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PERJURY STATEMENT

Subject: Fuel Lake Case No. Ro0002981 and Geotracker Clobal ID T1000000416, Red Hanger Cleaners, 6335-6339 College Ave., Oakland, CA 94618

" 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."

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30 YEARS

Project No. E13243.000
21 October 2014

Alameda County Environmental Health Services
Environmental Protection
11231 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Attention: Mr. Keith Nowell, PG, CHG, Hazardous Materials Specialist

Subject: **RED HANGER KLEANERS, 6335-6339 COLLEGE AVENUE, OAKLAND, CA**
Alameda County Environmental Health Case No. RO0002981
Phase II Environmental Site Assessment Soil Gas Investigation
Work Plan

References: (at end of work plan)

Dear Mr. Nowell:

On behalf of EFI Global, Inc. and Mr. Ronald Elvidge, site owner, Youngdahl Consulting Group, Inc. (Youngdahl) is presenting to Alameda County Environmental Health Services (ACEH) this Soil Gas Investigation Workplan (Workplan) for the Red Hanger Kleaners site (Site), located at 6335-6339 College Avenue in Oakland, California (Figures 1 and 2). Youngdahl has been retained to complete a characterization of soil gas impacts potentially resulting from a tetrachloroethylene
(PCE) release identified during previous Phase II investigations, and in accordance with the 24 June 2011 letter from ACEH.

- This Workplan presents the following:
- A Site Background;
- A Conceptual Site Model;
- A Sampling and Analysis Plan; and
- The proposed project schedule.

1.0 Introduction

The Red Hanger Kleaners site is located at 6239 College Avenue in a mixed commercial and residential area of Oakland, and consists of a three-story building, a parking area, and associated landscaping (Figure 2). The building is currently occupied by various tenants, including a dry cleaning facility. According to Reference No. 4, the Red Hanger Kleaners business has been located at 6239 College Avenue since about 1987. The site is assigned Alameda County Environmental Health Case No. RO00002981 and California State Water Resources Control Board Geotracker Global ID T10000000416.

A Phase I Environmental Site Assessment performed in 2005 identified a past underground storage tank (UST) and use as a dry cleaning business. A Phase II Environmental Site Assessment in 2005 identified a release of PCE and chloroform. The suspected UST was searched for as part of this assessment, only to find a filled-in excavation that once likely held a UST. Subsequent assessments identified that the groundwater was not as contaminated as

originally indicated and all of the PCE concentrations in soil and groundwater were below human health screening levels. A review of regulatory agency files identified other nearby properties with past site uses as dry cleaning facilities.

This workplan is for a soil gas investigation to evaluate if dry cleaning solvents and associated degradation compounds are present in soil gas at concentrations posing a risk to human health.

1.1 Site Location and Map

A topographic map based upon the USGS 7.5 minute quadrangles is provided as Figure 1. The site includes a single slab-on-grade structure (no basement) and paved parking areas (Figure 2). Surface runoff is conveyed by the storm sewer system. Wastewater is collected by the sanitary sewer system.

1.2 Geology/Hydrogeology

The site is located in the City of Oakland, which is within the Coast Ranges Geomorphic province. According to the 1:50,000 scale Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco counties (Reference No. 8), the site is underlain by Holocene age fluvial and alluvial fan deposits described as brown or tan, medium dense to dense, gravely sand or sandy gravel that generally grades upward to sandy or silty clay. Boring logs for the site assessments show silty clays and clayey gravels to be prevalent to the maximum 35-foot exploration depth.

2.0 Site Background

There have been a series of investigations by various consultants dating back to 2005. The following is a summary of these investigations. The addresses used for the Site in the reports for these investigations and in some regulatory correspondence are not consistent. The name of “Red Hanger Kleaners” and “Red Hanger Cleaners” was also used interchangeably. The following summaries report the addresses and business name as used in each individual report.

2.1 Phase I Environmental Site Assessment – March 2005

AEI Consultants (AEI) was retained by Ellwood Commercial Real Estate to conduct a Phase I Environmental Site Assessment (Phase I ESA) at 6235 College Avenue. They described the property as being in a mixed commercial and residential area of Oakland on property totaling approximately 11,353 square feet with a three-story building occupied by commercial and office tenants, and with a dry cleaning operation located on the first floor. AEI indicated that the property was improved with a concrete surfaced parking area and associated landscaping. Surrounding property uses were described as being a restaurant to the north, a parking lot and bank to the south, College Avenue and a gas station to the east, and private residences to the west.

AEI reviewed nearby groundwater monitoring data that inferred a groundwater flow direction to the southwest. AEI identified the following recognizable environmental conditions:

- *AEI reviewed a building plan which indicated that that an underground storage tank (UST) used for storing gasoline may have been located on the northwest portion of the subject property as late as 1986. The location of the UST was noted as "undetermined", however, a fill pipe was noted on the plans in this location. Building permits dated 1941 listed the occupant of the property as Berkeley Fuel and Supply; however, it is unknown whether the former UST was associated with this business. The subject property was not listed on the regulatory database as a current or former UST site; however, based on the building plan, it is apparent that a UST was formerly located onsite. The location of the former UST is unknown. Based on the unknown management and/or removal*

practices utilized in connection with the UST, the potential exists that a release of petroleum hydrocarbons from the UST has impacted the subsurface of the subject property via groundwater.

- *AEI's assessment revealed that dry cleaning activities have been conducted on the subject property since at least 1987. Dry cleaning operations typically use chlorinated solvents, particularly tetrachloroethylene (PCE) during the dry cleaning process. These solvents, even when properly stored and disposed of, can be released from these facilities in small, frequent releases through floor drains, cracked concrete, and sewer systems. Chlorinated solvents are highly mobile chemicals that can easily accumulate in soil and migrate to groundwater beneath a facility. Based on this information, the presence of a dry cleaning facility on the subject property represents evidence of a recognized environmental condition*.

AEI recommended that a subsurface investigation and a geophysical survey be conducted in connection with the former on-site UST and the long-term dry cleaning operations.

2.2 Phase II Subsurface Investigation – May 2005

AEI conducted a geophysical survey using electro-magnetic survey (E-M) Survey and ground penetrating radar (GPR) in the northwest corner of the site and in the area around the dry cleaning machines where the soil borings were planned. The E-M Survey identified an anomaly just inside the gate (northern end of property). GPR was able to identify the sanitary sewer along the back of the building and the storm drain along the west property line. GPR also identified what appeared to be a backfilled excavation (approximately 8 feet deep) that coincided with the E-M Survey anomaly along with a shallow (1.5 to 3.0 feet deep) narrow backfilled trench that ran through the center of the parking area, through the backfilled trench anomaly.

AEI advanced five soil borings to depths ranging from 12 to 25 feet below ground surface (bgs) with soil samples reportedly collected at regular intervals beginning at a depth of 3.0 to 4.0 bgs. The first boring was advanced to a total depth of 25 feet bgs to determine the depth of groundwater. The borings were advanced using a Geoprobe® model 5410 direct-push drilling rig. Soil samples were placed on ice. The depths of samples that were analyzed for borings SB-1 through SB-4 were not clearly specified in the report but appear to most likely be 3 to 4 feet bgs based on the chain of custody document. The depth of the sample analyzed for SB-5 was not clearly indicated but, based on the chain of custody, was likely 11.5 feet bgs. A groundwater sample was collected from boring SB-1 with first water reported at 17½ feet bgs and a water level at 16 feet bgs after 5 minutes.

Soil and groundwater samples were transported to McCampbell Analytical, Inc. with the soil samples from borings SB-1 through SB-4 analyzed for halogenated volatile organic compounds (HVOCs) by EPA Method 8260 (8010 basic list). The soil sample from SB-5 was analyzed for Total Petroleum Hydrocarbons quantified as gasoline (TPH-g), benzene, toluene, ethlybenzene, xylenes (BTEX), and methyl-tert-butyl ether (MTBE) by methods SW8015Cm/8021B. The groundwater sample from SB-1 was analyzed for HVOCs by EPA Method 8260B for the basic 8010 list.

No detectable concentrations of TPH-gasoline, TPH-diesel or TPH-motor oil were reported in the soil sample from SB-5. PCE was detected in soil borings SB-1 through SB-4 at concentrations ranging from 0.080 micrograms per kilogram (µg/kg) (SB-2) to 0.26 µg/kg (SB-4). No other HVOC analytes were detected in the soil samples. PCE was detected at a concentration of 48 micrograms per liter (µg/L) in the groundwater sample from boring SB-1 and

Chloroform was reported at a concentration of 0.83 µg/L. No other HVOC analytes were detected in the groundwater sample from SB-1.

AEI concluded that the presence of low levels of PCE in the soil and groundwater indicated that a small release of PCE had occurred in the area of the dry cleaning facility at the site. The presence of chloroform in the groundwater is probably the result of interaction between PCE and chlorine released by breakdown of the PCE with naturally occurring organic compounds in the soil or groundwater beneath the site. AEI recommended the following actions:

- No further investigation of the suspected UST in the NW corner of the property.
- Due to the fact that a release of hazardous material has been discovered, a copy of this report should be forwarded to ACEH.
- Request an immediate determination as to whether any further action will be required relative to the HVOCs detected.

2.3 Phase II Confirmation Sampling – June 2005

On 28 June 2005, EFI Global (EFI) advanced a direct push boring (SB-6) with continuous coring to a depth of 20 feet bgs. The coring was screened with a hand-held photo-ionization detector, with no VOC's detected in the field. The soils were reported to be composed as follows:

0 – 8 feet: brown silty clay;
8 – 12 feet: clay;
12 – 20 feet: clayey silt.

First groundwater was reported at a depth of 20 feet bgs with the static groundwater level at 16 feet bgs. Groundwater samples were collected from the borehole using a dedicated Teflon bailer. No odors were identified in the groundwater samples. The groundwater samples were transported to McCampbell Analytical, Inc. for analysis of VOCs by EPA Method 8260. PCE was reported at a concentration of 15 µg/L and chloroform was reported at a concentration of 0.83 µg/L.

EFI concluded that the shallow soils contain low concentrations of PCE, but PCE is not present in the deeper unsaturated soils. They considered it to be possible that the low concentration of PCE detected in the groundwater is not attributed to PCE in shallow soil at the site. EFI indicated that the sources of the PCE detected in the groundwater is unknown, but the concentrations appear to be low and not of significant concern at this time. EFI recommended against any further assessment of the PCE and requested that the City of Oakland Fire Department review the additional data in response to a previous request for "no further action".

2.4 Local Regulatory Agency File Review, Kays Cleaners, 6251 College Avenue – July 2008

Basics Environmental Inc. (Basics) reviewed the Phase I ESA and Phase II ESA (references No. 1 and 2) completed by AEI Environmental. Basics indicated that EFI prepared a report titled "Request for No Further Action – Red Hanger Cleaners (6235 College Avenue) dated 2 June 2005 and submitted to the Oakland Fire Department for review. EFI summarized the results in the AEI Phase I and Phase II ESA reports. EFI concluded that is possible that the low concentration of PCE detected in the groundwater is not attributed to PCE in shallow soil at the site. EFI indicated that there were once nearby historic dry cleaning businesses as follows: Rockridge Royal Cleaners located at 5445 College Avenue and down-gradient to cross-gradient; Garden Cleaners located at 5808 College Avenue and down-gradient to cross-gradient; and historically adjacent Kay's Cleaner located at 6251 College Avenue and directly up-gradient to the Red Hanger Cleaners. EFI recommended no further assessment of the PCE

in the soil and groundwater at the site and requested a "no further action" letter from the City of Oakland Fire Department. Basics Reviewed the report titled "Confirmation Sample Results – Red Hanger Cleaners (6235 College Avenue)" (Reference No. 3).

Basics reported that, on 15 July 2005, the Oakland Fire Department issued a letter stating that "no further action" was required by the Oakland Fire Department. Basics reported that the Oakland Fire Department authority does not extend to sites where groundwater has been impacted. Basics indicated that the extent of PCE in groundwater had not yet been defined horizontally or vertically and the health risk posed by the contaminants had not yet been evaluated.

Basics described their scope as to provide additional file review and further research to evaluate hazardous materials handling practices conducted at 6251 College Avenue. They discovered that Red Hangers Cleaners occupied 6251 College Avenue starting in approximately the year 1970. By 1987, they had moved to 6239 College Avenue.

Basics reviewed hazardous materials plans for 6239 College Avenue from April 1991 through March 2007. They reported that in April 1991, 100 gallons of waste PERC was generated per year and 55 gallons of new PERC was stored on site. Drums possibly containing PERC were stored outside for approximately two years. A May 1993 inspection noted that waste PERC filters were stored in two 15-gallon drums. A February 1997 Hazardous Materials Business Plan indicated that 140 gallons of PERC was stored onsite. A January 2007 inspection indicated that old waste should be properly disposed. A January 2007 and a March 2007 inspection indicated that no secondary containment was provided for a drum of PCE.

Basics reviewed the City of Oakland Building Department files for information pertaining to the former Kay's Cleaners and Red Hanger Cleaners. They reported that, for 6235-6239 College Avenue, in 1986 a building permit was issued for the demolition of a single story structure (6237-6247 College Avenue) and to erect a metal warehouse building. A building permit was issued for the construction of a new three story building in 1986 and aTemporary Certificate of Occupancy was issued to Red Hanger Cleaners.

