January 30, 2015

Mr. Mark Detterman, P.G., C.E.G.
Alameda County Health Care Services Agency
Environmental Health Services
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

RE: Data Gap Investigation Work Plan with Focused Site Conceptual Model

SITE: Sheaff's Garage
5930 College Avenue, Oakland, California
ACHCSA Fuel Leak Case No. RO0000377
GGE Project 2014

Dear Mr. Detterman:

Upon my authorization, Golden Gate Environmental, Inc. has prepared the attached *Data Gap Investigation Work Plan*, dated January 26, 2015, for the above-referenced property at 5930 College Avenue in Oakland, California. GGTR has uploaded an electronic copy of the document to the State Water Resources Control Board's GeoTracker Database System, as well as the Alameda County Health Care Services Agency FTP Site. Should you have any questions, please contact Mr. Brent Wheeler, Project Engineer of Golden Gate Environmental at (415) 512-1555 at your convenience.

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

Respectfully Submitted,

Dr. Brian R. Sheaff
William G. Sheaff & Patricia Warren Restated Living Trust U/D/T 2/14/89

Distribution: (1) Addressee

Sheaffs Service Garage
5930 College Avenue, Oakland, California

DATA GAP INVESTIGATION WORK PLAN

Alameda County LOP Cleanup Case # RO0000377

January 26, 2015

Prepared For:

Dr. Brian Sheaff

William G. Sheaff & Patricia Warren Restated Living Trust
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GGE Project No. 2014

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DATA GAP INVESTIGATION WORK PLAN

January 26, 2015

INTRODUCTION

Golden Gate Environmental, Inc. (GGE) is pleased to submit this Data Gap Investigation Work Plan with Focused Site Conceptual Model for the additional investigation activities at the property located at 5930 College Avenue in Oakland, California (Site). The work plan was prepared in response to the April 11, 2014 letter issued by Alameda County Environmental Health (ACEH) requesting additional characterization of the Site. GGE referred to the following documents available on the State Water Resources Control Board's GeoTracker website: the LTCP Checklist as of 6/20/2014, and Path to Closure Plan as of 6/20/2014. GGE also reviewed the State Water Resources Control Board review document titled Review Summary Report - Additional Work Third Review dated August 2014. GGE representatives met with ACEH staff in technical review meetings on June 13 and October 30, 2014. In an email dated November 4, 2014, ACEH staff granted an extension in the submittal date for the subject work plan.

The ACEH refers to the fuel leak case at the Site by the historical business name "Sheaffs Service Garage" and as Case # RO0000377. Under the Regional Water Quality Control Board's (RWQCB) Local Oversight Program (LOP), the ACEH is the lead regulatory agency for the case at the Site. The RWQCB manages the site as LUST Cleanup Site Case # 01-2296 with GeoTracker Global Tracking Number T0600102112.

Figure 1 is a *Site Location Map* showing the general location of the subject property. Figure 2 is a *Site Vicinity Map* showing land use of the surrounding neighborhood. Figure 3 is a *Site Plan* showing the approximate location of the former underground storage tanks (UST), historical soil borings, and existing groundwater monitoring field points MW-1, MW-2, MW-3 and PW-1. Figure 4 titled *Proposed Work* shows the location of proposed soil, soil gas and grab groundwater samples.

This work plan includes a Focused Site Conceptual Model in tabular format with reference to specific Low Threat Closure Policy criterion. The Focused Site Conceptual Model is an integral part of the decision making process used in this report to evaluate the Site for low threat closure. In general accordance with the technical comments presented in the aforementioned letter, the purpose of this work plan is to describe the procedures and methods used to conduct the following additional site characterization activities: 1) further define the length of the hydrocarbon-effected groundwater plume, 2) investigate for potential source areas of PCE contamination of groundwater, 3) further evaluate the direct contact and outdoor air volatilization issues, 4) resolve data gaps in subsurface sampling information, and 5) further evaluate the potential impact of vapor intrusion on the subject building and adjoining buildings. A copy of the ACEH correspondence is presented in Appendix C - Additional Documentation.

SITE LOCATION

The Site is a commercial property located at 5930 College Avenue along the east side of College Avenue between Harwood Street and Chabot Road in Oakland, California. The Site lies approximately 0.2 mile (1,000 feet) north of Highway 24 and about two miles east of Interstate 80 and the San Francisco Bay. The elevation of the Site is approximately 195 feet above Mean Sea Level. The property is relatively flat lying with the local topographic relief directed toward the west-southwest in the general direction of the San Francisco Bay as shown on Figure 1, Site Location Map. The topographic map of Figure 1 depicts the area of the subject property as dense urban development. Figure 2, Site Vicinity Map, shows the mixed-use commercial-residential character of the surrounding neighborhood. Commercial-retail corridors are located along main thoroughfares such as College Avenue with residential neighborhoods situated between the corridors. The character of the Site's neighborhood has remained consistent since the 1950s.

SITE DESCRIPTION

The property is currently 100% occupied by Stauder Automotive Service for the maintenance and repair of automobiles. The building is a small single-story industrial-style building constructed in 1952. The Site is approximately 5,500 square feet in area with about 75% utilized by an industrial-style garage building and 25% used as an exterior paved storage yard/parking lot. Two underground storage tanks (UST) were formerly located beneath the sidewalk at the southwest corner of the Site. No active USTs, fuel storage, or fuel distribution system currently exist onsite. Most of the building consists of open work / storage area. The photograph on the cover page shows the open space configuration of the building.

Source of Water:	Municipal – EBMUD 100% imported surface water
Sewage Disposal:	Municipal to sewage treatment plant
Storm water	Catch basin drains to storm water conduits under nearby streets that discharge to San Francisco Bay
Solid Waste Disposal:	Municipal
Year of Construction:	circa 1952

Occupant Stauder Automotive Service – 100%
Access to Property: Driveway/roll-up and doorway from College Avenue

A sidewalk borders the western side of the building along the College Avenue frontage. The wall of a commercial-retail building constructed in 1978 abuts the subject building on the north. A narrow corridor-walkway runs along the southern wall of the subject building separating a multistory apartment building with ground floor retail and parking. The rear of the property contains a paved parking and storage yard. Two residence backyards adjoin the subject property along the southern and western borders. The property is completely paved with asphalt or concrete with the building constructed on a concrete slab.

The following table summarizes the adjacent land use surrounding the subject property. The surrounding properties are also shown on Figure 2, Site Vicinity Map.

Compass Direction from Site	*Description of Adjoining Land Use*
North	College Square commercial-retail property / former Chevron gasoline service station (pre-1968)
Northwest	College Avenue with church beyond / former Shell gasoline station at corner of Claremont Avenue
Northeast	Residence and backyard
East	Residence backyard and patio
Southeast	Residence backyard and open courtyard
South	Multifamily Residential building with ground floor garage and residence backyard
West-Southwest	Commercial building / Dreyers Grand Ice Cream

A multistory commercial-residential building is adjacent to the Site on the south at 5916-20 College Avenue. This building contains a parking garage and a retail store (T-Mobile) on the ground floor with 12 multifamily apartments on upper floors. To the south and east of the Site is an older single-family residential neighborhood with residence backyards adjoining the Site's rear paved parking area. The surface channel of Harwood Branch creek is located within residential backyards about one block east and up-gradient of the Site. On the west, an Alameda County Flood Control District cutoff storm water conduit (90" diameter) associated with Harwood Branch creek is located within College Avenue. College Square is currently occupied by a restaurant (Barclays Restaurant & Pub) and office space (5940 College Avenue). This commercial development's ground floor retail space and parking garage are approximately 3-4 feet below the grade of the subject property. A sump pump pit is located near the former location of Gettler-Ryan well GR-MW1.

SITE HISTORY

According to a 1911 Sanborn map, the subject property and adjacent properties along the College Avenue between Harwood Avenue and Chabot Road (59th Street) were vacant lots in a developing residential neighborhood. The 1950 Sanborn map shows the subject property as a vacant lot and the adjacent property to the south occupied by the existing 12-unit apartment building. In 1952, an auto repair facility called Sheaffs Service Garage was constructed at the Site. Historical research shows that auto repair shops have continuously occupied the Site since construction in 1952. In the 1960s, the neighborhood appeared to be residential with commercial corridors along major streets such as College Avenue. A 1965 aerial photograph clearly shows that the subject building with the rear storage yard in the existing configuration. The property located at the northeast corner of Chabot Road and College Avenue was occupied by a gasoline station from approximately 1939 to 1965. A gasoline station also formerly existed at the northwest corner of Chabot Road and College Avenue at the current Dreyers Grand Ice Cream building. The adjacent property to the north was formerly occupied by Chevron Service Station #209339 prior to 1968 and was replaced with the existing commercial-retail development (College Square) circa 1978. In the 1982 aerial photograph, the neighborhood appears as currently existing. Figure 2 is a Site Vicinity Map showing land use of the surrounding neighborhood.

SENSITIVE RECEPTOR SURVEY

As requested by ACEH, GGE performed additional research to further document the presence of water supply wells within the vicinity of the subject property. The Alameda County Public Works Agency (ACPWA) provided the results of a database query for all water supply wells within a ½-mile radius of 5930 College Avenue. ACPWA reported one irrigation well and two domestic water supply wells within the search radius:

Type of well	Address of water supply well	Distance from 5930 College Av.
domestic	5809 Ivanhoe Road, Oakland, CA	1,267 feet east
domestic	5629 Vicente Street, Oakland, CA	3,205 feet southwest
irrigation	2727 Russel, Oakland, CA	3,895 feet north

The location of the wells is shown on the Water Supply Well Search Map in Appendix B. Groundwater flow at the site is measured at west to south. The only potential down-gradient water supply well is the 5629 Vicente Street domestic well that is over 3000 feet away, beyond the potential MTBE plume length of 1045 feet and the gasoline plume length of 855 feet plus buffer zone of 1000 feet (1,855 feet). The three water supply wells plot outside the plume map areas and are not shown on the plume maps in Appendix B.

GGE also plotted out the potential benzene plume length map of 554 feet and tabulated all addresses within the plotted benzene plume areas as provided in Appendix B. GGE performed a door to door

visual survey of the potential properties to search for obvious evidence of potential subsurface features. The church-school at 5951 College Avenue has a basement located across the street from the subject property. The basement is located beyond the former location of Gettler-Ryan monitor well MW-2, that was destroyed following case closure by the ACEH. An underground parking garage was observed at 5800-5820 College Avenue with access from Birch street. The garage is located from 457 to 572 feet from the subject property. The garage has a concrete slab and is well ventilated. The garage is located across Harwood Branch creek from the subject property and it is unlikely that any contamination plume would impact the garage. Appendix B provides the documentation for the well and sensitive receptor surveys.

FOCUSED SITE CONCEPTUAL MODEL

The Focused Site Conceptual Model (FSCM) is presented in Appendix A. As requested by the ACEH, the FSCM is presented in tabular format. GGE organized the FSCM by Low Threat Closure Policy criteria in order to facilitate the analysis of remaining data gaps. The FSCM utilized information in the following sources: 1) the April 11, 2014 letter issued by Alameda County Environmental Health (ACEH) requesting additional characterization at the Site, 2) the LTCP Checklist as of 6/20/2014, 3) Path to Closure Plan as of 6/20/2014, and 4) State Board Fund staff 5-year review titled Review Summary Report - Additional Work Third Review - August 2014. GGE representatives also met with the ACEH staff in technical review meetings on June 13 and October 30, 2014. Based on the outstanding data gaps identified in the FSCM, GGE proposes the additional investigation scope of work in the following sections.

DATA GAP INVESTIGATION

GGE is proposing additional site investigation in the form of soil, soil gas and groundwater sampling to address the data gaps identified in the FSCM. The proposed sampling locations are shown on Figure 4, Proposed Work. The following sections describe the procedures for the additional investigation work.

Scope/Sequence of Proposed Work Activities

The general scope of work and sequence of activities described and recommended in this work plan is outlined as follows:

- Obtain soil boring and groundwater monitoring well permits from the Alameda County Public Works Agency
- Obtain street excavation and/or minor encroachment permits for borings installed in the sidewalk or parking lane along College Avenue from the City of Oakland Department of Public Works Engineering Division
- Outline the proposed work area and boring locations in white surface paint and notify Underground Service Alert to clear for exterior subsurface utilities

- Revise the existing Site Health & Safety Plan for all newly-proposed field work
- Using drilling equipment, collect two soil gas samples from two locations at the rear parking lot: 1) boring B28 at southern property boundary at depth of 5 feet bgs and 2) boring B29 at northern property boundary at 5 feet bgs
- Install temporary well casing in boreholes B28 and B29 and recover two grab groundwater samples
- Using drilling equipment, drill and recover soil samples from depths of 2 and 4 feet below grade from one (1) location labeled as boring B30 within the building interior at former parts cleaner location
- Install temporary well casing in boreholes B30 and recover one grab groundwater sample
- Using drilling equipment, drill and recover a soil gas sample at a depth of 6.5 feet below grade from one (1) location labeled as boring B31 located in the sidewalk adjoining the frontage of the adjoining apartment building
- Using drilling equipment, drill three borings to 12 feet bgs from three (3) locations labeled as borings B31, B32 and B33 in the sidewalk frontage and parking lane of the adjoining properties; install temporary well casing and recover three grab groundwater samples
- Using drilling equipment, drill and recover soil samples from depths of 5 and 10 feet below grade from one (1) location labeled as boring B34 within the building interior near the location of former boring B12 at the hydraulic hoist location where high concentrations were formerly encountered
- Install temporary well casing in borehole B34 and recover one grab groundwater sample
- Using drilling equipment, drill and recover soil samples from depths of 5 and 10 feet below grade from one (1) location labeled as boring B35 within the parking lane adjacent to the former waste oil tank location to resolve direct contact and outdoor air volatilization concerns with the former waste oil tank
- Install one sub-slab vapor sampling point labeled SG-4 within the administrative office floor
- Recover four (4) soil gas samples from three existing vapor sampling points SG-1, SG-2 and SG-3 and new sub-slab vapor sampling point SG-4
- Back fill all boreholes as required per applicable guidelines and store all drill cuttings, solid waste and liquid wastes in secured containers pending off-site disposal
- Transport and submit under chain-of-custody control - all soil, soil gas and groundwater samples to a State-certified stationary laboratory for laboratory analyses
- Upload all investigative analytical data and required documentation to the State GeoTracker Database System and Alameda County FTP site
- Profile and transport all solid (auger soil cuttings) and liquid waste to respective State-licensed disposal facilities
- Interpret all data and prepare a report summarizing the field activities, findings, and conclusions of the additional site characterization activities.
- Distribute the final report with findings and recommendations to client and environmental cleanup oversight program

Summary Table of Proposed Work Activities

The following table presents a summary of the proposed investigative, sampling and laboratoyr analysis activities:

Label	*Depth Feet*	*Sampling Location & Purpose*	*Sample Data Recovered*	*Laboratory Analyses*
B28	12	Rear courtyard at southern boundary to determine PCE impact to adjoining property	Soil gas sample at 5 feet, grab groundwater sample at approx. 10 feet bgs	VOC
B29	12	Rear courtyard at northern boundary to determine PCE impact to adjoining property	Soil gas sample at 5 feet, grab groundwater sample at approx. 10 feet bgs	VOC
B30	12	Rear corner of subject building at former parts cleaner location to determine PCE impact	Soil samples at 2 and 4 feet, grab groundwater sample at approx. 10 feet bgs	VOC
SG-1, SG-2 SG-3	4-5 ft	Existing soil gas sampling probes	Re-sample existing soil gas probes installed at 4-5 feet bgs	TPH as gasoline, BTEX, VOC, PAHs, naphthalene, air gasses-oxygen
SG-4	sub-slab	Install new sub-slab vapor sampling probe within administrative office to determine impact of vapor intrusion	Sub-slab soil gas sample from directly below concrete floor slab from new vapor pin sampling probe	TPH as gasoline, BTEX, VOC, PAHs, naphthalene, air gasses-oxygen
B31	12	In sidewalk frontage of adjoining apartment building to determine impact of vapor intrusion to adjoining building and define extent of groundwater plume	Soil gas sample at 6.5 feet (default foundation depth of 1½ feet), grab groundwater sample at approx. 10 feet bgs	TPH as gasoline, BTEX, VOC, PAHs, naphthalene
B32	12	In parking lane of College Avenue to define extent of groundwater plume	Grab groundwater sample at approx. 10 feet bgs	TPH as gasoline, BTEX, PAHs, naphthalene
B33	12	In parking lane of College Avenue to define extent of groundwater plume	Grab groundwater sample at approx. 10 feet bgs	TPH as gasoline, BTEX, PAHs, naphthalene
B34	12	Soil and grab groundwater samples down-gradient from hydraulic hoist location	Soil samples at 5 and 10 feet, grab groundwater sample at approx. 10 feet bgs	TPH as hydraulic oil, VOC, PAHs, naphthalene
B35	10	Soil samples for evaluation of direct contact and outdoor air volatilization exposure	Soil samples at 4 and 9 feet bgs	PAHs, naphthalene

Description of Proposed Work Activities

As discussed in the Focused Site Conceptual Model (FSCM) in Appendix A, GGE identified outstanding data gaps utilizing the Low Threat Closure Policy and concerns identified by staff of the Alameda County Environmental Health (ACEH). To resolve the data gaps identified in the FSCM, GGE proposes the following investigation activities at the Site.

1) GGE recommends additional investigative sampling in the Site's rear courtyard area as shown on Figure 4, Proposed Work. The purpose of the investigation is to determine if PCE contamination of soil gas and groundwater exists above regulatory screening levels at the northern and sourthern boundaries of the rear courtyard. Soil gas samples will be collected from two boreholes using vapor sampling equipment for laboratory analysis of VOCs and two discrete boreholes would be used to recover two grab groundwater samples as described below.

One exploratory boring (B28) would be placed adjacent to the southern property boundary to assess shallow soil gas and groundwater for PCE contamination. A grab groundwater sample would be recovered from a boring approximately 12 feet deep. Groundwater is estimated to be approximately ten feet bgs. Additionally, a soil gas sampling probe would be installed in a separate borehole to recover a soil gas sample. No building foundation is present at this location so the soil gas sample would be collected at a depth of 5 feet below grade.

One exploratory boring (B29) would be placed adjacent to the northern property boundary to assess shallow soil gas and groundwater for PCE contamination. A grab groundwater sample would be recovered from a boring approximately 12 feet deep. Additionally, a soil gas sampling probe would be installed in a separate borehole to recover a soil gas sample. No building foundation is present at this location so the soil gas sample would be collected at a depth of 5 feet below grade.

2) One additional exploratory boring (B30) would be placed adjacent to the southeast interior corner of the subject building to assess soil and groundwater for PCE contamination. At this corner of the building, a former parts washer was installed in the corner sink. The soil samples would be collected at 2 and 4 feet below grade. The grab groundwater sample would be collected from approximately 10 feet below grade depending on the seasonal depth to water. GGE would verify that the sink/parts cleaner was formerly connected directly to the sanitary sewer and not to the rear oil water separator.

3) GGE proposes to install one sub-slab vapor probe within the concrete floor slab of the existing administrative office in the subject building at new location labeled SG-4, as shown on Figure 4, Proposed Work. A soil gas sample was previously approved by the ACEH for this location. But GGE was unable to recover the sample because of access limitations and disruption to business operations in the administrative office of the active auto repair business at the Site. GGE is now proposing a sub-slab vapor sampling point using Vapor Pin ^{TM} equipment at this location. A sub-slab vapor sampling point is easier to install and less disruptive to business operations because drilling equipment is not involved.

4) GGE is proposing to recover soil gas samples from the new sub-slab vapor sampling probe SG-4 and the three existing soil gas sampling probes SG-1, SG-2 and SG-3 to further evaluate subsurface soil gas conditions beneath the Site. The soil gas samples would be analyzed for oxygen content to further evaluate possible closure scenarios in Low Threat Closure Policy guidance.

5) GGE recommends collecting one (1) soil gas sample from the location labeled B31 as shown on Figure 4, Proposed Work. The purpose of the soil gas sample is to determine if PCE contamination of soil gas exists above regulatory screening levels adjacent to the adjoining apartment building. One soil gas sample will be collected from the borehole using vapor sampling equipment for laboratory analysis of VOCs. The soil gas sample would be collected at a depth of 6½ feet bgs allowing for the default 1½ foot depth of building foundation. The soils encountered in the boring would be continuously logged for lithology and obvious evidence of contamination (vapor & staining). Discrete soil samples would be recovered for laboratory analysis only if obvious evidence of soil contamination is observed.

6) GGE recommends drilling three (3) additional investigative borings labeled B31, B32 and B33 as shown on Figure 4, Proposed Work. The borings would be placed in the sidewalk, and east and west parking lanes of College Avenue. A grab groundwater sample would be recovered from each boring at approximately ten feet bgs to determine the groundwater plume length.

7) GGE proposes to drill one (1) exploratory boring labeled B34 near the former location of boring B12 and the hydraulic hoist location. Sampling results from previous boring B12 showed high concentrations of petroleum oil and volatile organic compounds (VOC) including naphthalene in groundwater at this location. New boring B34 would re-sample soil and groundwater down-gradient of the hydraulic lift location to determine current conditions and verify that the hydraulic lift is a potential contamination source.

8) GGE proposes to drill one (1) exploratory boring labeled B35 in the eastern parking lane of College Avenue as shown of Figure 4. GGE would recover soil samples at depths of 4 and 9 feet bgs for the laboratory analysis of PAHs and naphthalene to address ACEH concerns with direct contact and outdoor air volatilization concerns.

The following sections describe the procedures for performing the proposed work.

Health And Safety Plan

All contractors will be responsible for operating in accordance with the most current requirements of State and Federal Standards for Hazardous Waste Operations and Emergency Response (Cal. Code Regs., tit. 8, section 5192; 29 CFR 1910.120). Onsite personnel are responsible for operating in accordance with all applicable regulations of the Occupational Safety and Health Administration (OSHA) outlined in the State General Industry and Construction Safety Orders (Cal. Code Regs., tit. 8) and Federal Construction Industry Standards (29 CFR 1910 and 29 CFR 1926), as well as other

applicable federal, state and local laws and regulations. All personnel shall operate in compliance with all California OSHA requirements.

