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A Report Prepared For:

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**CORRECTIVE ACTION PLAN
FOR SOIL VAPOR EXTRACTION
6701, 6705, AND 6707 SHELLMOUND STREET
EMERYVILLE, CALIFORNIA
FUEL LEAK CASE NO. RO0000548
GEOTRACKER GLOBAL ID T0600100894**

JANUARY 30, 2017

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1.0 INTRODUCTION

This Corrective Action Plan (CAP) has been prepared by PES Environmental, Inc. (PES), on behalf of Anton Emeryville, LLC (Anton), for the property located at 6701, 6705, and 6707 Shellmound Street in Emeryville, California (collectively, the subject property or site). The site consists of a single legal parcel identified by Alameda County Assessor's Parcel Number (APN) 049-14906-02, covering approximately 2.27 acres. The site location and a site plan are shown on Plates 1 and 2. The subject property is currently listed as an open Spills, Leaks, Investigation and Cleanup (SLIC) case[1] with Alameda County Environmental Health (ACEH) as the lead environmental regulatory agency. PES understands Anton is seeking to acquire the site for redevelopment purposes and the development plans include: demolition of existing site buildings and other improvement; grading and soil excavation for new utilities and building foundations; and construction of a new multi-story multi-use building and associated parking, driveway, and landscaped areas.

PES previously implemented ACEH-approved work plans for on-site pre-construction subsurface investigations at the site (PES, 2015c, PES, 2016a). The results of the on-site investigations were documented in a report dated April 8, 2016 (Subsurface Investigation Report; PES, 2016b). The investigation findings included the identification of elevated volatile organic compound (VOC) concentrations in soil and soil vapor primarily beneath the southwestern portion of the site. These findings were discussed in a conference call with Anton and ACEH on March 1, 2016. During the conference call, PES recommended, and ACEH concurred, that implementation of an interim remedial action (IRA) consisting of soil vapor extraction (SVE), would be appropriate to reduce concentrations of VOCs in the subsurface prior to, and possibly during, the initiation of the planned development activities and to reduce potential exposure to future site users.

Documents previously prepared and submitted to ACEH include: the Conceptual Site Model (CSM; PES, 2015a); Site Management and Contingency Plan (SMP; PES, 2015b); Work Plan for Soil Vapor Extraction (SVE) (PES, 2016c); and Human Health Risk Assessment (HHRA; SLR, 2016). An off-site subsurface investigation was conducted in October 2016, in accordance with an approved work plan (PES, 2016f), and an Off-Site Subsurface Investigation Report was submitted to ACEH (PES, 2016g). The SVE activities presented in a Work Plan for Soil Vapor Extraction were approved for implementation by ACEH on November 8, 2016 (ACEH, 2016b) and SVE as an Interim Remedial Action (IRA) commenced on November 8, 2016. An SVE system Operation, Maintenance, Monitoring and Sampling Plan (SVE O&M Plan) was submitted to ACEH on December 16, 2016 (PES, 2016h). Remediation Progress Reports (RPRs) documenting SVE system operations, maintenance, and sampling are submitted to ACEH on a monthly basis.

[1] The case is identified as Mike Roberts Color Production (6707 Bay Street) ACEH Fuel Leak Case No. RO0000548; California State Water Resource Control Board GeoTracker Global ID T0600100894.

The objective of this CAP is to: (1) document the methods, procedures, and evaluation of effectiveness of SVE in reducing vadose-zone VOC concentrations in the southwest portion of the site; (2) identify target cleanup levels for VOC-affected media in the southwest portion of the site that will be protective of current and future on- and off-site users; (3) describe proposed additional on- and off-site investigation and monitoring activities to complete delineation of VOC-affected soil vapor, as well as evaluate post-SVE VOC levels in on- and off-site soil vapor; and (4) describe proposed focused source area soil sampling, removal action, and verification sampling in the southwestern portion of the site.

The following sections of this CAP include:

- **Section 2.0, Background** – presents a description of the site and its history, as well as the local geology and hydrogeology;
- **Section 3.0, Previous Site Activities** – presents a summary of previous environmental investigations and pertinent planning documents;
- **Section 4.0, Corrective Action Objectives and Goals** – discusses risk-based target cleanup levels for adoption as site cleanup goals for relevant media identified in the southwest portion of the site;
- **Section 5.0, Description of Corrective Action Plan** - presents the components of the proposed SVE corrective actions;
- **Section 6.0, Soil Vapor Extraction Operation, Maintenance, and Performance Evaluation Criteria** – provides details on the implementation and evaluation of SVE as an IRA;
- **Section 7.0, Supplemental Soil Vapor Investigation and Monitoring Plan** – discusses supplemental soil vapor investigation at on- and off-site locations, and installation of off-site soil vapor monitoring probes;
- **Section 8.0, Focused Source Area Soil Delineation and Removal Plan** – discusses targeted soil sampling locations, methods, and procedures for testing of source area soil, and presents the general scope of implementation procedures for contaminated soil excavation, verification sampling and chemical analysis program, and procedures for management of wastes generated during implementation, if necessary;
- **Section 9.0, CAP Implementation Reporting and Schedule** - discusses the proposed CAP Implementation Report and schedule; and
- **Section 10.0, References** – presents references utilized in the development of this CAP.

2.0 SITE BACKGROUND

Summary descriptions of the site location, physical setting, site history and operations, geologic and hydrogeologic settings are presented below. Additional details are provided in the CSM and SMP documents (PES, 2015a and 2015b).

2.1 Current Site and Vicinity Characteristics

The site is located at 6701, 6705, and 6707 Shellmound Street (previously known as Bay Street), in a mixed industrial, commercial, and residential area of Emeryville, Alameda County, California. The site consists of a single legal parcel covering approximately 2.27 acres and identified by Alameda County APN 049-1490-002. The current site buildings consist of a two-story office building and a warehouse building (Plate 2). A second story mezzanine-level is located in the northern portion of the warehouse. The warehouse and office building are connected by a 1-story lobby/receptionist area. The footprints of the office and warehouse buildings occupy approximately 7,470 and 43,850 square feet, respectively (see Plate 2), and both buildings have concrete slab-on grade floors. The exterior of the subject property consists of landscaped areas and asphalt paved parking and driving areas.

The site is bounded to the west and north by the Ashby Avenue off-ramp from Interstate 80, to the south by a commercial building, and to the east by Shellmound Street and a railroad right-of-way. The site buildings and adjacent areas are shown on Plate 2.

According to the United States Geological Survey (USGS) Oakland West, California Quadrangle 7.5 minute series topographic map dated 1993, the site is situated at an elevation of approximately 18 feet above mean sea level. The site is relatively flat, but the vicinity slopes gently to the west/southwest. The nearest surface water body is San Francisco Bay, located approximately 1,000 feet west of the subject property.

2.2 Historical Site Use

A discussion of historical site use was presented in the PES' SMP dated May 19, 2015. A brief summary of site historical use is presented below.

The site land historically consisted of San Francisco Bay tidal mud flats and was below sea level until the mid- to late-1930s, when a levee was built west of the subject property and a highway (Eastshore Highway, now Interstate 80) was constructed on the levee. From that time until the early to mid-1950s the area between the highway and the former shoreline, including the subject property and vicinity, were intermittently filled using non-native materials to create buildable land. The existing site buildings were constructed over the fill materials in approximately 1963.

A label tape manufacturer (Dymo) operated at the site from approximately 1963 to 1979, and reportedly used chemicals including methyl isobutyl ketone (MIBK, which is also known as 4-methyl-2-pentanone) and methyl ethyl ketone (MEK, also known as 2-butanone) stored in three underground storage tanks (USTs), previously located in the eastern portion of the site. The USTs were removed in 1989. Mike Roberts Color Production (MRCP) operated at the site from 1979 to 1989, and initially manufactured and printed colored postcards before later incorporating color printing, lithography, and off-set printing operations. Nady Systems, Inc. (Nady) purchased the property from MRCP in 1990 and utilized the site for office use and for storage of electronic sound equipment, product shipping and receiving, and minor equipment repair. Nady reportedly used only limited amounts of chemicals in its operations. Nady has relocated its operations and PES understands Nady currently only utilizes office areas within the northern extant building.

2.3 Site Geology and Hydrogeology

Based on the results of investigations performed on the subject property and in the vicinity, the site is underlain by non-native fill material overlying deposits of native silts and clays known locally as Old Bay Mud. The fill, generally most abundant on the western half of the site, has been encountered throughout the site and ranges in thickness from approximately 10 to 19 feet below ground surface (bgs). The fill consists primarily of coarse-grained sands and gravels that contain varying amounts of fines, and fine-grained silts and clays. The fill contains abundant debris (e.g., brick, concrete, metal, asphalt, glass, wood, fabric, and rubber). Fine-grained soils are present directly below the fill material. These soils generally consist of dark-colored clays and occasional silts with organic material that represent Old Bay Mud deposits.

Depth to groundwater varies locally across the site. Groundwater in the southwestern portion of the site has been encountered at depths ranging from approximately 12.75 to 13.5 feet bgs (PES, 2016b). Based on topography and the results of historical groundwater investigations, the predominant groundwater flow direction beneath the site is to the south-southwest toward the San Francisco Bay.

Previous investigations have shown that the fill materials at the site and other similarly filled properties in the vicinity can contain residual contamination. Contamination found and attributed to the non-native fill materials originally used to create the land along the bay-shore area of Emeryville includes total petroleum hydrocarbons (TPH), VOCs, semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and metals.

While groundwater is considered a drinking water source (in accordance with the Basin Plan [RWQCB, 2010]), groundwater in this area is prohibited by City of Emeryville Ordinance No. 07-006 for extraction or use.

2.4 Redevelopment Overview

Current improvements on the subject property, as shown on Plate 2, consist of two commercial buildings (a two-story office building and a single-story warehouse building), surface-level parking, and landscaped areas. The site has most recently been operated by Nady for packaging and distribution of communication systems, such as wireless microphones and specialty audio systems.

The redevelopment plans for the subject property include construction of a new multi-unit residential building with related amenities and facilities including parking, bike storage, fitness areas, lobby, leasing office, laundry room, and mail room. The building will be a seven-story at-grade (i.e., no basement levels) structure that will occupy the majority of the subject property. The building foundation will consist of a 24-inch thick, structural reinforced concrete mat foundation on drilled displacement piers. Drilled displacement piers will not produce significant volumes of soil requiring management, as the drilling technique displaces the soil into the borehole walls. The foundation design does not include grade beams, footings, or other features which would require excavation of soil prior to construction, other than for the foundation slab itself.

The ground level (first floor) and second floor will be comprised primarily of parking areas with some residential units, a lobby, and amenities areas. There will be five levels of residential units on the upper floors. Common areas (main entrance and lobby, fitness room, bike repair room/storage, dog spa) will be located on the first floor in the east portion of the new building, along Shellmound Street. Elevators will provide access from the ground level to floors two though seven. Elevators will be "pitless" type and will not penetrate the mat foundation.

New sidewalk and landscaping will be installed on the east side (front) of the building site along Shellmound Street. Vehicle access will be via a new driveway entrance off Shellmound Street at the southeast corner of the site (replacing the existing entrance off Shellmound Street). The driveway will consist of permeable pavement (constructed with both surficial grasscrete and decomposed granite) and concrete sidewalks. Open spaces consisting of concrete pathways, synthetic turf and landscape rock over turf block, and planter areas will be located around the north, west and south perimeters of the site. A playground/dog park area and outdoor fitness area are planned to occupy the southwest and northeast corners of the site, respectively. After redevelopment, the entire site will be covered by the building and paved parking areas and sidewalks with the exception of planter areas, playground/dog park area and outdoor fitness area.

Redevelopment construction activities will include: (1) removal of existing building foundations/slabs, existing utilities, surface parking, curbs, sidewalks, trees, planting areas, and light poles; (2) grading; (3) installation of drilled displacement piers; (4) excavation and installation of building foundations; (5) trench excavation and new underground utility installation; and (6) installation of new curbs, sidewalks, landscape/planting areas, trees, and new pole-mounted lights.

3.0 PREVIOUS ENVIRONMENTAL ACTIVITIES

Extensive site-specific and vicinity investigations have been recently performed by: ENVIRON International Corporation (ENVIRON) (2013), and PES (2014a, 2016b, 2016d, 2016e, and 2016g). The data from these investigations are summarized below. Pertinent data tables and figures presenting the results from these investigations are included in Appendix A.

3.1 Groundwater Sampling – April 2013

Groundwater sampling at the site was performed by ENVIRON in April 2013 (ENVIRON, 2013a, 2013b). Grab groundwater sampling locations are shown on Plate 2. The results of the sampling indicated that groundwater was impacted with total petroleum hydrocarbons quantified as diesel (TPHd) and total petroleum hydrocarbons quantified as motor oil (TPHmo) at concentrations above regulatory screening levels. Benzene, ethylbenzene, naphthalene, and xylenes were detected in groundwater in the western portion of the site (at sample location SG-5).

3.2 Soil Vapor Sampling – April 2013

As part of the April 2013 investigation, ENVIRON collected soil gas samples at locations SG-1 through SG-5 for analysis of VOCs. Benzene was detected at locations SG-1, SG-3, SG-4 and SG-5 at concentrations of 8.6 to 73 micrograms per cubic meter (μg/m3). The concentration of 73 μg/m3 detected at SG-3 and above the Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Level (ESL) for shallow soil gas at residential sites of 48 $\mu g/m^3$.

3.3 Groundwater Sampling – November 2013

In November 2013, PES conducted a supplemental subsurface investigation at the subject property (PES, 2014a). Grab groundwater sampling locations are shown on Plate 2. The investigation included the collection and analysis of grab groundwater samples from temporary well casings from six borings (GGW-1 through GGW-6) advanced in the exterior portions of the site.

The results of the grab groundwater sampling and analysis indicated groundwater impact from dissolved metals (i.e., arsenic and lead) above State of California Maximum Contaminant Levels (MCLs[2]) (PES, 2014a).

3.4 Conceptual Site Model (CSM) – February 2015

A CSM was prepared by PES in February 2015 based on data and information from previous environmental investigations and plans for site redevelopment and future use (PES, 2015a). The CSM was developed to identify potential human receptors and evaluate potentially

[2] California Department of Public Health Maximum Contaminant Levels (MCLs).

complete exposure pathways at the site for the COCs present in soil, groundwater and soil gas. The planned future land use at the site is residential with some commercial use. Human receptors at the site include future residents, current and future indoor commercial workers and future construction workers. Potential exposure pathways and receptors for construction work during redevelopment and future site occupants were evaluated. Existing and planned engineering and institutional controls were also considered in developing the CSM. The site will be paved or covered by buildings and no direct contact or soil incidental ingestions/dermal contact pathway exists for users of the site.

The CSM also noted the potential for future generation and migration of methane in the subsurface, and that potential for migration of VOC vapors and methane to indoor air was anticipated to be mitigated by installation of a vapor intrusion mitigation system, comprised of a physical barrier and passive venting system, beneath enclosed ground-floor portions of the new building as well as elevator pits.

One potentially complete exposure pathway was identified in the CSM:

- Incidental ingestion of or dermal contact by future construction and maintenance workers with subsurface soil.

The CSM identified that direct exposure for construction workers via contact with soil during temporary subsurface excavation or trenching would be regulated at the site by the SMP and associated HASP and an Intrusive Earthwork Guidance Plan (Appendix E of the SMP) that stipulated procedures for conducting subsurface work in the future (i.e., post-construction) that would be protective of the public and workers involved in subsurface work at the site.

The CSM will be updated to include the results of subsequent investigation and remediation. The updated CSM will be submitted to ACEH as part of site closure activities conducted by Anton.

3.5 Site Management and Contingency Plan – May 2015

The SMP describes procedures to be followed by construction contractors and workers, and environmental workers and other property owner representatives during redevelopment construction, as well as post-construction site management. The SMP provided a summary of existing soil and groundwater data for the site, identified safety and training requirements for construction workers, and established procedures for assessing and managing contaminated soil and groundwater that could be encountered during construction activities (e.g., demolition, grading, and excavation) and potential subsurface work in the future using the information available at the time the SMP was prepared. Soil management procedures were presented and designed to be implemented in a manner protective of human health and the environment and consistent with the planned redevelopment.

Based in part on information presented in the CSM, the SMP also identified the potential for future generation and migration of methane in the subsurface. Therefore as a precautionary measure, the SMP specified that the potential for migration of VOC vapors and methane to indoor air be mitigated by installation of a vapor intrusion mitigation system, comprised of a physical barrier and passive venting system, beneath enclosed ground-floor portions of the new building as well as elevator pits.

The SMP also provided the following information and procedures:

- Provisions for site redevelopment activities (e.g., building demolition and foundation slab removal, asphalt parking lot removal/installation, site grading/excavation activities, building and parking structure foundation construction, and utility trench construction);
- Health and Safety Plan (HASP) procedures for workers to follow during pre-construction and construction activities (not including asbestos-containing materials or other hazardous materials in existing building materials);
- Field screening and observation protocol during intrusive construction activities;
- Soil matrix sampling/characterization protocols;
- Soil and groundwater management practices (e.g., segregation/storage/transportation of soils, dust control, and decontamination procedures);
- A soil and groundwater contingency plan to manage presently unknown environmental conditions (e.g., suspect soil conditions, encountering USTs or other subsurface features, elevated vapor concentrations, etc.);
- An Intrusive Earthwork Guidance Plan for post-construction site operations, with procedures for protecting workers conducting subsurface work at the site; and
- A Post-Construction Operations and Management Plan.

The 2015 SMP will be updated to include the results of subsequent investigation and corrective action. The updated SMP will be submitted to ACEH as part of site closure activities conducted by Anton.

3.6 Soil Vapor and Sub-Slab Vapor Sampling – April 2015

In April 2015, a soil vapor and sub-slab vapor investigation was conducted by PES to further evaluate subsurface conditions in the vicinity of the former USTs and beneath the concrete slab of the existing warehouse building. Soil vapor sampling locations are shown on Plate 2 of Appendix A. The additional investigation included conducting soil gas and sub-slab vapor sampling for VOCs, methane, carbon dioxide, and oxygen. Soil gas samples were collected from three exterior locations at approximate depths of 5 and 10 feet bgs. Sub-slab vapor samples were collected from four interior locations at the site for analysis of VOCs, methane, carbon dioxide, and oxygen.

3.6.1 Soil Vapor Analytical Results

The analytical results indicated levels of VOCs, including benzene, toluene, ethylbenzene, and xylenes (collectively, BTEX compounds), MEK, and MIBK, in soil gas at approximate depths of 5 and 10 feet bgs in the vicinity of the former USTs and above applicable residential Environmental Screening Levels (ESLs). Methane was not detected in the soil vapor samples at or above the laboratory reporting limit, carbon dioxide was detected at levels ranging from 4.52 percent by volume (%volume) to 13.6 %volume, and oxygen levels ranged from 6.53%volume to 15.9%volume.

3.6.2 Sub-Slab Vapor Analytical Results

Low levels of VOCs, including tetracholoroethene (PCE), 1,1,1-trichloroethane (1,1,1-TCA), styrene, and MEK were detected in sub-slab vapor samples collected beneath the concrete slab of the warehouse building. Sub-slab sampling locations are shown on Plate 2 of Appendix A. Methane was not detected in the sub-slab vapor samples at or above the laboratory reporting limit, carbon dioxide was detected in three of the four samples at levels ranging from 0.272 %volume to 4.25 %volume, and oxygen levels ranged from 8.97 %volume to 19.1 %volume.

3.7 Pre-Construction Subsurface Investigation – November and December 2015

On November 30 through December 3, 2015, PES conducted a pre-construction subsurface investigation at the subject property. Soil vapor and soil sampling activities were conducted using direct push drilling technology at 65 locations at the site, including 24 soil vapor sampling locations, 28 soil sampling locations, and 13 multi-purpose soil vapor and soil sampling locations to evaluate the subsurface for the presence of VOCs, TPH, SVOCs, PCBs, metals, and/or asbestos-containing material (ACM) related to historical deposition of fill material beneath the site or previous industrial activities conducted at the site. The primary objectives of the investigation included evaluating soil vapor conditions at multiple depths beneath ground-floor residential units and common and amenity areas, and assessing the condition of soil anticipated to be disturbed during redevelopment construction, including: (1) soil to be excavated to accommodate the future building mat, pavement sections, landscape and surface water infiltration features; and (2) soil within planned utility trenches, to facilitate future construction worker safety and proper management of disturbed soil. The results of the investigation were documented in the Subsurface Investigation Report (PES, 2016b).

3.7.1 Soil Vapor Analytical Results

The results of the pre-construction subsurface investigation indicated the presence of VOCs, including vinyl chloride, benzene, and 1,1,2,2-tetrachloroethane (1,1,2,2-PCA) in soil vapor at concentrations above ESLs for residential and commercial land use. Concentrations of benzene, which was identified in soil vapor at multiple locations and depths across the site, and 1,1,2,2-PCA which was detected in isolated areas of the site, were generally consistent with the documented presence of petroleum hydrocarbons or other constituents associated with historical fill material. Vinyl chloride was detected at elevated concentrations in soil vapor primarily in the southwestern portion of the site.

3.7.2 Soil Analytical Results

The investigation also identified elevated concentrations of petroleum hydrocarbons (including TPHd and TPHmo), PCBs, phenol (an SVOC), and metals (including arsenic, lead, nickel, and zinc) in shallow soil across the site, consistent with the documented presence of historical fill material at the site.

3.8 Soil, Soil Vapor, and Groundwater Investigation – February 2016

Additional soil vapor, soil, and groundwater sampling activities were completed in accordance with PES' *Work Plan for Supplemental Pre-Construction Subsurface Investigation* dated January 21, 2016 (PES, 2016a) and conditionally approved by ACEH in a letter dated January 27, 2016. The results of the investigations were documented in the Subsurface Investigation Report (PES, 2016b).

The work was conducted February 1 through 4, 2016, and an additional 28 locations (primarily in the southwestern portion of the site) were sampled, including six soil vapor sampling locations, seven soil sampling locations, one grab groundwater sampling location, five soil and grab groundwater sampling locations, and nine locations for collection of both soil vapor and soil samples. The supplemental investigation activities were conducted to further evaluate the subsurface for the presence of VOCs (particularly vinyl chloride), to evaluate for potential source areas, and provide data in support of developing remedial or mitigation measures appropriate for the proposed development.

3.8.1 Soil Vapor Analytical Results

The results of the supplemental sampling indicated the presence of vinyl chloride and other VOCs in vadose zone soil in the southwestern portion of the site, with the most elevated concentrations of vinyl chloride detected at approximate depths of 5 and 10 feet bgs beneath the western portion of the unpaved alleyway immediately south of the warehouse (and adjacent to the southern property boundary), as well as beneath the southwestern portion of the warehouse concrete floor slab (PES, 2016b). The soil vapor sample data indicated the most elevated concentrations of vapor-phase VOCs were located beneath the western portion of the alleyway at approximate depths of 10 feet bgs. Detected oxygen levels ranged from 0.59 to 24 percent by volume; methane was also detected at levels ranging from 0.69 to 94 percent by volume. In general, elevated vinyl chloride concentrations detected in soil vapor samples were correlated to occur in samples with relatively low levels of oxygen. Vinyl chloride is generally not considered stable over time in the presence of ample oxygen.

3.8.2 Groundwater Analytical Results

Relatively low concentrations of VOCs, including vinyl chloride and benzene, were detected in groundwater beneath the southwestern portion of the site. Benzene concentrations in groundwater were detected slightly above the drinking water ESL, but well below the ESL for evaluation of potential vapor intrusion. The maximum concentration of vinyl chloride detected in grab groundwater samples (7.3 μg/L in sample SB61), while slightly above the ESL for evaluation of potential vapor intrusion in a residential setting (2.0 μg/L), was below the vapor intrusion ESL for a commercial setting (17 μg/L). The relatively low concentration in groundwater suggested that potential off-gassing from groundwater was not a significant source for the elevated levels of vinyl chloride detected in soil vapor.

In the Subsurface Investigation Report, PES recommended: (1) updating the existing CSM (PES, 2015a), SMP (PES, 2015b) and (HHRA (SLR, 2015) for the site to incorporate the Supplemental and Pre-Construction Subsurface Investigation findings; and (2) implementation of corrective action (i.e., interim remedial action) to the address VOC-affected media identified in the southwest portion of the property, including measures designed to actively reduce concentrations of VOCs beneath the site to acceptable risk-based levels.

3.9 Northern Extant Building Investigation – October 2016

The objective of the northern building investigation, which was conducted by PES in September 2016, was to evaluate the subsurface of a portion of the site not previously investigated for the potential presence of VOCs related to historical deposition of fill material beneath the site or previous industrial activities conducted at the site. The soil vapor and soil sampling activities included:

- Installing and sampling 6 temporary soil vapor probes (SV62 through SV67) beneath and in the immediate vicinity of the northern extant onsite building to evaluate soil vapor conditions at multiple depths (approximately 5 and 10 feet bgs); and

- Collecting companion soil samples from soil cores obtained at locations of the temporary soil vapor probes (SV62 through SV67) to characterize soil vapor conditions at multiple depths (approximately 5 and 10 feet bgs).

The results indicated that subsurface conditions with respect to VOCs and petroleum hydrocarbons in soil and soil vapor beneath and in the immediate vicinity of the northern extant onsite building were generally consistent with site conditions previously identified and attributed to historical deposition of fill material beneath the site.

3.10 Off-Site Soil, Soil Vapor, and Groundwater Investigation – October 2016

On behalf of Anton, PES conducted an off-site subsurface investigation in October 2016 at the 6601-6603 Shellmound Street property, located to the south of the 6701-6707 Shellmound Street property. The off-site investigation was conducted in accordance with PES' *Work Plan* *for Off-Site Subsurface Investigation* dated August 29, 2016 (PES, 2016f) and conditionally approved in a letter from ACEH dated September 4, 2015. The primary objective of the off-site investigation included delineation of the extent of VOC contamination, primarily vinyl chloride, affecting soil, soil gas, and groundwater at the 6601-6603 Shellmound Street property associated with the elevated VOC concentrations detected near the shared property boundary. The results of the off-site investigation were discussed on October 28, 2016 in a conference call with ACEH, Griffin Capital Corporation (off-site property owner representative), and Erler & Kalinowski (off-site property owner's environmental consultant).

The results of the off-site subsurface investigation were presented in a report entitled *Off-Site Sub-Surface Investigation Report* dated December 21, 2016 (PES, 2016g). Subsurface conditions with respect to the magnitude and horizontal and vertical extent of VOCs at the western portion of the off-site property were substantially characterized. With the exception of chlorinated VOCs (in particular, vinyl chloride), the laboratory analytical detections of VOCs and lithologic observations were generally consistent with the known presence of fill material beneath the site. The results were also consistent with prior investigations conducted at the subject property (PES, 2016b), which suggest that the source of vinyl chloride detections do not appear to originate on the 6601-6603 Shellmound Street property, but appear to be associated with undocumented historical release(s) from previous activities at the 6701-6707 Shellmound Street site.

Key findings of the off-site subsurface investigation of soil, soil vapor, and groundwater are summarized below.

3.10.1 Soil Analytical Results

Chlorinated VOCs were not detected in any of the 10 soil samples collected beneath the off-site building (PSV1 through PSV5) at 5 and 10 feet bgs. Non-chlorinated VOCs were detected at concentrations below Tier 1 ESLs. The results suggest that an off-site source of chlorinated VOCs in soil is not present.

3.10.2 Sub-Slab/Soil Vapor Analytical Results

Key findings of the off-site sub-slab and soil vapor sampling included:

- Vinyl chloride was not detected in any of the 11 sub-slab vapor samples;
- All other VOC detections in sub-slab vapor samples were below sub-slab ESLs for potential vapor intrusion concerns in a commercial setting; and
- Oxygen was present at generally high levels in all sub-slab vapor samples.

The sub-slab and soil vapor sample results indicated a general correlation in which VOC concentrations (most notably, vinyl chloride) generally appeared to attenuate with shallowing of depth (i.e., between vapor samples collected at 0.5, 5, and 10 feet bgs) commensurate with generally increasing oxygen concentrations with shallowing of depth.

Based on the results presented in the *Off-Site Investigation Report*, PES recommended the following:

- As noted above, there were several locations where concentrations of vinyl chloride in soil gas (one location at 5 feet bgs [(PSV10], and three locations at 10 feet bgs [PSV1, PSV6, and PSV10]) exceed the vapor intrusion ESL for a commercial setting. As such, additional investigation was recommended to laterally define concentrations of vinyl chloride-affected soil vapor in these areas;

- As requested by ACEH in an October 28, 2016 conference call, PES recommended collecting an additional soil vapor sample from approximately 10 feet bgs approximately 30 feet west of on-site sample location SV61; and

- As noted in the *Off-Site Subsurface Investigation Report*, SVE as an IRA commenced at the subject property on November 8, 2016. PES recommended installation of four permanent multi-depth soil vapor monitoring probes (i.e., vapor probe inlets at 5 and 10 feet bgs) inside the 6601-6603 Shellmound Street building, and collecting vapor samples to be analyzed for vinyl chloride, as well as obtaining field measurements to document observations of measurable influence (e.g., vacuum readings) in the subsurface at the off-site property.

3.11 Implementation of Soil Vapor Extraction as an Interim Remedial Action – November 2016

A pilot study for soil vapor extraction was conducted on July 13 and 14, 2016, and in accordance with PES' *Work Plan for Soil Vapor Extraction* (Work Plan; PES, 2016c). The Work Plan was approved by ACEH (ACEH, 2016a). Based on the results of the SVE pilot study, an induced vacuum response measured during the constant rate test was calculated with an estimated radius of influence (ROI) of approximately 28.6 feet. PES further concluded that the pilot study field measurements and vapor concentrations detected in baseline and post-pilot study vapor samples indicated that SVE technology was a viable technology for vadose zone remediation of VOCs (primarily vinyl chloride) at the site.

PES recommended: (1) implementation of full-scale SVE system and commencement of application of SVE as an approved IRA; and (2) updating the site-specific human health risk assessment (HHRA) to develop target cleanup goals as site-specific risk-based interim remedial action performance criteria. A total of 19 SVE and 10 air inlet wells were installed in July 2016 in the western portion of the on-site building. Operation of the SVE system commenced November 8, 2016 under a Bay Area Air Quality Management District (BAAQMD) permit and ACEH approval of operation of the SVE system (ACEH, 2016b).

3.12 Human Health Risk Assessment – December 2016

An updated HHRA has been prepared for the site by SLR International Corporation (SLR) to evaluate potential human health risks associated with exposure to chemicals detected in soil, groundwater, and soil gas during and following redevelopment of the site (SLR, 2016). The risk assessment was conducted consistent with guidance provided by California EPA, RWQCB, and USEPA. The approach used in the HHRA is consistent with Tier 1 outlined by the RWQCB (2016). Where relevant, chemicals exceeding the Tier 1 ESLs were quantitatively evaluated in a baseline risk assessment, which generally corresponds to Tier 3 of the guidance. In accordance with a request from ACEH, the HHRA was peer-reviewed by Enviro-Tox, a third-party toxicologist approved by ACEH. A letter of concurrence with the HHRA methods and results was issued by Enviro-Tox on December 20, 2016. A copy of the HHRA is presented as Appendix B to this CAP. Correspondence from Enviro-Tox and SLR are also provided in Appendix B.

The following hypothetical future onsite receptors were identified in the HHRA as likely present at the site:

- Construction worker receptor;
- Maintenance/utility worker receptor;
- Commercial worker receptor and
- Residential receptor (adult and child).

The construction worker receptor was assumed to work at the site during redevelopment construction. This receptor would potentially contact soil at depths down to 12 feet bgs. The maintenance/utility worker receptor was assumed to work at the site following redevelopment for short periods of time, to maintain underground utility lines and/or landscaping. This receptor would potentially contact soil at depths down to 12 feet bgs, the maximum depth of utility lines planned for the redevelopment.

On the basis of the discussions provided in the HHRA, the following exposure pathways were identified as potentially (or theoretically) complete and were evaluated in Tier 1:

- Future onsite construction worker receptor:
    - o Direct contact with soil via ingestion and dermal exposure; and
    - o Inhalation of vapors and dusts in outdoor air.
- Future onsite maintenance/utility worker receptor:
    - o Direct contact with soil via ingestion and dermal exposure; and
    - o Inhalation of vapors and dusts in outdoor air.

- Future onsite commercial (retail) worker receptor:
    - Direct contact with soil via ingestion and dermal exposure;
    - Inhalation of vapors in indoor air due to subsurface vapor intrusion; and
    - Inhalation of dusts and vapors in outdoor air.
- Future onsite residential receptor:
    - Direct contact with soil via ingestion and dermal exposure;
    - Inhalation of vapors in indoor air due to subsurface vapor intrusion; and
    - Inhalation of dusts and vapors in outdoor air.

The exposure scenarios identified for onsite future commercial and residential receptors assume no mitigation measures will occur to manage potential vapor intrusion. However, as discussed above in Section 3.5, a vapor mitigation system (consisting of a vapor barrier and venting system) will be installed beneath occupied spaces of the proposed development, eliminating any potential exposure via this pathway. Therefore, only the two invasive receptors (future onsite construction worker and future onsite maintenance/utility worker) were further evaluated beyond Tier 1 in the HHRA.

Site data were screened using ESLs developed for residential, commercial, and construction worker-based ESLs. Six chemicals in soil exceeding construction worker-based ESLs were quantitatively addressed in the HHRA (benzo(a)pyrene, total PCBs, arsenic, lead, vanadium, and TPHd). Although some non-volatile chemical concentrations also exceeded residential and commercial ESLs for contact with soil (and three chemicals for vapor intrusion), the HHRA noted that the future development would preclude exposure by these receptors to chemicals in site soil as there would be no exposed soil.

3.12.1 HHRA Target Cleanup Levels

Target cleanup levels (TCLs) were developed and presented in the HHRA. The TCLs represent the concentration of individual chemical that would result in a target hazard quotient (HQ) of 1 or lifetime excess cancer risk (LECR) of 1×10^{-6} based on the conservative exposure conditions assumed in the HHRA (including the assumption that no vapor intrusion mitigation is present for future site users). The TCL for each chemical is equal to the exposure (i.e., maximum) concentration multiplied by the target risk or hazard level and then divided by the risk or hazard level associated with the exposure concentration. For non-carcinogenic effects, since the target HQ is equal to one, the TCL is simply the maximum chemical concentration divided by the resulting HQ estimate. For carcinogenic effects, the TCL equals the maximum concentration multiplied by 1×10^{-6} and then divided by the associated LECR estimate. The final TCL for each chemical is the lower of the TCLs based on non-carcinogenic and carcinogenic effects.

Target cleanup levels (TCLs) were calculated for soil vapor constituents of potential concern (COPCs) with maximum detected concentrations resulting in a HQ or lifetime excess cancer risk (LECR) estimates above 1 or 1 x 10^{-6}, respectively, based on the vapor intrusion pathway for residential and commercial worker receptors. This included benzene, cis-1,2-dichloroethene, ethylbenzene, 1,1,2,2-tetrachloroethane, and vinyl chloride for residents. For commercial workers, this includes four of these five chemicals (all except ethylbenzene). The TCL calculations and resulting values are presented in Table 40 of the HHRA, presented in Appendix B.

As noted above and below, IRAs and engineering and institutional controls are components of the planned redevelopment project. USEPA and California Department of Toxic Substance Control (DTSC) (USEPA, 1991; CalEPA, 2011b) guidance indicate that source remediation is appropriate for HQ and LECR estimates greater than 1 or 1 x 10^{-4}, respectively. USEPA and DTSC further indicate that mitigation is appropriate for a HQ estimate greater than 1 and LECR estimates between 1 x 10^{-4} and 1 x 10^{-6}. Accordingly, TCLs may be scaled based on the anticipated protection afforded by engineering and institutional controls planned for the site. TCLs were therefore also calculated for future residential and commercial worker receptors using target LECRs of 1 x 10^{-5} and 1 x 10^{-4}. Summary Table 40 of the HHRA presents the TCLs for target LECRs between 1 x 10^{-4} and 1 x 10^{-6}.

3.12.2 Discussion of Post-Development Exposure Pathway

As noted throughout the HHRA, risk and hazard estimates were based on the conservative assumption that potential vapor intrusion and soil contact would not be mitigated with engineering or institutional controls. To provide an additional perspective for evaluation and interpretation of the results of the HHRA (in particular, implementation of the TCLs), the HHRA presented an evaluation of anticipated potential direct contact (e.g., ingestion, dermal absorption) and indirect exposure pathways (e.g., inhalation through volatilization) to affected media for the two primary future site receptors (residents and commercial retail workers) under the post-IRA, post-development scenario.

The HHRA concluded that implementation of SVE as an IRA and engineering and/or institutional controls planned for the project are anticipated to effectively mitigate all potential direct and indirect exposure pathways to, and associated risks from, soil, groundwater, and soil vapor at the site for future residential and commercial users. As such, direct or indirect post-development exposure pathways are not anticipated to be significant and/or complete at the site. Finally, the HHRA noted that the highly conservative risk and hazard estimates likely overestimate potential future exposures and risks to future residential and commercial users at the site.

4.0 CORRECTIVE ACTION OBJECTIVES AND GOALS

The objective of the CAP includes: establishing site-specific TCLs for constituents associated with the historic release of chlorinated VOCs in southern portion of the site, as well as establishing conservative and applicable TCLs for evaluation of off-site commercial site uses.

The proposed TCLs for site media are presented below:

4.1 Soil Vapor TCLs

4.1.1 Site-Specific Soil Vapor TCLs

The soil vapor cleanup goals for VOCs in the southern portion of the site are the soil vapor TCLs presented in Table 40 of the HHRA (SLR, 2016). The TCLs were calculated for soil vapor COPCs with maximum detected concentrations resulting in HQ or LECR estimates above 1 or 1 x 10^{-6}, respectively, based on the vapor intrusion pathway for residential and commercial worker receptors. The TCLs for the target LECR ranges for future residents and commercial workers are presented below:

- Benzene

  Residential TCL: 145 $\mu g/m^3$ (TCL of 10^{-6}); 1,400 $\mu g/m^3$ (TCL of 10^{-5}); and 4,600 $\mu g/m^3$ (TCL of 10^{-4})

  Commercial TCL: 1,200$\mu g/m^3$ (TCL of 10^{-6}); 12,600 $\mu g/m^3$ (TCL of 10^{-5}); and 39,200 $\mu g/m^3$ (TCL of 10^{-4})

- Cis-1,2-dichloroethene

  Residential TCL: 11,000 $\mu g/m^3$ (TCL of 10^{-6} through 10^{-4}) (non-carcinogenic effects only)

  Commercial TCL: 92,400 $\mu g/m^3$ (TCL of 10^{-6} through 10^{-4}) (non-carcinogenic effects only)

- Ethylbenzene

  Residential TCL: 1,200 $\mu g/m^3$ (TCL of 10^{-6}); 12,100 $\mu g/m^3$ (TCL of 10^{-5}); and 121,300 $\mu g/m^3$ (TCL of 10^{-4})

  Commercial TCL: All detections were below commercial/industrial soil vapor screening levels, and a TCL was therefore not developed in the HHRA. As such, the RWQCB's risk-based ESL for ethylbenzene concentrations in a commercial/industrial land use scenario (Table SG-1) of 4,300 $\mu g/m^3$ is adopted as the TCL for ethylbenzene in this CAP;

- 1,1,2,2-tetrachloroethane

  Residential TCL: 116 μg/m^3 (TCL of 10^{-6}); 1,100 μg/m^3 (TCL of 10^{-5}); and 11,500 μg/m^3 (TCL of 10^{-4})

  Commercial TCL: 1,000μg/m^3 (TCL of 10^{-6}); 10,100 μg/m^3 (TCL of 10^{-5}); and 101,200 μg/m^3 (TCL of 10^{-4})

- Vinyl chloride

  Residential TCL: 47 μg/m^3 (TCL of 10^{-6}); 473 μg/m^3 (TCL of 10^{-5}); and 4,700 μg/m^3 (TCL of 10^{-4})

  Commercial TCL: 400 μg/m^3 (TCL of 10^{-6}); 4,100 μg/m^3 (TCL of 10^{-5}); and 41,300 μg/m^3 (TCL of 10^{-4})

The TCL calculations and resulting values for target LECRs are also presented in Table 40 of the HHRA, provided in Appendix B.

4.1.2 General Soil Vapor TCLs

The soil vapor cleanup goals for VOCs in off-site areas will be the February 2016 RWQCB risk-based ESLs for Subslab / Soil Gas Vapor Intrusion Human Health Risk Screening Levels for commercial/industrial land use (Table SG-1). ESLs are provided in the RWQCB's *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* (RWQCB, 2016). The ESLs were developed by the RWQCB to be protective of human health and the environment for potentially complete exposure pathways.

4.2 Vadose Zone Soil TCLs

Concentrations and distribution of the previously identified organic and inorganic constituents are consistent with the documented presence of historical fill material at the site and vicinity. As noted in Section 3.0, the results of the subsurface investigations at on-site locations indicate the presence of TCE, and the degradation by-products cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride in soil beneath the site at concentrations above ESLs for residential and commercial land use. PCE was not detected at or above the laboratory reporting limit in any of soil samples. Concentrations of other VOCs detected sporadically across the site are also generally consistent with the documented presence of petroleum hydrocarbons or other constituents associated with historical fill material.

As noted previously (PES, 2016d), the presence of TCE and related breakdown by-products detected at relatively elevated concentrations in soil samples in the southwestern portion of the site (e.g., SB59 and SV60) form the basis of a hypothesis for an on-site point release source or sources within vadose zone soil at or near the locus of the elevated chlorinated VOC concentrations in soil vapor in the southwestern portion of the site.

Because no pathway exists for exposure to COPCs in soil, no TCLs were calculated in the HHRA (SLR, 2016). As such, soil TCLs proposed herein include constituents associated with the elevated chlorinated VOCs in the southwestern portion of the site, and include: TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. The proposed TCL are the conservatively established RWQCB risk-based ESL for shallow soil (less than 3 meters [9.84 feet] bgs) in a residential setting. The applicable soil ESLs for residential land use are as follows:

- Benzene: 49 μg/kg;
- TCE: 510 μg/kg;
- Cis-1,2-DCE: 3,500 μg/kg;
- Trans-1,2-DCE: 39,000 μg/kg; and
- Vinyl chloride: 8.2 μg/kg

4.3 Groundwater TCLs

Relatively low concentrations of VOCs, including vinyl chloride and benzene, were detected in groundwater beneath the southwestern portion of the site. Benzene concentrations in groundwater were detected slightly above the drinking water ESL, but well below the ESL for evaluation of potential vapor intrusion. The maximum concentration of vinyl chloride detected in grab groundwater samples (7.3 μg/L in sample SB61), was slightly above the ESL for evaluation of potential vapor intrusion in a residential setting (2.0 μg/L, fine-coarse scenario), and below the vapor intrusion ESL for a commercial setting (17 μg/L). The on- and off-site investigation results indicate that the source of chlorinated VOCs in soil vapor is predominantly located in on-site vadose-zone soil. The relatively low groundwater concentrations in and around the source soil areas suggest: (1) potential off-gassing from groundwater is not a significant source for the elevated levels of vinyl chloride previously detected in soil vapor (PES, 2016b); and (2) groundwater in the southwestern portion of the site has not been significantly impacted by the release. Because no pathway exists for future site users for exposure to COPCs in groundwater, TCLs were not calculated in the HHRA (SLR, 2016). On the basis of an absence of significant impact to groundwater from the site COPCs in soil, as well as absence of a significant vapor intrusion concern identified in on- and off-site groundwater samples, no specific TCLs are proposed for groundwater. Additionally, as noted above, use of groundwater as a drinking water source or for other purposes is prohibited by City of Emeryville Ordinance No. 07-006

5.0 DESCRIPTION OF CORRECTIVE ACTION

The proposed corrective action to meet the site target cleanup objectives consists of the following components:

- Conduct SVE to reduce VOC vapor concentrations in the southwest portion of the site to within TCLs, and verify the effectiveness in reduction of relevant VOCs in soil vapor through rebound testing;

- Conduct supplemental soil vapor investigation and monitoring at on- and off-site locations to establish and evaluate the lateral extent of vinyl chloride in soil vapor (at 5 and 10 feet bgs) at concentrations above the commercial ESL;

- Conduct focused supplemental soil investigation within on-site source areas of vinyl chloride impacts; and

- As needed, based on the results of focused soil investigation, conduct soil excavation and off-site disposal to remove soil with contaminant concentrations above TCLs, and collect soil verification samples to confirm that TCLs have been achieved.

The following sections describe the individual components of the CAP.

6.0 OPERATION, MAINTENANCE, AND PERFORMANCE EVALUATION CRITERIA FOR SOIL VAPOR EXTRACTION

6.1 SVE System

The SVE well network as constructed and currently operated consists of 19 SVE wells (wells SVE-1 through SVE-19) connected through schedule 40 polyvinyl chloride (PVC) piping plumbed to the SVE system air inlet. The extracted airstream is conveyed from the air inlet through a water knockout vessel, vacuum blower and through, in series, one treatment vessel containing 2,000 lb. of granular activated carbon (GAC) and two vessels containing 4,000 lb. of granular Hydrosil HS-600 potassium permangenate (7%) zeolite to remove VOCs contained in the extracted vapors. After treatment, the airstream is conveyed through an exhaust stack prior to discharge to the atmosphere above the roof line of the building. Monitoring points near each wellhead, between vessels, as well as at multiple points past the air inlet are monitored. Influent, mid-point, and effluent monitoring is conducted in accordance with the Authority to Construct (ATC) permit obtained from BAAQMD, presented in Attachment A of Appendix C.

A schematic diagram of the SVE system is presented in Attachment B of the Standard Operating Procedure (SOP), provided in the December 2016 RPR in Appendix C. Photographs of the SVE system components are presented in Appendix B of the SOP (Appendix C).

6.2 SVE System O&M Plan

The SVE system O&M Plan presents the methods and procedures for routine operation, maintenance, and monitoring of the SVE system. The procedures were developed in general accordance with the DTSC' *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (Vapor Intrusion Guidance), dated October 2011.

Implementation of the O&M Plan is performed by Environmental Engineering, Consulting, and Remediation, Inc. (E2CR). Details of operation of the SVE system, including summary tables of laboratory analytical data and field measurements, are documented in monthly RPRs and submitted ACEH.

6.3 SVE Well and Influent Sampling Schedule

To evaluate progress in removal of VOC-affected vapor from the sub-surface, the scheduled sampling events for planned collection and analysis of vapor samples from the SVE wells for laboratory analysis, previously presented in the O&M Plan, is as follows:

1. Prior to startup (baseline): All 19 SVE wells (completed on 10/31/16);
2. Approximately 30-days after startup: minimum 9 SVE well samples, and one sample of vapor stream (pre-dilution) before blower motor (vapor sampling completed on December 2, 2016);
3. Approximately 60-days after startup: minimum 9 SVE well samples, and one sample of vapor stream (pre-dilution) before blower motor (vapor sampling completed on January 16, 2016);
4. Approximately 90-days after startup: minimum 9 SVE well samples, and one sample of vapor stream (pre-dilution) before blower motor;
5. Approximately 120-days after startup: minimum 9 SVE well samples, and one sample of vapor stream (pre-dilution) before blower motor;
6. Approximately 150-days after startup: minimum 9 SVE well samples, and one sample of vapor stream (pre-dilution) before blower motor; and
7. Approximately 180-days after startup: all 19 SVE wells, 6 vapor monitoring probes, and one sample of vapor stream (pre-dilution) before blower motor.

Methods and procedures for collecting vapor samples and laboratory analysis for VOCs are presented in the O&M Plan (Appendix C).

6.4 Criteria for SVE Shutdown and Post-SVE Vapor Rebound Evaluation

When SVE well and influent vapor concentrations (based on laboratory analytical data) indicate removal of VOCs have been achieved to the maximum extent possible utilizing the SVE technology (e.g., stable or asymptotic concentrations, or concentrations less than the TCL), the SVE system will be turned off. To assess vapor conditions after operation of the SVE system ceases, rebound testing, consisting of one sampling event approximately 30 days after shutdown, and a second rebound testing event approximately 60 days after shutdown, will be conducted. Vapor samples will be collected from a minimum of 10 SVE wells. The rebound vapor samples will be collected from wells with the highest baseline sampling VOC concentrations at each rebound testing event. The ten wells with the highest baseline VOC concentrations include: SVE-16, SVE-12, SVE-18, SVE-1, SVE-17, SVE-15, SVE-10, SVE-13, SVE-9, and SVE-5. Rebound soil vapor sampling will be conducted consistent with the methods and procedures described in the SVE O&M Plan.

The results of the two rounds of SVE system rebound testing will be used to evaluate the relative stability of VOCs in vapor concentrations. If rebound above upper-bound TCLs (i.e., 1×10^{-4} target TCL) is observed, additional operation of the SVE system and/or other potential vapor mitigation technologies will be evaluated.

7.0 SUPPLEMENTAL SOIL VAPOR INVESTIGATION

Based on the results of on- and off-site investigations (PES, 2016b, 2016g) supplemental soil vapor investigation and monitoring activities are recommended and described herein. The proposed additional on- and off-site soil vapor sample locations are shown on Plate 4, and proposed sampling depths at each location are shown in Table 1. Methods and procedures for installation of soil vapor probes and sample collection are presented in Appendix D.

7.1 Soil Vapor Sampling

As requested by ACEH in an October 28, 2016 conference call, a temporary soil vapor probe will be installed (SV68) and a soil vapor sample will be collected from approximately 10 feet bgs, approximately 30 feet west of on-site sample location SV61, and analyzed for vinyl chloride by U.S. EPA Test Method TO-15.

To laterally define concentrations of vinyl chloride-affected soil vapor above the commercial ESL detected in off-site soil gas samples at PSV10 (at 5-feet bgs), and PSV1, PSV6, and PSV10 (all at 10-feet bgs), temporary soil vapor probes PSV12 and PSV13 will be installed and soil vapor samples will be collected at the two locations shown on Plate 4. The samples will be analyzed for vinyl chloride by U.S. EPA Test Method TO-15.

7.2 Soil Vapor Monitoring – Off-Site

As discussed in Section 3.11, SVE as an IRA commenced at the subject property on November 8, 2016. As recommended in the Off-Site Subsurface Investigation Report (PES, 2016g), permanent multi-depth soil vapor monitoring probes (with vapor probe inlets at 5 and 10 feet bgs) will be installed at four locations inside the 6601-6603 Shellmound Street building. Vapor samples will be collected and analyzed for vinyl chloride by U.S. EPA Test Method TO-15 approximately six months after SVE system start-up (e.g., May 2017). The off-site soil vapor monitoring probes will provide data suitable for assessing SVE influence in areas to the south of the SVE system. Observations of measurable vacuum in the subsurface will also be collected from the probes. The off-site vapor monitoring probes locations are shown on Plate 4. Additional details for installation of soil vapor probes and sample collection are presented in Appendix D.

8.0 FOCUSED SOIL SOURCE AREA EVALUATION AND REMOVAL PLAN

As noted in the CSM and HHRA (summarized in Sections 3.4 and 3.12, respectively), direct contact with site soil is not a potential pathway for future residential or commercial site users. There is a potential for future construction/utility workers to come into contact with affected soil. As described in Section 5.0, as a conservative measure the proposed target soil cleanup for soil is the RWQCB's residential land use ESL. Based on the prior soil sampling results (shown on Plate 14 of the Pre-Construction Subsurface Investigation report, provided in Appendix A), it is anticipated that supplemental sampling, and potentially focused soil removal and confirmation soil sampling, are necessary component required to document achievement of soil TCLs in the southwestern portion of the site.

The purpose of the focused source soil evaluation and removal plan presented in this CAP is to: (1) collect co-located soil samples adjacent to prior sampling locations SB51, SB55,SB59, SV60, and SV61 to assess potential reductions in soil chlorinated VOC concentrations as a result of implementation of SVE; (2) generate lateral characterization data for chlorinated VOC-affected soil previously identified in the southwestern portion of the site; (3) if needed based on testing results, conduct focused soil removal actions in locations with concentrations above soil TCLs; and (4) if soil excavation is deemed warranted, collect confirmation excavation sidewall and bottom soil samples. The following sections describe the methods and procedures of the supplemental soil sampling, soil removal actions, and confirmation soil sampling.

In the event soil excavation is required, the excavation will be included as a component of the updated SMP. Excavation of the soil will not be feasible until the on-site building has been demolished and underlying soil is accessible.

8.1 Focused Soil Delineation Sampling

The focused soil sampling will be conducted to assess for chlorinated VOCs associated with the release that are above soil TCLs in the southwestern portion of the site. Previous sample locations in the southwestern portion of the site with chlorinated VOCs detected above the residential ESL include exterior sample locations SV61, SV60, and SB59, and interior sample locations SB51 and SB55. Proposed supplemental soil sample locations are shown on Plate 5.

8.1.1 Field Planning Activities

Prior to initiating field activities at the site, PES will update the site-specific Health and Safety Plan (HASP) will be updated. The HASP will comply with applicable federal and California Occupational Safety and Health Administration (OSHA) guidelines. A drilling permit will be obtained from the Alameda County Public Works Agency, Water Resources Section (ACPWA).

Underground Service Alert will be contacted to schedule visits by public and private utility companies to locate their underground utilities. In addition, a private underground utility locating service will be contracted to conduct a subsurface electromagnetic survey to screen the proposed sampling locations for the presence of subsurface utilities.

8.1.2 Soil Sampling Methods and Procedures

As shown on Plate 5, soil samples will be collected at 20 proposed locations in the southwestern portion of the site. Sampling rationale and proposed sampling depths at each location are shown in Table 1.

8.1.3 Soil Sampling Methodology

Borehole drilling and sampling services will be provided by a licensed contractor possessing a valid C-57 water well contractor's license issued by the State of California, and in accordance with California Department of Water Resource Water Well Standards (Bulletin 74-90). The field investigation will be conducted under the supervision of a California-registered geologist or engineer. A PES geologist or engineer will observe the borehole drilling and will prepare a lithologic log of the borings using the Unified Soil Classification System. Select soil samples will be field screened for VOCs using a photoionization detector (PID), and the PID readings will be recorded on the lithologic log. Soil sampling depths and analyses may be modified based on the results of field screening, observations of changes in lithology, or visual or olfactory indications.

Drilling will be conducted with a truck-mounted or limited access track-mounted drill rig using direct-push technology. Continuous soil cores will be collected by driving a 4-foot long by nominal 2-inch outside-diameter open-tube sampler into undisturbed soil. The open-tube sampler will be lined with one 4-foot long, clear acetate sample sleeve. Soil samples will be collected in accordance with U.S. EPA Method 5035 using Terracore™ (or equivalent) samplers. Target depths of the soil samples are shown in Table 1. Soil samples will be submitted for analysis by the project laboratory for select VOCs by U.S. EPA Test Method 8260B.

Filled sample containers will be labeled for identification and immediately placed in a chilled, thermally insulated cooler (containing either bagged ice or blue ice) until delivery under chain-of-custody protocol to the project laboratory. Each sample will be assigned a sample number that will be entered on the chain-of-custody form. The chain-of-custody form will accompany the sample shipment to the laboratory to document sample possession from the time of collection. The samples will be analyzed under a standard turnaround time.

Reusable downhole drilling and sampling equipment will be decontaminated using a high-pressure, hot water wash or Alconox™ wash and triple rinse prior to collecting each soil sample. Upon completion of soil sampling activities, each borehole will be grouted to the ground surface with neat cement grout in accordance with ACPWA requirements, and the surface will be restored using concrete dyed to match the surrounding material.

8.1.4 Handling, Storage, and Disposal of Investigation-Derived Waste

Investigation-derived waste (IDW) generated during the supplemental subsurface investigation will be temporarily stored on the site. The IDW will be stored in secured, labeled 55-gallon steel drums until proper off-site management in accordance with applicable State and Federal laws can be arranged. The IDW will be disposed or recycled based on the results of the laboratory analyses.

8.2 Soil Excavation and Disposal Procedures

To the extent required on the basis of the focused soil delineation sampling, excavation and off-site transport and disposal will be the planned method for removal. It is anticipated that soil excavation activities will be conducted after demolition of the subject site building.

To reduce groundwater management and disposal costs, it is anticipated that the depth of removal will not extend appreciably into saturated material (groundwater is anticipated at approximately 13 to 14 feet bgs). Soil removed from the southwestern VOC source area will follow appropriate waste soil characterization and destination facility procedures.

Prior to conducting excavation, a geotechnical engineer will provide an evaluation of the excavation areas with recommendations for maintaining structural integrity of existing on- and off-site structures during and after excavation activities (e.g., excavation via slot trenches, installation of shoring, and appropriate backfilling procedures).

8.2.1 Estimated Dimensions of Excavation

The lateral and vertical extent of soil exceeding TCLs in the southwestern portion of the site, if present, will be determined by the results of sample results from the supplemental soil sampling results. The estimated volume of soil (dependent on total depth) is expected to range between 200 bank (in-place) cubic yards and 1,000 bank cubic yards.

8.2.2 Infrastructure, Permitting and Health & Safety Considerations

8.2.2.1 Utilities

Prior to conducting soil excavation, the remedial excavation contractor or general contractor will retain a private underground utility locating service to delineate subsurface utilities within and in the vicinity of the excavation area. If utilities necessary to ongoing functions of other areas of the site are identified within the excavation area, the remediation contractor will coordinate with the property owner or the property owner's representative to resolve utility relocation and to ensure that utility service to other areas is not disrupted. The remediation contractor will also be responsible for contacting USA to notify utility clients of the excavation work.

8.2.2.2 Permitting

The documentation needed for obtaining permits required to implement soil excavation and backfilling will be compiled. Approvals, permits, and licenses required by local, state, and federal agencies to complete the work will be obtained, and the work will be conducted in accordance with applicable federal, state, and local regulations. These include, but are not limited to:

- National Fire Protection Association (NFPA) 30, Flammable and Combustible Liquids;
- Occupational Safety and Health Administration (OSHA), 29 CFR 1910.120;
- Health and Safety Code, Division 20, Chapters 6.5 and 6.8;
- Title 8, California Code of Regulations (CCR), GISO 5192 Hazardous Materials Storage Ordinance, and Title 8 CCR 1532.1;
- California Code of Regulations, Title 8, Sections 1539-1543;
- Title 22, CCR Sections 66261.2 and 66261.3;
- Lead in Construction Interim Rule, Title 8 CCR, Section 1531;
- BAAQMD, Regulation 8, Organic Compounds, Rule 40, Aeration of Contaminated Soil and Removal of Underground Storage Tanks;
- Storm Water Pollution Prevention Plan; and
- City of Emeryville Grading Ordinance.

Anticipated permits and notifications include those related to excavation, soil stockpile management, on-site soil handling and loading, soil transportation and off-site landfill disposal, and backfilling and compaction activities.

8.2.2.3 Worker Health & Safety Plan

A site-specific HASP will be prepared by the earthwork contractor in accordance with applicable OSHA regulations for cleanup activities conducted by contractors. The HASP will provide information that addresses the health risks and hazards, employee training assignments to assure compliance with Title 8 of the California Code of Regulations, personal protective equipment, personnel monitoring, site control measures, decontamination procedures, and an Emergency Response Plan. The Emergency Response Plan will address any reasonably foreseeable accident or upset conditions and outlines the procedures to be followed in the event of an emergency at the site. Emergencies that may occur at the site can include chemical spills, fires, explosions, and personal injuries. The remedial contractor, yet to be determined, will also be required to develop a HASP for its workers.

8.2.3 Demolition of Concrete and Asphalt

Prior to soil excavation activities, it is anticipated that hazardous building materials present in the subject site buildings will be abated. Once abatement has been completed, the site structures will be removed by a demolition contractor. Demolition methods may include one or a combination of the following:

- Sawcutting;
- Jackhammering;
- Bulldozing;
- Breaking with a backhoe or excavator fitted with a hydraulic breaker; and/or
- Lifting with heavy equipment fitted with a bucket, thumb, grapple or other attachments.

Demolition of building foundations will be documented by the environmental consultant to assess for evidence of potential contamination of the concrete or asphalt (e.g., odors, staining, etc.).

Building foundations and asphalt paving surfaces will be removed and crushed for on-site reuse (e.g., road base or engineered fill material beneath hardscaped areas) or hauled off-site for disposal or recycling.

8.2.4 Dust Control

During excavation activities, depending on soil conditions, there is potential to generate airborne dust. The objective of dust control measures is to reduce dust generation to minimize the impact on tenants and the surrounding area. Therefore, as required, the excavation contractor will apply a water mist to the excavation, as well as soil handling and haul routes to reduce the potential for dust generation. Soil will be wetted as needed to reduce the occurrence of visible dust. At a minimum, emission (dust) control measures will comply with those established by OSHA and the BAAQMD for construction-related activities, and notification will be provided to BAAQMD in compliance with BAAQMD Regulation 8, Rule 40 requirements.

8.2.5 General Excavation Procedures

It is anticipated that the majority of excavated soils will be stockpiled on-site, before being loaded into haul trucks for transport off the site. Haul trucks will be inspected to verify that the waste soil is securely covered, to the extent practicable, and that the tires of the haul trucks are reasonably free of accumulated soil prior to leaving the site. A street sweeper will be made available, as needed, to keep site access points and adjacent roadways clean. The soil will be wetted, as necessary, to reduce the potential for dust generation during loading and transportation activities. In accordance with the City of Emeryville noise ordinance, excavation activities will be conducted between the hours of 7:00 a.m. and 6:00 p.m., or as approved otherwise.

During excavation activities, a PES engineer or geologist will be present to observe the excavation of the VOC-affected soil. Soil may be screened for the presence of VOCs during excavation based on sensory evidence, such as soil discoloration and odors, and/or field screening with an organic vapor meter.

If buried prehistoric or historic cultural materials are encountered during remediation activities, work will be halted until a qualified archeologist can evaluate the nature and significance of the materials. In the event of discovery of geologic or paleontological resources, a qualified paleontological resource specialist or geologist will be contacted for immediate evaluation of the resources. If the geologic or paleontological resources are confirmed to be significant, the Office of Historic Preservation within the Department of California State Parks will be contacted for further guidance relating to documentation and preservation of the resource.

8.2.6 Soil Stockpiling

Soil stockpiles will be constructed with plastic sheeting beneath (unless the ground surface is paved) and above the soil to prevent runon/runoff and fugitive dust and/or odor emissions. Stockpiled soil will be covered and secured at the end of each day.

8.2.7 Excavation Backfilling

Upon completion of excavation activities, the remedial contractor will backfill the excavation in accordance with the requirements of a geotechnical engineer and grading plan. For planning purposes, it is assumed the excavation will be backfilled with controlled-density fill (CDF) or other appropriate certified-clean backfill material to approximately 2 feet below grade. Certified clean soil fill will be placed over CDF and compacted as follows: (1) the soil will be placed in horizontal lifts not exceeding 8 inches in loose thickness; (2) the soil will be moisture conditioned to above optimum moisture content; and (3) the soil will then be compacted to

85 to 90 percent relative maximum dry density compaction depending on the geotechnical engineer's requirements.

At all times during excavation the remedial contractor will protect excavation areas using interlocking K-rail or water walls and/or portable chain-link fencing that is at least 6 feet high.

Due to the potential maximum depth of excavations relative to the depth to groundwater (approximately 13 to 14 feet bgs), the excavation bottom may require stabilization.
If required, this may be accomplished using drainage rock, geotextile fabric, and/or lime treatment. If groundwater is encountered during soil excavation before the limits of the soil contamination are reached, groundwater removed from the excavation will be pumped into aboveground containers (e.g., baker tanks) for subsequent analysis prior to treatment and/or disposal.

8.2.8 Decontamination Procedures

Equipment used for soil excavation and loading (including heavy equipment and truck tires) will be cleaned before leaving the Site. It is expected that the majority of soil can be removed using mechanical methods (e.g., scraping and dry brushing). Cleaning with water should only be performed as needed, because of the generation of additional waste requiring management. During soil excavation and loading, the work areas outside of the excavation itself will be kept reasonably clean and free of excessive soil or debris. Care will be exercised to minimize the potential for tracking any contaminated soil out of the work area. Accumulated soil will be placed onto the stockpile of excavated soil for subsequent disposal.

8.2.9 Transportation Plan

Following acceptance of the excavated soil at an appropriate disposal facility, the soil (classified as non-hazardous or hazardous) will be loaded onto trucks and transported following appropriate (or non-hazardous) waste manifesting procedures. As each truck is filled, an inspection will be made to ensure that the soil is properly covered, and that the tires and sides of the trucks are free of accumulated soil prior to leaving the Site. A street sweeper will be provided by the excavation contractor, if/as needed. It is anticipated that trucks will travel from the Site north on Shellmound Street to Interstate 80.