For 6251-6255 College Avenue, a permit was issued in 1925 for the construction of a three-story building at the corner of 63rd Street and College Avenue. In 1964 a Certificate of Completion was issued to Kay's Cleaners (6253 College Avenue). In 1965 a mechanical permit was issued for Red Hanger Cleaners at 6251-6255 College Avenue. Additional tenant improvements were issued in 1988, 2001, 2005, and 2006.

Basics reviewed city directories finding Kay Cleaners listed at 6253-6255 College Avenue in 1953, and at 6253 College Avenue in 1955, 1960, and 1965. In 1970, Kay Cleaners, Inc. was listed at 6251College Avenue. For 1973 and 1977, 6251 College Avenue was listed as Kay's Cleaners. In 1987, 6251 College Avenue was listed as Red Hanger Cleaners. In 1992, 6251 College Avenue was listed as Hazara Oriental Rug and 6235 College Avenue was listed as Office and Red Hanger. In 2002, 6251 College Avenue was listed as Impressions, Inc. and 6235 College Avenue was listed as Office and Red Hanger. In 2007 6251 College Avenue was listed as Impressions, Inc. and 6235 College Avenue was listed as being Office and Red Hanger.

Basics concluded that the building addressed as 6251-6255 College Avenue was occupied by Kay's Cleaners from at least 1953 to 1977. From 1982 to 1987, 6251-6255 College Avenue was listed as Red Hanger Cleaners. In 1987 Red Hanger Cleaners moved to 6235-6239 College Avenue.

Basics indicated that the 6251-6255 College Avenue site is not currently listed as a contaminated facility. However, given the potential for appreciable amounts of hazardous materials used over an extended period of time, they concluded that it is conceivable that soil and/or groundwater may have been impacted.

2.5 2009 Site Characterization Summary Report – 20 January 2010

In a letter dated 15 January 2009, staff of Alameda County Environmental Health (ACEH) indicated that they had reviewed the case file for Fuel Leak Case No. RO0002981 and Geotracker Global ID T10000000416, Red Hanger Cleaners, 6335-6339 College Ave., Oakland, CA 94618. ACEH requested the submission of a work plan to address determining the horizontal and vertical extent of the dissolved groundwater plume, a characterization of the vertical extent of soil contamination, an assessment of groundwater contamination at the former UST location, and a preferential pathway study including underground utilities and nearby wells. ACEH requested copies of all previous reports by 16 March 2009 and the work plan, including a well survey, by 15 April 2009.

Site Characterization Workplan

Environmental Resources Management (ERM) submitted a Site Characterization Workplan dated 13 April 2009 to ACEH. ERM summarized the AEI Consultants investigations (References No.1 and No.2), the EFI Global, Inc. investigation (Reference No. 3), and the Basics Environmental local agency file review (Reference No. 4). They also reviewed additional soil sampling conducted by P&D Environmental in May of 2008, describing it as follows:

> *An additional round of soil and ground water sampling was conducted at the Site in May 2008 by P&D Environmental, Inc. at two locations northeast (presumed upgradient) of the existing dry cleaning machines. The scope and results of that investigation have not been presented in a formal report, but boring logs, data summary tables, and an analytical report associated with those two locations (B7 and B8; Figure 3) were provided to ACEH under separate cover. PCE was detected in one of the soil samples, and in both ground water samples. In addition, chloroform was detected in both ground water samples. Both PCE detections in ground water were higher than the RWQCB screening level (7 µg/L and 12 µg/L). The source of these upgradient detections is unknown. However, one possibility is a former dry cleaning facility previously located adjacent to and northeast of the current Red Hanger Kleaners location at 6251 College Avenue. Basics Environmental (Basics) conducted a local regulatory agency file review for the two dry cleaning facilities, and presented their findings in a 23 July 2008 letter report (submitted to ACEH under separate cover). According to the Basics report, the 6251 address originally housed a dry cleaning operation called Kay's Cleaners, and that facility was apparently later adopted for use by Red Hanger Kleaners, which apparently moved their operations in 1987 to the current location. Currently, the 6251 College Avenue address is occupied by a nail salon.*

Preferential Pathway Study

ERM conducted a site walk to identify obvious evidence of subsurface utilities in the immediate site vicinity (i.e., utility boxes, manholes, etc.). On 8 April 2009, a geophysical survey was completed to identify anomalies suggestive of subsurface pipelines. The maximum utility depth was 5 feet bgs. ERM concluded that groundwater depths are substantially deeper than the utilities, so groundwater would not drain into or follow the utility corridors. However, they indicated that historical dry cleaner operations that released PCE-impacted wastewater to the sanitary sewer or storm sewer lines could also have had releases to the subsurface through cracks and breaks in the lines.

ERM reviewed a well survey obtained from Environmental Data Resources for all wells within ¼-mile of site and listed in local and regional databases. No federal or state water supply wells were identified within ¼-mile of the site. One federal public water supply well was located ¾-mile north of the site and one state well located approximately one mile west-northwest of the site. ERM identified 12 groundwater monitoring wells within ¼-mile of the site listed on the State Water Resources Control Board Geotracker Database. ERM found no evidence of wells in the immediate site vicinity that were located at hydrogeologic positions likely to serve as preferential pathways for chemical migration onto the site or away from the southwest corner of the site (where PCE was identified in groundwater).

Scope of Work

ERM defined the scope of work including:

1) The securing of permits;
2) Marking proposed boring locations and activating an Underground Services Alert;
3) The preparation of site specific health and safety plan;
4) The collection of soil and grab groundwater samples at nine locations in a two phase field investigation with Phase A being as follows:
    a) The advancement of borings in the vicinity of the dry cleaning machines to collect soil and groundwater samples.
    b) The advancement of a boring outside of the building, adjacent to Boring SB-1, downgradient from the dry cleaning machines to first water of 35 feet, whichever comes first;
    c) A boring in the alley north of the dry cleaning facility and west of the neighboring restaurant, upgradient of the dry cleaning machines.
    d) A boring in the alley and north of the dry cleaning business and west of the restaurant, upgradient of the dry cleaning machines, and north of the previous boring; and
    e) A boring within the former UST pit to collect a grab groundwater sample.
5) ERM defined Phase B as advancing three borings downgradient of those in which PCE was originally detected with one within the subject property boundaries at the southwest corner and two located off-site within the adjacent Bank of America parking lot.

Work Plan Summary

ERM summarized the subsurface stratigraphy of the site and their approach as follows:

> According to the prior Phase II investigation, the subsurface stratigraphy at the Site is predominantly silty clays and clayey silts, which would tend to inhibit the vertical migration of chemicals. In addition, the relatively low PCE concentrations observed at the Site do not suggest the presence of a separate fluid phase (i.e., dense nonaqueous phase liquid, of DNAPL, which, in the case of PCE, would tend to sink to the base of a water bearing zone). Therefore, the proposed scope assumes that the PCE concentrations observed in the two depth intervals sampled during Phase A will be comparable. If this is the case, or if the shallow samples contain appreciably higher concentrations than the deeper samples, the borings advanced during Phase B will terminate at a depth just beneath the ground water interface, at approximately 16 to 20 feet bgs.
>
> However, if the deep ground water samples collected during Phase A contain significantly higher concentrations, it will indicate that the vertical extent of PCE occurrence has not been defined adequately, and to more completely address the ACEH concerns, it may be necessary to collect additional ground water samples at intervals deeper than those investigated during Phase A prior to collecting downgradient samples.

ERM planned to collect soil samples during Phase A at 10 feet bgs and from directly above the groundwater contact (assumed to be 15 feet). They planned to collect groundwater samples using a hydropunch or similar groundwater sampling technique.

With the exception of the boring through the former UST pit, all soil and water samples were planned to be analyzed for VOCs by EPA Method 8260B. The soil and water samples from the boring through the UST pit were planned to be analyzed for Total Petroleum Hydrocarbons Extractable Range by EPA Method 8015 modified; along with Total Petroleum Hydrocarbons quantified as gasoline with benzene, toluene, ethylbenzene, xylenes, and fuel oxygenates by EPA Method 8260B.

ACEH Review of Workplan

The ACEH reviewed the work plan, conditionally approving it in a letter dated 14 August 2009 (Reference No. 6). Their technical comments were that they required a perjury letter, and that soil sampling also be performed at the capillary fringe, saturated zone, at lithologic changes, and from areas with high Photo-Ionization Detector (PID) readings. For the groundwater samples from below the former UST excavation, they requested additional analyses for ethylene dibromide (EDB) and ethylene dichloride by EPA Method 8260. ACEH requested that the technical report be submitted by January 15, 2010.

2009 Site Characterization Summary Report

ERM-West, Inc. (ERM) submitted a 2009 Site Characterization Report to ACEH dated 20 January 2010 (Reference No. 7).

Two soil borings were advanced outside of the building and downgradient near the dry cleaning machines, and one boring was advanced through the former UST excavation on 11 October 2009. Site access limitations prevented the drilling of borings in the alleyway north of the building. One soil boring was advanced inside the building on 5 December 2009 to characterize the vertical extent of soil PCE contamination. All soil borings were advanced manually with a stainless steel hand auger to 5 feet and then via direct push drilling to the terminus of each boring.

The soils were continuously cored in 4-foot lengths with the exception of the Location A-1 step-out boring, which was pushed directly to the terminous. The soil samples were visually examined to characterize the subsurface geology according to the Unified Soil Classification System, evaluated for visible evidence of contamination, and field screened with a PID for the presence of organic vapors. Visual observations and PID readings were used to determine the appropriate sampling intervals within each boring. Soil samples were collected in acetate liners, covered with Teflon tape, and capped with plastic end caps. All soil samples were sealed in plastic bags and stored in an iced cooler.

Groundwater was first encountered at depths of approximately 35 feet bgs, rising up to approximately 22 feet bgs. Upon reaching groundwater, temporary wells were installed using a HydroPunch sampler and ¾-inch polyvinyl chloride (PVC) pipe with 5 feet of screen at the bottom. Groundwater samples were collected using polyethylene tubing and a check valve into appropriate laboratory-provided sample containers and stored in an iced cooler.

The soil and groundwater samples from the area of the dry cleaning machines were analyzed for VOCs by EPA Method 8260B. The groundwater sample from below the former UST excavation was analyzed for TPH-gasoline/benzene, toluene, ethylbenzene, and xylenes (BTEX)/fuel oxygenates, and for water only, ethylene dibromide (EDB; syn: 1,2-dibromoethane)

and ethylene dichloride (EDC; syn:1,2-dichloroethane) by USEPA Method 8260B; and TPH-extractables by USEPA Method 8015-modified.

All borings were backfilled with neat cement. The soil cuttings were stored in one 55-gallon drum and stored on the property in preparation for disposal.

ERM reported the soils to be light brown to dark brown silts, sandy silts, and silty sands, and yellow-brown to orange-brown sandy/gravelly silts to clayey silts and gravelly clays to clays. Groundwater was encountered in three of the borings. One boring that was advanced to 35 feet bgs did not encounter groundwater. No evidence of impacts, such as odor or staining was observed in any of the borings.

The analytical results of this and past investigations are summarized on Figure 3. In general PCE was detected in the soil beneath the dry cleaning machines at concentrations ranging from not-detected at depths of 25 feet bgs and deeper, to 10.6 micrograms per kilogram (µg/kg) at 6.5 feet bgs. Outside of the building, PCE was detected in only one sample at a concentration of 4.3 µg/kg at 20 feet bgs. Toluene and Acetone were detected in low concentrations. TPH-extractables, TPH-gasoline, BTEX compounds, and fuel oxygenates were not detected in soil samples collected from beneath the former UST excavation. The concentrations of all soil analytes were below applicable screening levels.

PCE was detected in concentrations of 0.91 µg/L and 1.9 µg/L in the two groundwater samples collected next to the area of the dry cleaning machines. Chloroform was detected in concentrations of 1.7 µg/L and 1.9 µg/L. TPH-extractables, TPH-gasoline, BTEX compounds, and fuel oxygenates were not detected in the water sample collected from beneath the former UST excavation.

ERM summarized their report with the following:

- *The lack of TPH and fuel-related compounds in soil and ground water samples collected in the vicinity of the suspected former UST indicates that the former UST is not a source of TPH impacts to the subsurface.*

- *The lack of visual or other evidence of VOC impacts and the low reported concentrations of VOCs in unsaturated soils, below applicable screening levels, indicates that there is not a significant VOC source in shallow soils at the Site.*

- *The low reported concentrations of VOCs in Site ground water, below applicable screening levels, indicate that current VOC concentrations in Site ground water are lower than reported in 2008 and are not representative of significant VOC impacts.*

2.6 Well Survey Report – June 2010

ERM submitted a Well Survey Report for the Red Hanger Kleaners site to ACEH on 7 June 2010. ERM contacted the Alameda County Public Works Agency, Water Resources Section and the California Department of Water Resource, Division of Planning and Local Assistance for well information. ERM identified 26 wells within ¼-mile of the subject property. All of the identified wells were associated with environmental investigations being conducted at nearby sites.

ERM concluded that given the locations of these 26 wells relative to the subject property and the southwesterly groundwater flow direction in the vicinity, it is unlikely that the 26 wells would be potential receptors of groundwater flowing beneath the subject property or conduits to influence groundwater migration from the subject property.