In addition, California OSHA's Construction Safety Orders (especially Cal. Code Regs., tit. 8, sections 1539 and 1541) will be followed as appropriate. Specific requirements are identified below:

- At least 72 hours prior to initiating field work, GGE will surface mark all proposed work area(s) in white marking paint and notify Underground Service Alert (USA). All subsurface utility agencies must mark out all underground utility locations extending through general work area(s), and if high priority subsurface utilities are present within 10 feet of proposed excavation(s), GGE will meet with specific utility agencies to identify exact locations (Title 8, Section 1541).
- Work site traffic controls and warning sign placement must conform to the requirements of the State Department of Transportation's California Manual on Uniform Traffic Control Devices for Streets and Highways, September 26, 2006 (Title 8, Sections 1598 & 1599).

GGE has previously prepared a site-specific Health & Safety Plan (HASP) for the Site in accordance with current health and safety standards as specified by the federal and California OSHA's and has been submitted as part of previous work plans. The HASP will be reviewed and updated if needed for the current work.

The provisions of the HASP are mandatory for all personnel of the proposed project and its contractors who are at the Site. The contractor and its subcontractors doing fieldwork in association with this work plan will either adopt and abide by the HASP or shall develop their own safety plans which, at a minimum, meet the requirements of this HASP. All onsite personnel shall read the HASP and sign the "Plan Acceptance Form" before starting daily Site activities.

Field Procedures for Investigation Activities

PRE-FIELD WORK ACTIVITIES

GGE will obtain a drilling permit from the Alameda County Public Works Agency, an excavation/minor encroachment permit from the City of Oakland Office of Planning & Building, and if warranted, a parking permit from the Oakland Traffic Control Department. GGE will notify all property owners and tenants as well as the ACEH of all scheduled work activities. At least 72 hours before commencing field activities, GGE will visit the site and outline the proposed work areas in white surface paint and subsequently notify Underground Service Alert (USA) to locate and mark any subsurface utilities extending through the designated work areas. Also, GGE will prepare a traffic control plan should partial or complete closure of the parking lane and/or sidewalk along the College Avenue frontage be warranted.

GGE will notify the property owners, tenants, and regulatory agency representatives of all scheduled fieldwork and arrange and schedule all drilling and laboratory subcontractor services. Prior to commencing drilling activities, GGE will conduct a tailgate safety meeting with all site personnel addressing all information provided in the Community Site Health & Safety Plan. GGE will direct the

subcontracted driller to hand auger each proposed boring location to clear for unmarked subsurface utilities.

DRILLING & SOIL SAMPLING

Each proposed soil boring will be drilled by a California-licensed Water Well Drilling Contractor (C-57) using a limited access, direct-push drill rig equipped with 2¼-inch-diameter steel, concentrically-cased percussion drill tubes. While simultaneously casing the borehole with the outer drill tubes, soil samples will be collected in each boring using a 1.5-inch-diameter, butyrate plastic, tube-lined, core sampler (inner tube) driven in 2- to 4-foot increments into relatively undisturbed soil. GGE will classify and log all soil extracted from each borehole using the Unified Soil Classification System and Munsell Soil Color Chart, and monitor and record the organic vapor concentrations of selected soil samples using a MiniRae® photo ionization detector (PID) or other similar organic vapor analyzer. All borings will be logged under the supervision of a California-registered Civil Engineer/Geologist.

Soil samples retained for laboratory analysis of petroleum hydrocarbons will be immediately sealed with Teflon tape and plastic caps, appropriately labeled, and placed in a cooler chilled to approximately 4º Centigrade. Each soil sample retained for laboratory analysis of VOCs will be collected using a Terra Core sampler to extract a 5 gram sample of soil from the split open plastic sample tube into a 40-ml vial preserved with sodium bisulfate (EPA 5035), appropriately labeled, and placed in a cooler chilled to approximately 4º Centigrade. Two (2) vials will be collected at each sample location.

All down-hole drilling and sampling equipment will be cleaned between each boring location using a non-phosphate Alconox® solution and double rinsed using clean, potable water. A Chain-of-Custody form will be initiated by GGE personnel at the time of sampling and will accompany the soil and groundwater samples to a State-certified environmental laboratory using California Department of Health Services approved analytical methods.

GRAB GROUNDWATER SAMPLING

Following soil sample collection and drilling of each borehole, GGE will instruct the drilling contractor to install factory-sealed ¾-inch slotted PVC well screen with a bottom cap into each cased borehole to its total depth to expedite sampling and pre-filter the groundwater of coarse-grained sediments. GGE will direct the driller to extract the outer drill tubes 1 to 2 feet, exposing the PVC casing to the surrounding strata and groundwater.

GGE will initially measure and record the depth to groundwater and presence of free-floating product in each temporary piezometer using an electronic water/oil interface meter and determine when groundwater levels stabilize. GGE will obtain all measurements relative to the approximate north side of the top of casing (TOC), with an accuracy of 0.01 foot. GGE will then collect a grab groundwater sample from each borehole using a peristaltic pump (average flow rate @ 100 to 150 milliliters per minute) and dedicated 0.25-inch-diameter Teflon tubing. The groundwater sample will be immediately removed from the boring and carefully decanted from the end of the tubing into pre-

cleaned, laboratory-provided sample containers. The volatile water samples will be poured directly into laboratory cleaned 40-milliliter volatile organic analysis (VOA) vials to prevent loss of any volatile constituents. The vials will be filled slowly and in such a manner that the meniscus extends above the top of the VOA vial. After the vials are filled and capped, they will be inverted to insure there is no head space or entrapped air bubbles. The samples will be sealed with Teflon caps, properly labeled, and stored in a cooler chilled to approximately 4ºC.

As an alternative, based on subsurface conditions, the driller may elect to advance additional steel drill tubes retrofitted with a hydropunch sample point to approximately 10 fbg. GGE will first confirm that groundwater has not entered the drill tubes by lowering an electronic measuring tape to the total depth of the borehole. The driller will then extract the steel drill tube approximately 6 inches, exposing the perforated portion of the drive point to the surrounding strata, and subsequently collect a representative, depth discrete grab sample of the groundwater at depth using a peristaltic pump and new dedicated tubing. Sample collection and preservation will be similar to that discussed above.

SOIL GAS SAMPLING PROBE INSTALLATION

GGE will install semi-permanent soil gas probes and collect associated soil gas samples from separate boreholes adjacent to the proposed boring locations B28, B29 and B31. As above, each proposed boring will be drilled by a California-licensed Water Well Drilling Contractor (C-57) using a limited access, direct-push drill rig equipped with 2¼-inch-diameter steel, concentrically-cased percussion drill tubes, advanced to the final depth of 5 fbg (B28, B29) and 6.5 fbg (B31). Figure 5, titled *Proposed Soil Vapor Probe Construction Diagram* shows schematic representations of a single vapor probe constructed to both 5 and 6.5 fbg.

Once the designated target depth (@ 5 or 6.5 feet) is reached, the drive rod is removed and a semi-permanent vapor probe is constructed in the bottom of the borehole. At each target depth, a screened 2-inch vapor probe is installed on the downhole end of 1/4-inch Teflon tubing and extends approximately 12 inches above grade surface. The screened probe is encased in a 12-inch thick sand pack. Approximately 12 inches of dry granular bentonite is placed on top of the sand pack, followed by 2 to 3 feet of hydrated granular bentonite. Rapid set Portland cement will then be poured in the borehole between 0.5 and 1.5 fbg to form a surface seal. The top of the tubing is capped and contained within a flush-mounted well box with cover and placed in concrete to prevent surface water infiltration. Between vapor boring locations, the metal push-rod assembly will be washed and triple-rinsed with potable water void of VOCs.

A soil gas sample will collected at each location following the procedures provided in DTSC's April 2012 *Advisory – Active Soil Gas Investigations,* and discussed below. Following initial sampling, the vapor probe will remain installed for follow up confirmation sampling at 3, 6 or 12 months or other required sampling interval required by the local oversight agency.

SUB-SLAB VAPOR PROBE INSTALLATION

Vapor point installation and subsequent sampling activities will be performed in general accordance with the procedures provided in the procedures presented in the DTSC guidance document *Final, Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance)* dated October 2011. The new proposed sub-slab vapor sampling point SG-4 will be installed within the concrete floor slab of the administrative office at the location shown in Figure 4, Proposed Work.

The vapor point will be installed utilizing commercially available Vapor Pin™ sub-slab soil gas sampling device provided by Cox-Colvin. The Vapor Pin™ is designed for use in sub-slab soil-gas sampling. The Vapor Pin™ device is a single piece installation eliminating potential leak points and uses a silicone sleeve to form an air-tight seal with the side of the drill hole. The area of the vapor point will first be cleared of surface covering and hand washed with an Alconox solution. GGE will initially use a hammer drill to drill a 5/8" diameter hole through the entire concrete slab floor approximately 3 to 4 inches into the underlying baserock/soil material. GGE will clean the drill cuttings from the hole with a brush and drill a 1½" diameter surface hole approximately 1" deep to install a flush-mount vapor pin cover. GGE will install the Vapor Pin™ device using hand tools as described in the document titled *Standard Operating Procedure Installation and Extraction of the Vapor Pin* attached in Appendix C – Additional Documentation.

SOIL GAS SAMPLING

A soil gas sample will collected at each location following the procedures provided in DTSC's April 2012 *Advisory – Active Soil Gas Investigations*. The appropriate purge volume for this site was previously determined using a step purge volume testing program with test volumes of 1, 3, and 10 volumes. A purge volume of 3 volumes was determined to be appropriate for this site. In accordance with the current advisory for soil gas investigations, to allow the soil vapor conditions to approach representative, ambient conditions after probe emplacement using GeoProbe (direct push) technology, shut-in tests, leak testing, purging volume testing, and soil gas sampling should not be conducted until equilibration has occurred, at least 2 hours following completion of probe installation. A brief description of each soil gas assembly test is provided below.

A laboratory-supplied 6-liter purge canister and a 1-liter sample canister will be connected into a manifold using an inline 2-micron filter, a flow controller preset at a 150 milliliters/minute flow rate, and a dual valve assembly (V_1 and V_2). The sample canister, manifold, valves and the superior portion of the sub-slab vapor probe (at grade surface) will be connected using laboratory supplied Teflon tubing and Swagelok compression fittings. The sample canister and manifold assembly will be connected directly to the above-grade tubing of the newly-installed vapor probe. Clean laboratory-supplied canisters, manifold assemblies, and new Teflon tubing will be used at each sampling location.

Vacuum gauges will be pre-connected directly to each Summa canister at the laboratory. Per soil gas advisory specifications, flow rates between 100 and 200 milliliters per minute and an applied vacuum less than 100 inches of water should be maintained throughout purging and sampling to minimize

both ambient air infiltration from dilution of samples and partitioning of vapors from pore water to soil gas, to help ensure collection of a representative soil gas sample.

GGE will collect a sub-slab vapor sample from one location in the office at a depth of approximately 0.5 feet bgs (directly beneath the concrete floor slab). The sub-slab vapor sample location is shown on Figure 4, Proposed Work as location SG-4. The sampling apparatus used for sub-slab vapor sampling is similar to construction of that above except that sub-slab vapor samples are collected in a 6-liter Summa canister. Shut-in tests, leak testing, purging, and soil gas sampling will be conducted similar to soil gas probe sampling discussed below. A *Schematic of Sub-Slab Vapor Sampling* is shown in Figure 6.

Shut-In Test

A shut-in test should be conducted at every vapor sampling location to check for leaks in the above-grade sampling system. After assembly of the soil vapor sampling train as shown in Figure 6, GGE will close Valve V_1 and apply a vacuum at the 6-liter purge canister and continually observe the vacuum gauge(s) for at least 1 minute (standard time @ 10 minutes) to confirm that there is no observable loss in vacuum. Should a loss in vacuum occur, GGE will immediately close the valve at the purge canister and adjust all inline fittings between V_1 and the purge and sample canisters. After validation of the shut-in test is completed, the soil gas sampling train should not be disconnected or altered, and the subsequent leak test can be performed.

Leak Test

A leak test is conducted at every vapor sampling location during sample collection to check if ambient air is introduced into the soil gas sample and evaluate overall integrity of the sample. The introduction of ambient air into the soil gas sample will likely dilute or alter the actual site contaminant concentration. Atmospheric leakage generally occurs through faulty valves/gauges and loose fittings in the soil gas sampling train, and by advection through voids in the vapor probe construction material, borehole wall and directly through the soil column itself.

The leak check compound, isopropyl alcohol (IPA; CAS #67-63-0), is applied at the vapor probe inlet at grade surface, throughout the duration of the sampling event. GGE recommends using a shroud enclosure during the sampling of each vapor probe to ensure that a relatively high concentration of the leak check compound is maintained throughout the sampling event, and that the volatile tracer concentrations within the shroud be monitored and recorded periodically (@ 3-4 minute intervals) using a calibrated Photo Ionization Detector.

The shroud enclosure volume should be minimal, and the enclosure should be placed over the inlet of the soil vapor probe and contain at least the vapor tight valve V_1 and associated sections of Teflon tubing. IPA would be applied directly to a gauze or cloth and placed on the floor surface near the vapor probe inlet, whereas a gaseous tracer compound would be infused directly surrounding the vapor sampling train assembly within the shroud enclosure. The selected leak check compound should not be a suspected site contaminant, and should be included in the laboratory analyte list. If

warranted, a leak check sample canister (or associated tubing inlet) can be placed within the shroud enclosure and sampled concurrently with the soil gas sample.

Soil Gas Sample Collection

After a sufficient volume of vapor has been evacuated from the sampling assembly, GGE will perform soil gas sample collection. If a leak check canister is utilized, it will be connected to a separate manifold system "J-Tube" consisting of a 2-micron filter, flow controller, and a single valve assembly, and connected directly to Teflon tubing that extends within the shroud enclosure. GGE will place clean gauze saturated with IPA within the interior of the shroud enclosure throughout the duration of each sampling period, and continuously monitor the interior atmospheric concentration of the shroud with a MiniRae® PID. GGE will record the interior shroud VOC concentrations approximately every two minutes.

GGE will initially close the purge canister and open the valves for the 1-liter (soil gas) or 6-liter (sub-slab vapor) sample and leak detection canisters, and begin sample collection. Sampling will be terminated at each location when the sample canister vacuum gauge shows approximately 5 inches of mercury (adequate sample volume and suggested vacuum for sample extraction according to laboratory). Each sample canister will be disconnected from the sample train assembly, appropriately labeled and placed in a box or cooler (non-chilled) for transport to the laboratory. The results of the soil vapor analysis will be confirmed with duplicate soil vapor samples (at a rate of 10% of the soil vapor samples) collected simultaneously in additional Summa canisters utilizing a duplicate manifold assembly.

BACKFILLING

Immediately following sampling activities in all soil borings without semi-permanent vapor probes, GGE will direct the subcontracted driller to extract drill tubes from each borehole and backfill with neat Portland cement up to approximately 0.5 fbg. The balance of each borehole will be backfilled with appropriate surface material (i.e., concrete, asphalt, etc.) to restore original site conditions. Any boreholes containing groundwater will be backfilled by pumping Portland cement (6 gallons water per 94-pound bag of Portland cement) through a tremie pipe and grouting upward from the bottom of the boring; gravity flow of grout through a funnel will not be allowed. Any water discharging the boring during grouting will be managed as a hazardous waste (contained and collected with absorbent for placement in 55-gallon drum(s). In boreholes fitted with semi-permanent vapor probes (no future sampling required), the vapor probe and tubing will be pulled from the hole and the hole sealed at the surface with cement.

Waste Management

All hydrocarbon-impacted soil generated during the additional soil boring installation activities will be transferred directly to 55-gallon drums and temporarily stored onsite in a secure area. Pending receipt of the composite stockpile soil sample analysis, GGE and subcontractors will subsequently profile and transport the drummed waste to an appropriate licensed disposal facility under uniform

waste manifest. A copy of the solid waste manifest and associated weight ticket will be included in the technical report.

All borehole purge water and equipment wash and rinse water generated during the investigation activities will be transferred to separate 55-gallon D.O.T.-approved steel drums and stored onsite in a secure area. All waste water containers will be sealed and appropriately labeled and securely stored onsite pending future disposal at a State-licensed disposal or recycling facility. The liquid waste will be profiled for disposal/recycling under uniform waste manifest following receipt of the laboratory results of groundwater sample analysis.

Laboratory Analysis Plan

Laboratory Analysis of Soil Samples

GGE will submit the soil samples under formal chain of custody command to Torrent Laboratory Inc., a State-certified analytical laboratory (CA ELAP #1991) in Milpitas, California for laboratory analysis of the following fuel constituents:

Potential PCE Source Area: Soil samples collected from boring B30 will be analyzed for:

- Volatile Organic Compounds (Full List) by EPA Method 8260, to include Perchloroethene (PCE), Trichloroethene (TCE), 1,1-Dichloroethene (1,1-DCE), cis-1,2-Dichloroethene (cis-1,2-DCE), trans-1,2-Dichloroethene (trans-1,2-DCE) and Vinyl Chloride

Potential hydraulic lift Source Area: Soil samples collected from boring B34 will be analyzed for:

- Total Petroleum Hydrocarbons (TPH) as hydraulic oil (TPH-HO; EPA 8015M)
- Polynuclear Aromatic Hydrocarbons (PAHs), Naphthalene (EPA 8270C)

Potential Waste Oil Source Area: Soil samples collected from boring B35 will be analyzed for:

- Polynuclear Aromatic Hydrocarbons (PAHs), Naphthalene (EPA 8270C)

Laboratory Analysis of Groundwater Samples

GGE will submit all grab groundwater samples collected from boring B28 to B34 under formal chain of custody command to Torrent Laboratory, Inc., a State-certified analytical laboratory (CA ELAP #1991) in Milpitas, California, for laboratory analysis of the following constituents:

Potential PCE Source Area: Groundwater samples collected from borings B28, B29 & B30 will be analyzed for:

- Volatile Organic Compounds (Full List) by EPA Method SW8260B, to include Perchloroethene (PCE), Trichloroethene (TCE), 1,1-Dichloroethene (1,1-DCE), cis-1,2-Dichloroethene (cis-1,2-DCE), trans-1,2-Dichloroethene (trans-1,2-DCE) and Vinyl Chloride

Sidewalk, East and West Parking Lanes of College Avenue: Groundwater samples collected from borings B31, B32 & B33 will be analyzed for:

- Total Petroleum Hydrocarbons (TPH) as Gasoline by EPA Method SW8260B
- TPH as Diesel/Motor Oil by Method SW8015B(M)
- Volatile Organic Compounds (Full List) by EPA Method SW8260B, to include Benzene, Toluene, Ethylbenzene and Total Xylenes (BTEX), and Naphthalene
- Poly-Aromatic Hydrocarbons (PAHs) by EPA Method SW8270C

Potential hydraulic lift Source Area: Groundwater sample collected from boring B34 will be analyzed for:

- TPH as Hydraulic Oil by EPA Method SW8015B(M)
- Volatile Organic Compounds (Full List) by EPA Method SW8260B, to include Benzene, Toluene, Ethylbenzene and Total Xylenes (BTEX), and Naphthalene
- Poly-Aromatic Hydrocarbons (PAHs) by EPA Method SW8270C

East Parking Lane of College Avenue (Former UST Area): Groundwater sample collected from boring B35 will be analyzed for:

- Poly-Aromatic Hydrocarbons (PAHs) by EPA Method SW8270C, including Naphthalene

Torrent Laboratory, Inc. will complete all volatile organic analyses within the 14-day required time limit for analysis. A sample trip blank will accompany all groundwater samples to the laboratory and be analyzed for TPH-G & BTEX. Tables in the technical report will present a summary of the analytical results for this event as well as previous monitoring events at the Site.

Laboratory Analysis of Soil Gas Samples

GGE will submit sub-slab vapor and soil gas samples collected in SG-1 thru SG-4 under chain of custody command to Torrent Laboratory (Torrent) of Milpitas California (ELAP #1991) for chemical analysis. The samples will be analyzed using the following California Department of Health Services approved methods:

- Total Petroleum Hydrocarbons (TPH) as Gasoline by Modified EPA Method TO-3 M
- Volatile Organic Compounds (VOCs; Full List) by EPA Method TO-15
- Poly-Aromatic Hydrocarbons (PAHs) by EPA Method TO-13A
- Fixed Gases by ASTM Method D-1946 (Nitrogen, Hydrogen, Helium, Oxygen, Carbon Monoxide, Carbon Dioxide, Methane, Ethane, Ethene)

Approximately 10% duplicate soil gas samples will be submitted for chemical analysis under chain of custody command to Torrent Laboratory. The leak check canister sample will be analyzed only for 2-Propanol (Isopropyl Alcohol – IPA) by EPA Method TO-15. A copy of the certified laboratory analytical report associated with the sampling event will be presented in technical report.

SCHEDULE

GGE anticipates beginning the additional field activities within two to three weeks of receiving client authorization to proceed, and upon permit acquisition and subcontracted driller availability. The aforementioned technical report should be available within 45 to 60 days following receipt of all sample analytical results.

GEOTRACKER ELECTRONIC SUBMITTAL

GGE will direct Torrent to submit all analytical data in electronic deliverable format (EDF) via the Internet. All soil/groundwater sample analytical data will be uploaded to the State Water Resources Control Board's GeoTracker Database System. Also, a site plan, geologic boring logs, and construction log of each newly-installed boring/vapor well, as well as a copy of the report of findings will be uploaded in Portable Data Format (PDF) to the State GeoTracker Database. An appendix of the resulting technical report will include a copy of each associated GeoTracker Upload Confirmation Form.