8.3 Verification Sampling and Chemical Analysis

Verification soil samples will be collected from the excavation areas. These samples will be used to evaluate whether the TCLs for VOCs in vadose zone soils have been met. Excavation bottom and sidewall samples will be collected as appropriate to confirm that excavation of affected soil has been accomplished to the extent feasible. Verification samples will be collected from excavation areas at the following frequency: (1) one sidewall sample for every 5 feet of depth and every 25 linear feet; and (2) one bottom sample per 1,000 square feet. Sample locations and the number of samples collected may be adjusted in the field if necessary.

Verification soil samples will be submitted to a California-certified laboratory for chemical analysis of TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride by U.S. EPA Method 8260B.

Verification sample analyses may be performed utilizing an expedited laboratory turn-around schedule in order to reduce the likelihood for significant delays to affect the corrective action schedule. Should laboratory analytical results indicate that the soil TCLs have not been attained, additional excavation will be performed to the extent practicable.

8.4 Waste Soil Classification and Management

Where possible, waste soils will be segregated during excavation into discrete waste streams and handled in a manner appropriate for that material. Using data obtained during the focused soil sampling and/or stockpile sampling, appropriate landfills will be selected for the disposal of the excavated soil. Once the landfill site(s) are selected, the soil will be pre-profiled and any additional waste characterization testing will be performed in accordance with landfill waste acceptance requirements.

8.4.1 Soil Hauling and Off-Site Disposal

Soil will be transported to an appropriate disposal facility (Class 1, Class 2, or Class 3 landfill) by registered hazardous waste haulers in compliance with State and Federal requirements for the safe handling and transportation of hazardous waste.

8.4.2 Manifesting Procedures

Following acceptance of the excavated soil at an appropriate disposal facility, the soil will be loaded in licensed haul trucks (end-dumps or transfer boxes) and transported off the site following appropriate California and Federal waste manifesting procedures. The appropriate waste manifest documentation will be provided to truck drivers hauling the affected soil off-site.

9.0 CAP IMPLEMENTATION REPORTING AND SCHEDULE

9.1 CAP Implementation Reporting

A description of the methods and procedures of the above-referenced scopes of work will be presented in a report along with the results of the sampling activities (soil, soil vapor, and rebound testing). The report will also provide tabulated data, illustrations showing select contaminant concentrations, laboratory reports, and verification soil sample analytical results. The report will be submitted electronically to the State Water Resources Control Board Geotracker database and ACEH file transfer protocol (ftp) site.

If soil excavation is deemed warranted, soil excavation activities described in Sections 8.2 through 8.4 will be conducted and subsequently documented in an SMP implementation report. The SMP implementation report will provide a description of the method and extent of soil excavations conducted, soil cleanup levels achieved, copies of waste manifest forms, laboratory reports, and chain-of-custody forms.

9.2 Schedule

The tentative schedule for implementation of the CAP is as follows:

- Within one week following ACEH approval of this CAP, a public notification fact sheet will be distributed. The CAP public-notification letter will request comments from the public and other interested parties within 30-days of distribution. Response to comments will be provided within 14-days of close of the public comments period;
- Based on laboratory analytical results of SVE well and influent samples indicating that removal of VOCs from the vadose zone have been achieved to the maximum extent possible utilizing SVE remediation technology (e.g., stable or asymptotic concentrations, and/or concentrations less than TCLs), the SVE system will be shutdown;
- Within two weeks following shutdown of the SVE system, the on- and off-site soil vapor sampling and off-site soil vapor monitoring probe installation activities will be implemented;
- The focused soil investigation activities will be completed two to three weeks after ACEH approval of the CAP;
- Two rounds of vapor samples will be collected from SVE wells approximately 30 days and 60 days after shutdown to assess rebound vapor conditions;
- A CAP implementation report will be prepared to document the results of the supplemental on- and off-site soil vapor sampling, focused on-site soil sampling, and SVE well rebound vapor sampling within 90 days of SVE system shutdown; and
- If/as warranted, soil excavation activities described in Sections 8.2 through 8.4 will be documented in an SMP implementation report that will be prepared and submitted to ACEH within four weeks of receipt of soil excavation verification sampling results.

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TABLE

Table 1
Sampling and Analytical Program
Corrective Action Plan
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location ID	Sample Rationale	Sample Depth (feet bgs)	Analytical Program		Comments
			Select VOCs (TO-15 for air, 8260B for soil)	Helium (ASTM 1946D) - leak check compound	
Soil Vapor					
SV68	Assess westernmost extent of vinyl chloride in vicinity of SV61 and PSV1	10	X	X	Analytical reporting for vinyl chloride only
PSV12	Assess westernmost extent of vinyl chloride in vicinity of PSV6	10	X	X	Analytical reporting for vinyl chloride only
PSV13	Assess southernmost extent of vinyl chloride in vicinity of PSV10	5 and 10	X	X	Analytical reporting for vinyl chloride only
Soil Vapor Monitoring Probe					
PSGP1	Monitor vapor conditions at 6601-6603 Shellmound Street subsurface	5 and 10	X		Analytical reporting for vinyl chloride only
PSGP2	Monitor vapor conditions at 6601-6603 Shellmound Street subsurface	5 and 10	X		Analytical reporting for vinyl chloride only
PSGP3	Monitor vapor conditions at 6601-6603 Shellmound Street subsurface	5 and 10	X		Analytical reporting for vinyl chloride only
PSGP4	Monitor vapor conditions at 6601-6603 Shellmound Street subsurface	5 and 10	X		Analytical reporting for vinyl chloride only
Soil					
SB62	Assess lateral extent of vinyl chloride in soil in vicinity of SV61	10	X		Analytical reporting for vinyl chloride only
SB63	Assess lateral extent of vinyl chloride in soil in vicinity of SV61	10	X		Analytical reporting for vinyl chloride only
SB64	Assess lateral extent of vinyl chloride in soil in vicinity of SV61	10	X		Analytical reporting for vinyl chloride only
SB65	Assess lateral extent of vinyl chloride in soil in vicinity of SV61	10	X		Analytical reporting for vinyl chloride only
SB66	Assess lateral extent of select VOCs in soil in vicinity of SV60	10	X		Analytical reporting for TCE, cis-1,2-DCE, and vinyl chloride only
SB67	Assess lateral extent of select VOCs in soil in vicinity of SV60	10	X		Analytical reporting for TCE, cis-1,2-DCE, and vinyl chloride only
SB68	Assess lateral extent of select VOCs in soil in vicinity of SV60	10	X		Analytical reporting for TCE, cis-1,2-DCE, and vinyl chloride only
SB69	Assess lateral extent of select VOCs in soil in vicinity of SB59	5 and 10	X		Analytical reporting for TCE, trans-1,2-DCE, cis-1,2-DCE, and vinyl chloride only
SB70	Assess lateral extent of select VOCs in soil in vicinity of SB59	5 and 10	X		Analytical reporting for TCE, trans-1,2-DCE, cis-1,2-DCE, and vinyl chloride only
SB71	Assess lateral extent of select VOCs in soil in vicinity of SB59	5 and 10	X		Analytical reporting for TCE, trans-1,2-DCE, cis-1,2-DCE, and vinyl chloride only

Table 1
Sampling and Analytical Program
Corrective Action Plan
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location ID	Sample Rationale	Sample Depth (feet bgs)	Analytical Program		Comments
			Select VOCs (TO-15 for air, 8260B for soil)	Helium (ASTM 1946D) - leak check compound	
SB72	Assess lateral extent of select VOCs in soil in vicinity of SB59 and SB55	5 and 10	X		Analytical reporting for TCE, trans-1,2-DCE, cis-1,2-DCE, and vinyl chloride only
SB73	Assess lateral extent of select VOCs in soil in vicinity of SB59 and SB55	5 and 10	X		Analytical reporting for TCE, trans-1,2-DCE, cis-1,2-DCE, and vinyl chloride only
SB74	Assess lateral extent of select VOCs in soil at SB55	5 and 10	X		Analytical reporting for cis-1,2-DCE and vinyl chloride only
SB75	Assess lateral extent of vinyl chloride in soil in vicinity of SB51 and SB55	5 and 10	X		Analytical reporting for vinyl chloride only
SB76	Assess lateral extent of vinyl chloride in soil in vicinity of SB51 and SB55	5 and 10	X		Analytical reporting for vinyl chloride only
SB77	Assess lateral extent of vinyl chloride in soil in vicinity of SB51	5	X		Analytical reporting for vinyl chloride only
SB78	Assess soil concentration of vinyl chloride at SB51	5	X		Analytical reporting for vinyl chloride only
SB79	Assess lateral extent of vinyl chloride in soil in vicinity of SB51	5	X		Analytical reporting for vinyl chloride only
SB80	Assess soil concentration of select VOCs at SB59	5 and 10	X		Analytical reporting for TCE, trans-1,2-DCE, cis-1,2-DCE, and vinyl chloride only
SB81	Assess lateral extent of select VOCs in soil in vicinity of SV60	10	X		Analytical reporting for TCE, cis-1,2-DCE, and vinyl chloride only

Notes:
bgs = Below ground surface.
X = Scheduled for Analytical.
VOCs = Volatile organic compounds
TCE = Trichloroethene
cis-1,2-DCE = cis-1,2-dichloroethene
trans-1,2-DCE - = trans-1,2-dichloroethene

ILLUSTRATIONS

0 2000 4000

Scale in Feet

N

U.S.G.S. Topo Map - Oakland West, California, 7.5-minute quadrangle.1997

PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
Corrective Action Plan
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
1

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
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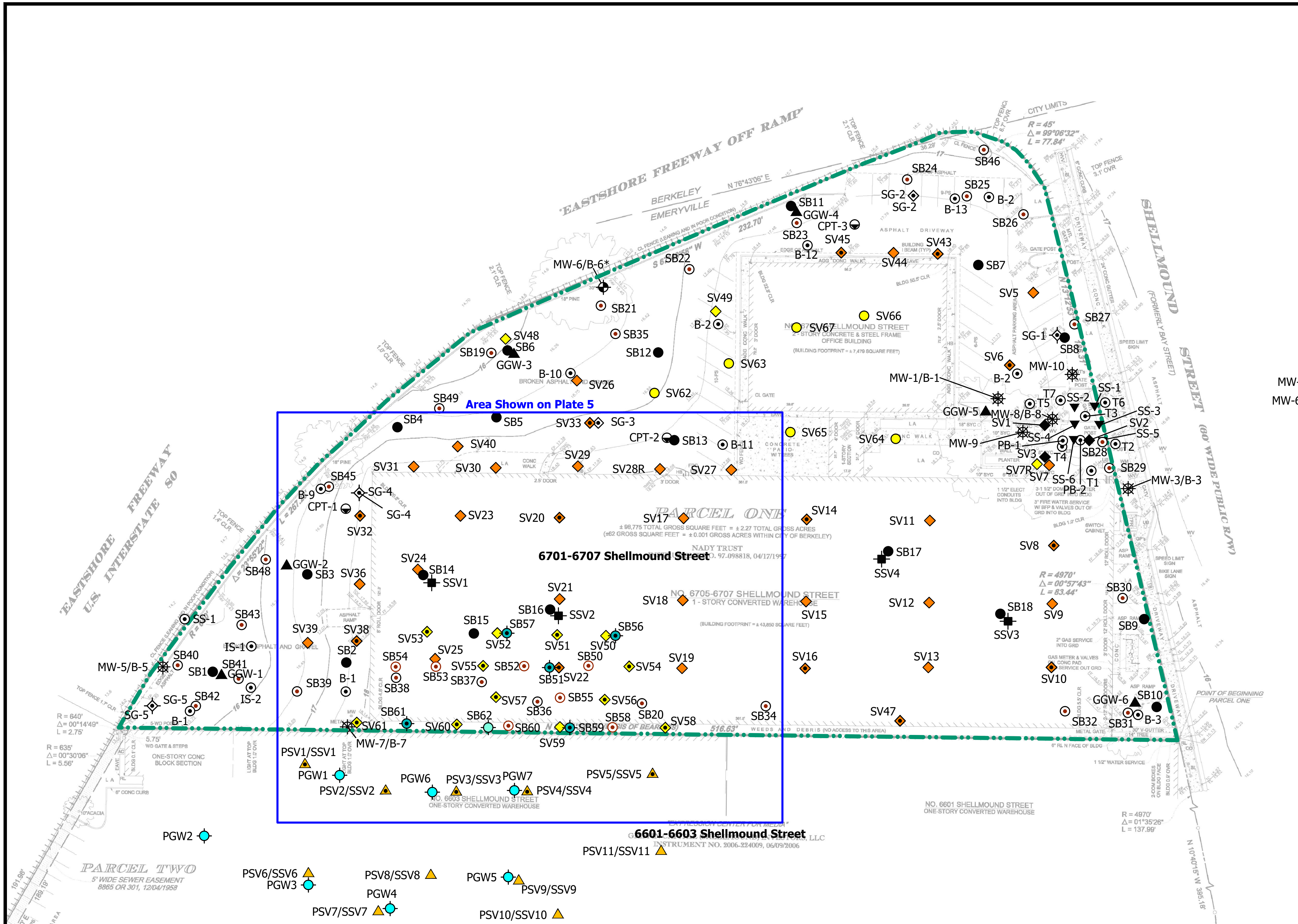

Explanation

- Approximate Property Boundary
- SV66 Soil Vapor and Soil Sampling Location (PES, Sep. 2016)
- SV7 Soil Vapor Sampling Location (PES, Nov.-Dec. 2015)
- SB24 Soil Sampling Location (PES, Nov.-Dec. 2015)
- SV33 Soil Vapor and Soil Sampling Location (PES, Nov. 2015)
- SB50 Soil Sampling Location (PES, Feb. 2016)
- SV7R Soil Vapor Sampling Location (PES, Feb. 2016)
- SV54 Soil Vapor and Soil Sampling Location (PES, Feb. 2016)
- SB56 Soil and Grab Groundwater Sample Location (PES, Feb. 2016)
- SB62 Grab Groundwater Sample Location (PES, Feb. 2016)
- PSV11 Multi-Depth Soil Vapor Sampling Location
- PSV5 Multi-Depth Soil Vapor and Soil Sampling Location
- PGS6 Grab Groundwater Sample Location
- SG-5 Soil, Soil Gas and Groundwater Sampling Location (Environ, 2013)
- SG-3 Soil Gas and Soil Sampling Location (Environ, 2013)
- MW-5/B-5 Monitoring Well - Destroyed (Environ, 2013)
- MW-6/B-6* Well not found, assumed to be destroyed
- SSV1 Sub-Slab Vapor Sampling Location (PES, April 2015)
- SV1 Soil Vapor Sampling Location (PES, April 2015)
- SB13 Soil Boring (PES, November 2013)
- GGW1 Grab Groundwater Boring (PES, November 2013)
- B-1 Geotechnical Boring (Geosphere, 2013)
- B-1 Geotechnical Boring (URS, 2005)
- CPT-1 CPT Location (URS, 2005)
- T2 Historical Test Boring (Various, 1989-2005)
- SS-5 Historical Confirmation Sample from Tank Excavation (Environ, 2013)

PES Environmental, Inc.
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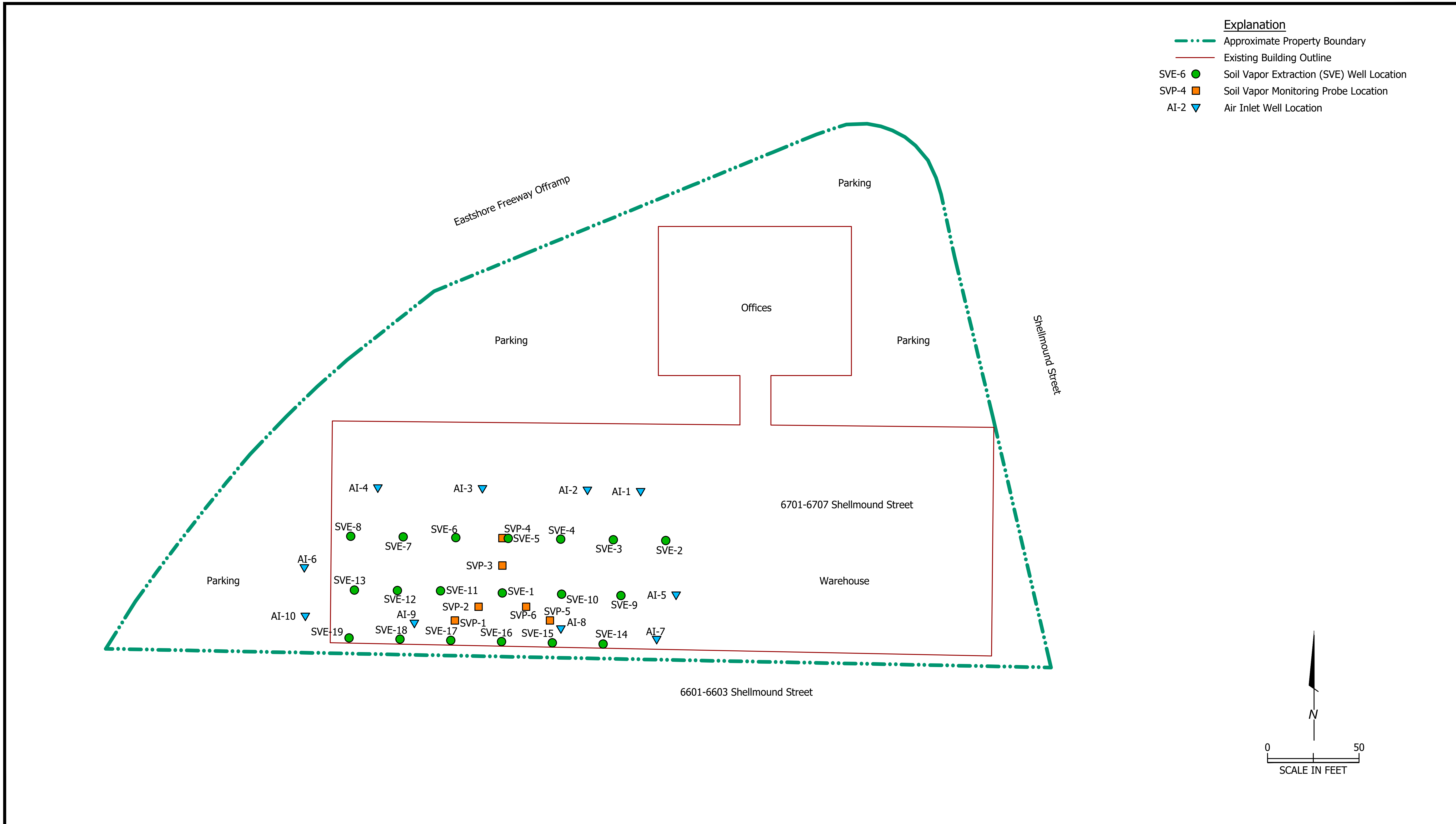
Site Plan and Previous Sampling Locations
Corrective Action Plan
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
2

1448.001.01.044	144800101044_CAP_2	DRAFT	1/17
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

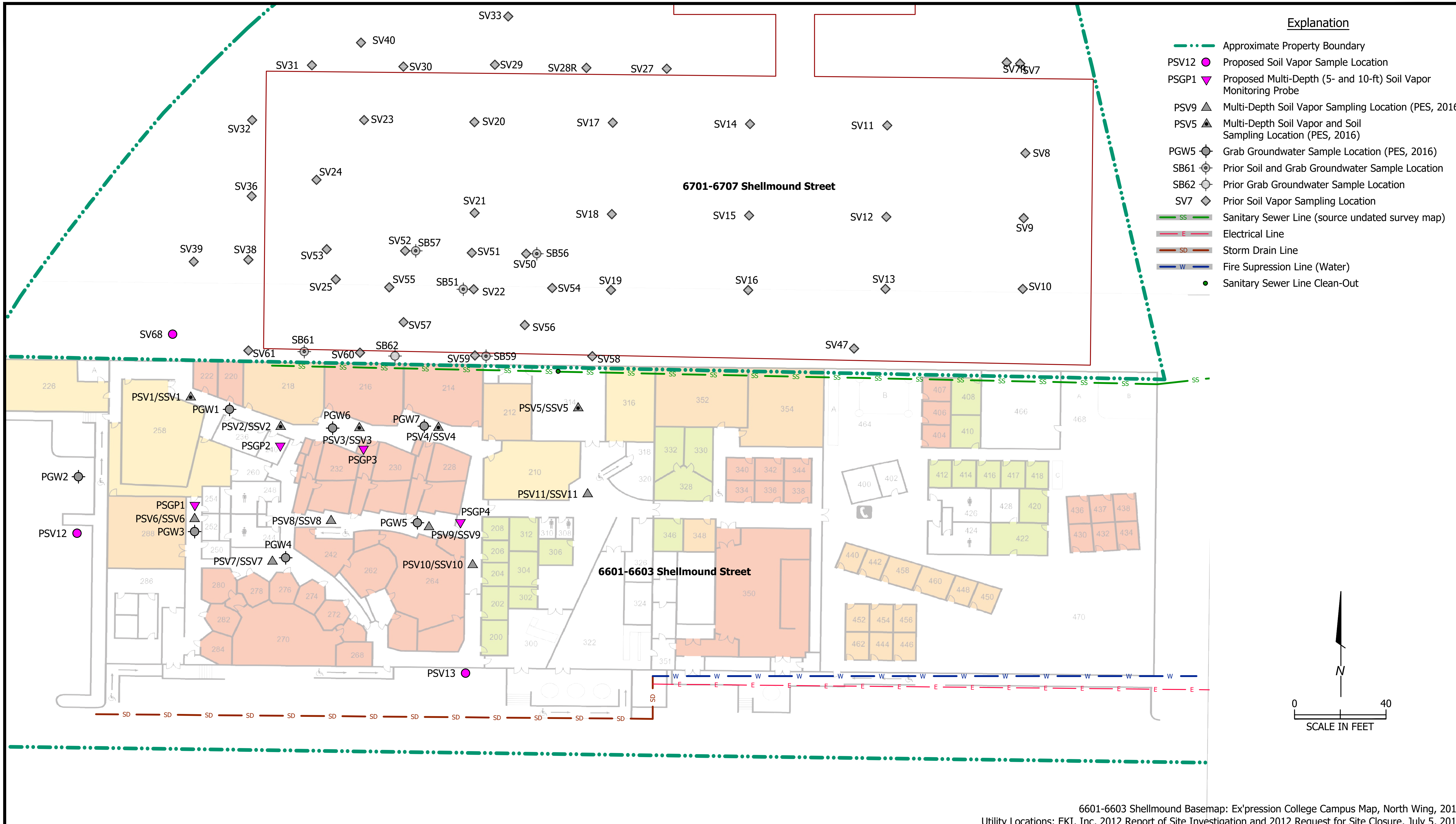


PES Environmental, Inc.
Engineering & Environmental Services

Soil Vapor Extraction Well, Inlet Well, and Soil Vapor Monitoring Probe Locations
Corrective Action Plan
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
3

1448.001.01.044	144800101044_CAP_3	DRAFT	1/17
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



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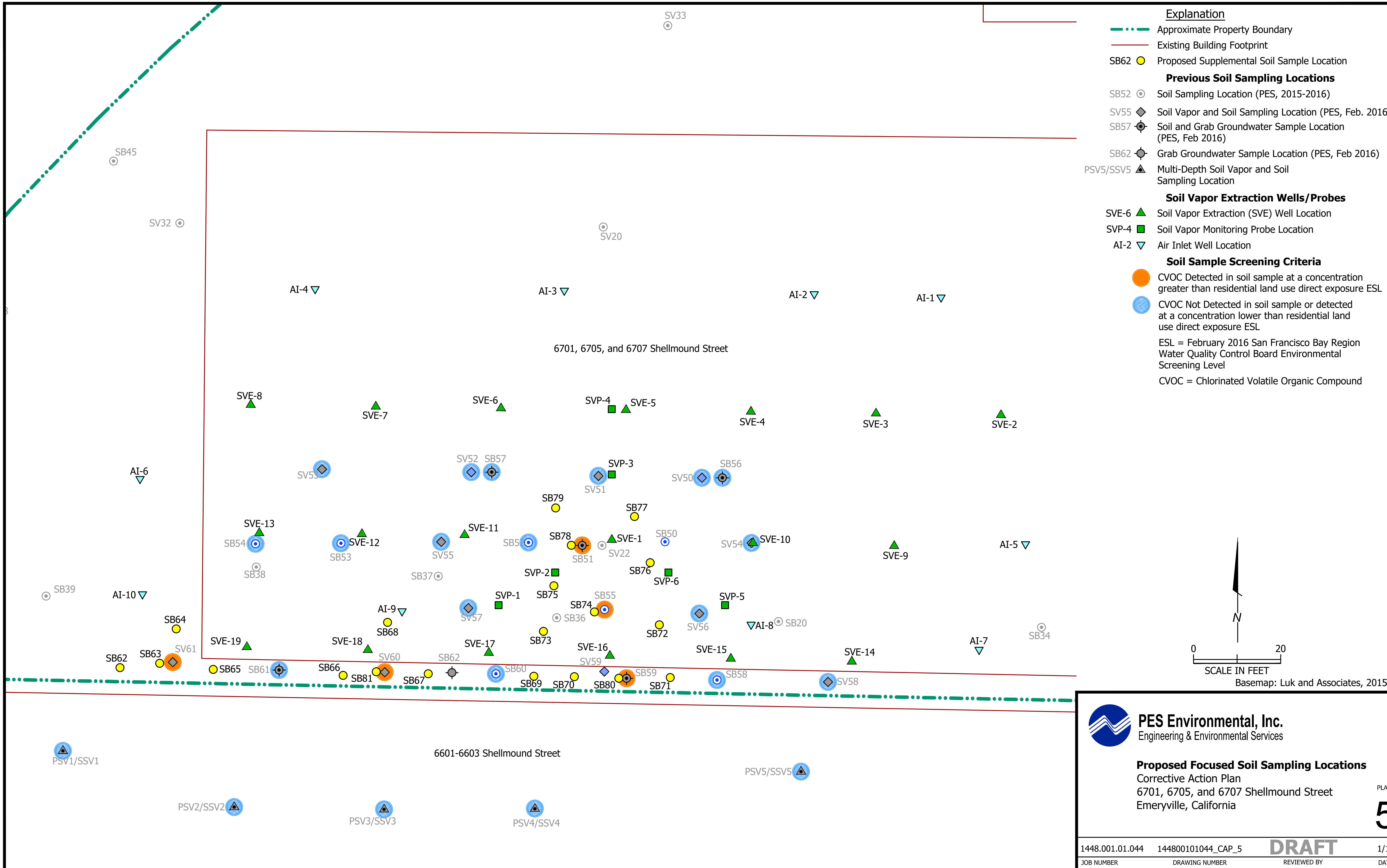
Engineering & Environmental Services

Proposed Supplemental Soil Vapor Sampling and Monitoring Locations
Corrective Action Plan
6601-6603 Shellmound Street
Emeryville, California

PLATE
4

1448.001.01.044	144800101044_CAP_4	DRAFT	1/17
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



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Engineering & Environmental Services

Proposed Focused Soil Sampling Locations
Corrective Action Plan
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
5

1448.001.01.044	144800101044_CAP_5	DRAFT	1/17
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

APPENDIX A

PERTINENT DATA FROM PREVIOUS INVESTIGATION REPORTS

Pertinent Data from April 8, 2016 *Pre-Construction Subsurface Investigation Report*

TABLES

Table 1
Sampling and Analysis Program
Supplemental Pre-Construction Subsurface Investigation
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location ID	Sample Rationale/Feature of Interest	Sample Depth (feet bgs)	Approximate Existing Ground Elevation (feet msl)	Approximate Future Grade Elevation (feet msl)	Approximate Sample Elevation (feet msl)	Approximate Sample Depth Beneath Future Grade (feet bgs)	Analysis Program: VOCs including MIBK, MEK, and naphthalene (TO-15 for air, 8260B for soil and GW)	1,4-dioxane (TO-15 for air, 8270 SIM for GW)	TPH quantified as diesel and motor oil	PCBs	SVOCs	Total Lead	Title 22 metals	Asbestos	Methane, Carbon Dioxide, and Oxygen (ASTM 1946D)	Helium (ASTM 1946D) - leak check compound	Comments
Soil Vapor																	
SV5	Future ground-floor common and amenity areas	5 and 10	17.5	20 [1]	12.5 and 7.5	7.5 and 12.5	X								X (5)	X	
SV6	Future ground-floor common and amenity areas	5 and 10	17.5	20 [1]	12.5 and 7.5	7.5 and 12.5	X									X	
SV7	Confirmation of previous soil gas sample SV3 elevated reporting limit for vinyl chloride	10	18	20 [1]	8	12	X									X	
SV7R	Confirmation of previous soil gas samples SV3 and SV7 with elevated reporting limits for vinyl chloride	10	18	20 [1]	8	12	X	X							X	X	Sample *analyzed at low calibration range to achieve target reporting limit of 18 ug/m3 for vinyl chloride.*
SV8	Future ground-floor common and amenity areas	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X								X	X	
SV9	Future ground-floor common and amenity areas	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X									X	
SV10	Future ground-floor common and amenity areas	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X								X	X	
SV11	Existing warehouse	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X								X	X	
SV12	Existing warehouse	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X									X	
SV13	Existing warehouse, shifted near edge of future building foundation	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X								X	X	
SV14	Existing warehouse	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X								X	X	
SV15	Existing warehouse	5 and 8	18.5	20 [1]	13.5 and 10.5	6.5 and 9.5	X									X	Refusal encountered at 8 feet bgs
SV16	Existing warehouse, shifted near edge of future building foundation	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X								X	X	
SV17	Existing warehouse	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X									X	
SV18	Existing warehouse	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X									X	
SV19	Existing warehouse, shifted near edge of future building foundation	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X								X	X	
SV20	Existing warehouse	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X								X	X	
SV21	Existing warehouse	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X									X	
SV22	Existing warehouse, shifted near edge of future building foundation	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X								X	X	
SV23	Existing warehouse, future ground-floor common and amenity areas	5 and 10	18.5	20 [1]	13.5 and 8.5	6.5 and 11.5	X								X	X	
SV24	Confirmation of previous sub-slab vapor sample SSV1 result for PCE; existing warehouse; future ground-floor residential units	5 and 10	18.5	20.5	13.5 and 8.5	7 and 12	X									X	
SV25	Existing warehouse, shifted near edge of future building foundation	5 and 10	18.5	20.5	13.5 and 8.5	7 and 12	X									X	
SV26	Future ground-floor common and amenity areas	5 and 10	16.5	19.5	11.5 and 6.5	8 and 13	X								X	X	
SV27	Inferred former drain pipe from mezzanine sump	5 and 10	18	20 [1]	13 and 8	7 and 12	X									X	
SV28R	Inferred former drain pipe from mezzanine sump	5 and 10	18	20 [1]	13 and 8	7 and 12	X								X	X	Sample SV28-5 and SV28-10 were compromised following collection, therefore a new nested probe SV28R was installed approx. 5 feet west, and samples SV28R-5 and SV28R-10 were submitted for analysis.
SV29	Inferred former drain pipe from mezzanine sump	5 and 10	17.5	20 [1]	12.5 and 7.5	7.5 and 12.5	X									X	
SV30	Inferred former drain pipe from mezzanine sump	5 and 10	17.5	20 [1]	12.5 and 7.5	7.5 and 12.5	X									X	
SV31	Inferred former drain pipe from mezzanine sump	5 and 10	17.5	19.5	12.5 and 7.5	7 and 12	X									X	
SV32	Former sump excavation area	5 and 10	17.5	19.5	12.5 and 7.5	7 and 12	X									X	
SV33	Confirmation of previous soil gas sample SG-3 result for PCE	5 and 10	17	20 [1]	12 and 7	8 and 13	X									X	
SV36	Future ground-floor residential units	5 and 10	17.5	20 [1]	12.5 and 7.5	7.5 and 12.5	X								X	X	
SV38	Former drum storage area; future ground-floor residential units	5 and 10	17.5	20 [1]	12.5 and 7.5	7.5 and 12.5	X								X	X	
SV39	Former drum storage area; future ground-floor residential units	5 and 10	16.5	20 [1]	11.5 and 6.5	8.5 and 13.5	X								X	X	

Table 1
Sampling and Analysis Program
Supplemental Pre-Construction Subsurface Investigation
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location ID	Sample Rationale/Feature of Interest	Sample Depth (feet bgs)	Approximate Existing Ground Elevation (feet msl)	Approximate Future Grade Elevation (feet msl)	Approximate Sample Elevation (feet msl)	Approximate Sample Depth Beneath Future Grade (feet bgs)	Analysis Program: VOCs including MIBK, MEK, and naphthalene (TO-15 for air, 8260B for soil and GW)	1,4-dioxane (TO-15 for air, 8270 SIM for GW)	TPH quantified as diesel and motor oil	PCBs	SVOCs	Total Lead	Title 22 metals	Asbestos	Methane, Carbon Dioxide, and Oxygen (ASTM 1946D)	Helium (ASTM 1946D) - leak check compound	Comments
SV40	Future ground-floor common and amenity areas	5 and 10	17	20 [1]	12 and 7	8 and 13	X									X	
SV43	Future ground-floor residential units	5 and 10	18	20 [1]	13 and 8	7 and 12	X									X	
SV44	Future ground-floor residential units	5 and 10	18	20 [1]	13 and 8	7 and 12	X								X	X	
SV45	Future ground-floor residential units	5 and 10	18	20 [1]	13 and 8	7 and 12	X								X	X	
SV47	Existing sand-filled sump on south side of building	5	18.5	20 [1]	13.5	6.5	X									X	PES attempted to collect a vapor sample at 10 feet bgs, however water was observed entrained in the probe during purging, therefore the 10-foot sample was not collected.
SV48	Lateral definition of VC and benzene in soil gas	5 and 10	16	19.5	11 and 6	8.5 and 13.5	X	X							X	X	
SV49	Lateral definition of benzene in soil gas	5	17.5	19.5	12.5	7	X	X							X	X	
SV50	Potential VC source area beneath warehouse	5	18.5	20 [1]	13.5	6.5	X	X							X	X	
SV51	Potential VC source area beneath warehouse	5	18.5	20 [1]	13.5	6.5	X	X							X	X	
SV52	Potential VC source area beneath warehouse	5	18.5	20 [1]	13.5	6.5	X	X							X	X	
SV53	Potential VC source area beneath warehouse	5	18.5	20 [1]	13.5	6.5	X	X							X	X	
SV54	Potential VC source area beneath warehouse	5	18.5	20 [1]	13.5	6.5	X	X							X	X	
SV55	Potential VC source area beneath warehouse	5	18.5	20 [1]	13.5	6.5	X	X								X	
SV56	Potential VC source area beneath warehouse	5	18.5	20 [1]	13.5	6.5	X	X							X	X	
SV57	Potential VC source area beneath warehouse	5	18.5	20 [1]	13.5	6.5	X	X							X	X	
SV58	Potential VC source area beneath alleyway	5 and 10	18	19	13 and 8	6 and 11	X	X							X	X	
SV59	Potential VC source area beneath alleyway	5 and 10	18	19	13 and 8	6 and 11	X	X							X	X	
SV60	Potential VC source area beneath alleyway	5 and 10	18	19	13 and 8	6 and 11	X	X							X	X	
SV61	Potential VC source area beneath former drum storage area, alleyway drainage area	5 and 10	18	19	13 and 8	6 and 11	X	X							X	X	
Soil																	
SB19	Future utility alignment; future pavement section	0.5	16	19.5	15.5	4			X	C		X					
SB20	Future utility alignment; future pavement section	1 and 2.5	18.5	20	17.5 and 16	2.5 and 4			X	C		X					
SB21	Future utility alignment; future pavement section	0.5	16.5	19.5	16	3.5			X	C		X					
SB22	Future utility alignment; future pavement section	0.5	17	19.5	16.5	3			X	C		X					
SB23	Future utility alignment; future pavement section	0.5	17.5	19	17	2			X	C	X		X	X			
SB24	Future utility alignment; future pavement section	0.5	17.5	19.5	17	2.5			X	C		X					
SB25	Future utility alignment; future pavement section	1	17.5	19.5	16.5	3			X	C		X					
SB26	Future utility alignment; future pavement section	1.5	17.5	18.5	16	2.5			X	C		X					
SB27	Future utility alignment; future pavement section	2.5	17.5	18	15	3			X	C		X					
SB28	Confirmation of previous soil gas sample SV2 result for benzene; future utility alignment	0.5 and 4.5	17	19	16.5 and 12.5	2.5 and 6.5	X (4.5)		X	C		X					
SB29	Future utility alignment; future pavement section	2.5	17	18.5	14.5	4			X	C	X		X	X			
SB30	Future utility alignment; future pavement section	1 and 4	17	18	16 and 13	2 and 5			X	C		X					
SB31	Future utility alignment; future pavement section	2 and 6	17.5	18.5	15.5 and 11.5	3 and 7			X	C		X					
SB32	Future utility alignment; future pavement section	1.5	18.5	20	17	3			X	C		X					Refusal encountered at 3 feet bgs, therefore only the 1.5-foot sample was collected.
SB34	Future utility alignment; future landscape area	4	18.5	20	14.5	5.5			X	C	X		X	X			

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Supplemental Pre-Construction Subsurface Investigation
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							Analysis Program										
Sample Location ID	Sample Rationale/Feature of Interest	Sample Depth (feet bgs)	Approximate Existing Ground Elevation (feet msl)	Approximate Future Grade Elevation (feet msl)	Approximate Sample Elevation (feet msl)	Approximate Sample Depth Beneath Future Grade (feet bgs)	VOCs including MIBK, MEK, and naphthalene (TO-15 for air, 8260B for soil and GW)	1,4-dioxane (TO-15 for air, 8270 SIM for GW)	TPH quantified as diesel and motor oil	PCBs	SVOCs	Total Lead	Title 22 metals	Asbestos	Methane, Carbon Dioxide, and Oxygen (ASTM 1946D)	Helium (ASTM 1946D) - leak check compound	Comments
SB35	Future infiltration gallery	0.5	16.5	19.5	16	3.5			X	C		X					
SB36	Future utility alignment; future pavement section	1.5	18.5	20	17	3			X	C		X					
SB37	Future infiltration gallery	0.5	18.5	20	18	2			X	C		X					
SB38	Future utility alignment; future pavement section	1.5	18.5	20.5	17	3.5			X	C		X					
SB39	Future utility alignment; future pavement section	0.5	16.5	19.5	16	3.5			X	C		X		X			
SB40	Future infiltration gallery; future playground/dog park area	1	15.5	18.5	14.5	4			X	C		X					
SB41	Future pavement section	1	16	19.5	15	4.5			X	C		X					
SB42	Future playground/dog park area	1	15.5	18.5	14.5	4			X	C	X		X	X			
SB43	Future utility alignment; future pavement section	1.5	16	19.5	14.5	5			X	C		X					
SB45	Future utility alignment; future pavement section	1.5	16.5	19	15	4			X	C		X					
SB46	Future outdoor fitness area	0.5	17	18.5	16.5	2			X	C	X		X	X			
SB48	Future utility alignment; future pavement section	1	16	19.5	15	4.5			X	C	X		X	X			
SB49	Future pavement section	0.5	16.5	19.5	16	3.5			X	C		X					
SB50	Potential VC source identification in vadose zone soil	0.5, 5.0, and 10	18.5	20 [1]	18, 13.5, and 8.5	2, 6.5, and 11.5	X (0.5 and 5)										
SB51	Potential VC source identification in soil and groundwater	0.5, 4.5, 10, and 13.5	18.5	20 [1]	18, 14, 8.5, and 5	2, 6, 11.5, and 15	X (0.5, 4.5, and 10)										
SB52	Potential VC source identification in vadose zone soil	0.5, 4.5, and 11	18.5	20 [1]	18, 14, and 7.5	2, 6, and 12.5	X (0.5 and 4.5)										
SB53	Potential VC source identification in vadose zone soil	0.5, 5.0, and 10	18.5	20.5	18, 13.5, and 8.5	2.5, 7, and 12	X (0.5, 5, and 10)										
SB54	Potential VC source identification in vadose zone soil	0.5 and 5.0	18.5	20.5	18 and 13.5	2.5 and 7	X (0.5 and 5)										
SB55	Potential VC source identification in vadose zone soil	0.5, 5.5, and 10	18.5	20 [1]	18, 13, and 8.5	2, 7, and 11.5	X (0.5, 5.5 and 10)										
SB56	Potential VC source identification in soil and groundwater	10 and 13	18.5	20 [1]	8.5 and 5.5	11.5 and 14.5	X (10 and 13)										
SB57	Potential VC source identification in soil and groundwater	10 and 12.5	18.5	20 [1]	8.5 and 6	11.5 and 14	X (10 and 12.5)										
SB58	Potential VC source identification in vadose zone soil	0.5 and 5.0	18	19	17.5 and 13	1.5 and 6	X (0.5 and 5)										
SB59	Potential VC source identification in soil and groundwater	0.5, 5, 10, and 13.5	18	19	17.5, 13, 8, and 4.5	1.5, 6, 11, and 14.5	X (0.5, 5, and 10)										
SB60	Potential VC source identification in vadose zone soil	0.5 and 5.0	18	19	17.5 and 13	1.5 and 6	X (0.5 and 5)										
SB61	Potential VC source identification in soil and groundwater	0.5, 5, 10, and 12.5	18	19	17.5, 13, 8, and 5.5	1.5, 6, 11, and 13.5	X (0.5, 5, and 10)										
SV6	Future building foundation	0.5	17.5	20 [1]	17	3			X	C	X		X	X			
SV8	Future building foundation	0.5	18.5	20 [1]	18	3			X	C		X					
SV10	Future building foundation	0.5	18.5	20 [1]	18	3			X	C	X		X	X			
SV14	Future building foundation	0.5	18.5	20 [1]	18	3			X	C	X		X	X			
SV16	Future building foundation	0.5	18.5	20 [1]	18	3			X	C		X					
SV20	Future building foundation	0.5	18.5	20 [1]	18	3			X	C	X		X	X			
SV22	Future building foundation	0.5	18.5	20 [1]	18	3			X	C		X					
SV32	Former sump excavation; future infiltration gallery	1 and 7	17.5	19.5	16.5 and 10.5	3 and 9	X (7)		X	C	X		X	X			
SV33	Confirmation of previous soil gas sample SG-3 result for PCE; future building foundation	0.5 and 4.5	17	20 [1]	16.5 and 12.5	3.5 and 7.5	X (4.5)		X	C		X					
SV38	Future building foundation	1	17.5	20 [1]	16.5	3.5			X	C	X		X				
SV43	Future building foundation	1	18	20 [1]	17	3			X	C		X					
SV45	Future building foundation	1	18	20 [1]	17	3			X	C		X					

Table 1
Sampling and Analysis Program
Supplemental Pre-Construction Subsurface Investigation
6701, 6705, and 6707 Shellmound Street, Emeryville, California

							Analysis Program										
Sample Location ID	**Sample Rationale/Feature of Interest**	**Sample Depth (feet bgs)**	**Approximate Existing Ground Elevation (feet msl)**	**Approximate Future Grade Elevation (feet msl)**	**Approximate Sample Elevation (feet msl)**	**Approximate Sample Depth Beneath Future Grade (feet bgs)**	**VOCs including MIBK, MEK, and naphthalene (TO-15 for air, 8260B for soil and GW)**	**1,4-dioxane (TO-15 for air, 8270 SIM for GW)**	**TPH quantified as diesel and motor oil**	**PCBs**	**SVOCs**	**Total Lead**	**Title 22 metals**	**Asbestos**	**Methane, Carbon Dioxide, and Oxygen (ASTM 1946D)**	**Helium (ASTM 1946D) - leak check compound**	**Comments**
SV47	Existing sand-filled sump on south side of building; future utility alignment; future pavement section	1.5, 2.5, 6	18.5	19.5	17, 16 and 12.5	2.5, 3.5, and 7	X (2.5)		X (1.5)	C							Boring SB33 replaced with SV47.
SV50	Potential VC source identification in vadose zone soil	0.5, 4.5	18.5	20 [1]	18 and 14	2 and 6	X (0.5 and 4.5)										
SV51	Potential VC source identification in vadose zone soil	0.5, 5.0	18.5	20 [1]	18 and 13.5	2 and 6.5	X (0.5 and 5)										
SV52	Potential VC source identification in vadose zone soil	0.5, 5.0	18.5	20 [1]	18 and 13.5	2 and 6.5	X (0.5 and 5)										
SV53	Potential VC source identification in vadose zone soil	0.5, 5.0	18.5	20.5	18 and 13.5	2.5 and 7	X (0.5 and 5)										
SV54	Potential VC source identification in vadose zone soil	0.5, 5.0	18.5	20 [1]	18 and 13.5	2 and 6.5	X (0.5 and 5)										
SV55	Potential VC source identification in vadose zone soil	0.5, 5.0	18.5	20 [1]	18 and 13.5	2 and 6.5	X (0.5 and 5)										
SV56	Potential VC source identification in vadose zone soil	0.5, 5.0	18.5	20	18 and 13.5	2 and 6.5	X (0.5 and 5)										
SV57	Potential VC source identification in vadose zone soil	0.5, 5.0	18.5	20	18 and 13.5	2 and 6.5	X (0.5 and 5)										
SV58	Potential VC source identification in vadose zone soil	0.5, 5, 10	18	19	17.5, 13, and 8	1.5, 6, and 11	X (0.5, 5 and 10)										
SV60	Potential VC source identification in vadose zone soil	0.5, 5, 10	18	19	17.5, 13, and 8	1.5, 6, and 11	X (0.5, 5 and 10)										
SV61	Potential VC source identification in vadose zone soil	0.5, 5, 10	18	19	17.5, 13, and 8	1.5, 6, and 11	X (0.5, 5 and 10)										
Groundwater																	
SB51	Initial characterization of VC impacts to groundwater	First encountered GW	18.5	20 [1]	5.5	14.5	X	X									
SB56	Initial characterization of VC impacts to groundwater	First encountered GW	18.5	20 [1]	5	15	X	X									
SB57	Initial characterization of VC impacts to groundwater	First encountered GW	18.5	20 [1]	5.5	14.5	X	X									
SB59	Initial characterization of VC impacts to groundwater	First encountered GW	18	19	4	15	X	X									
SB61	Initial characterization of VC impacts to groundwater	First encountered GW	18	19	5	14	X	X									
SB62	Initial characterization of VC impacts to groundwater	First encountered GW	18	19	5	14	X	X									

Notes:
bgs = Below ground surface.
msl = Mean sea level.
VOCs = Volatile organic compounds.
MIBK = Methyl isobutyl ketone or 4-methyl-2-pentanone.
MEK = Methyl ethyl ketone or 2-butanone.
TPH = Total petroleum hydrocarbons.
PCBs = Polychlorinated Biphenyls.
SVOCs = Semi-volatile organic compounds.
VC = Vinyl Chloride
X = Scheduled for analysis.
X (2.0) = Scheduled for analysis only at the indicated depth below existing ground surface, in feet bgs.
C = To be analyzed contingent upon detection of TPH at a concentration or 100 milligrams per kilogram or greater.
1 = Elevation of planned concrete building mat foundation is actually 19.9 feet above msl. Elevation rounded to 20 feet above msl for discussion purposes.

Table 2
Summary of Soil Vapor Analytical Results
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	PCE (µg/m³)	TCE (µg/m³)	cis-1,2-DCE (µg/m³)	trans-1,2-DCE (µg/m³)	Vinyl chloride (µg/m³)	1,1,1-TCA (µg/m³)	1,1,2,2-PCA (µg/m³)	MEK (µg/m³)	MIBK (µg/m³)	Acetone (µg/m³)	Benzene (µg/m³)	Toluene (µg/m³)	Ethylbenzene (µg/m³)	m,p-Xylene (µg/m³)	o-Xylene (µg/m³)	1,2,4-TMB (µg/m³)	1,3,5-TMB (µg/m³)	4-Ethyltoluene (µg/m³)	Carbon disulfide (µg/m³)	Chloroform (µg/m³)	Other VOCs (µg/m³)	Carbon Dioxide (% v/v)	Methane (% v/v)	Oxygen (% v/v)	Helium (% v/v)
SV5	SV5-5	5.0	12/2/2015	< 2.7	< 2.1	< 1.6	< 1.6	< 1	< 1.6	< 2.7	55	< 1.6	120	12	8.9	2.6	25	3.8	8.5	3.2	< 2	3.9	7.2	ND	4.1	< 0.96	17	1.5
	SV5-10	10.0	12/2/2015	< 4.6	< 3.6	< 2.7	< 2.7	< 1.7	< 2.8	< 4.6	43	< 2.8	76	< 2.1	2.9	< 2.9	< 5.8	< 2.9	< 6.6	< 3.3	< 3.3	< 4.2	10	ND	--	--	--	< 0.17
SV6	SV6-5	5.0	12/2/2015	< 4.6	< 3.7	5.4	< 2.7	< 1.7	< 2.8	< 4.7	73	< 2.8	270	31	16	3.2	9.3	< 3	< 6.7	< 3.4	< 3.4	120	21	3.9 (Freon 21)	--	--	--	< 0.17
	SV6-10	10.0	12/2/2015	< 6.2	< 4.9	< 3.6	< 3.6	< 2.3	< 3.7	< 6.3	12	< 3.8	37	< 2.9	< 3.5	< 4	< 8	< 4	< 9	< 4.5	< 4.5	< 5.7	< 3.4	4.8 (Freon 21)	--	--	--	0.57
SV7	SV7-10	10.0	12/2/2015	< 2,100	< 1,700	< 1,300	< 1,300	< 810	< 1,300	< 2,200	< 1,900	88,000	< 9,400	< 1,000	< 1,200	< 1,400	< 2,700	< 1,400	< 3,100	< 1,600	< 1,600	< 2,000	< 1,200	ND	--	--	--	< 0.17
SV7R	SV7R-10	10.0	2/4/2016	< 7.5	< 6.0	< 4.4	< 4.4	< 2.8	< 4.5	< 7.6	17	250	43	18	39	5.3	22	9.1	< 11	< 5.4	< 5.4	< 6.9	< 4.1	8.8 (Freon 12), 4.2 (MC)	8.2	< 0.86	5.9	< 0.17
SV8	SV8-5	5.0	12/3/2015	7.8	< 2.1	7.0	9.1	110	< 1.6	< 2.7	4.0	< 1.6	76	11	13	< 1.7	5.4	1.9	< 3.9	< 2	< 2	33	< 1.5	2.9 (CM), 3.2 (MC)	1.0	0.69	1.4	< 0.1
	SV8-10	10.0	12/3/2015	< 8.6	< 6.8	< 5	< 5	7.8	< 5.2	< 8.7	35	< 5.2	200	4.8	9.7	< 5.5	< 11	< 5.5	< 12	< 6.2	< 6.2	18	< 4.6	ND	2.2	1.6	4.3	< 0.19
SV9	SV9-5	5.0	12/2/2015	< 12	< 9.9	< 7.3	< 7.3	< 4.7	< 7.5	< 13	100	840	500	8.2	23	< 8	20	< 8	< 18	< 9	< 9	< 11	< 6.7	ND	--	--	--	0.93
	SV9-10	10.0	12/2/2015	< 5.4	< 4.3	< 3.2	< 3.2	< 2	< 3.3	< 5.5	48	140	160	< 2.6	3.9	< 3.5	7.5	3.9	< 7.9	< 3.9	< 3.9	< 5	< 2.9	ND	--	--	--	0.67
SV10	SV10-5	5.0	12/2/2015	< 21	< 16	22	< 12	< 7.8	< 12	< 21	67	300	630	30	26	< 13	< 26	< 13	< 30	< 15	< 15	< 19	< 11	ND	3.3	2.4	1.8	0.76
	SV10-10	10.0	12/2/2015	59	< 6.6	4.8	< 4.9	< 3.1	< 5	< 8.5	41	68	180	150	11	< 5.3	< 11	5.9	< 12	7.1	< 6.1	< 7.7	< 4.5	ND	5.3	< 0.96	1.7	0.71
SV11	SV11-5	5.0	12/3/2015	< 16	< 13	43	< 9.5	< 6.1	< 9.8	< 16	81	< 9.8	330	84	13	< 10	27	< 10	< 24	< 12	< 12	170	< 8.8	ND	3.6	2.5	2.3	0.44
	SV11-10	10.0	12/3/2015	< 42	< 33	< 24	< 24	< 16	< 25	< 42	140	< 25	770	900	85	< 27	< 53	< 27	< 61	< 30	< 30	< 38	< 23	ND	1.7	6.1	1.9	< 0.19
SV12	SV12-5	5.0	12/3/2015	< 13	< 10	< 7.7	< 7.7	< 5.0	< 8	< 13	37	< 8	300	40	15	< 8.4	< 17	< 8.4	< 19	< 9.6	< 9.6	63	< 7.1	ND	--	--	--	0.56
	SV12-10	10.0	12/3/2015	< 11	< 8.3	< 6.2	< 6.2	< 4.0	< 6.4	< 11	58	< 6.4	190	7.1	7.8	< 6.7	< 13	< 6.7	< 15	< 7.6	< 7.6	26	< 5.7	ND	--	--	--	0.64
SV13	SV13-5	5.0	12/2/2015	< 19	< 15	< 11	< 11	< 7.3	< 12	< 20	65	< 12	380	17	48	< 12	160	< 12	< 28	< 14	< 14	31	< 10	ND	1.1	13	1.6	0.90
	SV13-10	10.0	12/2/2015	< 12	< 9.8	< 7.3	< 7.3	< 4.7	< 7.5	< 13	55	< 7.5	420	36	67	8.4	27	8.5	< 18	< 9	< 9	44	< 6.7	ND	< 1	15	1.8	< 0.2
SV14	SV14-5	5.0	12/2/2015	< 26	< 21	< 15	< 15	< 9.8	< 16	< 26	96	< 16	590	83	32	< 17	< 33	< 17	< 38	< 19	< 19	140	< 14	ND	2.0	< 0.96	19	< 0.19
	SV14-10	10.0	12/2/2015	< 26	< 20	< 15	< 15	< 9.7	< 16	< 26	64	< 16	530	610	71	28	110	23	< 37	< 19	< 19	< 24	< 14	ND	1.9	13	1.7	1.2
SV15	SV15-5	5.0	12/2/2015	< 62	< 49	< 36	< 36	< 23	< 37	< 63	56	310	2,400	39	< 34	< 40	< 79	< 40	< 90	< 45	< 45	71	< 33	ND	--	--	--	< 0.18
	SV15-8	8.0	12/2/2015	< 18	< 14	24	< 10	< 6.6	< 11	< 18	< 15	< 11	460	120	49	19	54	22	< 25	< 13	< 13	190	< 9.5	ND	--	--	--	< 0.19
SV16	SV16-5	5.0	12/2/2015	< 31	< 25	< 18	< 18	< 12	< 19	< 31	64	< 19	630	59	43	< 20	< 40	< 20	< 45	< 22	< 22	28	< 17	ND	5.6	39	1.3	< 0.18
	SV16-10	10.0	12/2/2015	< 12	< 9.5	13	< 7.0	5.4	< 7.2	< 12	77	< 7.2	590	< 5.6	20	8.9	27	8.5	< 17	< 8.7	< 8.7	< 11	< 6.4	9 (1,1-DCA)	2.3	27	1.3	0.81
SV17	SV17-5	5.0	12/1/2015	< 18	< 14	< 10	< 10	< 6.7	< 11	< 18	93	< 11	400	130	120	24	130	26	< 26	< 13	< 13	120	31	ND	--	--	--	< 0.2
	SV17-10	10.0	12/1/2015	< 67	< 53	< 39	< 39	< 25	< 40	120	< 58	< 40	< 290	4,200	180	< 43	< 86	< 43	< 97	< 49	< 49	< 62	< 36	ND	--	--	--	< 0.2
SV18	SV18-5	5.0	12/2/2015	< 17	< 14	29	< 10	83	< 10	< 18	100	< 11	780	210	32	< 11	43	< 11	< 25	< 13	< 13	120	< 9.4	ND	--	--	--	< 0.18
	SV18-10	10.0	12/2/2015	< 11	< 8.9	< 6.6	< 6.6	57	< 6.8	< 11	72	< 6.8	380	84	39	8.9	27	9.2	< 16	< 8.2	< 8.2	280	< 6.1	20 (CM)	--	--	--	0.29
SV19	SV19-5	5.0	12/1/2015	< 19	< 15	14	< 11	650	< 11	< 19	150	< 11	760	300	59	< 12	68	13	< 28	< 14	< 14	66	< 10	ND	9.7	52	0.96	< 0.17
	SV19-10	10.0	12/1/2015	< 20	34	170	< 12	47	< 12	< 20	44	< 12	180	760	53	< 13	45	12	< 29	< 14	< 14	110	< 11	ND	1.8	75	0.87	< 0.18
SV20	SV20-5	5.0	12/1/2015	< 57	< 45	< 33	< 33	23	< 35	< 58	110	< 35	960	120	58	< 37	< 73	< 37	< 83	< 41	< 41	120	< 31	ND	5.0	20	2.3	< 0.17
	SV20-10	10.0	12/1/2015	< 13	< 11	25	< 7.9	19	< 8.1	< 14	54	< 8.1	230	110	65	9.9	40	11	< 19	< 9.7	< 9.7	60	< 7.3	7.9 (MC)	5.1	22	1.6	< 0.17
SV21	SV21-5	5.0	12/1/2015	< 20	17	70	< 12	48	< 12	< 20	83	< 12	620	62	54	< 13	< 26	< 13	< 29	< 14	< 14	120	23	ND	--	--	--	< 0.19
	SV21-10	10.0	12/1/2015	< 14	20	75	< 8.2	140	< 8.5	< 14	64	< 8.5	290	42	48	< 9	67	< 9	< 20	< 10	< 10	260	< 7.6	ND	--	--	--	< 0.17
SV22	SV22-5	5.0	12/1/2015	< 2,600	< 2,000	< 1,500	< 1,500	83,000	< 1,500	< 2,600	< 2,200	< 1,500	< 11,000	< 1,200	< 1,400	< 1,600	< 3,300	< 1,600	< 3,700	< 1,900	< 1,900	< 2,400	< 1,400	ND	11	35	1.4	< 0.19
	SV22-10	10.0	12/1/2015	< 1,200	< 940	1,500	1,200	35,000	< 710	< 1,200	< 1,000	< 710	< 5,200	< 560	< 660	< 760	< 1,500	< 760	< 1,700	< 860	< 860	< 1,100	< 640	ND	< 0.87	44	1.3	0.41
SV23	SV23-5	5.0	11/30/2015	< 17	< 13	110	33	14	< 10	< 17	47	< 10	210	970	35	16	36	11	< 25	< 12	< 12	18	< 9.1	18 (1,4-DCB)	10	< 1	2.0	< 0.2
	SV23-10	10.0	11/30/2015	< 9.8	< 7.7	< 5.7	< 5.7	< 3.7	< 5.9	< 9.9	110	< 5.9	410	27	34	< 6.3	18	6.0	< 14	< 7.1	< 7.1	9.0	8.5	ND	5.2	< 0.98	11	< 0.2
SV24	SV24-5	5.0	11/30/2015	< 12	< 9.5	< 7	< 7	< 4.5	< 7.3	< 12	120	< 7.3	560	12	32	< 7.7	18	< 7.7	< 17	< 8.7	< 8.7	< 11	< 6.5	ND	--	--	--	< 0.19
	SV24-10	10.0	11/30/2015	< 12	< 9.3	< 6.8	< 6.8	< 4.4	< 7.1	< 12	100	< 7.1	490	100	110	95	280	180	190	76	61	74	< 6.3	ND	--	--	--	< 0.19
SV25	SV25-5	5.0	12/1/2015	< 130	< 100	130	< 77	7,300	< 79	< 130	< 110	< 79	1,200	110	< 73	< 84	< 170	< 84	< 190	< 95	< 95	< 120	< 71	ND	--	--	--	< 0.19
	SV25-10	10.0	12/1/2015	< 260	300	2,100	210	11,000	< 160	< 270	< 230	< 160	< 1,200	160	< 150	< 170	< 340	< 170	< 380	< 190	< 190	< 240	< 140	ND	--	--	--	< 0.17
SV26	SV26-5	5.0	12/1/2015	< 6.4	5.8	28	< 3.7	14	< 3.9	< 6.5	63	< 3.9	290	240	35	18	120	18	17	10	< 4.6	130	< 3.5	ND	1.4	2.3	9.5	< 0.16
	SV26-10	10.0	12/1/2015	< 42	< 33	26	< 24	72	< 25	< 42	< 36	< 25	< 180	30	25	< 27	110	45	180	82	38	< 38	< 22	56 (CB)	2.8	3.3	1.8	< 0.18
SV27	SV27-5	5.0	11/30/2015	< 4.3	5.3	< 2.5	< 2.5	< 1.6	< 2.6	< 4.4	26	< 2.6	180	7.8	44	< 2.8	15	2.8	< 6.3	< 3.1	< 3.1	9.8	< 2.3	4.7 (2-Hexanone)	--	--	--	< 0.16
	SV27-10	10.0	11/30/2015	< 7.7	< 6.1	8.2	< 4.5	10	< 4.6	< 7.8	11	< 4.7	110	9.8	15	< 4.9	10	< 4.9	< 11	< 5.6	< 5.6	16	< 4.2	ND	--	--	--	< 0.16
SV28R	SV28R-5	5.0	12/3/2015	< 11	< 8.4	11	< 6.2	23	< 6.4	< 11	33	< 6.4	220	18	110	82	420	64	46	35	8.3	17	< 5.7	ND	1.0	13	2.0	0.58
	SV28R-10	10.0	12/3/2015	< 2.7	< 2.1	1.7	< 1.6	83	< 1.6	< 2.7	< 2.4	< 1.6	27	< 1.3	< 1.5	< 1.7	< 3.5	< 1.7	< 3.9	< 2	< 2	< 2.5	< 1.5	7.5 (DCFM)	< 0.97	21	1.4	< 0.19
SV29	SV29-5	5.0	11/30/2015	< 5.1	< 4.0	< 3.0	< 3.0	< 1.9	< 3.1	< 5.2	31	< 3.1	210	10	27	11	200	5.8	7.3	< 3.7	< 3.7	30	14	ND	--	--	--	< 0.19
	SV29-10	10.0	11/30/2015	< 5.0	6.2	< 2.9	< 2.9	< 1.9	< 3	< 5	30	< 3	160	35	21	8.0	47	7.8	7.1	5.1	< 3.6	63	< 2.7	3.4 (MC)	--	--	--	< 0.18
SV30	SV30-5	5.0	12/1/2015	< 5.7	110	6.7	3.4	< 2.1	< 3.4	< 5.8	22	< 3.4	110	12	11	< 3.6	11	< 3.6	< 8.3	< 4.1	< 4.1	41	7.3	ND	--	--	--	< 0.17
	SV30-10	10.0	12/1/2015	< 12	23	28	13	33	< 7.4	< 12	30	< 7.4	130	67	24	8.0	21	8.6	< 18	< 8.9	< 8.9	97	6.8	33 (1,1-DCE), 10 (Freon 11)	--	--	--	< 0.18
SV31	SV31-5	5.0	12/1/2015	< 4.6	13	< 2.7	< 2.7	< 1.7	< 2.8	< 4.7	13	< 2.8	75	13	19	4.0	14	6.3	< 6.7	< 3.4	< 3.4	21	8.5	3.5 (MC)	--	--	--	< 0.17
	SV31-10	10.0	12/1/2015	< 2.7	23	< 1.6	2.8	< 1	< 1.6	< 2.7	4.8	< 1.6	38	17	15	4.0	22	6.6	< 3.9	< 2.0	< 2.0	11	11	4 (CM)	--	--	--	< 0.16
SV32	SV32-5	5.0	12/1/2015	< 8.8	11	< 5.1	< 5.1	< 3.3	< 5.3	< 8.9	22	< 5.3	150	14	16	< 5.6	< 11	< 5.6	< 13	< 6.4	< 6.4	8.0	19	ND	--	--	--	< 0.16
	SV32-10	10.0	12/1/2015	< 19	< 15	< 11	< 11	< 7.2	< 12	< 19	49	< 12	330	43	17	< 12	< 24	< 12	< 28	< 14	< 14	< 18	< 10	ND	--	--	--	< 0.17
SV33	SV33-5	5.0	12/1/2015	< 22	< 18	< 13	< 13	< 8.5	< 14	< 23	34	< 14	230	37	20	< 14	30	< 14	< 33	< 16	< 16	24	< 12	ND	--	--	--	< 0.17
	SV33-10	10.0	12/1/2015	< 46	< 37	< 27	< 27	47	< 28	430	< 40	970	< 200	< 22	65	70	350	80	< 67	< 34	< 34	< 43	< 25	ND	--	--	--	< 0.17
SV36	SV36-5	5.0	12/1/2015	< 7.9	< 6.3	< 4.6	< 4.6	3.0	< 4.8	21	16	8.3	77	5.7	9.0	< 5.1	< 10	5.0	< 11	< 5.7	< 5.7	< 7.2	< 4.3	ND	3.6	< 1.2	17	< 0.23
	SV36-10	10.0	12/1/2015	< 58	< 46	< 34	< 34	< 22	< 35	2,500	< 51	370	< 260	150	41	210	< 75	250	< 85	< 42	< 42	53	< 31	170 (BC)	2.0	11	10	< 0.17
SV38	SV38-5	5.0	11/30/2015	< 17	< 13	< 9.7	< 9.7	25	< 10	< 17	85	< 10	460	18	24	< 11	< 21	< 11	< 24	< 12	< 12	110	48	ND	0.99	13	2.4	< 0.18
	SV38-10	10.0	11/30/2015	< 40	< 32	160	54	1,800	< 24	< 41	78	< 24	310	150	30	< 26	< 52	< 26	< 59	< 29	< 29	320	< 22	ND	< 0.89	67	1.6	< 0.18
SV39	SV39-5	5.0	12/1/2015	< 7.5	< 6	< 4.4	< 4.4	< 2.8	< 4.6	< 7.6	61	< 4.6	290	17	17	39	23	4.8	< 11	< 5.5	< 5.5	110	4.1	ND	< 0.96	< 0.96	24	0.19
	SV39-10	10.0	12/1/2015	< 8.1	9.0	38	63	7.5	< 4.9	< 8.2	49	< 4.9	200	130	71	99	220	65	62	43	23	140	< 4.4	ND	< 0.94	3.4	22	< 0.19
SV40	SV40-5	5.0	12/1/2015	< 17	13	42	10	24	< 10	27	29	38	180	25	14	< 11	< 22	< 11	< 25	< 12	< 12	43	< 9.2	ND	--	--	--	< 0.19