3.0 Conceptual Site Model

The area of investigation is underlain by bedded light brown to dark brown silts, sandy silts, and silty sands, and yellow-brown to orange-brown sandy/gravelly silts to clayey silts and gravelly clays to clays to a depth of at least 35 feet with groundwater ranging from 15 to 22 feet bgs (Figures 3, 4, and 5). A case closure letter for an underground storage tanks site at 6201 Claremont Avenue in Oakland (less than 200 feet east of the subject property) (Reference No. 9) showed the groundwater flow direction to be southwesterly with groundwater depths ranging from 11.69 to 23.02 feet bgs.

The identified chemicals of concern are PCE and chloroform. Based on the most recent site assessment, the concentrations in the groundwater and soil appear to be below human health risk screening thresholds. The soil ingestion/absorption and groundwater exposure pathways are therefore incomplete. However, the soil gas extent and concentrations are unknown, hence the work proposed in this workplan.

The buildings in the area known to be potentially impacted are the dry cleaning business, offices, a neighboring restaurant, residential properties, and a bank. Most of the area around the buildings is surrounded by both asphaltic concrete and portland cement paving (Figure 2). The site is crossed by various underground utilities which are potential preferential pathways for contaminant migration (Figure 3).

The PCE release is most likely related to dry cleaning businesses in the area (not necessarily only Red Hanger Kleaners). Dry cleaning operations typically use chlorinated solvents, particularly tetrachloroethylene (PCE) during the dry cleaning process. These solvents, even when properly stored and disposed of, can be released from these facilities in small, frequent releases through floor drains, cracked concrete, and sewer systems. Chlorinated solvents are highly mobile chemicals that can easily accumulate in soil and migrate to groundwater beneath a facility.

The potential exposure pathways for PCE and Chloroform are vapor intrusion into buildings and into the air outside of buildings. The potential receptors would be employees in the dry cleaning business, nearby restaurant, a nearby bank and offices, customers of these businesses and occupants of nearby residences (Figure 2).

4.0 Sampling and Analysis Plan

The objectives of this sampling and analysis plan are to further evaluate the extent of PCE, chloroform, and any other dry cleaning solvent/solvent degradation product contamination in the soil gas. Prior to sampling, the sampling locations will be identified and an underground services alert will be activated.

4.1 Dry Cleaning Solvent Soil Gas Contamination Investigation

Soil gas samples will be collected at several locations (Figure 6) from depths of approximately 5 feet bgs according to the attached Soil Vapor Standard Operating Procedures (SOP) of TEG-Northern California, Inc. (Appendix B) following California Department of Toxic Substances Control and San Francisco Regional Water Quality Control Board guidelines (Reference No. 14). The data obtained by this investigation will be compared to the San Francisco Bay May 2013 update to Environmental Screening Levels (Reference No. 15) and/or evaluated according to Reference No. 12. The first choice for soil gas sample collection will be via a temporary vapor implant as described in the SOP. If the soil at a sampling point lacks sufficient permeability to generate a soil gas sample, then the post-run tubing method will be used at that location. Each sampling point will undergo a minimum of a two-hour equilibration before sampling.

Subslab samples will be collected from one or two locations within the business. Either temporary or permanent subslab sampling points will be installed as shown in the attached TEG- Northern California, Inc. figures at locations shown on Figure 6. Soil gas collection procedures will be according to the attached SOP. Each subslab sampling point will undergo a minimum two-hour equilibration before sampling.

Analyses will be performed for VOCs (including acetone, chloroform, PCE, and toluene) by EPA Method 8260B using a California Department of Health Services certified onsite mobile lab (TEG-Northern California, Inc.). Additionally, the concentration of oxygen and carbon dioxide in the soil will be measured in at least one sample. A purge volume test will be used to determine the optimum purge volume per the SOP. One duplicate sample will be analyzed. One blank sample will be analyzed. The top of the sampling point will be enclosed in a shroud and iso-propanol (IPA) will be injected onto paper towels or clean rags in the shroud during sampling to check for leaks. If the tracer is detected, the sampling train will be inspected for vacuum integrity, and if necessary, the sampling point will be reinstalled and another sample collected. Field records will be kept according to the SOP.

Samples will be analyzed on a gas chromatograph equipped with capillary columns and a combination of mass spectrometer (GC/MS), TCD, and FID detectors as needed. This combination of columns and detectors ensures compound separation, recognition, and detection at the required levels.

These detectors enable on-site analysis for volatile aromatics (BTEX) and volatile organic compounds (VOCs) (e.g. DCE, TCE, PCE, vinyl chloride) using EPA approved analytical methodology outlined in EPA Method 8260B. Output signals from each detector are processed by computer chromatography software and the results entered into a laboratory computer for on-site processing. After extraction of the sampling equipment, each sampling point will be backfilled with neat cement grout.

Daily initial calibration is performed by injecting and analyzing a mid-range calibration standard. The acceptable continuing calibration agreement is +/- 15% to 25% to the calibration curve, depending on the compound. Blanks are analyzed at the start of each day and more often as appropriate depending upon the measured concentrations. Typically, when high sample values are encountered, additional blanks may be analyzed. Duplicate samples are analyzed as needed or as requested by the regulatory agency. A MS (mass spectrometer) detector is used for absolute compound identification of VOCs. Also, a surrogate compound is added to each sample during analysis to confirm that the chromatographic retention times have not shifted during the course of the day and that surrogate recovery is adequate showing proper instrument operation and integrity.

4.2 Reporting and Schedule

Once this Sampling and Analysis Plan is approved we anticipate one to two weeks to obtain the boring permit from the Alameda County Water District and to mark the site for an Underground Services Alert. The soil gas sampling is anticipated to require one day of field work.

The report will include a narrative of the sampling activities, a site plan showing sample locations, a table of sample point installation times and equilibration times, a summary of the analytical results, a comparison of the results to the San Francisco Bay Regional Water Quality Control Board ESLs and/or a vapor intrusion risk assessment, a data quality review, and conclusions.

The preparation of the soil gas assessment report is expected to require one week. Once our client approves the report, it will be submitted to ACEH and to the State Water Resources Control Board Geotracker Website. The report will be submitted to ACEH electronically.

5.0 Closing

Youngdahl proposes to complete this work by 7 January 2015, and to submit a report summarizing our sampling activities to Alameda County Environmental Health.

If you have questions regarding this Work Plan, please do not hesitate to contact us at (916) 933-0633.

Very truly yours,
Youngdahl Consulting Group, Inc.

David C. Sederquist

CERTIFIED HYDROGEOLOGIST
DAVID C. SEDERQUIST
NO. 619
EXPIRATION DATE
9/30/2016
STATE OF CALIFORNIA

David C. Sederquist, C.E.G., C.HG.
Senior Engineering Geologist/Hydrogeologist

Attachments: Figure 1 – Vicinity Map
Figure 2 – Site Location
Figure 3 – Site Plan
Figures 4 and 5 – Cross Sections
Figure 6 – Proposed Sampling Locations
TEG-Northern California, Inc. Sub-slab Vapor Probe Diagrams
Appendix A - Health and Safety Plan
Appendix B - TEG Soil Gas Protocols

Distribution: (1) EFI Global, Inc., Attention Mr. Gary Bates
(1) Alameda County Environmental Health, Attention Ms. Dilan Roe

6.0 References

1. Phase 1 Environmental Site Assessment, 6235 College Avenue, Oakland, California, prepared by AEI Consultants (Project No. 10693), dated 18 March 2005.

2. Phase II Subsurface Investigation Report, 6293 College Avenue, Oakland, California, prepared by AEI Consultants (Project No. 11065), dated 17 May 2005.

3. Confirmation Sample Results, Red Hanger Cleaners, 6235 College Avenue, Oakland, California, prepared by EFI Global, Inc. (Project No. 98360-00-051), dated 28 June 2005.

4. Local Agency File Review, 6251 College Avenue (Historic Kay's Cleaners), Oakland, California, prepared by Basics Environmental (Project No. 08-ENV1251), dated 23 July 2008.

5. Site Characterization Workplan, Red Hanger Kleaners Site, prepared by Environmental Resources Management, dated 13 April 2009.

6. Fuel Leak Case No. RO0002981 and Geotracker Global ID T10000000416, Red Hanger Cleaners, 6335-6339 College Ave., Oakland, CA 94618, letter from Alameda County Health Services Environmental Protection, dated 14 August 2009.

7. Red Hanger Kleaners, 6239 College Avenue, Oakland, California, 2009 Site Characterization Summary Report, prepared by ERM-West. Inc., dated 20 January 2010.

8. Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, And San Francisco Counties, California, by R.W. Graymer, United States Geological Survey, 2000.

9. Fuel Leak Case No. RO00000243, Unocal #0018, 6201 Claremont Avenue, Oakland, Case Closure Letter, prepared by Alameda Department of Environmental Health, dated 28 February 2012.

10. Vapor Intrusion Pathway: A Practical Guidance, prepared by the Interstate Technology & Regulatory Council, January 2007.

11. Advisory – Active Soil Gas Investigation, California Environmental Protection Agency, March 2010.

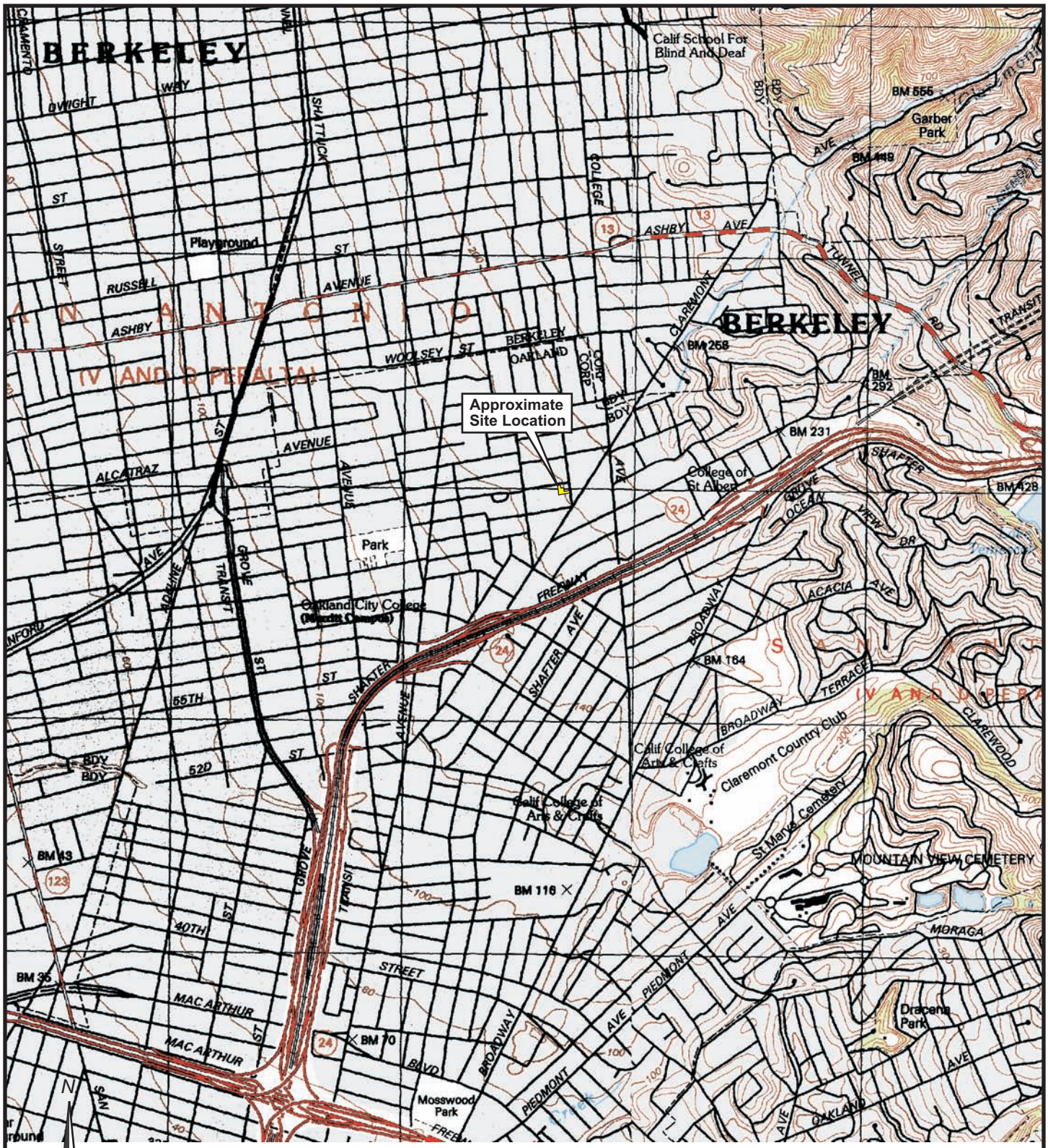
12. Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance), Department of Toxic Substances Control, California Environmental Protection Agency, October 2011.

13. Vapor Intrusion, Public Participation Advisory, Department of Toxic Substances Control, California Environmental Protection Agency, March 2012.

14. Advisory – Active Soil Gas Investigation, California Environmental Protection Agency, Department of Toxic Substances Control, Los Angeles Regional Water Quality Control Board, San Francisco Regional Water Quality Control Board, April 2012.

15. May 2013 update to Environmental Screening Levels, prepared by the San Francisco Bay Regional Water Quality Control Board, dated 23 Mary 2013.