REPORT PREPARATION & DISTRIBUTION

Following the completion of all field work, GGE will compile all field and analytical data to be used in preparation of a technical report that discusses the activities and findings of the investigation. The report will also present conclusions and recommendations for further action or case closure. The report will be placed on the ACEH's FTP Website for regulatory review and comment.

All reports that are prepared during the continuing work on this project will be submitted to:

Alameda County Health Care Services Agency
Environmental Health Services, Environmental Protection (LOP)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
Attention: Mr. Mark Detterman
Ms. Dylan Roe (1 Electronic Copy via ACHCSA FTP)
(1 Electronic Copy via GeoTracker)

William G Sheaff Trust
c/o Dr. Brian R. Sheaff, D.D.S.
1945 Parkside Drive
Concord, California 94519 (1 Electronic Copy via Email)
(1 Copy, Bound)

LIMITATIONS

It should be understood that all environmental assessments are inherently limited in that conclusions are drawn and recommendations developed from information obtained from limited research and visual observations. Subsurface conditions change significantly with distance and time and therefore may differ from the conditions implied by subsurface investigation. It must be noted that no investigation can absolutely rule out the existence of any hazardous or petroleum substances at a given site. Existing hazardous materials and contaminants can escape detection using these methods. The work performed in conjunction with this assessment and the data developed are intended as a description of available information at the dates and location given. GGE professional services have been performed, with findings obtained and recommendations prepared in accordance with customary principles and practices in the field of environmental science, at the time of the assessment.

This warranty is in lieu of all other warranties either expressed or implied. GGE is not responsible for the accuracy of information reported by others or the independent conclusions, opinions or recommendations made by others based on the field exploration presented in this report. The findings contained in this report are based upon information contained in previous reports of corrective action activities performed at the subject property and based upon site conditions as they existed at the time of the investigation, and are subject to change. The scope of services conducted in execution of this phase of investigation may not be appropriate to satisfy the needs of other users and any use or reuse of this document and any of its information presented herein is at the sole risk of said user. The figures, drawings and plates presented in this document are only for the purposes of environmental assessment and no other use is recommended. No other third party may rely on this report, figures or plates for any other purpose.

CERTIFICATION

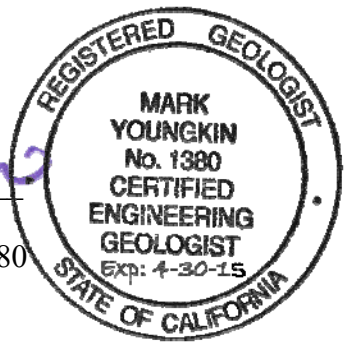
This document has been prepared in accordance with generally accepted environmental practices exercised by professional geologists, scientists, and engineers. No warranty, either expressed or implied, is made as to the professional advice presented herein. The findings conclusions, and recommendations contained in this document are based upon information contained in previous reports of corrective action activities performed at the subject property and based upon site conditions as they existed at the time of the investigation, and are subject to change.

The conclusions presented in this document are professional opinions based solely upon visual observations of the subject property and vicinity, and interpretation of available information as described in this report. The scope of services conducted in execution of this investigation may not be appropriate to satisfy the needs of other users and any use or reuse of this document and any of its information presented herein is at sole risk of said user.

Golden Gate Environmental, Inc.

Authored By:

Brent A. Wheeler
Project Engineer

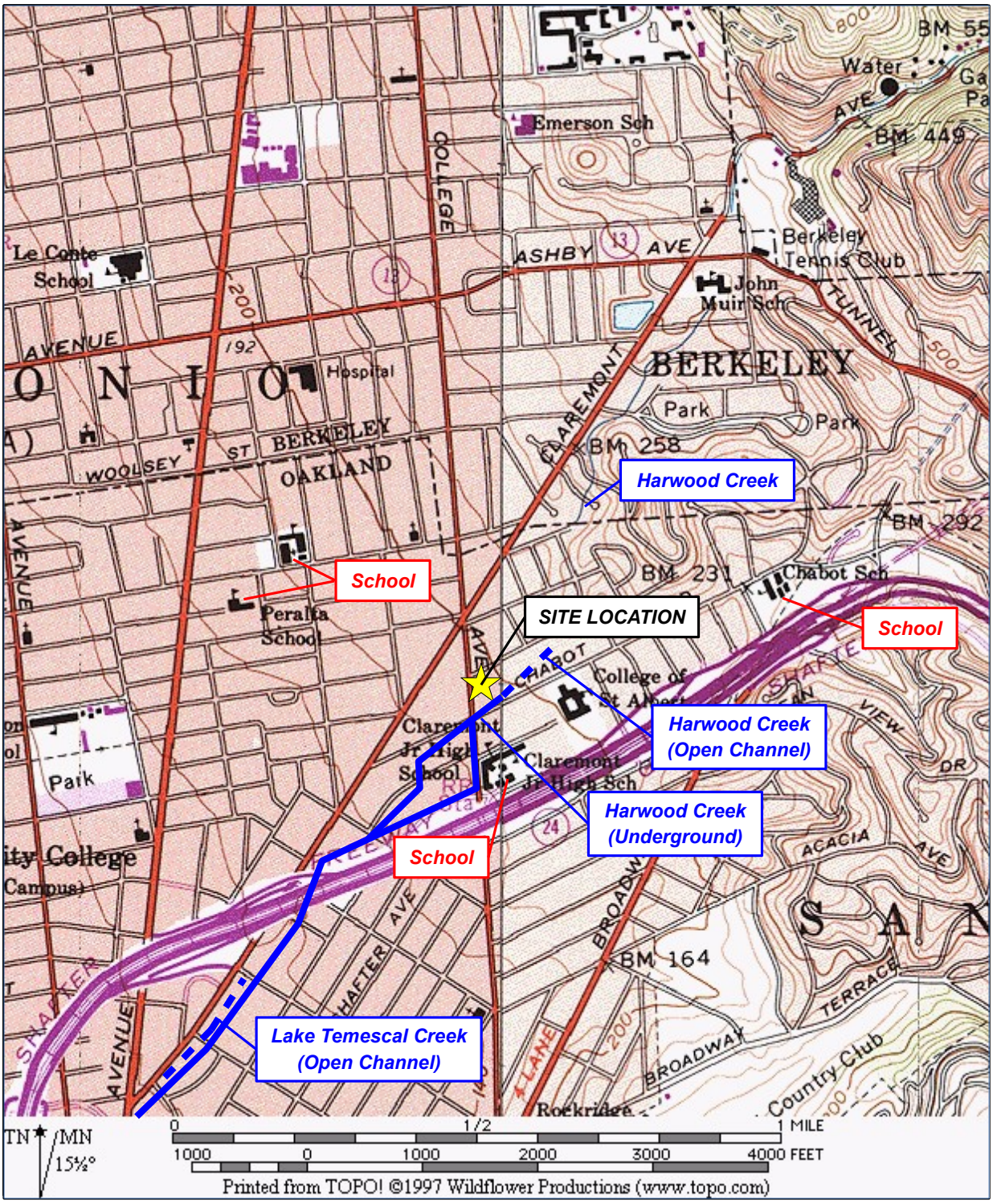


Mark Youngkin
Registered Geologist, CEG No.1380

FIGURES

DATA GAP INVESTIGATION WORK PLAN

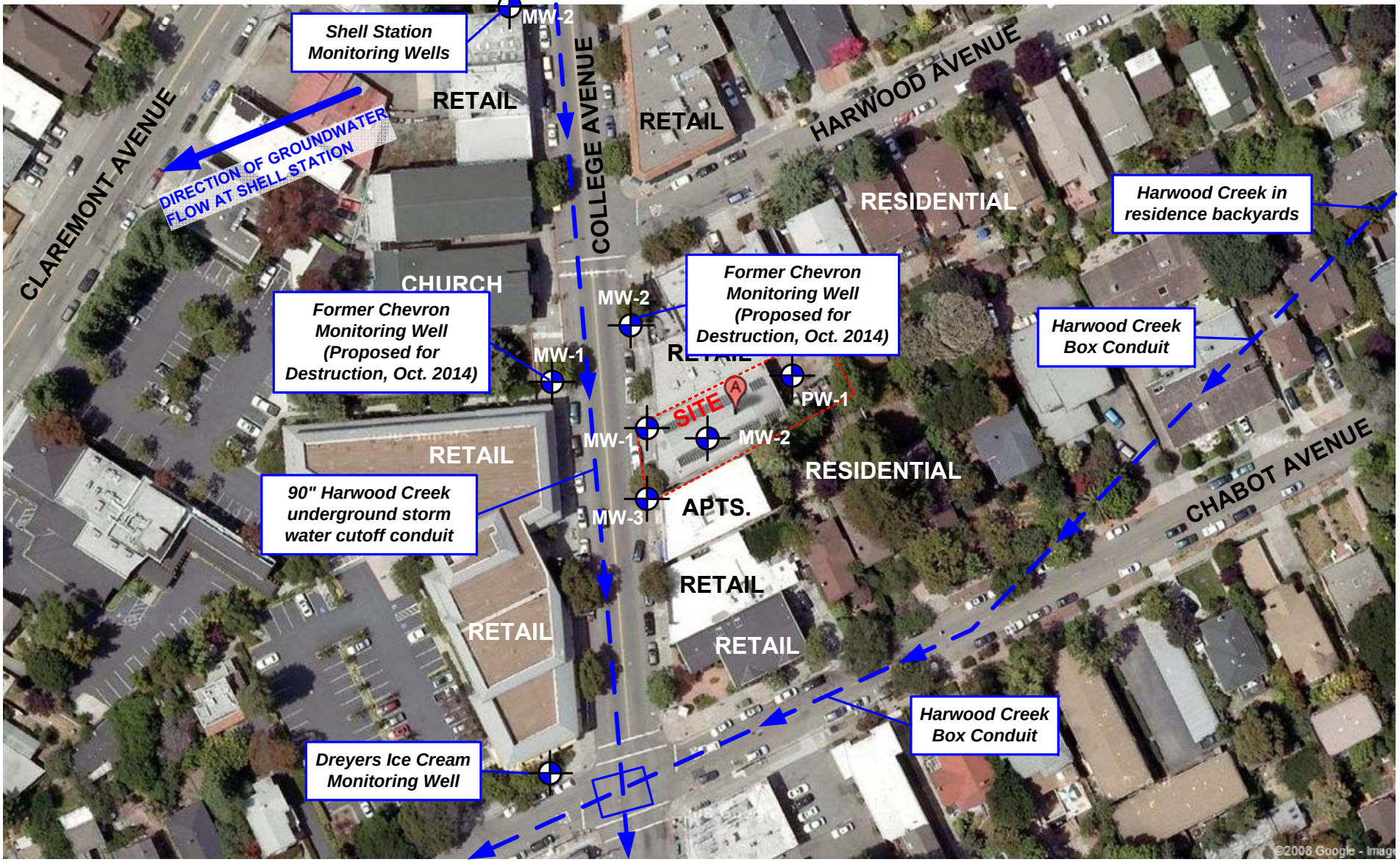
Sheaffs Garage
5930 College Avenue
Oakland, California
ACHCSA Site # RO0000377



GOLDEN GATE ENVIRONMENTAL, INC.
1455 Yosemite Av., San Francisco, CA 94124
Phone (415) 970-9088 Fax (415) 970-9089

SITE LOCATION MAP
5930 College Avenue, Oakland, California

GGE Project No. 2014 | *October 2014* | ***Figure 1***



Base Map from Google Maps, 2008, at a scale of about 1"=100 feet with North to top of map.

GOLDEN GATE ENVIRONMENTAL, INC.
1455 Yosemite Avenue, San Francisco, CA 94124
Phone (415) 970-9088 Fax (415) 970-9089

SITE VICINITY MAP

Sheaffs Garage
5930 College Avenue, Oakland, California

GGE Project No. 2014	October 2014	**FIGURE 2**

N
W
E
S

HARWOOD AVENUE
SIDEWALK
RESIDENCE
BACKYARD
GARAGE ENTRANCE
TWO-STORY COMMERCIAL BUILDING WITH UNDERGROUND PARKING GARAGE 5940 COLLEGE AVENUE
TWO-STORY COMMERCIAL BUILDING RESTAURANTS, RETAIL AND OFFICES FORMER CHEVRON SERVICE STATION 5940 COLLEGE AVENUE
COLLEGE SQUARE
RESTAURANT-BAR
Sump Pump
Below Grade Courtyard
COLLEGE AVENUE
SIDEWALK
GR-MW-2
CHURCH
COURTYARD
GR-MW-1
HB-3
HB-4
B8
HB-5
MW-3/B6
HB-6
SUBJECT PROPERTY
STAUDER AUTOMOTIVE
FORMER SHEAFFS GARAGE
5930 COLLEGE AVENUE
Approximate Location of Former Fuel Dispenser [Underlying Concrete Pad 42" x 42" Removed 8/27/02]
EX-3 @ 2.5'
EX-2 @ 3.5'
EX-1 @ 3.5'
Former Subsurface Product Line
GARAGE DOOR
B7
B19
SG-3
B20
B24
B11
HB-1
B18
B17
B16
B15
B14
B12
SG-2
SG-1
B13
B3
B2
B22
CPT-1B
CPT-1A
B10
B23
B1
B21
B9
MW-1/B4
MW-2/B5
A
A'
HYDRAULIC HOIST
Garage Work Area (Concrete Pavement)
PW-1 / (HB-2)
Oil Water Seperator
Stormwater Catch Basin
Cleanout
B25
B26
B27
Parking Lot (Concrete Pavement)
SINK / FORMER PARTS WASHER
OE-1
OE-2
OE-3
OE-4
OE-5
T1N
T1
T1S
T2
T2C
UST
T1C10
OFFICE
WC
CORRIDOR
SANITARY SEWER
RESIDENCE BACKYARD
COURTYARD
MULTI-TENANT COMMERCIAL/ RETAIL BUILDING
MULTI-STORY RESIDENTIAL BUILDING
GROUND FLOOR PARKING GARAGE
5916- 5920 COLLEGE AVENUE
COMMERCIAL/RETAIL BUILDING
5912 COLLEGE AVENUE

Scale in Feet
(1" = 20')
0 10 20

LEGEND

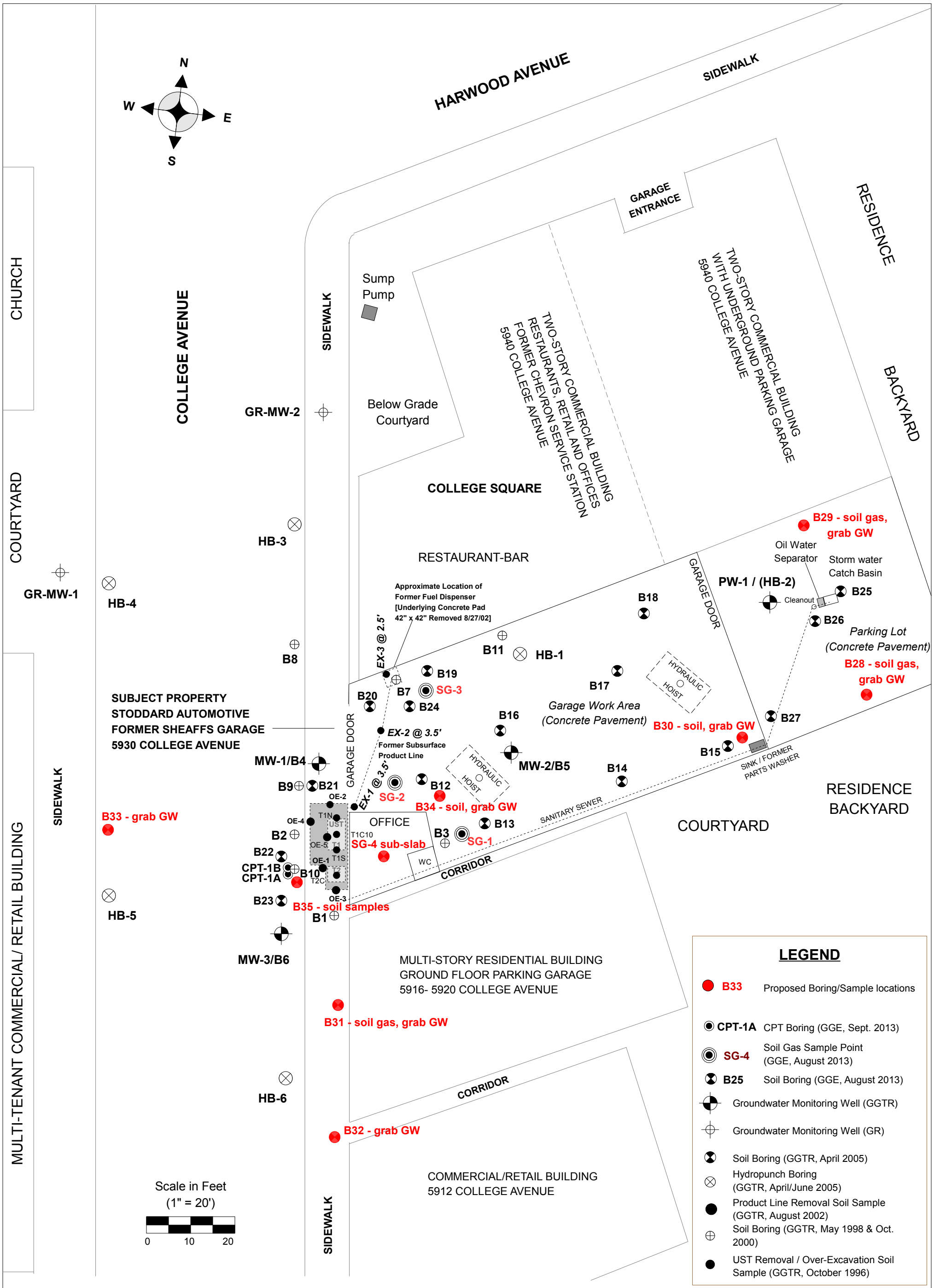
- CPT-1A CPT Boring (GGE, Sept. 2013)
- SG-4 Soil Gas Sample Point (GGE, August 2013)
- B25 Soil Boring (GGE, August 2013)
- Groundwater Monitoring Well (GGTR)
- Groundwater Monitoring Well (GR)
- Soil Boring (GGTR, April 2005)
- Hydropunch Boring (GGTR, April/June 2005)
- Product Line Removal Soil Sample (GGTR, August 2002)
- Soil Boring (GGTR, May 1998 & Oct. 2000)
- UST Removal / Over-Excavation Soil Sample (GGTR, October 1996)

GOLDEN GATE ENVIRONMENTAL, INC.
1455 Yosemite Avenue, San Francisco, CA 94124
Phone (415) 970-9088 Fax (415) 970-9089

SITE PLAN

Former Sheaff's Service Garage
5930 College Avenue, Oakland, CA 94618

GGE Project No. 2014	Figure By: ed (07/08); revised baw 8/13	October 2014	**Figure 3**



GOLDEN GATE ENVIRONMENTAL, INC.
1455 Yosemite Avenue, San Francisco, CA 94124
Phone (415) 970-9088 Fax (415) 970-9089

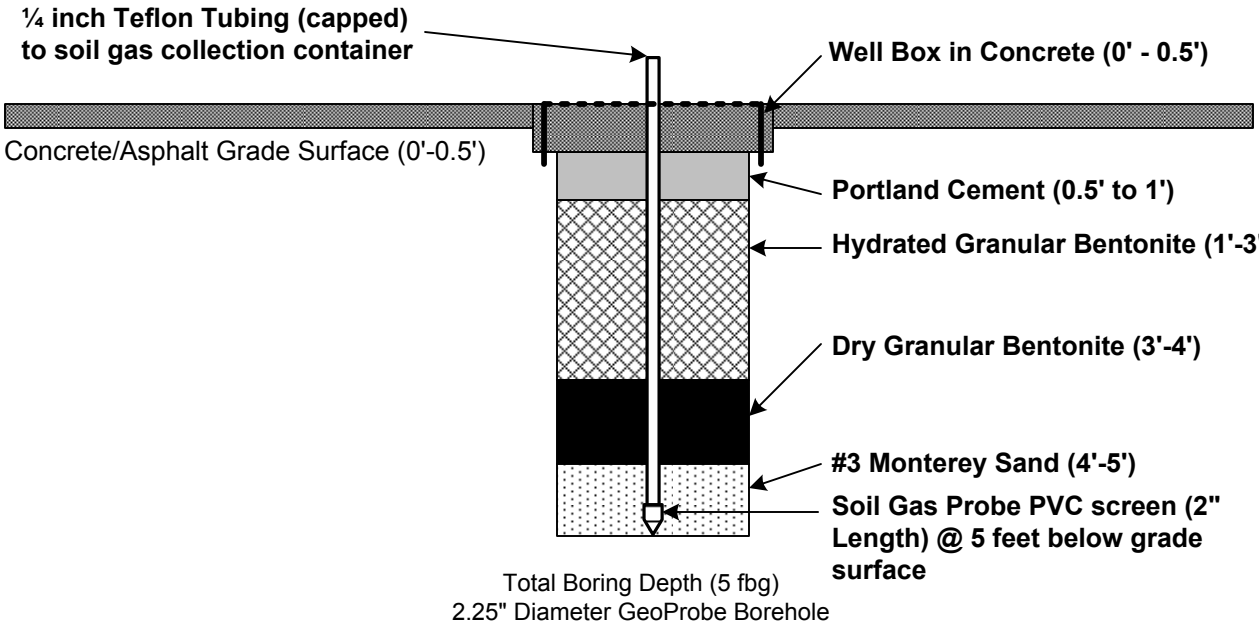
PROPOSED WORK
Former Sheaff's Service Garage
5930 College Avenue, Oakland, CA 94618

