (HVOCs) were detected. Additional information is available in WGR's January 24, 1989 *Soil Sampling and Monitoring Well Installation Letter*.

1989 Soil Boring and Monitoring Well Installation: WGR completed five soil borings as wells MW-4 through MW-8. Total petroleum hydrocarbons as diesel (TPHd) were detected in soil up to 600 milligrams per kilogram (mg/kg) at 9.6 feet below grade (fbg) near the former used oil UST. Total petroleum hydrocarbons as gasoline (TPHg) were detected at a concentration of 50,000 mg/kg at 23.5 fbg in MW-7, near the northeastern corner of the property. Additional information is available in WGR's June 1989 *Subsurface Investigation*.

June 1990 Offsite Well Installation: WGR installed four offsite wells, MW-9 through MW-12, in June 1990. The purpose was to delineate the extent of hydrocarbons downgradient and crossgradient of the site. No hydrocarbons were detected in any soil sample. A grab groundwater sample from well MW-9 contained 5,700 micrograms per liter (µg/L) TPHg and 47 µg/L benzene. Offsite wells MW-10 through MW-12 contained HVOC concentrations. Additional information is available in WGR's July 1990 *Off-Site Subsurface Investigation*.

October 1991 Offsite Well Installation: Pacific Environmental Group (PEG) installed well MW-13 to further evaluate the extent of the dissolved hydrocarbon plume, and upgradient monitoring well MW-14 to investigate suspected offsite origination of HVOCs. Additionally, four soil borings (B-A through B-D) were drilled to assess the extent of hydrocarbons in the vicinity of well MW-7 due to a soil sample at 23.5 fbg containing 50,000 mg/kg TPHg. Hydrocarbon concentrations were only detected in boring B-D at 120 mg/kg TPHg and up to 1.8 mg/kg benzene. Additional information is available in PEG's January 14, 1992 *Subsurface Investigation Report*.

December 1991 Soil Vapor Extraction Feasibility Test: PEG applied positive and negative pressures to MW-4 using a regenerative blower and measured pressure in surrounding wells. Soil vapor measurements and samples were collected. PEG recommended comparing

additional remedial technologies. Additional information is available in PEG's April 1, 1992 *Soil Vapor Extraction Feasibility Test Letter*.

November December 1992 Offsite Well Installation: Groundwater Technology Inc. (GTI) installed two offsite wells, MW-15 and MW-16, to further delineate the dissolved hydrocarbon plume downgradient. No hydrocarbons were detected in any soil samples. No groundwater samples were collected. Additional information is available in GTI's February 18, 1993 *Additional Environmental Assessment Report*.

January 1992 Soil Excavation: PEG oversaw removal of hydrocarbon impacted soil from the vicinity of well MW-4 and excavation of a 30 foot long by 5 foot deep trench across the area of the former USTs to confirm that the USTs had been removed from the site. Removal of the USTs was confirmed; however, construction debris, such as concrete slabs and piping, were observed beneath the surface in the area of the former USTs. Additional information is available is available in PEG's June 2, 1992 *Soil Excavation Letter Report*.

1992 Chlorinated Hydrocarbon Investigation: Geraghty & Miller, Inc. (G-M) evaluated the volatile organic compound (VOC) distribution pattern based on existing monitoring well data and analytical data from remedial activity. The report concluded that that VOCs detected in groundwater beneath the site were emanating from an offsite source. Additional information is available in G-M's October 5, 1992 *Evaluation of Chlorinated Hydrocarbon Distribution*.

July to December 1993 SVE Remediation System Installation and Operation: A soil vapor extraction (SVE) system was installed and operated at the site from July 1, 1993 through December 12, 1993. Evaluation of the system showed minimal effectiveness. Augmentation of the system with additional wells was evaluated and, due to low permeability soils, it was determined that efficiency would not be appreciably enhanced. The system was shut down in December 1993, and all system equipment was removed in December 1996. Additional information available is available in G-M's *Quarterly Groundwater Treatment System Compliance Report*.