Figures



1 ½ 0 1 Mile

1000 0 1000 3000 4000 5000 6000 7000 Feet

Scale: 1:24,000

BASE MAP REFERENCE: *U.S.G.S. 7.5 Minute Topographic Series, Oakland West Quadrangle, Dated 1993*
U.S.G.S. 7.5 Minute Topographic Series, Oakland East Quadrangle, Dated 1997

YOUNGDAHL CONSULTING GROUP, INC.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS TESTING

Project No.: E13243.000

October 2013

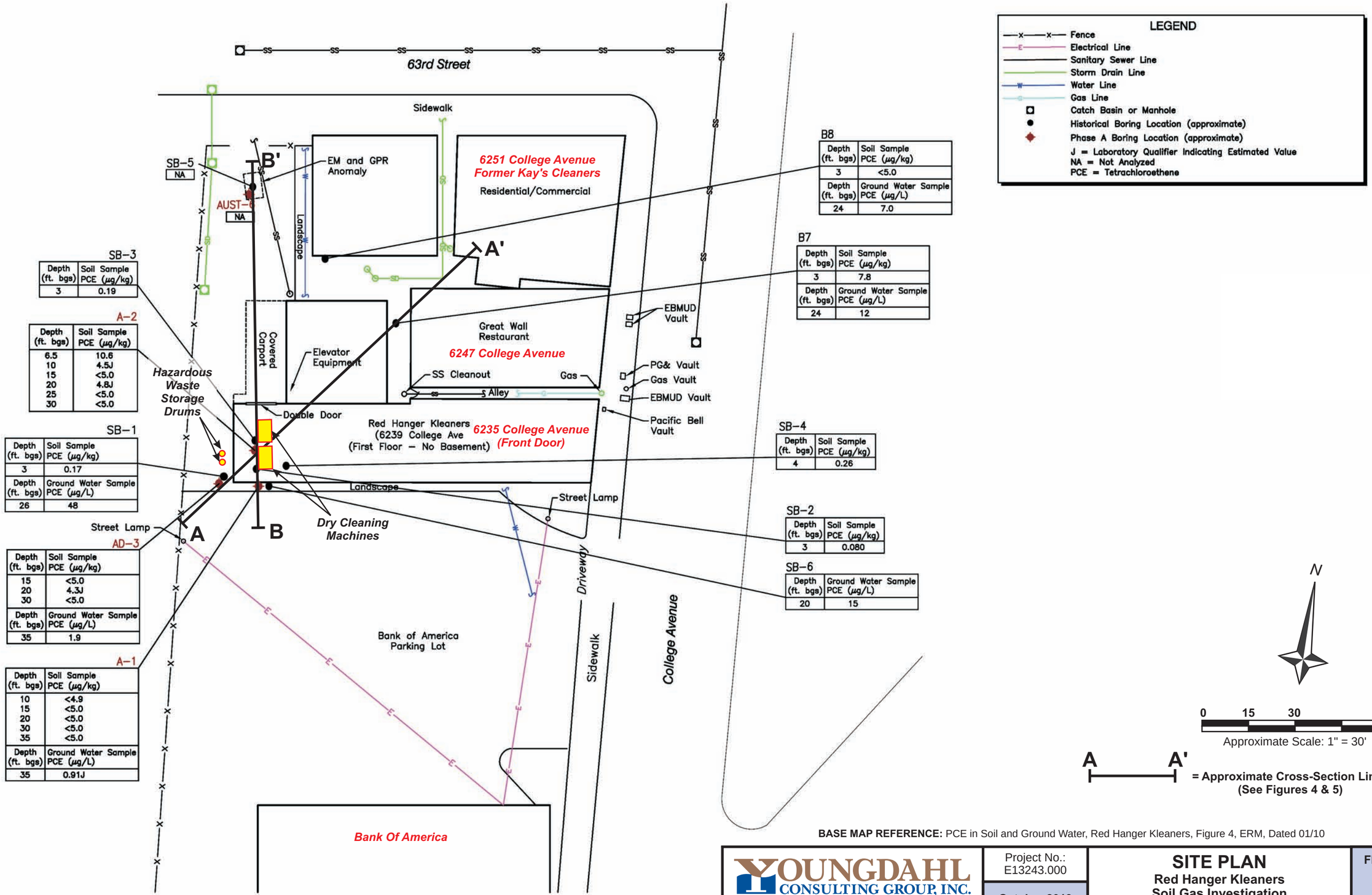
VICINITY MAP

Red Hanger Kleaners
Soil Gas Investigation
Oakland, California

FIGURE 1

BASE MAP REFERENCE: Aerial Photograph of Site, Red Hanger Kleaners, Figure 2, ERM, Dated 04/09

YOUNGDAHL CONSULTING GROUP, INC. GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS TESTING	Project No.: E13243.000 **October 2013**	**SITE LOCATION** **Red Hanger Kleaners** **Soil Gas Investigation** Oakland, California	**FIGURE** **2**



BASE MAP REFERENCE: PCE in Soil and Ground Water, Red Hanger Kleaners, Figure 4, ERM, Dated 01/10

YOUNGDAHL CONSULTING GROUP, INC.
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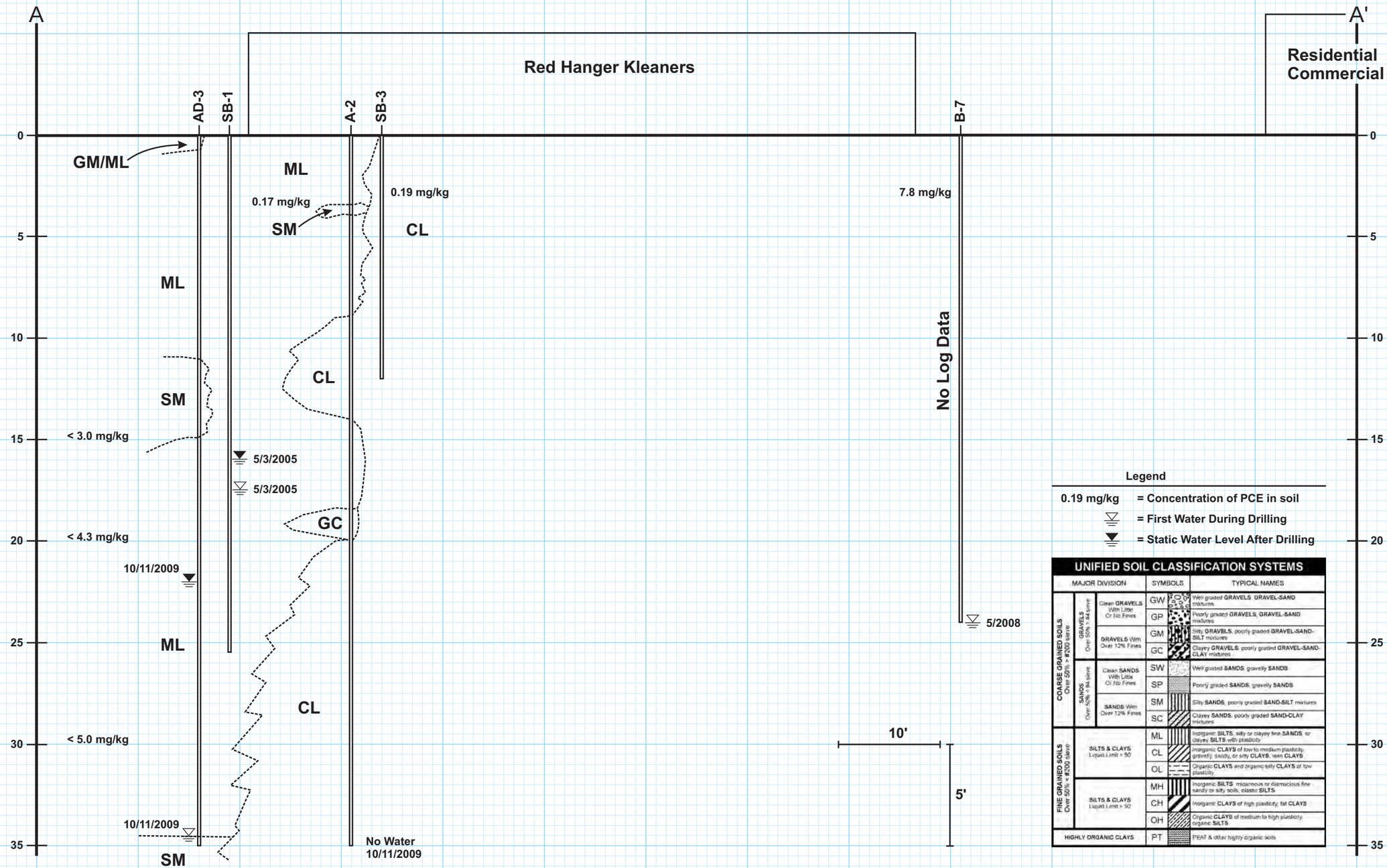
Project No.: E13243.000

October 2013

SITE PLAN

Red Hanger Kleaners
Soil Gas Investigation
Oakland, California

FIGURE 3



Legend

0.19 mg/kg	= Concentration of PCE in soil
▽	= First Water During Drilling
▼	= Static Water Level After Drilling

UNIFIED SOIL CLASSIFICATION SYSTEMS

MAJOR DIVISION			SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS Over 50% > #200 sieve	GRAVELS Over 50% > #4 sieve	Clean GRAVELS With Little Or No Fines	GW	Well graded GRAVELS, GRAVEL-SAND mixtures
			GP	Poorly graded GRAVELS, GRAVEL-SAND mixtures
		GRAVELS With Over 12% Fines	GM	Silty GRAVELS, poorly graded GRAVEL-SAND-SILT mixtures
			GC	Clayey GRAVELS, poorly graded GRAVEL-SAND-CLAY mixtures
	SANDS Over 50% > #4 sieve	Clean SANDS With Little Or No Fines	SW	Well graded SANDS, gravelly SANDS
			SP	Poorly graded SANDS, gravelly SANDS
		SANDS With Over 12% Fines	SM	Silty SANDS, poorly graded SAND-SILT mixtures
			SC	Clayey SANDS, poorly graded SAND-CLAY mixtures
FINE GRAINED SOILS Over 50% < #200 sieve	SILTS & CLAYS Liquid Limit < 50		ML	Inorganic SILTS, silty or clayey fine SANDS, or clayey SILTS with plasticity
			CL	Inorganic CLAYS of low to medium plasticity, gravelly, sandy, or silty CLAYS, lean CLAYS
			OL	Organic CLAYS and organic silty CLAYS of low plasticity
	SILTS & CLAYS Liquid Limit > 50		MH	Inorganic SILTS, micaceous or diamaceous fine sandy or silty soils, elastic SILTS
			CH	Inorganic CLAYS of high plasticity, fat CLAYS
			OH	Organic CLAYS of medium to high plasticity, organic SILTS
HIGHLY ORGANIC CLAYS			PT	PEAT & other highly organic soils

YOUNGDAHL CONSULTING GROUP, INC.
GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING

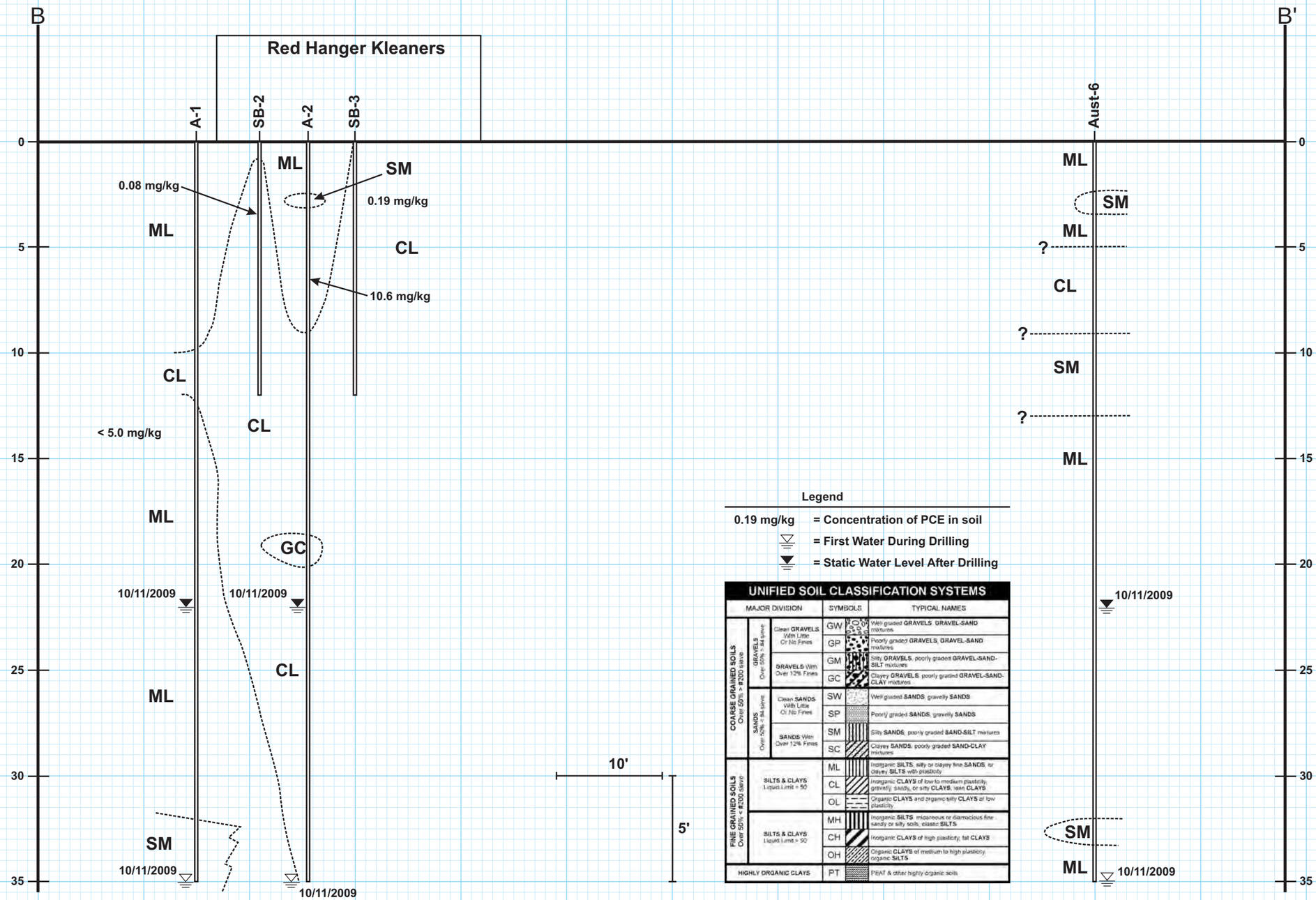
Project No.: E13243.000

October 2013

CROSS SECTION A - A'