GGE Project No. 2014

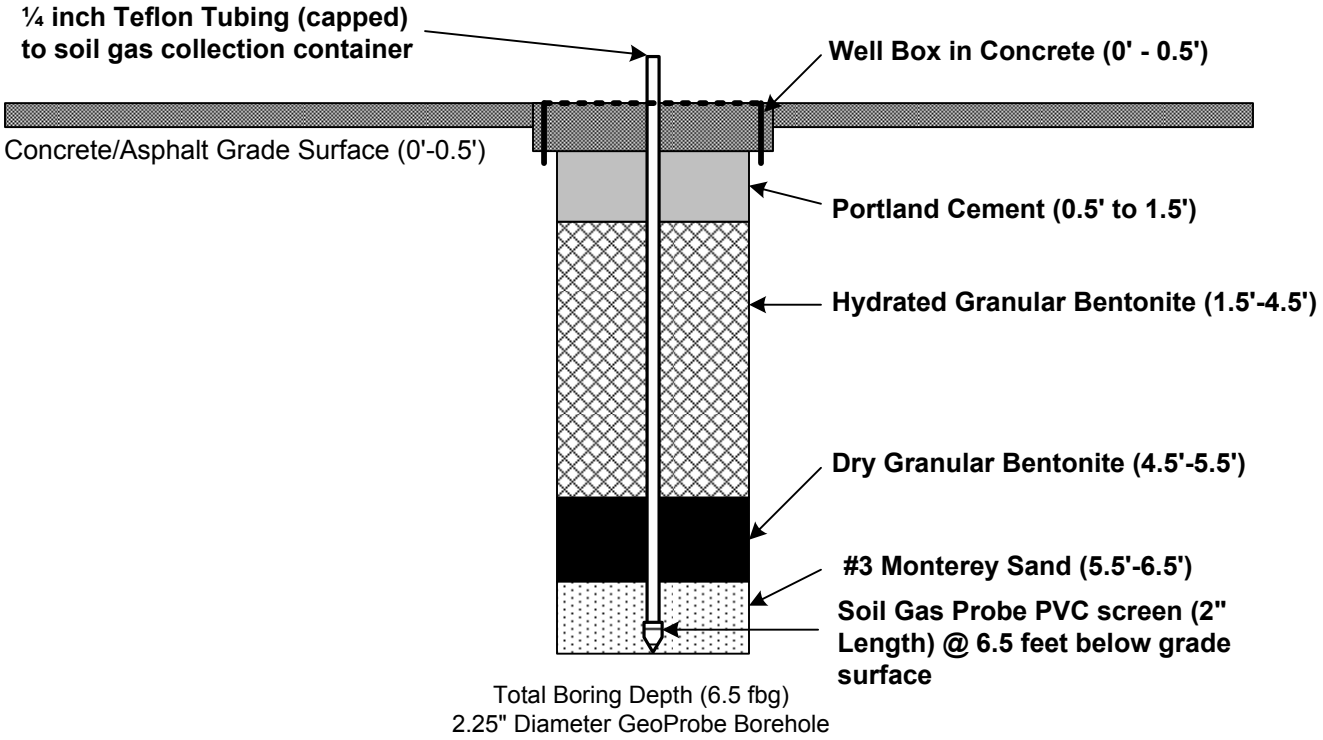
December 2014

Figure 4

Soil Vapor Probe
Construction Schematic (0' to 5')



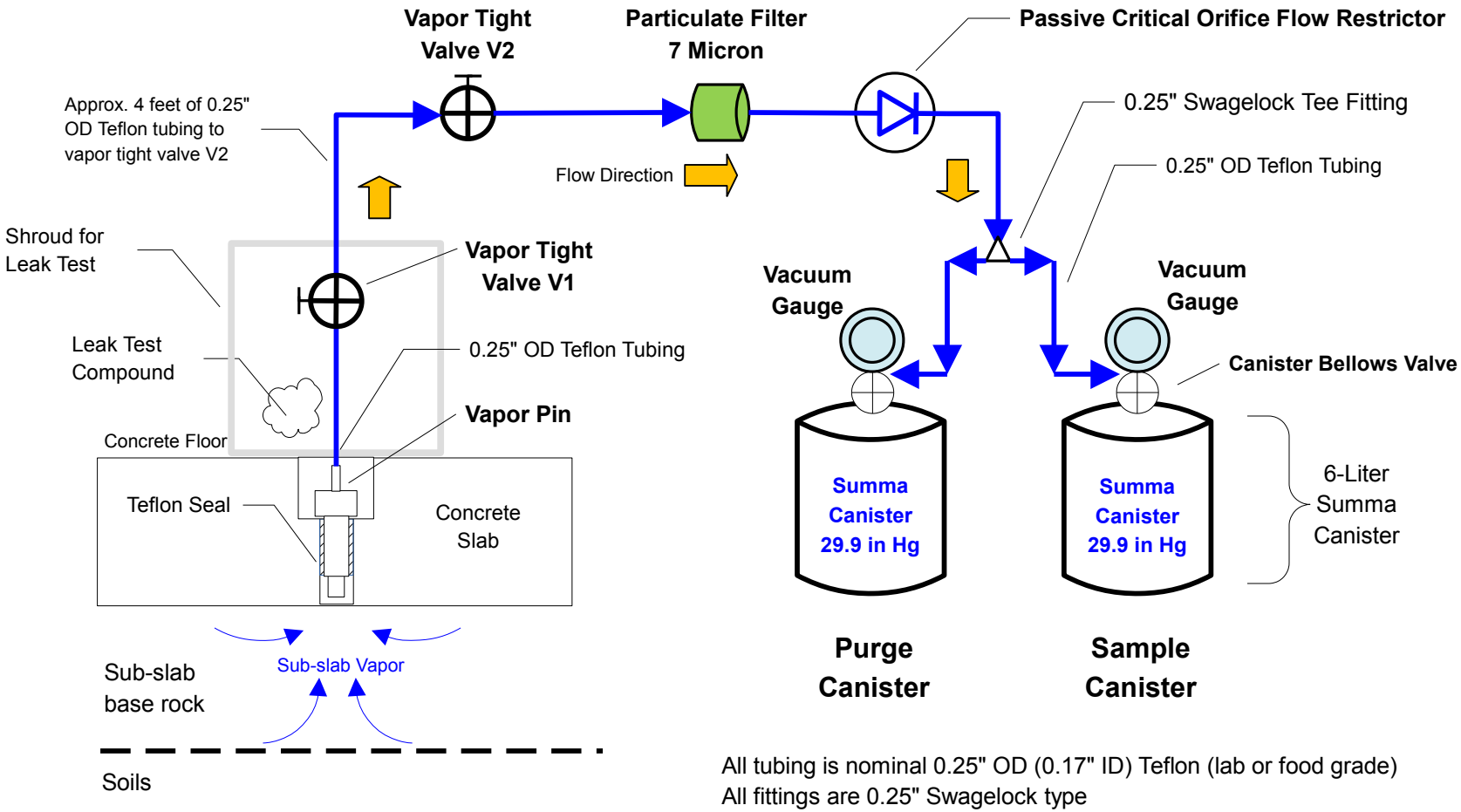
Soil Vapor Probe
Construction Schematic (0' to 6.5')



GOLDEN GATE ENVIRONMENTAL, INC. 1480 Carroll Avenue, San Francisco, CA 94124 Phone (415) 970-9088 Fax (415) 970-9089	**PROPOSED SOIL VAPOR PROBE CONSTRUCTION DIAGRAM (5' & 6.5' Total Depths)**

Fn: SG Probe Construction	*Not To Scale*	***Figure 5***

NOT TO SCALE - SKETCH ONLY



All tubing is nominal 0.25" OD (0.17" ID) Teflon (lab or food grade)
All fittings are 0.25" Swagelock type

Laboratory Analysis, Summa canisters, flow restrictor, particulate filter, bellows valves, and vacuum gauges provided by Torrent Laboratories, Inc.

Golden Gate Environmental, Inc.
1480 Carroll Ave., San Francisco, CA

Schematic of Subslab Vapor Sampling

Project No. 2014	December 2014	**Figure 6**

APPENDIX A

FOCUSED SITE CONCEPTUAL MODEL

DATA GAP INVESTIGATION WORK PLAN

Sheaffs Garage
5930 College Avenue
Oakland, California
ACHCSA Site # RO0000377

APPENDIX A
FOCUSED SITE CONCEPTUAL MODEL

<table>
<tr><th>Criteria</th><th>Description of Low Threat Closure Policy Criteria and Explanation</th><th>Data Gap</th><th>How to Address</th></tr>
<tr><td>A.</td><td>The unauthorized release is located within the service area of a public water system.</td><td>EBMUD - No data gap</td><td>No action needed</td></tr>
<tr><td>B.</td><td>The unauthorized release consists only of petroleum: Both ACEH and Water Board Fund staff indicate that chlorinated solvents in groundwater is impediment to case closure. Contaminants: TCE, PCE, Vinyl Chloride, IPB, TMB, cis-1,2-DCE, MC. The contaminants include gasoline constituents and breakdown products of PCE solvent.

In their April 11, Alameda County Environmental Health (ACEH) identifies three areas with potential tetrachloroethene (PCE) in soil:

1) A waste oil underground storage tank (UST) was present beneath the College Avenue sidewalk at the southwest corner of the site. The UST was removed in October 1996. The confirmation soil sample recovered from beneath the center of the waste oil tank T-2 contained 24 µg/Kg PCE in soil at a depth of 8 feet below grade surface (bgs) with non-detectable (<5 µg/Kg) TCE and cis-1,2-DCE. The 2013 Tier 1 ESL for PCE in soil is 430 µg/Kg. The laboratory analysis of soil samples from the following exploratory borings in the vicinity of the former UST: B10 at 11 feet bsg, B-12 at 10 and 15 feet bsg, B21 at 9.5 feet bsg, and B22 at 10 feet bsg, were all non-detectable for PCE, TCE and cis-1,2-DCD, see table below. Significant PCE contamination in soil does not appear associated with the former waste oil UST location. Grab groundwater sampling and years of groundwater monitoring of wells MW-1 and MW-3 did not detect PCE contamination in groundwater, and laboratory analysis for PCE was discontinued.

Summary of soil sampling for PCE at former waste oil tank:

<table>
<tr><th>Location</th><th>Sample ID</th><th>Sample Date</th><th>Sample Depth-ft</th><th>PCE</th><th>Notes</th></tr>
<tr><td>center of T2 excavation</td><td>7189-T2-C</td><td>8-6-1996</td><td>8</td><td>0.024 mg/kg</td><td>soil sample below bottom of waste oil UST tank T2 during tank removal</td></tr>
<tr><td>T2 Soil Stockpile</td><td>7189-SP2</td><td>8-6-1996</td><td>stockpile</td><td>0.031 mg/kg</td><td>composite sample of soil stockpile from waste oil UST tank T2 excavation</td></tr>
<tr><td>B10</td><td>7335-B10-11</td><td>10-30-2002</td><td>11</td><td>ND<0.020 mg/kg</td><td>soil sample from boring located west / adjacent to former waste oil tank excavation in sidewalk</td></tr>
<tr><td>B12</td><td>B12-10</td><td>4-30-2005</td><td>10</td><td>ND<0.005 mg/kg</td><td>soil sample approx. 20 northeast of former waste oil tank near hydraulic hoist</td></tr>
<tr><td></td><td>B12-15</td><td>4-30-2005</td><td>15</td><td>ND<0.005 mg/kg</td><td></td></tr>
<tr><td>B21</td><td>B21-8.5</td><td>6-22-2005</td><td>8.5</td><td>ND<0.250 mg/kg</td><td>soil sample from boring in sidewalk approx. 15 feet north of former waste oil tank</td></tr>
<tr><td>B22</td><td>B22-10</td><td>6-22-2005</td><td>10</td><td>ND<0.500 mg/kg</td><td>soil sample from boring in parking lane approx. 10 feet northwest of former waste oil tank location</td></tr>
</table>
</td><td>Data gaps present as discussed below:

No data gap - historic soil sampling indicates PCE contamination in soil associated with former waste oil UST location is not significant</td><td>Additional action needed as detailed below

No action needed for waste oil tank location</td></tr>
<tr><td></td><td>2) An oil-water separator (OWS) is located in the rear parking lot. Two soil borings adjacent to the oil-water separator (OWS) in the rear parking lot detected a maximum of 16 µg/Kg concentration of PCE at 2 feet. The 2013 Tier 1 ESL for PCE in soil is 430 µg/Kg. The ACEH suggests another</td><td>No data gap - potential source area at OWS was investigated in</td><td>No action needed for soil at OWS</td></tr>
</table>

<table>
<tr><th>Criteria</th><th>Description of Low Threat Closure Policy Criteria and Explanation</th><th>Data Gap</th><th>How to Address</th></tr>
<tr><td></td><td>source area may be present at the oil-water separator implying that investigation is incomplete at the OWS location. Source area was previously investigated and no source area of PCE contamination was discovered. In GGE's experience, the source area of PCE solvent has largely evaporated and dissipated into the atmosphere. Residual soil contamination of the smear zone is indicated by the presence of PCE in groundwater and the seasonal fluctuating concentrations of PCE in groundwater. PCE concentrations are below the current ESL value during low groundwater elevations and above ESL values during periods of high groundwater elevation. The ESL value is conservative and remediation of such low concentrations is impracticable.

Summary of soil sampling for PCE at oil-water separator (OWS):

<table>
<tr><th>Location</th><th>Sample ID</th><th>Sample Date</th><th>Sample Depth-ft</th><th>PCE</th><th>Notes</th></tr>
<tr><td>B25</td><td>B25-4</td><td>8-8-2013</td><td>4</td><td>ND<0.010 mg/kg</td><td>soil sample located adjacent to northeast corner of OWS</td></tr>
<tr><td>B26</td><td>B26-2</td><td>8-8-2013</td><td>2</td><td>0.016 mg/kg</td><td>soil samples located adjacent to southwest corner of OWS and along sanitary sewer alignment</td></tr>
<tr><td></td><td>B26-4</td><td>8-8-2013</td><td>4</td><td>ND<0.010 mg/kg</td><td></td></tr>
<tr><td>B27</td><td>B27-4</td><td>8-8-2013</td><td>4</td><td>ND<0.010 mg/kg</td><td>soil sample along sanitary sewer alignment adjacent to southeastern corner of building and former parts cleaner</td></tr>
</table></td><td>two borings and sanitary sewer line investigated with one boring with no significant soil contamination indicated by laboratory analysis for PCE.</td><td></td></tr>
<tr><td></td><td>Since April 2005, the depth to first water at well PW-1 has varied from 2.27 to 12.28 feet bgs. PCE concentrations in well PW-1 were last measured at 36 µg/Kg in October 2014, below the 2013 ESL value of 63 µg/Kg (not a potential drinking water supply). In well PW-1, PCE exhibits seasonal variations in PCE concentration from 25 to 120 µg/Kg. A former Chevron gasoline station and waste oil tank was located adjoining the rear parking lot on the north. Source of PCE contamination of groundwater may originate from offsite property to the north.</td><td>PCE contamination of groundwater may originate from offsite source at former gasoline station to north.</td><td>One boring located at northern boundary of rear parking lot with grab groundwater sample to detect offsite PCE contamination</td></tr>
<tr><td></td><td>3) A former parts washer/sink was located in the southeastern corner of the building. Boring B27 was installed near this former structure and detected no PCE contamination in soil; however, ACEH is concerned that the sampling location is up-gradient of the former parts washer. The parts washer/sink is located on the sanitary sewer alignment. GGE believes parts cleaner is connected directly to sanitary sewer line inside building.</td><td>In their April 11, ACEH indicates that potential PCE source area at former parts cleaner location is not completely investigated</td><td>One boring at parts cleaner location to determine connection and condition of subsurface soil</td></tr>
<tr><td>C.</td><td>The unauthorized (“primary”) release from the UST system has been stopped</td><td>No data gap</td><td>No action needed</td></tr>
<tr><td>D.</td><td>Free product has been removed to the maximum extent practicable

ACEH indicates that concentrations of gasoline and benzene are high enough in well MW-1 to present indirect evidence indicating free product is present. Historical groundwater monitoring has never detected free product at this site. Sheen is occasionally observed in monitor wells during periods of exceptionally high water level. However, no sheen has been observed since April 2009. Residual liquid phase hydrocarbons are present in the smear zone as indicated by the elevated gasoline and benzene concentrations in groundwater. GGE considers it impractical to attempt to remove free product from the smear zone. Residual hydrocarbon in smear zone from approximately 7.5 to 15 feet bgs is degrading slowly as trend line graphs</td><td>In their April 11, 2014 review letter, ACEH believes residual LNAPL is present in smear zone</td><td>As of 6/13/2014, ACEH in Path to Closure Plan indicates that General Criteria D is no longer an impediment to case closure</td></tr>
</table>

Criteria	*Description of Low Threat Closure Policy Criteria and Explanation*	*Data Gap*	*How to Address*
	indicate. GGE does not consider free product to be a data gap and is not proposing additional investigation for free product at the site. Additional groundwater sampling is proposed down-gradient of well MW-3 to verify plume length. ACEH indicates that if free product has been removed to the extent practicable, then LTCP Scenario 3- Case C (Low concentration groundwater scenario with Oxygen > 4%) may be used to satisfy the groundwater media specific criteria.		
E.	**A conceptual site model that assesses the nature, extent, and mobility of the release has been developed** In their April 2014 letter, ACEH states that insufficient data collection and analysis has been presented to assess the nature, extent, and mobility of the release and to support compliance with General Criteria b and d. This focused site conceptual model presents additional investigation activities to address data gaps as requested by ACEH.	In their April 11, 2014 review letter, ACEH believes that Site Conceptual Model is incomplete	As of 6/13/2014, ACEH in Path to Closure Plan indicates that General Criteria E is no longer an impediment to case closure
F.	**Secondary Source has been removed to the extent practicable** In their April 2014 letter, ACEH considers the indirect evidence of residual LNAPL remaining at the Site to constitute a potential threat to human health, to vapor intrusion to indoor air, and the residual secondary source is contributing to groundwater plume instability. The existing SCM states that a smear zone of residual petroleum is present at this site due to the large seasonal fluctuations in groundwater elevation. This smear zone causes the fluctuations in the groundwater plume concentrations. However, trend lines of historic groundwater sampling indicate the plume is declining in overall concentration. Existing soil gas sampling results indicate insignificant soil gas concentrations beneath the site. Additional soil gas investigation is proposed in this work plan to further document vapor conditions at the site.	In their April 11, 2014 review letter, ACEH believes residual LNAPL is present in smear zone	As of 6/13/2014, ACEH in Path to Closure Plan indicates that General Criteria F is no longer an impediment to case closure
	ACEH indicates that historic detections of naphthalene and poly-aromatic hydrocarbons (PAHs) in grab groundwater sample B12-W, located immediately down-gradient of a hydraulic hoist in May 2005, indicate the hydraulic hoists may be an unevaluated potential source. The soil sample from 10 feet in boring B12 contained non-detectable (<50 mg/Kg) Total Extractable Petroleum Hydrocarbons (TEPH) and non-detectable (<10 mg/Kg) Total Recoverable Petroleum Hydrocarbons (TRPH). Soil borings B5, B12 and B16 surround the active hydraulic lift location. Soil samples recovered from these borings did not exhibit evidence of significant petroleum contamination. Soil samples from Boring B5 and B12 were non-detectable for Total Extractable Petroleum Hydrocarbons (TEPH). GGE is conducting additional analysis of groundwater samples from monitor wells for diesel, motor oil and naphthalene.	In their April 11, 2014 review letter, ACEH believes that site in area of boring B12 and hydraulic hoist is under investigated - this work plan proposes an additional boring near hydraulic hoist location	As of 6/13/2014, ACEH in Path to Closure Plan indicates that General Criteria F is no longer an impediment to case closure
G.	**Soil or groundwater has been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15**	No data gap	No action needed
H.	**A nuisance exists, as defined by Water Code section 13050** In their April 11, ACEH indicates that soil vapor intrusion into adjacent apartment building has the potential to be a nuisance. However, it has not been evaluated. GGE is proposing additional soil gas investigation in this work plan.	In their April 11, 2014 review letter, ACEH believes that soil gas data is insufficient to evaluate risk to site and adjoining property	Work plan proposes additional soil gas sampling
1.	**Media Specific Criteria: Groundwater**		

APPENDIX A
FOCUSED SITE CONCEPTUAL MODEL

Criteria	*Description of Low Threat Closure Policy Criteria and Explanation*	*Data Gap*	*How to Address*
a.	Groundwater Plume Length - both ACEH and Water Board agree that the length and lateral extent of the groundwater plume has not been adequately defined. Utility conduits and storm drains interfere with the determination of plume length. This work plan proposes additional grab groundwater sampling.	In their April 11, 2014 review letter, ACEH indicates that plume length not adequately defined	Work plan proposes additional groundwater investigation
	ACEH additionally requests the addition of TPH as diesel to the groundwater sampling for at least one monitoring event. In their April 11, 2014 review letter, ACEH requests additional analysis from TPH as diesel, naphthalene and PAHs added to groundwater monitoring. TPH as diesel as been added to groundwater monitoring laboratory analysis.		TPH as diesel added to groundwater monitoring in April 2014
b.	Groundwater Plume is Not Stable - In their April 11, ACEH indicates that seasonal variation in petroleum concentrations is evidence that groundwater plume is not stable. ACEH cites October 2013 result for benzene in well MW-3 where 990 µg/Kg was the highest historical concentration. In well MW-3, benzene concentrations were 400 µg/Kg in April 2014 and 180 µg/Kg in October 2014, illustrating the seasonal nature of fluctuating groundwater concentrations. GGE believes that residual petroleum is present in smear zone and petroleum concentrations fluctuate seasonally. Trend line graphs indicate that plume is decreasing in overall petroleum concentration with time. Historic grab groundwater sampling at location HB-6 showed very low hydrocarbon concentrations. This work plan proposes additional grab groundwater sampling to verify that length of plume does not extend beyond former boring location HB-6. In their April 11, 2014 review letter, ACEH believes that seasonal fluctuations in concentration may indicate unstable plume conditions.	Contamination not completely identified in groundwater sampling	Analysis of Trend Graphs indicate decreasing concentrations with time - additional grab groundwater sampling to determine plume length
c.	Nearest Water Supply Well - ACEH requested additional research at the Alameda County Public Works Agency (ACPWA) to verify that no domestic or irrigation water supply wells are potentially impacted by the subject groundwater plume. ACPWA provided a database printout that indicates there are no wells within the area of the site and that lie within the projected plume lengths for benzene, MTBE and gasoline. In their April 11 review letter, the ACEH request additional research into water supply wells.	Contamination not completely identified in groundwater sampling	Additional water supply well research submitted in this document
d.	Property Owner Willing to Accept a Land Use Restriction	Owner has not indicated if land use control is acceptable	Ask owner about land use control
e.	Sensitive Receptor Survey - ACEH requested research into the presence of sumps, basements or other structures located south and west of the site. GGE performed a field survey with a visual search for the presence of such features. GGE observed a basement in the church-school facility down-gradient (south) across College Avenue. This facility was directly down-gradient of Gettler-Ryan well MW-1 that ACEH approved case closure and well destruction. The adjoining apartment building has an older elevator that typically utilized electric traction systems operated from the building rooftop - owner of adjoining building refused to provide information or allow access to recover grab groundwater sample. In their April 11, 2014 review letter, ACEH requests additional research into sensitive receptors.	Contamination not completely identified in groundwater sampling	Additional sensitive receptor research submitted in this document
f.	Naphthalene and PAH Contamination - ACEH requested analysis of groundwater for naphthalene and poly-aromatic hydrocarbons (PAHs). In their April 11, 2014 review letter, ACEH requests additional laboratory analysis of groundwater	Contamination not completely identified in groundwater sampling	Naphthalene and PAHs added to groundwater monitoring in April 2014
g.	Potential TPH as Motor Oil Contamination - ACEH requested analysis of groundwater for TPH as motor oil. In their April 11, 2014 review letter, ACEH requests additional research into sensitive receptors.	Contamination not completely identified in groundwater sampling	TPH as motor oil added to groundwater monitoring in April 2014
	Approved wells MW-4 and MW-5 were not installed because LTCP was issued and site was proposed for evaluation of case closure. At this time - GGE requests to not install wells MW-4 and MW-5 and perform additional grab groundwater sampling instead.	Contamination not completely identified in groundwater	Work plan proposes additional grab