June 2004 Additional Subsurface Investigation: In anticipation of future site development, which was proposed to include subsurface parking, Cambria Environmental Technology, Inc., (Cambria) conducted an additional subsurface investigation to further define residual hydrocarbon impacts in soils beneath the site to pre-profile soils for appropriate disposal options. Results confirmed hydrocarbon impacts in soil in the vicinity of well MW-7 that appeared to have originated from the first generation dispenser island, previously located approximately 15 feet upgradient of the well. Additional information is available in Cambria's October 14, 2004 *Subsurface Investigation Report*.

April 2007 Onsite Subsurface Investigation: Conestoga-Rovers & Associates (CRA) advanced four soil borings (SB1 through SB4) up gradient of MW-7 to define the extent of hydrocarbon impacts associated with a first generation dispenser island. TPHg and benzene in soil were detected only at 19.5 fbg in borings SB1, SB2, and SB3, with maximum concentrations of 140 mg/kg TPHg and 0.002 mg/kg benzene. TPHg and benzene were detected in grab-groundwater samples from each boring, except boring SB4, with maximum concentrations of 11,000 µg/l and 10 µg/l, respectively. Additional information is available in CRA's May 25, 2007 *Onsite Subsurface Investigation Report*.

June 2007 Soil Vapor Survey Installation and Investigation: CRA installed six nested soil vapor probes onsite. Samples were collected from all probes and the highest hydrocarbon concentrations were detected in VP-1 in the vicinity of the former used oil UST in the southwestern section of the site. TPHg and benzene were detected in soil vapor from all vapor points with maximum concentrations in VP-1 at 2,600,000 micrograms per meter cubed (µg/m3) and 2,600 µg/m3, respectively. Additional information is available in CRA's June 28, 2007 *Vapor Probe Survey Report*.

January – March 2008 Soil Excavation: CRA oversaw the removal of hydrocarbon impacted soil from the vicinity of well MW-7 and in the area of the formerly removed used oil UST. The majority of soil was removed using large diameter bucket augers and the resulting boreholes were immediately grouted. Additional soil in the vicinity of the former used-oil UST was excavated with a backhoe. Approximately 922 cubic yards of soil were removed. Well MW-7 and VP-1 were destroyed during the excavation. VP-1R was installed to replace VP-1. Additional information is available in CRA's July 11, 2008 *Remedial Activities Report*.

February 2009: ACEH correspondence stating that ACEH has no objections to the proposed plan for redevelopment provided the technical comments are addressed prior to redevelopment activities. ACEH also requested for work plan preparation to evaluate the data gap at the second generation USTs and off site plume characterization of downstream of the site.

ATTACHMENT C

STANDARD FIELD PROCEDURES FOR WELL INSTALLATION

Conestoga-Rovers & Associates

STANDARD FIELD PROCEDURES FOR MONITORING WELL INSTALLATION

This document presents standard field methods for drilling and sampling soil borings and installing, developing and sampling groundwater monitoring wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORINGS

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Professional Geologist (P.G.) or Professional Engineer (P.E.).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe®. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. 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 at the bottom of the borehole.

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 Analysis

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^{o} C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied 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 volatile vapor analyzer measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. Volatile vapor analyzer measurements are used along with the field observations, odors, stratigraphy and groundwater 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 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. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

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.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

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

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

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

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

Groundwater Sampling

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

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite and covered by plastic sheeting. At least three individual soil samples are collected from the stockpiles and composited at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples in addition to any analytes required by the receiving disposal facility. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Groundwater removed during development and sampling is typically 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. Upon receipt of analytic results, 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.

ATTACHMENT D

STANDARD FIELD PROCEDURES FOR SOIL BORINGS

ATTACHMENT D

STANDARD FIELD PROCEDURES FOR SOIL BORINGS

Conestoga-Rovers & Associates

STANDARD FIELD PROCEDURES FOR GEOPROBE® SOIL AND GROUNDWATER SAMPLING

This document describes Conestoga-Rovers & Associates' standard field methods for GeoProbe® soil and groundwater 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 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, and
- Other significant observations (i.e., cementation, presence of marker horizons, mineralogy)
- 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 Groundwater Sampling

Groundwater 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.

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.

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