Red Hanger Kleaners
Soil Gas Investigation
Oakland, California

FIGURE 4



Legend

0.19 mg/kg	= Concentration of PCE in soil
▽	= First Water During Drilling
▼	= Static Water Level After Drilling

UNIFIED SOIL CLASSIFICATION SYSTEMS

MAJOR DIVISION		SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS Over 50% > #200 sieve	GRAVELS Over 50% > #4 sieve — Clean GRAVELS With Little Or No Fines	GW	Well graded GRAVELS, GRAVEL-SAND mixtures
		GP	Poorly graded GRAVELS, GRAVEL-SAND mixtures
	GRAVELS With Over 12% Fines	GM	Silty GRAVELS, poorly graded GRAVEL-SAND-SILT mixtures
		GC	Clayey GRAVELS, poorly graded GRAVEL-SAND-CLAY mixtures
	SANDS Over 50% < #4 sieve — Clean SANDS With Little Or No Fines	SW	Well graded SANDS, gravelly SANDS
		SP	Poorly graded SANDS, gravelly SANDS
	SANDS With Over 12% Fines	SM	Silty SANDS, poorly graded SAND-SILT mixtures
		SC	Clayey SANDS, poorly graded SAND-CLAY mixtures
FINE GRAINED SOILS Over 50% < #200 sieve	SILTS & CLAYS Liquid Limit < 50	ML	Inorganic SILTS, silty or clayey fine SANDS, or clayey SILTS with plasticity
		CL	Inorganic CLAYS of low-to-medium plasticity, gravelly, sandy, or silty CLAYS, lean CLAYS
		OL	Organic CLAYS and organic silty CLAYS of low plasticity
	SILTS & CLAYS Liquid Limit > 50	MH	Inorganic SILTS, micaceous or diamacious fine sandy or silty soils, elastic SILTS
		CH	Inorganic CLAYS of high plasticity, fat CLAYS
		OH	Organic CLAYS of medium to high plasticity, organic SILTS
HIGHLY ORGANIC CLAYS		PT	PEAT & other highly organic soils

YOUNGDAHL CONSULTING GROUP, INC.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS TESTING

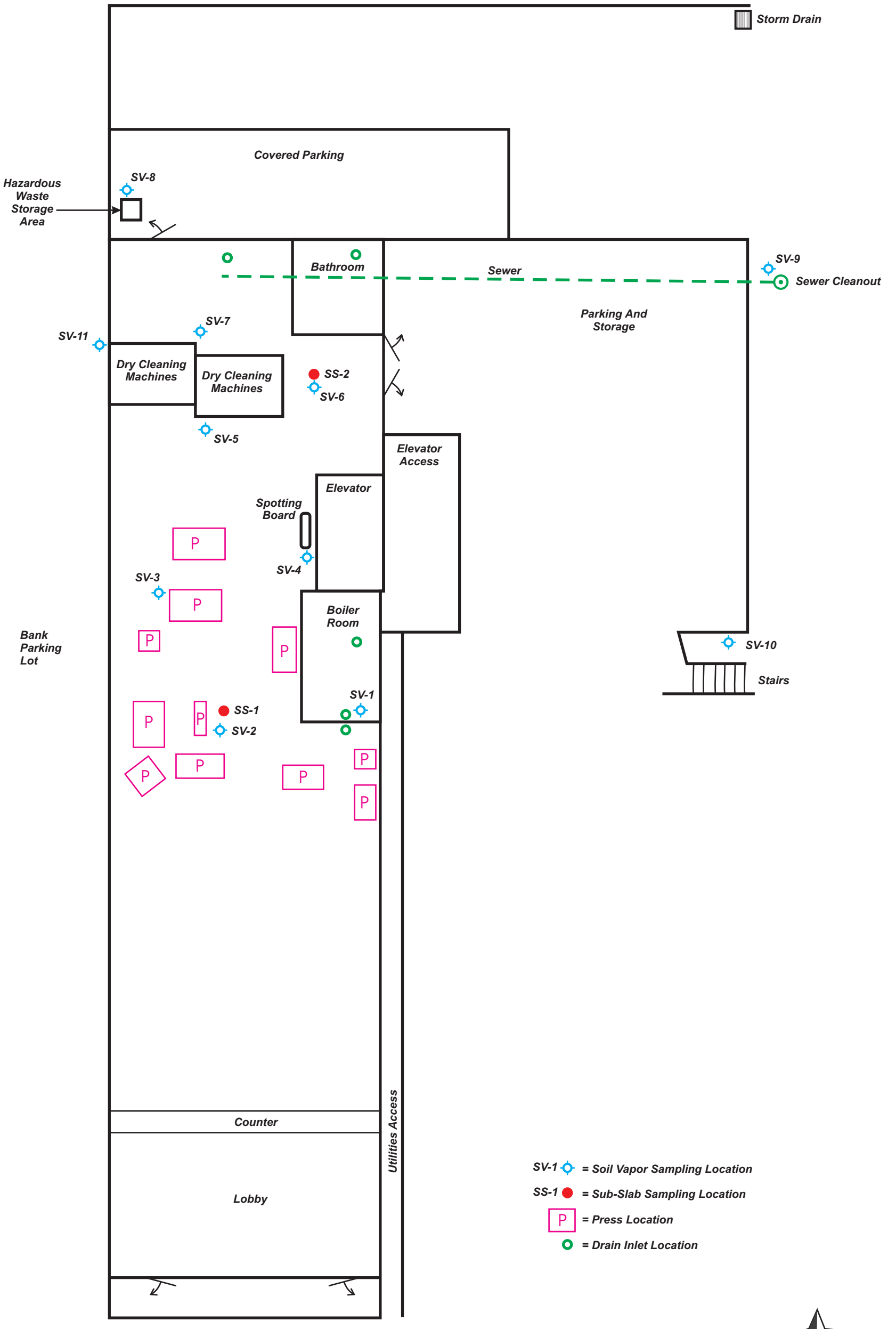
Project No.: E13243.000

October 2013

CROSS SECTION B - B'

Red Hanger Kleaners
Soil Gas Investigation
Oakland, California

FIGURE 5



YOUNGDAHL CONSULTING GROUP, INC.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS TESTING