Table 2
Summary of Soil Vapor Analytical Results
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	PCE (µg/m³)	TCE (µg/m³)	cis-1,2-DCE (µg/m³)	trans-1,2-DCE (µg/m³)	Vinyl chloride (µg/m³)	1,1,1-TCA (µg/m³)	1,1,2,2-PCA (µg/m³)	MEK (µg/m³)	MIBK (µg/m³)	Acetone (µg/m³)	Benzene (µg/m³)	Toluene (µg/m³)	Ethylbenzene (µg/m³)	m,p-Xylene (µg/m³)	o-Xylene (µg/m³)	1,2,4-TMB (µg/m³)	1,3,5-TMB (µg/m³)	4-Ethyltoluene (µg/m³)	Carbon disulfide (µg/m³)	Chloroform (µg/m³)	Other VOCs (µg/m³)	Carbon Dioxide (% v/v)	Methane (% v/v)	Oxygen (% v/v)	Helium (% v/v)
SV40	SV40-10	10.0	12/1/2015	< 62	< 49	< 36	< 36	**110**	< 38	**640**	< 54	**73**	< 270	**50**	< 35	< 40	**160**	**130**	< 90	< 45	< 45	< 57	< 34	ND	--	--	--	< 0.18
SV43	SV43-5	5.0	12/1/2015	< 8.5	< 6.7	< 5	< 5	< 3.2	< 5.1	< 8.6	**17**	**21**	**76**	**25**	**9.1**	< 5.4	< 11	< 5.4	< 12	< 6.2	< 6.2	**15**	**12**	ND	--	--	--	< 0.19
	SV43-10	10.0	12/1/2015	< 3	< 2.4	**1.8**	< 1.8	< 1.1	< 1.8	**7.5**	**15**	< 1.8	**42**	**5.1**	**4.9**	< 1.9	**5.3**	**1.9**	< 4.4	< 2.2	< 2.2	**6.5**	< 1.6	**3.3 (BC)**	--	--	--	< 0.18
SV44	SV44-5	5.0	12/1/2015	< 4.5	< 3.6	< 2.6	< 2.6	< 1.7	< 2.7	< 4.6	**49**	< 2.7	**220**	**50**	**17**	**30**	**22**	**13**	**16**	**3.7**	**6.9**	**60**	< 2.4	**17 (NAPH)**	< 0.83	< 0.83	**24**	< 0.17
	SV44-10	10.0	12/1/2015	< 5.9	< 4.7	**21**	< 3.5	**3.1**	< 3.6	< 6	**28**	< 3.6	**130**	**5.6**	**4.7**	< 3.8	< 7.6	< 3.8	< 8.6	< 4.3	< 4.3	**26**	< 3.2	ND	**9.3**	**0.92**	**2.3**	< 0.16
SV45	SV45-5	5.0	12/1/2015	< 12	< 9.2	**6.6**	< 6.8	< 4.4	< 7.0	< 12	**110**	< 7	**540**	**51**	**14**	**10**	**50**	**15**	< 17	< 8.4	< 8.4	**45**	**22**	ND	**5.8**	< 0.9	**14**	**0.34**
	SV45-10	10.0	12/1/2015	< 4.9	< 3.9	**9.5**	< 2.9	< 1.8	< 2.9	< 4.9	**76**	< 2.9	**170**	**16**	**8.3**	**6.0**	**33**	**12**	**9.7**	**4.4**	< 3.5	**7.7**	**4.9**	**3.4 (BC)**	**11**	< 0.9	**4.0**	**0.36**
SV47	SV47-5	5.0	12/3/2015	< 7.2	< 5.7	**8.8**	< 4.2	< 2.7	**5.7**	< 7.2	**38**	< 4.3	**250**	**13**	**24**	< 4.6	**11**	< 4.6	< 10	< 5.2	< 5.2	**22**	< 3.9	ND	--	--	--	< 0.21
SV48	SV48-5	5.0	2/1/2016	< 7.2	< 5.7	< 4.2	< 4.2	< 2.7	< 4.4	< 7.3	**21**	< 4.4	**200**	**34**	**210**	**36**	**150**	**52**	**27**	**12**	**12**	< 6.7	< 3.9	ND	**6.2**	< 0.96	**5.6**	**0.43**
	SV48-10	10.0	2/1/2016	< 5.1	< 4.1	**8.2**	< 3	**3.2**	< 3.1	< 5.2	**44**	< 3.1	**150**	**14**	**64**	**9.2**	**39**	**12**	**11**	**3.9**	**5.3**	**80**	< 2.8	**5.8 (CB)**	**8.2**	**2.6**	**2.0**	< 0.19
SV49	SV49-5	5.0	2/1/2016	< 5.0	**6.5**	**14**	< 2.9	< 1.9	< 3	< 5.1	**37**	< 3	**90**	**59**	**28**	**14**	**57**	**24**	**9.9**	**5.0**	**4.5**	**6.6**	< 2.7	ND	**6.8**	**1.3**	**2.1**	< 0.19
SV50	SV50-5	5.0	2/2/2016	< 27	< 21	< 16	< 16	**200**	< 16	< 27	**40**	**220**	**270**	**210**	**1,600**	**160**	**580**	**160**	< 39	< 19	**20**	**33**	< 14	ND	--	--	--	< 0.24
SV51	SV51-5	5.0	2/2/2016	< 150	< 120	< 87	< 87	**6,500**	< 90	< 150	< 130	< 90	< 650	**160**	**260**	< 96	< 190	< 96	< 220	< 110	< 110	< 140	< 81	ND	--	--	--	< 0.2
SV52	SV52-5	5.0	2/2/2016	< 15	< 12	**72**	< 8.6	**220**	< 8.9	< 15	**38**	< 8.9	**150**	**130**	**53**	< 9.5	**33**	**10**	< 21	< 11	< 11	< 14	< 8	ND	--	--	--	< 0.18
SV53	SV53-5	5.0	2/2/2016	**3.2**	**13**	**24**	**3.2**	**110**	**1.8**	< 2.7	**32**	< 1.6	**140**	**79**	**200**	**20**	**75**	**25**	**11**	**5.5**	**5.8**	**55**	**2.1**	**3.3 (1,1-DCE), 2.6 (CM), 3.9 (Freon 12), 4.1 (MC), 3.5 (Freon 11), 6.6 (VA)**	--	--	--	< 0.24
SV54	SV54-5	5.0	2/1/2016	< 150	< 120	< 89	< 89	**5,100**	< 92	< 150	< 130	< 92	< 670	**200**	< 85	< 98	< 200	< 98	< 220	< 110	< 110	< 140	< 82	ND	**8.5**	**45**	**2.0**	< 0.19
SV55	SV55-5	5.0	2/2/2016	< 15	< 12	< 8.9	< 8.9	**1,200**	< 9.2	< 15	**56**	< 9.2	**480**	**79**	**29**	< 9.7	< 19	< 9.7	< 22	< 11	< 11	**20**	< 8.2	ND	--	--	--	**0.19**
SV56	SV56-5	5.0	2/2/2016	< 530	< 420	**770**	< 310	**29,000**	< 320	< 540	< 460	< 320	< 2,300	**270**	< 290	< 340	< 680	< 340	< 770	< 380	< 380	< 490	< 290	ND	--	--	--	< 0.17
SV57	SV57-5	5.0	2/2/2016	< 180	< 140	**210**	< 100	**9,400**	< 110	< 180	< 160	< 110	< 780	**190**	**180**	< 110	< 230	< 110	< 260	< 130	< 130	< 160	< 96	ND	--	--	--	< 0.21
SV58	SV58-5	5.0	2/3/2016	< 4.9	< 3.8	< 2.8	< 2.8	< 1.8	< 2.9	< 4.9	**24**	< 2.9	**99**	**38**	**140**	**15**	**58**	**18**	**12**	**5.0**	**5.9**	**18**	< 2.6	**3.7 (Freon 12)**	< 0.9	< 0.9	**24**	< 0.18
	SV58-10	10.0	2/3/2016	< 8.8	**11**	**18**	< 5.1	**6.4**	< 5.3	< 8.9	**63**	< 5.3	**220**	**160**	**89**	**22**	**64**	**22**	**15**	**7.5**	**9.9**	**150**	< 4.7	ND	< 1.2	**35**	**14**	**0.38**
SV59	SV59-5	5.0	2/3/2016	< 2,600	< 2,000	**3,300**	**1,700**	**120,000**	< 1,500	< 2,600	< 2,200	< 1,500	< 11,000	< 1,200	< 1,400	< 1,600	< 3,300	< 1,600	< 3,700	< 1,900	< 1,900	< 2,300	< 1,400	ND	**2.6**	**9.4**	**13**	< 0.19
	SV59-10	10.0	2/3/2016	< 810	**680**	**5,600**	**2,100**	**15,000**	< 490	< 820	< 700	< 490	< 3500	< 380	< 450	< 520	< 1,000	< 520	< 1,200	< 590	< 590	< 740	< 440	ND	< 0.96	**39**	**2.6**	< 0.19
SV60	SV60-5	5.0	2/3/2016	< 110	< 89	**720**	**220**	**3,100**	< 68	< 110	< 98	**72**	< 490	**110**	**500**	< 72	**170**	**86**	< 160	< 82	< 82	< 100	< 61	ND	< 0.97	< 0.97	**24**	< 0.19
	SV60-10	10.0	2/3/2016	< 29,000	< 23,000	**98,000**	**41,000**	**920,000**	< 18,000	< 30,000	< 26,000	< 18,000	< 130,000	< 14,000	< 16,000	< 19,000	< 38,000	< 19,000	< 43,000	< 21,000	< 21,000	< 27,000	< 16,000	ND	< 0.87	**94**	**0.59**	< 0.17
SV61	SV61-5	5.0	2/4/2016	< 23	< 18	< 13	< 13	< 8.5	< 14	< 23	**25**	< 14	**260**	**37**	**820**	**300**	**1,500**	**530**	**500**	**240**	**200**	< 21	< 12	ND	< 0.84	< 0.84	**24**	**0.21**
	SV61-10	10.0	2/4/2016	< 420	< 330	< 240	< 240	**7,500**	< 250	< 420	< 360	< 250	< 1,800	**340**	**280**	< 270	**1,400**	**410**	**580**	**340**	**380**	< 380	< 230	ND	< 0.86	**25**	**7.3**	< 0.17
Residential Land Use ESL (Soil Gas) [1]				*240*	*240*	*4,200*	*31,000*	*4.7*	*520,000*	*24*	*2,600,000*	*1,600,000*	*16,000,000*	*48*	*160,000*	*560*	*52,000*	*52,000*	*NE*	*NE*	*NE*	*NE*	*61*	*NE*	*NE*	*NE*	*NE*	*NE*
Commercial/Industrial ESL [2]				*2,100*	*3,000*	*35,000*	*260,000*	*160*	*4,400,000*	*210*	*22,000,000*	*13,000,000*	*140,000,000*	*420*	*1,300,000*	*4,900*	*440,000*	*440,000*	*NE*	*NE*	*NE*	*NE*	*530*	*NE*	*NE*	*NE*	*NE*	*NE*

Notes:
Detections are shown in bold. Results equal to or exceeding applicable regulatory screening levels are shaded.
Only detected analytes are summarized on table. Refer to Appendix C for laboratory report to access entire list of compounds analyzed.
PCE = Tetrachloroethene.
TCE = Trichloroethene.
DCE = Dichloroethene.
TCA = Trichloroethane.
PCA = Tetrachloroethane
MEK = Methyl Ethyl Ketone
MIBK = Methyl Isobutyl Ketone
TMB = Trimethylbenzene.
CB = Chlorobenzene.
CM = Chloromethane.
DCA = Dichloroethane.
DCB = Dichlorobenzene
BC = Benzyl chloride
Freon 11 = Trichlorofluoromethane
Freon 12 = Dichlorodifluoromethane
Freon 21 = Dichlorofluoromethane
TCD = Carbon Dioxide
MC = Methylene Chloride
NAPH = Naphthalene
VA = Vinyl Acetate
VOCs = Volatile organic compounds.
bgs = Below ground surface.
µg/m³ = Micrograms per cubic meter.
% v/v = Percent by volume.
< 2.9 = Not detected at or above the indicated laboratory method reporting limit.
ND = Not detected at or above the respective laboratory method reporting limits.
NE = Not established.
-- = Not applicable/not analyzed.
1. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table SG-1 Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels. Residential.

2. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table SG-1 Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels. Commercial/Industrial.

Table 3
Summary of Soil Vapor Leak Check Results
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	Helium Detected in Sample (% v/v)	Helium Detected in Shroud (% v/v)	Breakthrough Factor (%)
SV5	SV5-5	5.0	12/2/2015	**1.5**	**19.8**	7.6
SV6	SV6-10	10.0	12/2/2015	**0.57**	**18.6**	3.1
SV9	SV9-5	5.0	12/2/2015	**0.93**	**18.0**	5.2
	SV9-10	10.0	12/2/2015	**0.67**	**18.0**	3.7
SV10	SV10-5	5.0	12/2/2015	**0.76**	**16.1**	4.7
	SV10-10	10.0	12/2/2015	**0.71**	**16.1**	4.4
SV11	SV11-5	5.0	12/3/2015	**0.44**	**24.2**	1.8
SV12	SV12-5	5.0	12/3/2015	**0.56**	**25.9**	2.2
	SV12-10	10.0	12/3/2015	**0.64**	**25.9**	2.5
SV13	SV13-5	5.0	12/2/2015	**0.90**	**11.2**	8.0
SV14	SV14-10	10.0	12/2/2015	**1.2**	**16.2**	7.4
SV16	SV16-10	10.0	12/2/2015	**0.81**	**13.2**	6.1
SV18	SV18-10	10.0	12/2/2015	**0.29**	**10.1**	2.9
SV22	SV22-10	10.0	12/1/2015	**0.41**	**22.4**	1.8
SV28R	SV28R-5	5.0	12/3/2015	**0.58**	**25.7**	2.3
SV39	SV39-5	5.0	12/1/2015	**0.19**	**11.2**	1.7
SV45	SV45-5	5.0	12/1/2015	**0.34**	**19.6**	1.7
	SV45-10	10.0	12/1/2015	**0.36**	**19.6**	1.8
SV48	SV48-5	5.0	2/1/2016	**0.43**	**11.0**	3.9
SV55	SV55-5	5.0	2/2/2016	**0.19**	**27.0**	0.7
SV58	SV58-10	10.0	2/3/2016	**0.38**	**18.0**	2.1
SV61	SV61-5	5.0	2/4/2016	**0.21**	**19.0**	1.1
***Acceptable Ambient Air Breakthrough Limit* [1]**				--	--	*5%*

Notes:
Detections are shown in bold. Results equal to or exceeding applicable RPD limits are shaded.
bgs = Below ground surface.
RPD = Relative percent difference.
% v/v = Percent by volume.
-- = Not applicable/not analyzed.
1. In accordance with California Environmental Protection Agency/Department of Toxic Substances Control Advisory - Active Soil Gas Investigations, July 2015 - Appendix C: Quantitative Leak Testing Using a Tracer Gas.

Table 4
Summary of Soil Analytical Results - Petroleum Hydrocarbons, VOCs, SVOCs, and PCBs
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	TPHd (mg/Kg)	TPHmo (mg/Kg)	TCE (µg/Kg)	cis-1,2-DCE (µg/Kg)	trans-1,2-DCE (µg/Kg)	Vinyl chloride (µg/Kg)	Benzene (µg/Kg)	Toluene (µg/Kg)	Ethylbenzene (µg/Kg)	m,p-Xylenes (µg/Kg)	o-Xylenes (µg/Kg)	Naphthalene (µg/Kg)	MEK (µg/Kg)	Acetone (µg/Kg)	Other VOCs (µg/Kg)	Phenol (mg/Kg)	PCB-1260 (µg/Kg)
SB19	SB19-0.5	0.5	12/2/2015	24	86	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
SB20	SB20-1.0	1.0	11/30/2015	23	57	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
	SB20-2.5	2.5	11/30/2015	36	110	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	1,700 H
SB21	SB21-0.5	0.5	12/2/2015	110	380	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	1,900 H
SB22	SB22-0.5	0.5	12/2/2015	1.6	< 50	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
SB23	SB23-0.5	0.5	12/2/2015	26	130	--	--	--	--	--	--	--	--	--	< 130	--	--	ND	< 0.13	490 H
SB24	SB24-0.5	0.5	12/2/2015	56	180	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	3,700 H
SB25	SB25-1	1.0	12/2/2015	87	410	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	800 H
SB26	SB26-1.5	1.5	12/2/2015	27	160	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	120 H
SB27	SB27-2.5	2.5	12/2/2015	260	960	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	590 H
SB28	SB28-0.5	0.5	12/2/2015	64	190	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	610 H
	SB28-4.5	4.5	12/2/2015	200	890	< 4.5	< 4.5	< 4.5	< 4.5	< 4.5	< 4.5	< 4.5	--	--	< 9	--	< 45	ND	--	55,000 H
SB29	SB29-2.5	2.5	12/2/2015	39	110	--	--	--	--	--	--	--	--	--	< 130	--	--	ND	< 0.13	1,900 H
SB30	SB30-1	1.0	12/2/2015	5.0	< 49	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
SB31	SB31-2	2.0	12/2/2015	35	150	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	280 E H
	SB31-6	6.0	12/2/2015	110	510	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	< 50
SB32	SB32-1.5	1.5	12/3/2015	26	100	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	290 H
SB34	SB34-4.0	4.0	12/1/2015	59	290	--	--	--	--	--	--	--	--	--	< 330	--	--	ND	< 0.33	190 H
SB35	SB35-0.5	0.5	12/2/2015	130	450	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	620 H
SB36	SB36-1.5	1.5	11/30/2015	16	< 50	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
SB37	SB37-0.5	0.5	12/1/2015	2.9	< 50	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
SB38	SB38-1.5	1.5	11/30/2015	11	< 50	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
SB39	SB39-0.5	0.5	12/2/2015	79	210	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	250 H
SB40	SB40-1	1.0	12/2/2015	84	300	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	1,900 H
SB41	SB41-1	1.0	12/2/2015	150	490	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	2,900 H
SB42	SB42-1	1.0	12/2/2015	55	170	--	--	--	--	--	--	--	--	--	< 330	--	--	ND	< 0.33	2,800 H
SB43	SB43-1.5	1.5	12/1/2015	200	680	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	1,300 H
SB45	SB45-1.5	1.5	12/1/2015	460	1,900	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	2,800 H
SB46	SB46-0.5	0.5	12/2/2015	62	310	--	--	--	--	--	--	--	--	--	< 330	--	--	ND	< 0.33	1,200 H
SB48	SB48-1.0	1.0	12/1/2015	110	410	--	--	--	--	--	--	--	--	--	< 660	--	--	ND	< 0.66	8,300 H
SB49	SB49-0.5	0.5	12/2/2015	8.2	< 50	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
SB50	SB50-0.5	0.5	2/1/2016	--	--	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	--	--	< 8.5	--	< 42	ND	--	--
	SB50-5	5.0	2/1/2016	--	--	< 3.7	6.2	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	--	--	< 7.3	--	< 37	ND	--	--
SB51	SB51-0.5	0.5	2/1/2016	--	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	--	--	< 7	--	< 35	ND	--	--
	SB51-4.5	4.5	2/1/2016	--	--	< 3.6	< 3.6	< 3.6	35	9.8	59	97	270	110	110	8.6	38	990 >LR b (1,2,4-TMB), 370 >LR b (1,3,5-TMB), 90 (IPB), 95 (n-BB), 91 (p-IT), 150 >LR b (PB), 86 (sec-BB), 4.6 (tert-BB)	--	--
	SB51-10	10.0	2/1/2016	--	--	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	22	6.4 (n-BB), 4.2 (p-IT), 5.6 (sec-BB)	--	--
SB52	SB52-0.5	0.5	2/1/2016	--	--	< 4	< 4	< 4	< 4	< 4	< 4	< 4	--	--	< 8.1	--	< 40	ND	--	--
	SB52-4.5	4.5	2/1/2016	--	--	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	--	--	< 7.8	--	55	ND	--	--
SB53	SB53-0.5	0.5	2/1/2016	--	--	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	--	--	< 7.5	--	< 38	ND	--	--
	SB53-5	5.0	2/1/2016	--	--	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	--	--	< 6.3	--	< 31	ND	--	--
	SB53-10	10.0	2/1/2016	--	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	--	--	< 6.9	--	< 35	ND	--	--
SB54	SB54-0.5	0.5	2/2/2016	--	--	< 3.4	< 3.4	< 3.4	< 6.8	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 6.8	< 14	ND	--	--
	SB54-5	5.0	2/2/2016	--	--	< 3.3	< 3.3	< 3.3	< 6.5	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 6.5	< 13	ND	--	--
SB55	SB55-0.5	0.5	2/2/2016	--	--	< 3.7	< 3.7	< 3.7	< 7.4	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 7.4	< 15	ND	--	--
	SB55-5.5	5.0	2/2/2016	--	--	< 4.6	300 >LR b	56	60	< 4.6	< 4.6	< 4.6	< 4.6	< 4.6	< 4.6	< 9.1	35 b	ND	--	--
	SB55-10	10.0	2/2/2016	--	--	< 810	24,000	8,300	< 1,600	< 810	< 810	< 810	< 810	< 810	< 810	< 1,600	< 3,200	ND	--	--
SB56	SB56-10	10.0	2/4/2016	--	--	< 4.2	< 4.2	< 4.2	< 8.4	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	16	69	ND	--	--
	SB56-13	13.0	2/4/2016	--	--	< 390	< 390	< 390	< 780	< 390	< 390	< 390	< 390	< 390	< 390	< 780	< 1,600	620 (p-IT)	--	--
SB57	SB57-10	10.0	2/4/2016	--	--	< 3.8	< 3.8	< 3.8	< 7.6	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 7.6	21 b	ND	--	--
	SB57-12.5	12.5	2/4/2016	--	--	< 350	< 350	< 350	< 710	< 350	< 350	< 350	< 350	< 350	< 350	< 710	< 1,400	ND	--	--
SB58	SB58-0.5	0.5	2/3/2016	--	--	< 3.5	< 3.5	< 3.5	< 7	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7	< 14	ND	--	--
	SB58-5	5.0	2/3/2016	--	--	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	8.5	36 b	ND	--	--
SB59	SB59-0.5	0.5	2/3/2016	--	--	< 3.0	< 3.0	< 3.0	< 6.1	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 6.1	< 12	ND	--	--
	SB59-5	5.0	2/3/2016	--	--	< 3.7	130	19	38	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 7.4	19 b	ND	--	--
	SB59-10	10.0	2/3/2016	--	--	20,000	73,000	81,000	14,000	< 2,900	< 2,900	< 2,900	< 2,900	< 2,900	< 2,900	< 5,900	< 12,000	ND	--	--
	SB59-13.5	13.5	2/3/2016	--	--	< 3.4	99	3.6	26	< 3.4	< 3.4	< 3.4	20	7.5	< 3.4	< 6.9	< 14	4.1 (1,2,4-TMB)	--	--
SB60	SB60-0.5	0.5	2/3/2016	--	--	< 3.5	< 3.5	< 3.5	< 7	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7	< 14	ND	--	--
	SB60-5	5.0	2/3/2016	--	--	< 3.2	< 3.2	< 3.2	< 6.3	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	< 6.3	< 13	ND	--	--
SB61	SB61-0.5	0.5	2/3/2016	--	--	< 3.5	< 3.5	< 3.5	< 7	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7	< 14	ND	--	--
	SB61-5	5.0	2/3/2016	--	--	< 3.9	< 3.9	< 3.9	< 7.7	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 7.7	18 b	ND	--	--
	SB61-10	10.0	2/3/2016	--	--	< 1,200	< 1,200	< 1,200	< 2,500	< 1,200	< 1,200	< 1,200	< 1,200	< 1,200	9,200	< 2,500	< 4,900	1,300 (PB)	--	--
	SB61-12.5	12.5	2/3/2016	--	--	< 440	< 440	< 440	< 890	< 440	< 440	< 440	< 440	< 440	1,800	< 890	< 1,800	ND	--	--
SV6	SV6-0.5	0.5	12/1/2015	2.2	< 50	--	--	--	--	--	--	--	--	--	< 67	--	--	ND	< 0.067	--
SV8	SV8-0.5	0.5	12/3/2015	7.2	< 50	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
SV10	SV10-0.5	0.5	12/1/2015	7.4	< 50	--	--	--	--	--	--	--	--	--	< 66	--	--	ND	< 0.066	--
SV14	SV14-0.5	0.5	12/1/2015	4.8	< 50	--	--	--	--	--	--	--	--	--	< 67	--	--	ND	< 0.067	--
SV16	SV16-0.5	0.5	12/1/2015	130	380	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	< 49
SV20	SV20-0.5	0.5	11/30/2015	34	98	--	--	--	--	--	--	--	--	--	< 330	--	--	ND	< 0.33	--
SV22	SV22-0.5	0.5	11/30/2015	6.6	< 50	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
SV32	SV32-1.0	1.0	11/30/2015	38	160	--	--	--	--	--	--	--	--	--	< 330	--	--	ND	< 0.33	1,800 H
	SV32-7.0	7.0	11/30/2015	780	5,300	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	< 4.1	--	--	< 8.1	--	< 41	ND	< 3.3	890 H

Table 4
Summary of Soil Analytical Results - Petroleum Hydrocarbons, VOCs, SVOCs, and PCBs
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	TPHd (mg/Kg)	TPHmo (mg/Kg)	TCE (µg/Kg)	cis-1,2-DCE (µg/Kg)	trans-1,2-DCE (µg/Kg)	Vinyl chloride (µg/Kg)	Benzene (µg/Kg)	Toluene (µg/Kg)	Ethylbenzene (µg/Kg)	m,p-Xylenes (µg/Kg)	o-Xylenes (µg/Kg)	Naphthalene (µg/Kg)	MEK (µg/Kg)	Acetone (µg/Kg)	Other VOCs (µg/Kg)	Phenol (mg/Kg)	PCB-1260 (µg/Kg)
SV33	SV33-0.5	0.5	11/30/2015	**130**	**410**	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	**4,000 H**
	SV33-4.5	4.5	11/30/2015	**230**	**1,000**	< 4	< 4	< 4	< 4	< 4	< 4	< 4	--	--	< 8	--	**47**	ND	--	**860 H**
SV38	SV38-1.0	1.0	11/30/2015	**29**	**83**	--	--	--	--	--	--	--	--	--	< 130	--	--	ND	**0.70**	--
SV43	SV43-1.0	1.0	11/30/2015	**3.7**	< 50	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
SV45	SV45-1.0	1.0	11/30/2015	**130**	**600**	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	**6,900 H**
SV47	SV47-1.5	1.5	12/3/2015	**7.3**	< 49	--	--	--	--	--	--	--	--	--	--	--	--	ND	--	--
	SV47-2.5	2.5	12/3/2015	**16**	< 50	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	--	--	< 7.5	--	< 37	ND	--	--
SV50	SV50-0.5	0.5	2/2/2016	--	--	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.1	< 14	ND	--	--
	SV50-4.5	4.5	2/2/2016	--	--	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	**27**	ND	--	--
SV51	SV51-0.5	0.5	2/2/2016	--	--	< 4.0	< 4.0	< 4.0	< 7.9	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 7.9	< 16	ND	--	--
	SV51-5	5.0	2/2/2016	--	--	< 3.8	< 3.8	< 3.8	< 7.6	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	**7.8**	**34**	ND	--	--
SV52	SV52-0.5	0.5	2/2/2016	--	--	< 3.8	< 3.8	< 3.8	< 7.7	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 7.7	< 15	ND	--	--
	SV52-5	5.0	2/2/2016	--	--	< 3.7	< 3.7	< 3.7	< 7.3	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	**4**	< 7.3	**16**	ND	--	--
SV53	SV53-0.5	0.5	2/2/2016	--	--	< 3.3	< 3.3	< 3.3	< 6.6	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 6.6	< 13	ND	--	--
	SV53-5	5.0	2/2/2016	--	--	< 3.2	< 3.2	< 3.2	< 6.4	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	< 6.4	**18**	ND	--	--
SV54	SV54-0.5	0.5	2/4/2016	--	--	< 3.3	< 3.3	< 3.3	< 6.7	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 6.7	< 13	ND	--	--
	SV54-5	5.0	2/4/2016	--	--	< 4.3	< 4.3	< 4.3	< 8.6	< 4.3	< 4.3	< 4.3	< 4.3	< 4.3	< 4.3	< 8.6	**40**	ND	--	--
SV55	SV55-0.5	0.5	2/2/2016	--	--	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.1	< 14	ND	--	--
	SV55-5	5.0	2/2/2016	--	--	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.1	< 14	ND	--	--
SV56	SV56-0.5	0.5	2/2/2016	--	--	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	< 14	ND	--	--
	SV56-5	5.0	2/2/2016	--	--	< 4.2	< 4.2	< 4.2	< 8.3	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 8.3	**23 b**	ND	--	--
SV57	SV57-0.5	0.5	2/2/2016	--	--	< 3.9	< 3.9	< 3.9	< 7.8	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 7.8	< 16	ND	--	--
	SV57-5	5.0	2/2/2016	--	--	< 3.6	< 3.6	< 3.6	< 7.2	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.2	< 14	ND	--	--
SV58	SV58-0.5	0.5	2/3/2016	--	--	< 4.2	< 4.2	< 4.2	< 8.3	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 8.3	< 17	ND	--	--
	SV58-5	5.0	2/3/2016	--	--	< 3.6	< 3.6	< 3.6	< 7.3	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.3	**20 b**	ND	--	--
	SV58-10	10.0	2/3/2016	--	--	< 4	< 4	< 4	< 8	< 4	< 4	< 4	< 4	< 4	< 4	< 8	< 16	ND	--	--
SV60	SV60-0.5	0.5	2/3/2016	--	--	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	< 14	ND	--	--
	SV60-5	5.0	2/3/2016	--	--	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	< 14	ND	--	--
	SV60-10	10.0	2/3/2016	--	--	**600**	**13,000**	**5,800**	**3,300**	< 400	< 400	< 400	**530**	**710**	**890**	< 800	< 1,600	**2,700 (1,2,4-TMB), 2,600 (1,3,5-TMB), 430 (IPB), 590 (p-IT), 650 (PB), 610 (sec-BB)**	--	--
SV61	SV61-0.5	0.5	2/1/2016	--	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	--	--	< 7.1	--	< 35	ND	--	--
	SV61-5	5.0	2/1/2016	--	--	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	--	--	< 7.6	--	< 38	ND	--	--
	SV61-10	10.0	2/1/2016	--	--	< 3.5	< 3.5	< 3.5	**14**	**5.2**	**26**	**16**	**13**	**26**	**17**	**12**	**43**	**1,900 >LR b (1,2,4-TMB), 340 >LR b (1,3,5-TMB), 450 >LR b (IPB), 130 (n-BB), 220 >LR b (p-IT), 450 >LR b (PB), 210 >LR b (sec-BB), 39 (tert-BB)**	--	--
Tier 2 Residential Land Use ESL (Shallow Soil)				*230 [1]*	*5,100 [3]*	*510 [3]*	*3,500 [3]*	*39,000 [3]*	*8.2 [3]*	*49 [3]*	*9,300 [3]*	*1,400 [3]*	*11,000 [3]*	*11,000 [3]*	*1,800 [1]*	*13,000 [3]*	*500 [3]*	Varies	*8.8 [3]*	*250 [6]*
Construction Worker Exposure ESL [2]				*850*	*31,000*	*22,000*	*84,000*	*530,000*	*3,400*	*24,000*	*3,900,000*	*480,000*	*2,300,000*	*2,300,000*	*76,000*	*130,000,000*	*250,000,000*	Varies	*94,000*	*5,600 [6]*

Notes:
Detections are shown in bold. Results equal to or exceeding applicable regulatory screening levels are shaded.
Only detected analytes are summarized on table. Refer to Appendix C for laboratory report to access entire list of compounds analyzed.
VOCs = Volatile organic compounds.
SVOCs = Semi-volatile organic compounds
TPHd = Total petroleum hydrocarbons quantified as diesel (C10-C28).
TPHmo = Total petroleum hydrocarbons quantified as motor oil (C24-C36).
TCE = Trichloroethene.
DCE = Dichloroethene.
IPB = Isopropylbenzene
p-IT = para-Isopropyl Toluene
PB = Propylbenzene
PCBs = Polychlorinated biphenyls
MEK = Methyl Ethyl Ketone
n-BB = n-Butylbenzene
sec-BB = sec-Butylbenzene
tert-BB = tert-Butylbenzene
TMB = Trimethylbenzene.
bgs = Below ground surface.
mg/kg = Milligrams per kilogram.
µg/kg = Micrograms per kilogram.
< 0.99 = Not detected at or above the indicated laboratory method reporting limit.
-- = Not applicable/not analyzed.
H = Sample was prepped or analyzed beyond the specified holding time.
E = Result exceeded calibration range.
ND = Not Detected.
>LR = Response exceeds instrument's linear range
b = High response was observed for acetone; see lab report for detailed explanation.
1. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table S-1: Direct Exposure Human Health Risk Levels, Residential: Shallow Soil Exposure
2. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table S-1: Soil Direct Exposure Human Health Risk Screening Levels, Any Land Use, Construction Worker Shallow and Deep Soil Exposure Scenario.
3. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table S-2: Soil Leaching to Groundwater Screening Levels, Final Soil Leaching Screening Levels, Non-Drinking Water Resources.
4. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table S-4: Soil Odor Nuisance Screening Levels, Residential Land Use, Shallow Soil Exposure Scenario.
5. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table S-3: Soil Gross Contamination Level.
6. Screening level is for total PCBs.

Table 5
Summary of Soil Analytical Results - Inorganics and Asbestos
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	Arsenic [1] (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Vanadium (mg/kg)	Zinc (mg/Kg)	Bulk Asbestos (%v/v)
SB19	SB19-0.5	0.5	12/2/2015	--	--	--	--	--	--	--	**210** [F2]	--	--	--	--	--	--
SB20	SB20-1.0	1.0	11/30/2015	--	--	--	--	--	--	--	**14**	--	--	--	--	--	--
	SB20-2.5	2.5	11/30/2015	--	--	--	--	--	--	--	**21**	--	--	--	--	--	--
SB21	SB21-0.5	0.5	12/2/2015	--	--	--	--	--	--	--	**90**	--	--	--	--	--	--
SB22	SB22-0.5	0.5	12/2/2015	--	--	--	--	--	--	--	**9.3**	--	--	--	--	--	--
SB23	SB23-0.5	0.5	12/2/2015	**5.2**	**200**	**0.57**	< 0.46	**41**	**11**	**30**	**31**	**0.98**	< 0.46	**57**	**30**	**87**	ND
SB24	SB24-0.5	0.5	12/2/2015	--	--	--	--	--	--	--	**43**	--	--	--	--	--	--
SB25	SB25-1	1.0	12/2/2015	--	--	--	--	--	--	--	**140**	--	--	--	--	--	--
SB26	SB26-1.5	1.5	12/2/2015	--	--	--	--	--	--	--	**33**	--	--	--	--	--	--
SB27	SB27-2.5	2.5	12/2/2015	--	--	--	--	--	--	--	**32**	--	--	--	--	--	--
SB28	SB28-0.5	0.5	12/2/2015	--	--	--	--	--	--	--	**80**	--	--	--	--	--	--
	SB28-4.5	4.5	12/2/2015	--	--	--	--	--	--	--	**39**	--	--	--	--	--	--
SB29	SB29-2.5	2.5	12/2/2015	**6.9**	**190**	**0.48**	< 0.45	**45**	**11**	**38**	**35**	**0.85**	< 0.45	**48**	**38**	**130**	ND
SB30	SB30-1	1.0	12/2/2015	--	--	--	--	--	--	--	**16**	--	--	--	--	--	--
SB31	SB31-2	2.0	12/2/2015	--	--	--	--	--	--	--	**45**	--	--	--	--	--	--
	SB31-6	6.0	12/2/2015	--	--	--	--	--	--	--	**1,200** [F2]	--	--	--	--	--	--
SB32	SB32-1.5	1.5	12/3/2015	--	--	--	--	--	--	--	**39**	--	--	--	--	--	--
SB34	SB34-4.0	4.0	12/1/2015	**5.6**	**100**	**0.29**	< 0.34	**78**	**13**	**23**	**9.4**	**0.16**	< 1.4	**86**	**59**	**56**	ND
SB35	SB35-0.5	0.5	12/2/2015	--	--	--	--	--	--	--	**59**	--	--	--	--	--	--
SB36	SB36-1.5	1.5	11/30/2015	--	--	--	--	--	--	--	**14**	--	--	--	--	--	--
SB37	SB37-0.5	0.5	12/1/2015	--	--	--	--	--	--	--	**7.9**	--	--	--	--	--	--
SB38	SB38-1.5	1.5	11/30/2015	--	--	--	--	--	--	--	**19**	--	--	--	--	--	--
SB39	SB39-0.5	0.5	12/2/2015	--	--	--	--	--	--	--	**59**	--	--	--	--	--	ND
SB40	SB40-1	1.0	12/2/2015	--	--	--	--	--	--	--	**58**	--	--	--	--	--	--
SB41	SB41-1	1.0	12/2/2015	--	--	--	--	--	--	--	**86**	--	--	--	--	--	--
SB42	SB42-1	1.0	12/2/2015	**6.7**	**170**	< 0.31	< 0.38	**96**	**16**	**60**	**70**	**0.28**	< 1.5	**120**	**43**	**150**	< 1 [2]
SB43	SB43-1.5	1.5	12/1/2015	--	--	--	--	--	--	--	**160**	--	--	--	--	--	--
SB45	SB45-1.5	1.5	12/1/2015	--	--	--	--	--	--	--	**200**	--	--	--	--	--	--
SB46	SB46-0.5	0.5	12/2/2015	**7.0**	**160**	**0.42**	**0.45**	**42**	**11**	**78**	**150**	**0.41**	< 1.6	**52**	**46**	**240**	ND
SB48	SB48-1.0	1.0	12/1/2015	**6.0**	**180**	< 0.31	**0.48**	**48**	**13**	**59**	**190**	**0.83**	< 1.6	**75**	**58**	**230**	ND [3]
SB49	SB49-0.5	0.5	12/2/2015	--	--	--	--	--	--	--	**24**	--	--	--	--	--	--
SV6	SV6-0.5	0.5	12/1/2015	**6.0**	**160**	**0.38**	**0.56**	**42**	**18**	**22**	**48**	**0.18**	**1.5**	**63**	**33**	**80**	ND
SV8	SV8-0.5	0.5	12/3/2015	--	--	--	--	--	--	--	**10**	--	--	--	--	--	--
SV10	SV10-0.5	0.5	12/1/2015	**9.0**	**180**	**0.43**	< 0.41	**130**	**20**	**33**	**9.3**	**0.25**	< 1.6	**170**	**51**	**67**	ND
SV14	SV14-0.5	0.5	12/1/2015	**9.6**	**220**	**0.42**	< 0.4	**150**	**20**	**36**	**12**	**0.17**	< 1.6	**150**	**52**	**94**	ND
SV16	SV16-0.5	0.5	12/1/2015	--	--	--	--	--	--	--	**11**	--	--	--	--	--	--
SV20	SV20-0.5	0.5	11/30/2015	**4.7**	**160**	**0.37**	**0.18**	**55**	**12**	**26**	**16**	**0.44**	< 0.46	**73**	**36**	**72**	ND
SV22	SV22-0.5	0.5	11/30/2015	--	--	--	--	--	--	--	**11**	--	--	--	--	--	--
SV32	SV32-1.0	1.0	11/30/2015	**5.5**	**170**	< 0.35	< 0.44	**100**	**15**	**35**	**21**	**0.37**	< 1.8	**120**	**53**	**100**	ND
	SV32-7.0	7.0	11/30/2015	**7.0**	**680**	< 0.37	**1.9**	**44**	**8.2**	**190**	**570**	**0.23**	**3.2**	**64** [F1]	**61**	**790**	ND
SV33	SV33-0.5	0.5	11/30/2015	--	--	--	--	--	--	--	**120**	--	--	--	--	--	--
	SV33-4.5	4.5	11/30/2015	--	--	--	--	--	--	--	**100**	--	--	--	--	--	--
SV38	SV38-1.0	1.0	11/30/2015	**3.7**	**140**	< 0.36	< 0.45	**110**	**17**	**30**	**22**	**0.33**	< 1.8	**160**	**74**	**63**	--
SV43	SV43-1.0	1.0	11/30/2015	--	--	--	--	--	--	--	**12**	--	--	--	--	--	--
SV45	SV45-1.0	1.0	11/30/2015	--	--	--	--	--	--	--	**90**	--	--	--	--	--	--
SV47	SV47-1.5	1.5	12/3/2015	--	--	--	--	--	--	--	**11**	--	--	--	--	--	--
	SV47-6.0	6.0	12/3/2015	--	--	--	--	--	--	--	**350**	--	--	--	--	--	--
Residential Land Use ESL (Shallow Soil) [4]				*0.067*	*15,000*	*150*	*39*	*120* [6]	*23*	*3,100*	*80*	*13*	*390*	*820*	*140,000*	*23,000*	*NE*
Construction Worker Exposure ESL [5]				*0.94*	*2,900*	*40*	*41*	*510* [6]	*27*	*14,000*	*320*	*42*	*1,700*	*83*	*600*	*100,000*	*NE*

Notes:
Detections are shown in bold. Results equal to or exceeding applicable regulatory screening levels are shaded.
Only detected analytes are summarized on table. Refer to Appendix C for laboratory report to access entire list of compounds analyzed.
VOCs = Volatile organic compounds.
bgs = Below ground surface.
mg/kg = Milligrams per kilogram.
% v/v = Percent by volume.
< 3.8 = Not detected at or above the indicated laboratory method reporting limit.
-- = Not applicable/not analyzed.
ND = Not detected.
F1 = Matrix spike (MS) and/or matrix spike duplicate (MSD) recovery was outside acceptance limits.
F2 = Matrix spike/matrix spike duplicate (MS/MSD) relative percent differences exceeded control limits.
1. Background concentrations of arsenic in soil in the San Francisco Bay Area, calculated as the 95th percentile of 1,395 data points, is 17 mg/kg (LBL, 2002).
2. As chrysotile asbestos.
3. Insufficient soil volume was available to collect a sample from the 1 to 1.5 foot bgs interval for asbestos analysis. Therefore, the sample for asbestos analysis was collected from the 1.5 to 2 feet bgs interval.
4. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table S-1. Soil Direct Exposure Human Health Risk Screening Levels, Residential Land Use, Shallow Soil Exposure Scenario.
5. February 2016 SFRWQCB ESLs, Table S-1. Soil Direct Exposure Human Health Risk Screening Levels, Any Land Use, Construction Worker Shallow and Deep Soil Exposure Scenario.
6. ESL value is for chromium III.

Table 6
Summary of Groundwater Analytical Results
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Date Sampled	cis-1,2-DCE (µg/L)	Vinyl Chloride (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	m,p-Xylene (µg/L)	o-Xylene (µg/L)	Naphthalene (µg/L)	1,2,4-TMB (µg/L)	1,3,5-TMB (µg/L)	Other VOCs (µg/L)	1,4-Dioxane (µg/L)
SB51	SB51-GW	2/1/2016	< 0.50	**1.6**	**3.2**	< 0.50	< 0.50	--	--	**5.0**	< 0.50	< 0.50	ND	< 10
SB56	SB56-GW	2/4/2016	< 25	< 25	**5.6 J**	< 25	< 25	< 25	< 25	< 100	< 25	< 25	ND	--
SB57	SB57-GW	2/4/2016	< 8.3	< 8.3	**3.0 J**	< 8.3	< 8.3	**5.3 J**	**3.2 J**	< 33	**3.5 J**	**1.8 J**	ND	--
SB59	SB59-GW	2/3/2016	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 100	< 25	< 25	ND	< 100
SB61	SB61-GW	2/3/2016	**9.2 J**	**7.3 J**	**4.0 J**	< 13	< 13	< 13	< 13	< 50	**3.3 J**	< 13	ND	< 100
SB62	SB62-GW	2/4/2016	**1.7 J**	**2.8 J**	**3.3 J**	**1.9 J**	**1.4 J**	**3.0 J**	**3.8 J**	**2.7 J**	**3.1 J**	**1.7 J**	ND	--
MCL (Final) [1]			*6.0*	*0.50*	*1.0*	*40*	*30*	*20*		*0.12*	*NE*	*NE*	--	*0.38*
Residential Land Use ESL (Vapor Intrusion) [2]			*15,000*	*2.0*	*30*	*100,000*	*370*	*38,000*		*180*	*NE*	*NE*	--	*NE*
Commercial Land Use ESL (Vapor Intrusion) [3]			*130,000*	*17*	*260*	*NE*	*3,300*	*NE*		*1,600*	*NE*	*NE*	--	*NE*

Notes:

Detections are shown in bold. Results equal to or exceeding applicable regulatory screening levels are shaded.

Only detected analytes are summarized on table. Refer to Appendix C for laboratory report to access entire list of compounds analyzed.

DCE = Dichloroethene.

TMB = Trimethylbenzene.

VOCs = Volatile organic compounds.

bgs = Below ground surface.

µg/L= Micrograms per Liter

< 2.9 = Not detected at or above the indicated laboratory method reporting limit.

ND = Not detected at or above the respective laboratory method reporting limits.

NE = Not established.

-- = Not applicable/not analyzed.

J = Indicates an estimated value.

1. MCL = February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table GW-1 Groundwater Direct Exposure Human Health Risk Screening Levels, Final MCL Priority Screening Level.

2. ESL = February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table GW-3 Groundwater Vapor Intrusion Human Health Risk Levels, Deep Groundwater Residential: Fine to Coarse Scenario

3. ESL = February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table GW-3 Groundwater Vapor Intrusion Human Health Risk Levels, Deep Groundwater Commercial/Industrial: Fine to Coarse Scenario

ILLUSTRATIONS

0 2000 4000

Scale in Feet

N

U.S.G.S. Topo Map - Oakland West, California, 7.5-minute quadrangle.1997

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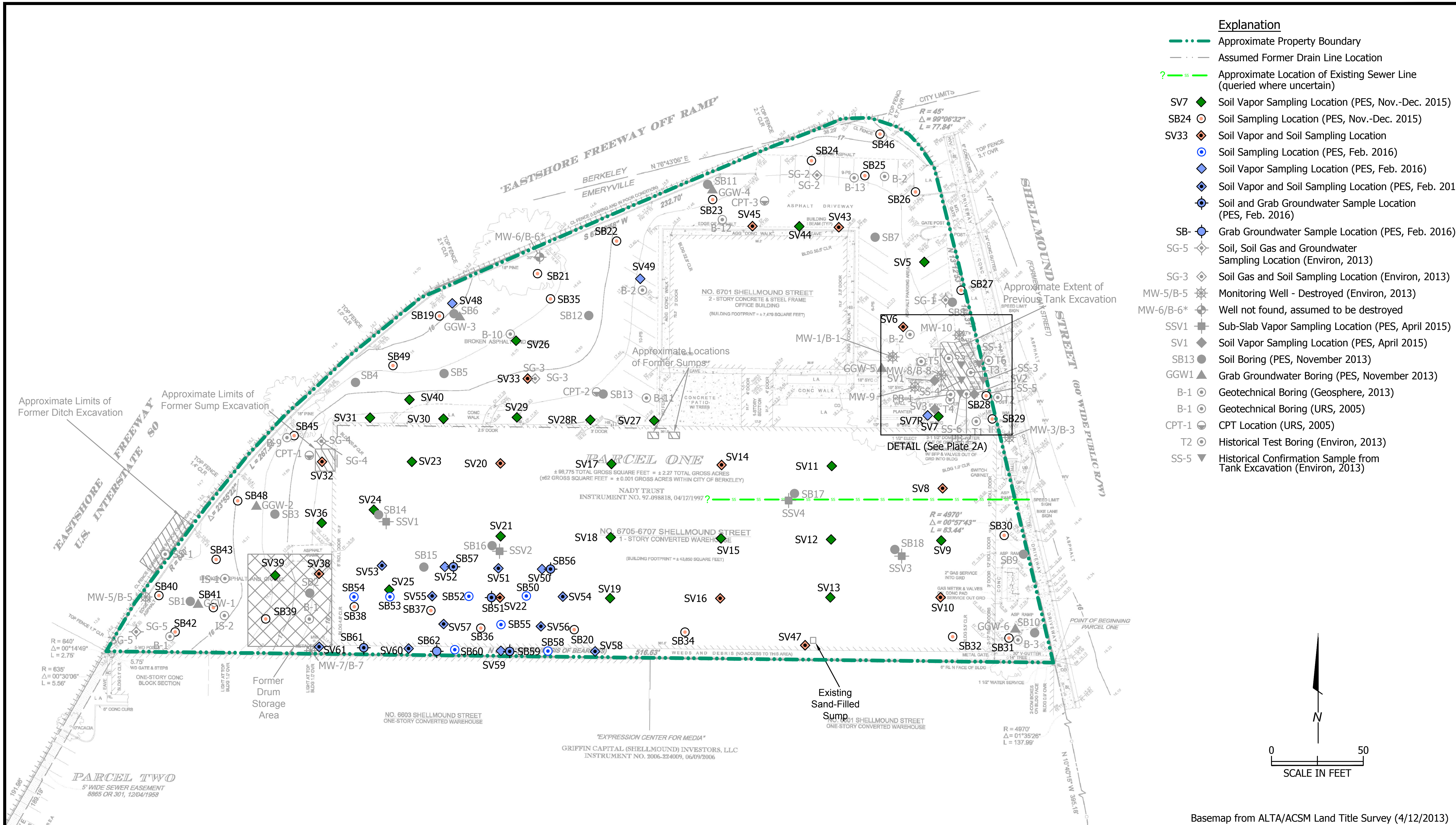
Site Location Map
Pre-Construction Subsurface Investigation Summary Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
1

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.019	144800101019_PCSIR-r1_1-2	CJB	4/16



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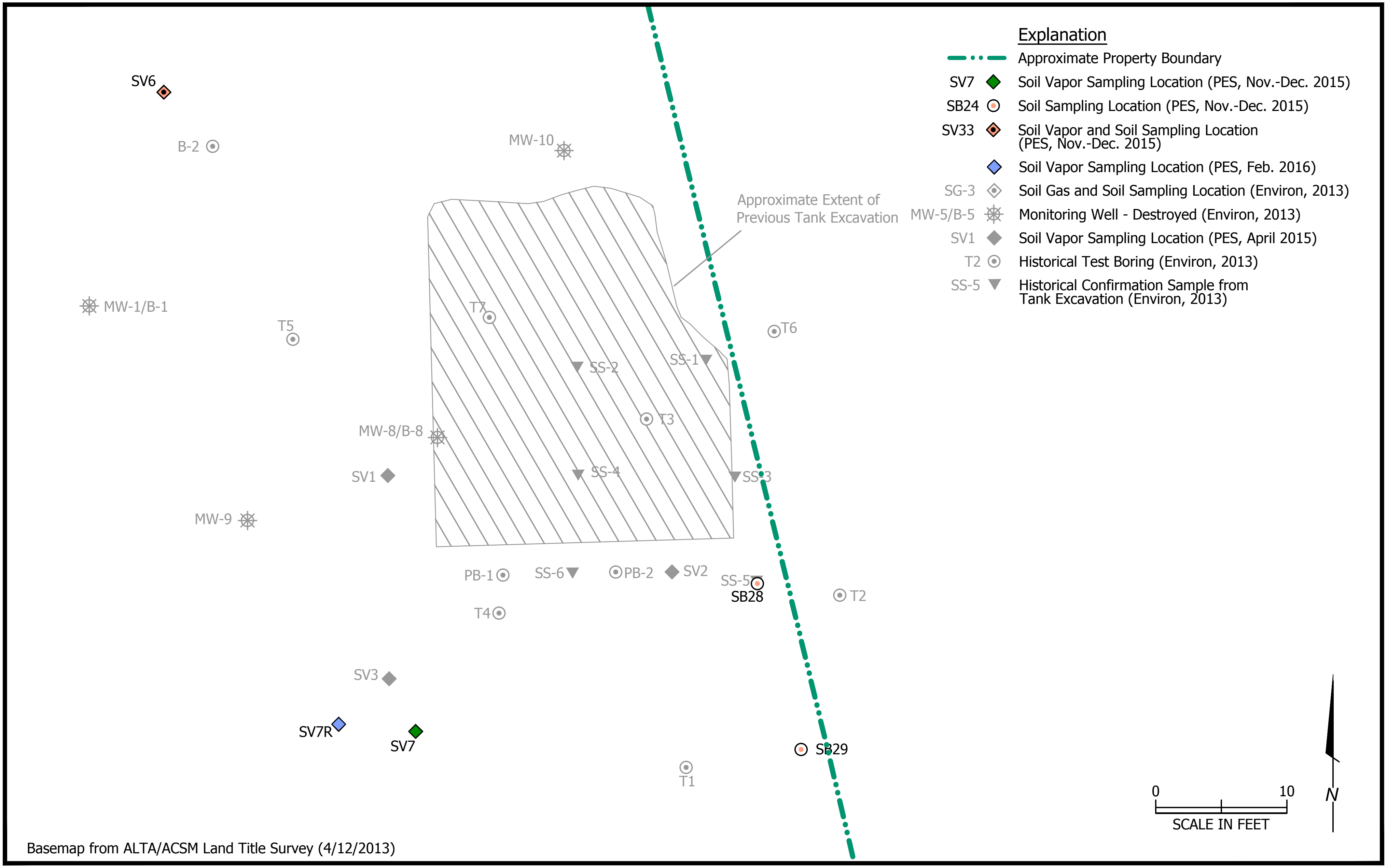
Site Plan Showing Sample Locations
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
2

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.009	144800101019_PCSIR-r1_1-2	CJB	4/16



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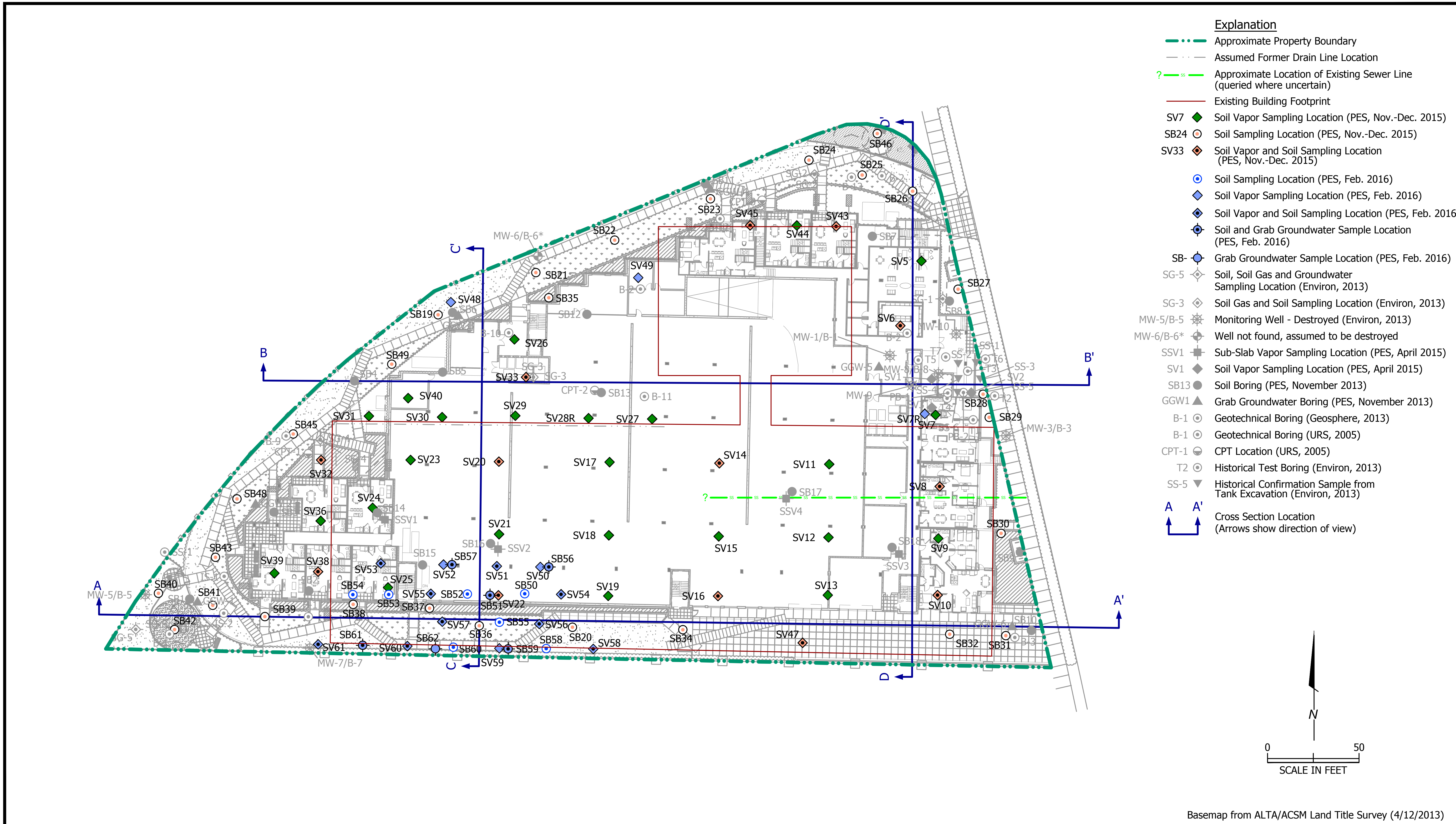
Site Detail Showing Former Underground Storage Tank Area
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
2A

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.009	144800101019_PCSIR-r1_2A	CJB	4/16

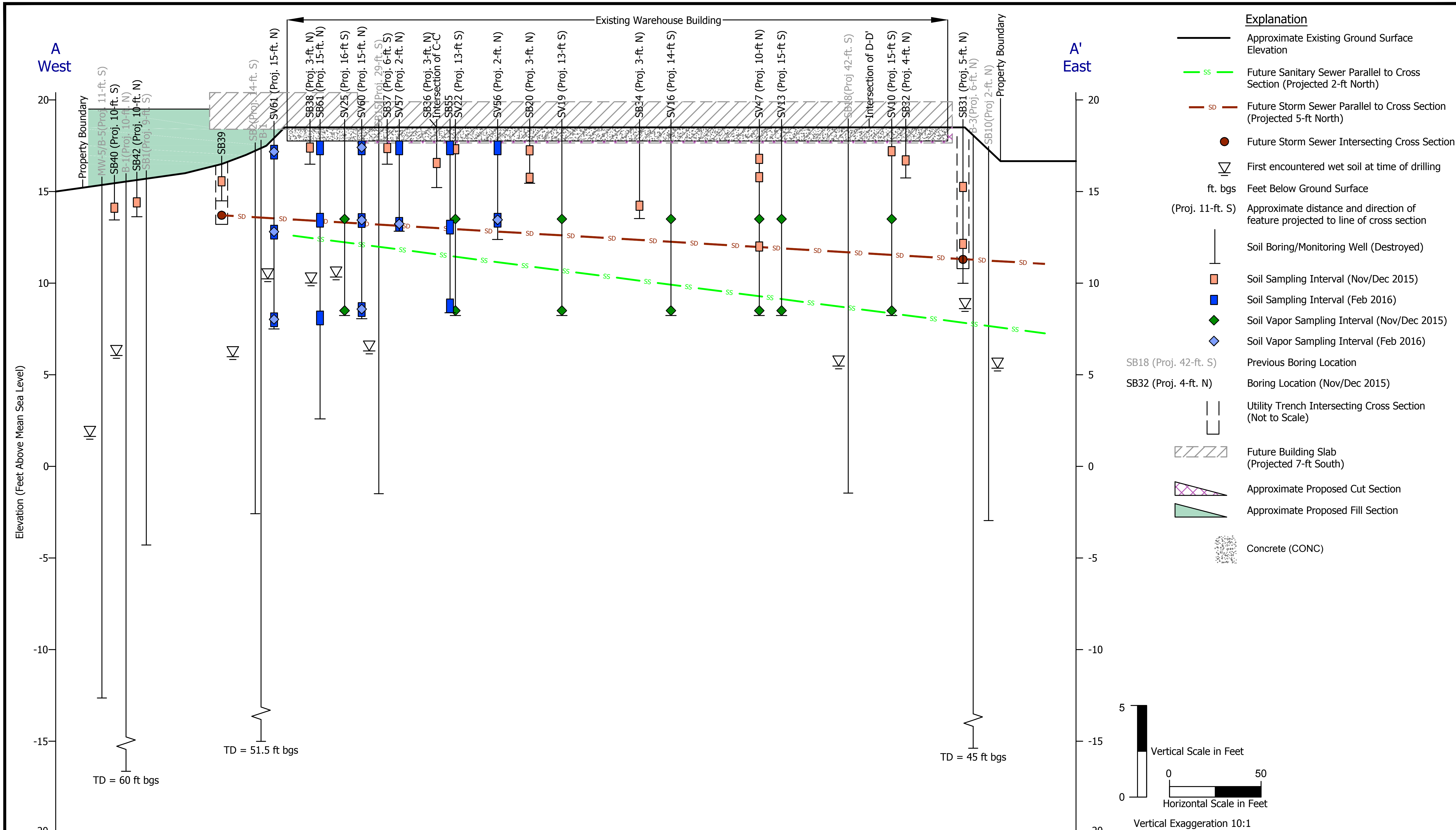


PES Environmental, Inc.
Engineering & Environmental Services

Sample Locations, Proposed Ground Level Development Plan, and Cross Section Locations
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
3

1448.001.01.019	144800101019_PCSIR-r1_3	CJB	4/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