Criteria	*Description of Low Threat Closure Policy Criteria and Explanation*	*Data Gap*	*How to Address*
		sampling	groundwater sampling instead of new monitor wells
2.	**Media Specific Criteria for Vapor Intrusion to Indoor Air**		
a.	The vapor risk to the administrative office at the site, typically more enclosed than a shop floor, has not been assessed but was proposed and subsequently approved in the June 10, 2011 directive letter. Vapor analysis for naphthalene and PAHs has not been conducted to enable an evaluation under the LTCP vapor criterion. This is appropriate at a site with a former waste oil UST and hydraulic hoists as soil, at a depth of 10 feet bgs, contains elevated concentrations of naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene. Recovery of soil gas sample from office was not feasible due to access and disruption to business operations. Because of access limitations, GGE proposes to install a sub-slab vapor sampling point in office. In their April 11, 2014 review letter, ACEH requests additional research into sensitive receptors. Contamination not completely identified in groundwater sampling	Contamination not completely identified in groundwater sampling	One sub-slab vapor sampling point to be installed in office
b.	Offsite Risk of Vapor Intrusion - ACEH considers a potential risk to offsite receptors at the adjacent apartment building from shallow seasonal groundwater with elevated benzene concentrations. In their April 11, 2014 review letter, ACEH requests additional soil gas sampling at adjoining property	Contamination not completely identified in groundwater sampling	Work plan proposes additional soil gas sample
c.	Depth of Existing Vapor Points - ACEH considers the lack of foundation data to compromise the validity of existing soil gas samples collected at five feet and four feet bgs (where drilling refusal was encountered). No foundation information is available for this site. GGE proposes using the default foundation depth of 1.5 feet for new soil gas samples. In their April 11, 2014 review letter, ACEH request foundation data.	Soil gas samples from inappropriate depths	Any additional soil gas samples to be deeper at 6.5 feet within subject building
	In meetings, ACEH staff expressed concern over the PCE detection in soil gas at the former dispenser location in vapor probe SG-3-3V. Soil gas sampling with a mobile laboratory on August 26, 2013 indicated PCE concentrations of 580 µg/m^3 (duplicate was 590 µg/m^3). Two other soil gas samples did not have detectable PCE concentrations. GGE returned to re-sample probe SG-3-3V on October 26, 2013 using a Summa canister and stationary laboratory analysis. The laboratory reported a PCE concentration of 191 µg/m^3 in the sample, which is below the conservative ESL value of 210 µg/m^3 for residential land use and 2100 µg/m^3 for commercial land use. In their April 11, 2014 review letter, ACEH requests re-sampling of existing vapor probes to verify soil gas conditions beneath building.	Soil gas sampling probes have only been sampled one time and seasonal variation has not been evaluated	Re-sample existing soil gas sampling probes
3.	**LTCP Media Specific Criteria for Direct Contact and Outdoor Air Criteria**		
	ACEH believes that the site fails to meet worker criterion due to the presence of residual benzene, ethylbenzene, and naphthalene at 9-10 feet bgs at offsite bore locations B2 and B22. No soil samples from 0-5 foot (8 samples) exceed the values on Table 1 of the LTCP. Table 1B of investigation reports has an error in reporting units at the top of the table. The naphthalene concentration in Boring B22 at 10 feet should be 640 µg/kg (instead of mg/kg) and is below the Tier 1 ESL value of 1200 µg/kg and below all values on Table 1 of LTCP. No naphthalene samples exceed the values on Table 1. Smear zone at this site is present from approximately 7½ to 15 feet bgs. Two soil samples (out of total of 26 soil samples from 5 to 10 feet bgs) from borings B2 and B4 exceed values in Table 1 of LTCP for benzene and ethylbenzene. In boring B2, the soil sample at 9 feet bgs has a benzene concentration of 13 mg/kg and ethylbenzene concentration of 38 mg/kg. The benzene concentration slightly exceeds the commercial/industrial volatilization to outdoor air (5 to 10 feet bgs) value of 12 mg/kg. Both values exceed residential values for volatilization to	Sampling data needs clarification for evaluation of direct contact and volatilization risk to human health	Data table corrected - no additional investigation for direct contact and outdoor air is proposed at this time for continued commercial use of site. Discuss land use control

<table>
<tr><th>Criteria</th><th>Description of Low Threat Closure Policy Criteria and Explanation</th><th>Data Gap</th><th>How to Address</th></tr>
<tr><td></td><td>outdoor air. In boring B4, the soil sample from 9 feet has a benzene concentration of 4 mg/kg and ethylbenzene concentration of 6 mg/kg. The benzene and ethylbenzene concentrations are below the commercial/industrial volatilization to outdoor air (5 to 10 feet bgs) values. Benzene exceeds residential values for volatilization to outdoor air at 5 to 10 feet bgs. GGE will discuss land use control limited to commercial land use with owner.
Site is used for a commercial auto repair shop. One soil sample has a benzene concentration that slightly exceeds the commercial volatilization to outdoor air value at a depth of 9 feet. All concentrations are below the utility worker values. Residual concentrations of benzene and ethylbenzene may pose a risk to any future residential use of the Site. GGE will discuss land use control limited to commercial land use with owner. In their April 11, 2014 review letter, ACEH requests clarification of historical sampling data and evaluation of criteria with strategy to resolve data gaps in soil sampling at source area.</td><td></td><td>limited to commercial land use with owner.</td></tr>
<tr><td></td><td>Naphthalene and PAHs have not been sufficiently analyzed in the source area to characterize the site under this criterion. GGE believes that sufficient soil sampling for naphthalene exists to indicate that naphthalene in soil above 10 feet is not pose a significant threat under this criterion as shown in the table below. Laboratory analysis for PAHs - seven carcinogenic poly-aromatic hydrocarbons (PAHs) as benzo(a)pyrene toxicity equivalent [BaPe] - was not required at time of previous investigations. An additional boring near former waste oil tank is needed for analysis of new soil samples at 5 and 10 feet for analysis of PAHs. In their April 11, 2014 review letter, ACEH requests clarification of historical sampling data and evaluation of criteria with strategy to resolve data gaps in sampling.

Summary of naphthalene analysis results in soil at former waste oil UST source area:

<table>
<tr><th>Location</th><th>Sample ID</th><th>Sample Date</th><th>Sample Depth-ft</th><th>Naphthalene</th><th>Notes</th></tr>
<tr><td>center of T2 excavation</td><td>7189-T2-C</td><td>8-6-1996</td><td>8</td><td>ND<0.005 mg/kg</td><td>soil sample below bottom of waste oil UST tank T2 during tank removal</td></tr>
<tr><td>T2 Soil Stockpile</td><td>7189-SP2</td><td>8-6-1996</td><td>stockpile</td><td>ND<0.005 mg/kg</td><td>composite sample of soil stockpile from waste oil UST tank T2 excavation</td></tr>
<tr><td>B10</td><td>7335-B10-11</td><td>10-30-2002</td><td>11</td><td>0.715 mg/kg</td><td>soil sample from boring located west / adjacent to former waste oil tank excavation in sidewalk</td></tr>
<tr><td>B12</td><td>B12-10</td><td>4-30-2005</td><td>10</td><td>ND<0.010 mg/kg</td><td>soil sample approx. 20 feet northeast of former waste oil tank near hydraulic hoist</td></tr>
<tr><td></td><td>B12-15</td><td>4-30-2005</td><td>15</td><td>0.819 mg/kg</td><td></td></tr>
<tr><td>B21</td><td>B21-8.5</td><td>6-22-2005</td><td>8.5</td><td>ND<0.250 mg/kg</td><td>soil sample from boring in sidewalk approx. 15 feet north</td></tr>
</table></td><td>Contamination not completely identified in soil sampling</td><td>Work plan proposes additional boring down-gradient of former waste oil tank with soil sampling at 5 and 10 feet for PAHs and naphthalene</td></tr>
</table>

Criteria	Description of Low Threat Closure Policy Criteria and Explanation						Data Gap	How to Address
						of former waste oil tank		
	B22	B22-10	6-22-2005	10	0.640 mg/kg	soil sample from boring in parking lane approx. 10 feet northwest of former waste oil tank location		

STATE WATER RESOURCES CONTROL BOARD

GEOTRACKER

SHEAFFS SERVICE GARAGE (T0600102112) - (MAP)

SIGN UP FOR EMAIL ALERTS

5930 COLLEGE AVE.
OAKLAND, CA 94618
ALAMEDA COUNTY
LUST CLEANUP SITE
PRINTABLE CASE SUMMARY

CLEANUP OVERSIGHT AGENCIES
ALAMEDA COUNTY LOP *(LEAD)* - *CASE #: RO0000377*
CASEWORKER: *MARK DETTERMAN*
SAN FRANCISCO BAY RWQCB (REGION 2) - *CASE #: 01-2296*
CASEWORKER: *Cherie McCaulou*

CUF Claim #:	**12154**, 10787
CUF Priority Assigned:	B
CUF Amount Paid:	$224,927

LTCP CHECKLIST AS OF 6/20/2014

VIEW PATH TO CLOSURE PLAN | BACK TO CASE SUMMARY

General Criteria - *The site satisfies the policy general criteria* — **NO**

a. Is the unauthorized release located within the service area of a public water system? — **YES**
Name of Water System : EBMUD

b. The unauthorized release consists only of petroleum (info). — **NO**
Contaminants :
TCE, PCE, VINYL CHLORIDE, OTHER - IPB, TMB, cis-1,2-DCE, MC

c. The unauthorized ("primary") release from the UST system has been stopped. — **YES**

d. Free product has been removed to the maximum extent practicable (info). — **YES**

e. A conceptual site model that assesses the nature, extent, and mobility of the release has been developed (info). — **YES**

f. Secondary source has been removed to the extent practicable (info). — **YES**

g. Soil or groundwater has been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15. — **YES**

h. Does a nuisance exist, as defined by Water Code section 13050. — **YES**
Describe Nuisance Condition :
Soil Vapor intrusion into adjacent apartment building has the potential to be a nuisance. However, it has not been evaluated.

1. Media-Specific Criteria: Groundwater - *The contaminant plume that exceeds water quality objectives is stable or decreasing in areal extent, and meets all of the additional characteristics of one of the five classes of sites listed below.* — **NO**

EXEMPTION - Soil Only Case (Release has not Affected Groundwater - Info) — **NO**

Does the site meet any of the Groundwater specific criteria scenarios? — **NO**

ADDITIONAL QUESTIONS - The following conditions exist that do not meet the policy criteria:

Plume Length (That Exceeds Water Quality Objectives) :
- Unknown

Free Product in Groundwater :
- Unknown

For sites with free product, the Plume Has Been Stable or Decreasing for 5-Years (info) :
- No

For sites with free product, owner Willing to Accept a Land Use Restriction (if required) :
- Unknown

Free Product Extends Offsite :
- Unknown

Benzene Concentration :
- ≥ 3,000 µg/l

MTBE Concentration :

- ≥ 1,000 µg/l

Nearest Supply Well (From Plume Boundary) :
- Unknown

Nearest Surface Water Body (From Plume Boundary) :
- ≤ 250 Feet

2. Media Specific Criteria: Petroleum Vapor Intrusion to Indoor Air - *The site is considered low-threat for the vapor-intrusion-to-air pathway if site-specific conditions satisfy items 2a, 2b, or 2c* **NO**

EXEMPTION - Active Commercial Petroleum Fueling Facility **NO**

Does the site meet any of the Petroleum Vapor Intrusion to Indoor Air specific criteria scenarios? **NO**

ADDITIONAL QUESTIONS - The following conditions exist that do not meet the policy criteria:

Exposure Type :
- Residential

Free Product :
- In Groundwater

TPH in the Bioattenuation Zone :
- ≥ 100 mg/kg

Bioattenuation Zone Thickness :
- ≥ 5 Feet and < 10 Feet

Benzene in Groundwater :
- ≥ 1,000 µg/l

Soil Gas Benzene :
- Unknown

Soil Gas EthylBenzene :
- Unknown

Soil Gas Naphthalene :
- Unknown

3. Media Specific Criteria: Direct Contact and Outdoor Air Exposure - *The site is considered low-threat for direct contact and outdoor air exposure if it meets 1, 2, or 3 below.* **NO**

EXEMPTION - The upper 10 feet of soil is free of petroleum contamination **NO**

Does the site meet any of the Direct Contact and Outdoor Air Exposure criteria scenarios? **NO**

ADDITIONAL QUESTIONS - The following conditions exist that do not meet the policy criteria:

Exposure Type :
- Residential

Petroleum Constituents in Soil :
- >5 Feet bgs and ≤10 Feet bgs

Soil Concentrations of Benzene :
- > 12 mg/kg and ≤ 14 mg/kg

Soil Concentrations of EthylBenzene :
- > 32 mg/kg and ≤ 89 mg/kg

Soil Concentrations of Naphthalene :
- Unknown

Soil Concentrations of PAH :
- Unknown

Additional Information

Should this case be closed in spite of NOT meeting policy criteria?	NO

STATE WATER RESOURCES CONTROL BOARD
GEOTRACKER

SHEAFFS SERVICE GARAGE (T0600102112) - (MAP)

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CUF Amount Paid: $224,927

PATH TO CLOSURE PLAN FY 12/13 AS OF 6/20/2014 BACK TO LTCP CHECKLIST

IMPEDIMENT 1:

General Criteria B: The unauthorized release does NOT consist only of petroleum.

Step to Resolve Impediment 1 - Step 1:
See Groundwater Media-Specific Criteria for description of additional steps to closure.

COMPLETION DATE	
PROJECTED DATE	ACTUAL DATE
5/1/2018	

IMPEDIMENT 2:

General Criteria D: Free product has NOT been removed to the maximum extent practicable

Step to Resolve Impediment 2 - Step 1:
No longer an impediment (Impediment addressed by completed action or conditions changed)

COMPLETION DATE	
PROJECTED DATE	ACTUAL DATE
10/1/2017	6/13/2014

IMPEDIMENT 3:

General Criteria E: A conceptual site model that assesses the nature, extent, and mobility of the release has NOT been developed

Step to Resolve Impediment 3 - Step 1:
No longer an impediment (Impediment addressed by completed action or conditions changed)

COMPLETION DATE	
PROJECTED DATE	ACTUAL DATE
10/1/2017	6/13/2014

IMPEDIMENT 4:

General Criteria F: Secondary source has NOT been removed to the extent practicable

Step to Resolve Impediment 4 - Step 1:
No longer an impediment (Impediment addressed by completed action or conditions changed)

COMPLETION DATE	
PROJECTED DATE	ACTUAL DATE
10/1/2017	6/13/2014

IMPEDIMENT 5:

General Criteria H: A nuisance exists, as defined by Water Code section 13050.

Step to Resolve Impediment 5 - Step 1:
See Groundwater Media-Specific Criteria for description of additional steps to closure.

COMPLETION DATE	
PROJECTED DATE	ACTUAL DATE
5/1/2018	

IMPEDIMENT 6:

Media-Specific Criteria: Groundwater: The contaminant plume that exceeds water quality objectives is NOT stable or decreasing in areal extent, and does NOT meet all of the additional characteristics of one of the five classes of sites.

Conditions that do not meet the policy criteria:
- Plume Length (That Exceeds Water Quality Objectives): Unknown
- Free Product in Groundwater: Unknown
- For sites with free product, the Plume Has Been Stable or Decreasing for 5-Years (info): No
- For sites with free product, owner Willing to Accept a Land Use Restriction (if required): Unknown

- Free Product Extends Offsite: Unknown
- Benzene Concentration: ≥ 3,000 µg/l
- MTBE Concentration: ≥ 1,000 µg/l
- Nearest Supply Well (From Plume Boundary): Unknown
- Nearest Surface Water Body (From Plume Boundary): ≤ 250 Feet

Step to Resolve Impediment 6 - Step 1:

Work plan for site characterization (Groundwater Plume Extent, Soil Vapor (TPH and HVOC if needed), and Direct Contact sampling; 4 months) Site characterization (6 months) Pilot test work plan (3 months) Pilot test (case specific or 6 months) Interim remediation work plan (3 months) Interim remediation (6 months) Verification monitoring (12 months) Closure requirements along path to closure (6 months)

COMPLETION DATE	
PROJECTED DATE	ACTUAL DATE
5/1/2018	

IMPEDIMENT 7:

Media Specific Criteria: Petroleum Vapor Intrusion to Indoor Air: The site is NOT considered low-threat for the vapor-intrusion-to-air pathway and site-specific conditions do NOT satisfy items 2a, 2b, or 2c .

Conditions that do not meet the policy criteria:
- Exposure Type: Residential
- Free Product: In Groundwater
- TPH in the Bioattenuation Zone: ≥ 100 mg/kg
- Bioattenuation Zone Thickness: ≥ 5 Feet and < 10 Feet
- Benzene in Groundwater: ≥ 1,000 µg/l
- Soil Gas Benzene: Unknown
- Soil Gas EthylBenzene: Unknown
- Soil Gas Naphthalene: Unknown

Step to Resolve Impediment 7 - Step 1:

See Groundwater Media-Specific Criteria for description of additional steps to closure.

COMPLETION DATE	
PROJECTED DATE	ACTUAL DATE
5/1/2018	

IMPEDIMENT 8:

Media Specific Criteria: Direct Contact and Outdoor Air Exposure: The site is NOT considered low-threat for direct contact and outdoor air exposure as it does NOT meet 1, 2, or 3.

Conditions that do not meet the policy criteria:
- Exposure Type: Residential
- Petroleum Constituents in Soil: >5 Feet bgs and ≤10 Feet bgs
- Soil Concentrations of Benzene: > 12 mg/kg and ≤ 14 mg/kg
- Soil Concentrations of EthylBenzene: > 32 mg/kg and ≤ 89 mg/kg
- Soil Concentrations of Naphthalene: Unknown
- Soil Concentrations of PAH: Unknown

Step to Resolve Impediment 8 - Step 1:

See Groundwater Media-Specific Criteria for description of additional steps to closure.

COMPLETION DATE	
PROJECTED DATE	ACTUAL DATE
5/1/2018	

REQUIREMENTS ALONG PATH TO CLOSURE

DATE IDENTIFIED FOR CLOSURE	CLOSURE INITIATED BY	RP NOTIFICATION DATE	PUBLIC PARTICIPATION COMPLETION DATE	WELL DESTRUCTION LETTER DATE	WELL DESTRUCTION DATE	WASTE DISPOSAL DATE	LAND USE RESTRICTION DATE	SITE CLOSURE DATE

REVIEW SUMMARY REPORT – ADDITIONAL WORK
THIRD REVIEW – AUGUST 2014

Agency Information

Agency Name: Alameda County Environmental Health Department (County)	Address: 1131 Harbor Bay Parkway Alameda, CA 94502
Agency Caseworker: Mark Detterman	Case No.: RO0000377

Case Information

USTCF Claim No.: 10787	GeoTracker Global ID: T0600102112
Site Name: Sheaff's Service Station	Site Address: 5930 College Avenue Oakland, CA 94618
Responsible Party 1: Margaret S. Hansen	Address: Private Address
Responsible Party 2: William Sheaff Trust Attn: Brian Sheaff	Address: Private Address
USTCF Expenditures to Date: $209,462	Number of Years Case Open: 17

To view all public documents for this case available on GeoTracker use the following URL.
URL: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0600102112

Summary

The Low-Threat Underground Storage Tank (UST) Case Closure Policy (Policy) contains general and media-specific criteria, and cases that meet those criteria are appropriate for closure pursuant to the Policy. This case does not meet all of the required criteria of the Policy. Highlights of the case follow:

This Site is an auto service facility. An unauthorized release was reported in August 1996 following the removal of two USTs (one gasoline and one waste oil) and an unknown volume of contaminated soil was excavated in 1996. Since 1998, four groundwater monitoring wells have been installed and monitored. No active remediation has been conducted at this site. According to groundwater data, water quality objectives have not been achieved.