Project No.: E13243.000

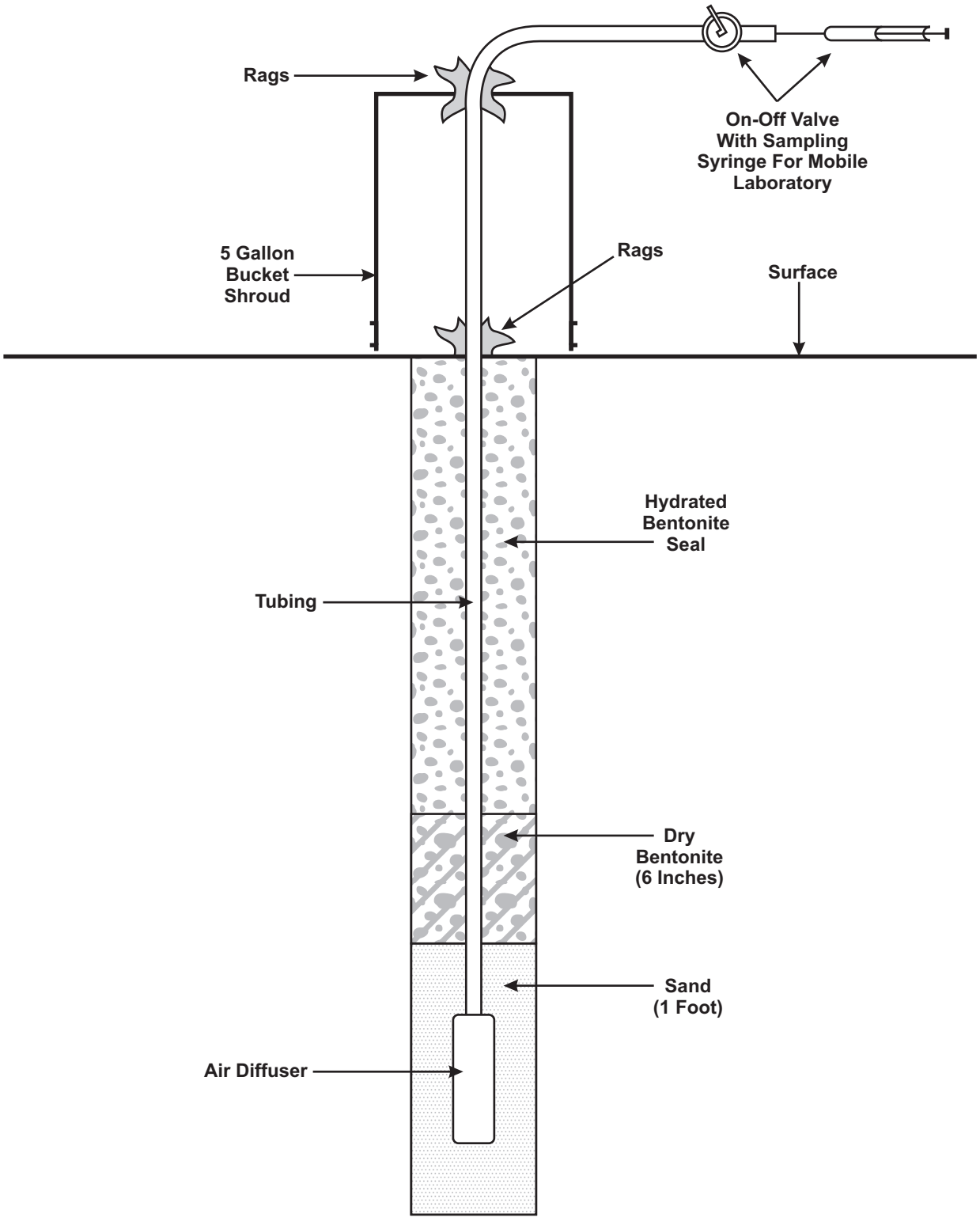
January 2014

SAMPLE LOCATIONS

Red Hanger Kleaners
Soil Gas Investigation
Oakland, California

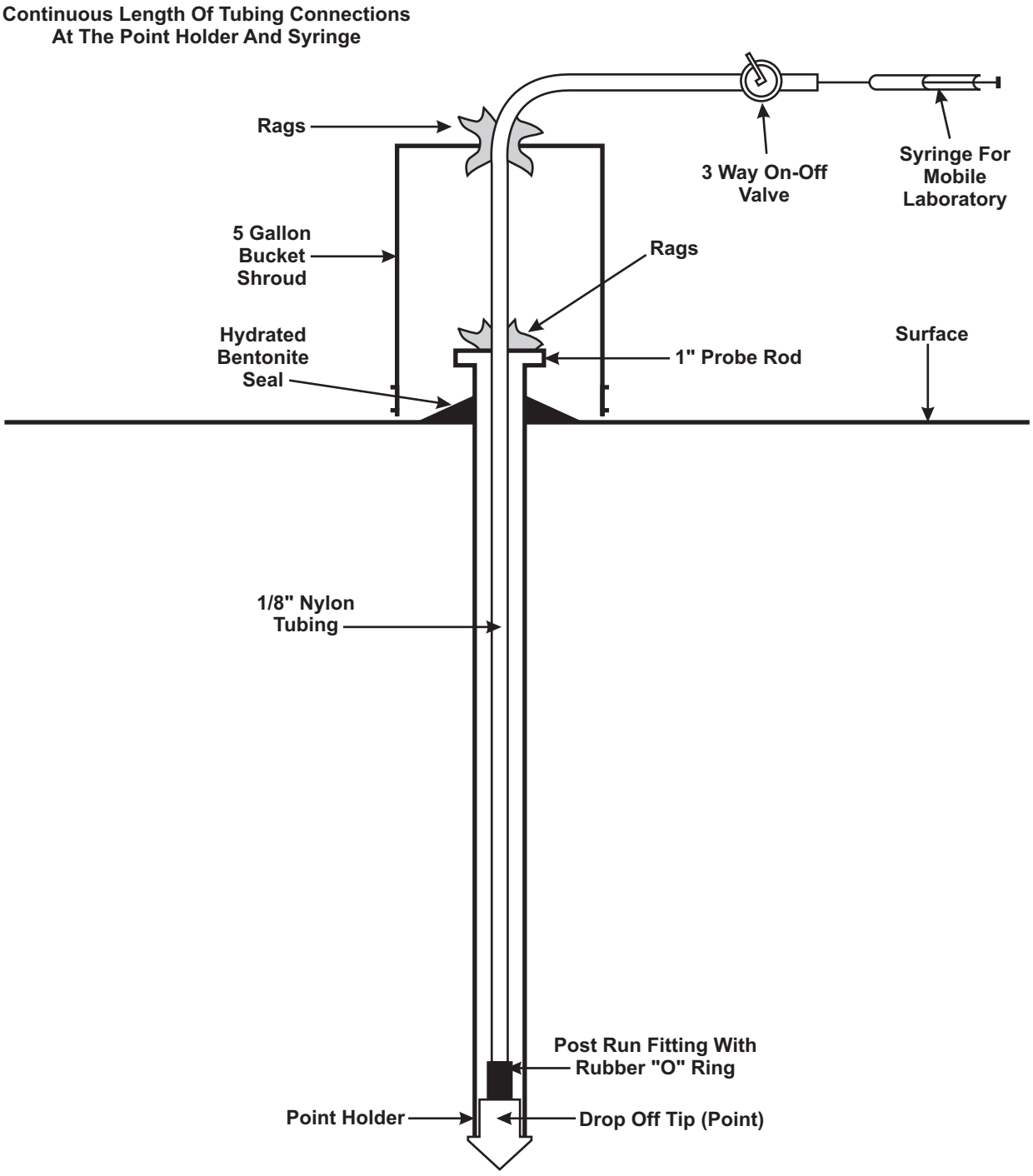
FIGURE 6

TEMPORARY SOIL VAPOR POINTS



YOUNGDAHL CONSULTING GROUP, INC. GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS TESTING	Project No.: E13243.000 October 2013	**SOIL VAPOR POINTS** **Red Hanger Kleaners** **Soil Gas Investigation** Oakland, California	FIGURE **7**

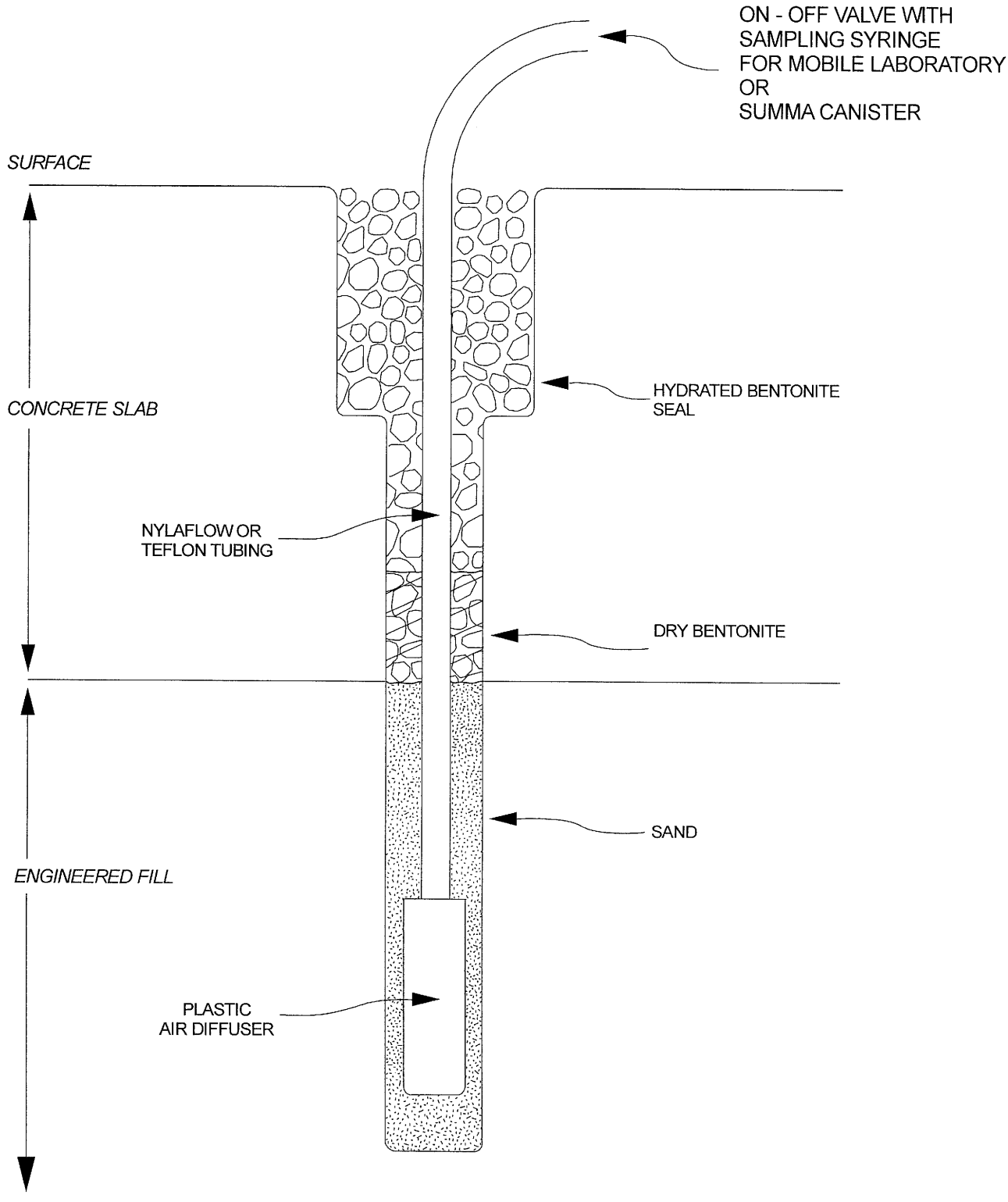
TEMPORARY SOIL VAPOR PROBE



The Only Possible Leak Points Are:

- From The Outside Of The Rod
- The Connection At The Syringe
- The Post Run Fitting At The Point Holder

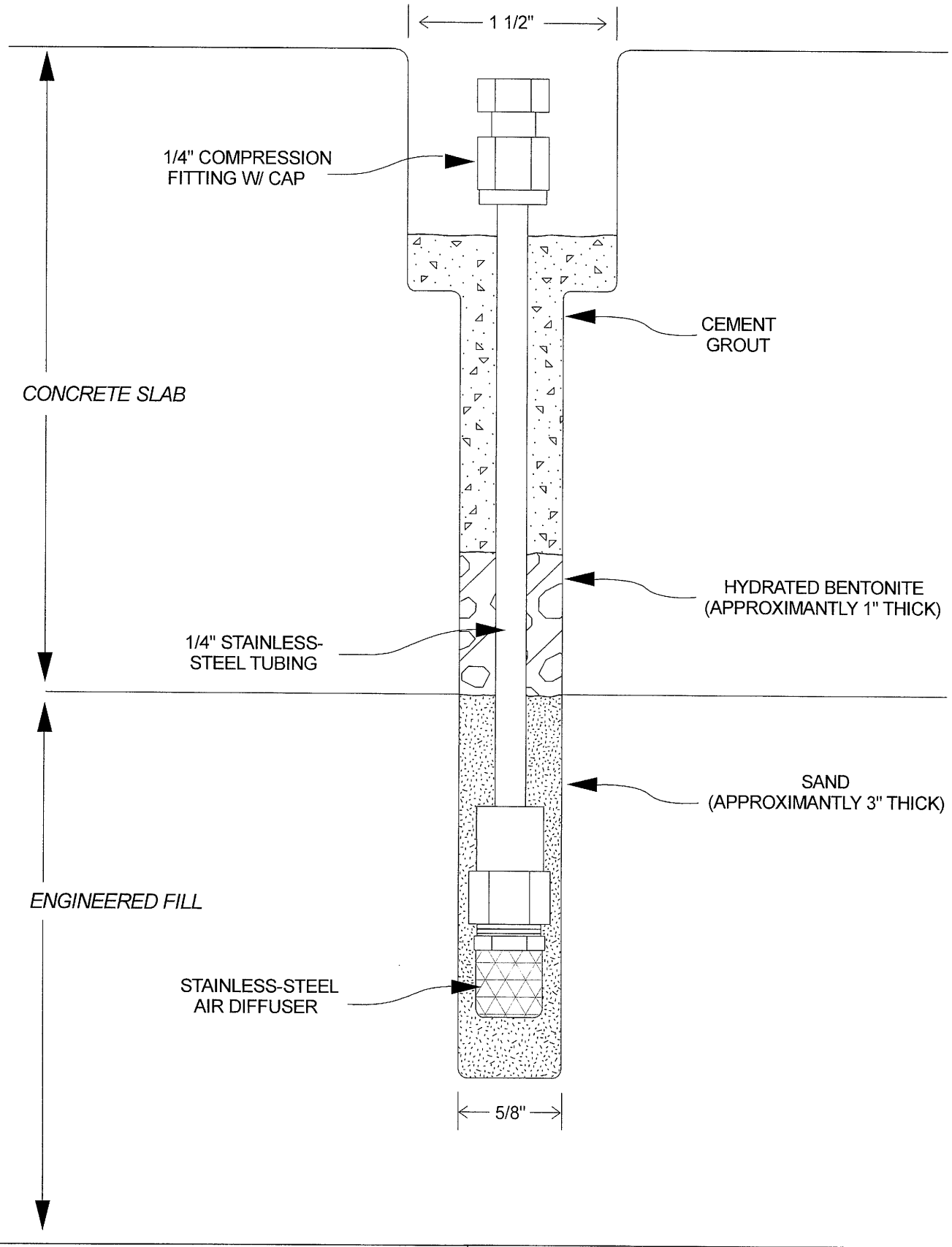
YOUNGDAHL CONSULTING GROUP, INC. GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS TESTING	Project No.: E13243.000 October 2013	**SOIL VAPOR PROBE** **Red Hanger Kleaners** **Soil Gas Investigation** Oakland, California	**FIGURE** **8**



TEG-TSUBSVP2

TEMPORARY SUB-SLAB
SOIL VAPOR PROBE

teg TEG - Northern California, Inc.
11350 MONIER PARK PLACE, RANCHO CORDOVA, CALIFORNIA 95742



TEG-SUBSVP2

PERMANENT SUB-SLAB SOIL VAPOR PROBE

teg TEG - Northern California, Inc.
11350 MONIER PARK PLACE, RANCHO CORDOVA, CALIFORNIA 95742

Appendix A
Health and Safety Plan

YOUNGDAHL CONSULTING GROUP, INC.
Building Innovative Solutions
1234 Glenhaven Court, El Dorado Hills, Ca 95762
5750 Arabian Lane, Loomis, Ca 95650
ph 916.933.0633 fx 916.933.6482
www.youngdahl.net

HEALTH AND SAFETY PLAN
FOR
PHASE II ENVIRONMENTAL SITE ASSESSMENT
SOIL GAS INVESTIGATION
RED HANGER KLEANERS
6335-6339 COLLEGE AVENUE, OAKLAND, CALIFORNIA

PREPARED BY:
YOUNGAHL CONSULTING GROUP, INC.
1234 GLENHAVEN COURT
EL DORADO HILLS, CALIFORNIA 95762

REQUIRED PERSONAL PROTECTIVE EQUIPMENT

Required Equipment	Item Description	Text Reference
Chlorinated Solvents (PCE) & Chloroform	CHEMICALS OF CONCERN	Section 3.0
Level D	EPA LEVEL PPE	Section 3.0
Hard Hat	HEAD PROTECTION	Section 3.0
Safety Glasses	EYE/FACE PROTECTION	Section 3.0
Work/Rubber Gloves	HAND PROTECTION	Section 3.0
Snug-Fitting Clothes	BODY PROTECTION	Section 3.0
None	LUNG PROTECTION	Section 3.0
Drilling Equipment	EAR PROTECTION	Section 3.0
High Top Leather Boots	FOOT PROTECTION	Section 3.0

EMERGENCY TELEPHONE NUMBERS

(510) 655-4000	Alta Bates Summit Med Center, 350 Hawthorne Ave, Oakland 94609
911	Emergency (Local Fire Department)
(800) 342-9293	Poison Control Center
(800) 424-8802	National Response Center
(916) 933-0633	Project Managers - David Sederquist
(832) 518-5145	Client Contact – EFI Global, Inc., Mr. Tim Herbert

HEALTH AND SAFETY PLAN
FOR
PHASE II ENVIRONMENTAL SITE ASSESSMENT
SOIL GAS INVESTIGATION
RED HANGER KLEANERS
6335-6339 COLLEGE AVENUE, OAKLAND, CALIFORNIA

1.0 INTRODUCTION

The purpose of this soil gas survey is to investigate for chlorinated solvents, particularly tetrachloroethylene (PCE) and chloroform. This document describes the health and safety procedures for the collection of soil gas samples. Soil gas samples will be collected at four (4) locations from depths of approximately 5 feet in accordance with the Soil Vapor Standard Operating Procedures (SOP) of TEG-Northern California, Inc. Analyses will be performed for VOCs (including acetone, chloroform, PCE, and toluene) by EPA Method 8260B using a California Department of Health Services certified onsite mobile lab operated by TEG-Northern California, Inc. Additionally, the concentration of oxygen and carbon dioxide in the soil will be measured in at least one sample.