PES Environmental, Inc.
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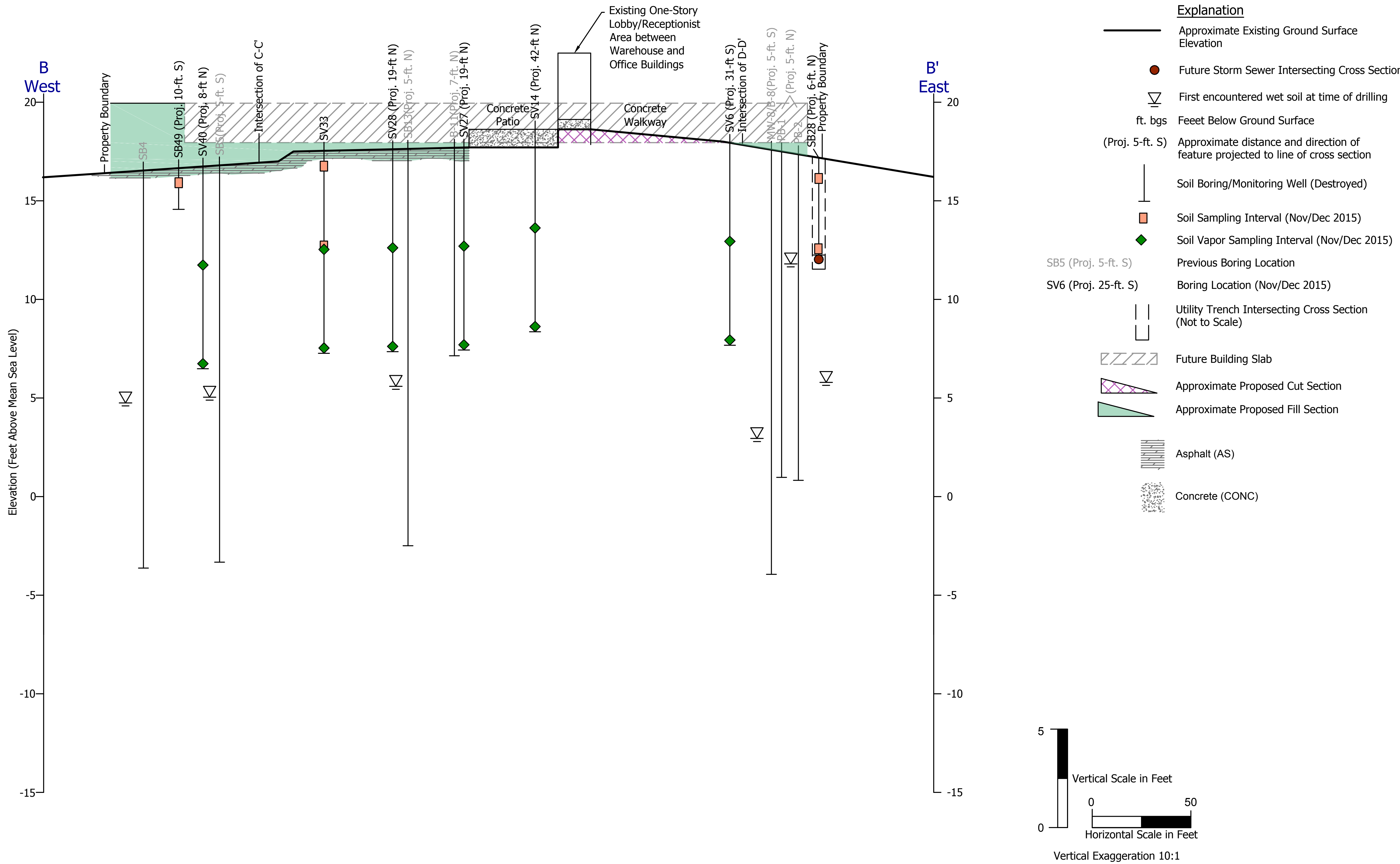
Cross Section A-A' Showing Soil Sample Locations, Proposed Building Slab and Utility Alignments
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
4

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.019	144800101019_PCSIR-r1_4-7	CJB	4/16



Cross Section B-B' Showing Soil Sample Locations, Proposed Building Slab and Utility Alignments
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
5

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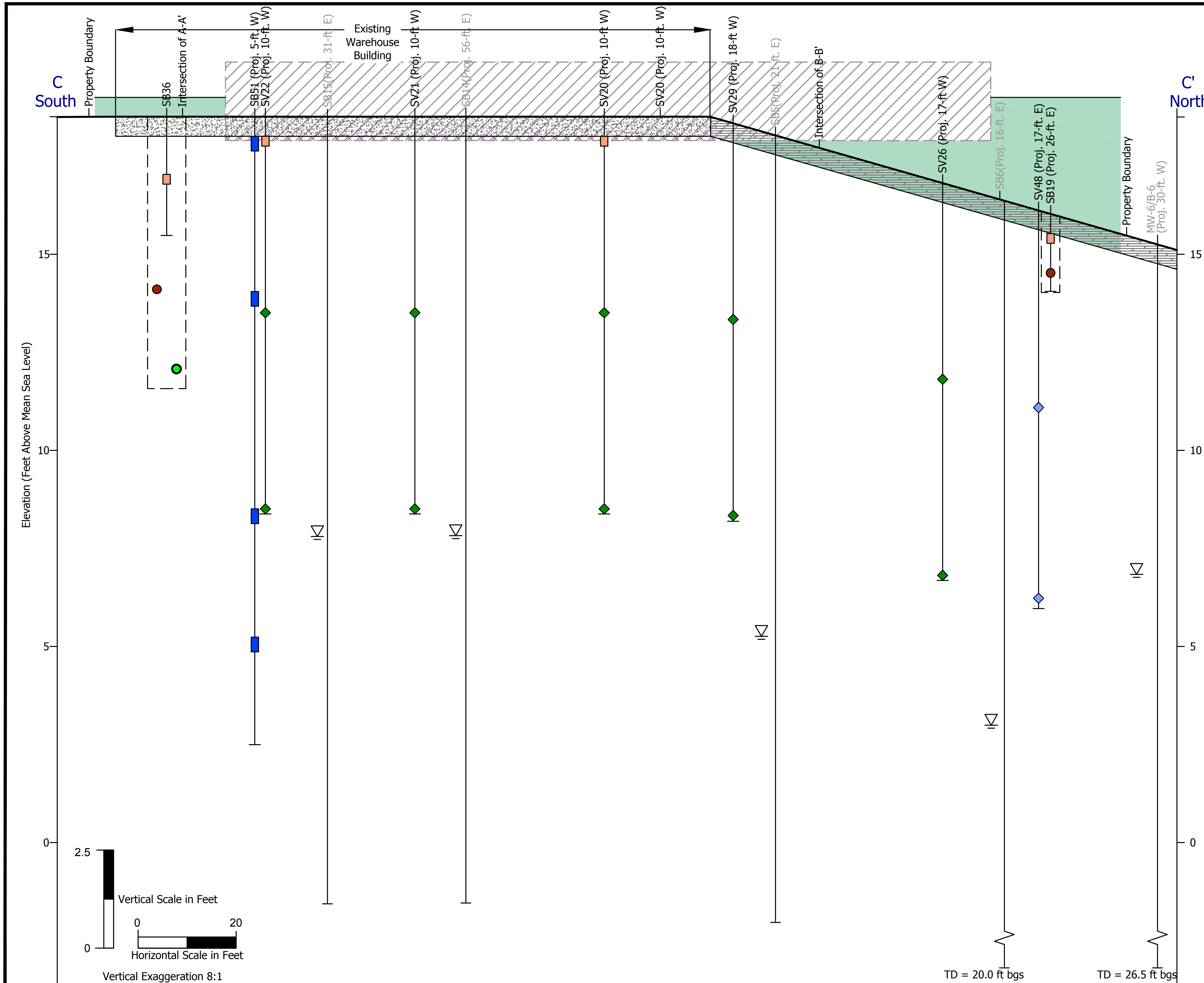
1448.001.01.019	144800101019_PCSIR-r1_4-7	CJB	4/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

(line)	Approximate Existing Ground Surface Elevation
(green circle)	Future Sanitary Sewer Intersecting Cross Section
(red circle)	Future Storm Sewer Intersecting Cross Section
(triangle)	First encountered wet soil at time of drilling
ft. bgs	Feet Below Ground Surface
(Proj. 31-ft. E)	Approximate distance and direction of feature projected to line of cross section
(line)	Soil Boring/Monitoring Well (Destroyed)
(square)	Soil Sampling Interval (Nov/Dec 2015)
(square)	Soil Sampling Interval (Feb 2016)
(diamond)	Soil Vapor Sampling Interval (Nov/Dec 2015)
(diamond)	Soil Vapor Sampling Interval (Feb 2016)
SB5 (Proj. 5-ft. S)	Previous Boring Location
SV6 (Proj. 25-ft. S)	Boring Location (Nov/Dec 2015)
(dashed)	Utility Trench Intersecting Cross Section (Not to Scale)
(hatch)	Future Building Slab
(hatch)	Approximate Proposed Cut Section
(fill)	Approximate Proposed Fill Section
(pattern)	Asphalt (AS)
(pattern)	Concrete (CONC)

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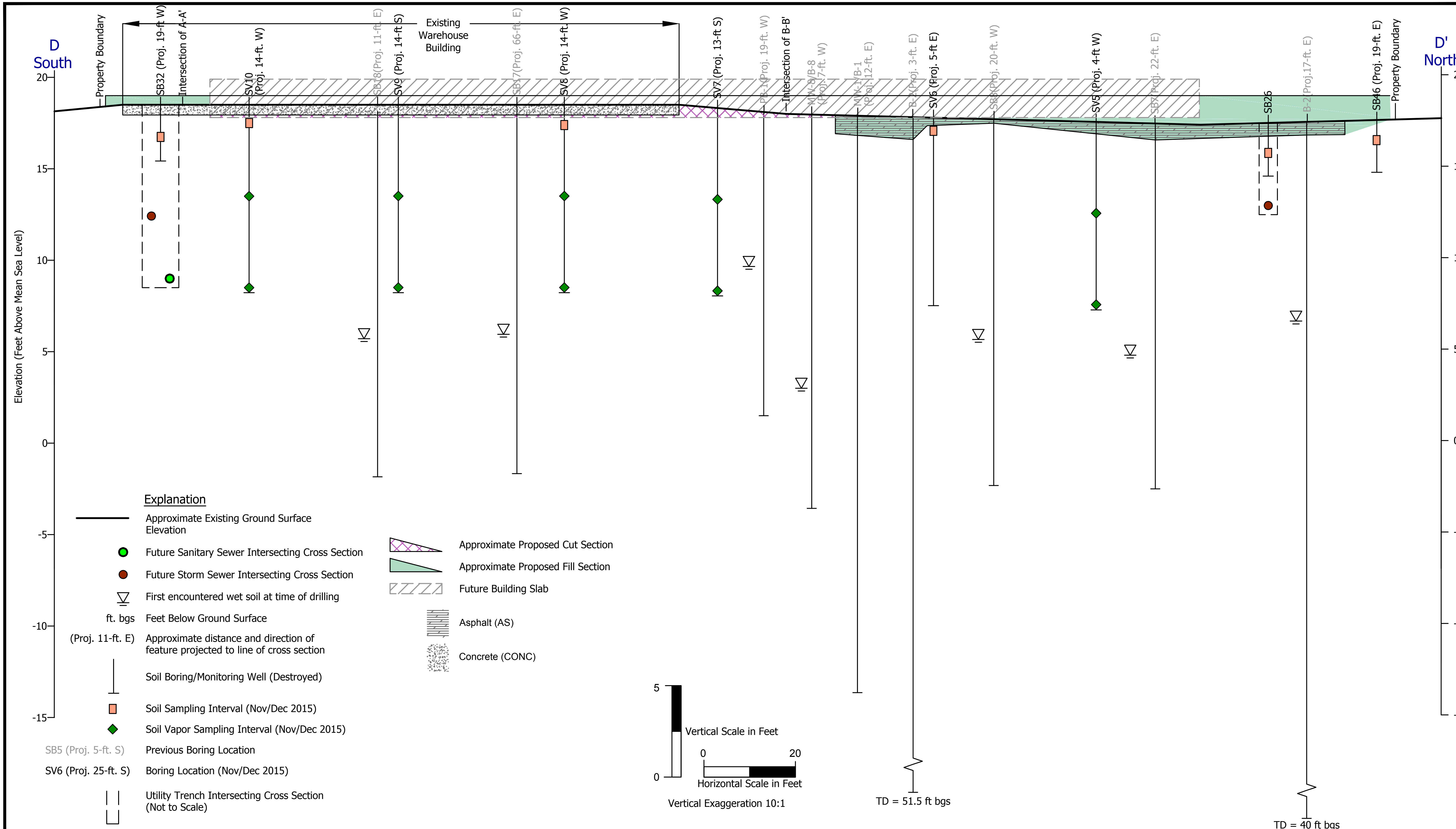
Cross Section C-C' Showing Soil Sample Locations, Proposed Building Slab and Utility Alignments
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
6

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.019	144800101019_PCSIR-r1_4-7	CJB	4/16



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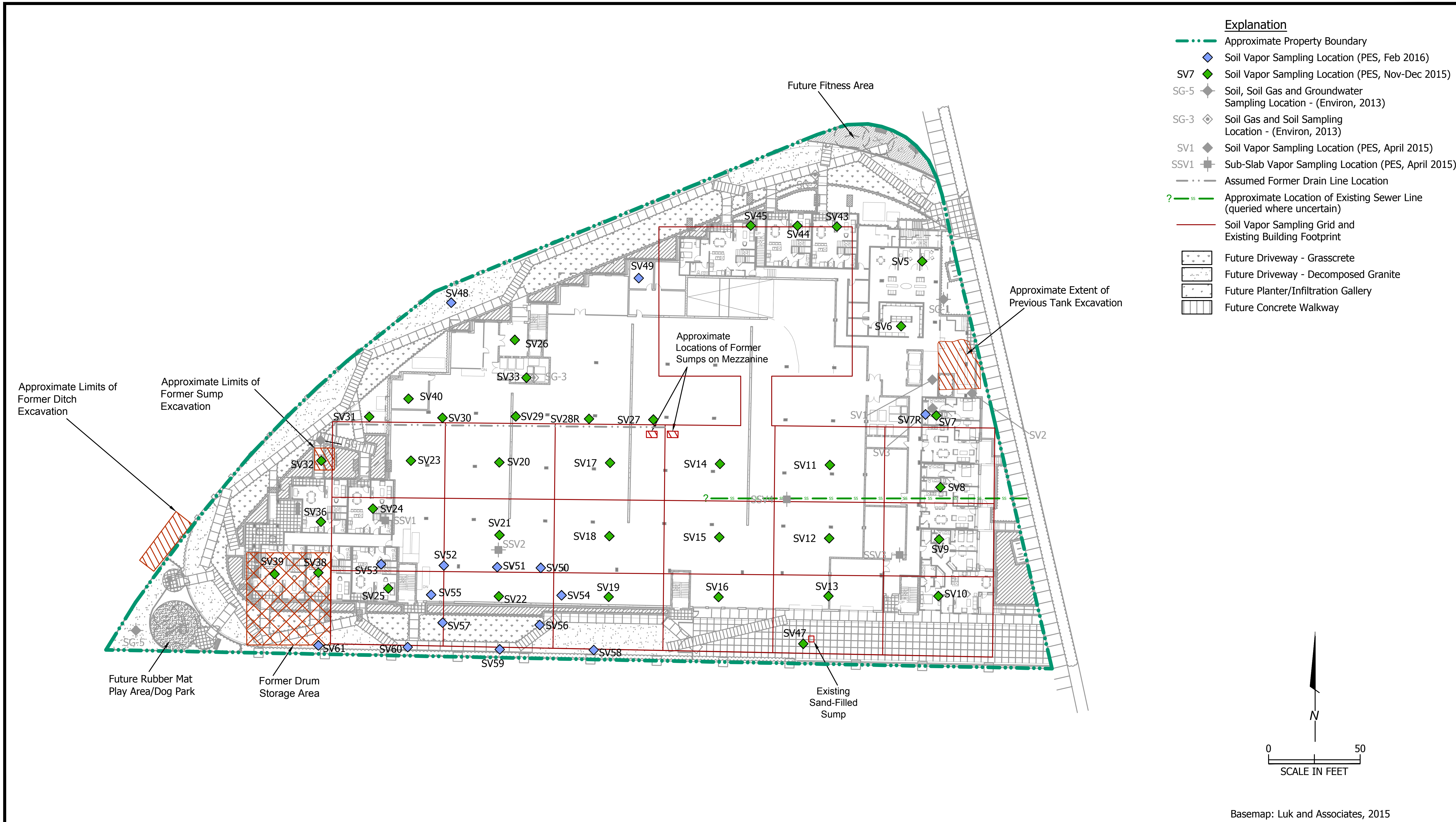
Cross Section D-D' Showing Soil Sample Locations, Proposed Building Slab and Utility Alignments
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
7

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.019	144800101019_PCSIR-r1_4-7	CJB	4/16



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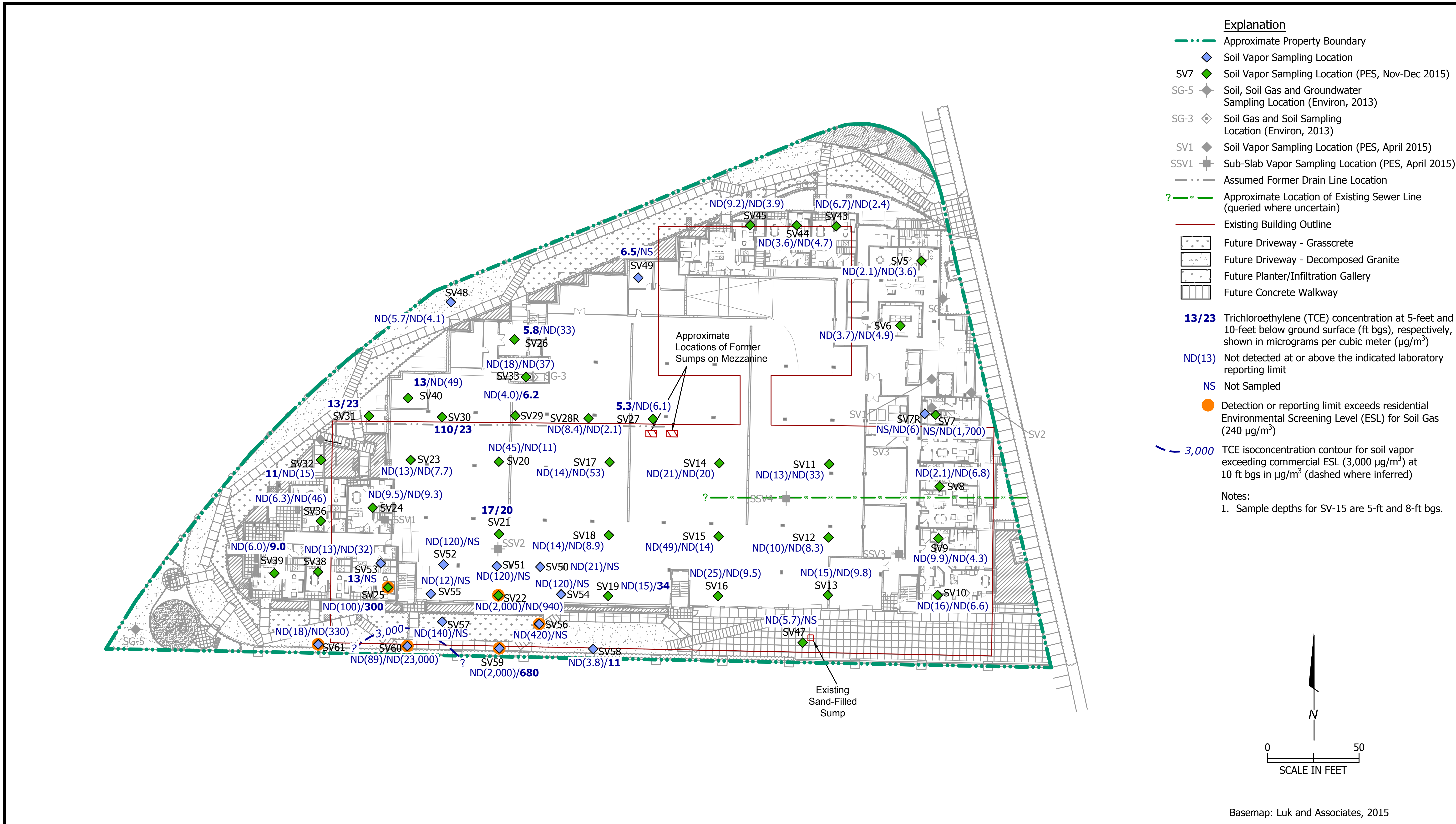
Soil Vapor Sample Locations and Proposed Ground Level Development Plan
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
8

1448.001.01.019	144800101019_PCSIR-r1_8-15	CJB	4/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

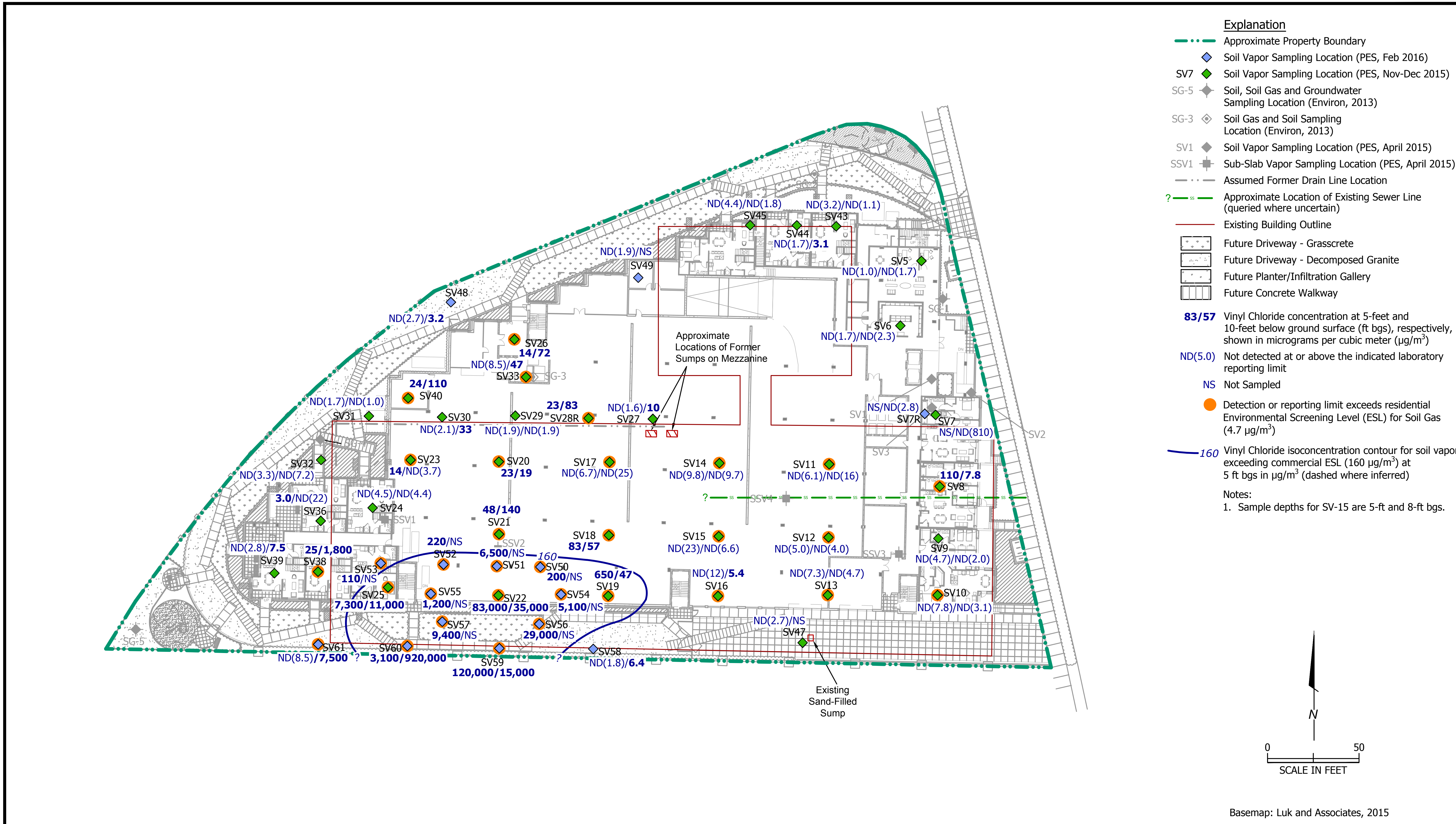


PES Environmental, Inc.
Engineering & Environmental Services

Soil Vapor Analytical Results - Trichloroethylene
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
9

1448.001.01.019	144800101019_PCSIR-r1_8-15	CJB	4/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

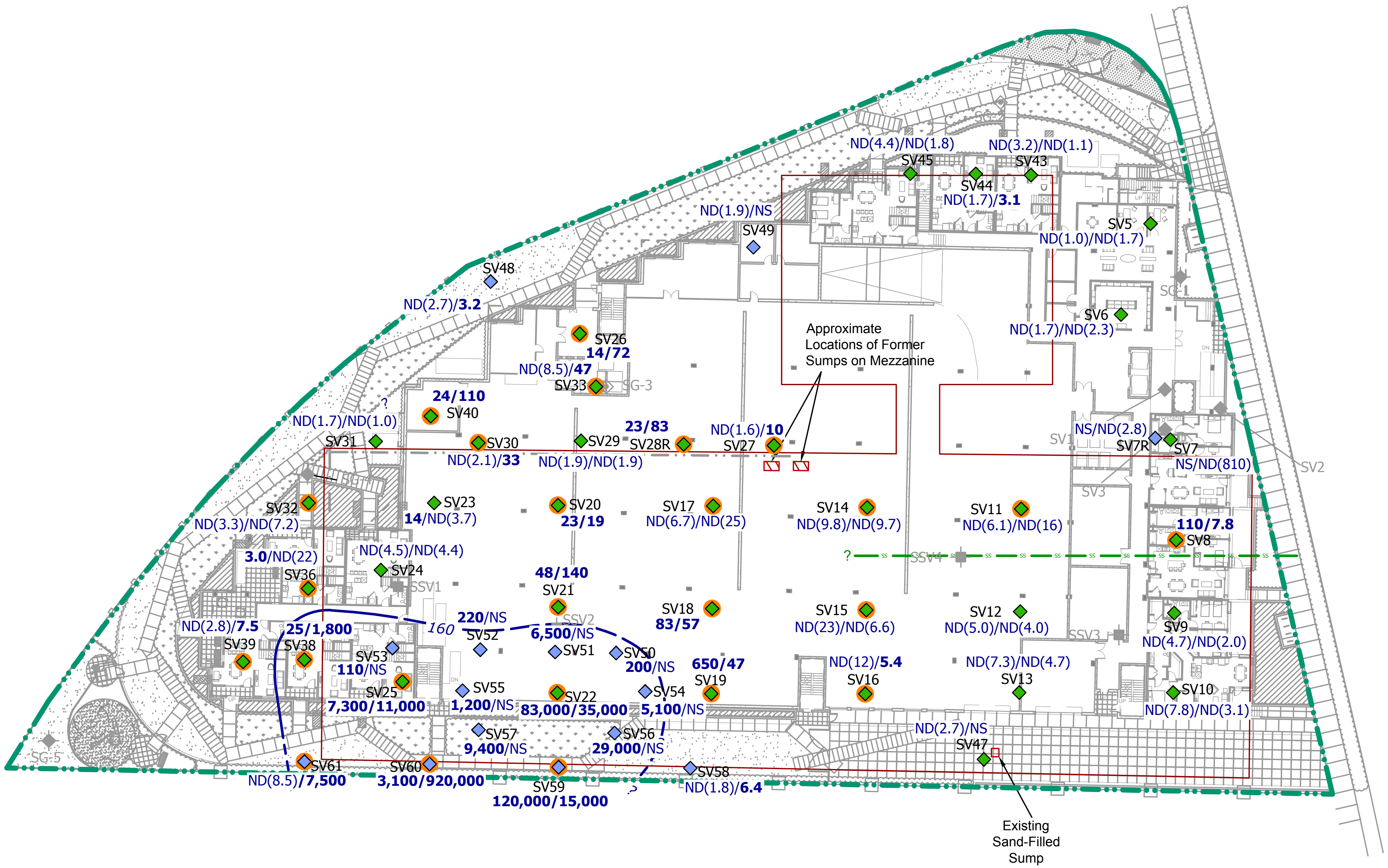


PES Environmental, Inc.
Engineering & Environmental Services

Soil Vapor Analytical Results and Isoconcentration Contours - Vinyl Chloride at 5 feet bgs
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
10A

1448.001.01.019	144800101019_PCSIR-r1_8-15	CJB	4/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

- Approximate Property Boundary
- Soil Vapor Sampling Location (PES, Feb 2016)
- SV7 — Soil Vapor Sampling Location (PES, Nov-Dec 2015)
- SG-5 — Soil, Soil Gas and Groundwater Sampling Location (Environ, 2013)
- SG-3 — Soil Gas and Soil Sampling Location (Environ, 2013)
- SV1 — Soil Vapor Sampling Location (PES, April 2015)
- SSV1 — Sub-Slab Vapor Sampling Location (PES, April 2015)
- Assumed Former Drain Line Location
- ? — Approximate Location of Existing Sewer Line (queried where uncertain)
- Existing Building Outline
- Future Driveway - Grasscrete
- Future Driveway - Decomposed Granite
- Future Planter/Infiltration Gallery
- Future Concrete Walkway
- **83/57** — Vinyl Chloride concentration at 5-feet and 10-feet below ground surface (ft bgs), respectively, shown in micrograms per cubic meter ($\mu g/m^3$)
- ND(5.0) — Not detected at or above the indicated laboratory reporting limit
- NS — Not Sampled
- Detection or reporting limit exceeds residential Environmental Screening Level (ESL) for Soil Gas (4.7 $\mu g/m^3$)
- *160* — Vinyl Chloride isoconcentration contour for soil vapor exceeding commercial ESL (160 $\mu g/m^3$) at 5 ft bgs in $\mu g/m^3$ (dashed where inferred)

Notes:

1. Sample depths for SV-15 are 5-ft and 8-ft bgs.

0 50
SCALE IN FEET

Basemap: Luk and Associates, 2015

PES Environmental, Inc.
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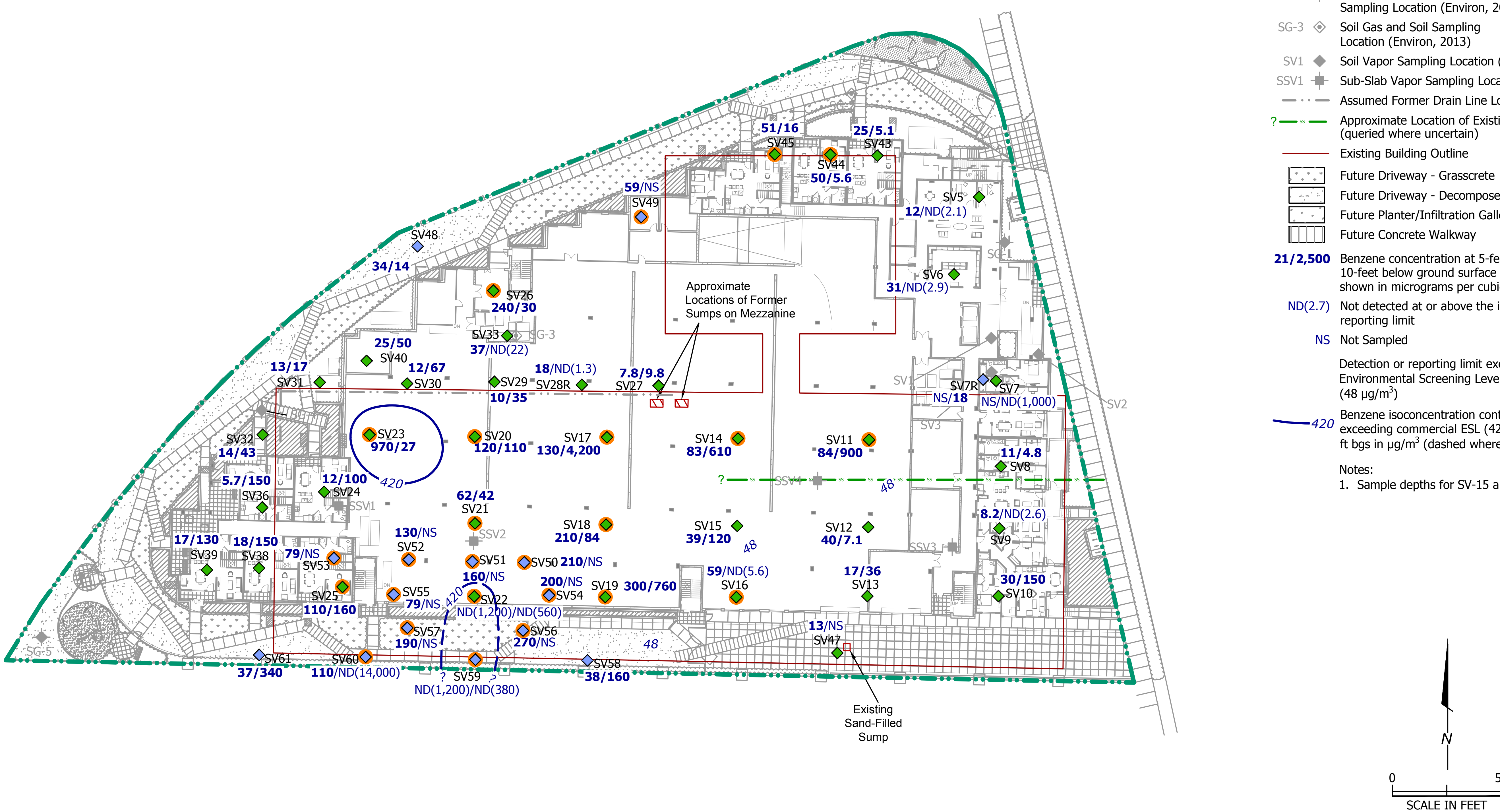
Soil Vapor Sample Results and Isoconcentration Contours - Vinyl Chloride at 10 ft bgs
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
10B

1448.001.01.019	144800101019_PCSIR-r1_8-15	CJB	4/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

- Approximate Property Boundary
- Soil Vapor Sampling Location (PES, Feb 2016)
- SV7 — Soil Vapor Sampling Location (PES, Nov-Dec 2015)
- SG-5 — Soil, Soil Gas and Groundwater Sampling Location (Environ, 2013)
- SG-3 — Soil Gas and Soil Sampling Location (Environ, 2013)
- SV1 — Soil Vapor Sampling Location (PES, April 2015)
- SSV1 — Sub-Slab Vapor Sampling Location (PES, April 2015)
- Assumed Former Drain Line Location
- Approximate Location of Existing Sewer Line (queried where uncertain)
- Existing Building Outline
- Future Driveway - Grasscrete
- Future Driveway - Decomposed Granite
- Future Planter/Infiltration Gallery
- Future Concrete Walkway
- **21/2,500** — Benzene concentration at 5-feet and 10-feet below ground surface (ft bgs), respectively, shown in micrograms per cubic meter (µg/m^3)
- ND(2.7) — Not detected at or above the indicated laboratory reporting limit
- NS — Not Sampled
- Detection or reporting limit exceeds residential Environmental Screening Level (ESL) for Soil Gas (48 µg/m^3)
- 420 — Benzene isoconcentration contour for soil vapor exceeding commercial ESL (420 µg/m^3) at 10 ft bgs in µg/m^3 (dashed where inferred)

Notes:

1. Sample depths for SV-15 are 5-ft and 8-ft bgs.

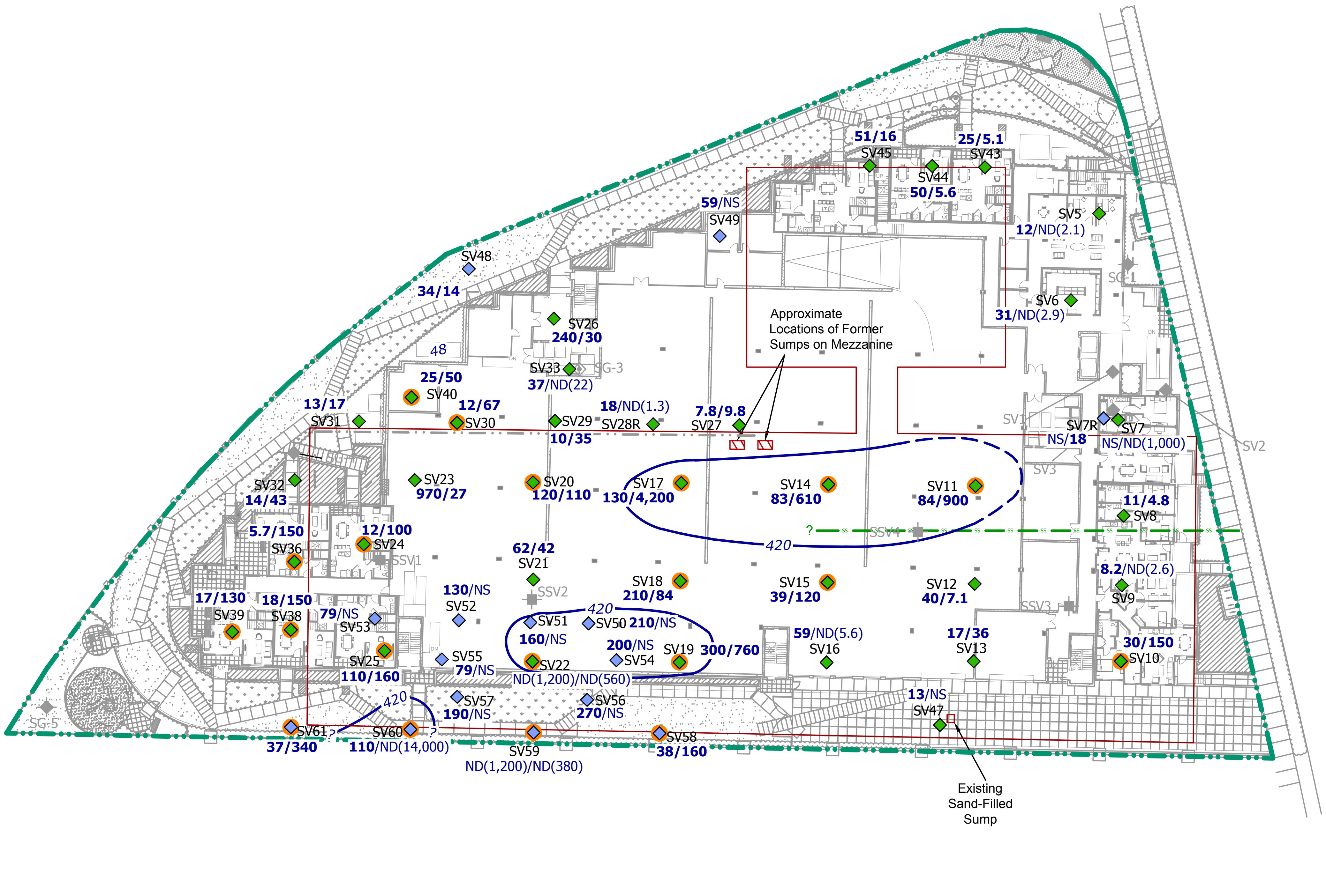
Basemap: Luk and Associates, 2015

Soil Vapor Sample Results and Isoconcentration Contours - Benzene at 5 ft bgs
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
11A

PES Environmental, Inc.
Engineering & Environmental Services

1448.001.01.019	144800101019_PCSIR-r1_8-15	CJB	4/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

- Approximate Property Boundary
- Soil Vapor Sampling Location (PES, Feb 2015)
- SV7 — Soil Vapor Sampling Location (PES, Nov-Dec 2015)
- SG-5 — Soil, Soil Gas and Groundwater Sampling Location (Environ, 2013)
- SG-3 — Soil Gas and Soil Sampling Location (Environ, 2013)
- SV1 — Soil Vapor Sampling Location (PES, April 2015)
- SSV1 — Sub-Slab Vapor Sampling Location (PES, April 2015)
- Assumed Former Drain Line Location
- Approximate Location of Existing Sewer Line (queried where uncertain)
- Existing Building Outline
- Future Driveway - Grasscrete
- Future Driveway - Decomposed Granite
- Future Planter/Infiltration Gallery
- Future Concrete Walkway
- **21/2,500** — Benzene concentration at 5-feet and 10-feet below ground surface (ft bgs), respectively, shown in micrograms per cubic meter (µg/m^3)
- ND(2.7) — Not detected at or above the indicated laboratory reporting limit
- NS — Not Sampled
- Detection or reporting limit exceeds residential Environmental Screening Level (ESL) for Soil Gas (48 µg/m^3)
- 420 — Benzene isoconcentration contour for soil vapor exceeding commercial ESL (420 µg/m^3) at 10 ft bgs in µg/m^3 (dashed where inferred)

Notes:
1. Sample depths for SV-15 are 5-ft and 8-ft bgs.

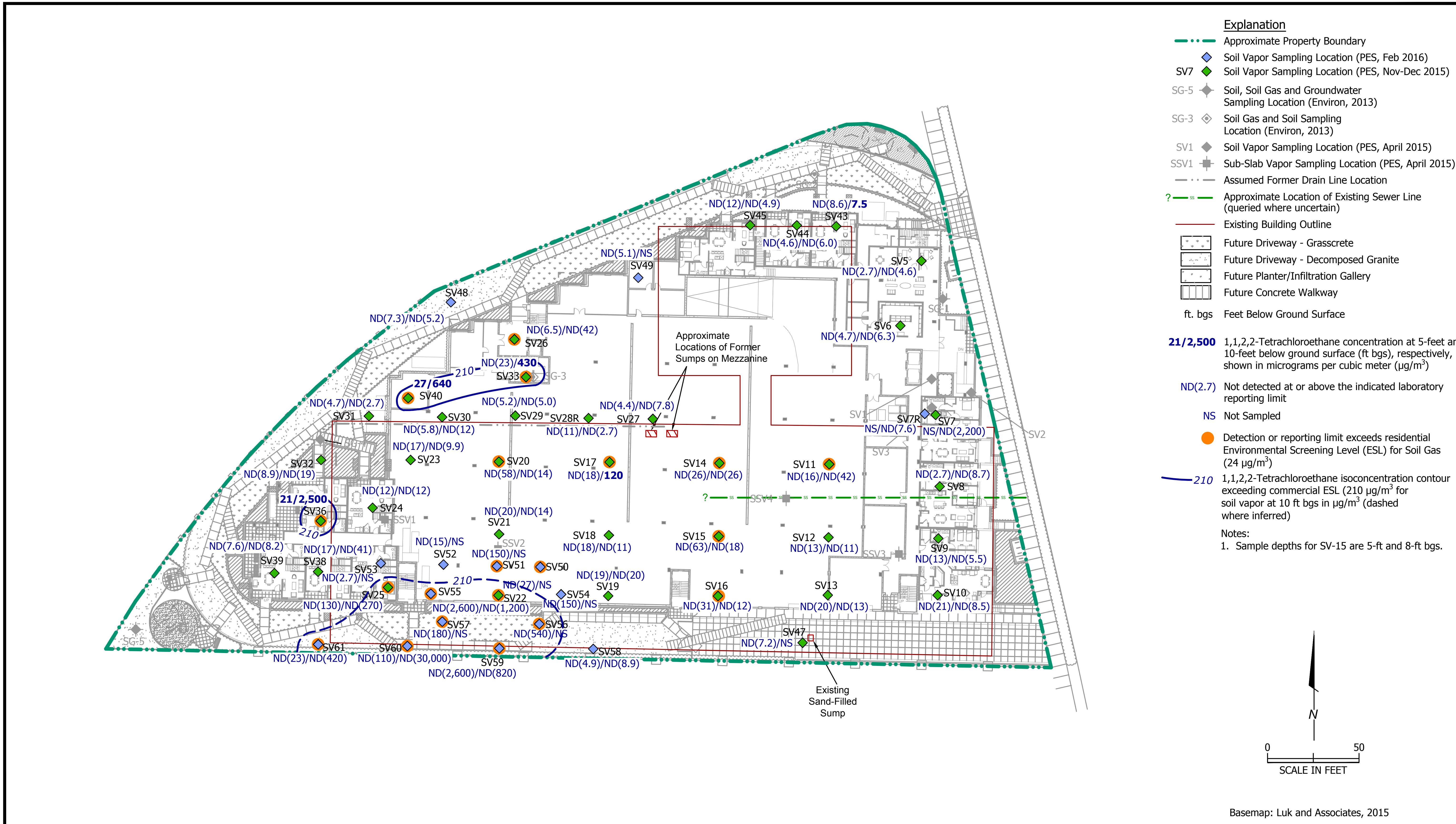
Basemap: Luk and Associates, 2015

PES Environmental, Inc.
Engineering & Environmental Services

Soil Vapor Sample Results and Isoconcentration Contours - Benzene at 10 ft bgs
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
11B

1448.001.01.019	144800101019_PCSIR-r1_8-15	CJB	4/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

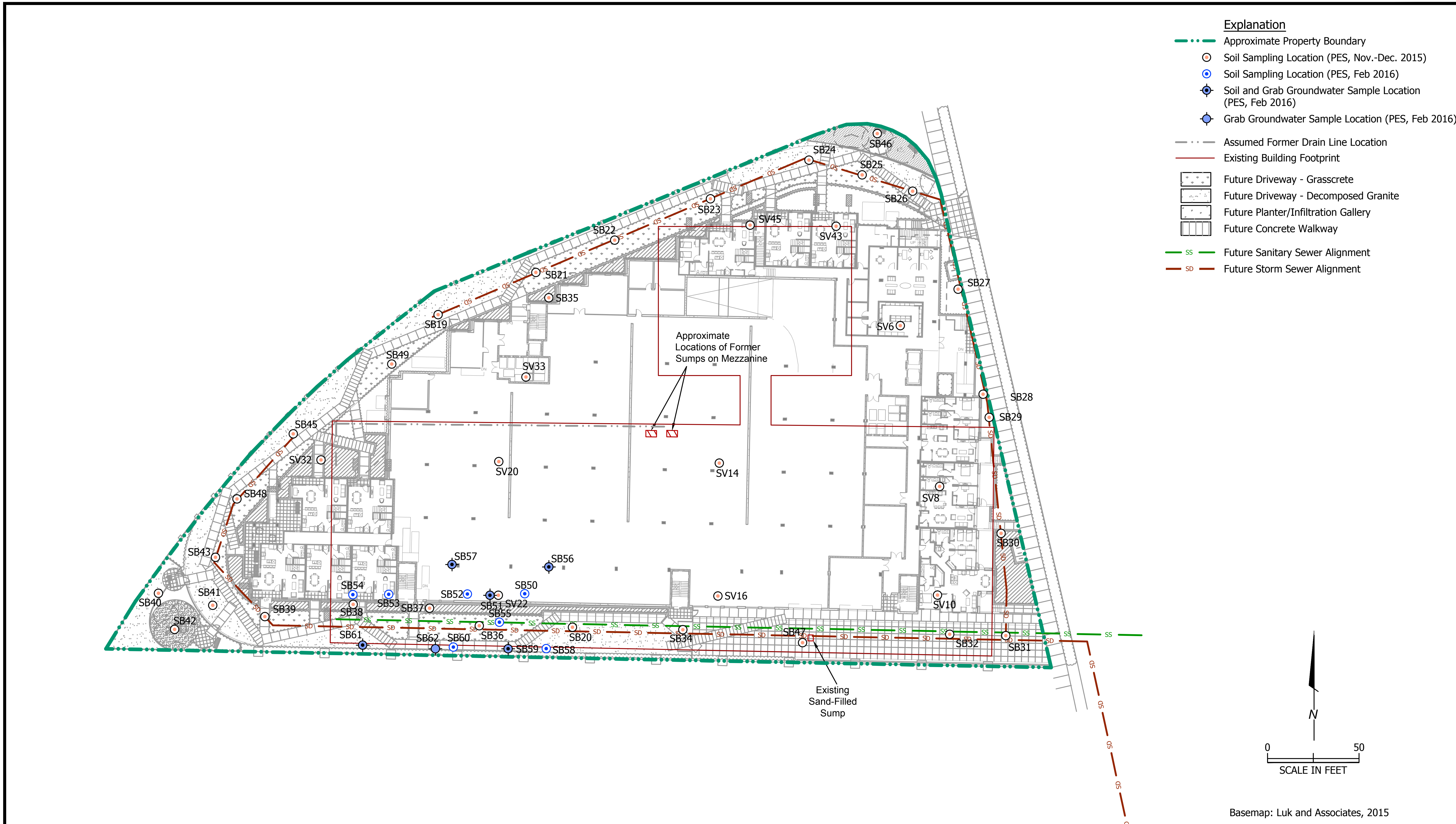


PES Environmental, Inc.
Engineering & Environmental Services

Soil Vapor Sample Results - 1,1,2,2-Tetrachloroethane
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
12

1448.001.01.019	144800101019_PCSIR-r1_8-15	CJB	4/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



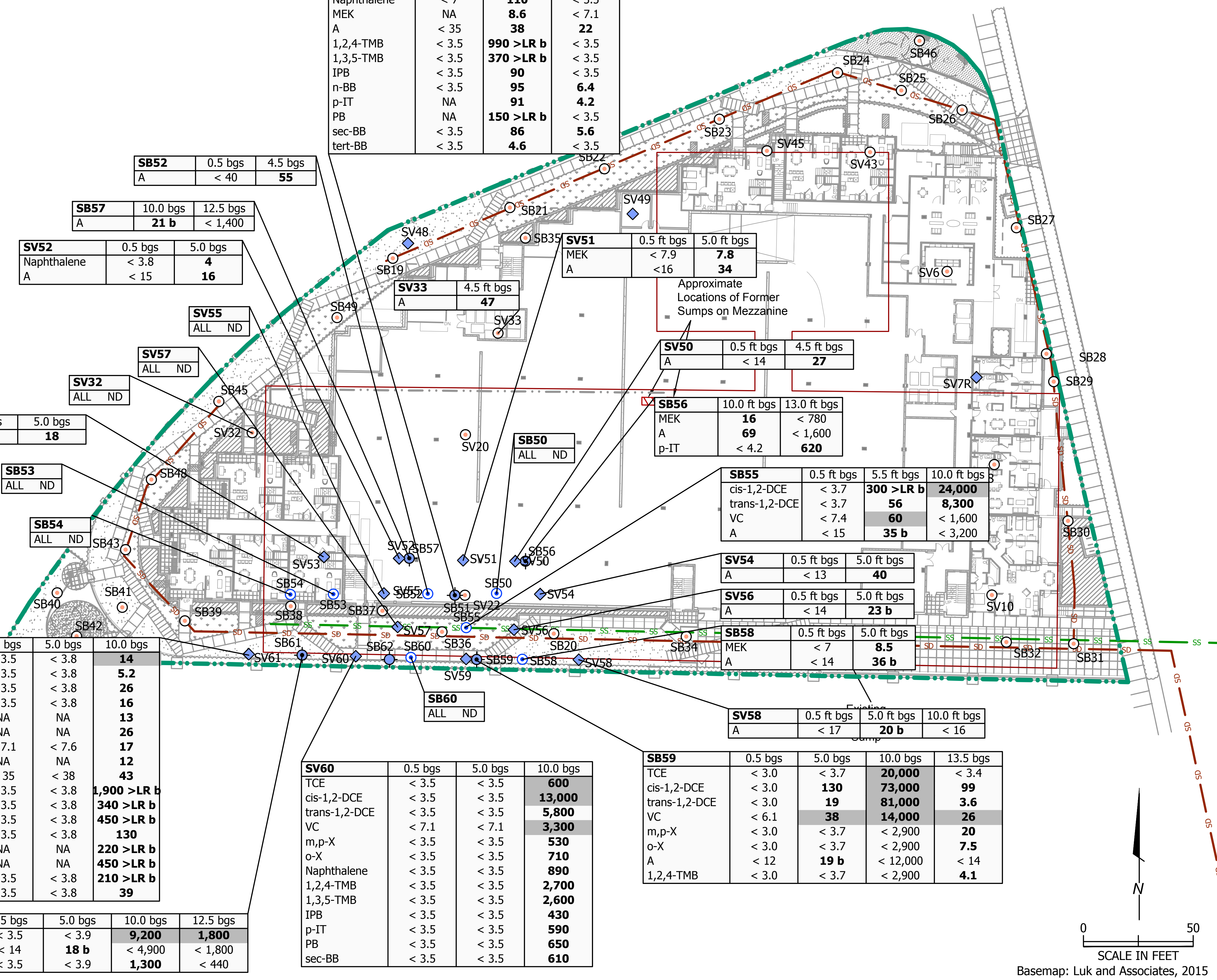
Soil and Grab Groundwater Sample Locations and Proposed Ground-Level Development Plan

Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PES Environmental, Inc.
Engineering & Environmental Services

PLATE 13

1448.001.01.019	144800101019_PCSIR-r1_8-15	CJB	4/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



SB51	0.5 bgs	4.5 bgs	10.0 bgs
VC	< 3.5	**35**	< 7.1
B	< 3.5	**9.8**	< 3.5
T	< 3.5	**59**	< 3.5
EB	< 3.5	**97**	< 3.5
m,p-X	NA	**270**	< 3.5
o-X	NA	**110**	< 3.5
Naphthalene	< 7	**110**	< 3.5
MEK	NA	**8.6**	< 7.1
A	< 35	**38**	**22**
1,2,4-TMB	< 3.5	**990 >LR b**	< 3.5
1,3,5-TMB	< 3.5	**370 >LR b**	< 3.5
IPB	< 3.5	**90**	< 3.5
n-BB	< 3.5	**95**	**6.4**
p-IT	NA	**91**	**4.2**
PB	NA	**150 >LR b**	< 3.5
sec-BB	< 3.5	**86**	**5.6**
tert-BB	< 3.5	**4.6**	< 3.5

SB52	0.5 bgs	4.5 bgs
A	< 40	**55**

SB57	10.0 bgs	12.5 bgs
A	**21 b**	< 1,400

SV52	0.5 bgs	5.0 bgs
Naphthalene	< 3.8	**4**
A	< 15	**16**

SV55	
ALL	ND

SV57	
ALL	ND

SV32	
ALL	ND

SV53	0.5 bgs	5.0 bgs
A	< 13	**18**

SB53	
ALL	ND

SB54	
ALL	ND

SV51	0.5 ft bgs	5.0 ft bgs
MEK	< 7.9	**7.8**
A	<16	**34**

SV33	4.5 ft bgs
A	**47**

SV50	0.5 ft bgs	4.5 ft bgs
A	< 14	**27**

SB56	10.0 ft bgs	13.0 ft bgs
MEK	**16**	< 780
A	**69**	< 1,600
p-IT	< 4.2	**620**

SB50	
ALL	ND

SB55	0.5 ft bgs	5.5 ft bgs	10.0 ft bgs
cis-1,2-DCE	< 3.7	**300 >LR b**	**24,000**
trans-1,2-DCE	< 3.7	**56**	**8,300**
VC	< 7.4	**60**	< 1,600
A	< 15	**35 b**	< 3,200

SV54	0.5 ft bgs	5.0 ft bgs
A	< 13	**40**

SV56	0.5 ft bgs	5.0 ft bgs
A	< 14	**23 b**

SB58	0.5 ft bgs	5.0 ft bgs
MEK	< 7	**8.5**
A	< 14	**36 b**

SV58	0.5 ft bgs	5.0 ft bgs	10.0 ft bgs
A	< 17	**20 b**	< 16

SB60	
ALL	ND

SV61	0.5 bgs	5.0 bgs	10.0 bgs
VC	< 3.5	< 3.8	**14**
B	< 3.5	< 3.8	**5.2**
T	< 3.5	< 3.8	**26**
EB	< 3.5	< 3.8	**16**
m,p-X	NA	NA	**13**
o-X	NA	NA	**26**
Naphthalene	< 7.1	< 7.6	**17**
MEK	NA	NA	**12**
A	< 35	< 38	**43**
1,2,4-TMB	< 3.5	< 3.8	**1,900 >LR b**
1,3,5-TMB	< 3.5	< 3.8	**340 >LR b**
IPB	< 3.5	< 3.8	**450 >LR b**
n-BB	< 3.5	< 3.8	**130**
p-IT	NA	NA	**220 >LR b**
PB	NA	NA	**450 >LR b**
sec-BB	< 3.5	< 3.8	**210 >LR b**
tert-BB	< 3.5	< 3.8	**39**

SB61	0.5 bgs	5.0 bgs	10.0 bgs	12.5 bgs
Naphthalene	< 3.5	< 3.9	**9,200**	**1,800**
A	< 14	**18 b**	< 4,900	< 1,800
PB	< 3.5	< 3.9	**1,300**	< 440

SV60	0.5 bgs	5.0 bgs	10.0 bgs
TCE	< 3.5	< 3.5	**600**
cis-1,2-DCE	< 3.5	< 3.5	**13,000**
trans-1,2-DCE	< 3.5	< 3.5	**5,800**
VC	< 7.1	< 7.1	**3,300**
m,p-X	< 3.5	< 3.5	**530**
o-X	< 3.5	< 3.5	**710**
Naphthalene	< 3.5	< 3.5	**890**
1,2,4-TMB	< 3.5	< 3.5	**2,700**
1,3,5-TMB	< 3.5	< 3.5	**2,600**
IPB	< 3.5	< 3.5	**430**
p-IT	< 3.5	< 3.5	**590**
PB	< 3.5	< 3.5	**650**
sec-BB	< 3.5	< 3.5	**610**

SB59	0.5 bgs	5.0 bgs	10.0 bgs	13.5 bgs
TCE	< 3.0	< 3.7	**20,000**	< 3.4
cis-1,2-DCE	< 3.0	**130**	**73,000**	**99**
trans-1,2-DCE	< 3.0	**19**	**81,000**	**3.6**
VC	< 6.1	**38**	**14,000**	**26**
m,p-X	< 3.0	< 3.7	< 2,900	**20**
o-X	< 3.0	< 3.7	< 2,900	**7.5**
A	< 12	**19 b**	< 12,000	< 14
1,2,4-TMB	< 3.0	< 3.7	< 2,900	**4.1**

Approximate Locations of Former Sumps on Mezzanine

Explanation

- Approximate Property Boundary
- Soil Sampling Location (PES, Nov.-Dec. 2015)
- Soil Sampling Location (PES, Feb 2016)
- Soil Vapor and Soil Sampling Location (PES, Feb. 2016)
- Soil and Grab Groundwater Sample Location (PES, Feb 2016)
- Grab Groundwater Sample Location (PES, Feb 2016)
- Assumed Former Drain Line Location
- Existing Building Footprint
- Future Driveway - Grasscrete
- Future Driveway - Decomposed Granite
- Future Planter/Infiltration Gallery
- Future Concrete Walkway
- Future Sanitary Sewer Alignment
- Future Storm Sewer Alignment

Notes:

Detections are shown in bold. Results equal to or exceeding one or more applicable regulatory screening levels are shaded.
All results presented in micrograms per kilogram (µg/kg)
VOCs = Volatile organic compounds.
TCE = Trichloroethene.
DCE = Dichloroethene.
VC = Vinyl Chloride
B = Benzene
T = Toluene
EB = Ethylbenzene
m,p-X = m,p-Xylenes
o-X = o-Xylenes
MEK = Methyl ethyl ketone or 2-Butanone
A = Acetone
TMB = Trimethylbenzene.
IPB = Isopropylbenzene
n-BB = n-Butylbenzene
p-IT = para-Isopropyl Toluene
PB = Propylbenzene
sec-BB = sec-Butylbenzene
tert-BB = tert-Butylbenzene
bgs = Below ground surface.
< 0.99 = Not detected at or above the indicated laboratory method reporting limit.
NA = Not applicable/not analyzed.
>LR = Response exceeds instrument's linear range
b = High response was observed for acetone; see lab report for detailed explanation.