The petroleum release is limited to the soil and shallow groundwater. According to data available in GeoTracker, there are no public water supply wells or surface water bodies within 1,000 feet of the Site. No other water supply wells have been identified within 1,000 feet of the Site in files reviewed. The unauthorized release is located within the service area of a public water system, as defined in the Policy. The affected shallow groundwater is not currently being used as a source of drinking water, and it is highly unlikely that the affected shallow groundwater will be used as a source of drinking water in the foreseeable future. Other designated beneficial uses of impacted groundwater are not threatened, and it is highly unlikely that they will be, considering these factors in the context of the site setting.

Rationale for Closure under the Policy

- General Criteria: The case does not meet all eight Policy general criteria; chlorinated solvents in groundwater.
- Groundwater Specific Criteria: The case does not meet Policy criteria because the contaminant plume that exceeds water quality objectives is not defined.
- Vapor Intrusion to Indoor Air: The case meets Policy Criterion 2b. Although no document titled "Risk Assessment" was found in the files reviewed, a professional assessment of site-specific risk from exposure through the vapor intrusion pathway was performed by Fund staff. The assessment found that there is no significant risk of petroleum vapors adversely affecting human health. The Site is paved and accidental exposure to site soils is prevented. The onsite building is an active automotive repair facility with multiple rollup doors that would prevent the accumulation of soil vapors in the building. In addition, as an active automotive repair facility, there would adequate air exchange provided by the building's ventilation system required to control vehicle exhaust generated during automotive repair. Additionally, soil vapor samples collected in August 2013 from 4 to 15 feet below ground surface (bgs) at the site showed no vapor intrusion from the UST petroleum hydrocarbon release.
- Direct Contact and Outdoor Air Exposure: This case meets Policy Criterion 3b. Although no document titled "Risk Assessment" was found in the files reviewed, a professional assessment of site-specific risk from exposure through the direct exposure pathway was performed by Fund staff. The assessment of site-specific risk from potential exposure to residual soil contamination found that maximum concentrations of petroleum constituents remaining in soil will have no significant risk of adversely affecting human health. The former USTs were located beneath a sidewalk. Site soil contamination is covered with pavement preventing accidental exposure.

Objections to Closure and Responses

According to the Path to Closure page in GeoTracker, finalized on December 11, 2013, the County opposes closure because:

- Release not limited to petroleum hydrocarbons.
  RESPONSE: We concur.
- Free product remains.
  RESPONSE: No free product remains in site wells.
- Inadequate conceptual site model.
  RESPONSE: Adequate data is available in GeoTracker to prepare a conceptual site model as defined by the Policy.
- Secondary source remains.
  RESPONSE: Secondary source as defined by the Policy was removed by excavation in 1996.
- Nuisance exists.
  RESPONSE: No nuisance exists.
- The case does not meet Policy groundwater criteria.
  RESPONSE: We concur.
- The case does not meet Policy vapor criteria.
  RESPONSE: The case meets Policy Criterion 2b.
- The case does not meet Policy direct contact criteria.
  RESPONSE: This case meets Policy Criterion 3b.

Recommendation
The Fund recommends that the County direct the responsible party, through enforcement if necessary, to define the extent of groundwater contamination.

8/1/14

Kirk Larson, P.G. Date
Engineering Geologist
Technical Review Unit
(916) 341-5663

8/6/14

Robert Trommer, C.H.G. Date
Senior Engineering Geologist
Chief, Technical Review Unit
(916) 341-5684

APPENDIX B

SENSITIVE RECEPTOR SURVEY

DATA GAP INVESTIGATION WORK PLAN

Sheaffs Garage
5930 College Avenue
Oakland, California
ACHCSA Site # RO0000377

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

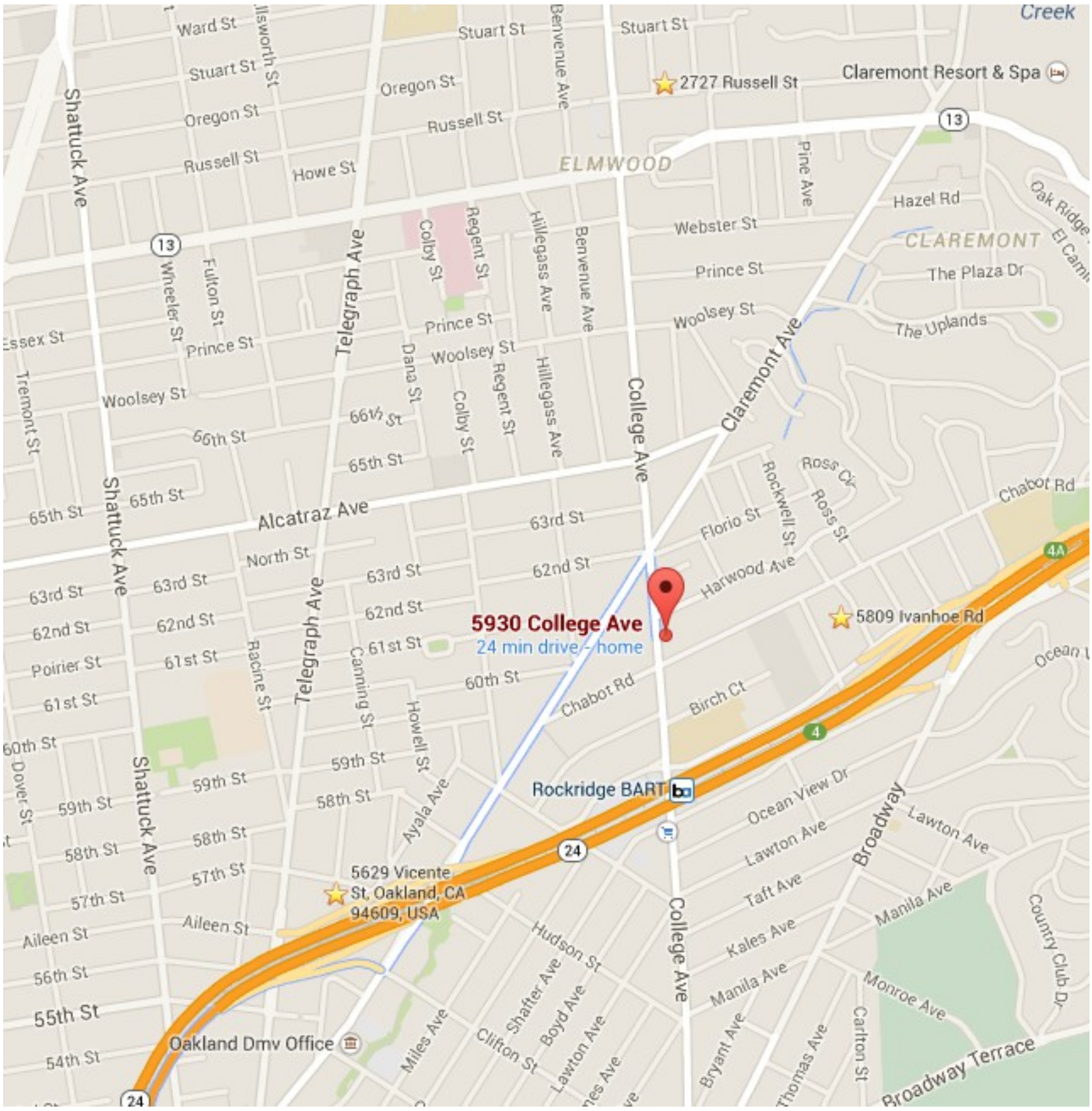
REMOVED

Benzene Plume - sensitive receptor mapping within 554 foot radius

Street Address	*Property Use*	*Distance in feet*	*Feature*
Benzene - northern plume:			
5951 College Avenue	College Avenue Unified Presbyterian Church/ Rock Ridge Little School/College Preparatory Academy	136	basement
5955 College Avenue	Church auditorium/gymnasium	200	
5901-5937 College Avenue	Dreyers Retail building to Chabot Road - ground floor retail shops, offices above	89-200	
6016 Claremont	older residence	464	
6021 Claremont	older residence	416	
6028-6036 Claremont	single-story office	269-405	
6046 Claremont	parking lot		
6048 Claremont	2-story duplex	305	
6060 Claremont	2-story apartment building	287	
6066 Claremont	older shop building (red)	303	
6068 Claremont	Breema Center (commercial)	377	
6079 Claremont	older residence	494	
6067 Claremont	older residence	466	
6065 Claremont	older residence	461	
6057 Claremont	older residence	461	
6049-6053 Claremont	2-story apartment building	464	
6045 Claremont	older residence	482	
6037 Claremont	older residence	474	
Benzene - southern plume:			
5916 College Avenue	4-story building with ground floor retail & parking garage and residential above	adjoining	
5910-5914 College Avenue	single-story retail shops - Homesteader, Somerset clothing	99	
5900-5902 College Avenue	single-story retail building - Toast restaurant and Sew Much the Better	147	
5856-5858 College Avenue	single-story retail shops - Lavender Nails Spa, Child's Play (clothing), miam miam restaurant	262	
5854 College Avenue	single-story Hawthorne boutique,	316	
5846 College Avenue	2-story duplex residence ?	320	
5830-5844 College Avenue	single-story Claremont Day Nurseries	351	
5824 College Avenue	2-story apartment building	409	

5800-5816	2-story retail building - Rockridge Luggage, restaurants, Smitten Ice Cream, medical offices	457-572	underground parking garage
5897 College Avenue	single-story retail building - Tajara Sushi	307	
5835-5845 College Avenue	2-story medical offices	346	
5831-5833 College Avenue	3-story commercial retail	392	
5817-5819 College Avenue	single-story retail building - clothing and restaurants, Barneys Burgers	448	
5815 College Avenue	single-story retail building - clothing	480	
5801 College Avenue	single-story retail building - Zachary's Pizza	534	
5723-5725 Oak Grove Avenue	My Own Montessori School, older residence with backyard dwelling	553	ground floor school
5719 Oak Grove Avenue	older residence with backyard dwelling	581	
5944 Chabot Road	older residence	392	
5938 Chabot Road	older residence with backyard dwelling	424	
5932 Chabot Road	older residence	463	
5924 Chabot Road	older residence	501	
5916 Chabot Road	older residence	529	
5910 Chabot Road	older residence	558	

WATER SUPPLY WELL SEARCH MAP



Map showing plotted results of water supply well search within ½ mile of 5930 College Avenue as provided by the Alameda County Public Works Agency in attached database query printout. Query reveals two domestic supply wells and one irrigation supply well within the search radius as shown on map above:
Domestic well - 5629 Vicente Street, Oakland, CA
Domestic well - 5809 Ivanhoe Road, Oakland, CA
Irrigation well - 2727 Russell Street, Oakland, CA

GOLDEN GATE ENVIRONMENTAL, INC.
3730 Mission Street, San Francisco, CA 94110
Phone (415) 970-9088 Fax (415) 970-9089

WATER SUPPLY WELL SEARCH MAP
Sheaffs Service Garage
5930 College Avenue, Oakland, CA 94618

GGE Project No. 2014 | August 2014 | **Figure 1**

PLUME MAP FOR BENZENE WITH RADIUS OF 554 FEET

Sensitive receptor survey showing plume map for benzene with radius of 554 feet in two groundwater flow directions as determined from rose diagram of historical groundwater measurements.

GOLDEN GATE ENVIRONMENTAL, INC. 3730 Mission Street, San Francisco, CA 94110 Phone (415) 970-9088 Fax (415) 970-9089	**PLUME MAP - BENZENE** Sheaffs Service Garage 5930 College Avenue, Oakland, CA 94618	
GGE Project No. 2014	August 2014	**Figure 1**

PLUME MAP FOR TPH GASOLINE WITH RADIUS OF 855 FEET

Sensitive receptor survey showing plume map for Total Petroleum Hydrocarbons (TPH) as gasoline with radius of 855 feet in two groundwater flow directions as determined from rose diagram of historical groundwater measurements.

GOLDEN GATE ENVIRONMENTAL, INC.
3730 Mission Street, San Francisco, CA 94110
Phone (415) 970-9088 Fax (415) 970-9089

PLUME MAP – TPH GASOLINE
Sheaffs Service Garage
5930 College Avenue, Oakland, CA 94618

GGE Project No. 2014	August 2014	**Figure 2**

PLUME MAP FOR MTBE WITH RADIUS OF 1045 FEET

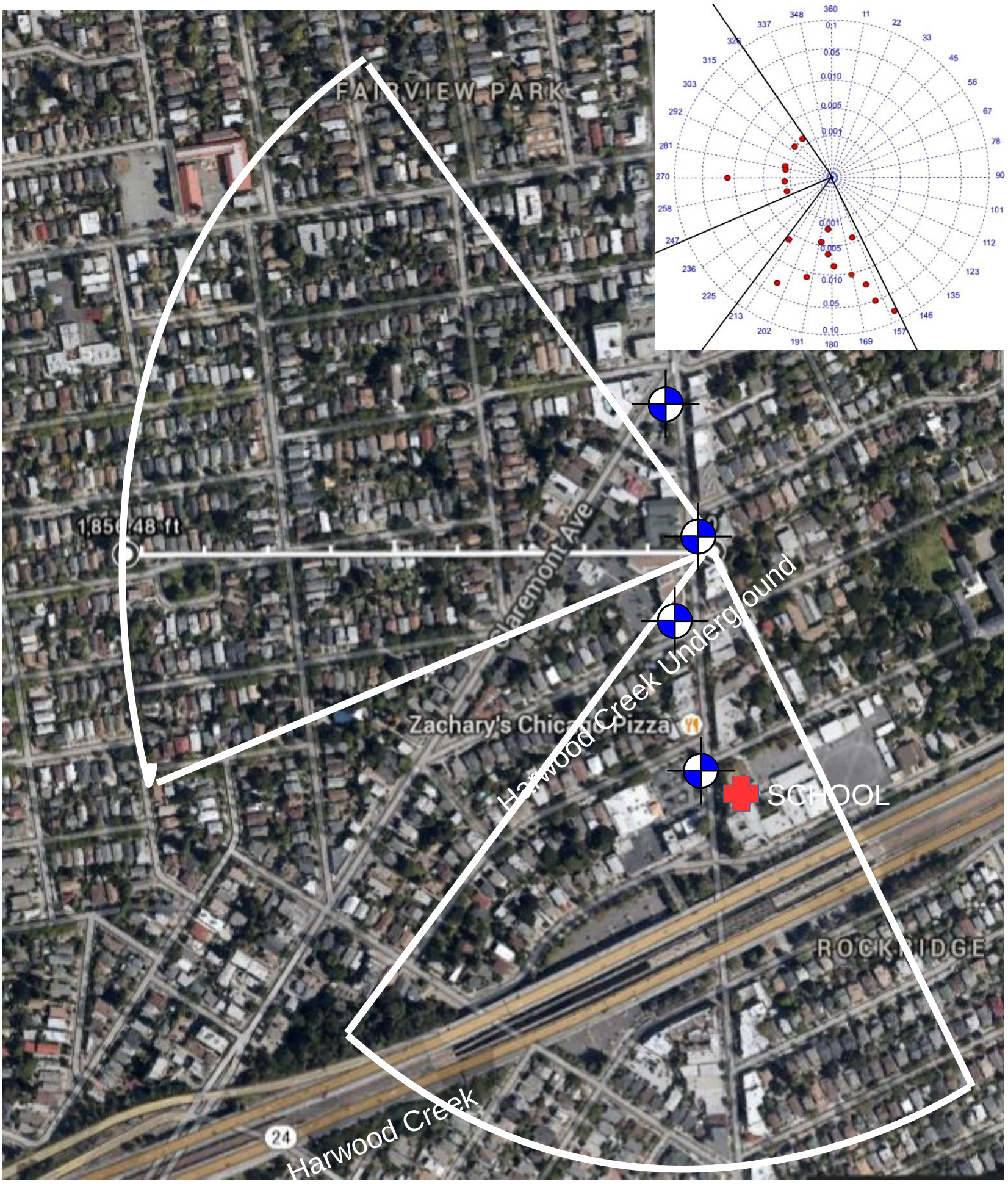
Sensitive receptor survey showing plume map for MTBE with radius of 1045 feet in two groundwater flow directions as determined from rose diagram of historical groundwater measurements.

GOLDEN GATE ENVIRONMENTAL, INC.
3730 Mission Street, San Francisco, CA 94110
Phone (415) 970-9088 Fax (415) 970-9089

PLUME MAP – MTBE
Sheaffs Service Garage
5930 College Avenue, Oakland, CA 94618

GGE Project No. 2014	August 2014	**Figure 3**

PLUME MAP OF TPH GASOLINE PLUS 1000 FEET OF BUFFER ZONE



Sensitive receptor survey showing plume map for Total Petroleum Hydrocarbons (TPH) as gasoline radius of 855 feet with 1000 foot buffer zone in two groundwater flow directions as determined from rose diagram of historical groundwater measurements.

GOLDEN GATE ENVIRONMENTAL, INC. 3730 Mission Street, San Francisco, CA 94110 Phone (415) 970-9088 Fax (415) 970-9089	**PLUME MAP – TPH GASOLINE WITH BUFFER ZONE** Sheaffs Service Garage 5930 College Avenue, Oakland, CA 94618	
GGE Project No. 2014	August 2014	**Figure 4**

APPENDIX C

ADDITIONAL DOCUMENTATION

DATA GAP INVESTIGATION WORK PLAN

Sheaffs Garage
5930 College Avenue
Oakland, California
ACHCSA Site # RO0000377

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

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

April 11, 2014

Dr. Brian Sheaff
William J Sheaff Trust
1945 Parkside Drive
Concord, CA 94519
(sent via e-mail: drsheaff@pacbell.net)

Subject: Request for Focused Site Conceptual Model, and a Data Gap Work Plan; Fuel Leak Case No. RO0000377 and Geotracker Global ID T0600102112, Sheaffs Service Garage, 5930 College Avenue, Oakland, CA 94618

Dear Dr. Brian Sheaff:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Additional Soil and Water Investigation Report*, dated February 6, 2014, prepared and submitted on your behalf by Golden Gate Environmental, Inc (GGEI) for the subject site. Thank you for submitting the report.

ACEH has also evaluated the data and recommendations presented in the above-mentioned report, in conjunction with the case files, to determine if the site is eligible for closure as a low risk site under the State Water Resources Control Board's (SWRCBs) Low Threat Underground Storage Tank Case Closure Policy (LTCP). Based on ACEH staff review, we have determined that the site fails to meet the LTCP General Criteria b, (petroleum only release), d (Free Product), e (Site Conceptual Model), f (Secondary Source Removal) and the Media-Specific Criteria for Groundwater, the Media-Specific Criteria for Vapor Intrusion to Indoor Air, and the Media-Specific Criteria for Direct Contact (see Geotracker for a copy of the LTCP review).

Therefore, at this juncture ACEH requests that you prepare a Data Gap Investigation Work Plan that is supported by a focused Site Conceptual Model (SCM) to address the Technical Comments provided below. Prior to submitting the work plan, ACEH would like to invite you to a meeting to discuss the site and strategize about the most efficient path towards closure. ACEH requests notification of suitable dates and times for the meeting by the date listed below.

TECHNICAL COMMENTS

1. **LTCP General Criteria b (Unauthorized Release Consists Only of Petroleum)** – For purposes of this policy, petroleum is defined as crude oil, or any fraction thereof, which is liquid at standard conditions and temperature and pressure, which means 60 degrees Fahrenheit and 14.7 pounds per square inch absolute including the following substances: motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents and used oils, including any additives and blending agents such as oxygenates contained in the formulation of the substances.

   Three areas have been identified during site investigation activities with potential tetrachloroethene (PCE) contamination in soil:

   - A waste oil underground storage tank (UST) was present beneath the College Avenue sidewalk at the southwest corner of the site. The UST was removed in October 1996. Soil analytical data detected low concentrations of PCE in soil at a depth of 8 feet below grade surface (bgs) beneath the UST. Subsequently, five grab groundwater samples in the immediate vicinity of the waste oil UST have not detected PCE in groundwater.
   - Investigations adjacent to an oil-water separator (OWS) in the back parking lot at the site have detected similar low concentrations of PCE at a shallower depth (2 feet rather than 8

feet), and may suggest another source area may be present at the site at the oil-water separator.

- A former parts washer previously located in the southeastern corner of the building. Boring B27 was installed near this former structure and detected no PCE contamination in soil; however, the bore location is upgradient of the former parts washer. Additionally, the parts washer and the OWS appear to have been plumbed together and it is not clear, due to a lack of understanding of the use of the OWS, if the parts washer drained to the OWS prior to discharge to sanitary sewer.

The referenced report suggests that these low soil concentrations may be related to the offsite former waste oil UST location at the immediately adjacent upgradient former Chevron facility. However, the presence of low concentrations of PCE in shallow soil at two feet indicates an onsite source rather than an offsite source. ACEH notes that low concentrations of PCE in soil can lead to risk of vapor intrusion to indoor to building occupants (see Technical Comment 8 below).

Please present a strategy in the Data Gap Work Plan (described in Technical Comment 8 below) to address the data gaps identified above. Specifically, please evaluate potential connections between the former parts washer and the OWS through a sewer pipe and the potential for the presence of another PCE source at the former parts washer location. Alternatively, please provide justification of why the site satisfies this general criterion in the focused SCM described in Technical Comment 8 below.

2. **LTCP General Criteria d (Free Product)** – The LTCP requires free product to be removed to the extent practicable at release sites where investigations indicate the presence of free product by removing in a manner that minimizes the spread of the unauthorized release into previously uncontaminated zones by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site, and that properly treats, discharges, or disposes of recovery byproducts in compliance with applicable laws. Additionally, the LTCP requires that abatement of free product migration be used as a minimum objective for the design of any free product removal system.