All Youngdahl employees will follow this plan. The prime responsibility for employee safety lies with each company for its own employees. It is expressly intended that all project work will be undertaken in accordance with this Health and Safety Plan, prepared in accordance with Title 8 California code of Regulations, Section 5192. This section requires workers coming into contact with contaminated soil have Hazardous Waste Operations and Emergency Response (HAZWOPER) training and be under medical surveillance. Each field team member will maintain a general responsibility to identify and correct any health and safety hazards and cooperate toward working as safely as possible.

1.1 Project Background and Contaminants of Potential Concern

The Red Hanger Kleaners site is located at 6335-6339 College Avenue in a mixed commercial and residential area of Oakland, and consists of a three-story building, a parking area, and associated landscaping. The building is currently occupied by various tenants, including a dry cleaning facility. The Red Hanger Kleaners business has been at this location since about 1987. A Phase I Environmental Site Assessment in 2005 identified a past underground storage tank (UST) at this location and the sites use as a dry cleaning business. A Phase II Environmental Site Assessment in 2005 identified a release of PCE and chloroform. The suspected UST was searched for as a part of this assessment, only to find a filled-in excavation that once likely held a UST. Subsequent assessments identified that the groundwater was not as contaminated as originally indicated and all of the PCE concentrations in soil and groundwater were below human health screening levels. A review of regulatory agency files identified other nearby properties with past dry cleaning site use. The Red Hanger Kleaners site is assigned Alameda County Environmental Health Case No. RO00002981 and California State Water Resources Control Board Geotracker Global ID T10000000416.

The PCE release is most likely related to dry cleaning businesses in the area (not necessarily only Red Hanger Kleaners). Dry cleaning operations typically use chlorinated solvents, particularly tetrachloroethylene (PCE) during the dry cleaning process. These solvents, even when properly stored and disposed of, can be released from these facilities in small, frequent releases through floor drains, cracked concrete, and sewer systems. Chlorinated solvents are highly mobile chemicals that can easily accumulate in soil and migrate to groundwater beneath a facility.

1.2 Project Description

<u>Soil Gas Survey for Volatile Organic Compounds</u>
Soil gas samples will be collected at four (4) locations from depths of approximately 5 feet by TEG-Northern California, Inc. All gas samples will be analyzed using TEG- Northern California, Inc.'s on-site laboratory for volatile organic compounds (VOCs) (including acetone, chloroform, PCE, and toluene by EPA Method 8260B.

2.0 KEY PERSONNEL

Project personnel who will have overall responsibility for the safe operation of this project and who is HAZWOPER trained is David C. Sederquist, C.E.G., C.HG.

2.1 Youngdahl Consulting Group, Inc. Project Director and Project Safety Officer Responsibilities

- Conduct, in conjunction with site personnel, initial site safety training for all project field team members as described in this document,
- Assure all Youngdahl Consulting Group, Inc., field team personnel have read and understand the Health and Safety Plan,
- Assure that all work performed by Youngdahl Consulting Group, Inc., personnel is conducted in accordance with safe practices outlined in this plan,
- Coordinate with site personnel for fire-watch, traffic control, and security services at the site,
- Monitor activities to insure the proper use of personal protective equipment,
- Insure safety equipment for use by Youngdahl Consulting Group, Inc., personnel is maintained in a usable condition,
- Initiate outside emergency phone calls when an emergency or accident requires medical attention, and
- Shut down or modify field work activity based on criteria presented in this document.

3.0 HAZARD EVALUATION

This Health and Safety Plan addresses specific on-site work activities relevant to collecting samples and data. This plan covers anticipated activities and hazards, and makes provision for modification or amendment as health-related data are developed through these work plan investigations. This plan will be amended with site-specific hazard assessments for sites identified as posing potentially unusual health hazards for workers. The Safety Officer will amend the Health and Safety Plan as needed. As air, water, soil, and chemical substance monitoring and analysis data become available for site work, the information will be evaluated by the Safety Officer.

Mechanical Hazards – Slip, trip, and fall hazards and muscular injury potential caused by overexertion.

Biological Hazards – None anticipated.

Chemical Hazards – Exposure to chlorinated solvents (tetrachloroethylene - PCE) and chloroforms.

Fire Hazards – None anticipated. Smoking is not allowed on the site.

Acoustical Hazards – Noise from drilling equipment. Sound volumes can be mitigated by distance from source and/or ear plugs. Ear plugs will be provided on site for all personnel.

Stress Hazards – Overexertion, particularly in hot temperatures; exposure to too much sun (heat stress, ultraviolet light). Heat stress may occur during the warmer portion of the day. Exposed portions of the skin and eyes are subject to ultraviolet radiation causing sunburn.

Excavation Collapse Hazards – None anticipated.

Buried Utility Hazard – Buried utilities could be encountered during excavation.

4.0 SAFE WORK PRACTICES AND LEVEL OF PERSONAL PROTECTION

The following sections present procedures on how to address safely the primary potential hazards encountered in the different tasks of this project. The standard level of personal protection is also defined. Based on the work to be performed and the hazards that may be encountered, EPA Level D personal protection has been determined to be adequately protective and suitable for the tasks in this project. All tasks require Level D protection while certain unexpected tasks may require more stringent protection. These determinations will be made by the Safety Officer and modifications to work practice and the required level of personal protection will be specified as amendments to this section of the plan.

Depending on site conditions the Project Director, in coordination with the Safety Officer, may increase or decrease the level of personal protection. Such decisions will be made based on field observations collected as work is conducted. Youngdahl will use the following general guidelines representing EPA Level D personal protection:

- Hard hats and high top leather boots required, rubber boots are required if water or rainy conditions are encountered. Eye protection is recommended. Rubber gloves should be worn while sampling and decontaminating sampling equipment.

- All field personnel will wear protective equipment. Shirts and long pants are required to be worn at all times, shorts will not be worn. High-top and steel toed leather boots should be worn for foot protection.

5.0 PERSONAL PROTECTIVE EQUIPMENT

Protective Clothing: All field personnel will wear protective equipment. Shirts are required to be worn at all times, shorts will not be worn. Steel toed leather boots should be worn for foot protection. Hard hats are required when working in the vicinity of heavy equipment. Rubber gloves should be worn while soil sampling and while decontaminating sampling equipment. Ear plugs will be provided for hearing protection.

6.0 WORK ZONES AND SITE SECURITY

The work zone where workers may come in contact with contaminated soil is surrounding the drill rig during the removal of asphaltic concrete and/or soil for the advancement of geotechnical boring and during soil sample collection. The area surrounding the drill rig will be delineated with orange cones. Safe work practices shall be in place to limit site access to unauthorized personnel. Tailgate safety meetings shall be conducted as needed. Eating, drinking, and smoking in the work zone is prohibited.

7.0 DECONTAMINATION PROTOCOL

Decontamination of personnel is not specified as contamination is not anticipated. Decontamination of equipment will be performed by washing in an alkanox solution then triple rinsing in DI water between sampling events. Personnel should wear rubber gloves and eye protection during this process.

8.0 EMERGENCY RESPONSE PLAN

Emergency procedures listed in this plan are designed to give the field team instruction in handling medical emergencies and fires during sampling activities. The phone number for the nearest hospital with emergency facilities and a map to the hospital from the work site is included with this document. A cellular telephone will be available at the work site.

Medical problems occurring on-site will be handled quickly. Emergency telephone numbers will be written down and posted in the passenger compartment of the Youngdahl Consulting Group, Inc. field vehicle. The field team will be instructed to seek immediate professional medical attention for all serious injuries. A first aid kit will be present at the site for use in case of minor injuries.

9.0 MEDICAL SURVEILLANCE

Medical surveillance shall be provided for those individuals who are or may be: exposed to hazardous substances or health hazards at or above the established permissible exposure limit, above the publish exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year and all employees who wear a respirator for 30 days or more a year or as required by OSHA 29 CFR 1910.134.

ALL PROJECT FIELD STAFF

All project staff must sign, indicating that they have read and understand the Health and Safety Plan for this project. A copy of this Health & Safety plan must be readily available at the job site**.**

Employee Name	Date Distributed	Signature
David C. Sederquist		

VISITORS & EMPLOYEES

All visitors must sign, indicating that they have received a copy of this Health and Safety Plan and will comply with applicable OSHA, EPA, and local government rules and regulations.

Employee Name	Firm Name	Date	Signature

SUPPLIES CHECKLIST

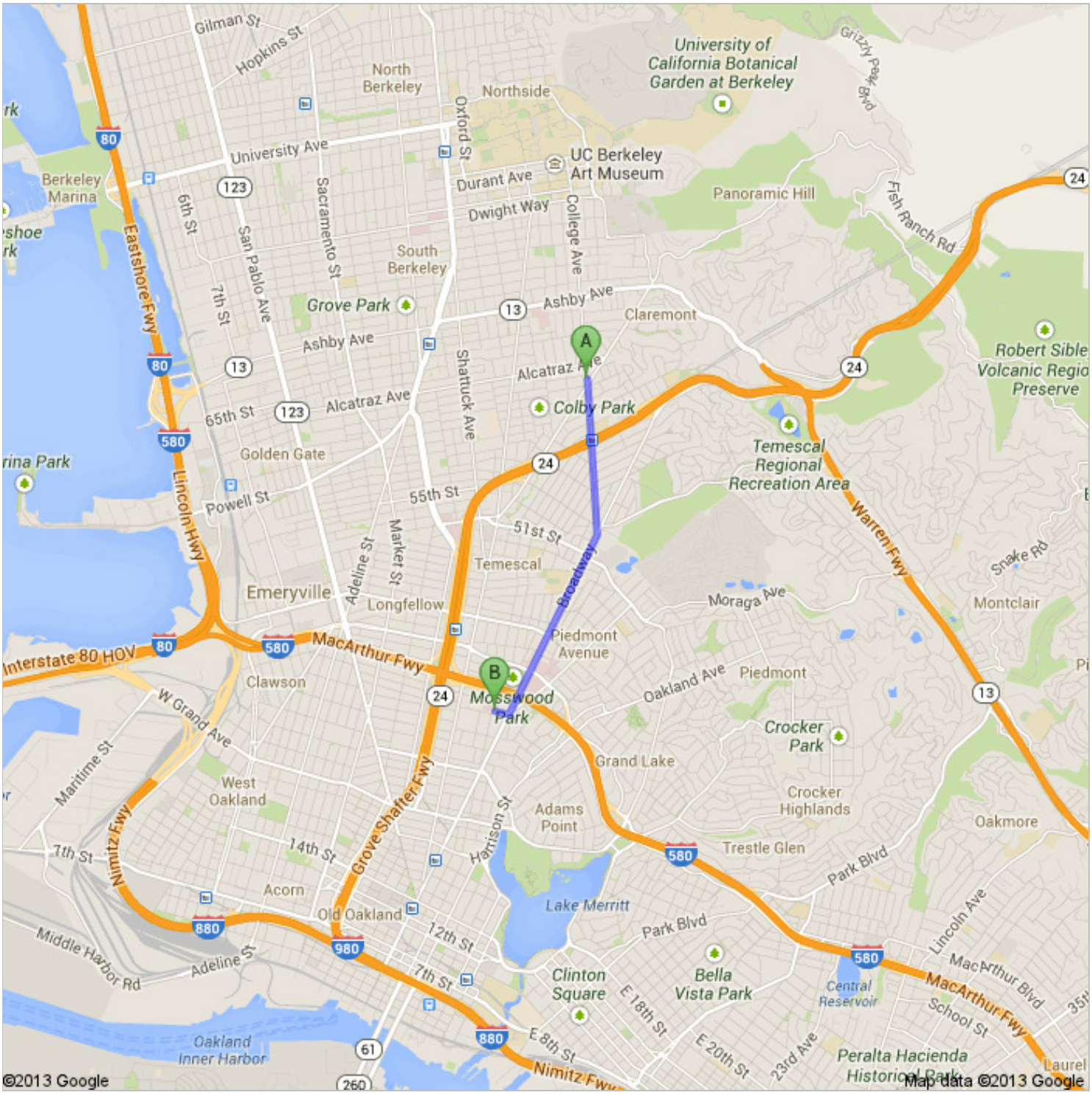
__x__ File Information
__x__ Client Information
__x__ Work Plan
__x__ Telephone Nos.
__x__ Safety Vests
__x__ 3 Cleaning Buckets
__x__ Scrub Brushes
__x__ Zip-Lock Bags
__x__ Sampler
__x__ Trowel
__x__ Hammer
__x__ Garbage Bags
__x__Traffic Safety Cones
__x__Chain-of-Custody Forms
__x__ Health & Safety Plan
__x__ Contractor Information
__x__ Fire Extinguisher
__x__ First Aid Kit
__x___End Caps
__x__ Deionized Water
__x__ Dust Suppression Equipment
__x__ Spade
__x__ Shovel
__x__ Teflon Sheeting
__x__ Business Cards
__x__ Wash Water

The above items are marked with a check if collected for this investigation or "na" if not applicable as determined by the project health & safety officer.