0 50
SCALE IN FEET

Basemap: Luk and Associates, 2015

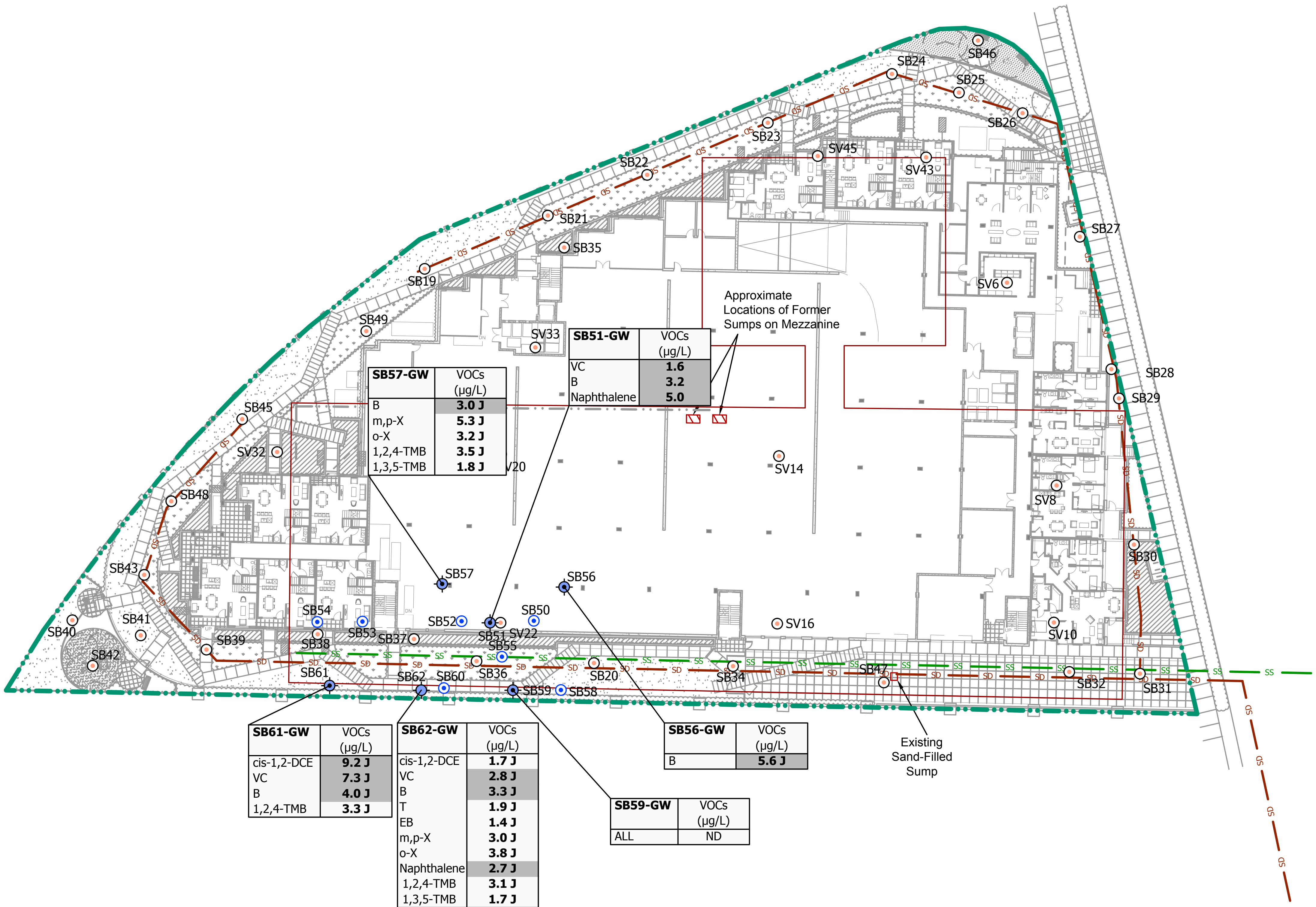
PES Environmental, Inc.
Engineering & Environmental Services

Summary of Soil Analytical Results- Volatile Organic Compounds

Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE 14

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.019	144800101019_PCSIR-r1_8-15	CJB	4/16



SB57-GW	VOCs (µg/L)
B	**3.0 J**
m,p-X	**5.3 J**
o-X	**3.2 J**
1,2,4-TMB	**3.5 J**
1,3,5-TMB	**1.8 J**

SB51-GW	VOCs (µg/L)
VC	**1.6**
B	**3.2**
Naphthalene	**5.0**

SB61-GW	VOCs (µg/L)
cis-1,2-DCE	**9.2 J**
VC	**7.3 J**
B	**4.0 J**
1,2,4-TMB	**3.3 J**

SB62-GW	VOCs (µg/L)
cis-1,2-DCE	**1.7 J**
VC	**2.8 J**
B	**3.3 J**
T	**1.9 J**
EB	**1.4 J**
m,p-X	**3.0 J**
o-X	**3.8 J**
Naphthalene	**2.7 J**
1,2,4-TMB	**3.1 J**
1,3,5-TMB	**1.7 J**

SB59-GW	VOCs (µg/L)
ALL	ND

SB56-GW	VOCs (µg/L)
B	**5.6 J**

Explanation

- Approximate Property Boundary
- Soil Sampling Location (PES, Nov.-Dec. 2015)
- Soil Sampling Location (PES, Feb 2016)
- Soil and Grab Groundwater Sample Location (PES, Feb 2016)
- Grab Groundwater Sample Location (PES, Feb 2016)
- Assumed Former Drain Line Location
- Existing Building Footprint
- Future Driveway - Grasscrete
- Future Driveway - Decomposed Granite
- Future Planter/Infiltration Gallery
- Future Concrete Walkway
- SS — Future Sanitary Sewer Alignment
- SD — Future Storm Sewer Alignment

Notes:
Detections are shown in bold. Results equal to or exceeding one or more applicable regulatory screening levels are shaded.
VOCs = Volatile organic compounds.
DCE = Dichloroethene.
VC = Vinyl Chloride
B = Benzene
T = Toluene
EB = Ethylbenzene
m,p-X = m,p-Xylenes
o-X = o-Xylenes
TMB = Trimethylbenzene.
J = Indicates an estimated value.
ND = Not Detected.
µg/L= Micrograms per Liter

Basemap: Luk and Associates, 2015

PES Environmental, Inc.
Engineering & Environmental Services

Summary of Grab Groundwater Analytical Results - Volatile Organic Compounds
Pre-Construction Subsurface Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
15

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.019	144800101019_PCSIR-r1_8-15	CJB	4/16

Pertinent Data from August 29, 2016 *Results of Pilot Study for Soil Vapor Extraction*

TABLES

Table 1
Summary of SVE and Air Inlet Well Construction Details
Results of SVE Pilot Study
6701 - 6707 Shellmound Street
Emeryville, California

Well Identification	Date Installed	Borehole Depth (feet bgs)	Borehole Diameter (inches)	Well Screen Interval (feet bgs)	Sand Pack Interval (feet bgs)	Well Screen Diameter (inches)	Well Screen Slot Size (inches)
AI-1	7/27/16	10.7	10.0	5 to 10	4.5 to 10.66	2.0	0.020
AI-2	7/27/16	10.8	10.0	5 to 10	4.5 to 10.75	2.0	0.020
AI-3	7/27/16	10.5	10.0	5 to 10	4.5 to 10.5	2.0	0.020
AI-4	7/28/16	10.7	10.0	5 to 10	4.5 to 10.66	2.0	0.020
AI-5	7/27/16	10.7	10.0	5 to 10	4.5 to 10.66	2.0	0.020
AI-6	7/28/16	10.6	10.0	5 to 10	4.5 to 10.625	2.0	0.020
AI-7	7/25/16	10.4	10.0	4.79 to 9.79	4.25 to 10.42	2.0	0.020
AI-8	7/25/16	10.5	10.0	5 to 10	4.5 to 10.5	2.0	0.020
AI-9	7/26/16	10.7	10.0	5 to 10	4.5 to 10.66	2.0	0.020
AI-10	7/28/16	10.7	10.0	5 to 10	4.5 to 10.66	2.0	0.020
SVE-1	7/8/16	10.0	10.0	5 to 10	4.5 to 10.66	2.0	0.020
SVE-2	7/26/16	10.7	10.0	5 to 10	4.5 to 10.66	2.0	0.020
SVE-3	7/27/16	9.4	10.0	3.96 to 8.96	3.42 to 9.42	2.0	0.020
SVE-4	7/27/16	10.6	10.0	5 to 10	4.5 to 10.625	2.0	0.020
SVE-5	7/27/16	10.6	10.0	5 to 10	4.5 to 10.625	2.0	0.020
SVE-6	7/28/16	10.8	10.0	5 to 10	4.5 to 10.75	2.0	0.020
SVE-7	7/28/16	10.8	10.0	5 to 10	4.5 to 10.75	2.0	0.020
SVE-8	7/28/16	10.7	10.0	5 to 10	4.5 to 10.66	2.0	0.020
SVE-9	7/27/16	10.6	10.0	5 to 10	4.5 to 10.58	2.0	0.020
SVE-10	7/27/16	10.6	10.0	5 to 10	4.5 to 10.58	2.0	0.020
SVE-11	7/26/16	10.6	10.0	5 to 10	4.5 to 10.46	2.0	0.020
SVE-12	7/26/16	11.2	10.0	5 to 10	4.5 to 11.17	2.0	0.020
SVE-13	7/26/16	10.6	10.0	5 to 10	4.5 to 10.58	2.0	0.020
SVE-14	7/25/16	10.7	10.0	5 to 10	4.5 to 10.66	2.0	0.020
SVE-15	7/25/16	10.7	10.0	5 to 10	4.5 to 10.58	2.0	0.020
SVE-16	7/25/16	10.7	10.0	5 to 10	4.5 to 10.66	2.0	0.020
SVE-17	7/25/16	10.4	10.0	4.79 to 9.79	4.25 to 10.42	2.0	0.020
SVE-18	7/26/16	11.1	10.0	5 to 10	4.5 to 11.08	2.0	0.020
SVE-19	7/26/16	10.7	10.0	5 to 10	4.5 to 10.66	2.0	0.020

Notes:
feet bgs = feet below ground surface.

Table 2
Summary of Soil Vapor Monitoring Probe Construction Details
Results of SVE Pilot Study
6701 - 6707 Shellmound Street
Emeryville, California

Well Identification	Date Installed	Borehole Depth (feet bgs)	Borehole Diameter (inches)	Well Screen Interval (feet bgs)	Sand Pack Interval (feet bgs)	Well Screen Diameter (inches)
SVP-1-3.5	7/8/16	8.00	2.0	3.25 to 3.75	3 to 4	0.375
SVP-1-7.5	7/8/16	8.00	2.0	7.25 to 7.75	7 to 8	0.375
SVP-2-3.5	7/8/16	8.00	2.0	3.25 to 3.75	3 to 4	0.375
SVP-2-7.5	7/8/16	8.00	2.0	7.25 to 7.75	7 to 8	0.375
SVP-3-3.5	7/8/16	8.00	2.0	3.25 to 3.75	3 to 4	0.375
SVP-3-7.5	7/8/16	8.00	2.0	7.25 to 7.75	7 to 8	0.375
SVP-4-3.5	7/8/16	8.00	2.0	3.25 to 3.75	3 to 4	0.375
SVP-4-7.5	7/8/16	8.00	2.0	7.25 to 7.75	7 to 8	0.375
SVP-5-3.5	7/8/16	8.00	2.0	3.25 to 3.75	3 to 4	0.375
SVP-5-7.5	7/8/16	8.00	2.0	7.25 to 7.75	7 to 8	0.375
SVP-6-3.5	7/8/16	8.00	2.0	3.25 to 3.75	3 to 4	0.375
SVP-6-7.5	7/8/16	8.00	2.0	7.25 to 7.75	7 to 8	0.375

Notes:
feet bgs = feet below ground surface.

Table 3
Summary of Soil Vapor Analytical Results
Results of SVE Pilot Study
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Date	Sample Depth (feet bgs)	TCE (µg/m³)	cis-1,2-DCE (µg/m³)	trans-1,2-DCE (µg/m³)	Vinyl chloride (µg/m³)	1,1,1-TCA (µg/m³)	1,1,2,2-PCA (µg/m³)	MEK (µg/m³)	MIBK (µg/m³)	Acetone (µg/m³)	Benzene (µg/m³)	Toluene (µg/m³)	Ethylbenzene (µg/m³)	m,p-Xylene (µg/m³)	o-Xylene (µg/m³)	1,2,4-TMB (µg/m³)	1,3,5-TMB (µg/m³)	1,3-DCB (µg/m³)	4-Ethyltoluene (µg/m³)	Carbon disulfide (µg/m³)	Chloroform (µg/m³)	Other VOCs (µg/m³)
SVE-1	SVE-1	7/13/2016	5 to 10	< 140	< 110	< 110	**3,400**	< 110	< 180	< 160	< 110	< 790	< 85	< 100	< 120	< 230	< 120	< 260	< 130	< 160	< 130	< 170	< 98	
SVE-1	SVE-1	7/14/2016	5 to 10	< 1600	**3,500**	**1,900**	**40,000**	< 1200	< 2000	< 1700	< 1200	< 8600	< 930	< 1100	< 1300	< 2500	< 1300	< 2900	< 1400	< 1800	< 1400	< 1800	< 1100	
SVP-1-7.5	SVP-1-7.5	7/12/2016	7.5	< 250	**250**	< 180	**13,000**	< 190	< 310	< 270	< 190	< 1400	**250**	< 170	< 200	< 400	< 200	< 450	< 220	< 270	< 220	< 280	< 170	
SVP-2-3.5	SVP-2-3.5	7/12/2016	3.5	< 17	< 12	< 12	**920**	< 13	< 21	< 18	< 13	< 92	**28**	**31**	**14**	**55**	**23**	< 31	< 15	< 19	< 15	**83**	**78**	
SVP-2-7.5	SVP-2-7.5	7/12/2016	7.5	< 1300	< 990	< 990	**75,000**	< 1000	< 1700	< 1500	< 1000	< 7400	< 800	< 950	< 1100	< 2200	< 1100	< 2500	< 1200	< 1500	< 1200	< 1600	< 920	
SVP-3-7.5	SVP-3-7.5	7/12/2016	7.5	< 38	< 28	< 28	**2,400**	< 29	< 49	**57**	< 29	**260**	**310**	**170**	< 31	< 61	< 31	< 70	< 35	< 43	< 35	**130**	< 26	
SVP-4-3.5	SVP-4-3.5	7/12/2016	3.5	**6.9**	< 1.6	< 1.6	< 1	**9.5**	**4.8**	**19**	**11**	**44**	**19**	**18**	**23**	**120**	**54**	**17**	**8.7**	< 2.4	**3.9**	**3.1**	**57**	**2.0 (BDCM), 2.4 (Freon 12), 1.5 (MC), 2.6 (Freon 11)**
SVP-4-7.5	SVP-4-7.5	7/12/2016	7.5	**19**	**57**	**9.1**	**180**	< 4.5	< 7.6	**23**	< 4.5	**84**	**230**	**59**	**21**	**210**	**24**	**20**	**10**	**59**	< 5.4	**20**	< 4.1	**72 (1,4-DCB), 23 (NAPH)**
SVP-5-7.5	SVP-5-7.5	7/12/2016	7.5	< 510	< 370	< 370	**22,000**	< 390	< 650	< 560	< 390	< 2800	**490**	< 360	< 410	< 820	< 410	< 930	< 460	< 570	< 460	< 590	< 350	
SVP-6-3.5	SVP-6-3.5	7/12/2016	3.5	< 1700	**14,000**	**6,100**	**100,000**	< 1300	< 2200	< 1900	< 1300	< 9600	< 1000	< 1200	< 1400	< 2800	< 1400	< 3200	< 1600	< 2000	< 1600	< 2000	< 1200	
SVP-6-7.5	SVP-6-7.5	7/12/2016	7.5	< 1800	**16,000**	**6,300**	**98,000**	< 1400	< 2300	< 2000	< 1400	< 10000	< 1100	< 1300	< 1500	< 3000	< 1500	< 3400	< 1700	< 2000	< 1700	< 2100	< 1200	
Residential Land Use ESL [1]				*240*	*4,200*	*31,000*	*4.7*	*520,000*	*24*	*2,600,000*	*1,600,000*	*16,000,000*	*48*	*160,000*	*560*	*52,000*	*52,000*	*NE*	*NE*	*NE*	*NE*	*61*	*NE*	*NE*
Commercial/Industrial Land Use ESL [2]				*3,000*	*35,000*	*260,000*	*160*	*4,400,000*	*210*	*22,000,000*	*13,000,000*	*140,000,000*	*420*	*1,300,000*	*4,900*	*440,000*	*440,000*	*NE*	*NE*	*NE*	*NE*	*530*	*NE*	*NE*

Notes:

Detections are shown in bold. Results equal to or exceeding applicable regulatory screening levels are shaded.

Only detected analytes are summarized on table. Refer to Appendix D for laboratory report to access entire list of compounds analyzed.

SVE = Soil vapor extraction

BDCM = Bromodichloromethane

DCB = Dichlorobenzene

DCE = Dichloroethene.

Freon 11 = Trichlorofluoromethane

Freon 12 = Dichlorodifluoromethane

MC = Methylene Chloride

MEK = Methyl Ethyl Ketone

MIBK = Methyl Isobutyl Ketone

NAPH = Naphthalene

PCA = Tetrachloroethane

TCA = Trichloroethane.

TCE = Trichloroethene.

TMB = Trimethylbenzene.

VOCs = Volatile organic compounds.

bgs = Below ground surface.

µg/m³ = Micrograms per cubic meter.

< 2.9 = Not detected at or above the indicated laboratory method reporting limit.

NE = Not established.

-- = Not applicable/not analyzed.

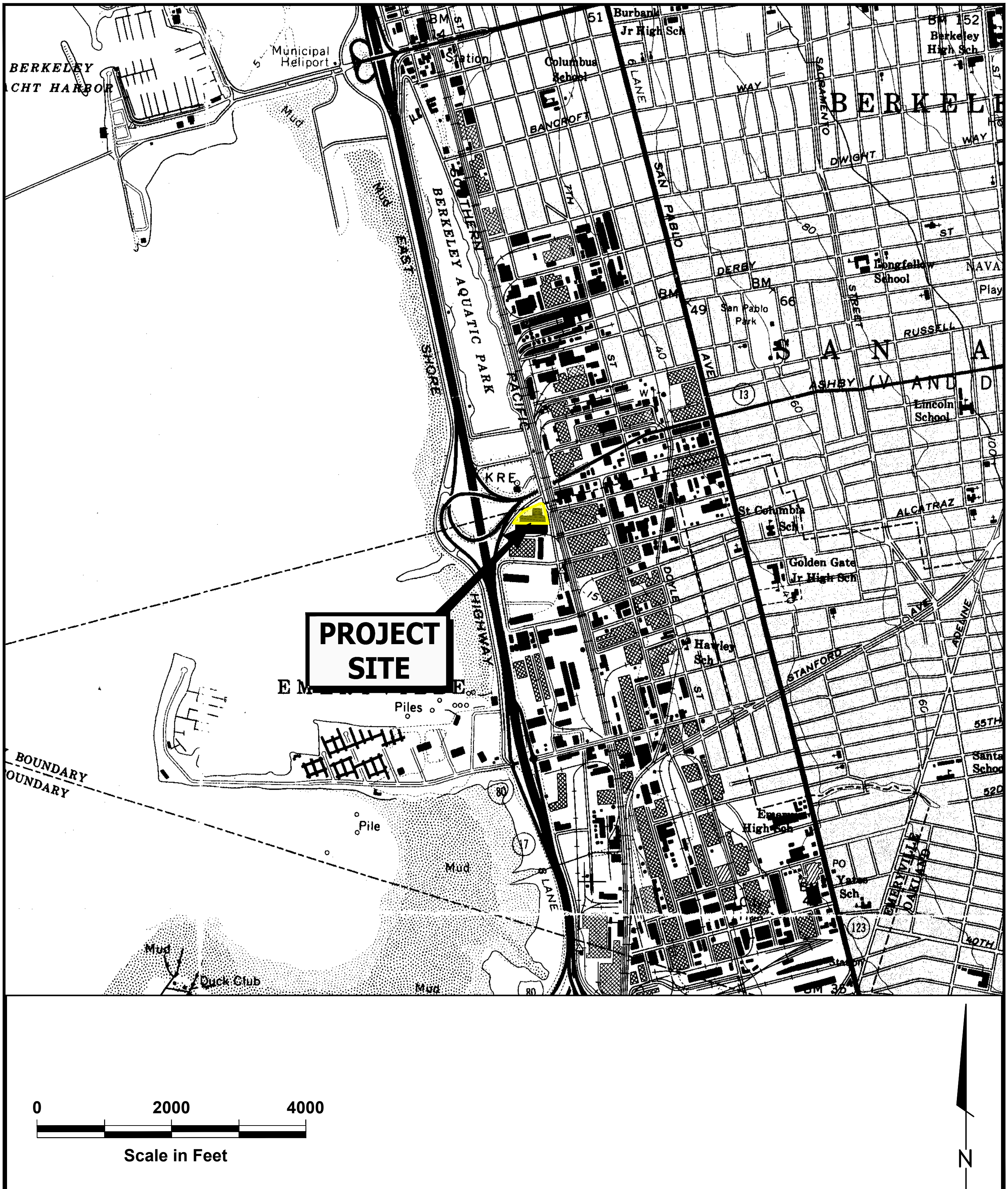
1. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table SG-1 Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels. Residential.
2. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table SG-1 Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels. Commercial/Industrial.

Table 4
Summary of Pilot Study Mass Removal Estimate
Results of SVE Pilot Study
6701 - 6707 Shellmound Street
Emeryville, California

Date and Time	Test Phase	Runtime Since Previous Date/Time Recording (hours)	Cumulative Runtime (hours)	Sample Date	Sample ID	SVE Sytem Influent VC Concentration (µg/m3)	Average Flow Rate from SVE-1 (SCFM)	Mass of Vinyl Chloride Removed Since Previous Date/Time Recording (lbs)	Cumulative Mass of Vinyl Chloride Removed Since Previous Date/Time (lbs)	Estimated Vinyl Chloride Mass Removal Rate (lbs/day)
7/13/16 11:00 AM	Step Test 1	0.5	--	--	--	40,000	9.7	0.0007	0.0007	--
7/13/2016 14:20:00 PM	Step Test 2	1.5	2.0	--	--	40,000	16.2	0.0036	0.0044	--
7/13/2016 15:20:00 PM	Step Test 3	0.5	2.5	--	--	40,000	21.0	0.0016	0.0059	--
7/13/2016 16:15:00 PM	Step Test 4	0.6	3.1	--	--	40,000	24.4	0.0021	0.0081	--
7/14/2016 14:55:00 PM	Constant	6.4	9.5	7/14/2016	SVE-1	40,000	25.5	0.0244	0.0325	0.0916

Notes:
µg/m3 - micrograms per cubic meter of air
lbs/day - pounds per day
SCFM - Standard cubic feet per minute
VC - Vinyl Chloride
-- - Not applicable/not analyzed

ILLUSTRATIONS



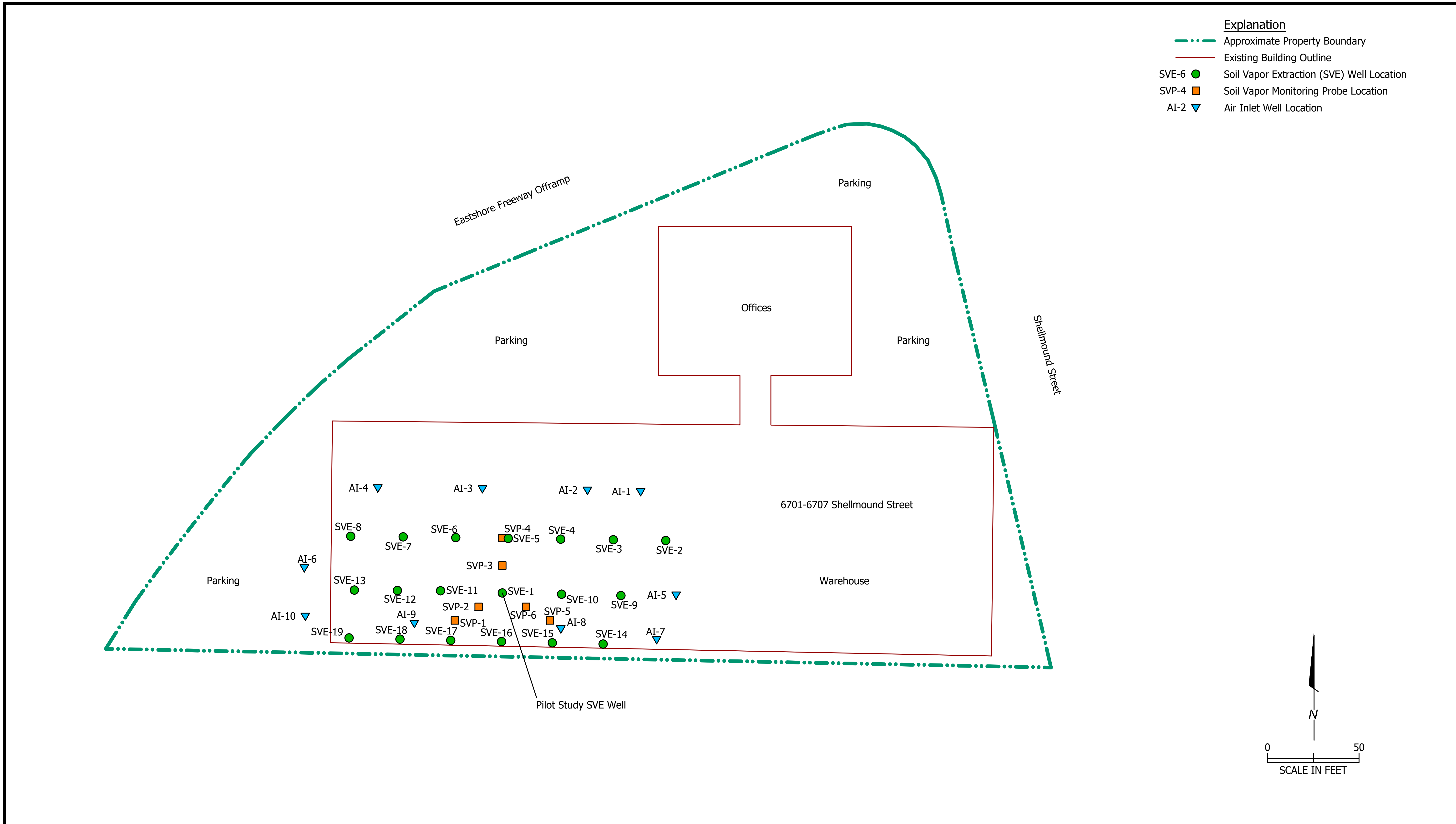
U.S.G.S. Topo Map - Oakland West, California, 7.5-minute quadrangle.1997

PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
Results of Pilot Study for Soil Vapor Extraction
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
1

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.02.004	144800102004_PS_1	CJB	8/16

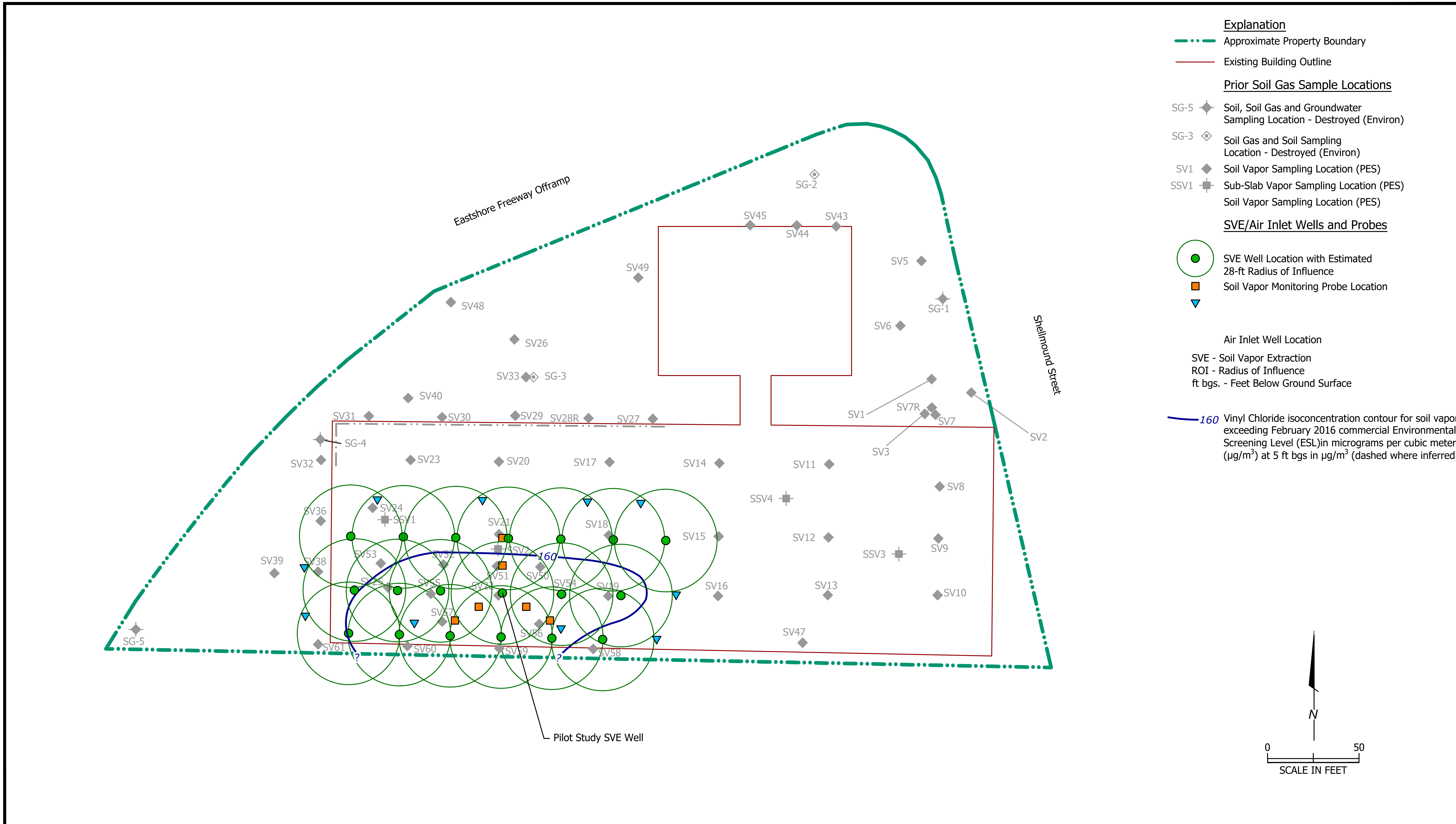


PES Environmental, Inc.
Engineering & Environmental Services

Site Plan and SVE/Air Inlet Well and Probe Locations
Results of Pilot Study for Soil Vapor Extraction
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
2

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.02.004	144800102004_PS_2	CJB	8/16

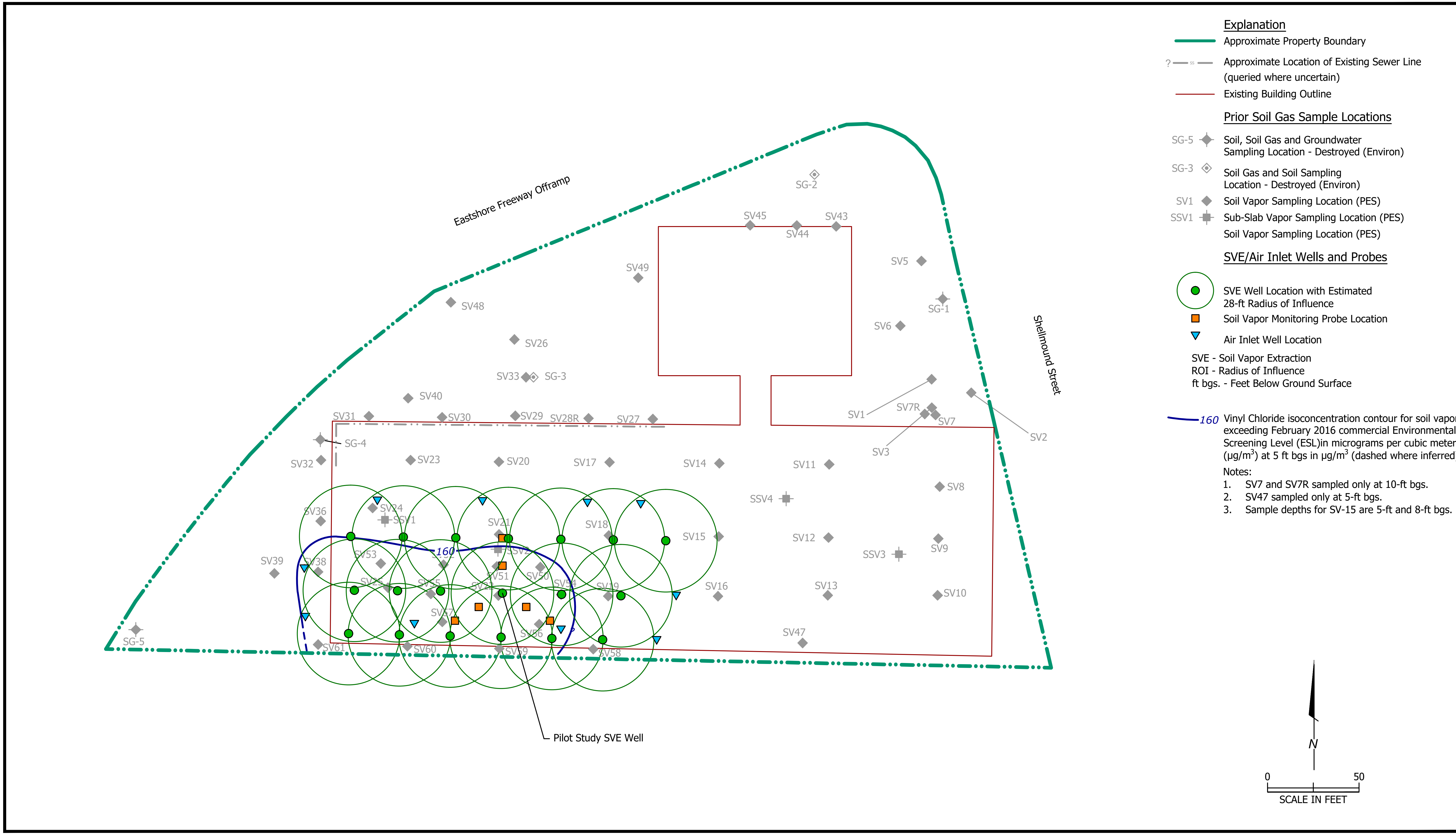


PES Environmental, Inc.
Engineering & Environmental Services

Estimated Vapor Extraction ROI for SVE Wells, with Isoconcentration Contours - Vinyl Chloride at 5 ft bgs
Results of Pilot Study for Soil Vapor Extraction
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
3

1448.001.02.004	144800102004_PS_3-4	CJB	8/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



PES Environmental, Inc.
Engineering & Environmental Services

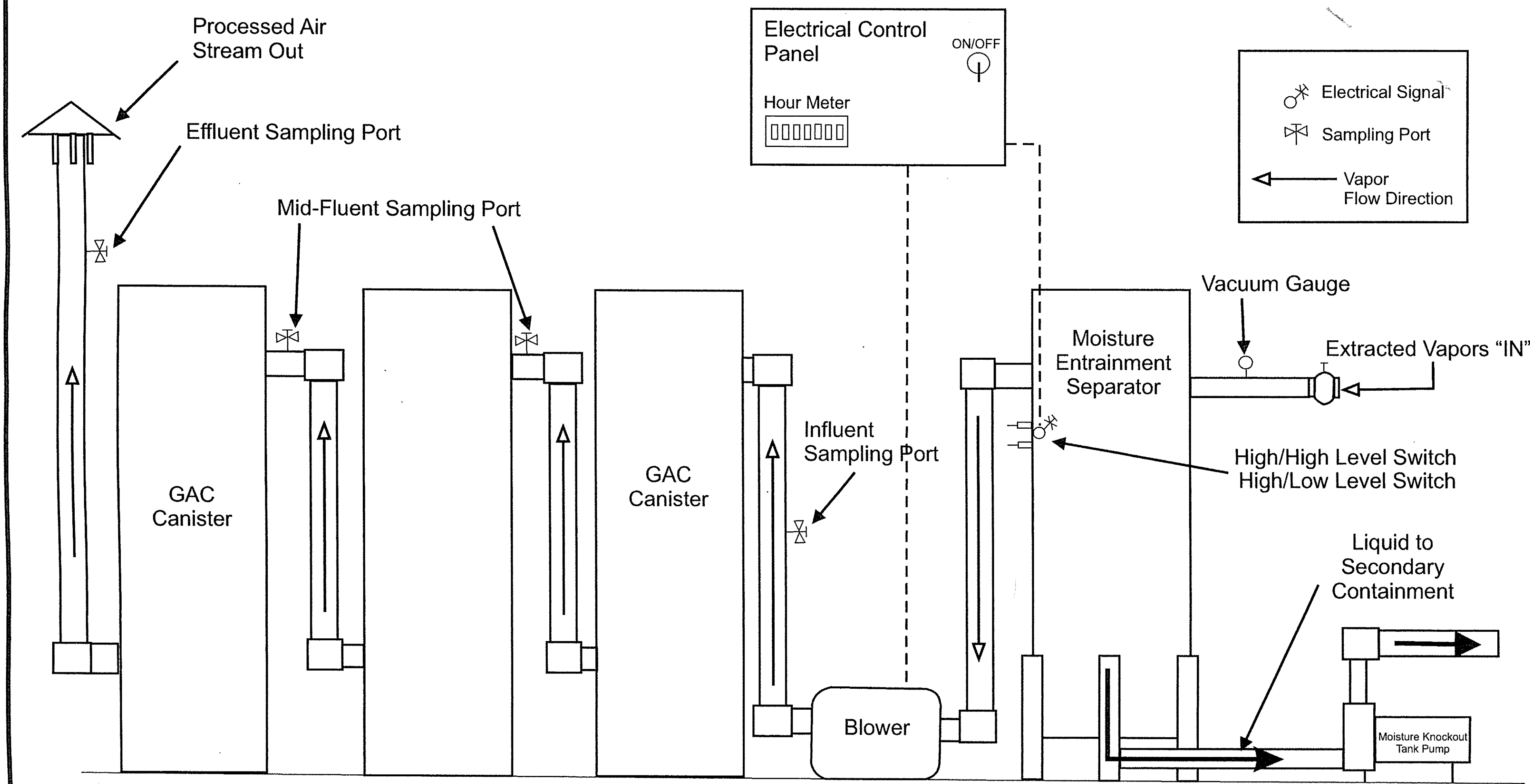
Estimated Vapor Extraction ROI for SVE Wells, with Isoconcentration Contours - Vinyl Chloride at 10 ft bgs
Results of Pilot Study for Soil Vapor Extraction
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
4

1448.001.02.004	144800102004_PS_3-4	CJB	8/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

APPENDIX A

SCHEMATIC DRAWING OF SVE SYSTEM



6701 - 6707 SHELLMOUND STREET
EMERYVILLE, CALIFORNIA

PROCESS AND INSTRUMENTATION FLOW DIAGRAM

Pertinent Data from October 6, 2016 *Northern Extant Onsite Building Investigation Report*

Table 1
Summary of Soil Vapor Analytical Results
Northern Extant Onsite Building Investigation Report
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	Acetone (µg/m^3)	Benzene (µg/m^3)	MEK (µg/m^3)	Carbon disulfide (µg/m^3)	Chloroform (µg/m^3)	Chloromethane (µg/m^3)	cis-1,2-DCE (µg/m^3)	Ethylbenzene (µg/m^3)	4-Ethyltoluene (µg/m^3)	2-Hexanone (µg/m^3)
SV62	SV62-5	5.0	9/7/2016	**590**	**120**	**93**	**41**	**17**	< 15	< 15	**55**	< 18	< 15
	SV62-10	10.0	9/7/2016	< 1200	< 130	< 240	< 250	< 150	< 170	< 160	< 180	< 200	< 170
SV63	SV63-5	5.0	9/7/2016	**310**	**27**	**71**	**25**	**8.7**	< 3.7	< 3.5	**23**	**4.5**	**6.8**
	SV63-10	10.0	9/7/2016	< 740	**170**	< 150	< 160	< 91	< 100	< 99	< 110	< 120	< 100
SV64	SV64-5	5.0	9/7/2016	**190**	**12**	**40**	**9.8**	< 2.0	< 2.3	< 2.2	**7.5**	< 2.7	**2.8**
	SV64-10	10.0	9/7/2016	**100**	**19**	**26**	**37**	< 6.6	< 7.4	< 7.1	**8.1**	< 8.8	< 7.4
SV65	SV65-5	5.0	9/7/2016	**200**	**23**	**50**	< 6.2	< 3.6	< 4.1	< 3.9	**6.3**	< 4.9	< 4.0
	SV65-10	10.0	9/7/2016	**73**	**83**	**19**	**11**	< 3.5	**4.6**	< 3.7	**15**	< 4.6	< 3.9
SV66	SV66-5	5.0	9/7/2016	**160**	**29**	**30**	**8.3**	**42**	**3.9**	**14**	**17**	< 4.0	< 3.3
	SV66-10	10.0	9/7/2016	**190**	**120**	**57**	**29**	< 13	<15	**23**	< 16	< 18	< 15
SV67	SV67-5	5.0	9/12/2016	**100**	**3900**	**15**	< 12	< 7.3	< 8.2	< 7.9	**1900**	**190**	< 8.2
	SV67-10	10.0	9/12/2016	< 59	**6.5**	< 12	< 12	< 7.3	< 8.2	< 7.9	< 8.6	< 9.8	< 8.1
Residential Land Use ESL (Soil Gas) [1]				*16,000,000*	*48*	*2,600,000*	*NE*	*61*	*47000*	*4,200*	*560*	*NE*	*NE*
Commercial/Industrial ESL [2]				*140,000,000*	*420*	*22,000,000*	*NE*	*530*	*390000*	*35,000*	*4,900*	*NE*	*NE*

Sample Location	Sample ID	MIBK (µg/m^3)	Toluene (µg/m^3)	TCE (µg/m^3)	1,2,4-TMB (µg/m^3)	1,3,5-TMB (µg/m^3)	m,p-Xylene (µg/m^3)	o-Xylene (µg/m^3)	Naphthalene (µg/m^3)	Vinyl Chloride (µg/m3)	Other VOCs (µg/m^3)	Methane (% v/v)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Helium (% v/v)
SV62	SV62-5	< 15	**250**	< 20	**50**	**27**	**390**	**94**	< 39	< 9.4	ND	**5.0**	< 2.3	**8.3**	**0.77**
	SV62-10	< 170	< 150	< 220	< 400	< 200	< 350	< 180	< 420	< 100	ND	**5.6**	< 5.0	**6.1**	**2.1**
SV63	SV63-5	**14**	**68**	< 4.8	**13**	**6.3**	**92**	**27**	< 9.3	< 2.3	ND	**0.22**	< 3.3	**9.0**	**1.1**
	SV63-10	< 100	< 94	< 130	< 250	< 120	**620**	< 110	< 260	< 64	ND	**2.9**	< 3.1	**15**	**1.0**
SV64	SV64-5	**3.9**	**36**	< 3.0	**6.6**	< 2.7	**26**	**7.6**	< 5.8	< 1.4	ND	**0.0024**	< 2.1	**17**	**1.2**
	SV64-10	< 7.4	**28**	< 9.7	< 18	< 8.8	**20**	< 7.8	< 19	< 4.6	ND	**0.0057**	< 6.8	**26**	**4.0**
SV65	SV65-5	**7.6**	**17**	< 5.3	< 9.7	< 4.9	**22**	**7.8**	< 10	< 2.5	ND	**0.0033**	< 6.3	**14**	**2.8**
	SV65-10	< 3.9	**21**	< 5.1	< 9.3	< 4.6	**69**	**31**	<9.9	< 0.94	ND	**0.0027**	< 3.5	**16**	**1.5**
SV66	SV66-5	< 3.3	**86**	**6.1**	**12**	**4.1**	**54**	**18**	< 8.6	< 2.1	ND	**0.0029**	< 3.1	**14**	**1.7**
	SV66-10	< 15	**37**	< 19	< 36	< 18	**37**	< 16	< 38	< 9.3	ND	**0.60**	< 4.5	**15**	**2.1**
SV67	SV67-5	< 8.2	**4700**	**50**	**320**	**180**	**3900**	**760**	< 130	< 5.1	**15 (1,1-DCA); 18 (1,2-DCA)**	**0.00091**	< 2.0	**20**	< 0.41
	SV67-10	< 8.1	< 7.5	< 11	< 20	< 9.8	< 17	< 8.6	< 21	< 5.1	ND	**0.043**	< 2.1	**20**	**0.71**
Residential Land Use ESL (Soil Gas) [1]		*1,600,000*	*160,000*	*240*	*NE*	*NE*	*52,000*	*52,000*	*41*	*4.7*	*Varies*	*NE*	*NE*	*NE*	*NE*
Commercial/Industrial ESL [2]		*13,000,000*	*1,300,000*	*3,000*	*NE*	*NE*	*440,000*	*440,000*	*360*	*160*	*Varies*	*NE*	*NE*	*NE*	*NE*

Notes:

Detections are shown in bold. Results equal to or exceeding applicable regulatory screening levels are shaded.

Only detected analytes are summarized on table. Refer to Appendix C for laboratory report to access entire list of compounds analyzed.

DCA = Dichloroethane

DCE = Dichloroethene.

MEK = Methyl Ethyl Ketone, 2-Butanone

MIBK = Methyl Isobutyl Ketone

TCE = Trichloroethene.

TMB = Trimethylbenzene.

bgs = Below ground surface.

VOCs = Volatile organic compounds.

µg/m^3 = Micrograms per cubic meter.

% v/v = Percent by volume.

< 2.9 = Not detected at or above the indicated laboratory method reporting limit.

ND = Not detected at or above the respective laboratory method reporting limits.

NE = Not established.

-- = Not applicable/not analyzed.

1. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table SG-1 Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels. Residential.
2. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table SG-1 Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels. Commercial/Industrial.

Table 2
Summary of Soil Vapor Leak Check Results
Northern Extant Onsite Building Investigation Report
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	Helium Detected in Sample (% v/v)	Helium Detected in Shroud (% v/v)	Breakthrough Factor (%)
SV62	SV62-5	5.0	9/7/2016	**0.77**	**42.8**	1.8
	SV62-10	10.0	9/7/2016	**2.1**	**42.8**	4.9
SV63	SV63-5	5.0	9/7/2016	**1.1**	**41.2**	2.7
	SV63-10	10.0	9/7/2016	**1.0**	**41.2**	2.4
SV64	SV64-5	5.0	9/7/2016	**1.2**	**50.6**	2.4
	SV64-10	10.0	9/7/2016	**4.0**	**50.6**	7.9
SV65	SV65-5	5.0	9/7/2016	**2.8**	**58.1**	4.8
	SV65-10	10.0	9/7/2016	**1.5**	**58.1**	2.6
SV66	SV66-5	5.0	9/7/2016	**1.7**	**48.9**	3.5
	SV66-10	10.0	9/7/2016	**2.1**	**48.9**	4.3
SV67	SV67-5	5.0	9/12/2016	< 0.41	**41.6**	< 1.0
	SV67-10	10.0	9/12/2016	**0.71**	**41.6**	1.7
Acceptable Ambient Air Breakthrough Limit [1]				--	--	*5%*

Notes:
Detections are shown in bold. Results equal to or exceeding applicable RPD limits are shaded.
bgs = Below ground surface.
% v/v = Percent by volume.
< 0.41 = Not detected at or above the indicated laboratory method reporting limit.
-- = Not applicable/not analyzed.
1. In accordance with California Environmental Protection Agency/Department of Toxic Substances Control Advisory - Active Soil Gas Investigations, July 2015 - Appendix C: Quantitative Leak Testing Using a Tracer Gas.

Table 3
Summary of Soil Analytical Results - Petroleum Hydrocarbons and VOCs
Northern Extant Onsite Building Investigation Report
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	Xylenes (Total) (µg/Kg)	Naphthalene (µg/Kg)	Acetone (µg/Kg)	4-Isopropyltoluene (µg/Kg)	Carbon Disulfide (µg/Kg)	Other VOCs (µg/Kg)
SV62	SV62-5	5.0	9/7/2016	< 17	**60**	**100**	< 8.3	< 8.3	ND
	SV62-10	10.0	9/7/2016	< 12	< 12	**130**	< 6.2	**6.3**	ND
SV63	SV63-5	5.0	9/7/2016	< 8.1	< 8.1	< 40	< 4.0	< 4.0	ND
	SV63-10	10.0	9/7/2016	**7.2**	**33**	**57**	**7.1**	< 3.6	ND
SV64	SV64-5	5.0	9/7/2016	< 11	< 11	< 57	< 5.7	< 5.7	ND
	SV64-10	10.0	9/7/2016	< 7.8	< 7.8	**48**	< 3.9	< 3.9	ND
SV65	SV65-5	5.0	9/7/2016	< 8.1	< 8.1	< 41	< 4.1	< 4.1	ND
	SV65-10	10.0	9/7/2016	< 10	< 10	< 51	< 5.1	< 5.1	ND
SV66	SV66-5	5.0	9/7/2016	< 7.2	< 7.2	**47**	< 3.6	< 3.6	ND
	SV66-10	10.0	9/7/2016	< 7.7	< 7.7	**100**	< 3.9	< 3.9	ND
SV67	SV67-5	5.0	9/12/2016	< 10	**40**	**230**	< 5.2	< 5.2	ND
	SV67-10	10.0	9/12/2016	< 7.3	< 7.3	**60**	< 3.7	< 3.7	ND
Tier 2 Residential Land Use ESL (Shallow Soil)				*500,000*	*3,300* [1]	*500* [3]	*NE*	*NE*	*Varies*
Construction Worker Exposure ESL [2]				*2,400,000*	*14,000*	*630,000,000*	*NE*	*NE*	*Varies*

Notes:

Detections are shown in bold. Results equal to or exceeding applicable regulatory screening levels are shaded.

Only detected analytes are summarized on table. Refer to Appendix C for laboratory report to access entire list of compounds analyzed.

VOCs = Volatile organic compounds.

bgs = Below ground surface.

µg/Kg = Micrograms per kilogram.

< 3.7 = Not detected at or above the indicated laboratory method reporting limit.

ND = Not Detected.

NE = Not established.

1. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table S-1: Direct Exposure Human Health Risk Levels, Residential: Shallow Soil Exposure
2. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table S-1: Direct Exposure Human Health Risk Screening Levels, Any Land Use, Construction Worker Shallow and Deep Soil Exposure Scenario.
3. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table S-2: Soil Leaching to Groundwater Screening Levels, Water Resources. Final Soil Leaching Screening Levels, Non-Drinking

ILLUSTRATIONS

0 2000 4000

Scale in Feet

N

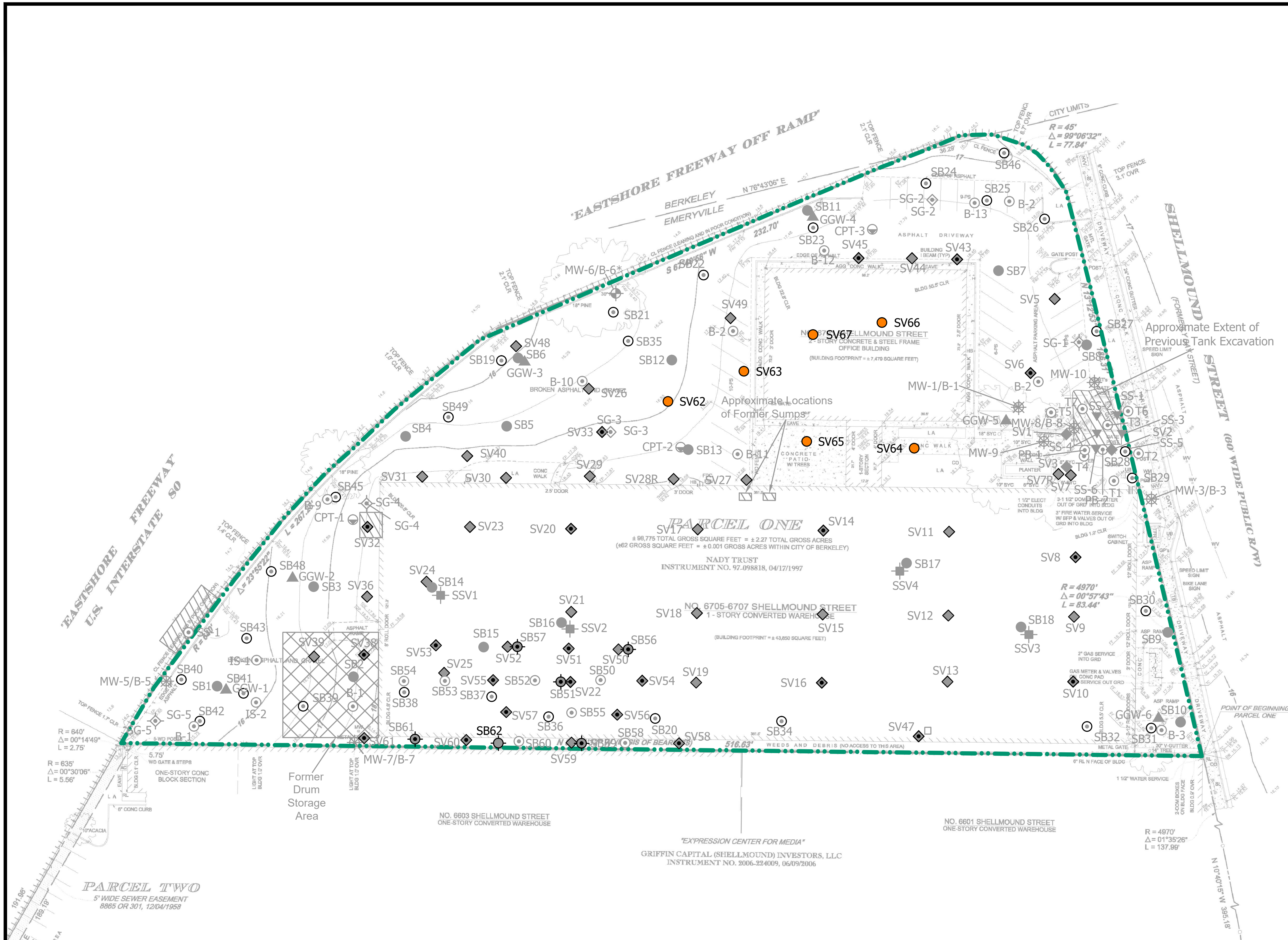
U.S.G.S. Topo Map - Oakland West, California, 7.5-minute quadrangle.1997

PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
Northern Extant Onsite Building Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
1

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.036	144800101036_WP_1-2	GJG	10/16



Explanation

- Approximate Property Boundary
- Soil Vapor and Soil Sampling Location (PES, Sep. 2016)
- SV7 — Soil Vapor Sampling Location (PES, Nov.-Dec. 2015)
- SB24 — Soil Sampling Location (PES, Nov.-Dec. 2015)
- SV33 — Soil Vapor and Soil Sampling Location
- SB50 — Soil Sampling Location (PES, Feb. 2016)
- SV7R — Soil Vapor Sampling Location (PES, Feb. 2016)
- SV54 — Soil Vapor and Soil Sampling Location (PES, Feb. 2016)
- SB56 — Soil and Grab Groundwater Sample Location (PES, Feb. 2016)
- SB62 — Grab Groundwater Sample Location (PES, Feb. 2016)
- SG-5 — Soil, Soil Gas and Groundwater Sampling Location (Environ, 2013)
- SG-3 — Soil Gas and Soil Sampling Location (Environ, 2013)
- MW-5/B-5 — Monitoring Well - Destroyed (Environ, 2013)
- MW-6/B-6* — Well not found, assumed to be destroyed
- SSV1 — Sub-Slab Vapor Sampling Location (PES, April 2015)
- SV1 — Soil Vapor Sampling Location (PES, April 2015)
- SB13 — Soil Boring (PES, November 2013)
- GGW1 — Grab Groundwater Boring (PES, November 2013)
- B-1 — Geotechnical Boring (Geosphere, 2013)
- B-1 — Geotechnical Boring (URS, 2005)
- CPT-1 — CPT Location (URS, 2005)
- T2 — Historical Test Boring (Environ, 2013)
- SS-5 — Historical Confirmation Sample from Tank Excavation (Environ, 2013)

Basemap from ALTA/ACSM Land Title Survey (4/12/2013)

PES Environmental, Inc.
Engineering & Environmental Services

Site Plan and Sample Locations
Northern Extant Onsite Building Investigation Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
2

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.036	144800101036_WP_1-2	GJG	10/16

Pertinent Data from PES' December 21, 2016 *Off-Site Subsurface Investigation Report*

TABLES

Table 1
Sampling and Analysis Program
Revised Work Plan for Off-Site Subsurface Investigation
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location ID	Sample Rationale/Feature of Interest	Proposed Sample Depth (feet bgs)	Analysis Plan: VOCs	Analysis Plan: Oxygen and Carbon Dioxide [1]	Analysis Plan: Tracer Gas Compound [1]	Comments
Soil Gas						
PSV1	Lateral definition of VOCs in soil vapor	0.5, 5, and 10	X	X	X	
PSV2	Near vicinity of VOC in soil vapor	0.5, 5, and 10	X	X	X	Deeper soil vapor sample collected at 9 feet bgs due to drilling refusal
PSV3	Near vicinity of VOC in soil vapor	0.5, 5, and 10	X	X	X	Due to drilling refusal (8 feet bgs) no deeper soil vapor sample collected
PSV4	Near vicinity of VOC in soil vapor	0.5, 5, and 10	X	X	X	
PSV5	Near vicinity of VOC in soil vapor	0.5, 5, and 10	X	X	X	
PSV6	Lateral definition of VOCs in soil vapor	0.5, 5, and 10	X	X	X	
PSV7	Lateral definition of VOCs in soil vapor	0.5, 5, and 10	X	X	X	
PSV8	Lateral definition of VOCs in soil vapor	0.5, 5, and 10	X	X	X	
PSV9	Lateral definition of VOCs in soil vapor	0.5, 5, and 10	X	X	X	Deeper soil vapor sample collected at 9 feet bgs due to drilling refusal
PSV10	Lateral definition of VOCs in soil vapor	0.5, 5, and 10	X	X	X	
PSV11	Lateral definition of VOCs in soil vapor	0.5, 5, and 10	X	X	X	Deeper soil vapor sample collected at 9 feet bgs due to drilling refusal
Soil						
PSV1	Assess conditions in vicinity of detected soil VOCs	5 and 10	X			
PSV2	Assess conditions in vicinity of detected soil VOCs	5 and 10	X			
PSV3	Assess conditions in vicinity of detected soil VOCs	5 and 10	X			Deeper soil sample collected at 8 feet bgs due to drilling refusal
PSV4	Assess conditions in vicinity of detected soil VOCs	5 and 10	X			
PSV5	Assess conditions in vicinity of detected soil VOCs	5 and 10	X			
Groundwater						
PGW1	Assess off-site groundwater downgradient of groundwater VOC detections		X			Due to drilling refusal within vadose zone, no groundwater sample collected
PGW2	Assess off-site groundwater downgradient of groundwater VOC detections		X			
PGW3	Assess off-site groundwater downgradient of groundwater VOC detections		X			Due to drilling refusal in vadose zone, no groundwater sample collected
PGW4	Assess off-site groundwater downgradient of groundwater VOC detections		X			
PGW5	Assess off-site groundwater downgradient of groundwater VOC detections		X			
PGW6	Assess off-site groundwater downgradient of groundwater VOC detections		X			Due to drilling refusal in vadose zone, no groundwater sample collected
PGW7	Assess off-site groundwater downgradient of groundwater VOC detections		X			Due to drilling refusal in vadose zone, no groundwater sample collected

Notes:
bgs = Below ground surface.
VOCs = Volatile organic compounds; laboratory analysis by USEPA Methods TO-15 (Vapor) and 8260B (soil and groundwater).
X = Scheduled for analysis.
[1] = Laboratory analysis by ASTM 1946D.

Table 2
Summary of Soil Vapor Analytical Results
Off-Site Subsurface Investigation Report
6601-6603 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	PCE (μg/m^3)	TCE (μg/m^3)	cis-1,2-DCE (μg/m^3)	trans-1,2-DCE (μg/m^3)	Vinyl chloride (μg/m^3)	1,1,1-TCA (μg/m^3)	MEK (μg/m^3)	MIBK (μg/m^3)	Acetone (μg/m^3)	Benzene (μg/m^3)	Toluene (μg/m^3)	Ethylbenzene (μg/m^3)	m,p-Xylene (μg/m^3)	o-Xylene (μg/m^3)	1,2,4-TMB (μg/m^3)	1,3,5-TMB (μg/m^3)	4-Ethyltoluene (μg/m^3)	Carbon disulfide (μg/m^3)	Chloroform (μg/m^3)	Other VOCs (μg/m^3)	Carbon Dioxide (% v/v)	Oxygen (% v/v)	Helium (% v/v)
PSV1/SSV1	SSV1	0.5	10/18/2016	< 12	**23**	< 7	< 7	< 4.5	< 7.3	< 10	< 7.3	**220**	< 5.7	< 6.7	< 7.7	< 15	< 7.7	< 17	< 8.7	< 8.7	< 11	< 6.5	ND	**10**	**4.8**	< 0.18
	PSV1-5	5.0	10/21/2016	**28**	**23**	**130**	**13**	**82**	< 11	**220**	**61**	**380**	**120**	**410**	**39**	**150**	**40**	< 26	< 13	< 13	**38**	< 9.8	ND	**11**	**2.4**	**0.30**
	PSV1-10	10.0	10/21/2016	< 69	**63**	**170**	**240**	**210**	< 42	**78**	< 42	< 300	**510**	**1,100**	**860**	**2,500**	**920**	< 100	< 50	< 50	**140**	< 37	ND	< 1	**1.9**	< 0.2
PSV2/SSV2	SSV2	0.5	10/18/2016	**400**	**18**	< 7	< 7	< 4.5	**40**	< 10	< 7.3	**250**	**7.3**	**7.1**	< 7.7	< 15	< 7.7	< 17	< 8.7	< 8.7	< 11	< 6.5	ND	< 0.97	**19**	**0.27**
	PSV2-5	5.0	10/21/2016	< 2.7	**3.7**	**75**	**15**	**300**	< 1.6	**140**	< 1.6	**330**	**37**	**270**	**34**	**130**	**38**	**18**	**7.2**	**7.1**	**23**	< 1.5	**4.8 (1,1-DCA), 4.5 (CB), 2.5 (1,3-DCB)**	**5.7**	**8.7**	< 0.19
	PSV2-9	9.0	10/21/2016	< 18	< 14	**30**	**17**	**190**	< 11	**86**	**92**	**240**	**110**	**680**	**73**	**270**	**83**	**35**	**15**	**16**	**50**	< 9.8	ND	< 1.1	**1.1**	< 0.21
PSV3/SSV3	SSV3	0.5	10/18/2016	< 4.1	< 3.2	< 2.4	< 2.4	< 1.5	< 2.5	**8.3**	< 2.5	**92**	**18**	**5.1**	< 2.6	**6.4**	**2.6**	< 5.9	< 3	< 3	< 3.8	< 2.2	ND	< 0.98	**13**	**0.52**
	PSV3-5	5.0	10/21/2016	< 130	< 100	**150**	< 74	**3,700**	< 76	**170**	**85**	< 550	**170**	**610**	**100**	**400**	**110**	< 180	< 92	< 92	< 120	< 68	ND	**6.4**	**2.2**	< 0.6
PSV4/SSV4	SSV4	0.5	10/18/2016	< 34	< 27	< 20	< 20	< 13	< 21	< 30	< 21	**750**	< 16	< 19	< 22	< 44	< 22	< 50	< 25	< 25	< 32	**33**	ND	< 0.99	**13**	**0.37**
	PSV4-5	5.0	10/21/2016	< 17	< 13	< 9.9	< 9.9	< 6.4	< 10	**240**	**68**	**400**	**110**	**740**	**86**	**340**	**95**	**39**	**17**	**23**	**73**	< 9.2	ND	**4.7**	**7.4**	< 0.2
	PSV4-10	10.0	10/21/2016	< 13	< 9.9	**8.8**	< 7.3	< 4.7	< 7.6	**100**	**72**	**150**	**130**	**370**	**78**	**270**	**93**	**52**	**24**	**19**	**370**	< 6.8	ND	**3.0**	**1.6**	< 0.19
PSV5/SSV5	SSV5	0.5	10/18/2016	< 5.6	**17**	< 3.3	< 3.3	< 2.1	< 3.4	< 4.8	< 3.4	**160**	**3.6**	**4.4**	< 3.6	**7.3**	< 3.6	< 8.1	< 4	< 4	**25**	< 3	ND	**2.1**	**15**	**0.41**
	PSV5-5	5.0	10/19/2016	< 54	< 43	< 32	< 32	< 20	< 33	**310**	< 33	**490**	**100**	**180**	**35**	**150**	**36**	< 79	< 39	< 39	**95**	< 29	ND	**3.6**	**2.4**	< 0.2
	PSV5-10	10.0	10/19/2016	< 67	< 53	< 39	< 39	< 25	< 40	**180**	< 40	**310**	**180**	**260**	**54**	**190**	**69**	< 97	< 48	< 48	**270**	< 36	ND	< 0.99	**3.9**	< 0.2
PSV6/SSV6	SSV6	0.5	10/18/2016	< 5.4	**200**	< 3.2	< 3.2	< 2	< 3.3	**13**	< 3.3	**120**	**3.3**	**18**	**3.6**	**12**	**4.0**	< 7.8	< 3.9	< 3.9	**270**	**18**	ND	**2.9**	**18**	**3.1**
	PSV6-5	5.0	10/20/2016	< 11	**36**	**100**	**11**	**150**	< 6.9	**250**	**88**	**470**	**180**	**150**	**25**	**98**	**26**	**20**	**9.6**	< 8.3	**20**	< 6.2	ND	**6.8**	**2.6**	< 0.16
	PSV6-10	10.0	10/20/2016	< 14	< 11	< 8.3	< 8.3	**460**	< 8.6	**92**	< 8.6	**160**	**190**	**69**	**30**	**97**	**38**	**29**	**20**	**13**	**62**	< 7.7	**36 (CE)**	< 0.78	**8.1**	**1.1**
PSV7/SSV7	SSV7	0.5	10/18/2016	< 130	< 100	< 75	< 75	< 48	< 77	< 110	**140**	**2,800**	< 60	< 71	< 82	< 160	< 82	< 190	< 93	< 93	< 120	< 69	ND	< 0.95	**3.6**	< 0.19
	PSV7-5	5.0	10/20/2016	< 8.9	**24**	**37**	**15**	**12**	< 5.4	**100**	< 5.4	**210**	**290**	**67**	**15**	**58**	**18**	**13**	< 6.4	**6.4**	**9.3**	< 4.8	ND	**7.1**	**9.8**	**0.33**
	PSV7-10	10.0	10/20/2016	< 4.8	< 3.8	**3.9**	< 2.8	< 1.8	< 2.9	**120**	< 2.9	**150**	**47**	**95**	**21**	**61**	**26**	**28**	**11**	**8.0**	**13**	< 2.6	ND	**4.1**	**6.6**	< 0.15
PSV8/SSV8	SSV8	0.5	10/18/2016	< 14	< 11	< 8.1	< 8.1	< 5.2	< 8.4	**13**	< 8.4	**480**	**15**	**11**	< 8.9	< 18	< 8.9	< 20	< 10	< 10	< 13	< 7.5	**27 (1,4-Dioxane)**	**3.8**	**7.9**	< 0.21
	PSV8-5	5.0	10/20/2016	< 15	< 12	**13**	< 8.7	**30**	< 9	**250**	**68**	**370**	**71**	**290**	**58**	**210**	**61**	**45**	**22**	**20**	**33**	< 8	ND	**1.2**	**8.4**	< 0.17
	PSV8-10	10.0	10/20/2016	< 7.6	**11**	**30**	**6.3**	**51**	< 4.6	**110**	< 4.6	**190**	**150**	**170**	**63**	**120**	**38**	**27**	**13**	**11**	**49**	< 4.1	**12 (Styrene)**	**2.8**	**5.5**	< 0.2
PSV9/SSV9	SSV9	0.5	10/18/2016	< 7.1	**12**	< 4.1	< 4.1	< 2.7	< 4.3	< 6.2	< 4.3	**380**	**9.6**	**6.7**	< 4.5	**13**	**4.8**	< 10	< 5.1	< 5.1	**11**	**16**	ND	< 1	**13**	< 0.2
	PSV9-5	5.0	10/20/2016	< 17	**95**	**37**	**58**	**120**	< 10	**320**	**68**	**370**	**51**	**160**	**36**	**140**	**40**	**34**	**14**	< 12	< 15	< 9.1	ND	**11**	**1.9**	< 0.19
	PSV9-9	9.0	10/20/2016	**48**	**110**	**98**	**110**	**210**	< 4.9	**130**	**48**	**170**	**53**	**150**	**23**	**69**	**20**	< 12	< 5.9	< 5.9	**190**	< 4.4	**17 (1,1-DCE) 9.3 (CB)**	**4.2**	**1.7**	< 0.2
PSV10/SSV10	SSV10	0.5	10/18/2016	< 5.8	< 4.6	< 3.4	< 3.4	< 2.2	< 3.5	< 5	< 3.5	**130**	**4.6**	**3.6**	< 3.7	< 7.4	< 3.7	< 8.4	< 4.2	< 4.2	< 5.3	**6.5**	ND	< 1.1	**20**	**0.22**
	PSV10-5	5.0	10/20/2016	< 17	**79**	**90**	**69**	**200**	< 10	**270**	**91**	**380**	**92**	**210**	**42**	**150**	**47**	**40**	**19**	< 12	< 16	< 9.2	ND	**8.4**	**1.5**	< 0.16
	PSV10-10	10.0	10/20/2016	< 52	**120**	**950**	**390**	**1,500**	< 32	**110**	< 32	< 230	**1,700**	**270**	**610**	**580**	**390**	**450**	**280**	**180**	**100**	< 28	ND	< 0.97	**1.3**	< 0.19
PSV11/SSV11	SSV11	0.5	10/18/2016	< 17	**74**	< 9.8	< 9.8	< 6.3	< 10	< 15	< 10	**280**	**9.0**	< 9.3	< 11	< 22	< 11	< 24	< 12	< 12	< 15	< 9.1	ND	**3.3**	**14**	< 0.2
	PSV11-5	5.0	10/21/2016	< 21	**23**	**32**	< 12	**15**	< 12	**130**	< 12	**790**	**340**	**260**	**38**	**240**	**48**	< 30	< 15	< 15	**33**	< 11	ND	**2.3**	**1.7**	< 0.19
	PSV11-9	9.0	10/21/2016	< 11	**17**	**40**	**10**	**43**	< 6.7	**72**	< 6.7	**230**	**130**	**210**	**44**	**270**	**57**	**46**	**27**	**15**	**82**	< 6	**17 (NAPH)**	< 0.98	**10**	**0.73**
RWQCB Commercial/Industrial Land Use VI ESL (Subslab / Soil Gas) [1]				*2100*	*3000*	*35,000*	*350,000*	*160*	*4,400,000*	*22,000,000*	*1,600,000*	*130,000,000*	*420*	*1,300,000*	*4900*	*440,000*	*440,000*	*NE*	*NE*	*NE*	*NE*	*530*	*NE*	*NE*	*NE*	*NE*
RWQCB TCE Trigger Level, Commercial/Industrial Subslab/Soil Gas [2]				--	*8000*	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
Detections are shown in bold. Results equal to or exceeding applicable regulatory screening levels are shaded.
Only detected analytes are summarized on table. Refer to Appendix C for laboratory report to access entire list of compounds analyzed.
PCE = Tetrachloroethene.
TCE = Trichloroethene.
DCE = Dichloroethene.
TCA = Trichloroethane.
PCA = Tetrachloroethane.
MEK = Methyl Ethyl Ketone.
MIBK = Methyl Isobutyl Ketone.
TMB = Trimethylbenzene.
CB = Chlorobenzene.
CE = Chloroethane.
DCB = Dichlorobenzene.
NAPH = Naphthalene.
VOCs = Volatile organic compounds.
bgs = Below ground surface.
μg/m^3 = Micrograms per cubic meter.
% v/v = Percent by volume.
< 2.9 = Not detected at or above the indicated laboratory method reporting limit.
ND = Not detected at or above the respective laboratory method reporting limits.
NE = Not established.
-- = Not applicable/not analyzed.
1. ESL = February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table SG-1 Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels. Commercial/industrial Final VI Screening Level.
2. RWQCB, 2016. User's Guide: Derivation and Application of Environmental Screening Levels (ESLs), TCE ESLs, Action Levels for Indoor Air (Response), and Groundwater and Soil Gas Trigger Leveles (Sample Indoor Air), Table 4-4. February.