   ACEH's review of the case files indicates that insufficient data and analysis has been presented to assess residual free product at the site. Specifically, total petroleum hydrocarbons as gasoline (TPHg) and benzene were detected at or near concentrations that the technical support documents for the LTCP consider to be indirect evidence of Light Non-Aqueous Phase Liquid (LNAPL). The technical support documents state that concentrations of benzene in groundwater greater than 3,000 micrograms per liter (µg/l) and TPHg concentrations greater than 20,000 µg/l constitute indirect evidence of LNAPL. Please note that similar concentrations of TPHg and benzene were documented (15,000 and 12,000 µg/l TPHg and 4,900 and 2,400 µg/l benzene) during the October 2008 and the October 2013 groundwater monitoring events. Within this five year interval, TPHg concentrations ranged up to 75,000 µg/l, and benzene concentrations ranged up to 14,000 µg/l. Sheen is also reported on groundwater from wells MW-1, MW-2, and MW-3 during this time interval.

   Please evaluate the concentrations indicative of LNAPL per the LTCP justification papers and assess whether there is a potential for free product mobility / migration in the focused SCM and if applicable present a strategy in the Data Gap Work Plan (described in Technical Comment 8 below) to address the items discussed above. Include in your assessment, potential preferential pathways, the adequacy of the monitoring well network, and evidence of sheen on groundwater. Alternatively, please provide justification of why the site satisfies this general criterion in the focused SCM described in Technical Comment 8 below.

3. **LTCP General Criteria e (Site Conceptual Model)** – According to the LTCP, the SCM is a fundamental element of a comprehensive site investigation. The SCM establishes the source and attributes of the unauthorized release, describes all affected media (including soil, groundwater, and soil vapor as appropriate), describes local geology, hydrogeology and other physical site characteristics that affect contaminant environmental transport and fate, and identifies all confirmed and potential contaminant receptors (including water supply wells, surface water bodies, structures and their inhabitants). The SCM is relied upon by practitioners as a guide for investigative design and data collection. All relevant site characteristics identified by the SCM shall be assessed and

supported by data so that the nature, extent and mobility of the release have been established to determine conformance with applicable criteria in this policy.

Our review of the case files indicates that insufficient data collection and analysis has not been presented to assess the nature, extent, and mobility of the release and to support compliance with General Criteria b and d as discussed in Technical Comments 1 and 2 above, General Criteria f, and Media Specific Criteria for Vapor Intrusion to Indoor Air, Groundwater, and Direct Contact and Outdoor Air Exposure as described in Technical Comments Technical Comments 4, 5, 6, and 7, below, respectively.

4. **General Criteria f – Secondary Source Has Been Removed to the Extent Practicable** – "Secondary source" is defined as petroleum-impacted soil or groundwater located at or immediately beneath the point of release from the primary source. Unless site attributes prevent secondary source removal (e.g. physical or infrastructural constraints exist whose removal or relocation would be technically or economically infeasible), petroleum-release sites are required to undergo secondary source removal to the extent practicable as described in the policy. "To the extent practicable" means implementing a cost-effective corrective action which removes or destroys-in-place the most readily recoverable fraction of source-area mass. It is expected that most secondary mass removal efforts will be completed in one year or less. Following removal or destruction of the secondary source, additional removal or active remedial actions shall not be required by regulatory agencies unless (1) necessary to abate a demonstrated threat to human health or (2) the groundwater plume does not meet the definition of low threat as described in this policy.

   At the subject site, structural and infrastructure constraints to the removal of the secondary source were encountered; namely building structural stability on the east and subsurface utility infrastructure to the west. However, as discussed above, indirect evidence of LNAPL remains present beneath the site, and despite additional subsurface work, it does not appear that the potential threat to human health due to vapor intrusion to indoor air has been adequately accessed as stated (see also Technical Comment 6 below). Additionally, the residual source appears to be contributing to the groundwater plume instability as discussed in Technical Comment 5b.

   Finally, the detection of significant concentrations of naphthalene and poly-aromatic hydrocarbons (PAHs) in grab groundwater sample B12-W, located immediately downgradient of a hydraulic hoist in May 2005 (as discussed below in Technical Comment 5f) indicate the hydraulic hoists may be an unevaluated potential source.

   Please present a strategy in the Data Gap Work Plan (described in Technical Comment 8 below) to address the items discussed above. Alternatively, please provide justification of why the site satisfies this general criterion in the focused SCM described in Technical Comment 8 below.

5. **LTCP Media Specific Criteria for Groundwater** – To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent, and meet all of the additional characteristics of one of the five classes of sites listed in the policy.

   Our review of the case files indicates that insufficient data collection and analysis has been presented to support the requisite characteristics of plume stability or plume classification as follows:

   a. **Groundwater Plume Length** – The length and lateral extent of the groundwater dissolved and free-phase plumes has not been adequately defined due to the presence of two storm drain lines in College Avenue (a 8-inch diameter local storm drain and a large through-going 90-inch flood control storm drain) and an inadequate well network. The referenced report states that the 90-inch flood control storm drain acts as a hydrologic barrier and prevents the plume from migrating further. In conflict with this position are stated conclusions that subsurface utilities in College Avenue skew the groundwater gradient southward in the winter time. This indicates that the utilities are not hydrologic barriers, but are likely "gaining and losing" conduits, and also indicates the groundwater plume is not defined to the west, and to the south beneath the immediately adjacent apartment building. These two flow directions are supported by the rose diagrams generated for the site.

Additionally, a substantial number of groundwater and soil analytical results, both current and historic, document higher concentrations of total xylenes than total benzene. Because diesel fuel contains substantially more xylenes than benzene by formulation, ACEH requests the inclusion of TPHd analysis of groundwater from all wells for a minimum of one monitoring event. ACEH recognizes that preferential degradation of benzene over xylenes can also produce this result. However, the presence, or lack thereof, of detectable TPHd at the site can affect the determination of the downgradient and lateral extent of a groundwater plume under the LTCP. The need for additional analysis for TPHd is requested to be evaluated thereafter.

b. **Groundwater Plume is Not Stable** – As discussed above, between 2008 and 2013 groundwater TPHg concentrations ranged between 12,000 and 75,000 µg/l, and benzene concentrations ranged between 2,400 and 14,000 µg/l in offsite well MW-1. Additionally, data collected during the last groundwater monitoring event in October 2013 indicates increasing benzene concentrations in well MW-3, and that the concentration is historically the highest concentration at 990 µg/l.

c. **Nearest Water Supply Well** – A well survey has been conducted using Department of Water Resources (DWR) data; however, known monitoring wells in the local vicinity were not found using the DWR data, and indicate the data set is incomplete. It appears appropriate to include the data set maintained by the Alameda County Public Works Agency (ACPWA) in order to obtain a complete data set. Additionally, ACEH requests that the results of both data sets be plotted on an area vicinity map of appropriate scale, in order quickly assess the data and to maintain owner confidentially.

d. **Property Owner Willing to Accept a Land Use Restriction?** – If, based on the LNAPL mobility evaluation discussed in Technical Comment 2 above, it is determined that Free Product has been removed to the maximum extent practicable, scenario 3C may be used to satisfy the groundwater media specific criterion. It is uncertain if the property owner is willing to accept a land use restriction once other impediments to closure under the groundwater media-specific criteria have been satisfied. Communicating this possibility may allow use of the scenario.

e. **Sensitive Receptor Survey** - The subject site is situated on the edge of a residential neighborhood. Because groundwater appears to flow to the south beneath the residential apartment building, and to the west beneath a multi-tenant commercial retail facility and other structures across College Avenue, during different times of the year, it appears appropriate to determine if basements, elevators and sumps, or other structures may be present beneath the site vicinity that can eliminate or negate any level of safety through vertical separation built into the LTCP by bioattenuation zone requirements, and for the vapor intrusion to indoor air and direct contact criterions of the LTCP.

f. **Naphthalene and PAH Contamination** - ACEH's review of the files indicates that naphthalene and poly-aromatic hydrocarbons (PAHs) were detected in grab groundwater sample B12-W located immediately downgradient of a hydraulic hoist in May 2005 at significant concentrations of 305,000 µg/L naphthalene, 430,000 µg/l 1,3,5-trimethylbenzene, and 127,000 µg/l 1,2,4-trimeylbenzene. Additionally, soil samples collected in June 2005 at B22, collected at a depth of 10 feet bgs immediately downgradient of the former UST excavation, contained concentrations of naphthalene up to 640 milligrams per kilogram (mg/kg), 1,2,4-trimetylbenzene up to 4,000 mg/kg, and 1,3,5-trimethylbenzene up to 5,100 mg/kg. Other volatile organic compounds (VOCs) were also detected in the grab groundwater sample. It is not clear the extent that naphthalene of other VOCs have been analyzed during groundwater monitoring events at the site as the analytical data has not been tabulated and may appear only in laboratory reports. Therefore ACEH requests that the analytical data be tabulated to enable a quick understanding of contaminant trends of these chemicals at the site.

Additionally, it does not appear that PAHs have been analyzed in groundwater monitoring wells at the site; however, if the analysis for these chemicals has been collected ACEH requests the data be similarly tabulated. Because there was a waste oil UST associated with the site, it is

appropriate to collect the data. Please also evaluate the need for continued VOC and PAH analysis in groundwater and any future borings at the site.

g. **Potential TPHmo Contamination** – Grab groundwater analysis for TPH as motor oil (TPHmo) do not appear to have been consistently analyzed in soil or groundwater at a site that contained a waste oil UST and contains hydraulic hoists. Similar to the discussion above in Technical Comment 5a, it appears appropriate to investigate the potential for motor oil contamination in groundwater at the site.

Please present a strategy in the Data Gap Work Plan (described in Technical Comment 8 below) to address the items discussed above. Based on the review of the case file it appears that information previously requested of you has not been submitted. An August 3, 2010 directive letter from ACEH approved the installation, and requested the relocation, of proposed groundwater monitoring well MW-5. The November 30, 2010 *Work Plan Addendum for Soil Gas Sampling,* relocated the proposed well location. The work was approved in a directive letter dated June 10, 2011. Additionally, previously approved well MW-4 has also not been installed, even though permits for both wells were obtained from the Alameda County Public Works Agency (ACPWA). No reason for the not undertaking the work was provided in the cited report.

Alternatively, please provide justification of why the site satisfies the Media-Specific Criteria for Groundwater in the focused SCM described in Technical Comment 8 below.

6. **LTCP Media Specific Criteria for Vapor Intrusion to Indoor Air –** The LTCP describes conditions, including bioattenuation zones, which if met will assure that exposure to petroleum vapors in indoor air will not pose unacceptable health risks to human occupants of existing or future site buildings, and adjacent parcels. Appendices 1 through 4 of the LTCP criteria illustrate four potential exposure scenarios and describe characteristics and criteria associated with each scenario.

Our review of the case files indicates that the site data collection and analysis fail to support the requisite characteristics of one of the four scenarios as follows:

a. **Onsite Risk of Vapor Intrusion** - Three soil vapor points were installed to a depth of four feet below grade surface (bgs) recently and collected useful data that has allowed an understanding of the risk of vapor intrusion to portions of the building on the site. However, the soil vapor probe locations were placed interior to the property and were not placed proximal to the source and residual LNAPL concentrations in soil and groundwater. Specifically, the vapor risk to the office, typically more enclosed than a shop floor, has not been assessed but was proposed and subsequently approved in the June 10, 2011 directive letter. It also does not appear that vapor analysis for naphthalene and PAHs has been conducted to enable an evaluation under the LTCP vapor criterion. This is appropriate at a site with a former waste oil UST and hydraulic hoists as soil, at a depth of 10 feet bgs, contains elevated concentrations of naphthalene, 1,2,4-trimetylbenzene, and 1,3,5-trimethylbenzene as noted above.

b. **Offsite Risk of Vapor Intrusion** – Depth to groundwater in offsite wells MW-1 and MW-3 has been reported to be as high as 3.08 and 3.41 feet bgs, respectively. According to the LTCP a 10 foot bioattenuation zone is required for a site with benzene concentrations between 100 and 1,000 µg/l. As previously noted, the benzene concentration in offsite well MW-3 were last reported in October 2013 at 990 µg/l, a historic high at the site. Therefore there is potential risk to offsite receptors from vapor intrusion to indoor air including the offsite apartment building, with an enclosed first floor garage, and potentially an elevator and sump. Please also be aware that the potential for vapor intrusion to the apartment building is not limited to hydrocarbon contamination, but includes potential PCE contamination previously documented at a shallow depth near the oil-water separator in the back parking lot onsite.

c. **Depth of Existing Vapor Points** – Analysis of the risk of vapor intrusion to indoor air under the LTCP evaluates vapor data collected at a depth of five feet below building foundations. The existing vapor points were installed at a depth of 4 to 5 feet bgs, but the depth of the building foundation was not discussed. These details are appropriate in order to understand the existing vapor data within the context of the LTCP. ACEH requests that foundational details be provided in the SCM discussed in Technical Comment 8 below.

Please present a strategy in the Data Gap Investigation Work Plan described in Technical Comment 8 below to collect additional data to satisfy the bioattenuation zone characteristics of Scenarios 1, 2 or 3, or to collect soil gas data to satisfy Scenario 4.

Alternatively, please provide justification of why the site satisfies the Media-Specific Criteria for Vapor Intrusion to Indoor Air in a SCM that assures that exposure to petroleum and VOC (PCE) vapors in indoor air will not pose unacceptable health risks to occupants of onsite and adjacent buildings.

Please note, that if direct measurement of soil gas is proposed, ensure that your strategy is consistent with the field sampling protocols described in the Department of Toxic Substances Control's Final Vapor Intrusion Guidance (October 2011). Consistent with the guidance, ACEH requires installation of permanent vapor wells to assess temporal and seasonal variations in soil gas concentrations.

7. **LTCP Media Specific Criteria for Direct Contact and Outdoor Air Criteria** – The LTCP describes conditions where direct contact with contaminated soil or inhalation of contaminants volatized to outdoor air poses a low threat to human health. According to the policy, release sites where human exposure may occur satisfy the media-specific criteria for direct contact and outdoor air exposure and shall be considered low-threat if the maximum concentrations of petroleum constituents in soil are less than or equal to those listed in Table 1 for the specified depth bgs. Alternatively, the policy allows for a site specific risk assessment that demonstrates that maximum concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health, or controlling exposure through the use of mitigation measures, or institutional or engineering controls.

   Our review of the case files indicates that the site fails to meet the residential, commercial, or utility worker portions of this media-specific criterion due to the presence of contaminant concentrations at 9 or 10 feet bgs up to 13 mg/kg benzene, 38 mg/kg ethylbenzene, and 640 mg/kg naphthalene at offsite bore locations B2 and B22. Additionally, it does not appear that naphthalene and PAHs have been sufficiently analyzed in the source area to characterize the site under this criterion.

   Therefore, please present a strategy in the Data Gap Work Plan described in Technical Comment 8 below to collect sufficient data to satisfy the direct contact and outdoor air exposure criteria in the source area.

   Alternatively, please provide justification of why the site satisfies the Media-Specific Criteria for Direct Contact and Outdoor Air Exposure in the focused SCM described in Technical Comment 8 below that assures that exposure to petroleum constituents in soil will have no significant risk of adversely affecting human health.

8. **Data Gap Investigation Work Plan and Focused Site Conceptual Model** – Please prepare Data Gap Investigation Work Plan to address the technical comments listed above. Please support the scope of work in the Data Gap Investigation Work Plan with a focused SCM and Data Quality Objectives (DQOs) that relate the data collection to each LTCP criteria. For example please clarify which scenario within each Media-Specific Criteria a sampling strategy is intended to apply to.

   In order to expedite review, ACEH requests the focused SCM be presented in a tabular format that highlights the major SCM elements and associated data gaps, which need to be addressed to progress the site to case closure under the LTCP. Please see Attachment A "Site Conceptual Model Requisite Elements". Please sequence activities in the proposed revised data gap investigation scope of work to enable efficient data collection in the fewest mobilizations possible.

   Finally, the lack of a scale on site figures complicates this analysis. ACEH requests that all future figures contain a lined scale.

9. **Groundwater Monitoring** – Please continue to conduct semi-annual groundwater monitoring events at the site and submit reports in accordance with the schedule below. However, ACEH requests the inclusion of an additional groundwater analysis due to an atypical gasoline chemical signature at the site as discussed above in Technical Comment 5.

   Additionally, as requested above, please include analysis for naphthalene, PAHs, TPHd, and TPHmo in future groundwater monitoring events. The need for additional analysis of these contaminants is requested to be evaluated thereafter.

TECHNICAL REPORT REQUEST

Please upload technical reports to the ACEH ftp site (Attention: Barbara Jakub), and to the State Water Resources Control Board's Geotracker website, in accordance with the following specified file naming convention and schedule:

- **April 30, 2014** – Notification of Available Meeting Dates
- **June 13, 2014** – First 2014 Semi-Annual Groundwater Monitoring Event
  (File to be named: GWM_R_yyyy-mm-dd)
- **June 27, 2014** – Data Gap Investigation Plan and Focused Site Conceptual Model
  (File to be named: WP_SCM_R_yyyy-mm-dd)

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.

Online case files are available for review at the following website: http://www.acgov.org/aceh/index.htm.

Thank you for your cooperation. Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 567-6876 or send me an electronic mail message at mark.detterman@acgov.org.

Sincerely,

Digitally signed by Mark E. Detterman
DN: cn=Mark E. Detterman, o, ou, email, c=US
Date: 2014.04.15 10:58:31 -07'00'

Mark Detterman, P.G., C.E.G.
Senior Hazardous Materials Specialist

Enclosures: Attachment 1 - Responsible Party(ies) Legal Requirements/Obligations & ACEH Electronic Report Upload (ftp) Instructions

Attachment A – Site Conceptual Model Requisite Elements

cc: Brent Wheeler, Golden Gate Environmental, Inc, 1455 Yosemite Avenue, San Francisco, CA 94124 (sent via electronic mail: b.wheeler@ggtr.com)

Mark Youngkin, Golden Gate Environmental, Inc, 1455 Yosemite Avenue, San Francisco, CA 94124 (sent via electronic mail to: geomark@sbcglobal.net)

Leroy Griffin, Oakland Fire Department 250 Frank H. Ogawa Plaza, Ste. 3341, Oakland, CA 94612-2032 (sent via electronic mail to lgriffin@oaklandnet.com)

Dilan Roe, ACEH (sent via electronic mail to dilan.roe@acgov.org)
Mark Detterman (sent via electronic mail to mark.detterman@acgov.org)
Electronic file, GeoTracker

Attachment 1

Responsible Party(ies) Legal Requirements/Obligations

REPORT/DATA REQUESTS

These reports/data are being requested pursuant to Division 7 of the California Water Code (Water Quality), Chapter 6.7 of Division 20 of the California Health and Safety Code (Underground Storage of Hazardous Substances), and Chapter 16 of Division 3 of Title 23 of the California Code of Regulations (Underground Storage Tank Regulations).

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (Local Oversight Program [LOP] for unauthorized releases from petroleum Underground Storage Tanks [USTs], and Site Cleanup Program [SCP] for unauthorized releases of non-petroleum hazardous substances) require submission of reports in electronic format pursuant to Chapter 3 of Division 7, Sections 13195 and 13197.5 of the California Water Code, and Chapter 30, Articles 1 and 2, Sections 3890 to 3895 of Division 3 of Title 23 of the California Code of Regulations (23 CCR). Instructions for submission of electronic documents to the ACEH FTP site are provided on the attached "Electronic Report Upload Instructions."

Submission of reports to the ACEH FTP site is in addition to requirements for electronic submittal of information (ESI) to the State Water Resources Control Board's (SWRCB) Geotracker website. In April 2001, the SWRCB adopted 23 CCR, Division 3, Chapter 16, Article 12, Sections 2729 and 2729.1 (Electronic Submission of Laboratory Data for UST Reports). Article 12 required electronic submittal of analytical laboratory data submitted in a report to a regulatory agency (effective September 1, 2001), and surveyed locations (latitude, longitude and elevation) of groundwater monitoring wells (effective January 1, 2002) in Electronic Deliverable Format (EDF) to Geotracker. Article 12 was subsequently repealed in 2004 and replaced with Article 30 (Electronic Submittal of Information) which expanded the ESI requirements to include electronic submittal of any report or data required by a regulatory agency from a cleanup site. The expanded ESI submittal requirements for petroleum UST sites subject to the requirements of 23 CCR, Division, 3, Chapter 16, Article 11, became effective December 16, 2004. All other electronic submittals required pursuant to Chapter 30 became effective January 1, 2005. Please visit the SWRCB website for more information on these requirements: (http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/).

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, 7835, 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, late 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.

Alameda County Environmental Cleanup Oversight Programs (LOP and SCP)	**REVISION DATE:** July 25, 2012
	ISSUE DATE: July 5, 2005
	PREVIOUS REVISIONS: October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010
SECTION: Miscellaneous Administrative Topics & Procedures	**SUBJECT:** Electronic Report Upload (ftp) Instructions

The Alameda County Environmental Cleanup Oversight Programs (petroleum UST and SCP) require submission of all reports in electronic form to the county's FTP site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

REQUIREMENTS

- **Please do not submit reports as attachments to electronic mail.**
- Entire report including cover letter must be submitted to the ftp site as **a single Portable Document Format (PDF) with no password protection**.
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- **Signature pages and perjury statements must be included and have either original or electronic signature.**
- **Do not password protect the document**. Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted**.
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:

  RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Submission Instructions

1) Obtain User Name and Password
   a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
      i) Send an e-mail to deh.loptoxic@acgov.org
   b) In the subject line of your request, be sure to include **"ftp PASSWORD REQUEST"** and in the body of your request, include the **Contact Information, Site Addresses**, and the **Case Numbers (RO# available in Geotracker) you will be posting for**.

2) Upload Files to the ftp Site
   a) Using Internet Explorer (IE4+), go to ftp://alcoftp1.acgov.org
      (i) Note: Netscape, Safari, and Firefox browsers will not open the FTP site as they are NOT being supported at this time.
   b) Click on Page located on the Command bar on upper right side of window, and then scroll down to Open FTP Site in Windows Explorer.
   c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
   d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
   e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.