Date: _____ Responsible Employee: _____

Google

Directions to 350 Hawthorne Ave, Oakland, CA 94609
2.2 mi – about **7 mins**



A 6239 College Ave, Oakland, CA 94618

1.	Head **south** on **College Ave** toward **62nd St** About 3 mins	go 0.9 mi total 0.9 mi
2.	Continue onto **Broadway** About 4 mins	go 1.2 mi total 2.2 mi
3.	Turn right onto **Hawthorne Ave** Destination will be on the right	go 459 ft total 2.2 mi

B 350 Hawthorne Ave, Oakland, CA 94609

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

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Appendix B
TEG Soil Gas Protocols

Soil Vapor Standard Operating Procedures

TEG-Northern California, Inc.

Fulfilling CA-EPA (DTSC), LA-RWQCB, and SF-RWQCB
Advisory – Active Soil Gas Investigations **(April 2012)**

Revision 5

January 2013

Soil Gas Sampling Procedures

Probe Construction and Insertion

TEG's hydraulically or manually driven soil vapor probes are constructed of either 1.0, 1.25, or 1.5 inch outside diameter steel probe rods and equipped with a hardened drop-off steel tip. The probes are nominally 4 feet long and threaded together to reach multiple depths. The probe rod is driven into the subsurface with TEG's *Strataprobe*™ direct-push system, or by an electric rotary hammer. Once inserted to the desired depth, an inert 1/8 inch nylaflow tube is threaded down the center of the probe rod and connected to a sampling port just above the drop-off tip. Teflon tubing can also be used if needed. This internal, disposable sample tubing design eliminates any contact between the probe rod and the soil vapor sample. The probe is retracted slightly to expose the vapor sampling port. The probe rod is sealed at the surface with granular and hydrated bentonite and allowed to equilibrate for a minimum of 2 hours before sampling. After a sample is obtained the tubing is removed and the probe rod advanced to the next sampling depth or removed. This design prevents clogging of the sampling port and cross-contamination from soils during insertion.

Alternately, a temporary vapor implant can be installed in an open hole created by a direct push probe rod as above, or in some cases by hand augering. For same day sampling, an inert, plastic sparge implant tip is typically installed in the middle of a one foot sand pack with 1/8 or 1/4 inch diameter nylaflow tubing running from the tip to the surface. Teflon tubing can also be used if needed. Dry bentonite is placed in the hole above the sand pack, followed by hydrated bentonite to the surface, to complete the vapor point installation and seal the sand pack zone from other zones and ambient air. If the implants are to be installed for a longer period of time for later sampling or to allow for resampling, a stainless steel sparge implant tip is recommended instead of plastic. The vapor implant is allowed to equilibrate, before sampling, for a minimum of 2 hours for sampling points installed by direct push, or 48 hours for points installed by hand augering.

Soil Gas Sampling

A syringe is used to place a vacuum on the sample train to test the integrety of all the conections from the surface to the sampling tip. Soil vapor is withdrawn from the end of the inert nylaflow tubing sample train that runs from the sampling tip to the surface using a 20 to 100 cubic centimeter (cc) syringe or gas tight canister (Summa) connected via an on-off valve. The probe tip and sampling tubing is nominally purged of three internal dead volumes, or based upon a pre-determined purge volume as established by a purge volume test as described below. A sample of in-situ soil vapor is then withdrawn and immediately transferred to the mobile lab for analysis within minutes of collection. The use of small calibrated syringes allows for careful monitoring of purge and sample volumes. This procedure ensures adequate sample flow is obtained without excessive pumping of air or introduction of surface air into the sample.

For off-site analysis, samples are collected in stainless steel canisters, or in tedlar bags when allowed. Samples collected in tedlar bags for VOC analysis are either analyzed within six hours or transferred to a canister.

<u>Purge Volume Test</u>

If required, a site specific purge volume test is conducted at the beginning of the soil gas survey to purge ambient air from the sampling system. Three different volumes are sampled (nominally 1, 3, 10 purge volumes) and analyzed immediately to determine the volume amount with the highest concentration. This optimum purge volume, based on the purge volume test, is achieved and used during the entire site investigation.

Use of Tracer Compound to Ensure Probe Seal Integrity

A tracer compound, typically 1,1 difluoroethane (1,1 DFA), iso-propanol (IPA), or hexane is used to test for leaks around the probe rod at the ground surface and in the sampling system. The tracer is placed around the base of the probe rod and at the top of the probe rod during sample collection. If the tracer is detected per CA-EPA (DTSC), LA-RWQCB, and SF-RWQCB *Advisory – Active Soil Gas Investigations* (April 2012) specifications, the sampling train is inspected for vacuum integrity, and if necessary the sample point is reinstalled, and another sample is collected.

Sample Flow Rate

Sample collection is timed so that the flow rate does not exceed 200 milliliters per minute. This is accomplished by withdrawing the plunger on the syringe at a constant rate of 3 milliliters per second. The collector notes the collection time, and also records any resistance to sample flow that is felt on the syringe during collection.

Summa Canister

Summa canisters are connected to the end of the nylaflow tubing to the same three way valve used with the syringe. A choke is placed on the canister to ensure that the flow rate is no more than 200 milliliters per minute into the summa canister.

Field Records

The field technician maintains a logsheet summarizing:

-- Sample identification

-- Probe location

-- Date and time of sample collection

-- Sampling depth

-- Identity of samplers

-- Sampling methods and devices

-- Soil gas purge volumes

-- Volume of soil gas extracted

-- Observation of soil or subsurface characteristics (any condition that affects sample integrity)

-- Chain of custody protocols, if needed, and records used to track samples from sampling point to analysis.

Analytical Methodology

The following typical analytical protocols fulfills the specific EPA analytical methods and the most recent CA-EPA (DTSC), LA-RWQCB, and SF-RWQCB *Advisory – Active Soil Gas Investigations* (April 2012) (the advisory documents).

Operating Conditions and Instrumentation

Volatile Organic Compounds (VOCs) by EPA 8260

Instrument: Agilent 6850/5973N or 6850/5975N GCMS
Column: 20 meter DB-624, 0.18mm x 1.0u. capillary.
Carrier flow: Helium at 1.0 ml/min.
Detectors: Quadrupole MS, full scan mode or SIM
Concentrator: Tekmar 3000/Archon or Tekmar 3100/Archon

Fixed and Biogenic Gases (O2, CO2, & Methane)

Instrument: SRI 8610 or Carle AGC 311 Gas Chromatograph
Column: 6 foot CTR
Carrier flow: Helium at 15 ml/min.
Detectors: Thermoconductivity (TCD) for O2 & CO2.
Detectors: Flame ionization detector (FID) or TCD for methane.

Hydrogen Sulfide

Instrument: Jerome 631x
Detectors: Gold-film

Standard Preparation

Primary (stock) standards: Made from certified neat components or from traceable standards purchased from certified suppliers.

Secondary (working) Standards: Made by diluting primary standard. Typical concentrations are 1ug/ml, 10 ug/ml, and 50 ug/ml.

Laboratory Check Samples are prepared at the midpoint concentration from a standard purchased from a source different than the primary standards.

Lot numbers and preparations of all standards are recorded on a log sheet and kept in the mobile laboratory.

Initial Multi-Point Calibration Curve

An initial calibration curve of multiple points as per the individual method requirements, is performed either:

-- At the start of the project.

-- When the GC column or operating conditions have changed.

-- When the daily mid-point calibration check cannot meet the requirements as specified below.

Calibration curves for each target component are prepared by analyzing low, mid, and high calibration standards covering the expected concentration range. A linearity check of the calibration curve for each compound is performed by computing a correlation coefficient or an average response factor (RF). If a correlation coefficient (r) of 0.99, or a percent relative standard deviation (%RSD) of +/- 30% of the RF, is obtained, an average response factor is used over the entire calibration range. If the linearity criteria are not obtained, the mean of the RSD values can be calculated, or quantitation for that analyte is performed using a calibration curve as per the method (e.g. EPA 8260B). Details of various calibration procedure details are outlined in the method.

After each initial multi-point calibration, the validity of the curve is further verified with a laboratory control standard (LCS) typically prepared at the mid-point of the calibration range. The LCS includes target compounds, and the response factor (RF) should fall within +/- 20% of the RF from the initial calibration curve as per the advisory documents, adjusted to the published accuracy of the LCS standard.

Continuing Calibration (Daily Mid-point Calibration Check)

Calibration Check Compounds (CCCs) are prepared from a traceable source and analyzed at the beginning of each day. Acceptable CCC agreement is set at +/- 20% to the average response factor from the calibration curve. When calibration checks fall outside this acceptable range for analytes detected on the site, corrective action, consisting of verification of the standard and/or a new calibration curve for the analytes out of specifications is performed by the on-site chemist.

The continuing calibration includes all compounds expected or detected at the site in addition to any specific compounds designated in the project workplan.

Reporting Limits

Typical reporting limits are outlined below:

Compound	Detector	Report Limit
VOCs by 8260B	Mass Spec	1.0 to 0.01 ug/l-vapor
Methane	FID	1000 ppmv
Fixed Gases	TCD	1% by vol
H2S	Gold Film	0.10 ppmv

Injection of Soil Gas Samples

Vapor samples from the probe sampling syringe are injected with surrogates into a purge & trap instrument for VOC analysis. Separate aliquots are directly injected into gas chromatographs for fixed gases and methane analysis

Laboratory Data Logs

The field chemist maintains injection and sample analysis records including date and time of analysis, sampler's name, chemist's name, sample ID number, concentrations of compounds detected, calibration data, and any unusual conditions.

Quality Control Procedures

Compliance With Standards

Sampling and analytical procedures complied with the CA-EPA (DTSC), LA-RWQCB, and SF-RWQCB *Advisory – Active Soil Gas Investigations* (April 2012).

Sampling Quality Control

Method Blanks

Prior to sampling each day, all components of the sampling system are checked for contamination by drawing ambient air from above ground through the sampling equipment, and injecting a sample into a gas chromatograph. The analysis results are recorded in the data tables as blanks.

Sample Quality Control

Each sample is given a unique identification number specifying location and depth. Purge and sample volumes are monitored closely using small calibrated syringes to assure a proper flow of soil gas. This ensures a representative sample is obtained from the sample zone without excessive pumping, which could result in sampling of surface air.

Decontamination Procedures

To minimize the potential for cross-contamination between sites, all external soil vapor probe parts are wiped or washed cleaned of excess dirt and moisture with solvents or potable water as appropriate. The probe's internal nylaflow tubing is purged with clean air between sampling locations or replaced as necessary. Sampling syringes are flushed with clean air after each use, baked in an oven, or replaced.

Corrective Action

Corrective action is taken when unexpected contaminant levels are detected. First duplicate samples are taken to verify the initial detection of contamination. If contamination is suspected, then the sample probes are disassembled, wiped cleaned of excess dirt and moisture, rinsed with potable water, washed with Alconox and water, and rinsed again with potable water. The sample tubing in the probe is replaced. Contaminated sampling syringes are baked in an oven or discarded.

Analytical Quality Control

Method Blanks

Method blanks are performed at the start of each day by drawing clean air through the sampling equipment and analyzing. These blanks verify all components of the sampling and analytical system are free of contamination. Additional blanks are performed more often as appropriate depending upon the measured concentrations, generally at a minimum 1 every 20 samples. Blank analyses are typically recorded in the data tables. If a blank shows a measurable amount of any target compound, the on-site chemist will investigate and determine the source, and resolve the contamination problem prior to analyzing any samples.

Duplicate Samples

Duplicate (repetitive) analysis of a sample is performed when inconsistent data are observed, but typically at least one every 20 samples. Because soil vapor duplicates can vary widely, nominal relative percent difference (RPD) acceptance criteria is $\pm$ a factor of 2.

Continuing Calibration (Daily Mid-point Calibration Check)

As described earlier, continuing calibration standards prepared from a traceable source are analyzed at the beginning of each day.

Laboratory Check Standard

Laboratory check standards, prepared at the RL concentration, are analyzed at the end of each day if all samples are below detection. Acceptance criteria is a minimum recovery of 50% from the true value. If the laboratory check standards fall outside this acceptance range for analytes analyzed on site, corrective action, consisting of verification of the standard and/or a new calibration curve for the analytes out of specifications, is performed.

Soil Vapor Sampling Point Installation

Utilizing Probe Rods and Post Run Fittings

TEG's hydraulically or manually driven soil vapor probes are constructed of either 1.0, 1.25, or 1.5 inch outside diameter steel probe rods and equipped with a hardened drop-off steel tip. The probe rods are nominally 4 feet long and threaded together to reach multiple depths. The probe rod is driven into the subsurface with TEG's *Strataprobe*™ direct-push system, or by an electric rotary hammer. Once the probe rod is installed to the desired depth, an inert 1/8 inch nylaflow tube, fitted with a threaded, stainless steel post run fitting equipped with an 0-ring, is inserted down the center of the probe rod and connected to a sampling port just above the drop-off tip. This internal, disposable sample tubing design eliminates any contact between the probe rod and the soil vapor sample. The probe is retracted slightly to expose the vapor sampling port. The probe rod is sealed at the surface with granular and hydrated bentonite and allowed to equilibrate for a minimum of 2 hours before sampling. After a sample is obtained the tubing is removed and the probe rod advanced to the next sampling depth or removed. This design prevents clogging of the sampling port and cross-contamination from soils during insertion.

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