Table 3
Summary of Soil Vapor Leak Check Results
Off-Site Subsurface Investigation Report
6601-6603 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	Helium Detected in Sample (% v/v)	Helium Detected in Shroud (% v/v)	Breakthrough Factor (%)
PSV1/SSV1	SSV1	0.5	10/18/2016	0.18	26.7	0.7
	PSV1-5	5	10/21/2016	**0.3**	24.7	1.2
	PSV1-10	10	10/21/2016	0.2	24.7	0.8
PSV2/SSV2	SSV2	0.5	10/18/2016	**0.27**	28.9	0.9
	PSV2-5	5	10/21/2016	0.19	32.8	0.6
	PSV2-9	9	10/21/2016	0.21	32.8	0.6
PSV2/SSV3	SSV3	0.5	10/18/2016	**0.52**	29.7	1.8
	PSV3-5	5	10/21/2016	0.6	34.9	1.7
PSV4/SSV4	SSV4	0.5	10/18/2016	**0.37**	29.3	1.3
	PSV4-5	5	10/21/2016	0.2	36.2	0.6
	PSV4-10	10	10/21/2016	0.19	36.2	0.5
PSV5/SSV5	SSV5	0.5	10/18/2016	**0.41**	29.1	1.4
	PSV5-5	5	10/19/2016	0.2	32.6	0.6
	PSV5-10	10	10/19/2016	0.2	36.8	0.5
PSV6/SSV6	SSV6	0.5	10/18/2016	**3.1**	27.5	11.3
	PSV6-5	5	10/20/2016	0.16	28.2	0.6
	PSV6-10	10	10/20/2016	**1.1**	28.2	3.9
PSV7/SSV7	SSV7	0.5	10/18/2016	0.19	25.9	0.7
	PSV7-5	5	10/20/2016	**0.33**	25.4	1.3
	PSV7-10	10	10/20/2016	0.15	25.4	0.6
PSV8/SSV8	SSV8	0.5	10/18/2016	0.21	36.2	0.6
	PSV8-5	5	10/20/2016	0.17	28.8	0.6
	PSV8-10	10	10/20/2016	0.2	28.8	0.7
PSV9/SSV9	SSV9	0.5	10/18/2016	0.2	32.7	0.6
	PSV9-5	5	10/20/2016	0.19	29.7	0.6
	PSV9-9	9	10/20/2016	0.2	29.7	0.7
PSV10/SSV10	SSV10	0.5	10/18/2016	**0.22**	29.7	0.7
	PSV10-5	5	10/20/2016	0.16	32.8	0.5
	PSV10-10	10	10/20/2016	0.19	32.8	0.6
PSV11/SSV11	SSV11	0.5	10/18/2016	0.2	34.8	0.6
	PSV11-5	5	10/21/2016	0.19	32.6	0.6
	PSV11-9	9	10/21/2016	**0.73**	32.6	2.2
Acceptable Ambient Air Breakthrough Limit [1]				--	--	*5%*

Notes:
Detections are shown in bold. Results equal to or exceeding applicable RPD limits are shaded.
bgs = Below ground surface.
% v/v = Percent by volume.
-- = Not applicable.
1. In accordance with California Environmental Protection Agency/Department of Toxic Substances Control Advisory - Active Soil Gas Investigations, July 2015 - Appendix C: Quantitative Leak Testing Using a Tracer Gas.

Table 4
Summary of Soil Analytical Results - Detected VOCs
Off-Site Subsurface Investigation Report
6601-6603 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	Acetone (µg/Kg)	1,2,4-TMB (µg/Kg)	1,3,5-TMB (µg/Kg)	Ethylbenzene (µg/Kg)	Naphthalene (µg/Kg)	sec-Butylbenzene (µg/Kg)	tert-Butylbenzene (µg/Kg)	Toluene (µg/Kg)	Total Xylenes (µg/Kg)
PSV1	PSV1-5-5.5	5-5.5	10/21/2016	**48**	< 4.1	< 4.1	< 4.1	< 8.2	< 4.1	< 4.1	< 4.1	< 8.2
	PSV1-9.75-10.25	9.75-10.25	10/21/2016	**41**	**16 ***	**6.8 ***	**12**	**9.2 ***	**6.6 ***	**4.2 ***	**11**	**67**
PSV2	PSV2-5-5.5	5-5.5	10/21/2016	< 36	< 3.6	< 3.6	< 3.6	< 7.2	< 3.6	< 3.6	< 3.6	< 7.2
	PSV2-9.75-10.25	9.75-10.25	10/21/2016	< 34	< 3.4	< 3.4	< 3.4	< 6.9	< 3.4	< 3.4	< 3.4	< 6.9
PSV3	PSV3-5-5.5	5-5.5	10/21/2016	< 32	< 3.2	< 3.2	< 3.2	< 6.4	< 3.2	< 3.2	< 3.2	< 6.4
	PSV3-7.5-8	7.5-8	10/21/2016	**63**	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	< 3.5	< 7.1
PSV4	PSV4-5-5.5	5-5.5	10/21/2016	< 37	< 3.7	< 3.7	< 3.7	< 7.4	< 3.7	< 3.7	< 3.7	< 7.4
	PSV4-9.75-10.25	9.75-10.25	10/21/2016	< 38	< 3.8	< 3.8	< 3.8	< 7.5	< 3.8	< 3.8	< 3.8	< 7.5
PSV5	PSV5-5-5.5	5-5.5	10/19/2016	< 35	< 3.5	< 3.5	< 3.5	< 7	< 3.5	< 3.5	< 3.5	< 7
	PSV5-9.75-10.25	9.75-10.25	10/19/2016	**53**	< 3.6	< 3.6	< 3.6	< 7.2	< 3.6	< 3.6	< 3.6	< 7.2
Tier 1 Commercial/Industrial Land Use ESL (Shallow Soil) [1]				*500*	*NE*	*NE*	*1,400*	*33*	*NE*	*NE*	*2,900*	*2,300*

Notes:
Detections are shown in bold. Results equal to or exceeding applicable regulatory screening levels are shaded.
Only detected analytes are summarized on table. Refer to Appendix C for laboratory report to access entire list of compounds analyzed.
VOCs = Volatile organic compounds.
TMB = Trimethylbenzene.
bgs = Below ground surface.
µg/kg = Micrograms per kilogram.
< 3.5 = Not detected at or above the indicated laboratory method reporting limit.
* - Internal Standard (ISTD) response for the sample was outside control limits. The sample was re-analyzed with concurring results and the second set of data has been reported.

Table 5
Summary of Groundwater Analytical Results - Detected VOCs
Off-Site Subsurface Investigation Report
6601-6603 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Date Sampled	Benzene (µg/L)	Ethylbenzene (µg/L)	n-Butylbenzene (µg/L)	sec-Butylbenzene (µg/L)	N-Propylbenzene (µg/L)	Isopropylbenzene (µg/L)	Total Xylenes (µg/L)	Naphthalene (µg/L)	1,2,4-TMB (µg/L)	1,3,5-TMB (µg/L)	Toluene (µg/L)	4-Isopropyltoluene (µg/L)
PGW2	PGW2-GW	10/20/2016	**2.4**	**4.4**	**2.4**	**7.1**	**10**	**14**	**5**	**12**	**55**	**4.9**	**0.72**	**3.7**
PGW4	PGW4-GW	10/19/2016	**3.2**	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	*< 1*
PGW5	PGW5-GW	10/19/2016	< 0.5	< 0.5	< 1	< 1	< 1	< 0.5	< 1	< 1	< 0.5	< 0.5	< 0.5	*< 1*
		MCL (Final) [1]	*1.0*	*300*	*NE*	*NE*	*NE*	*NE*	*1,750*	*0.17*	*NE*	*NE*	*40*	*NE*
Commercial Land Use ESL (Vapor Intrusion) [2]			*260*	*3,300*	*NE*	*NE*	*NE*	*NE*	*NE*	*1,600*	*NE*	*NE*	*NE*	*NE*

Notes:
Detections are shown in bold. Results equal to or exceeding groundwater vapor intrusion human health ESLs (Table W-3) are shaded.
Only detected analytes are summarized on table. Refer to Appendix C for laboratory report to access entire list of compounds analyzed.
TMB = Trimethylbenzene.
VOCs = Volatile organic compounds.
µg/L= Micrograms per Liter.
<0.5 = Not detected at or above the indicated laboratory method reporting limit.
NE = Not established.
1. MCL = February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table GW-1 Groundwater Direct Exposure Human Health Risk Screening Levels, Final MCL Priority Screening Level.
2. ESL = February 2016 RWQCB ESLs, Table W-3 Groundwater Vapor Intrusion Human Health Risk Levels, Deep Groundwater Commercial/Industrial: Fine to Coarse Scenario.

ILLUSTRATIONS

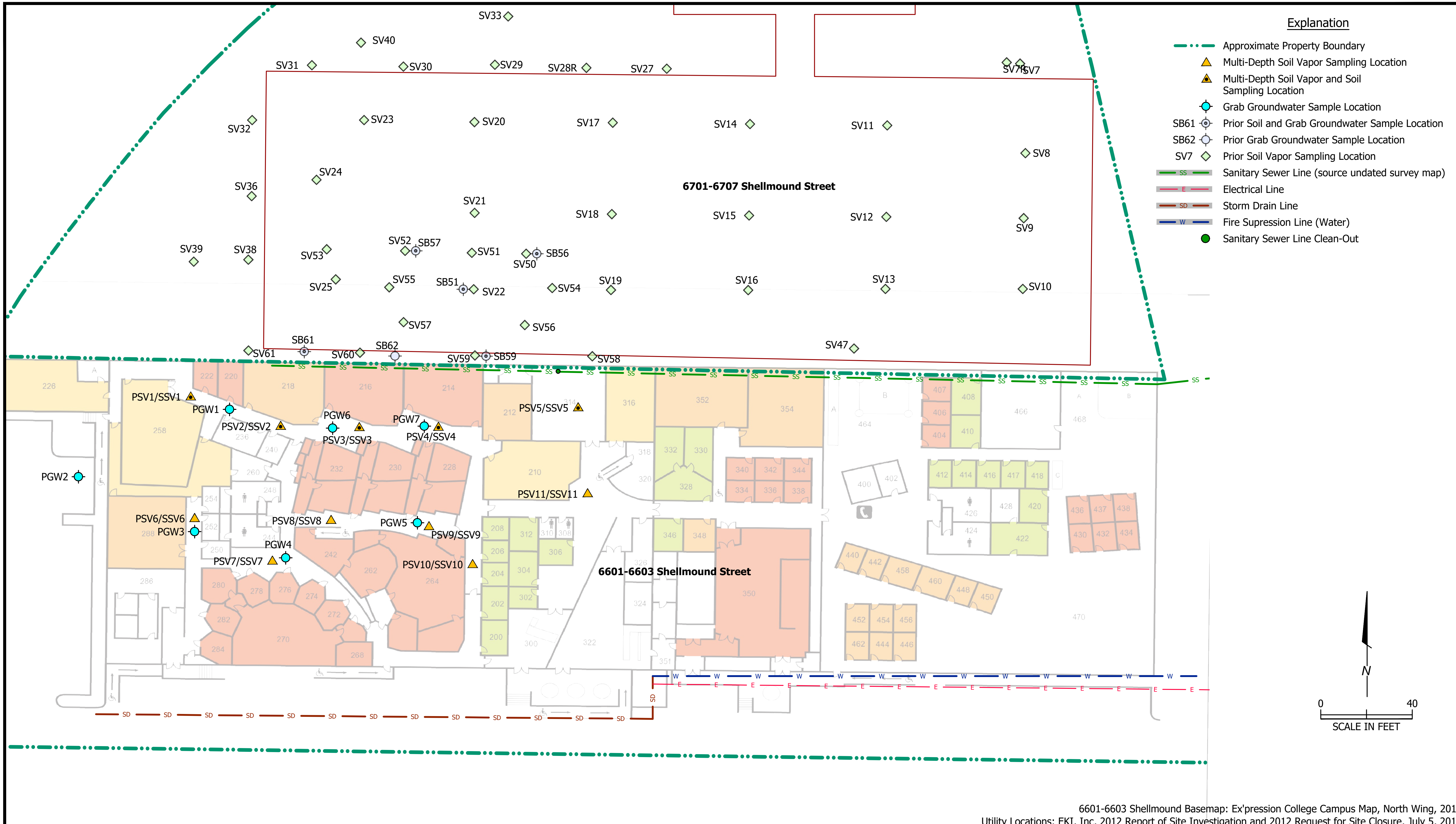
Aerial Photo: October 30, 2015 (Google 2016)

PES Environmental, Inc.
Engineering & Environmental Services

Site Location
Subsurface Off-Site Investigation
6601-6603 Shellmound Street
Emeryville, California

PLATE
1

1448.001.01.043	144800101043_OR_1	CJB	12/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

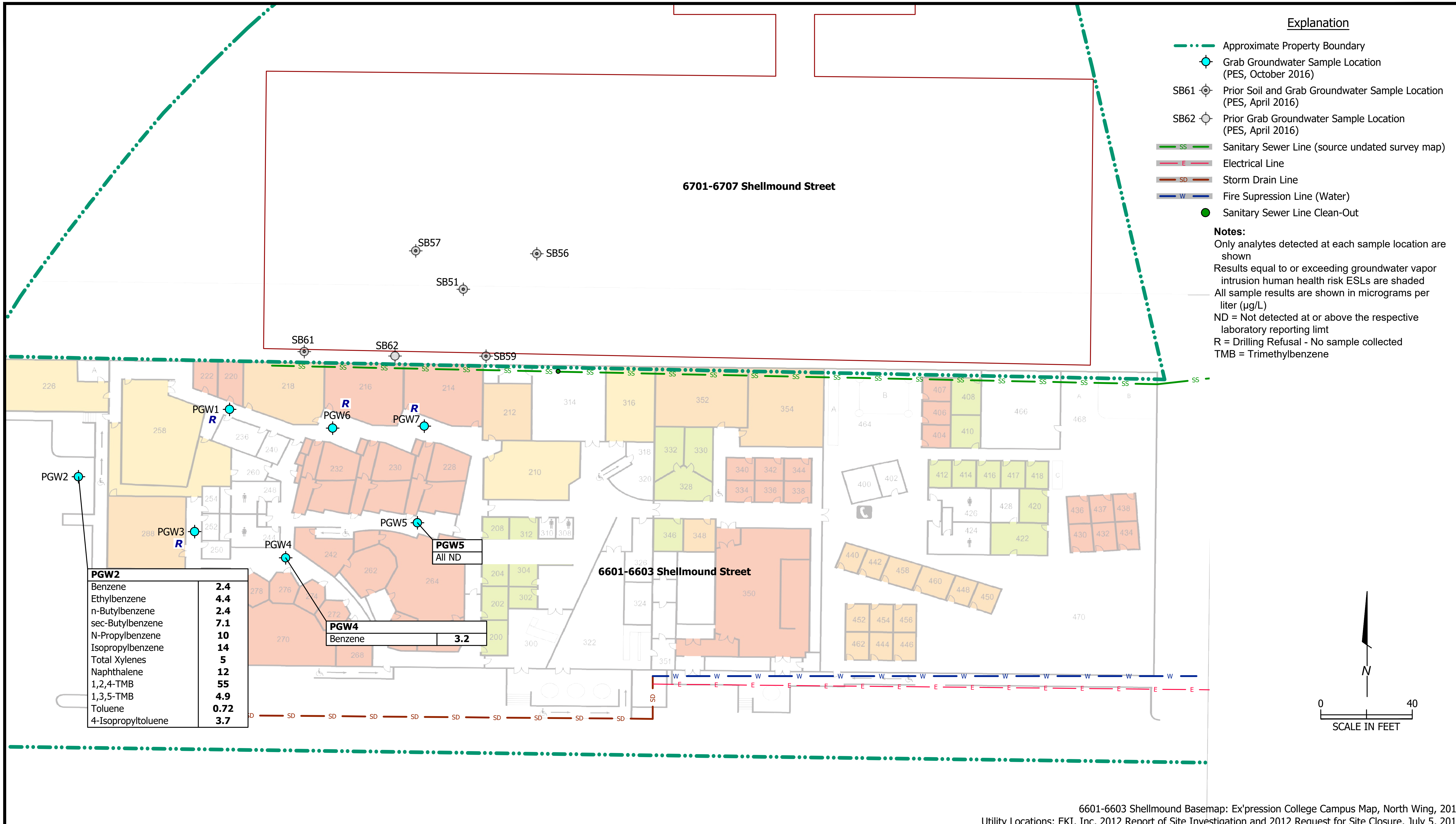


PES Environmental, Inc.
Engineering & Environmental Services

Soil, Soil Vapor, and Groundwater Sample Locations
Subsurface Off-Site Investigation
6601-6603 Shellmound Street
Emeryville, California

PLATE
2

1448.001.01.043	144800101043_OR_2-6	CJB	12/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



PGW2	
Benzene	2.4
Ethylbenzene	4.4
n-Butylbenzene	2.4
sec-Butylbenzene	7.1
N-Propylbenzene	10
Isopropylbenzene	14
Total Xylenes	5
Naphthalene	12
1,2,4-TMB	55
1,3,5-TMB	4.9
Toluene	0.72
4-Isopropyltoluene	3.7

PGW4	
Benzene	3.2

Explanation

- Approximate Property Boundary
- Grab Groundwater Sample Location (PES, October 2016)
- SB61 Prior Soil and Grab Groundwater Sample Location (PES, April 2016)
- SB62 Prior Grab Groundwater Sample Location (PES, April 2016)
- SS Sanitary Sewer Line (source undated survey map)
- E Electrical Line
- SD Storm Drain Line
- W Fire Supression Line (Water)
- Sanitary Sewer Line Clean-Out

Notes:
Only analytes detected at each sample location are shown
Results equal to or exceeding groundwater vapor intrusion human health risk ESLs are shaded
All sample results are shown in micrograms per liter (µg/L)
ND = Not detected at or above the respective laboratory reporting limt
R = Drilling Refusal - No sample collected
TMB = Trimethylbenzene

6601-6603 Shellmound Basemap: Ex'pression College Campus Map, North Wing, 2015
Utility Locations: EKI, Inc, 2012 Report of Site Investigation and 2012 Request for Site Closure, July 5, 2012

PES Environmental, Inc.
Engineering & Environmental Services

Detected Volatile Organic Compound Concentrations in Groundwater Samples
Subsurface Off-Site Investigation
6601-6603 Shellmound Street
Emeryville, California

PLATE 3

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
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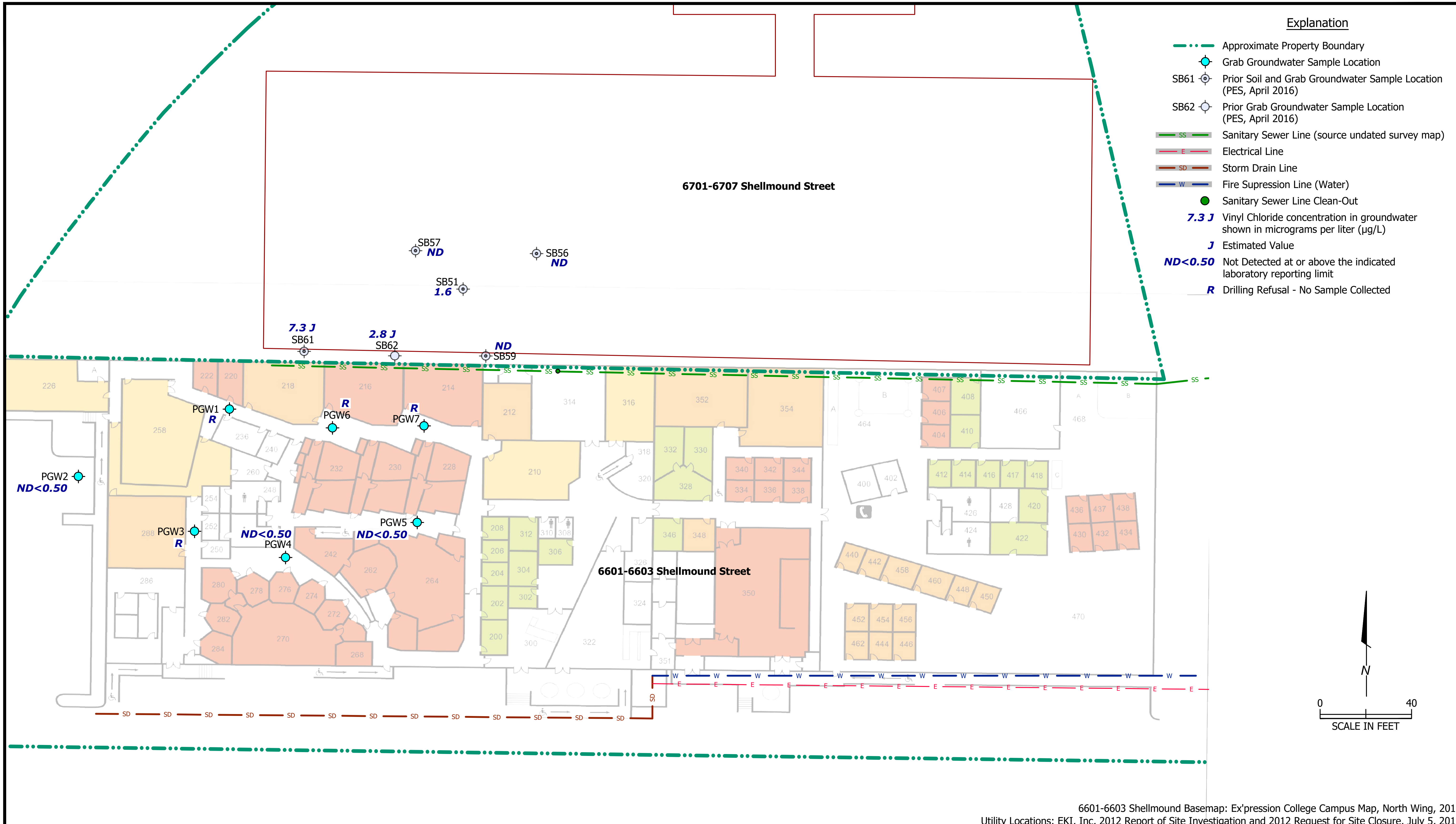
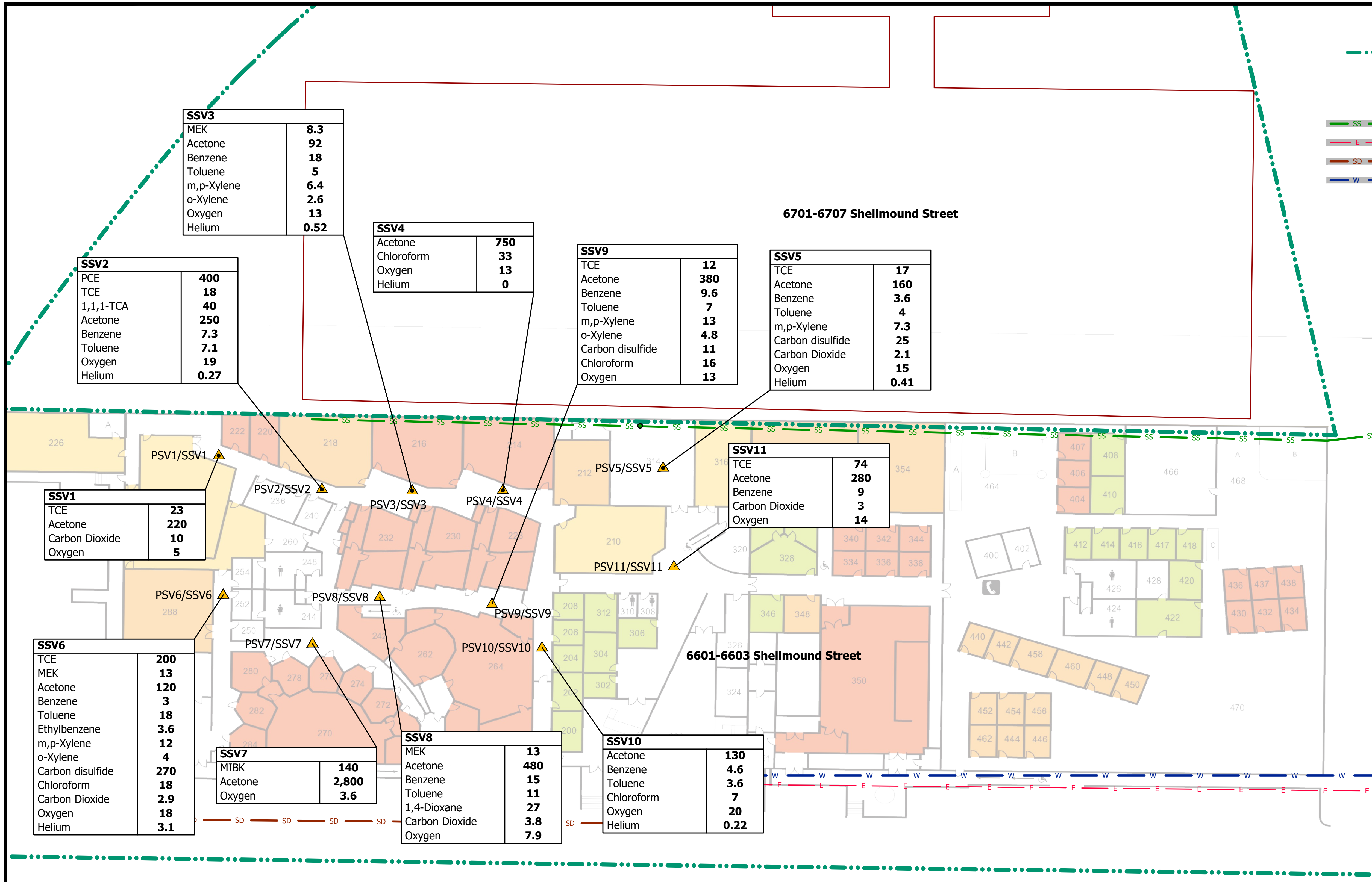


PES Environmental, Inc.
Engineering & Environmental Services

Vinyl Chloride Concentrations in Groundwater Samples
Subsurface Off-Site Investigation
6601-6603 Shellmound Street
Emeryville, California

PLATE
3a

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.043	144800101043_OR_2-6	CJB	12/16



SSV1	
TCE	**23**
Acetone	**220**
Carbon Dioxide	**10**
Oxygen	**5**

SSV2	
PCE	**400**
TCE	**18**
1,1,1-TCA	**40**
Acetone	**250**
Benzene	**7.3**
Toluene	**7.1**
Oxygen	**19**
Helium	**0.27**

SSV3	
MEK	**8.3**
Acetone	**92**
Benzene	**18**
Toluene	**5**
m,p-Xylene	**6.4**
o-Xylene	**2.6**
Oxygen	**13**
Helium	**0.52**

SSV4	
Acetone	**750**
Chloroform	**33**
Oxygen	**13**
Helium	**0**

SSV5	
TCE	**17**
Acetone	**160**
Benzene	**3.6**
Toluene	**4**
m,p-Xylene	**7.3**
Carbon disulfide	**25**
Carbon Dioxide	**2.1**
Oxygen	**15**
Helium	**0.41**

SSV6	
TCE	**200**
MEK	**13**
Acetone	**120**
Benzene	**3**
Toluene	**18**
Ethylbenzene	**3.6**
m,p-Xylene	**12**
o-Xylene	**4**
Carbon disulfide	**270**
Chloroform	**18**
Carbon Dioxide	**2.9**
Oxygen	**18**
Helium	**3.1**

SSV7	
MIBK	**140**
Acetone	**2,800**
Oxygen	**3.6**

SSV8	
MEK	**13**
Acetone	**480**
Benzene	**15**
Toluene	**11**
1,4-Dioxane	**27**
Carbon Dioxide	**3.8**
Oxygen	**7.9**

SSV9	
TCE	**12**
Acetone	**380**
Benzene	**9.6**
Toluene	**7**
m,p-Xylene	**13**
o-Xylene	**4.8**
Carbon disulfide	**11**
Chloroform	**16**
Oxygen	**13**

SSV10	
Acetone	**130**
Benzene	**4.6**
Toluene	**3.6**
Chloroform	**7**
Oxygen	**20**
Helium	**0.22**

SSV11	
TCE	**74**
Acetone	**280**
Benzene	**9**
Toluene	**3**
Oxygen	**14**

Explanation

- Approximate Property Boundary
- Multi-Depth Soil Vapor Sampling Location
- Multi-Depth Soil Vapor and Soil Sampling Location
- Sanitary Sewer Line (source undated survey map)
- Electrical Line
- Storm Drain Line
- Fire Supression Line (Water)
- Sanitary Sewer Line Clean-Out

Notes:

Only analytes detected at each sample location are shown

Detections are shown in **bold**

Results equal to or exceeding applicable regulatory screening levels are shaded

Carbon Dioxide, Oxygen, and Helium sample results are shown in percent by volume (% v/v)

All other sample results are shown in micrograms per cubic meter (μg/m^3)

<2.9 = Not detected at or above the indicated laboratory method reporting limit

ft bgs = Depth of sample in feet below ground surface

PCE = Tetrachloroethene

TCE = Trichloroethene

DCE = Dichloroethene

TCA = Trichloroethane

MEK = Methyl Ethyl Ketone

MIBK = Methyl Isobutyl Ketone

TMB = Trimethylbenzene

DCA = Dichloroethane

CB = Chlorobenzene

DCB = Dichlorobenzene

CE = Chloroethane

NAPH = Naphthalene

6601-6603 Shellmound Basemap: Ex'pression College Campus Map, North Wing, 2015

Utility Locations: EKI, Inc, 2012 Report of Site Investigation and 2012 Request for Site Closure, July 5, 2012

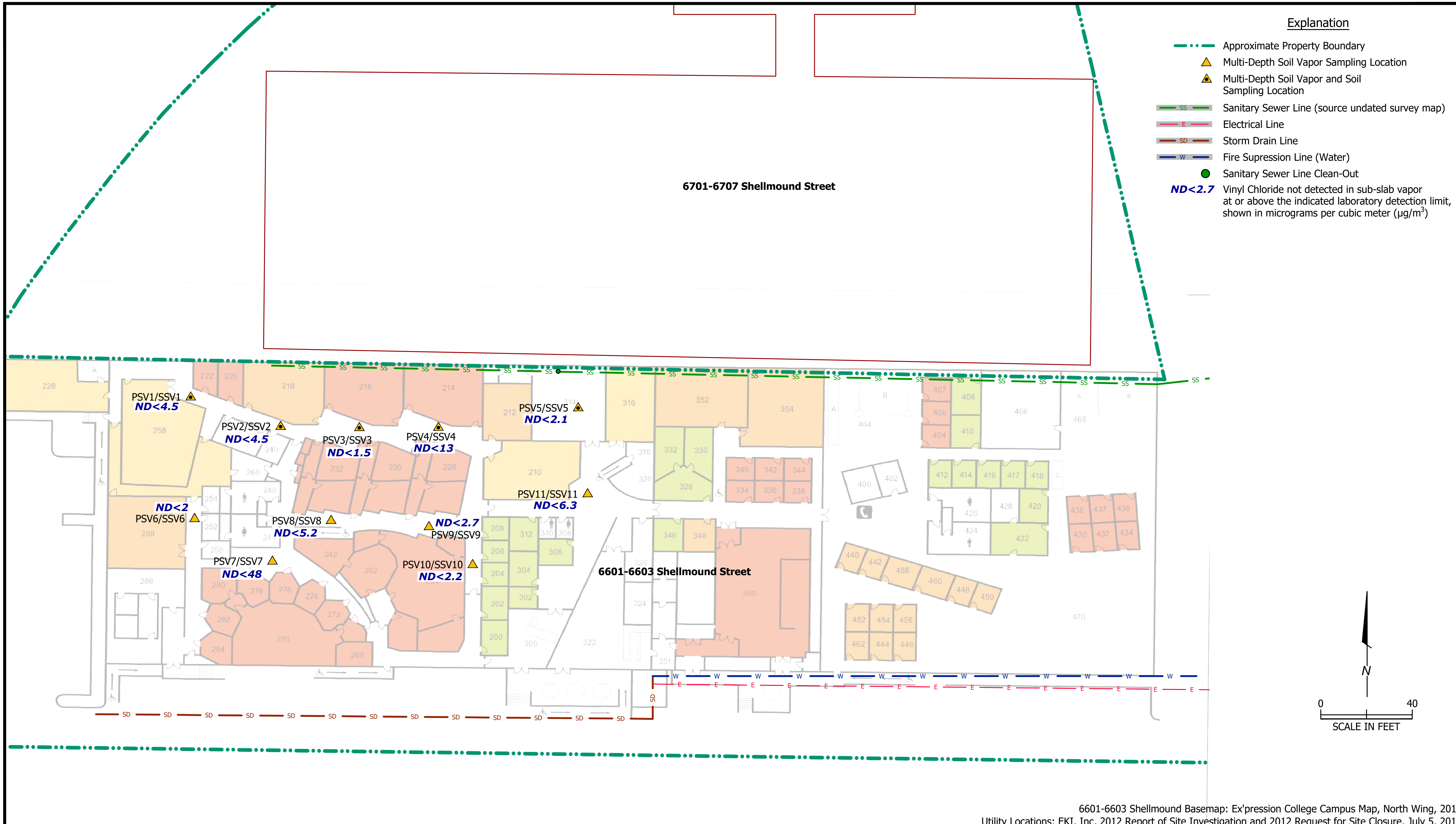
PES Environmental, Inc.
Engineering & Environmental Services

Detected Volatile Organic Compound Concentrations in Sub-slab Vapor Samples

Subsurface Off-Site Investigation
6601-6603 Shellmound Street
Emeryville, California

PLATE 4

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.043	144800101043_OR_2-6	CJB	12/16



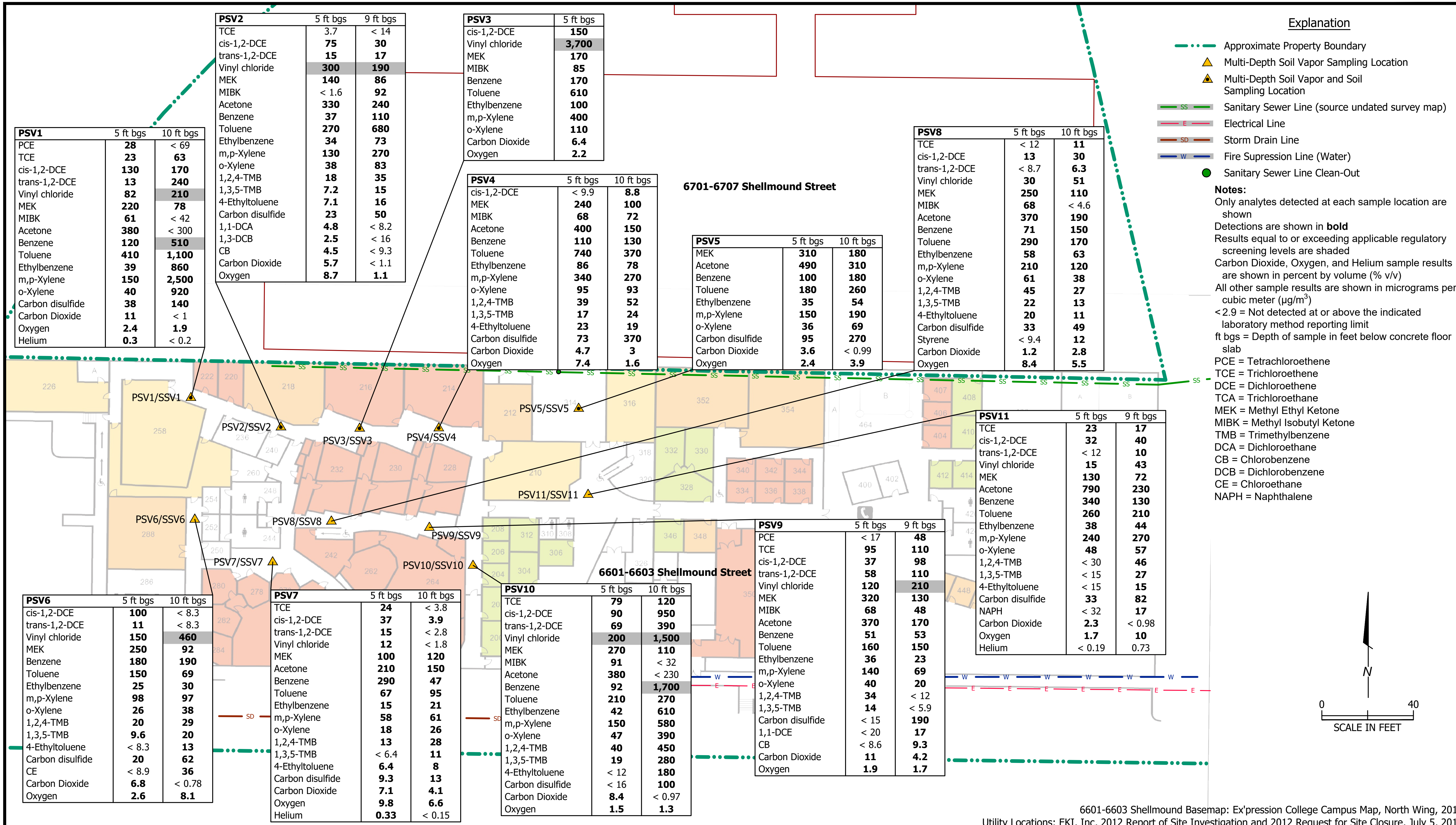
6601-6603 Shellmound Basemap: Ex'pression College Campus Map, North Wing, 2015
Utility Locations: EKI, Inc, 2012 Report of Site Investigation and 2012 Request for Site Closure, July 5, 2012

PES Environmental, Inc.
Engineering & Environmental Services

Vinyl Chloride Concentrations in Sub-slab Vapor Samples
Subsurface Off-Site Investigation
6601-6603 Shellmound Street
Emeryville, California

PLATE
4a

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.043	144800101043_OR_2-6	CJB	12/16



PSV1	5 ft bgs	10 ft bgs
PCE	**28**	< 69
TCE	**23**	**63**
cis-1,2-DCE	**130**	**170**
trans-1,2-DCE	**13**	**240**
Vinyl chloride	**82**	**210**
MEK	**220**	**78**
MIBK	**61**	< 42
Acetone	**380**	< 300
Benzene	**120**	**510**
Toluene	**410**	**1,100**
Ethylbenzene	**39**	**860**
m,p-Xylene	**150**	**2,500**
o-Xylene	**40**	**920**
Carbon disulfide	**38**	**140**
Carbon Dioxide	**11**	< 1
Oxygen	**2.4**	**1.9**
Helium	**0.3**	< 0.2

PSV2	5 ft bgs	9 ft bgs
TCE	3.7	< 14
cis-1,2-DCE	**75**	**30**
trans-1,2-DCE	**15**	**17**
Vinyl chloride	**300**	**190**
MEK	**140**	**86**
MIBK	< 1.6	**92**
Acetone	**330**	**240**
Benzene	**37**	**110**
Toluene	**270**	**680**
Ethylbenzene	**34**	**73**
m,p-Xylene	**130**	**270**
o-Xylene	**38**	**83**
1,2,4-TMB	**18**	**35**
1,3,5-TMB	**7.2**	**15**
4-Ethyltoluene	**7.1**	**16**
Carbon disulfide	**23**	**50**
1,1-DCA	**4.8**	< 8.2
1,3-DCB	**2.5**	< 16
CB	**4.5**	< 9.3
Carbon Dioxide	**5.7**	< 1.1
Oxygen	**8.7**	**1.1**

PSV3	5 ft bgs
cis-1,2-DCE	**150**
Vinyl chloride	**3,700**
MEK	**170**
MIBK	**85**
Benzene	**170**
Toluene	**610**
Ethylbenzene	**100**
m,p-Xylene	**400**
o-Xylene	**110**
Carbon Dioxide	**6.4**
Oxygen	**2.2**

PSV4	5 ft bgs	10 ft bgs
cis-1,2-DCE	< 9.9	**8.8**
MEK	**240**	**100**
MIBK	**68**	**72**
Acetone	**400**	**150**
Benzene	**110**	**130**
Toluene	**740**	**370**
Ethylbenzene	**86**	**78**
m,p-Xylene	**340**	**270**
o-Xylene	**95**	**93**
1,2,4-TMB	**39**	**52**
1,3,5-TMB	**17**	**24**
4-Ethyltoluene	**23**	**19**
Carbon disulfide	**73**	**370**
Carbon Dioxide	**4.7**	**3**
Oxygen	**7.4**	**1.6**

PSV5	5 ft bgs	10 ft bgs
MEK	**310**	**180**
Acetone	**490**	**310**
Benzene	**100**	**180**
Toluene	**180**	**260**
Ethylbenzene	**35**	**54**
m,p-Xylene	**150**	**190**
o-Xylene	**36**	**69**
Carbon disulfide	**95**	**270**
Carbon Dioxide	**3.6**	< 0.99
Oxygen	**2.4**	**3.9**

PSV8	5 ft bgs	10 ft bgs
TCE	< 12	**11**
cis-1,2-DCE	**13**	**30**
trans-1,2-DCE	< 8.7	**6.3**
Vinyl chloride	**30**	**51**
MEK	**250**	**110**
MIBK	**68**	< 4.6
Acetone	**370**	**190**
Benzene	**71**	**150**
Toluene	**290**	**170**
Ethylbenzene	**58**	**63**
m,p-Xylene	**210**	**120**
o-Xylene	**61**	**38**
1,2,4-TMB	**45**	**27**
1,3,5-TMB	**22**	**13**
4-Ethyltoluene	**20**	**11**
Carbon disulfide	**33**	**49**
Styrene	< 9.4	**12**
Carbon Dioxide	**1.2**	**2.8**
Oxygen	**8.4**	**5.5**

PSV11	5 ft bgs	9 ft bgs
TCE	**23**	**17**
cis-1,2-DCE	**32**	**40**
trans-1,2-DCE	< 12	**10**
Vinyl chloride	**15**	**43**
MEK	**130**	**72**
Acetone	**790**	**230**
Benzene	**340**	**130**
Toluene	**260**	**210**
Ethylbenzene	**38**	**44**
m,p-Xylene	**240**	**270**
o-Xylene	**48**	**57**
1,2,4-TMB	< 30	**46**
1,3,5-TMB	< 15	**27**
4-Ethyltoluene	< 15	**15**
Carbon disulfide	**33**	**82**
NAPH	< 32	**17**
Carbon Dioxide	**2.3**	< 0.98
Oxygen	**1.7**	**10**
Helium	< 0.19	**0.73**

PSV6	5 ft bgs	10 ft bgs
cis-1,2-DCE	**100**	< 8.3
trans-1,2-DCE	**11**	< 8.3
Vinyl chloride	**150**	**460**
MEK	**250**	**92**
Benzene	**180**	**190**
Toluene	**150**	**69**
Ethylbenzene	**25**	**30**
m,p-Xylene	**98**	**97**
o-Xylene	**26**	**38**
1,2,4-TMB	**20**	**29**
1,3,5-TMB	**9.6**	**20**
4-Ethyltoluene	< 8.3	**13**
Carbon disulfide	**20**	**62**
CE	< 8.9	**36**
Carbon Dioxide	**6.8**	< 0.78
Oxygen	**2.6**	**8.1**

PSV7	5 ft bgs	10 ft bgs
TCE	**24**	< 3.8
cis-1,2-DCE	**37**	**3.9**
trans-1,2-DCE	**15**	< 2.8
Vinyl chloride	**12**	< 1.8
MEK	**100**	**120**
Acetone	**210**	**150**
Benzene	**290**	**47**
Toluene	**67**	**95**
Ethylbenzene	**15**	**21**
m,p-Xylene	**58**	**61**
o-Xylene	**18**	**26**
1,2,4-TMB	**13**	**28**
1,3,5-TMB	< 6.4	**11**
4-Ethyltoluene	**6.4**	**8**
Carbon disulfide	**9.3**	**13**
Carbon Dioxide	**7.1**	**4.1**
Oxygen	**9.8**	**6.6**
Helium	**0.33**	< 0.15

PSV10	5 ft bgs	10 ft bgs
TCE	**79**	**120**
cis-1,2-DCE	**90**	**950**
trans-1,2-DCE	**69**	**390**
Vinyl chloride	**200**	**1,500**
MEK	**270**	**110**
MIBK	**91**	< 32
Acetone	**380**	< 230
Benzene	**92**	**1,700**
Toluene	**210**	**270**
Ethylbenzene	**42**	**610**
m,p-Xylene	**150**	**580**
o-Xylene	**47**	**390**
1,2,4-TMB	**40**	**450**
1,3,5-TMB	**19**	**280**
4-Ethyltoluene	< 12	**180**
Carbon disulfide	< 16	**100**
Carbon Dioxide	**8.4**	< 0.97
Oxygen	**1.5**	**1.3**

PSV9	5 ft bgs	9 ft bgs
PCE	< 17	**48**
TCE	**95**	**110**
cis-1,2-DCE	**37**	**98**
trans-1,2-DCE	**58**	**110**
Vinyl chloride	**120**	**210**
MEK	**320**	**130**
MIBK	**68**	**48**
Acetone	**370**	**170**
Benzene	**51**	**53**
Toluene	**160**	**150**
Ethylbenzene	**36**	**23**
m,p-Xylene	**140**	**69**
o-Xylene	**40**	**20**
1,2,4-TMB	**34**	< 12
1,3,5-TMB	**14**	< 5.9
Carbon disulfide	< 15	**190**
1,1-DCE	< 20	**17**
CB	< 8.6	**9.3**
Carbon Dioxide	**11**	**4.2**
Oxygen	**1.9**	**1.7**

Explanation

- Approximate Property Boundary
- Multi-Depth Soil Vapor Sampling Location
- Multi-Depth Soil Vapor and Soil Sampling Location
- Sanitary Sewer Line (source undated survey map)
- Electrical Line
- Storm Drain Line
- Fire Supression Line (Water)
- Sanitary Sewer Line Clean-Out

Notes:

Only analytes detected at each sample location are shown
Detections are shown in **bold**
Results equal to or exceeding applicable regulatory screening levels are shaded
Carbon Dioxide, Oxygen, and Helium sample results are shown in percent by volume (% v/v)
All other sample results are shown in micrograms per cubic meter (μg/m^3)
< 2.9 = Not detected at or above the indicated laboratory method reporting limit
ft bgs = Depth of sample in feet below concrete floor slab
PCE = Tetrachloroethene
TCE = Trichloroethene
DCE = Dichloroethene
TCA = Trichloroethane
MEK = Methyl Ethyl Ketone
MIBK = Methyl Isobutyl Ketone
TMB = Trimethylbenzene
DCA = Dichloroethane
CB = Chlorobenzene
DCB = Dichlorobenzene
CE = Chloroethane
NAPH = Naphthalene

6601-6603 Shellmound Basemap: Ex'pression College Campus Map, North Wing, 2015
Utility Locations: EKI, Inc, 2012 Report of Site Investigation and 2012 Request for Site Closure, July 5, 2012

PES Environmental, Inc.
Engineering & Environmental Services

Detected Volatile Organic Compound Concentrations in Soil Vapor Samples at 5- and 10-ft Below Ground Surface
Subsurface Off-Site Investigation
6601-6603 Shellmound Street
Emeryville, California

PLATE
5

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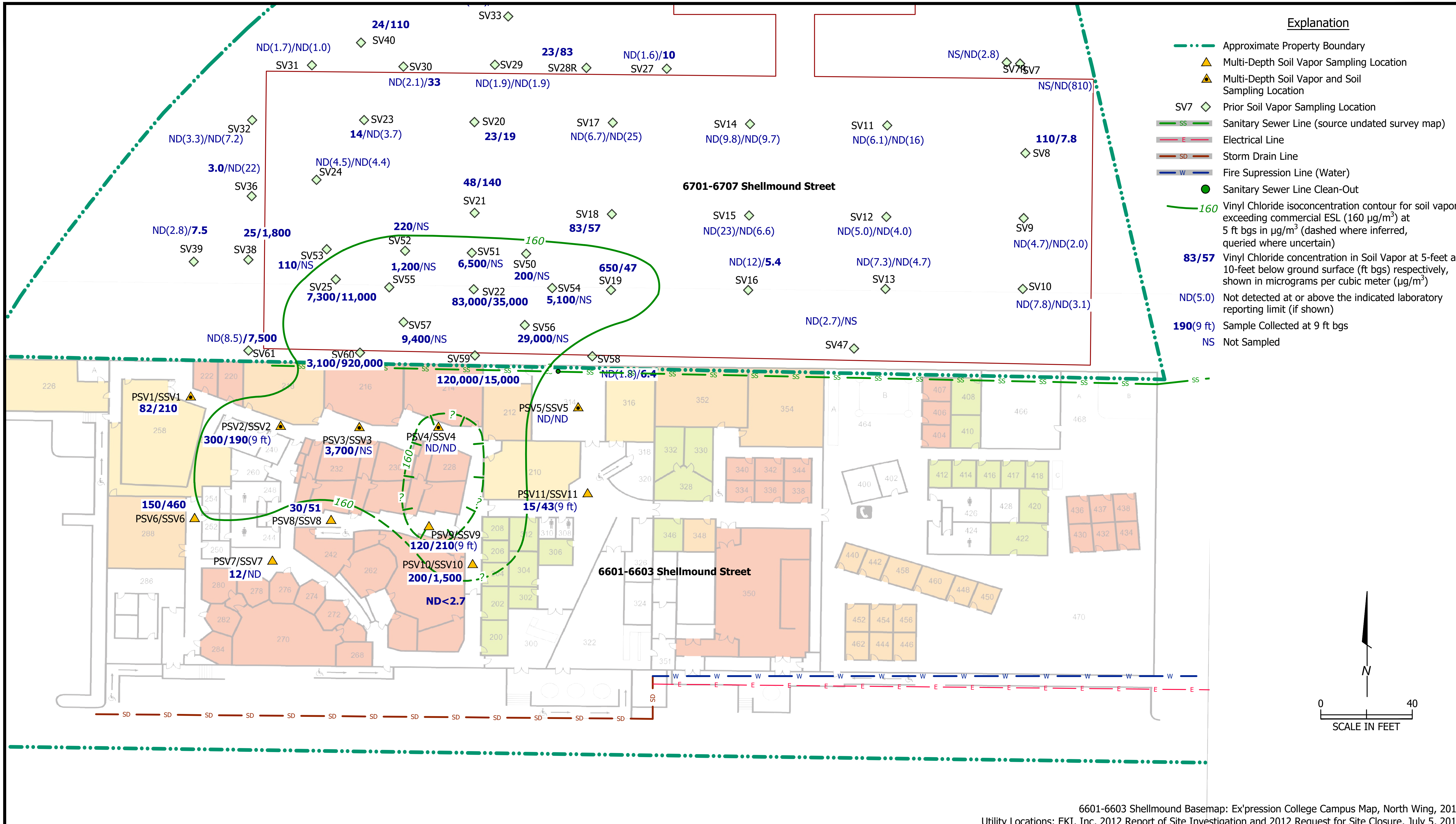


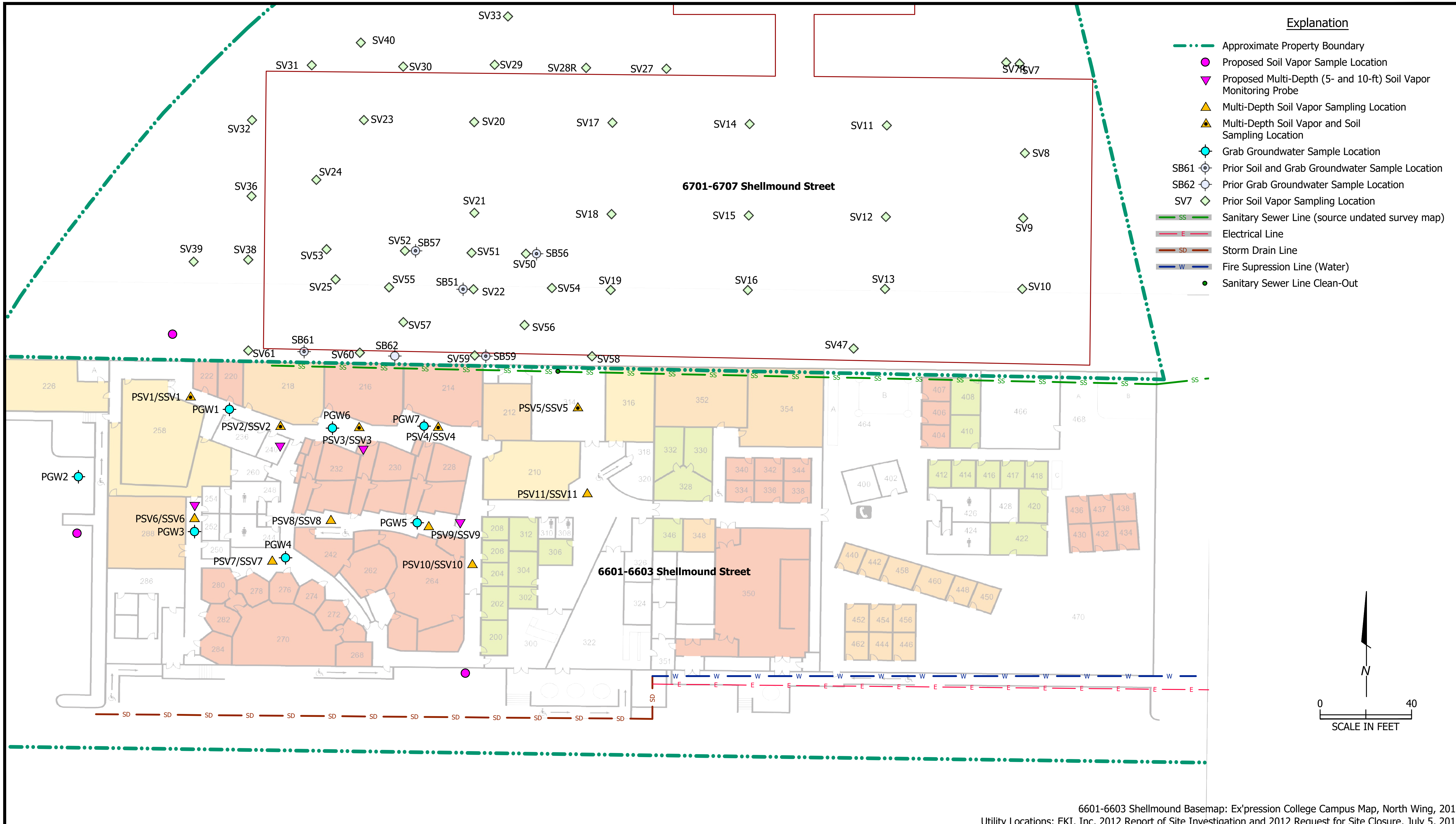
PES Environmental, Inc.
Engineering & Environmental Services

Vinyl Chloride Concentrations in Soil Vapor Samples at 5- and 10-ft Below Ground Surface

Subsurface Off-Site Investigation
6601-6603 Shellmound Street
Emeryville, California

PLATE
5a

1448.001.01.043	144800101043_OR_2-6	CJB	12/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



PES Environmental, Inc.
Engineering & Environmental Services

Proposed Additional Soil Vapor Sampling and Monitoring Locations
Subsurface Off-Site Investigation
6601-6603 Shellmound Street
Emeryville, California

PLATE 6

1448.001.01.043	144800101043_OR_2-6	CJB	12/16
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APPENDIX B

DECEMBER 2016 HUMAN HEALTH RISK ASSESSMENT PREPARED BY SLR INTERNATIONAL

HQ Bay Area Office
950 Tower Lane, Ste. 1225
Foster City, CA 94404

AntonDev.com

December 27, 2016

Alameda County Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Attention: Mr. Mark Detterman, PG, CEG, Senior Hazardous Materials Specialist

TRANSMITTAL LETTER
HUMAN HEALTH RISK ASSESSMENT REPORT
6701-6707 SHELLMOUND STREET
EMERYVILLE, CALIFORNIA
Fuel Leak Case No. RO0000548
Geotracker Global ID T0600100894

Dear Mr. Detterman:

Submitted herewith for your review is the *Human Health Risk Assessment Report, 6701-6707 Shellmound Street, Emeryville, California* dated November 2016, prepared by SLR International Corporation.

I declare, under penalty of perjury, that the information and/or recommendations contained in the above-referenced document for the subject property are true and correct to the best of my knowledge.

Very truly yours,

ANTON EMERYVILLE, LLC

R. Green

Rachel Green
Development Manager

HUMAN HEALTH RISK ASSESSMENT REPORT
6701-6707 SHELLMOUND STREET
EMERYVILLE, CALIFORNIA

NOVEMBER, 2016

Prepared by:

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Director of Risk Assessment and Toxicology
SLR International Corporation

This document was prepared upon request and on behalf of PES Environmental, Inc. No other party should rely on the information contained herein without prior written consent of SLR International Corporation and PES Environmental, Inc. The conclusions, recommendations, and interpretations in this document are based in part on information contained in other documents and sources, as cited in the text. Therefore, this document is also subject to the limitations of the cited documents and sources.

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1.0 INTRODUCTION

This Human Health Risk Assessment (HHRA) Report was prepared by SLR International Corporation (SLR) for PES Environmental, Inc. (PES) on behalf of their client, Anton Emeryville, LLC (Anton), for the property located at 6701-6707 Shellmound Street in Emeryville, California (the site). Anton plans to redevelop the site for multi-use purposes with apartments, leasing offices, common areas, and parking. This HHRA was prepared to update a previous HHRA completed by SLR for the site (SLR, 2015). The updates were requested by Alameda County Environmental Health Services (ACEH), and include additional pre-construction subsurface investigation data that were recently collected by PES. ACEH requested that a third-party toxicologist review this updated HHRA and an updated HHRA Work Plan (RAWP); Enviro-Tox was selected by ACEH as the third-party reviewer. The updated RAWP was provided to ACEH and to Enviro-Tox for review on October 17, 2016. Enviro-Tox approved the RAWP in correspondence dated October 16, 2016. This updated HHRA was completed consistent with the approved updated RAWP.

The site is currently listed as an open Spills, Leaks, Investigation and Cleanup (SLIC) case with ACEH as the lead environmental regulatory agency. According to the SLIC database, soil and groundwater were impacted by releases of solvents and non-petroleum hydrocarbons from Mike Roberts Color Production (6707 Bay Street). The site is also listed in the Leaking Underground Storage Tank (LUST) database due to a reported release from former USTs at this same 6707 Bay Street location. The LUST case (ACEH fuel leak case number RO0000548) has been conditionally closed by ACEH under conditions associated with a deed notice. Bay Street is now Shellmound Street.

While the ACEH is the lead environmental regulatory agency for the site, they do not have specific HHRA guidance. Instead, other protocols recommended by the California Environmental Protection Agency (CalEPA) are typically followed. The primary guidance used by ACEH is provided by the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB), and the proposed HHRA was conducted generally consistent with their guidance (RWQCB, 2016). Additional CalEPA and U.S. Environmental Protection Agency (USEPA) risk assessment guidance and resources (CalEPA, 2011a, 2014, 2015, 2016; USEPA, 1989, 1991, 1992, 2015, 2016a, 2016b, 2016c) were also used for the HHRA, as relevant and applicable. Where applicable, analytical data were compared to risk-based screening levels and evaluated for potential risks as recommended by the RWQCB (2016).

The objective of the HHRA is to evaluate potential human health risks associated with exposure to chemicals detected in site media during and post-redevelopment. The HHRA described in this Report builds upon the previous HHRA conducted for the site (SLR, 2015). Specifically, baseline risks were evaluated for hypothetical receptors that may be exposed to chemicals detected in site media based on the conservative assumption that potential vapor intrusion and soil contact will not be mitigated with engineering or institutional controls. Sampling activities not assessed in the previous HHRA were conducted at the site in 2015 and 2016. Data from these activities were included in this HHRA, and are summarized below by sampling event.