3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
   a) Send email to deh.loptoxic@acgov.org notify us that you have placed a report on our ftp site.
   b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
   c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO#, use the street address instead.
   d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

ATTACHMENT A

Site Conceptual Model Requisite Elements

ATTACHMENT A

Site Conceptual Model

The site conceptual model (SCM) is an essential decision-making and communication tool for all interested parties during the site characterization, remediation planning and implementation, and closure process. A SCM is a set of working hypotheses pertaining to all aspects of the contaminant release, including site geology, hydrogeology, release history, residual and dissolved contamination, attenuation mechanisms, pathways to nearby receptors, and likely magnitude of potential impacts to receptors.

The SCM is initially used to characterize the site and identify data gaps. As the investigation proceeds and the data gaps are filled, the working hypotheses are modified, and the overall SCM is refined and strengthened until it is said to be "validated". At this point, the focus of the SCM shifts from site characterization towards remedial technology evaluation and selection, and later remedy optimization, and forms the foundation for developing the most cost-effective corrective action plan to protect existing and potential receptors.

For ease of review, Alameda County Environmental Health (ACEH) requests utilization of tabular formats to (1) highlight the major SCM elements and their associated data gaps which need to be addressed to progress the site to case closure (see Table 1 of attached example), and (2) highlight the identified data gaps and proposed investigation activities (see Table 2 of the attached example). ACEH requests that the tables presenting the SCM elements, data gaps, and proposed investigation activities be updated as appropriate at each stage of the project and submitted with work plans, feasibility studies, corrective action plans, and requests for closures to support proposed work, conclusions, and/or recommendations.

The SCM should incorporate, but is not limited to, the topics listed below. Please support the SCM with the use of large-scaled maps and graphics, tables, and conceptual diagrams to illustrate key points. Please include an extended site map(s) utilizing an aerial photographic base map with sufficient resolution to show the facility, delineation of streets and property boundaries within the adjacent neighborhood, downgradient irrigation wells, and proposed locations of transects, monitoring wells, and soil vapor probes.

a. Regional and local (on-site and off-site) geology and hydrogeology. Include a discussion of the surface geology (e.g., soil types, soil parameters, outcrops, faulting), subsurface geology (e.g., stratigraphy, continuity, and connectivity), and hydrogeology (e.g., water-bearing zones, hydrologic parameters, impermeable strata). Please include a structural contour map (top of unit) and isopach map for the aquitard that is presumed to separate your release from the deeper aquifer(s), cross sections, soil boring and monitoring well logs and locations, and copies of regional geologic maps.

b. Analysis of the hydraulic flow system in the vicinity of the site. Include rose diagrams for depicting groundwater gradients. The rose diagram shall be plotted on groundwater elevation contour maps and updated in all future reports submitted for your site. Please address changes due to seasonal precipitation and groundwater pumping, and evaluate the potential interconnection between shallow and deep aquifers. Please include an analysis of vertical hydraulic gradients, and effects of pumping rates on hydraulic head from nearby water supply wells, if appropriate. Include hydraulic head in the different water bearing zones and hydrographs of all monitoring wells.

c. Release history, including potential source(s) of releases, potential contaminants of concern (COC) associated with each potential release, confirmed source locations, confirmed release locations, and existing delineation of release areas. Address primary leak source(s) (e.g., a tank, sump, pipeline, etc.) and secondary sources (e.g., high-

ATTACHMENT A

Site Conceptual Model (continued)

concentration contaminants in low-permeability lithologic soil units that sustain groundwater or vapor plumes). Include local and regional plan view maps that illustrate the location of sources (former facilities, piping, tanks, etc.).

d. Plume (soil gas and groundwater) development and dynamics including aging of source(s), phase distribution (NAPL, dissolved, vapor, residual), diving plumes, attenuation mechanisms, migration routes, preferential pathways (geologic and anthropogenic), magnitude of chemicals of concern and spatial and temporal changes in concentrations, and contaminant fate and transport. Please include three-dimensional plume maps for groundwater and two-dimensional soil vapor plume plan view maps to provide an accurate depiction of the contaminant distribution of each COC.

e. Summary tables of chemical concentrations in different media (i.e., soil, groundwater, and soil vapor). Please include applicable environmental screening levels on all tables. Include graphs of contaminant concentrations versus time.

f. Current and historic facility structures (e.g., buildings, drain systems, sewer systems, underground utilities, etc.) and physical features including topographical features (e.g., hills, gradients, surface vegetation, or pavement) and surface water features (e.g. routes of drainage ditches, links to water bodies). Please include current and historic site maps.

g. Current and historic site operations/processes (e.g., parts cleaning, chemical storage areas, manufacturing, etc.).

h. Other contaminant release sites in the vicinity of the site. Hydrogeologic and contaminant data from those sites may prove helpful in testing certain hypotheses for the SCM. Include a summary of work and technical findings from nearby release sites, including the two adjacent closed LUFT sites, (i.e., Montgomery Ward site and the Quest Laboratory site).

i. Land uses and exposure scenarios on the facility and adjacent properties. Include beneficial resources (e.g., groundwater classification, wetlands, natural resources, etc.), resource use locations (e.g., water supply wells, surface water intakes), subpopulation types and locations (e.g., schools, hospitals, day care centers, etc.), exposure scenarios (e.g. residential, industrial, recreational, farming), and exposure pathways, and potential threat to sensitive receptors. Include an analysis of the contaminant volatilization from the subsurface to indoor/outdoor air exposure route (i.e., vapor pathway). Please include copies of Sanborn maps and aerial photographs, as appropriate.

j. Identification and listing of specific data gaps that require further investigation during subsequent phases of work. Proposed activities to investigate and fill data gaps identified.

TABLE 1

INITIAL SITE CONCEPTUAL MODEL

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Geology and Hydrogeology	Regional	The site is in the northwest portion of the Livermore Valley, which consists of a structural trough within the Diablo Range and contains the Livermore Valley Groundwater Basin (referred to as "the Basin") (DWR, 2006). Several faults traverse the Basin, which act as barriers to groundwater flow, as evidenced by large differences in water levels between the upgradient and downgradient sides of these faults (DWR, 2006). The Basin is divided into 12 groundwater basins, which are defined by faults and non-water-bearing geologic units (DWR, 1974). The hydrogeology of the Basin consists of a thick sequence of fresh-water-bearing continental deposits from alluvial fans, outwash plains, and lacustrine environments to up to approximately 5,000 feet bgs (DWR, 2006). Three defined fresh-water bearing geologic units exist within the Basin: Holocene Valley Fill (up to approximately 400 feet bgs in the central portion of the Basin), the Plio-Pleistocene Livermore Formation (generally between approximately 400 and 4,000 feet bgs in the central portion of the Basin), and the Pliocene Tassajara Formation (generally between approximately 250 and 5,000 or more feet bgs) (DWR, 1974). The Valley Fill units in the western portion of the Basin are capped by up to 40 feet of clay (DWR, 2006).	None	NA
	Site	***Geology:*** Borings advanced at the site indicate that subsurface materials consist primarily of finer-grained deposits (clay, sandy clay, silt and sandy silt) with interbedded sand lenses to 20 feet below ground surface (bgs), the approximate depth to which these borings were advanced. The documented lithology for one on-site boring that was logged to approximately 45 feet bgs indicates that beyond approximately 20 feet bgs, fine-grained soils are present to approximately 45 feet bgs. A cone penetrometer technology test indicated the presence of sandier lenses from approximately 45 to 58 feet bgs and even coarser materials (interbedded with finer-grained materials) from approximately 58 feet to 75 feet bgs, the total depth drilled. The lithology documented at the site is similar to that reported at other nearby sites, specifically the Montgomery Ward site (7575 Dublin Boulevard), the Quest laboratory site (6511 Golden Gate Drive), the Shell-branded Service Station site (11989 Dublin Boulevard), and the Chevron site (7007 San Ramon Road). ***Hydrogeology:*** Shallow groundwater has been encountered at depths of approximately 9 to 15 feet bgs. The hydraulic gradient and groundwater flow direction have not been specifically evaluated at the site.	As noted, most borings at the site have been advanced to approximately 20 feet bgs, and one boring has been advanced and logged to 45 feet bgs; CPT data was collected to 75 feet bgs at one location. Lithologic data will be obtained from additional borings that will be advanced on site to further the understanding of the subsurface, especially with respect to deeper lithology. The on-site shallow groundwater horizontal gradient has not been confirmed. Additionally, it is not known if there may be a vertical component to the hydraulic gradient.	Two direct push borings and four multi-port wells will be advanced to depth (up to approximately 75 feet bgs) and soil lithology will be logged. See items 4 and 5 on Table 2. Shallow and deeper groundwater monitoring wells will be installed to provide information on lateral and vertical gradients. See items 2 and 5 on Table 2.
Surface Water Bodies		The closest surface water bodies are culverted creeks. Martin Canyon Creek flows from a gully west of the site, enters a culvert north of the site, and then bends to the south, passing approximately 1,000 feet east of the site before flowing into the Alamo Canal. Dublin Creek flows from a gully west of the site, enters a culvert approximately 750 feet south of the site, and then joins Martin Canyon Creek approximately 750 feet southeast of the site.	None	NA
Nearby Wells		The State Water Resources Control Board's GeoTracker GAMA website includes information regarding the approximate locations of water supply wells in California. In the vicinity of the site, the closest water supply wells presented on this website are depicted approximately 2 miles southeast of the site; the locations shown are approximate (within 1 mile of actual location for California Department of Public Health supply wells and 0.5 mile for other supply wells). No water-producing wells were identified within 1/4 mile of the site in the well survey conducted for the Quest Laboratory site (6511 Golden Gate Drive; documented in 2009); information documented in a 2005 report for the Chevron site at 7007 San Ramon Road indicates that a water-producing well may exist within 1/2 mile of the site.	A formal well survey is needed to identify water-producing, monitoring, cathodic protection, and dewatering wells.	Obtain data regarding nearby, permitted wells from the California Department of Water Resources and Zone 7 Water Agency (Item 11 on Table 2).

TABLE 2

DATA GAPS AND PROPOSED INVESTIGATION

Item	Data Gap	Proposed Investigation	Rationale	Analysis
5	Evaluate the possible presence of impacts to deeper groundwater. Evaluate deeper groundwater concentration trends over time. Obtain data regarding the vertical groundwater gradient. Obtain more lithological data below 20 feet bgs.	Install four continuous multichannel tubing (CMT) groundwater monitoring wells (aka multi-port wells) to approximately 65 feet bgs in the northern parking lot with ports at three depths (monitoring well locations may be adjusted pending results of shallow grab groundwater samples; we will discuss any potential changes with ACEH before proceeding). Groundwater monitoring frequency to be determined. Soil samples will be collected only if there are field indications of impacts. Soil lithology will be logged. However, information regarding the moisture content of soil may not be reliable using sonic drilling technology (two borings will be logged using direct push technology; see Item 4, above).	One well is proposed at the western (upgradient) property boundary to confirm that there are no deeper groundwater impacts from upgradient. Two wells are proposed near the center of the northern parking lot to evaluate potential impacts in an area where deeper impacts, if any, would most likely to be found. One well is proposed at the eastern (downgradient) property boundary to confirm that there are no impacts extending off-site. Port depths will be chosen based on the locations of saturated soils (as logged in direct push borings; see Item 4, above), but are expected at approximately 15, 45, and 60 feet bgs.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance.
6	Evaluate possible off-site migration of impacted soil vapor in the downgradient direction (east). Evaluate concentration trends over time.	Install 4 temporary nested soil vapor probes at approximately 4 and 8 feet bgs along the eastern property boundary. Based on the results of the sampling, two sets of nested probes will be converted to vapor monitoring wells to allow for evaluation of VOC concentration trends over time.	Available data indicate that PCE and TCE are present in soil vapor in the eastern portion of the northern parking lot. Samples are proposed on approximately 50-foot intervals along the eastern property boundary to provide a transect of concentrations through the vapor plume. The depths of 4 and 8 feet bgs are chosen to provide data closest to the source (i.e., groundwater) while avoiding saturated soil, and also provide shallower data to help evaluate potential attenuation within the soil column. Two sets of nested vapor probes will be converted into vapor monitoring wells (by installing well boxes at ground surface); the locations of the permanent wells will be chosen based on the results of samples from the temporary probes.	*Soil vapor*: VOCs by EPA Method TO-15.
7	Evaluate potential for off-site migration of impacted groundwater in the downgradient direction (east).	Advance two borings to approximately 20 feet bgs in the parking lot of the property east of the Crown site for collection of grab groundwater samples.	Two borings are proposed off-site, on the property east of the Crown site, just east of the building in the expected area of highest potential VOC concentrations.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance.
8	Evaluate VOC concentrations just north of the highest concentration area.	Advance two borings to approximately 20 feet bgs north of Building A for collection of soil and grab groundwater samples. Soil samples will be collected at two depths in the vadose zone. Soil samples will be collected based on field indications of impacts (PID readings, odor, staining) or, in the absence of field indications of impacts, at 5 and 10 feet bgs.	The highest concentrations of PCE in groundwater were detected at boring NM-B-32, just north of Building A. The nearest available data to the north are approximately 75 feet away. One of the borings will be advanced approximately 20 feet north of NM-B-32 to provide data close to the highest concentration area. A second boring will be advanced approximately halfway between the first boring and former boring NM-B-33 to provide additional spatial data for contouring purposes. These borings will be part of a transect in the highest concentration area.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance. *Soil:* VOCs by EPA Method 8260 (soil samples to be collected using field preservation in accordance with EPA Method 5035).
9	Evaluate VOC concentrations in soil vapor in the south parcel of the site.	Install four temporary soil vapor probes at approximately 5 feet bgs around boring SV-25, where PCE was detected in soil vapor at a low concentration.	PCE was detected in soil vapor sample SV-25 in the southern parcel, although was not detected in groundwater in that area. Three probes will be installed approximately 30 feet from of boring SV-25 to attempt to delineate the extent of impacts. A fourth probe is proposed west of the original sample, close to the property boundary and the location of mapped utility lines, which may be a potential conduit, to evaluate potential impacts from the west.	*Soil vapor*: VOCs by EPA Method TO-15.
10	Obtain additional information regarding subsurface structures and utilities to further evaluate migration pathways and sources.	Ground penetrating radar (GPR) and other utility locating methodologies will be used, as appropriate, to further evaluate the presence of unknown utilities and structures at the site.	Utilities have been identified at the site that include an on-site sewer lateral and drain line, and shallow water, electric, and gas lines. Given the current understanding of the distribution of PCE in groundwater at the site, it is possible that other subsurface utilities, and specifically sewer laterals, exist that may act as a source or migration pathway for distribution of VOCs in the subsurface.	NA

Detterman, Mark, Env. Health

From: Detterman, Mark, Env. Health
Sent: Tuesday, November 04, 2014 11:22 AM
To: 'Brent Wheeler'
Cc: Mark Youngkin; Brian Sheaff; John Accacian; Annette Chen; Tim Hallen; Gina Wee; dylan.roe@acgov.org
Subject: RE: Extension Request for Submittal of Data Gap Work Plan & Focused Site Conceptual Model - 5930 College Avenue, Oakland (ACEH Fuel Leak Case #RO0000377)

Brent,
Based on the discussions at the October 30, 2014 meeting, it appears appropriate to extend the submittal date from June 27, 2014 to December 31, 2014. The meeting helped flesh-out and fill some of the previously identified data gaps, and helped to focus future work efforts on remaining data gaps under the Low-Threat Closure Policy. I'll update Geotracker shortly.

Mark Detterman
Senior Hazardous Materials Specialist, PG, CEG
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, CA 94502
Direct: 510.567.6876
Fax: 510.337.9335
Email: mark.detterman@acgov.org

PDF copies of case files can be downloaded at:

http://www.acgov.org/aceh/lop/ust.htm

From: Brent Wheeler [mailto:b.wheeler@ggtr.com]
Sent: Monday, November 03, 2014 2:19 PM
To: Detterman, Mark, Env. Health
Cc: Mark Youngkin; Brian Sheaff; John Accacian; Annette Chen; Tim Hallen; Gina Wee; dylan.roe@acgov.org
Subject: Extension Request for Submittal of Data Gap Work Plan & Focused Site Conceptual Model - 5930 College Avenue, Oakland (ACEH Fuel Leak Case #RO0000377)

Mark,

On behalf of Dr. Brian Sheaff and the William G. Sheaff & Patricia Warren Restated Living Trust U/D/T 2/14/89, Golden Gate Environmental, Inc. (GGE) requests a 60-day extension for submittal of the Data Gap Work Plan and Focused Site Conceptual Model (SCM) previously requested in the ACEH Letter dated April 11, 2014. We anticipate submitting the document on or before December 31, 2014.

Based on review and discussion of plume map data presented by GGE in our most recent meeting at the ACEH office dated October 30, 2014, it was recommended that additional borings southeast of the subject property be utilized for the collection of shallow soil, grab groundwater and soil gas samples to further delineate the extent of contamination in the general down- to lateral-gradient groundwater flow direction from the site. The additionally requested time will be utilized for preparation of the work plan and SCM, with the proposed work

scope used to fulfil the existing data gaps for case closure under the Low Threat UST Closure Policy. Please contact us with any questions.

Regards,

Brent Wheeler
Golden Gate Environmental, Inc.
Golden Gate Tank Removal, Inc.
1455 Yosemite Avenue
San Francisco, CA 94124

Direct Phone: 415-970-9088 (GGE), 415-512-1555 (GGTR)
Cellular Phone: 415-686-8846
Email: wheelerbrent@ymail.com, b.wheeler@ggtr.com

Standard Operating Procedure Installation and Extraction of the Vapor Pin™

May 20, 2011

Scope:

This standard operating procedure describes the installation and extraction of the Vapor Pin™[1] for use in sub-slab soil-gas sampling.

Purpose:

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the Vapor Pin™ for the collection of sub-slab soil-gas samples.

Equipment Needed:

- Assembled Vapor Pin™ [Vapor Pin™ and silicone sleeve (Figure 1)];
- Hammer drill;
- 5/8-inch diameter hammer bit (Hilti™ TE-YX 5/8" x 22" #00206514 or equivalent);
- 1½-inch diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch diameter bottle brush;
- Wet/dry vacuum with HEPA filter (optional);
- Vapor Pin™ installation/extraction tool;
- Dead blow hammer;
- Vapor Pin™ flush mount cover, as necessary;
- Vapor Pin™ protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel.

[1]Cox-Colvin & Associates, Inc., designed and developed the Vapor Pin™; a patent is pending.

Figure 1. Assembled Vapor Pin™.

Installation Procedure:

1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.

2) Set up wet/dry vacuum to collect drill cuttings.

3) If a flush mount installation is required, drill a 1½-inch diameter hole at least 1¾-inches into the slab.

4) Drill a 5/8-inch diameter hole through the slab and approximately 1-inch into the underlying soil to form a void.

5) Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.

6) Place the lower end of Vapor Pin™ assembly into the drilled hole. Place the small hole located in the handle of the extraction/installation tool over the Vapor Pin™ to protect the barb fitting and cap, and tap the Vapor Pin™ into place using a

dead blow hammer (Figure 2). Make sure the extraction/installation tool is aligned parallel to the Vapor Pin™ to avoid damaging the barb fitting.

Figure 2. Installing the Vapor Pin™.

For flush mount installations, unscrew the threaded coupling from the installation/extraction handle and use the hole in the end of the tool to assist with the installation (Figure 3).

Figure 3. Flush-mount installation.

During installation, the silicone sleeve will form a slight bulge between the slab and the Vapor Pin™ shoulder. Place the protective cap on Vapor Pin™ to prevent vapor loss prior to sampling (Figure 4).

Figure 4. Installed Vapor Pin™.

7) For flush mount installations, cover the Vapor Pin™ with a flush mount cover.

8) Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to equilibrate prior to sampling.

9) Remove protective cap and connect sample tubing to the barb fitting of the Vapor Pin™ (Figure 5).

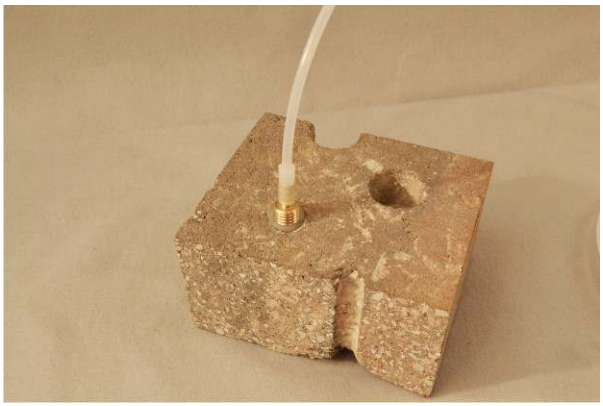


Figure 5. Vapor Pin™ sample connection.

10) Conduct leak tests [(e.g., real-time monitoring of oxygen levels on extracted sub-slab soil gas, or placement of a water

dam around the Vapor Pin™) Figure 6]. Consult your local guidance for possible tests.

Figure 6. Water dam used for leak detection.

11) Collect sub-slab soil gas sample. When finished sampling, replace the protective cap and flush mount cover until the next sampling event. If the sampling is complete, extract the Vapor Pin™.

Extraction Procedure:

1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the Vapor Pin™ (Figure 7). Continue turning the tool to assist in extraction, then pull the Vapor Pin™ from the hole (Figure 8).

Figure 7. Removing the Vapor Pin™.

Figure 8. Extracted Vapor Pin™.

2) Fill the void with hydraulic cement and smooth with the trowel or putty knife.

3) Prior to reuse, remove the silicone sleeve and discard. Decontaminate the Vapor Pin™ in a hot water and Alconox® wash, then heat in an oven to a temperature of 130° C.

The Vapor Pin™ to designed be used repeatedly; however, replacement parts and supplies will be required periodically. These parts are available on-line at www.CoxColvin.com.

Replacement Parts:

Vapor Pin™ Kit Case - VPC001
Vapor Pins™ - VPIN0522
Silicone Sleeves - VPTS077
Installation/Extraction Tool - VPIE023
Protective Caps - VPPC010
Flush Mount Covers - VPFM050
Water Dam - VPWD004
Brush - VPB026