The following sampling activities were conducted at the site during a pre-construction subsurface investigation in November and December of 2015 (PES, 2015a):

- A soil gas survey to further address potential vapor intrusion concerns beneath former industrial features, existing buildings, and proposed future building areas including first-floor residential units and common areas;
- Additional confirmation soil gas sampling to assess conditions associated with volatile organic compounds (VOCs) or elevated laboratory detection limits for VOCs reported for soil gas and subslab vapor samples collected in April 2015;
- Shallow soil sampling to assess the condition of soil anticipated to be disturbed during site redevelopment, including: (1) soil to be excavated to accommodate the future building foundation, pavement sections, landscape and surface water infiltration features; and (2) soil within proposed utility trenches. Assessment of soil in these areas provided additional data to facilitate future construction worker safety and proper management of disturbed soil;
- Shallow soil sampling to assess the condition of soil beneath proposed exterior landscaped and play areas to confirm no concerns exist with respect to potential future residential exposure; and
- Confirmation soil sampling within the former UST area to assess soil conditions associated with benzene reported in one soil gas sample collected in April 2015.

Following the November and December 2015 pre-construction subsurface investigation, supplemental investigation activities were conducted in February 2016, primarily in the southwestern portion of the site, to further evaluate the subsurface for the presence and potential sources of VOCs, particularly vinyl chloride. Sampling activities conducted at the site in February 2016 included the following (PES, 2016a):

- Installing and sampling temporary soil vapor probes to further define the presence of vinyl chloride in soil vapor and evaluate potential vadose zone source areas in the southwestern portion of the warehouse building, near the southern property boundary, near the northwestern site boundary, and at one location in the eastern portion of the site to re-assess soil vapor conditions at 10 feet bgs where laboratory reporting limits for vinyl chloride were previously elevated;

- Advancing shallow soil borings within the existing warehouse building and beneath an alleyway between the onsite warehouse and an offsite building to evaluate potential on-site vadose zone soil where elevated concentrations of vinyl chloride were detected in soil vapor during the November and December 2015 investigation; and

- Advancing soil borings to first encountered groundwater to evaluate soil within the vadose zone and potential impact to groundwater.

September 2016 sampling activities were focused on evaluating the subsurface in the area of the northern extant onsite building and included (PES, 2016b):

- Installing and sampling temporary soil vapor probes beneath and in the immediate vicinity of the northern extant onsite building to evaluate soil vapor conditions at multiple depths (approximately 5 and 10 feet bgs); and

- Collecting companion soil samples from soil cores obtained at locations of the temporary soil vapor probes.

The additional data collected in 2015 and 2016 are provided in this HHRA along with older data (Tables 1 through 9). The 2015 and 2016 data, in addition to older data, were incorporated in the revised HHRA as described in Sections 3.2 and 4.3 of this Report. Current plans for the redevelopment, including soil excavation and removal, at the time of the HHRA were also considered. The HHRA can serve as a tool to help determine the need for potential controls such as soil management procedures, capping, and vapor mitigation measures.

1.1 OVERVIEW OF APPROACH

The RWQCB provides screening-based guidance for evaluating sites with contaminated media in their *User's Guide: Derivation and Application of Environmental Screening Levels* (RWQCB, 2016). In that guidance, the RWQCB provides environmental screening levels (ESLs) for use in a tiered approach similar to the tiered risk-based approach outlined by ASTM International in their *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (ASTM, 1995).

In addition to human health risk-based goals, the ESLs also address aesthetic goals (e.g., taste and odor) and environmental protection goals presented in the Water Quality Control Plan for the San Francisco Bay Basin ("Basin Plan"; RWQCB, 2010), including:

Surface Water and Groundwater:

- Protection of drinking water resources;
- Protection of aquatic habitat; and
- Protection against adverse nuisance conditions.

Soil:

- Protection of human health;
- Protection of groundwater;
- Protection of terrestrial biota; and
- Protection against adverse nuisance conditions.

ESLs, which are considered very conservative (i.e., stringent), are not enforceable regulatory cleanup standards. Exceedance of an ESL indicates the potential presence of environmental threats, and suggests, but does not require, a need for additional evaluation. The presence of a chemical at concentrations below ESLs can be assumed to not pose a significant environmental threat (RWQCB, 2016).

The RWQCB (2016) tiered approach consists of the following steps:

- Tier 1 Evaluation – In this conservative screening step, chemical concentrations are directly compared to ESLs selected for the site. Results of this comparison are used to guide decisions regarding the need for a more detailed risk assessment (e.g., Tier 2 evaluation), additional site investigation, or remedial action.

- Tier 2 Evaluation – In this step, ESLs are modified with respect to site-specific data or considerations. Examples cited by the RWQCB include modifying an ESL based on site–specific information (e.g., depth to groundwater or soil geophysical properties) or to meet alternative target risk levels.

- Tier 3 Evaluation – In this step, site-specific screening levels or clean-up levels are developed using alternate models and modeling assumptions.

The approach followed for this HHRA is consistent with Tier 1 outlined by the RWQCB (2016). Where relevant, chemicals exceeding the Tier 1 ESLs were quantitatively evaluated in a baseline risk assessment, which generally corresponds to Tier 3 of the guidance.

Other guidance was also consulted, as necessary and appropriate, as documented in this Report. This Report is organized as follows:

- Section 1.0 - Introduction
- Section 2.0 - Site Background
- Section 3.0 - Data Evaluation
- Section 4.0 - Conceptual Site Model
- Section 5.0 - Tier 1 Evaluation
- Section 6.0 – Quantitative Risk Evaluation
- Section 7.0 - Uncertainty Evaluation
- Section 8.0 - References.

2.0 SITE BACKGROUND

This section describes the site location and use, the adjacent offsite area, and physical characteristics pertinent to the HHRA. Additional information is provided in PES (2015b).

2.1 DESCRIPTION OF SITE AND SURROUNDING AREA

The site is located at 6701, 6705, and 6707 Shellmound Street (previously known as Bay Street), in a mixed industrial, commercial, and residential area of Emeryville in Alameda County, California (Plate 1). The site currently contains a two-story office building and a warehouse building connected by a common lobby area and is used for commercial purposes (Plate 2).

Future plans are for a new multi-story, multi-family residential development to be constructed on the site. Existing buildings and related improvements will be demolished and removed, followed by grading and excavation for new construction. Planned development includes a seven-story at-grade (i.e., no basement levels) structure comprising the majority of the subject property with parking garage, lobby, and amenities spaces occupying the first (on-grade) and second floors of the building. A limited portion of the first and second floors will be developed as residential units. After redevelopment, the entire site will be covered by a combination of the building and associated paved parking and driving areas, with the exception of planter boxes and landscaped areas.

The site is bounded to the west and north by the Ashby Avenue off-ramp from Interstate 80, to the south by a commercial building, and to the east by Shellmound Street and a railroad right-of-way. The site buildings and the adjacent areas are shown on Plates 2 and 3 in PES (2015b). The footprints of the office and warehouse buildings occupy approximately 7,470 and 43,850 square feet, respectively, and both buildings have slab-on-grade foundations. The remainder of the site consists of landscaped areas and asphalt paved parking and driving areas.

According to the United States Geological Survey (USGS) Oakland West, California Quadrangle 7.5-minute series topographic map dated 1993, the site is situated at an elevation of approximately 18 feet above mean sea level. The site is relatively flat, but the vicinity slopes gently to the west/southwest. The nearest surface water body is San Francisco Bay, located approximately 1,000 feet west of the subject property (PES, 2015b).

No potentially sensitive receptors were identified within 0.25 mile (1,320 feet) of the site.

The highly developed and paved nature of the site area and vicinity make it likely that ecological exposure pathways are incomplete. Wildlife present at the site includes common, non-endangered species such as perching birds, small mammals such as mice, and reptiles such as lizards. However, exposure to chemicals in soil is prevented by paving and ongoing disturbance by human activity makes nesting and breeding at the site unlikely. No aquatic resources are present, which precludes the presence of aquatic receptors. Therefore, this risk assessment does not consider ecological receptors.

2.2 GEOLOGY AND HYDROGEOLOGY

Based on the results of investigations performed on the subject property and in the vicinity, the site is underlain by imported fill material overlying deposits of native silts and clays known locally as Old Bay Mud. Beneath the Old Bay Mud deposits are deposits of stiffer sand, silts, and clays that likely represent alluvial deposits of the Temescal Formation. The land on which the site is located historically consisted of San Francisco Bay tidal mud flats and was below sea level until the mid- to late-1930s, when a levee was built west of the subject property and a highway (Eastshore Highway, now Interstate 80) was constructed on the levee. From that time until the early to mid-1950s the area between the highway and the former shoreline, including the subject property and vicinity, were filled in by non-native soils to create buildable land. The fill material generally consists of coarse-grained sands and gravels that contain varying amounts of fines, and fine-grained silts and clays.

Previous investigations have shown that the fill materials at the site and other similarly filled properties in the vicinity contain residual contamination with related impacts to shallow groundwater. Contamination found and attributed to the non-native fill materials originally used to create the land along the bay-shore area of Emeryville including the site and immediate vicinity includes impacts related to total petroleum hydrocarbons (TPH), VOCs, semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and metals.

Groundwater was encountered at the site at approximately 11 to 13 feet below ground surface (bgs) in November 2013 (PES, 2015b). In February 2016, shallow groundwater in the southwestern portion of the site was encountered at depths ranging from approximately 12.75 to 13.5 feet bgs (PES, 2016a), and groundwater was not encountered within the total depth explored of 10 feet bgs in September 2016 (PES, 2016b). Historic groundwater data indicate that groundwater depths fluctuated between 5.15 and 11.72 feet bgs in the early 1990s, with both the shallowest and deepest groundwater levels occurring in 1995 (PES, 2015b). At that time, the shallowest groundwater levels were observed in the southwestern portion of the property, with deeper levels generally observed to the north and east. Groundwater flow to the south/southwest has been measured from monitoring well data collected on the subject property with localized flow toward the west in the vicinity of the former underground storage tanks (see Plate 3 of PES, 2015b).

2.3 INSTITUTIONAL AND ENGINEERING CONTROLS

There is an existing deed notice on the subject property. As part of the closure for the former USTs and the related LUST case, a deed notice for the site was provided to the ACEH on February 1, 1995 as a requirement by the ACEH and the RWQCB for closure of the UST case. One requirement under the notice was to conduct an environmental risk assessment if any significant change in land use is proposed. The subject site land use will be changed from commercial to multi-use under the proposed development plans, triggering the need for an environmental risk assessment. This HHRA fulfills that requirement.

A City of Emeryville Ordinance (No. 07-006) prohibits extraction of groundwater for drinking, industrial or irrigation purposes, and serves as an additional institutional control that reduces the potential for exposure to groundwater.

In conjunction with redevelopment of the site, Anton plans to work with the ACEH to develop a land use covenant (LUC) to replace the existing deed notice. The LUC document will identify the contamination at the site, restrictions on development and use of the site, restrictions on use of underlying groundwater, and requirements for maintenance of the site cover and notification to ACEH. To address contaminated media that may be encountered during construction and redevelopment activities, Anton also intends to submit an updated Site Management and Contingency Plan (SMP) for ACEH approval. The SMP will provide procedures for handling and management of soil, and potentially groundwater, encountered during construction. The new building plans include ground floor residential units on the west and north sides of the building, elevator pits in the center area of the building, and common and amenity areas in the east portion of the building. To mitigate for potential accumulation and migration of VOCs and methane in soil vapor into these ground floor building areas, a vapor mitigation system will be designed and installed beneath the floor slab underlying these portions of the building. The system will consist of impermeable vapor barriers with passive venting. The vapor mitigation system will be incorporated into the building design and details and specifications will be provided in the building plans. The SMP will also provide a post-construction operations and management (O&M) plan to describe procedures to be followed to maintain a cap over subsurface materials and to describe operation and management of the vapor mitigation system. Implementation of these institutional and engineering controls will substantially limit or eliminate exposure to chemicals detected in soil at the site during construction activities and site redevelopment, and in the future. More details of the SMP are provided in PES (2015b).

2.4 PLANNED INTERIM REMEDIAL MEASURE

Based on the results of subsurface investigations, which encountered elevated concentrations of VOCs, particularly vinyl chloride, in soil and soil vapor primarily beneath the southwestern portion of the site, an interim remedial measure (IRM) consisting of soil vapor extraction (SVE) will be implemented to reduce concentrations of VOCs in the subsurface prior to, and possibly during, the initiation of the planned development activities and to reduce potential exposure to site users. A SVE pilot study was conducted in July 2016, and based on the results of the pilot study 19 SVE wells were installed in the southwestern portion of the site. Health risk-based target cleanup levels were developed for soil vapor as part of the HHRA to help guide SVE system operation. Pending the completion of a subsurface investigation to be conducted on the property immediately south of the site, the SVE system will be operated as needed to reduce VOCs in soil vapor to the site-specific health risk-based levels.

3.0 DATA EVALUATION

This section summarizes historical and recent sampling and analysis of soil, groundwater, and soil gas at the site based on PES (2015a, 2015b, 2016a, and 2016b); more detailed information can be found in those documents. Methods used to identify risk assessment datasets for each medium are also described.

3.1 SITE CHARACTERIZATION

As discussed in PES (2015b), the site has been the subject of several investigations and remediation commencing in 1989. Soil and groundwater sampling began at that time, and some limited soil gas sampling was conducted in April 2013. The most recent activities conducted to date at the site include soil and soil gas sampling conducted in February and September of 2016, and groundwater sampling in February of 2016. All sample locations are shown on Plates 2 and 3. The locations of samples collected from specific media are shown on Plates 4 (soil gas), 5 (soil), and 6 (groundwater). The proposed future building footprint is shown on Plates 3 through 6.

On the basis of the results of the multiple investigations and remediation activities, the UST case was granted conditional closure by the ACEH and RWQCB in a letter dated February 1, 1995. The conditional case closure was granted on the basis of the data provided and the execution of a deed notice, as discussed in Section 2.3.

3.1.1 SOIL CHARACTERIZATION

Soil sampling was conducted at the site in 1989 from 10 soil borings, and TPH was identified in shallow soil at the western end of the site near Interstate 80. That same year, soil samples were collected from five additional soil borings, and identified the presence of TPH, PCBs, lead, and methyl isobutyl ketone (MIBK). USTs were removed in October of 1989, and the excavated soil, impacted with MIBK, was placed back into the excavation.

A soil vapor extraction (SVE) system was installed and operated between July and September 1990 to treat MIBK. Soil was sampled in 1991 in the remediated area, and the SVE system was decommissioned in May 1993. Nature and extent sampling was conducted in 1994, and nine additional soil borings were installed. Conditional site closure of the UST portion of the site was granted by the ACEH in December 1996.

In April 2013, five new soil locations were sampled, and PCBs, dichlorodiphenyltrichloroethane (DDT), and metals were detected in most of the samples. In November 2013, PES drilled and sampled 18 soil borings at both exterior and interior locations across the site. Soil results from the fill material underlying the entire site (identified during the continuous cores collected during this event) indicated SVOCs, PCBs, and metals were present above regulatory screening levels.

Additional soil sampling activities were conducted in November and December of 2015 to assess the condition of soil anticipated to be disturbed during site redevelopment, soil beneath proposed exterior landscaped and play areas, and soil within the former UST area. All samples were analyzed for TPH and lead, and most samples were analyzed for PCBs. A subset of the samples was analyzed for other metals, asbestos, and SVOCs, and a smaller subset was analyzed for VOCs. TPH and metals were detected frequently in the 2015 samples. Acetone and phenol were detected at one location each; other VOCs and SVOCs, and asbestos, were not detected.

In February 2016, 56 soil samples were collected and analyzed for VOCs. Samples were collected from 18 locations beneath the existing warehouse building and the alleyway to evaluate potential onsite vadose zone soil in the vicinity of previous sample locations SV22 and SV25 where elevated concentrations of vinyl chloride were detected in soil vapor during the November and December 2015 investigation, and from 5 additional locations in the southwestern portion of the site to evaluate soil within the vadose zone and potential impact to groundwater. VOCs were detected in relatively few of the February 2016 soil samples; acetone was detected in 17 of the 56 samples; other VOCs, including vinyl chloride, were detected in only 7 or fewer samples.

Twelve soil samples were collected in September 2016 from six locations beneath and in the immediate vicinity of the northern extant onsite building and analyzed for VOCs. Acetone was detected in most samples; detections of other VOCs (xylenes, naphthalene, 4-isopropyltoluene, and carbon disulfide) were limited to one to three samples. Soil data collected through September 2016 are summarized in Tables 1 through 5.

3.1.2 GROUNDWATER CHARACTERIZATION

In 1989, four monitoring wells were developed from the soil boreholes and subsequently sampled. Two new monitoring wells were developed in 1990, and all six wells were sampled. Benzene, MIBK, and oil and grease were detected in some of these wells. Groundwater extraction began in October 1990. In 1991, three of the monitoring wells were sampled to evaluate the efficacy of the extraction system, and MIBK was detected in one of these wells. Three additional quarterly monitoring rounds were conducted, after which the treatment system was decommissioned in May 1993 (along with the SVE system).

Nature and extent sampling was conducted for soil in 1994, and two of these borings were developed into monitoring wells and sampled. All other monitoring wells were also sampled at this time. MIBK continued to be detected at concentrations up to 140,000 micrograms per liter (ug/L). Quarterly groundwater monitoring continued through May 1996, at which time conditional soil closure was granted and sampling activities ceased.

In April 2013, ENVIRON collected grab groundwater samples from three new sampling locations (SG-1, SG-4, and SG-5). Depth to groundwater in the borings was as follows: (1) SG-1: 10.75 feet bgs; (2) SG-4: 11.75 feet bgs; and (3) SG-5: 10.29 feet bgs. TPH as diesel (TPHd), and VOCs including benzene, ethylbenzene, naphthalene, and xylenes were detected above regulatory screening levels. Analysis of groundwater samples collected during the April 2013 investigation also indicated the presence of elevated concentrations (i.e., exceeding California Maximum Contaminant Levels [MCLs] and ESLs) of total metals (antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, silver, vanadium, and zinc). In November 2013, PES collected groundwater samples for analysis of dissolved metals from temporary well casings at six exterior locations across the site. Results indicated dissolved arsenic and lead present at concentrations above California MCLs. As discussed in PES' Conceptual Site Model (PES, 2015b), based on a comparison of dissolved lead and other metals results obtained during PES' November 2013 investigation to those obtained during ENVIRON's April 2013 investigation, it appears that the April 2013 metal results were based on analysis of total metals and not representative of dissolved metals groundwater conditions beneath the site.

Six grab groundwater samples were collected from locations in the southwestern portion of the site in February 2016 and analyzed for VOCs and 1,4-dioxane. Benzene was detected in five of the six samples, while other VOCs were detected in one to three samples. Four VOCs (cis-1,2-dichloroethene, vinyl chloride, benzene, and naphthalene) were detected in at least one sample at concentrations above MCLs and/or ESLs. Groundwater data collected through February 2016 are summarized in Tables 6 and 7.

3.1.3 SOIL GAS CHARACTERIZATION

Soil gas samples were collected at 4.5 feet bgs from five locations in April 2013. Benzene was detected at an elevated concentration at one location, but this sample was compromised with ambient air and is likely not representative of subsurface conditions (PES, 2015b). An additional six samples were collected by PES in April 2015, representing two depths (5 and 9.5-10 feet bgs) at each of three locations. Benzene was also detected at an elevated concentration at one location during the 2015 sampling event. At this same time, four subslab samples were collected from beneath the existing building. Four VOCs (tetrachloroethene [PCE], 1,1,1-trichloroethane, styrene, and methyl ethyl ketone) were detected in subslab samples.

Additional soil gas sampling activities were conducted in November and December of 2015 to further address potential vapor intrusion concerns beneath former industrial features, existing buildings, and proposed future building areas including first-floor residential units and common areas; and to assess conditions associated with VOCs or elevated laboratory detection limits for VOCs reported for soil gas and subslab vapor samples collected in April 2015. Samples were collected from a depth of five feet bgs. Samples were also collected from a depth of 10 feet bgs at most locations, and from eight feet bgs at one location. Twenty VOCs were detected in at least one of these samples; four of these (trichloroethene [TCE], vinyl chloride, 1,1,2,2-tetrachloroethane, and benzene) were detected at concentrations above soil gas ESLs protective of vapor intrusion concerns for residents.

Additional soil gas samples were collected from locations across the site and analyzed for VOCs in February and September of 2016. The February 2016 soil gas samples were also analyzed for

1,4-dioxane. Twenty samples were collected in February from depths of 5 feet bgs (14 samples) and 10 feet bgs (6 samples). In September 2016, six samples each were collected from depths of 5 and 10 feet bgs. Detected VOCs were similar in both sampling events. 1,4-Dioxane was not detected in the February 2016 samples. Vinyl chloride was detected in the majority of the February samples. Vinyl chloride was not detected in any of the September samples, although some reporting limits were above residential ESLs due to sample dilutions required as a result of elevated concentrations of other (non-target and target) VOCs.

Methane has also been analyzed and detected in soil vapor samples collected from the site, along with several other fixed gases (oxygen, carbon dioxide, argon, helium, and nitrogen) that are not typically addressed in risk assessments. Methane is typically managed separately as a fire safety issue and was not evaluated in the HHRA. As described in Section 4.3, a vapor mitigation system will be designed and installed beneath portions of the building; this would address methane concerns as well as potential exposures to VOCs.

Soil gas data collected through September 2016 are summarized in Table 8, and subslab data are provided in Table 9.

3.2 RISK ASSESSMENT DATASET

An evaluation of the available soil, groundwater, and soil gas data was conducted to identify data applicable to the HHRA. Some data points may not be applicable according to criteria such as sampling date and location. Criteria evaluated for identifying the risk assessment dataset include (1) sample location, (2) sample depth, (3) sample date, and (4) type of sample. Results of this evaluation are discussed below.

Sample location. With two exceptions, soil samples were collected only from onsite locations. The exceptions are two samples from a single location, one at 1 foot bgs and one at 3 feet bgs, which were collected beyond the site boundary in a ditch to the west of the site. This ditch collected runoff from the asphalt (Plate 2), and the area was excavated to approximately 3 feet bgs in 1989. Also, the sump area on the west side of the warehouse building was excavated to 1 foot bgs in 1989. Samples from soil that has been excavated and removed from the site are not representative of current soil conditions, and are not included in the risk assessment dataset. With the exception of the sump area and offsite ditch area, no soil has been removed from the site, but VOC remediation occurred in the tank excavation area in 1990. Therefore, VOC soil data collected in the vicinity of the former USTs prior to implementation of the remediation systems in 1990 are not representative of current site conditions. These include the six samples collected in October 1989 from beneath the UST excavation; two samples collected from 4 and 9 feet bgs at location B-8/MW-8, downgradient of the UST area, in January 1990; and four samples of drain residue collected in 1989. All other soil sample locations are relevant for evaluation in the risk assessment dataset, as are all data for non-VOCs. Many sample locations will be covered by the building footprint or parking areas post-development; these data are also included in the risk assessment dataset for evaluation of potential exposures during construction.

Separate soil datasets were also evaluated to estimate potential risks to future maintenance/utility workers and future residents. The residential risk assessment dataset includes only samples from the locations that will be outside the footprint of the planned building and not covered by concrete walkways/pavers (Plates 3 through 6). For future maintenance/utility workers, the dataset is limited to locations of proposed utility trenches. The proposed storm drain and sanitary sewer alignments are shown on Plates 3 through 6.

All groundwater data were collected onsite, and all sample locations are relevant for inclusion in the groundwater risk assessment dataset. All soil gas data (excluding subslab samples, as discussed further below) are included in the risk assessment dataset, except for the shroud sample that was collected from SG-2 for quality assurance purposes and is not representative of soil gas conditions.

Sample depth. The soil samples were collected from depths ranging from 0.5 to 30.5 feet bgs. The planned excavation at the site may reach a depth of approximately 12 feet bgs. Therefore, soil samples from 0.5 to 12 feet bgs are included in the soil risk assessment datasets for potential direct contact with soil by maintenance and construction workers. To evaluate potential post-construction exposures by future residential receptors, soil samples from 0.5 to 2 feet bgs are included in a separate soil risk assessment dataset. Samples deeper than 12 feet bgs were not quantitatively addressed in the HHRA.

Sample date. UST removal and remediation activities occurred at the site between 1989 and 1993. As a result, some of the data represent samples from locations where soil and/or groundwater have been remediated. At these locations (near the former USTs), only soil data collected post-remediation are considered to potentially reflect current conditions for VOCs and are included in the risk assessment dataset for those chemicals. Soil samples SS-1 through SS-6 and B-8/MW-8 were therefore excluded from the risk assessment dataset for VOCs.

Groundwater extraction and treatment occurred in the early 1990s. Prior to 2013, the most recent groundwater samples that were analyzed for VOCs were collected in 1996, and the most recent metals sample was collected in 1989. Recent groundwater data are likely to be the most representative of current groundwater conditions, particularly for evaluation of potential vapor intrusion for volatile chemicals. Therefore, only groundwater data collected in 2013 and 2016 are included in the risk assessment dataset.

Soil gas samples were collected in 2013, 2015, and 2016; samples collected in all three years are included in the risk assessment dataset.

Sample type. Soil samples were collected from soil borings and excavation limits (prior to backfilling), while groundwater samples represent both grab groundwater samples and monitoring well samples. Both types of soil samples are included in the risk assessment dataset.

Grab groundwater samples are not generally suited for risk assessment purposes because chemical concentrations in grab samples are generally higher than would be anticipated from groundwater wells due to the presence of soil particles from the borehole in the sample, and the lack of equilibrium conditions during sample collection. Therefore, including groundwater data from grab samples in a risk assessment is conservative, particularly for chemicals with low water solubility and high sorption capacity. However, monitoring well samples have not been collected at the site since 1996 and all of the recent data represent grab groundwater samples. Grab samples are therefore included in the risk assessment dataset. Grab samples collected in April 2013 were not filtered, while the November 2013 samples were filtered prior to analysis for metals. The filtered samples are more representative of groundwater conditions at the site and are therefore included in the groundwater risk assessment dataset for metals. Only unfiltered samples were analyzed for VOCs (in April 2013 and February 2016); these samples are therefore included in the risk assessment dataset for these chemicals. This represents a source of uncertainty and is discussed further in the uncertainty section.

All soil gas samples are included in the risk assessment dataset, except for subslab samples that were collected from beneath an existing building at the site. Future development will include removal of existing buildings, including building foundations, and excavation and grading of shallow soils across the site. Subslab data collected from beneath the existing building are therefore not relevant for evaluation of vapor intrusion to future buildings. The vapor intrusion pathway was therefore evaluated using soil gas and groundwater data, but not subslab data.

The risk assessment datasets for soil are presented in Tables 10 through 14 (construction scenario), Tables 15 through 17 (residential scenario), and Tables 18 through 22 (utility/maintenance scenario). Note that no VOCs or SVOCs were detected in any soil samples collected from depths less than or equal to 2 feet bgs at locations that will remain uncovered by the building or concrete walkways; the residential soil risk assessment dataset therefore does not include VOCs or SVOCs. The risk assessment dataset for groundwater is presented in Tables 23 (VOCs) and 24 (metals), and the soil vapor risk assessment dataset is presented in Table 25.

4.0 CONCEPTUAL SITE MODEL (CSM)

In this section, potential human receptors and potentially complete exposure pathways are identified at the site. A Conceptual Site Model (CSM) was previously developed to facilitate this process, and was submitted to ACEH (Plate 9 in PES, 2015b and Plate 3 in SLR, 2015). The CSM presented in this Report updates the previous CSM by incorporating additional potentially complete exposure pathways that were previously identified as incomplete or insignificant due to planned engineering and institutional controls, as requested by ACEH. The CSM presents the relationships between chemical sources and receptors at the site, and identifies potentially complete pathways through which receptors may be exposed to the analytes detected in site media. This is accomplished by considering the site characteristics discussed in Section 2 and summarized below and in PES (2015b), as well as the fate and transport characteristics of analytes identified at the site (Section 3). The updated CSM diagram is presented as Plate 7. The Tier 1 screening analysis that follows then serves to further focus the quantitative risk assessment on chemicals and pathways that require further evaluation.

4.1 SUMMARY OF SITE CHARACTERISTICS

- Vadose zone soil is predominantly silts and clays mixed with fill material known to be impacted with TPH, VOCs, SVOCs, PCBs, and metals. The fill material overlies Old Bay Mud deposits;
- Depth to groundwater ranged from 11 to 13 feet bgs in November 2013, from 12.75 to 13.5 feet bgs in the southwestern portion of the site in February 2016, and greater than at least 10 feet bgs in September 2016; groundwater has historically been encountered at depths as shallow as 5.15 feet bgs;
- Groundwater flows to the south/southwest;
- Groundwater cannot be used for domestic or other purposes based on a LUC and City Of Emeryville ordinance;
- The site will be redeveloped in the future as a seven-story at-grade multi-use building with parking/driving areas and some planters/landscaping. Most residential areas will be above the second floor. The first two floors will include some office and retail space;
- The maximum planned construction excavation depth is 12 feet bgs for utility trenches;
- Detected analytes include VOCs, SVOCs, TPH, PCBs, DDT, and metals in soil, groundwater, and/or soil gas.

Potential receptors and exposure pathways at the site are identified in the following sections and are presented graphically on Plate 7.

4.2 HYPOTHETICAL HUMAN RECEPTORS

"Receptor" is the term used in risk assessments for people who may be exposed to impacted media at or near an evaluated site. Receptors are not actual people. Rather, they represent groups of people that are associated with various assumed exposure scenarios and are, therefore, termed "hypothetical." Categories of receptors include: residential, commercial/industrial worker, visitor/trespasser, recreator, and construction/utility worker. When receptors are identified for a risk assessment, these categories are considered in light of current and likely future use of the site and nearby area, and access to the site and impacted media. Only those likely to be the most highly exposed, such as onsite residents and workers, are generally evaluated in a risk assessment. While nearby offsite receptors may be exposed to impacted media (e.g., groundwater), this exposure is generally substantially less than onsite exposures and is not typically quantified. At this site, all receptors are identified as "hypothetical future receptors" because this CSM applies to a future redevelopment scenario. Although the site is currently occupied, site usage will change once redevelopment occurs; in addition, the current site use is commercial, and a future commercial receptor is included in the CSM.

The following hypothetical future onsite receptors were identified as likely present at the site:

- Construction worker receptor;
- Maintenance/utility worker receptor;
- Commercial worker receptor; and
- Residential receptor (adult and child).

The construction worker receptor was assumed to work at the site during redevelopment. This receptor would potentially contact soil at depths down to 12 feet bgs.

The maintenance/utility worker receptor was assumed to work at the site following redevelopment for short periods of time, to maintain underground utility lines and/or landscaping. This receptor would potentially contact soil at depths down to 12 feet bgs, the maximum depth of utility lines planned for the redevelopment.

Retail worker receptors were assumed to work at the site following redevelopment in retail space located on the first two floors. Adult and child residential receptors were assumed to live in units on all floors, but primarily on the third floor and above. All of these hypothetical future onsite receptors are shown on Plate 7.

4.3 POTENTIAL EXPOSURE PATHWAYS

Potentially complete exposure pathways for the hypothetical receptors are identified in this section. An exposure pathway is a mechanism by which receptors are assumed to contact chemicals in site media. USEPA (1989) describes a complete exposure pathway in terms of four components:

- A source and mechanism of chemical release (e.g., release of SVOCs);
- A retention or transport medium (e.g., soil above 12 feet bgs);

- A receptor at a point of potential exposure to a contaminated medium (e.g., construction worker); and
- An exposure route at the exposure point (e.g., inhalation exposure).

If any of these four components is not present, then a potential exposure pathway is considered incomplete and is not evaluated further in a risk assessment. If all four components are present, a pathway is considered potentially complete. Pathways may be potentially complete but insignificant, because the characteristics of the assumed exposure scenario are unlikely to be associated with elevated or unacceptable risks. By contrast, potentially complete and significant pathways represent pathways through which the majority of exposure occurs, and therefore are most likely to be associated with elevated risks. Therefore, these pathways are typically quantified in a risk assessment whereas the former are not.

Exposure to chemicals in soil can occur directly through incidental ingestion and dermal contact and inhalation of dust or indirectly through inhalation of vapors from the subsurface. All receptors were assumed to be exposed to vapors in air originating from the subsurface, as discussed further below. The site redevelopment plans call for the site to be fully paved upon completion except for landscaped areas, which will include a minimum of two feet of clean fill above the site soils (PES, 2015b). However, to evaluate potential conditions without a clean fill cap, residential receptors were assumed to be directly exposed to soil in proposed exterior landscaped and play areas. Inhalation of dust or vapors in outdoor air was also identified as a potentially complete exposure pathway for this receptor. Construction and maintenance worker receptors can reasonably be assumed to be exposed directly to chemicals in soil. Exposure to chemicals in dust or vapors is possible during excavation activities. Although monitoring and dust suppression will be conducted as part of planned redevelopment activities, dust or vapor inhalation is considered to represent a potentially complete exposure pathway for invasive workers. Retail workers were assumed to spend the majority of their time indoors while at the site; therefore, no potentially complete soil exposure pathways were identified for this receptor.

First encountered groundwater at the site has historically been as shallow as 5.15 bgs (1995), and more recently ranged from 11 to 13.5 feet bgs (PES, 2015b, 2016a). The maximum depth of the excavation for utility trenches will be approximately 12 feet bgs. The construction of the building foundation system will utilize drilled displacement piers and the building will be constructed with an at grade 24-inch thick concrete slab. Deeper excavations will be limited to those conducted for utility trenches. Therefore, groundwater could be encountered in some locations during utility trench excavations. However, redevelopment activities will require dewatering in the event groundwater is encountered during excavation, and the SMP for the site will also require actions to be taken should groundwater be encountered, so direct contact with groundwater is not anticipated to be a complete exposure pathway. However, in consideration of historically shallow groundwater levels and in order to evaluate potential exposures without planned institutional/engineering controls, this exposure pathway is conservatively identified in the CSM as potentially complete for maintenance/utility workers and construction workers. Groundwater at the site cannot be used as a domestic water supply, so exposure through domestic use is an incomplete exposure pathway for all receptors.

The new building plans include ground floor residential units on the west and north sides of the building, elevator pits in the center area of the building, and common and amenity areas in the east portion of the building (PES, 2015b). To mitigate for potential accumulation and migration of VOCs and methane in soil gas into these ground floor building areas, a vapor mitigation system will be designed and installed beneath the floor slab underlying these portions of the building. If required, the system will consist of impermeable vapor barriers with passive venting. For the purposes of this CSM, as requested by ACEH, no vapor mitigation measures were assumed. The requirement for the vapor mitigation system will be based in part on the results of the HHRA.

Vapor inhalation may occur from chemicals volatilizing from either groundwater or soil. Vapor inhalation in the indoor environment is typically assumed to be associated with higher exposures than outdoor vapor inhalation. Therefore, all potential vapor inhalation by the commercial and residential receptors was conservatively assumed to occur indoors. Note that outdoor vapor inhalation is incorporated in the soil ESLs, so this pathway, while considered insignificant relative to indoor inhalation, will be included in the Tier 1 soil evaluation. As discussed previously, vapor inhalation for the construction and maintenance/utility worker receptors was assumed to occur outdoors, since these receptors are not expected to work indoors.

On the basis of the discussions provided in the preceding text and as shown on Plate 7, the following exposure pathways were identified as potentially (or theoretically) complete and were evaluated in Tier 1:

- Future onsite construction worker receptor:
    - Direct contact with soil via ingestion and dermal exposure
    - Dermal contact with groundwater
    - Inhalation of vapors and dusts in outdoor air
- Future onsite maintenance/utility worker receptor:
    - Direct contact with soil via ingestion and dermal exposure
    - Dermal contact with groundwater
    - Inhalation of vapors and dusts in outdoor air

- Future onsite commercial (retail) worker receptor:
  - Inhalation of vapors in indoor air due to subsurface vapor intrusion
- Future onsite residential receptor:
  - Direct contact with soil via ingestion and dermal exposure
  - Inhalation of vapors in indoor air due to subsurface vapor intrusion
  - Inhalation of dusts and vapors in outdoor air.

As discussed in the following section, the Tier 1 evaluation utilizes screening levels, some of which are receptor- and pathway- specific. Therefore, in addition to identifying chemicals that should be further evaluated, Tier 1 also serves to distinguish potentially complete but insignificant pathways from those that are potentially complete and significant.

The Tier 1 screening evaluation encompassing the exposure scenarios identified above is described in the next section.

5.0 TIER 1 EVALUATION

This section describes the Tier 1 human health risk-based screening evaluation that was conducted for the site. To identify chemicals of potential concern (COPCs), and associated exposure pathways for quantitative evaluation in the HHRA, the maximum detected concentrations of chemicals in site media were compared to conservative, generic, risk-based screening levels. These are described in the following section, followed by a discussion of the Tier 1 evaluation results.

5.1 RISK-BASED SCREENING LEVELS

As discussed in Section 1.1, the RWQCB's ESLs (RWQCB, 2016) address environmental protection goals presented in the Water Quality Control Plan for the San Francisco Bay Basin. In addition to being protective of human health and ecological receptors, they are also currently designed to be protective of groundwater and to protect against nuisance conditions. Therefore, not all ESLs are strictly risk-based. Those that are risk-based target a lifetime excess cancer risk of $1x10^{-6}$, which is at the low end of the range of risks considered acceptable by USEPA ($1x10^{-4}$ to $1x10^{-6}$; Federal Register 56(20):3535, 1991) and a noncancer hazard quotient (HQ) of 1. Therefore, use of ESLs is conservative. The following sections identify ESLs used in screening site soil, groundwater, and soil gas data.

5.1.1 SOIL ESLS

Using terms and conventions for ESLs assigned by the RWQCB (2016), ESLs for "direct exposure", were conservatively utilized to identify COPCs in soil. The specific ESLs used in this screening analysis were developed by the RWQCB for residential and construction worker exposure scenarios, based on the goal of protection of human health. The ESLs were developed for cumulative exposure across all exposure pathways, including dermal contact, incidental soil ingestion, and inhalation of vapors and particulates in outdoor air (RWQCB, 2016). Since there are no ESLs specific to an invasive maintenance/utility worker, this receptor was evaluated using ESLs developed for the construction worker receptor.

5.1.2 GROUNDWATER ESLS

Groundwater ESLs were developed by the RWQCB (2016) based on several goals including:

- Protection of human health;
  - Emission of subsurface vapors to building interiors
  - Ingestion of groundwater as drinking water
  - Dermal contact with water used domestically
  - Inhalation of vapors from water during domestic use
- Protection of aquatic habitat goals; and
- Protection against nuisance concerns (odors, etc.) and general resource degradation.

Based on the goals of the HHRA and the CSM described in Section 4.0 and presented on Plate 7, only values based on the protection of human health for vapor intrusion concerns were used in the Tier 1 evaluation. Separate ESL values are developed for use with groundwater data collected from depths of less than 10 feet bgs (shallow groundwater) and from depths of 10 feet bgs or greater (deep groundwater). Groundwater was encountered at depths greater than 10 feet bgs in all of the borings from which grab groundwater samples were collected in 2013 and 2016. The deep groundwater ESLs are therefore consistent with the depths of the groundwater samples to be included in the risk assessment dataset, and were used to identify groundwater COPCs for the vapor intrusion pathway. Dermal exposure is only included in the groundwater ESLs for a residential scenario. All detected chemicals in the groundwater risk assessment dataset were therefore identified as COPCs for evaluation of the dermal contact pathway for the construction and maintenance/utility worker receptors.

5.1.3 SOIL GAS ESLS

Soil gas ESLs were developed by the RWQCB (2016) protective of vapor intrusion for both residential and commercial exposure scenarios. Soil gas ESLs have not been developed for construction or other outdoor workers. Soil gas data were compared to vapor intrusion screening levels to identify COPCs for the vapor intrusion pathway.

5.2 RISK-BASED SCREENING RESULTS

The screening evaluation is presented in Tables 26 (soil), 27 (groundwater), and 28 (soil vapor). Results of the evaluation are described for each medium in the following sections.

5.2.1 SOIL

Chemicals identified as soil COPCs varied by receptor based on the risk assessment datasets and ESLs specific to each receptor. For the construction worker receptor, one VOC (vinyl chloride), one SVOC (benzo[a]pyrene), three PCB Aroclors (1260, 1262, and 1268), total PCBs, six metals (arsenic, cadmium, cobalt, lead, nickel, and vanadium), oil & grease, and TPH-diesel were identified as soil COPCs. For the maintenance/utility worker receptor, one SVOC (benzo[a]pyrene), two of the PCB Aroclors (1260 and 1262), total PCBs, four of the metals (arsenic, cadmium, lead, and nickel), and TPH-diesel were identified as soil COPCs. For the residential receptor, only one PCB Aroclor (1260), two metals (arsenic and lead), and TPH-diesel were identified as soil COPCs. All of the soil COPCs identified for each receptor were quantitatively evaluated in the HHRA, except for total PCBs. In the soil datasets for the site, total PCBs consists of the sum of the three detected Aroclors. Therefore, instead of double-counting potential risks due to PCBs by evaluating both the individual Aroclors and total PCBs, only the individual Aroclors were evaluated and the risk and hazard estimates were summed to represent the total risks from PCBs.

5.2.2 GROUNDWATER

As discussed previously, based on a lack of appropriate screening levels, all chemicals detected in groundwater were identified as COPCs for evaluation of dermal groundwater contact by the construction and maintenance/utility worker receptors. For the vapor intrusion pathway, the screening evaluation identified only one VOC (vinyl chloride) as a COPC for the residential receptor, and none for the commercial worker receptor.

5.2.3 SOIL VAPOR

Seven of the VOCs detected in soil vapor were identified as COPCs for the residential receptor. These include benzene, cis-1,2-dichloroethene, ethylbenzene, 1,1,2,2-tetrachloroethane, trichloroethene, 1,2,4-trimethylbenzene, and vinyl chloride. Four of these VOCs (benzene, cis-1,2-dichloroethene, 1,1,2,2-tetrachloroethane, and vinyl chloride) were also identified as COPCs for the commercial worker receptor.

6.0 QUANTITATIVE RISK EVALUATION

As discussed in Section 5, chemicals identified as COPCs based on the Tier 1 evaluation were retained for further quantitative evaluation in the baseline HHRA. This section describes the toxicity values, exposure assessment, and risk characterization methods used for the HHRA. Chemicals not identified as COPCs in Tier 1 were also evaluated in the risk assessment, as described in Section 6.3.4.

6.1 TOXICITY EVALUATION

Potential toxic effects of chemicals are generally classified as carcinogenic (i.e., cancer-causing), or noncarcinogenic (i.e., noncancer health effects). These endpoints are separately quantified in HHRAs as cancer risks and noncancer health effects, respectively. Toxicity values numerically express the magnitude of potential toxic effects of chemicals. Reference doses (RfDs) and reference concentrations (RfCs) are used to quantify noncancer health effects, and cancer slope factors (SFs) and inhalation unit risks (IURs) are used to quantify cancer risks. Both cancer and noncancer endpoints may be evaluated for carcinogenic chemicals depending on the chemicals' toxic effects and availability of RfDs/RfCs.

Toxicity values are pathway-specific and are provided for both ingestion (RfDs and SFs) and inhalation (RfCs and IURs) pathways, as available and applicable. Noncancer toxicity values are provided by USEPA for chronic and subchronic exposure, which correspond to 7 years or more exposure, and less than 7 years, respectively. Chronic values were used to evaluate all receptors in the HHRA except for construction workers; subchronic values, where available, were used to evaluate this receptor since exposures are assumed to occur over a one-year exposure duration. In addition, the Office of Environmental Health Hazard Assessment (OEHHA) of CalEPA has developed reference exposure levels (RELs) for a small number of chemicals. RELs correspond to USEPA reference concentrations for the inhalation pathway; some oral exposure values are also available. CalEPA values were used preferentially where available.

Cancer-based toxicity values correspond to lifetime exposure and are provided for both the ingestion (SFs) and inhalation (IURs) pathways, as available and applicable by USEPA. CalEPA also provides cancer SFs and IURs. CalEPA values are based on an independent review by OEHHA of the toxicological literature, and are generally more conservative (i.e., higher) than USEPA values. As with noncancer toxicity values, CalEPA SF and IUR values, where available, were used preferentially.

Toxicity values for chemicals other than TPH were obtained from the following sources, in the order provided below, for the RA:

- Toxicity Criteria Database (TCDB), an online database maintained by OEHHA (CalEPA, 2016) was used as the preferred source to obtain toxicity criteria.
- The USEPA's Regional Screening Levels Tables (USEPA, 2016a) were used to obtain toxicity values not available through CalEPA (2016). This semi-annually updated source includes values from the USEPA's Integrated Risk Information System (IRIS), as well as CalEPA and other USEPA sources.

For TPH, toxicity values from RWQCB (2016) were used. The noncancer and cancer toxicity values for the COPCs are presented in Table 29.

6.2 EXPOSURE ASSESSMENT

The first part of the exposure assessment is a CSM, which identifies potential human receptors and exposure pathways at the site primarily on the basis of land and groundwater uses, and was discussed in Section 4 and presented graphically on Plate 7. Inputs to the dose estimation, including exposure assumptions and methods that were used to develop exposure point concentrations (EPCs), are discussed below.

6.2.1 EXPOSURE ASSUMPTIONS

Exposure assumptions are values used to quantify the assumed exposure to chemicals detected in site media for each receptor. Assumptions are either general and correspond to all the hypothetical receptors evaluated (e.g., averaging time), or receptor- and pathway-specific, such as body weight and exposure duration. Exposure assumptions that were used in this HHRA represent a conservative, reasonable maximum exposure (RME) scenario. The RME scenario is described by USEPA (1989) as the "highest exposure that can be reasonably anticipated to occur." Risk assessments are intended to be conservative to protect human health. RME scenarios are unlikely to occur in real life and describe only the smallest, most highly exposed portion of the population (i.e., 90^{th} to 95^{th} percentile and above). According to USEPA (1992), RME is not intended to be worst case, which would exceed upper percentile exposure. To this end, exposure assumptions should comprise both upper percentile and average values (USEPA, 1992).

Exposure assumptions for use in the RA were compiled from CalEPA and USEPA guidance documents. CalEPA's HHRA Note 1 (CalEPA, 2014) was used as the primary source for exposure assumptions. For carcinogens, age-adjusted intake rates were used as described in the RSL User's Guide (USEPA, 2016b). Exposure assumption values, sources, and rationale are provided in Table 30.

6.2.2 EXPOSURE POINT CONCENTRATIONS

EPCs are chemical concentrations in the media to which receptors are assumed to be directly exposed at an assumed point of contact. EPCs are combined mathematically in dose equations with exposure assumptions to estimate exposure doses for each exposure pathway. For a baseline

HHRA, USEPA (1989) recommends that EPCs be the lesser of the 95 percent upper confidence limit of the mean (95UCL) and maximum concentration in the exposure unit. The 95UCL provides a conservative measure of the average concentration to which receptors are likely exposed as they move around a site over the exposure duration.

USEPA's ProUCL Version 5.1 (USEPA, 2016c) was used to identify appropriate UCL concentrations for COPCs in soil. This software analyzes the data distribution, and estimates and recommends UCLs on the unknown mean, using both distribution-based (i.e., normal and lognormal parametric) and distribution-free (i.e., non-parametric) methods. Statistics are calculated using several approaches and the program recommends the statistic that best fits the distribution. Using the most recent version of the software, non-detect values are entered at the method detection limit (MDL) or the reporting limit (RL) and identified using an indicator variable column, and several different methods are used to handle non-detects in the UCL calculation process. Use of the one-half MDL or RL method, which has historically been used to estimate concentrations for environmental data sets containing non-detects, is no longer recommended and is only included in the ProUCL software for historical and comparison purposes (USEPA, 2015). Therefore, to calculate soil EPCs using the ProUCL software, non-detect values were entered as the corresponding RLs and the UCLs were selected on a chemical-specific basis as recommended by the program.

To be consistent with USEPA guidance, the lesser of the maximum detected concentration and the UCL was used as the EPC for each soil COPC detected in at least four samples. The ProUCL User's Guide (USEPA, 2015) does not recommend selecting a UCL as the EPC for data sets with only a few detected values (fewer than 4 to 6 values, or 4 to 5 percent detection frequency). Therefore, for chemicals with fewer than four detected values, the maximum concentration was selected as the EPC. Outputs from the ProUCL software are provided in Appendix A.

For the construction worker receptor exposure scenario, soil EPCs incorporate soil samples to the planned excavation depth (including surface samples) across the entire site. For the maintenance/utility worker exposure scenario, only samples to this depth within proposed utility trenches were used to calculate soil EPCs. For residents, only shallow soil samples from locations outside of the proposed building footprint were incorporated for soil EPC calculations. The plans for the development are shown on Plates 3 through 6. Soil EPCs for each receptor are provided in Table 31.

Soil data are typically not evaluated for vapor intrusion; soil gas and groundwater data are considered more appropriate for such evaluations. Soil gas data were used as the primary line of evidence to evaluate this pathway, as described further below. Soil gas is the medium closest to potential receptors and these data are therefore considered the most relevant for estimating exposure and are given the most weight, consistent with CalEPA (2011a) guidance. Soil gas samples collected from depths of five to 10 feet bgs were used to evaluate vapor intrusion concerns within this depth interval, as recommended by the RWQCB (2016). The groundwater dataset was used as a secondary line of evidence to evaluate the vapor intrusion pathway.

A location-specific evaluation was conducted to evaluate the vapor intrusion pathway, consistent with CalEPA policy. The maximum detected concentration of each soil gas COPC was used to calculate indoor air EPCs for the initial evaluation. Indoor air EPCs were calculated using the CalEPA-modified version of the Johnson and Ettinger (J&E) model (Appendix B). The same procedure was followed using groundwater data (Appendix C), and the results were compared to those based on soil gas data as a secondary line of evidence.

The groundwater risk assessment dataset is limited to nine or fewer samples, depending on the chemical, for VOCs, and to six samples for metals. Many COPCs were only detected in a few samples. Maximum detected chemical concentrations were therefore conservatively used to represent EPCs for groundwater COPCs.

EPCs were combined with exposure assumptions and toxicity values to estimate risks as described in the following section.

6.3 RISK CHARACTERIZATION

Two steps are conducted to characterize risks: (1) dose estimation and (2) risk estimation. These steps are briefly described in the following sections.

6.3.1 DOSE ESTIMATION

To estimate exposure doses, exposure assumptions and EPCs were combined mathematically in dose equations specific to each exposure pathway. These equations are consistent with those provided in CalEPA and USEPA guidance (CalEPA, 1996, 2015; USEPA, 1989). The estimated dose is also referred to as the chronic daily intake (CDI) or subchronic daily intake (SDI), which correspond to exposures greater than or less than 7 years, respectively (USEPA, 1989).

Exposure doses are separately estimated for cancer effects (CDIc) and noncancer effects (CDIn or SDIn), using the “averaging time” (AT) to differentiate the two endpoints. The averaging time is the time period over which the dose is averaged to yield a “daily intake” in units of milligrams of chemical per kilogram of body weight per day (mg/kg-day). For cancer effects, the carcinogenic averaging time (ATc) equals an assumed lifetime of 70 years. For noncancer effects, the noncarcinogenic averaging time (ATn) equals the receptor’s exposure duration.

The general equation to estimate an exposure dose is:

$$\text{Dose} = \frac{EPC * ED * EF * IR}{BW * AT}$$

Where:

Dose	=	CDI or SDI in milligrams per kilogram-day (mg/kg-day)
EPC	=	medium-specific exposure point concentration (e.g., soil, air)
ED	=	exposure duration (years)
EF	=	exposure frequency (days per year)
IR	=	intake rate (e.g., soil ingestion rate)
BW	=	body weight (kilograms)
AT	=	averaging time (days; ATn or ATc)

Pathway-specific dose equations are provided in the risk calculation tables (Tables 32 through 36).

6.3.2 RISK ESTIMATION

Potential cancer and noncancer health effects were separately quantified in the HHRA as discussed in the following text.

Noncancer health effects are quantified to provide Hazard Quotients (HQs) and Hazard Indices (HIs) for each receptor. An HQ is a chemical-specific estimate of adverse noncancer health effects for a particular pathway and receptor. HQs are derived by comparing the noncancer exposure dose to the corresponding noncancer reference dose (i.e., ratio of dose to RfD). An HI is the sum of HQs for one pathway or the sum of HIs for all pathways. HQs and HIs are estimated as described below.

- HQ = CDIn /cRfD or SDIn / sRfD
- An HQ is estimated for each COPC for a given pathway and receptor
- HQs are summed across chemicals to provide a Hazard Index (HI) representing the total estimated noncancer hazard for each pathway (pathway-specific HI)
- Pathway-specific HIs are then summed across all pathways quantified for each receptor to provide a multipathway HI
- The resulting HI is compared to the agency-recommended target HI of one (1; CalEPA, 1996, 2015; USEPA, 1989). An HI less than or equal to 1 indicates that adverse noncancer health effects are not anticipated for the given receptor under the exposure conditions evaluated.

Cancer risks are estimated for each receptor as described below.

- Theoretical excess risk = CDIc x SF
- An excess risk is estimated for each COPC for a given pathway and receptor
- Chemical-specific risk estimates are summed to provide a pathway-specific total lifetime excess cancer risk (LECR) estimate for each pathway
- Pathway-specific risk estimates are then summed across all pathways quantified for each receptor to provide a multipathway total LECR estimate for each receptor.

For the vapor intrusion pathway, HQ and LECR estimates were calculated using the CalEPA-modified version of the J&E model, using the exposure assumptions and toxicity values provided therein. Separate versions of the model are provided for the residential and commercial scenarios; the appropriate model was used to calculate risk and hazard estimates for each receptor in the HHRA. Based on soil boring logs provided in PES (2015b and 2016b), soils within the upper ten feet at the site typically consist of clay or silt mixed with sand and/or gravel. Based on this information combined with guidance from USEPA (2004a), a soil type of sandy loam was used to represent site subsurface conditions. Soil vapor sample depths corresponded to the maximum detected COPC concentrations. For groundwater, a depth of 13 feet was used based on PES (2016a). The J&E modeling spreadsheets for soil vapor are provided in Appendix B. The J&E modeling spreadsheet for vinyl chloride in groundwater is provided in Appendix C.

Cancer risks are termed "theoretical lifetime excess risks" to distinguish risk results from actual cancer cases such as those recorded for the general population by the Centers for Disease Control. Risk results are entirely theoretical and correspond to the hypothetical exposure scenarios evaluated in the RA. "Excess" means that risk results are additional to the "background" rate of cancer cases in the general population of about 40 percent (two in five persons, according to the American Cancer Society).

USEPA characterizes theoretical LECRs below one in one million (10^{-6}) as not of concern and has stated that estimated risks between 10^{-6} and one in 10,000 (10^{-4}) are "safe and protective of public health" (Federal Register 56(20):3535, 1991). Remedial action is not generally required by USEPA for sites with a theoretical lifetime excess risk of less than 10^{-4} (USEPA, 1991). CalEPA (1996, 2015) generally adopts the conservative target risk of 10^{-6}, the lower end of the USEPA target risk range, for residents. Consistent with CalEPA policy, a target cancer risk of 10^{-6} was utilized in the HHRA.

Risk and hazard equations and calculations are presented for soil in Tables 32 (construction worker), 33 (maintenance/utility worker), and 34 (resident), for dermal contact with groundwater (construction and maintenance/utility workers) in Table 35, and for vapor intrusion from soil vapor to indoor air (resident and commercial/industrial worker) in Table 36. Groundwater data were used as a secondary line of evidence to evaluate the vapor intrusion pathway; this evaluation is presented in Appendix C.

6.3.3 RISK CHARACTERIZATION RESULTS

The risk characterization results are summarized below and in Table 37.

Future Construction Worker Receptor:

- Theoretical HI: 32, which is well above the target HI of 1. This HI is primarily due to ingestion of arsenic in soil, and dermal contact with TPH-diesel in groundwater.

- Theoretical LECR: 1 x 10^{-5}, which is above CalEPA's target risk of 10^{-6} and in the middle of USEPA's target risk range of 10^{-6} to 10^{-4}. This risk estimate is primarily due to ingestion of and dermal contact with arsenic and Aroclor 1260 in soil.

<u>Future Maintenance/Utility Worker Receptor</u>:

- Theoretical HI: 1, which is equal to but not above the target HI of 1. This indicates that adverse noncancer health effects are not anticipated for this receptor under the conservative exposure conditions evaluated.
- Theoretical LECR: 2 x 10^{-5}, which is above CalEPA's target risk of 10^{-6} and in the middle of USEPA's target risk range of 10^{-6} to 10^{-4}. This risk estimate is primarily due to ingestion of and dermal contact with arsenic and Aroclor 1260 in soil.

<u>Future Resident Receptor</u>:

- Theoretical HI: 46, which is above the target HI of 1. This hazard index is primarily due to ingestion of arsenic in soil, and inhalation of cis-1,2-dichloroethene and vinyl chloride migrating from soil vapor to indoor air.
- Theoretical LECR: 2 x 10^{-2}, which is above both CalEPA's target risk of 10^{-6} and USEPA's target risk range of 10^{-6} to 10^{-4}. This risk estimate is primarily due to inhalation of vinyl chloride migrating from soil vapor to indoor air and ingestion of arsenic in soil.

<u>Future Commercial/Industrial Worker Receptor</u>:

- Theoretical HI: 2, which is slightly above the target HI of 1. This hazard estimate is based primarily on inhalation of cis-1,2-dichloroethene and vinyl chloride migrating from soil vapor to indoor air. Only cis-1,2-dichloroethene has a chemical-specific HQ above 1 (1.1); this is equal to 1 when rounded to one significant figure.
- Theoretical LECR: 2 x 10^{-3}, which is above both CalEPA's target risk of 10^{-6} and USEPA's target risk range of 10^{-6} to 10^{-4}. This risk estimate is primarily due to inhalation of vinyl chloride migrating from soil vapor to indoor air.

6.3.3.1 Vapor Intrusion Risks from Groundwater

Groundwater data were used as a secondary line of evidence to evaluate potential risks from the vapor intrusion pathway to the future resident and commercial worker receptors. The results of this evaluation are provided in Appendix C. Only one VOC (vinyl chloride) was identified as a groundwater COPC for the residential receptor, and no chemicals were detected in groundwater at concentrations above vapor intrusion ESLs for the commercial worker receptor. The noncancer HQ estimate for the residential receptor is well below one (0.0072). This indicates that adverse noncancer health effects are not anticipated for this receptor under the conservative exposure conditions evaluated. The LECR estimate for the future resident receptor is 2 x 10^{-5}, which is above CalEPA's target risk of 10^{-6} and in the middle of USEPA's target risk range of 10^{-6} to 10^{-4}. This LECR is three orders of magnitude lower than the LECR estimate for this receptor based on the maximum detected concentration of vinyl chloride in soil vapor. Therefore, soil vapor appears to be the most relevant medium for addressing risks associated with vapor intrusion. Further, the same chemical, vinyl chloride, drives risks from vapor intrusion in both media.

6.3.4 EVALUATION OF CHEMICALS NOT IDENTIFIED AS COPCS

Chemicals not identified as COPCs in Tier 1 (i.e., chemicals that are detected but only at concentrations below ESLs) were also evaluated in the risk assessment as requested by ACEH. This evaluation utilized ESLs to calculate a ratio for each chemical of the maximum detected concentration to the ESL. This ratio is referred to herein as the screening level (SL) quotient. For carcinogenic chemicals, separate SL quotients were calculated for cancer and noncancer effects. For each effect type (i.e., cancer and noncancer), SL quotients were summed across chemicals to calculate cumulative SL quotients equivalent to the cumulative cancer risk and noncancer hazard estimates calculated for COPCs in each medium. The SL quotient calculations are presented in Tables 38 (soil) and 39 (soil vapor). These values were then added to the cumulative HI and LECR estimates based on the COPCs evaluated in the quantitative risk assessment, to provide cumulative estimates of cancer risks and noncancer hazards across all chemicals detected in each medium (Table 37).

The SL quotients calculated for non-COPCs in soil and soil vapor are generally much lower than the risk and hazard estimates based on COPCs. For example, the noncancer SL quotient for the construction worker receptor is 3, versus a COPC-based HI of 32. Similarly, the cancer-based SL quotient for the commercial/industrial worker receptor adds a total of 1×10^{-6} to the COPC-based LECR of 2×10^{-3}. The noncancer SL quotient for the maintenance/utility worker (2), however, is twice as high as the COPC-based HI for this receptor (1). This is in part due to the use of maximum concentrations, rather than 95UCLs, to calculate the SL quotients. Also, four times the number of chemicals detected in the soil risk assessment dataset for this receptor had maximum concentrations below SLs, compared to the number of chemicals in this dataset that were identified as COPCs. The cumulative noncancer and cancer-based SL quotients for soil and soil vapor, and the total estimates based on combined HIs or LECRs and SL quotients, are presented in Table 37.

6.3.5 TARGET SOIL VAPOR CLEANUP LEVELS

Target cleanup levels (TCLs) were calculated for soil vapor COPCs with maximum detected concentrations resulting in HQ or LECR estimates above 1 or 1×10^{-6}, respectively, based on the vapor intrusion pathway for residential and commercial worker receptors. This includes benzene, cis-1,2-dichloroethene, ethylbenzene, 1,1,2,2-tetrachloroethane, and vinyl chloride for residents. For commercial workers, this includes four of these five chemicals (all except ethylbenzene). The TCL calculations and resulting values are presented in Table 40.

Target cleanup levels represent the concentration of each chemical that would result in a target HQ of 1 or LECR of 1×10^{-6} based on the conservative exposure conditions assumed in the HHRA. The TCL for each chemical is equal to the exposure (i.e., maximum) concentration multiplied by the target risk or hazard level and then divided by the risk or hazard level associated with the exposure concentration. For noncarcinogenic effects, since the target hazard quotient is equal to one, the TCL is simply the maximum chemical concentration divided by the resulting

HQ estimate. For carcinogenic effects, the TCL equals the maximum concentration multiplied by 1×10^{-6} and then divided by the associated LECR estimate. The final TCL for each chemical is the lower of the TCLs based on noncarcinogenic and carcinogenic effects.

Detected concentrations of each chemical were then compared to the TCLs to identify additional locations (i.e., other than the location of the maximum detected concentration), if any, with concentrations that may result in HQ or LECR estimates greater than 1 or 1×10^{-6}, respectively (Table 40). This comparison utilized residential TCLs because these values are lower than those based on a commercial scenario.

As noted above and below, interim remedial measures and engineering and institutional controls are components of the planned redevelopment project. USEPA and DTSC guidance indicate that source remediation is appropriate for HQ and LECR estimates greater than 1 or 1×10^{-4}, respectively. USEPA and DTSC further indicate that mitigation is appropriate for a HQ estimate greater than 1 and LECR estimates between 1×10^{-4} and 1×10^{-6} (USEPA, 1991; CalEPA, 2011b). Accordingly, TCLs may be adjusted based on the anticipated protection afforded by engineering and institutional controls planned for the site. TCLs were therefore also calculated for future residential and commercial worker receptors using target LECRs of 1×10^{-5} and 1×10^{-4}. For each of these target cancer risk estimates, as with the values based on a target LECR of 1×10^{-6}, the target noncancer hazard quotient is equal to one and the final TCL is the lower of the TCLs based on noncarcinogenic and carcinogenic effects.

Three COPCs (benzene, 1,1,2,2-tetrachloroethane, and vinyl chloride) were detected at concentrations above their respective TCLs at other sampling locations in addition to the locations of the maximum detected concentrations. Benzene and vinyl chloride concentrations above TCLs are more widespread, while 1,1,2,2-tetrachloroethane was detected at only four locations (including the maximum location) at concentrations above the TCL. All of these locations exhibit elevated concentrations of the other COPCs (maximum concentration of benzene detected at SV17, benzene elevated at location of 1,1,2,2-tetrachloroethane maximum [SV36], vinyl chloride above TCL at SV40), except for SV33 where the vinyl chloride concentration equals but does not exceed the TCL (Table 40). Soil gas COPCs other than cis-1,2-dichloroethene also had some reporting limits (for non-detect results) that were above TCLs. Only locations with detected results above TCLs are listed in Table 40.

6.3.6 DISCUSSION

Risk and hazard estimates calculated in this HHRA were based on the conservative assumption that potential vapor intrusion and soil contact will not be mitigated with engineering or institutional controls. Construction and maintenance/utility workers were also conservatively assumed to regularly contact groundwater. Based on these conservative assumptions, risk and/or hazard estimates for all receptors are above regulatory target levels. Risk and hazard estimates are elevated for all media and are primarily due to arsenic and Aroclor 1260 in soil, TPH-diesel in groundwater, and cis-1,2-dichloroethene and vinyl chloride in soil vapor.

As noted in Table 4, the background concentration of arsenic in soil in the San Francisco Bay Area, calculated as the 95th percentile of 1,395 data points, is 17 mg/kg (LBL, 2002). This background concentration is greater than all of the arsenic EPCs based on site-specific soil data (11 mg/kg, 6.6 mg/kg, and 6.8 mg/kg for the construction worker, maintenance/utility worker, and resident receptors, respectively). Risk and hazard estimates for arsenic in soil may therefore be due to naturally occurring, and not site-related, sources of arsenic.

Engineering and institutional controls are planned for the site redevelopment, and these controls are expected to limit potential receptor exposures to impacted media. This is discussed below for the future construction and maintenance/utility worker receptors, followed by a separate discussion of post-IRM, post-development receptors (i.e., future residents and commercial workers).

Construction workers will be required to follow guidelines presented in the updated SMP and to comply with the site-specific Health and Safety Plan (HASP) that will be provided as an appendix to the SMP. Exposure to construction workers will be controlled through the use of personal protective equipment as described in the SMP. The purpose of the HASP is to provide: (1) health and safety guidelines for those who may potentially encounter chemicals during site excavation for construction of subgrade portions of the building, and in areas where earthwork will be performed outside of the building footprint (e.g., dewatering well installation, underground utility work, etc.); and (2) contingency procedures to be implemented by contractors to protect worker health and safety should hazardous materials be encountered. A HASP has been prepared for the project in accordance with California Occupational Safety and Health Administration (CAL-OSHA) Construction Safety Orders within Title 8 of the California Code of Regulations (CCR). All environmental consultants implementing the SMP at the project site will be required to be 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER)-trained. In addition, contractors working on-site will be required to be 40-hour HAZWOPER-trained if they are: (1) working in areas where suspect soil conditions have been identified based on site characterization data or field screening; and/or (2) conducting activities where exposure to shallow groundwater might occur, such as deeper excavations.

Post-construction intrusive activities, including unregulated activities such as landscaping or regulated activities such as subsurface repairs, will be conducted in accordance with an Intrusive Earthwork Guidance Plan (IEGP), which will be appended to the SMP. The IEGP provides procedures to follow to protect the public and workers involved in potential subgrade construction, maintenance, repair, inspection, or other activity involving subgrade work (regulated activities). However, in accordance with the SMP, certain areas of the site will be completed with clean, imported fill material, allowing unregulated or routine activities to be conducted. A minimum 2 feet-thick layer of clean soil/fill material will be placed at the surface for planter and landscaped areas. Shallow landscaping work (conducted within the upper 2 feet of soil) is considered an unregulated activity as the upper 2 feet of the landscaped areas will be backfilled with clean soil.

Regulated activities are described as: (1) Exterior Subsurface Construction or Repair – any activity (e.g., construction, utility line repair or installation) that extends below existing grade of pavement, concrete, or other hardscape; (2) Deep Landscaping Work – any activity related to landscaping that extends deeper than 2 feet beneath existing grade; (3) Interior Sub-Slab Work – any work that penetrates the first floor concrete floor slab of the building (a vapor mitigation system is planned for installation beneath portions of the new building not used for parking and specific procedures exist for penetration and repair); and (4) Environmental Investigations **–** any subsurface soil, groundwater, or soil vapor investigation activities that may expose workers or the public to subsurface media.

Prior to commencement of any regulated activities, the following tasks must be completed: (1) all contractors and subcontractors of either the owner, tenants, or another party causing regulated activities at the site, shall read and acknowledge they read the IEGP; (2) applicable environmental documents and investigations pertaining to the site shall be reviewed; (3) subsurface utilities will be located and verified with Underground Safety Alert (USA) and a private contractor; (4) if the planned work includes intruding beneath the floor slab of the new building, no such work shall be performed without completion of an assessment, by a qualified environmental engineer, of the potential for damaging the sub-slab vapor mitigation system, and complying with the SMP; and (5) the personnel or subcontractor performing such work will be required to develop a HASP in accordance with the hazardous material regulations found in the Title 29 Code of Federal Regulations (CFR) 1910.120, CAL-OSHA, and Title 8 of the CCR, Section 5192 HAZWOPER.

Based on the above discussion, the conservative assumptions utilized for the HHRA result in overestimation of potential exposures and risks to future construction and maintenance/utility worker receptors. Assuming the requirements described above are followed, actual exposures to these receptors will be lower than those estimated assuming no controls are implemented.

6.3.6.1 Post-Development Exposure Pathway Discussion

As noted above, risk and hazard estimates calculated in this HHRA are based on the conservative assumption that potential vapor intrusion and soil contact will not be mitigated with engineering or institutional controls. Plate 7 provides a Conceptual Site Model Diagram and identifies the potential exposure pathways at the site during construction and post-construction. However, to provide an additional framework for evaluation and interpretation of the results of the HHRA (in particular, implementation of the TCLs), the following presents a discussion of anticipated potential direct contact (e.g., ingestion, dermal absorption) and indirect exposure pathways (e.g., inhalation through volatilization) to affected media for the two primary future site receptors (residents and commercial retail workers) under the post-IRM, post-development scenario.

Direct Exposure: Direct exposure can occur to hypothetical human receptors via incidental soil ingestion and dermal contact with soil and groundwater.

Shallow groundwater, historically observed at depths ranging from 5 to 13.5 feet bgs, is not used as a drinking water source for the site or surrounding area, so ingestion of groundwater by residential or commercial (retail) workers is highly improbable. To prevent vapor intrusion into the building, a vapor barrier product combined with a passive venting system will be installed beneath enclosed building spaces, and all penetration points for utilities will have protective boots to prevent water and/or vapor intrusion.

Direct contact with soil is not considered to be a significant or complete exposure pathway for future residential and commercial (retail) users under the post-IRM, post-development scenario. Underlying soil will be capped and covered by the newly constructed concrete foundation slab, exterior areas will be covered by hardscaping and/or clean fill, and no impacted soils will be exposed after construction of the project.

Indirect Exposure: Indirect exposure can occur to future hypothetical human receptors via indoor air inhalation, ambient air inhalation, and fugitive dust inhalation. Indirect contact to future users via indoor vapor intrusion from potential post-IRM soil and groundwater volatilization is not anticipated to remain a significant exposure pathway based on the anticipated benefit provided by proper installation of a vapor intrusion barrier and passive venting system. Exposure of future residents and commercial workers to post-IRM COPCs via ambient air is not considered a complete exposure pathway. Based on the lack of surface soil exposure, the fugitive dust inhalation pathway is not considered complete for these two primary future site users.

In summary, implementation of the SVE IRM and engineering and/or institutional controls planned for the project are anticipated to effectively mitigate potential direct and indirect exposure pathways to, and associated risks from, soil, groundwater, and soil vapor at the site for future residential and commercial users. Specifically: (1) the site redevelopment will serve as a cap and will prevent future residential and commercial (retail) receptors from contacting soil, eliminating the direct and indirect contact pathways (i.e., dermal contact, ingestion, and dust inhalation) associated with COPCs in soil; (2) ongoing performance of SVE as an IRM will remove significant VOC mass; and (3) the planned vapor mitigation system to be installed beneath the building will effectively eliminate the complete and significant vapor intrusion pathway from post-IRM COPCs in soil vapor from entering enclosed spaces on the ground level. As such, direct or indirect post-development exposure pathways are not anticipated to be significant and/or complete at the site. Therefore, the conservative risk and hazard estimates presented in this HHRA likely overestimate potential future exposures and risks to future residential and commercial users at the site.

7.0 UNCERTAINTY EVALUATION

Quantifying uncertainty is an essential element of the RA process. According to USEPA's *Guidance on Risk Characterization for Risk Managers and Risk Assessors*, the point estimates of risk that are generated in a deterministic HHRA such as that completed for the site "do not fully convey the range of information considered and used in developing the assessment" (USEPA, 1992). All reasonable steps were taken to limit uncertainties in the HHRA. However, risk assessment is an inherently uncertain process due to its predictive nature and reliance on assumptions. In general, these uncertainties are driven by variability in:

- Chemical monitoring data and assumptions used in the fate and transport models with which concentrations at receptor locations are estimated;
- Receptor exposure assumptions; and
- The accuracy of toxicity values used to characterize risks and hazards.

Key uncertainties associated with these and other steps of the HHRA are described below.

Data Collection and Evaluation. The techniques used for data sampling and analysis may result in a number of uncertainties. These uncertainties are itemized below in the form of assumptions:

- It was assumed that the nature and extent of chemical impacts at the site have generally been adequately characterized.
- It was assumed that sampling and analytical methods were based on agency-approved methods incorporating recommended quality assurance/control methods. Systematic or random errors in the chemical analyses may yield erroneous data. Collection and incorporation of duplicate samples reduces the impact of this uncertainty.
- Use of soil data obtained as early as 1989 is conservative. Current concentrations at the same sampling locations would likely be lower since changes in chemical mass due to processes such as volatilization, leaching, and biodegradation lead to lower concentrations over time, assuming no ongoing source remains onsite.
- It was conservatively assumed in this RA that soil, groundwater, and soil vapor concentrations do not attenuate over time. Natural attenuation processes such as biodegradation and volatilization tend to decrease organic chemical concentrations in the subsurface over time. Also, an infinite mass of material was assumed present in the subsurface. In reality, mass would likely be depleted over the 25- or 26- year exposure periods assumed for workers and residents, respectively, further lowering exposure estimates.

Overall, using maximum detected COPC concentrations (or upper-bound estimates of the mean in a few cases) for the EPCs, compounded with the deterministic sampling strategy used at the site and other conservative assumptions regarding chemical concentrations, is likely to result in an overestimation of exposure and subsequent noncancer hazards and cancer risks.

COPC Identification. Where possible, screening levels for structurally similar chemicals were conservatively used as surrogates for chemicals without available screening levels in the COPC identification process. For some chemicals, no appropriate surrogate was available. The few chemicals without available screening levels or suitable surrogates are not expected to contribute significantly to the risk and hazard estimates calculated based on COPCs, and these chemicals were not quantitatively evaluated in the HHRA. This remains a source of uncertainty in the HHRA and may result in a slight underestimation of exposure and risk.

Exposure Assessment. Key uncertainties associated with this component of the risk assessment are summarized below.

- Exposure Pathways. The exposure pathways quantified are expected to represent the primary drivers of exposure, based on the results of the chemical analyses and the expected fate and transport of these chemicals in the environment. Minor, secondary pathways may also exist but often cannot be identified or evaluated using the available data. The contribution of secondary pathways to the overall risk from the site is not likely to be significant.
- Exposure Assumptions. Exposure assumptions used in the risk assessment are reflective of trends (usually for the most sensitive individual within an entire population), and as such are subject to intrinsic variability. Their presence therefore introduces a level of uncertainty to the risk assessment. Assumptions used in the risk assessment were generally RME values obtained from CalEPA guidance. Overall, the exposure assumptions used in the HHRA likely result in an overestimation of risks and hazards for the pathways quantified.
- EPCs. As previously discussed, use of maximum detected COPC concentrations is conservative, particularly since maximum concentrations of some chemicals are not consistent with typical concentrations detected at the site. Maximum detected concentrations were also used to calculate SL quotients for non-COPCs. The average concentrations that may be encountered as receptors move around the site would be lower than the maximum concentrations used as EPCs for soil vapor and groundwater in this HHRA. Moreover, receptors were assumed to be exposed to a single-point EPC for their entire exposure duration, since attenuation and degradation of soil, groundwater, and soil vapor concentrations over time were not assumed to occur. These assumptions are associated with an overestimate of risks and hazards.
- Fate and Transport Models. The models that were used in this assessment have been developed or accepted by regulatory agencies. This generally means that these models overestimate actual exposures. For instance, the J&E model used to estimate vapor flux from soil gas is an “infinite source” model that assumes no loss of chemical mass over time. It is also a one-compartment model that assumes one direction for vapor chemical migration. Actual vapor flux measurements at the site soil surface often demonstrate a flux rate substantially below that predicted by the models, especially in the future as chemical mass is depleted through volatilization, degradation, and attenuation

mechanisms. The models used are designed to overestimate exposure and contribute to conservatism in the risk assessment.

- Engineering and Institutional Controls. It was conservatively assumed for the purposes of this HHRA that potential vapor intrusion, soil contact, and groundwater contact will not be mitigated with engineering or institutional controls. Controls are planned for the site to reduce potential exposures. This assumption therefore results in overestimation of potential exposures and risks.
- Groundwater Risk Assessment Dataset. Grab groundwater samples are not generally suited for risk assessment purposes because chemical concentrations in grab samples are generally higher than would be anticipated from groundwater wells due to the presence of soil particles from the borehole in the sample, and the lack of equilibrium conditions during sample collection. Further, only unfiltered samples were collected for VOC analysis. These data likely overestimate concentrations of chemicals dissolved in groundwater.

Toxicity Assessment. Toxicity information for many chemicals is often limited. Consequently, there are varying degrees of uncertainty associated with the toxicity values calculated by CalEPA and USEPA. Sources of uncertainty include:

- Using dose-response information from effects observed at high doses in the laboratory to predict the adverse health effects that may occur following exposure to the low levels expected from human contact with the agent in the environment;
- Using dose-response information from short-term exposures in the laboratory to predict the effects of long-term exposures in the environment;
- Using dose-response information from animal studies to predict effects in humans; and
- Using dose-response information from homogeneous animal or human populations to predict the effects likely to be observed in the general population consisting of individuals with a wide range of sensitivities.

Because "uncertainty factors" of 10 are typically used by CalEPA and USEPA for several of these variables, use of CalEPA and USEPA toxicity values likely results in an overestimation of hazard and risk.

For some chemicals, toxicity information is not available. In such cases, structurally similar surrogate chemicals were used to estimate toxicity. This is likely conservative, but remains a source of uncertainty in the HHRA.

Risk Characterization. A number of limitations are associated with the risk characterization approach for carcinogens and noncarcinogens. For instance, the cancer SF or IUR is often based on an upper 95UCL of the probability of a cancer response in experimental subjects and assumes linearity of dose-response from the maximum tolerated doses used in cancer studies down to very low concentrations. It was further assumed that all cancer risks and noncancer hazards were additive regardless of the target organ or toxic mechanism of action. These factors likely result in an overestimation of the actual risks and hazards associated with subsurface residual chemical mass.

Summary of HHRA Uncertainties. The analysis of uncertainties and limitations associated with the risk assessment indicates that noncancer hazard and cancer risk estimates likely overestimate actual impacts to human health. Although, as outlined above, many factors can contribute to the potential for over- or underestimating risk, input values used to estimate potential exposures were primarily upper-bound values. Actual chemical exposures at the site are most likely less than those estimated for the evaluated receptors.

8.0 REFERENCES

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TABLES

Table 1
Summary of Laboratory Analytical Results for Soil - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Location	Sample Depths (ft bgs)	VOCs (µg/kg)																
				Acetone	Benzene	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Carbon Disulfide	Chlorobenzene	1,2-DCA	1,2-DCB	1,3-DCB	1,4-DCB	cis-1,2-DCE	trans-1,2-DCE	Ethylbenzene	Isopropylbenzene	4-Isopropyl Toluene	Methylene Chloride
IS1	4/26/1989	Former Drum Area	3.5	-	<30	--	--	--	-	<30	<30	<30	<30	<30	--	--	<30	--	--	<30
		Former Drum Area	7.0	-	<30	--	--	--	-	<30	<30	<30	<30	<30	--	--	<30	--	--	<30
		Former Drum Area	10.5	-	**240**	--	--	--	-	**110**	**500**	<60	<60	<60	--	--	**1,800**	--	--	<60
IS2	4/26/1989	Former Drum Area	3.0	-	<30	--	--	--	-	<30	<30	<30	<30	<30	--	--	<30	--	--	<30
		Former Drum Area	8.5	-	**140**	--	--	--	-	<150	<150	<150	<150	<150	--	--	**1,400**	--	--	<150
REAR	8/21/1989	Offsite Excavation	1	<40,000	<8,000	--	--	--	<20,000	-	-	<20,000	<20,000	<20,000	--	--	**20,000**	--	--	<20,000
REAR	8/21/1989	Offsite Excavation	3	<20,000	<4,000	--	--	--	<8,000	-	-	<10,000	<10,000	<10,000	--	--	**20,000**	--	--	<10,000
SS-1-E	10/5/1989	UST Confirmation	2' Beneath UST	<200,000	**1,300**	--	--	--	<80,000	<30	<30	<30	**120**	**260**	--	--	**40**	--	--	<30
SS-2-W	10/5/1989	UST Confirmation	2' Beneath UST	<20	**230**	--	--	--	<3	<30	<30	<30	<30	<30	--	--	**30**	--	--	<30
SS-3-E	10/5/1989	UST Confirmation	2' Beneath UST	**40**	<30	--	--	--	<3	<30	<30	<30	<30	<30	--	--	<30	--	--	<30
SS-4-W	10/5/1989	UST Confirmation	2' Beneath UST	<2,000,000	**1,400**	--	--	--	<800,000	<30	<30	**70**	**2,000**	**2,400**	--	--	**110**	--	--	<30
SS-5-E	10/5/1989	UST Confirmation	2' Beneath UST	<400,000	<300	--	--	--	<20,000	<30	<30	<30	<30	<30	--	--	<300	--	--	<30
SS-6-W	10/5/1989	UST Confirmation	2' Beneath UST	<2,000,000	**4,600**	--	--	--	<800,000	<30	<30	<30	<30	<30	--	--	<1,500	--	--	<30
B-7/MW-7	1/3/1990	Drum Area	4	<50	<10	--	--	--	<10	<10	<10	<10	<10	<10	--	--	<10	--	--	<50
			9	<50	<10	--	--	--	<10	<10	<10	<10	<10	<10	--	--	**250**	--	--	<50
B-8/MW-8	1/3/1990	Downgradient of USTs	4	<50	<10	--	--	--	<10	<10	<10	<10	<10	<10	--	--	<10	--	--	<50
B-8/MW-8	1/3/1990	Downgradient of USTs	9	<50	<100	--	--	--	<100	<100	<100	<100	<100	<100	--	--	<100	--	--	<500
B-9	1/4/1990	At sump	4	<50	<10	--	--	--	<10	<10	<10	<10	<10	<10	--	--	<10	--	--	<50
			9	<50	**54**	--	--	--	<10	<10	<10	<10	<10	<10	--	--	**140**	--	--	<50
B-10	1/4/1990	Northwest Parking Lot	4	<50	<10	--	--	--	<10	<10	<10	<10	<10	<10	--	--	<10	--	--	<50
			9	<100	<20	--	--	--	<20	<20	<20	<20	<20	<20	--	--	<20	--	--	<100
B-11	1/4/1990	Between office and warehouse	4	<50	<10	--	--	--	<10	<10	<10	<10	<10	<10	--	--	<10	--	--	<50
			9	<50	<10	--	--	--	<10	<10	<10	<10	<10	<10	--	--	<10	--	--	<50
-	4/1/1990	B-12	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-			9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-	4/1/1990	B-13	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-			9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PB-1	9/5/1991	Soil Boring in tank area	6	<20	<5	--	--	--	<5	<5	<5	<5	**2**	<5	--	--	<5	--	--	<5
			8.5	<20	<5	--	--	--	<5	<5	<5	**3**	**4**	<5	--	--	<5	--	--	<5
PB-2	9/5/1991	Soil Boring in tank area	5.5	<20	<5	--	--	--	<5	<5	<5	<5	<5	<5	--	--	<5	--	--	<5
			8	<20	**5**	--	--	--	<5	<5	<5	**4**	**4**	<5	--	--	<5	--	--	<5
MW-9	4/13/1994	W of Tank Excavation	8.5	**70**	<5	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
			15.5	**140**	**4**	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
MW-10	4/14/1994	N of Tank Excavation	9.5	**30**	<5	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
			15.5	**320**	<10	--	--	--	**20**	<10	<10	NR	NR	NR	--	--	<10	--	--	**40**
T-2	4/13/1994	SE tank excavation	6	-	-	--	--	--	-	-	-	-	-	-	--	--	-	--	--	-
			8.5	**110**	<5	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
T-3	4/13/1994	Bottom tank excavation	8	**70**	**4**	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
			14.5	**100**	<5	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
T-4	4/14/1994	SW tank excavation	9	**50**	<5	--	--	--	**4**	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
			14.5	**160**	<5	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
T-5	4/14/1994	W of tank excavation	5	-	-	--	--	--	-	-	-	-	-	-	--	--	-	--	--	-
			9	**20**	<5	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
			14.5	<20	**12**	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
T-6	4/14/1994	NE tank excavation	7.5	**100**	<5	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
			14	<100	<30	--	--	--	<30	<30	<30	NR	NR	NR	--	--	<30	--	--	<50
T-7	4/14/1994	NW tank excavation	7.5	**30**	<5	--	--	--	<5	<5	<5	NR	NR	NR	--	--	<5	--	--	<10
			14	<1,000	**600**	--	--	--	<300	<300	<300	NR	NR	NR	--	--	<300	--	--	<500
SB2	11/07/2013	West of Warehouse	4	<20	<5	--	--	--	<5	<5	<5	<5	<5	<5	--	--	<5	--	--	<20
			7.5	**35**	<4.7	--	--	--	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	--	--	<4.7	--	--	<19
SB6-4.0	11/07/2013	SB6	4.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB6-10.0			10.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB7-2.5	11/08/2013	SB7	2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB7-8.0			8.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB11-2.0	11/08/2013	SB11	2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB11-5.5			5.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB13-1.5	11/08/2013	SB13	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB13-10.0			10.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Location	Sample Depths (ft bgs)	VOCs (µg/kg)													Comments
				MEK	MIBK	Naphthalene	Propylbenzene	Toluene	1,2,4-TCB	TCE	1,2,4-TMB	1,3,5-TMB	Vinyl chloride	m,p-Xylenes	o-Xylenes	Total Xylenes	
IS1	4/26/1989	Former Drum Area	3.5	-	-	--	--	**60**	--	<30	--	--	--	--	--	**40**	
		Former Drum Area	7.0	-	-	--	--	**200**	--	<30	--	--	--	--	--	**70**	
		Former Drum Area	10.5	-	-	--	--	**1,300**	--	**300**	--	--	--	--	--	**11,000**	
IS2	4/26/1989	Former Drum Area	3.0	-	-	--	--	**250**	--	<30	--	--	--	--	--	**100**	
		Former Drum Area	8.5	-	-	--	--	**100**	--	<150	--	--	--	--	--	**4,500**	
REAR	8/21/1989	Offsite Excavation	1	<40,000	<40,000	--	--	**80,000**	--	-	--	--	--	--	--	**360,000**	Not Representitive of Final Soil Conditions, Soil Excavated
REAR	8/21/1989	Offsite Excavation	3	<20,000	<20,000	--	--	<4,000	--	-	--	--	--	--	--	**77,000**	Offsite Location
SS-1-E	10/5/1989	UST Confirmation	2' Beneath UST	<200,000	**600,000**	--	--	NR	--	<30	--	--	--	--	--	**300**	Not Representitive of Final Soil Conditions; SVE Conducted
SS-2-W	10/5/1989	UST Confirmation	2' Beneath UST	<20	**20**	--	--	**60**	--	<30	--	--	--	--	--	**50**	Not Representitive of Final Soil Conditions; SVE Conducted
SS-3-E	10/5/1989	UST Confirmation	2' Beneath UST	<20	<20	<30	--	**50**	**200**	<30	--	--	--	--	--	**35**	Not Representitive of Final Soil Conditions; SVE Conducted
SS-4-W	10/5/1989	UST Confirmation	2' Beneath UST	<2,000,000	**3,300,000**	--	--	NR	--	<30	--	--	--	--	--	**1,100**	Not Representitive of Final Soil Conditions; SVE Conducted
SS-5-E	10/5/1989	UST Confirmation	2' Beneath UST	<40,000	**180,000**	**300**	--	NR	<200	<30	--	--	--	--	--	**1,000**	Not Representitive of Final Soil Conditions; SVE Conducted
SS-6-W	10/5/1989	UST Confirmation	2' Beneath UST	<2,000,000	**5,000,000**	--	--	NR	--	<30	--	--	--	--	--	**7,500**	Not Representitive of Final Soil Conditions; SVE Conducted
B-7/MW-7	1/3/1990	Drum Area	4	<50	<30	<300	--	<10	<300	<10	--	--	--	--	--	<10	
			9	<50	<30	**750**	--	**61**	<300	<10	--	--	--	--	--	**1,020**	
B-8/MW-8	1/3/1990	Downgradient of USTs	4	<50	<30	<300	--	<10	<300	<10	--	--	--	--	--	<10	Not Representitive of Final Soil Conditions; SVE Conducted
B-8/MW-8	1/3/1990	Downgradient of USTs	9	<500	**8,300**	<300	--	<100	<300	<100	--	--	--	--	--	<100	Not Representitive of Final Soil Conditions; SVE Conducted
B-9	1/4/1990	At sump	4	<50	<30	<300	--	**12**	<300	<10	--	--	--	--	--	<10	
			9	<50	<30	**8,900**	--	**26**	<300	<10	--	--	--	--	--	**380**	
B-10	1/4/1990	Northwest Parking Lot	4	<50	<30	--	--	<10	--	<10	--	--	--	--	--	**43**	
			9	<100	<60	--	--	<20	--	<20	--	--	--	--	--	<20	
B-11	1/4/1990	Between office and warehouse	4	<50	<30	<300	--	**15**	<300	<10	--	--	--	--	--	<10	
			9	<50	<30	<300	--	<10	<300	<10	--	--	--	--	--	<10	
-	4/1/1990	B-12	4	--	--	<300	--	--	<300	--	--	--	--	--	--	--	
-			9	--	--	<300	--	--	<300	--	--	--	--	--	--	--	
-	4/1/1990	B-13	4	--	--	<300	--	--	<300	--	--	--	--	--	--	--	
-			9	--	--	<300	--	--	<300	--	--	--	--	--	--	--	
PB-1	9/5/1991	Soil Boring in tank area	6	<20	<10	--	--	<5	--	<5	--	--	--	--	--	<5	
			8.5	<20	<10	--	--	<5	--	<5	--	--	--	--	--	<5	
PB-2	9/5/1991	Soil Boring in tank area	5.5	<20	<10	--	--	<5	--	<5	--	--	--	--	--	<5	
			8	<20	<10	--	--	<5	--	<5	--	--	--	--	--	<5	
MW-9	4/13/1994	W of Tank Excavation	8.5	**10**	**6**	-	--	<5	-	<5	--	--	--	--	--	<5	
			15.5	**20**	<10	<300	--	<5	<300	<5	--	--	--	--	--	<5	
MW-10	4/14/1994	N of Tank Excavation	9.5	<10	<10	--	--	<5	--	<5	--	--	--	--	--	<5	
			15.5	**120**	**11**	--	--	<10	--	<10	--	--	--	--	--	<10	
T-2	4/13/1994	SE tank excavation	6	-	-	<300	--	-	<300	-	--	--	--	--	--	-	
			8.5	**20**	<10	-	--	<5	-	<5	--	--	--	--	--	<5	
T-3	4/13/1994	Bottom tank excavation	8	**10**	<10	--	--	<5	--	<5	--	--	--	--	--	<5	
			14.5	**20**	<10	--	--	<5	--	<5	--	--	--	--	--	<5	
T-4	4/14/1994	SW tank excavation	9	**8**	**10**	--	--	<5	--	<5	--	--	--	--	--	<5	
			14.5	**40**	<10	--	--	<5	--	<5	--	--	--	--	--	<5	
T-5	4/14/1994	W of tank excavation	5	-	-	<3,000	--	-	<3,000	-	--	--	--	--	--	-	
			9	<10	<10	<300	--	<5	<300	<5	--	--	--	--	--	<5	
			14.5	**10**	<10	-	--	<5	-	<5	--	--	--	--	--	<5	
T-6	4/14/1994	NE tank excavation	7.5	**10**	**6**	--	--	<5	--	<5	--	--	--	--	--	<5	
			14	<50	<50	--	--	<30	--	<30	--	--	--	--	--	<30	
T-7	4/14/1994	NW tank excavation	7.5	**9**	<10	--	--	<5	--	<5	--	--	--	--	--	<5	
			14	<500	**7800**	--	--	<300	--	<300	--	--	--	--	--	**500**	
SB2	11/07/2013	West of Warehouse	4	<9.9	<9.9	<67	--	<5	-	<5	--	--	--	--	--	<5	
			7.5	<9.5	<9.5	<130	--	<4.7	-	<4.7	--	--	--	--	--	<4.7	
SB6-4.0	11/07/2013	SB6	4.0	--	--	**2,900**	--	--	-	--	--	--	--	--	--	--	
SB6-10.0			10.0	--	--	<67	--	--	-	--	--	--	--	--	--	--	
SB7-2.5	11/08/2013	SB7	2.5	--	--	**1,500**	--	--	-	--	--	--	--	--	--	--	
SB7-8.0			8.0	--	--	**28,000**	--	--	-	--	--	--	--	--	--	--	
SB11-2.0	11/08/2013	SB11	2.0	--	--	<1,300	--	--	-	--	--	--	--	--	--	--	
SB11-5.5			5.5	--	--	<670	--	--	-	--	--	--	--	--	--	--	
SB13-1.5	11/08/2013	SB13	1.5	--	--	**260**	--	--	-	--	--	--	--	--	--	--	
SB13-10.0			10.0	--	--	**2,100**	--	--	-	--	--	--	--	--	--	--	

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Sample ID	Date	Location	Sample Depths (ft bgs)	VOCs (µg/kg)																
				Acetone	Benzene	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Carbon Disulfide	Chlorobenzene	1,2-DCA	1,2-DCB	1,3-DCB	1,4-DCB	cis-1,2-DCE	trans-1,2-DCE	Ethylbenzene	Isopropylbenzene	4-Isopropyl Toluene	Methylene Chloride
SB23-0.5	12/2/2015	SB23	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB28-4.5	12/2/2015	SB-28	4.5	<45	ND	--	--	--	ND	ND	ND	ND	ND	ND	--	--	ND	--	--	ND
SB29-2.5	12/2/2015	SB29	2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB34-4.0	12/1/2015	SB34	4.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB42-1	12/2/2015	SB42	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB46-0.5	12/2/2015	SB46	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB48-1.0	12/1/2015	SB48	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV6-0.5	12/1/2015	SV6	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV10-0.5	12/1/2015	SV10	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV14-0.5	12/1/2015	SV14	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV20-0.5	11/30/2015	SV20	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV32-1.0	11/30/2015	SV32	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV32-7.0	11/30/2015	SV-32	7.0	<41	ND	--	--	--	ND	ND	ND	ND	ND	ND	--	--	ND	--	--	ND
SV33-4.5	11/30/2015	SV-33	4.5	**47**	ND	--	--	--	ND	ND	ND	ND	ND	ND	--	--	ND	--	--	ND
SV38-1.0	11/30/2015	SV38	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV47-2.5	12/03/2015	SV-47	2.5	<37	ND	--	--	--	ND	ND	ND	ND	ND	ND	--	--	ND	--	--	ND
SB50-0.5	2/1/2016	SB50	0.5	< 42	< 4.2	< 4.2	< 4.2	< 4.2	--	--	--	--	--	--	< 4.2	< 4.2	< 4.2	< 4.2	-	--
SB50-5	2/1/2016		5.0	< 37	< 3.7	< 3.7	< 3.7	< 3.7	--	--	--	--	--	--	**6.2**	< 3.7	< 3.7	< 3.7	-	--
SB51-0.5	2/1/2016	SB51	0.5	< 35	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	-	--
SB51-4.5	2/1/2016		4.5	**38**	**9.8**	**95**	**86**	**4.6**	--	--	--	--	--	--	< 3.6	< 3.6	**97**	**90**	**91**	--
SB51-10	2/1/2016		10.0	**22**	< 3.5	**6.4**	**5.6**	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	**4.2**	--
SB52-0.5	2/1/2016	SB52	0.5	< 40	< 4	< 4	< 4	< 4	--	--	--	--	--	--	< 4	< 4	< 4	< 4	-	--
SB52-4.5	2/1/2016		4.5	**55**	< 3.9	< 3.9	< 3.9	< 3.9	--	--	--	--	--	--	< 3.9	< 3.9	< 3.9	< 3.9	-	--
SB53-0.5	2/1/2016	SB53	0.5	< 38	< 3.8	< 3.8	< 3.8	< 3.8	--	--	--	--	--	--	< 3.8	< 3.8	< 3.8	< 3.8	-	--
SB53-5	2/1/2016		5.0	< 31	< 3.1	< 3.1	< 3.1	< 3.1	--	--	--	--	--	--	< 3.1	< 3.1	< 3.1	< 3.1	-	--
SB53-10	2/1/2016		10.0	< 35	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	-	--
SB54-0.5	2/2/2016	SB54	0.5	< 14	< 3.4	< 3.4	< 3.4	< 3.4	--	--	--	--	--	--	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	--
SB54-5	2/2/2016		5.0	< 13	< 3.3	< 3.3	< 3.3	< 3.3	--	--	--	--	--	--	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	--
SB55-0.5	2/2/2016	SB55	0.5	< 15	< 3.7	< 3.7	< 3.7	< 3.7	--	--	--	--	--	--	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	--
SB55-5.5	2/2/2016		5.0	**35**	< 4.6	< 4.6	< 4.6	< 4.6	--	--	--	--	--	--	**300 >LR**	**56**	< 4.6	< 4.6	< 4.6	--
SB55-10	2/2/2016		10.0	< 3,200	< 810	< 810	< 810	< 810	--	--	--	--	--	--	**24,000**	**8,300**	< 810	< 810	< 810	--
SB56-10	2/4/2016	SB56	10.0	**69**	< 4.2	< 4.2	< 4.2	< 4.2	--	--	--	--	--	--	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	--
SB56-13	2/4/2016		13.0	< 1,600	< 390	< 390	< 390	< 390	--	--	--	--	--	--	< 390	< 390	< 390	< 390	**620**	--
SB57-10	2/4/2016	SB57	10.0	**21**	< 3.8	< 3.8	< 3.8	< 3.8	--	--	--	--	--	--	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	--
SB57-12.5	2/4/2016		12.5	< 1,400	< 350	< 350	< 350	< 350	--	--	--	--	--	--	< 350	< 350	< 350	< 350	< 350	--
SB58-0.5	2/3/2016	SB58	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	--
SB58-5	2/3/2016		5.0	**36**	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	--
SB59-0.5	2/3/2016	SB59	0.5	< 12	< 3.0	< 3	< 3	< 3	--	--	--	--	--	--	< 3.0	< 3.0	< 3.0	< 3	< 3	--
SB59-5	2/3/2016		5.0	**19**	< 3.7	< 3.7	< 3.7	< 3.7	--	--	--	--	--	--	**130**	**19**	< 3.7	< 3.7	< 3.7	--
SB59-10	2/3/2016		10.0	< 12,000	< 2,900	< 2900	< 2900	< 2900	--	--	--	--	--	--	**73,000**	**81,000**	< 2,900	< 2900	< 2900	--
SB59-13.5	2/3/2016		13.5	< 14	< 3.4	< 3.4	< 3.4	< 3.4	--	--	--	--	--	--	**99**	**3.6**	< 3.4	< 3.4	< 3.4	--
SB60-0.5	2/3/2016	SB60	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	--
SB60-5	2/3/2016		5.0	< 13	< 3.2	< 3.2	< 3.2	< 3.2	--	--	--	--	--	--	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	--
SB61-0.5	2/3/2016	SB61	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	--
SB61-5	2/3/2016		5.0	**18**	< 3.9	< 3.9	< 3.9	< 3.9	--	--	--	--	--	--	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	--
SB61-10	2/3/2016		10.0	< 4,900	< 1,200	< 1200	< 1200	< 1200	--	--	--	--	--	--	< 1,200	< 1,200	< 1,200	< 1200	< 1200	--
SB61-12.5	2/3/2016		12.5	< 1,800	< 440	< 440	< 440	< 440	--	--	--	--	--	--	< 440	< 440	< 440	< 440	< 440	--
SV50-0.5	2/2/2016	SV50	0.5	< 14	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	--
SV50-4.5	2/2/2016		4.5	**27**	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	--
SV51-0.5	2/2/2016	SV51	0.5	< 16	< 4.0	< 4	< 4	< 4	--	--	--	--	--	--	< 4.0	< 4.0	< 4.0	< 4	< 4	--
SV51-5	2/2/2016		5.0	**34**	< 3.8	< 3.8	< 3.8	< 3.8	--	--	--	--	--	--	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	--
SV52-0.5	2/2/2016	SV52	0.5	< 15	< 3.8	< 3.8	< 3.8	< 3.8	--	--	--	--	--	--	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	--
SV52-5	2/2/2016		5.0	**16**	< 3.7	< 3.7	< 3.7	< 3.7	--	--	--	--	--	--	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	--

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Sample ID	Date	Location	Sample Depths (ft bgs)	VOCs (µg/kg) MEK	MIBK	Naphthalene	Propylbenzene	Toluene	1,2,4-TCB	TCE	1,2,4-TMB	1,3,5-TMB	Vinyl chloride	m,p-Xylenes	o-Xylenes	Total Xylenes	Comments
SB23-0.5	12/2/2015	SB23	0.5	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SB28-4.5	12/2/2015	SB-28	4.5	ND	ND	--	--	ND	--	ND	--	--	--	--	--	ND	
SB29-2.5	12/2/2015	SB29	2.5	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SB34-4.0	12/1/2015	SB34	4.0	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SB42-1	12/2/2015	SB42	1.0	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SB46-0.5	12/2/2015	SB46	0.5	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SB48-1.0	12/1/2015	SB48	1.0	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SV6-0.5	12/1/2015	SV6	0.5	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SV10-0.5	12/1/2015	SV10	0.5	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SV14-0.5	12/1/2015	SV14	0.5	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SV20-0.5	11/30/2015	SV20	0.5	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SV32-1.0	11/30/2015	SV32	1.0	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SV32-7.0	11/30/2015	SV-32	7.0	ND	ND	ND	--	ND	ND	ND	--	--	--	--	--	ND	
SV33-4.5	11/30/2015	SV-33	4.5	ND	ND	--	--	ND	--	ND	--	--	--	--	--	ND	
SV38-1.0	11/30/2015	SV38	1.0	--	--	ND	--	--	ND	--	--	--	--	--	--	--	
SV47-2.5	12/03/2015	SV-47	2.5	ND	ND	--	--	ND	--	ND	--	--	--	--	--	ND	
SB50-0.5	2/1/2016	SB50	0.5	-	--	< 8.5	-	< 4.2	--	< 4.2	< 4.2	< 4.2	< 4.2	-	-	--	
SB50-5	2/1/2016		5.0	-	--	< 7.3	-	< 3.7	--	< 3.7	< 3.7	< 3.7	< 3.7	-	-	--	
SB51-0.5	2/1/2016	SB51	0.5	-	--	< 7	-	< 3.5	--	< 3.5	< 3.5	< 3.5	< 3.5	-	-	--	
SB51-4.5	2/1/2016		4.5	**8.6**	--	**110**	**150**	**59**	--	< 3.6	**990**	**370**	**35**	**270**	**110**	--	
SB51-10	2/1/2016		10.0	< 7.1	--	< 3.5	< 3.5	< 3.5	--	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	--	
SB52-0.5	2/1/2016	SB52	0.5	-	--	< 8.1	-	< 4	--	< 4	< 4	< 4	< 4	-	-	--	
SB52-4.5	2/1/2016		4.5	-	--	< 7.8	-	< 3.9	--	< 3.9	< 3.9	< 3.9	< 3.9	-	-	--	
SB53-0.5	2/1/2016	SB53	0.5	-	--	< 7.5	-	< 3.8	--	< 3.8	< 3.8	< 3.8	< 3.8	-	-	--	
SB53-5	2/1/2016		5.0	-	--	< 6.3	-	< 3.1	--	< 3.1	< 3.1	< 3.1	< 3.1	-	-	--	
SB53-10	2/1/2016		10.0	-	--	< 6.9	-	< 3.5	--	< 3.5	< 3.5	< 3.5	< 3.5	-	-	--	
SB54-0.5	2/2/2016	SB54	0.5	< 6.8	--	< 3.4	< 3.4	< 3.4	--	< 3.4	< 3.4	< 3.4	< 6.8	< 3.4	< 3.4	--	
SB54-5	2/2/2016		5.0	< 6.5	--	< 3.3	< 3.3	< 3.3	--	< 3.3	< 3.3	< 3.3	< 6.5	< 3.3	< 3.3	--	
SB55-0.5	2/2/2016	SB55	0.5	< 7.4	--	< 3.7	< 3.7	< 3.7	--	< 3.7	< 3.7	< 3.7	< 7.4	< 3.7	< 3.7	--	
SB55-5.5	2/2/2016		5.0	< 9.1	--	< 4.6	< 4.6	< 4.6	--	< 4.6	< 4.6	< 4.6	**60**	< 4.6	< 4.6	--	
SB55-10	2/2/2016		10.0	< 1,600	--	< 810	< 810	< 810	--	< 810	< 810	< 810	< 1,600	< 810	< 810	--	
SB56-10	2/4/2016	SB56	10.0	**16**	--	< 4.2	< 4.2	< 4.2	--	< 4.2	< 4.2	< 4.2	< 8.4	< 4.2	< 4.2	--	
SB56-13	2/4/2016		13.0	< 780	--	< 390	< 390	< 390	--	< 390	< 390	< 390	< 780	< 390	< 390	--	
SB57-10	2/4/2016	SB57	10.0	< 7.6	--	< 3.8	< 3.8	< 3.8	--	< 3.8	< 3.8	< 3.8	< 7.6	< 3.8	< 3.8	--	
SB57-12.5	2/4/2016		12.5	< 710	--	< 350	< 350	< 350	--	< 350	< 350	< 350	< 710	< 350	< 350	--	
SB58-0.5	2/3/2016	SB58	0.5	< 7	--	< 3.5	< 3.5	< 3.5	--	< 3.5	< 3.5	< 3.5	< 7	< 3.5	< 3.5	--	
SB58-5	2/3/2016		5.0	**8.5**	--	< 3.6	< 3.6	< 3.6	--	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	--	
SB59-0.5	2/3/2016	SB59	0.5	< 6.1	--	< 3.0	< 3	< 3.0	--	< 3.0	< 3	< 3	< 6.1	< 3.0	< 3.0	--	
SB59-5	2/3/2016		5.0	< 7.4	--	< 3.7	< 3.7	< 3.7	--	< 3.7	< 3.7	< 3.7	**38**	< 3.7	< 3.7	--	
SB59-10	2/3/2016		10.0	< 5,900	--	< 2,900	< 2900	< 2,900	--	**20,000**	< 2900	< 2900	**14,000**	< 2,900	< 2,900	--	
SB59-13.5	2/3/2016		13.5	< 6.9	--	< 3.4	< 3.4	< 3.4	--	< 3.4	**4.1**	< 3.4	**26**	**20**	**7.5**	--	
SB60-0.5	2/3/2016	SB60	0.5	< 7	--	< 3.5	< 3.5	< 3.5	--	< 3.5	< 3.5	< 3.5	< 7	< 3.5	< 3.5	--	
SB60-5	2/3/2016		5.0	< 6.3	--	< 3.2	< 3.2	< 3.2	--	< 3.2	< 3.2	< 3.2	< 6.3	< 3.2	< 3.2	--	
SB61-0.5	2/3/2016	SB61	0.5	< 7	--	< 3.5	< 3.5	< 3.5	--	< 3.5	< 3.5	< 3.5	< 7	< 3.5	< 3.5	--	
SB61-5	2/3/2016		5.0	< 7.7	--	< 3.9	< 3.9	< 3.9	--	< 3.9	< 3.9	< 3.9	< 7.7	< 3.9	< 3.9	--	
SB61-10	2/3/2016		10.0	< 2,500	--	**9,200**	**1300**	< 1,200	--	< 1,200	< 1200	< 1200	< 2,500	< 1,200	< 1,200	--	
SB61-12.5	2/3/2016		12.5	< 890	--	**1,800**	< 440	< 440	--	< 440	< 440	< 440	< 890	< 440	< 440	--	
SV50-0.5	2/2/2016	SV50	0.5	< 7.1	--	< 3.6	< 3.6	< 3.6	--	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	--	
SV50-4.5	2/2/2016		4.5	< 7.1	--	< 3.5	< 3.5	< 3.5	--	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	--	
SV51-0.5	2/2/2016	SV51	0.5	< 7.9	--	< 4.0	< 4	< 4.0	--	< 4.0	< 4	< 4	< 7.9	< 4.0	< 4.0	--	
SV51-5	2/2/2016		5.0	**7.8**	--	< 3.8	< 3.8	< 3.8	--	< 3.8	< 3.8	< 3.8	< 7.6	< 3.8	< 3.8	--	
SV52-0.5	2/2/2016	SV52	0.5	< 7.7	--	< 3.8	< 3.8	< 3.8	--	< 3.8	< 3.8	< 3.8	< 7.7	< 3.8	< 3.8	--	
SV52-5	2/2/2016		5.0	< 7.3	--	**4**	< 3.7	< 3.7	--	< 3.7	< 3.7	< 3.7	< 7.3	< 3.7	< 3.7	--	

Table 1
Summary of Laboratory Analytical Results for Soil - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Location	Sample Depths (ft bgs)	VOCs (µg/kg)																
				Acetone	Benzene	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Carbon Disulfide	Chlorobenzene	1,2-DCA	1,2-DCB	1,3-DCB	1,4-DCB	cis-1,2-DCE	trans-1,2-DCE	Ethylbenzene	Isopropylbenzene	4-Isopropyl Toluene	Methylene Chloride
SV53-0.5	2/2/2016	SV53	0.5	< 13	< 3.3	< 3.3	< 3.3	< 3.3	--	--	--	--	--	--	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	--
SV53-5	2/2/2016		5.0	**18**	< 3.2	< 3.2	< 3.2	< 3.2	--	--	--	--	--	--	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	--
SV54-0.5	2/4/2016	SV54	0.5	< 13	< 3.3	< 3.3	< 3.3	< 3.3	--	--	--	--	--	--	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	--
SV54-5	2/4/2016		5.0	**40**	< 4.3	< 4.3	< 4.3	< 4.3	--	--	--	--	--	--	< 4.3	< 4.3	< 4.3	< 4.3	< 4.3	--
SV55-0.5	2/2/2016	SV55	0.5	< 14	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	--
SV55-5	2/2/2016		5.0	< 14	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	--
SV56-0.5	2/2/2016	SV56	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	--
SV56-5	2/2/2016		5.0	**23**	< 4.2	< 4.2	< 4.2	< 4.2	--	--	--	--	--	--	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	--
SV57-0.5	2/2/2016	SV57	0.5	< 16	< 3.9	< 3.9	< 3.9	< 3.9	--	--	--	--	--	--	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	--
SV57-5	2/2/2016		5.0	< 14	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	--
SV58-0.5	2/3/2016	SV58	0.5	< 17	< 4.2	< 4.2	< 4.2	< 4.2	--	--	--	--	--	--	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	--
SV58-5	2/3/2016		5.0	**20**	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	--
SV58-10	2/3/2016		10.0	< 16	< 4	< 4	< 4	< 4	--	--	--	--	--	--	< 4	< 4	< 4	< 4	< 4	--
SV60-0.5	2/3/2016	SV60	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	--
SV60-5	2/3/2016		5.0	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	--
SV60-10	2/3/2016		10.0	< 1,600	< 400	< 400	**610**	< 400	--	--	--	--	--	--	**13,000**	**5,800**	< 400	**430**	**590**	--
SV61-0.5	2/1/2016	SV61	0.5	< 35	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5	-	--
SV61-5	2/1/2016		5.0	< 38	< 3.8	< 3.8	< 3.8	< 3.8	--	--	--	--	--	--	< 3.8	< 3.8	< 3.8	< 3.8	-	--
SV61-10	2/1/2016		10.0	**43**	**5.2**	**130**	**210**	**39**	--	--	--	--	--	--	< 3.5	< 3.5	**16**	**450**	**220**	--
SV62-5	9/7/2016	SV62	5.0	**100**	--	--	--	--	< 8.3	--	--	--	--	--	--	--	--	--	< 8.3	--
SV62-10	9/7/2016		10.0	**130**	--	--	--	--	**6.3**	--	--	--	--	--	--	--	--	--	< 6.2	--
SV63-5	9/7/2016	SV63	5.0	< 40	--	--	--	--	< 4.0	--	--	--	--	--	--	--	--	--	< 4.0	--
SV63-10	9/7/2016		10.0	**57**	--	--	--	--	< 3.6	--	--	--	--	--	--	--	--	--	**7.1**	--
SV64-5	9/7/2016	SV64	5.0	< 57	--	--	--	--	< 5.7	--	--	--	--	--	--	--	--	--	< 5.7	--
SV64-10	9/7/2016		10.0	**48**	--	--	--	--	< 3.9	--	--	--	--	--	--	--	--	--	< 3.9	--
SV65-5	9/7/2016	SV65	5.0	< 41	--	--	--	--	< 4.1	--	--	--	--	--	--	--	--	--	< 4.1	--
SV65-10	9/7/2016		10.0	< 51	--	--	--	--	< 5.1	--	--	--	--	--	--	--	--	--	< 5.1	--
SV66-5	9/7/2016	SV66	5.0	**47**	--	--	--	--	< 3.6	--	--	--	--	--	--	--	--	--	< 3.6	--
SV66-10	9/7/2016		10.0	**100**	--	--	--	--	< 3.9	--	--	--	--	--	--	--	--	--	< 3.9	--
SV67-5	9/12/2016	SV67	5.0	**230**	--	--	--	--	< 5.2	--	--	--	--	--	--	--	--	--	< 5.2	--
SV67-10	9/12/2016		10.0	**60**	--	--	--	--	< 3.7	--	--	--	--	--	--	--	--	--	< 3.7	--

Table 1
Summary of Laboratory Analytical Results for Soil - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Location	Sample Depths (ft bgs)	MEK	MIBK	Naphthalene	Propylbenzene	Toluene	1,2,4-TCB	TCE	1,2,4-TMB	1,3,5-TMB	Vinyl chloride	m,p-Xylenes	o-Xylenes	Total Xylenes	Comments
				VOCs (µg/kg)													
SV53-0.5	2/2/2016	SV53	0.5	< 6.6	--	< 3.3	< 3.3	< 3.3	--	< 3.3	< 3.3	< 3.3	< 6.6	< 3.3	< 3.3	--	
SV53-5	2/2/2016		5.0	< 6.4	--	< 3.2	< 3.2	< 3.2	--	< 3.2	< 3.2	< 3.2	< 6.4	< 3.2	< 3.2	--	
SV54-0.5	2/4/2016	SV54	0.5	< 6.7	--	< 3.3	< 3.3	< 3.3	--	< 3.3	< 3.3	< 3.3	< 6.7	< 3.3	< 3.3	--	
SV54-5	2/4/2016		5.0	< 8.6	--	< 4.3	< 4.3	< 4.3	--	< 4.3	< 4.3	< 4.3	< 8.6	< 4.3	< 4.3	--	
SV55-0.5	2/2/2016	SV55	0.5	< 7.1	--	< 3.6	< 3.6	< 3.6	--	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	--	
SV55-5	2/2/2016		5.0	< 7.1	--	< 3.6	< 3.6	< 3.6	--	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	--	
SV56-0.5	2/2/2016	SV56	0.5	< 7.1	--	< 3.5	< 3.5	< 3.5	--	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	--	
SV56-5	2/2/2016		5.0	< 8.3	--	< 4.2	< 4.2	< 4.2	--	< 4.2	< 4.2	< 4.2	< 8.3	< 4.2	< 4.2	--	
SV57-0.5	2/2/2016	SV57	0.5	< 7.8	--	< 3.9	< 3.9	< 3.9	--	< 3.9	< 3.9	< 3.9	< 7.8	< 3.9	< 3.9	--	
SV57-5	2/2/2016		5.0	< 7.2	--	< 3.6	< 3.6	< 3.6	--	< 3.6	< 3.6	< 3.6	< 7.2	< 3.6	< 3.6	--	
SV58-0.5	2/3/2016	SV58	0.5	< 8.3	--	< 4.2	< 4.2	< 4.2	--	< 4.2	< 4.2	< 4.2	< 8.3	< 4.2	< 4.2	--	
SV58-5	2/3/2016		5.0	< 7.3	--	< 3.6	< 3.6	< 3.6	--	< 3.6	< 3.6	< 3.6	< 7.3	< 3.6	< 3.6	--	
SV58-10	2/3/2016		10.0	< 8	--	< 4	< 4	< 4	--	< 4	< 4	< 4	< 8	< 4	< 4	--	
SV60-0.5	2/3/2016	SV60	0.5	< 7.1	--	< 3.5	< 3.5	< 3.5	--	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	--	
SV60-5	2/3/2016		5.0	< 7.1	--	< 3.5	< 3.5	< 3.5	--	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	--	
SV60-10	2/3/2016		10.0	< 800	--	**890**	**650**	< 400	--	**600**	**2700**	**2600**	**3,300**	**530**	**710**	--	
SV61-0.5	2/1/2016	SV61	0.5	-	--	< 7.1	-	< 3.5	--	< 3.5	< 3.5	< 3.5	< 3.5	-	-	--	
SV61-5	2/1/2016		5.0	-	--	< 7.6	-	< 3.8	--	< 3.8	< 3.8	< 3.8	< 3.8	-	-	--	
SV61-10	2/1/2016		10.0	**12**	--	**17**	**450**	**26**	--	< 3.5	**1900**	**340**	**14**	**13**	**26**	--	
SV62-5	9/7/2016	SV62	5.0	--	--	--	--	--	--	--	--	--	--	--	--	< 17	
SV62-10	9/7/2016		10.0	--	--	--	--	--	--	--	--	--	--	--	--	< 12	
SV63-5	9/7/2016	SV63	5.0	--	--	--	--	--	--	--	--	--	--	--	--	< 8.1	
SV63-10	9/7/2016		10.0	--	--	--	--	--	--	--	--	--	--	--	--	**7.2**	
SV64-5	9/7/2016	SV64	5.0	--	--	--	--	--	--	--	--	--	--	--	--	< 11	
SV64-10	9/7/2016		10.0	--	--	--	--	--	--	--	--	--	--	--	--	< 7.8	
SV65-5	9/7/2016	SV65	5.0	--	--	--	--	--	--	--	--	--	--	--	--	< 8.1	
SV65-10	9/7/2016		10.0	--	--	--	--	--	--	--	--	--	--	--	--	< 10	
SV66-5	9/7/2016	SV66	5.0	--	--	--	--	--	--	--	--	--	--	--	--	< 7.2	
SV66-10	9/7/2016		10.0	--	--	--	--	--	--	--	--	--	--	--	--	< 7.7	
SV67-5	9/12/2016	SV67	5.0	--	--	--	--	--	--	--	--	--	--	--	--	< 10	
SV67-10	9/12/2016		10.0	--	--	--	--	--	--	--	--	--	--	--	--	< 7.3	

Notes:
Detections are shown in bold
ft bgs = Feet below ground surface
VOCs = Volatile organic compounds
µg/kg = Micrograms per kilogram
DCB = Dichlorobenzene
MEK = Methyl Ethyl Ketone
MIBK = Methyl Isobutyl Ketone
- = Not analyzed
<## = Not detected at or above the indicated laboratory reporting limit
ND = Not detected
-- = Not detected or not analyzed
NR = Not reported
DCE = Dichloroethene
TCB = Trichlorobenzene
TCE = Trichloroethene
TMB = Trimethylbenzene
Not Representative of Final Soil Conditions

Table 2
Summary of laboratory Analytical Results for Soil - SVOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Boring Location	Sample Number	Depth (Feet bgs)	Date Collected	SVOCs (µg/kg)																				
				Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) Anthracene	Benzo (a) Pyrene	Benzo (b) Fluoranthene	Benzo (k) Fluoranthene	Benzo (g,h,i) Perylene	Chrysene	Fluoranthene	Fluorene	Isophorene	Indeno (1,2,3-cd) Pyrene	2-Methyl-naphthalene	4-Methyl-phenol	Nitro-benzene	N-Nitrosodi-phenylamine	Phenanthrene	Phenol	Pyrene	Bis (2-ethylhexyl) phthalate
SS-3-E	-	-	10/5/1989	-	-	-	ND(30)	ND(30)	-	ND(30)	-	ND(70)	ND(30)	-	ND(30)	-	ND(30)	**200**	ND(30)	-	ND(30)	-	ND(30)	ND(300)
SS-5-E	-	-	10/5/1989	-	-	-	ND(200)	ND(200)	-	ND(200)	-	ND(400)	ND(200)	-	ND(200)	-	**1,000**	ND(200)	ND(200)	-	ND(200)	-	ND(200)	ND(2,000)
B-7/M-7	-	4	1/3/1990	-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(2,000)
		9		-	-	-	ND(300)	ND(300)	-	ND(300)	-	**390**	**320**	-	ND(300)	-	**1,500**	ND(300)	ND(300)	-	**530**	-	**380**	ND(2,000)
B-8/MW-8	-	4	1/3/1990	-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(2,000)
		9		-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	**410**	ND(2,000)
B-9	-	4	1/4/1990	-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(2,000)
		9		-	-	-	ND(300)	ND(300)	-	ND(300)	-	**690**	**340**	-	ND(300)	-	**1,100**	ND(300)	ND(300)	-	**590**	-	**550**	ND(2,000)
B-11	-	4	1/4/1990	-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	**320**	ND(2,000)
		9		-	-	-	**580**	ND(300)	-	ND(300)	-	**820**	**1,100**	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	**560**	-	**1,800**	ND(2,000)
B-12	-	4	1/4/1990	-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	**370**	ND(2,000)
		9		-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(2,000)
B-13	-	4	1/4/1990	-	-	-	ND(300)	**470**	-	ND(300)	-	**390**	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	**920**	ND(2,000)
		9		-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(2,000)
MW-9	-	8.5	4/13/1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15.5		-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	ND(300)	**400**
T-2	-	6	4/13/1994	-	-	-	ND(300)	ND(300)	-	**200**	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)
		8.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T-5	-	5	4/14/1994	-	-	-	ND(3,000)	ND(3,000)	-	ND(3,000)	-	ND(3,000)	ND(3,000)	-	ND(3,000)	-	ND(3,000)	ND(3,000)	ND(3,000)	-	ND(3,000)	-	ND(3,000)	ND(3,000)
		9.0		-		-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)	-	ND(300)	-	ND(300)	**400**
		14.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SB2	SB2-4.0	4	11/7/2013	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	-	ND(67)	ND(67)	ND(330)	-	ND(330)	ND(67)	-	ND(67)	-
	SB2-7.5	7.5		ND(130)	**270**	**630**	**1,200**	**970**	**970**	**360**	**330**	**1,400**	**2,100**	**210**	-	**340**	ND(130)	ND(660)	-	ND(660)	**2,400**	-	**2,300**	-
SB6	SB6-4.0	4	11/7/2013	ND(660)	ND(660)	**1,200**	**2,400**	**3,000**	**3,700**	**1,500**	**1,400**	**2,900**	**4,400**	**810**	-	**1,300**	ND(660)	ND(3,300)	-	ND(3,300)	**5,500**	-	**4,500**	-
	SB6-10.0	10		ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	-	ND(67)	ND(67)	ND(330)	-	ND(330)	ND(67)	-	ND(67)	-
SB7	SB7-2.5	2.5	11/8/2013	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	-	ND(330)	ND(330)	**10,000**	-	ND(1,700)	**450**	-	ND(330)	-
	SB7-8.0	8		**500**	ND(330)	**340**	**340**	ND(330)	ND(330)	ND(330)	ND(330)	**470**	**1,100**	**680**	-	ND(330)	**9,200**	ND(1,600)	-	**1,700**	**2,400**	-	**1,100**	-
SB11	SB11-2.0	2	11/8/2013	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	-	ND(1,300)	ND(1,300)	ND(6,600)	-	ND(6,600)	ND(1,300)	-	**1,300**	-
	SB11-5.5	5.5		ND(670)	ND(670)	ND(670)	ND(670)	**900**	**990**	ND(670)	ND(670)	**820**	**1,800**	ND(670)	-	ND(670)	ND(670)	ND(3,300)	-	ND(3,300)	**750**	-	**2,300**	-
SB13	SB13-1.5	1.5	11/8/2013	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	-	ND(66)	**92**	ND(330)	-	ND(330)	ND(66)	-	**79**	-
	SB13-10.0	10		ND(1,700)	ND(1,700)	ND(1,700)	**2,000**	ND(1,700)	**1,800**	ND(1,700)	ND(1,700)	**2,100**	**4,200**	ND(1,700)	-	ND(1,700)	**2,000**	ND(8,300)	-	ND(8,300)	**7,500**	-	**4,000**	-
SB23	SB23-0.5	0.5	12/2/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(130)	ND	ND
SB29	SB29-2.5	2.5	12/2/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(130)	ND	ND
SB34	SB34-4.0	4.0	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(330)	ND	ND
SB42	SB42-1	1.0	12/2/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(330)	ND	ND
SB46	SB46-0.5	0.5	12/2/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(330)	ND	ND
SB48	SB48-1.0	1.0	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(660)	ND	ND
SV6	SV6-0.5	0.5	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(67)	ND	ND
SV10	SV10-0.5	0.5	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(66)	ND	ND
SV14	SV14-0.5	0.5	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(67)	ND	ND
SV20	SV20-0.5	0.5	11/30/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(330)	ND	ND
SV32	SV32-1.0	1.0	11/30/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(330)	ND	ND
SV32	SV32-7.0	7.0	11/30/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(3,300)	ND	ND
SV38	SV38-1.0	1.0	11/30/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**700**	ND	ND

Notes:
Detections are shown in bold.
bgs = Below ground surface
µg/kg = Micrograms per kilogram
\- = Not applicable / not analyzed or not detected
ND(67) = Not detected at or above the indicated laboratory reporting limit
ND = Not detected
SVOC = semi-volatile organic compound

Table 3
Summary of laboratory Analytical Results for Soil - PCBs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample Number	Depth (feet bgs)	Date Collected	Aroclor-1260 [1] (mg/kg)	Aroclor-1262 (mg/kg)	Aroclor-1268 (mg/kg)	Total PCBs (mg/kg)	DDT (mg/kg)
SB5	SB5-3.0	3	11/7/2013	**10**	ND(0.17)	ND(0.17)	**10**	-
	SB5-8.0	8	11/7/2013	ND(0.012)	**0.018**	ND(0.012)	**0.018**	-
	SB5-11.5	11.5	11/7/2013	ND(0.012)	**0.014**	ND(0.012)	**0.014**	-
SB6	SB6-4.0	4	11/7/2013	**0.57**	ND(0.012)	ND(0.012)	**0.57**	-
	SB6-8.0	8	11/7/2013	ND(0.012)	**0.16**	ND(0.012)	**0.16**	-
	SB6-10.0	10	11/7/2013	ND(0.012)	**4.8**	ND(0.012)	**4.8**	-
SB7	SB7-2.5	2.5	11/8/2013	**1.9**	ND(0.082)	ND(0.082)	**1.9**	-
	SB7-8.0	8	11/8/2013	ND(0.042)	**1.5**	ND(0.042)	**1.5**	-
SB11	SB11-2.0	2	11/8/2013	**0.38**	ND(0.012)	ND(0.012)	**0.38**	-
	SB11-5.5	5.5	11/8/2013	**1.2**	ND(0.042)	**1.4**	**2.60**	-
SB12	SB12-2.0	2	11/8/2013	**2**	ND(0.042)	ND(0.042)	**2**	-
	SB12-5.0	5	11/8/2013	ND(0.041)	**1.2**	ND(0.041)	**1.2**	-
	SB12-10.0	10	11/8/2013	ND(0.083)	**6.5**	ND(0.083)	**6.5**	-
SB13	SB13-1.5	1.5	11/8/2013	**0.27**	ND(0.012)	ND(0.012)	**0.27**	-
	SB13-5.0	5	11/8/2013	**0.018**	ND(0.012)	ND(0.012)	**0.018**	-
	SB13-10.0	10	11/8/2013	**3.3**	ND(0.084)	**1.9**	**5.2**	-
SB14	SB14-3.5	3.5	11/9/2013	**0.013**	ND(0.012)	ND(0.012)	**0.013**	-
SG-1	-	3.5 - 4.0	4/19/2013	ND(0.5)	-	-	ND(0.5)	**0.03**
SG-2	-	3.0 - 3.5	4/19/2013	ND(1.0)	-	-	ND(1.0)	**0.068**
SG-3	-	3.5 - 4.0	4/19/2013	**14**	-	-	**14**	**0.25**
SG-4	-	3.5 - 4.0	4/19/2013	**8**	-	-	**8**	**0.42**
SG-5	-	4.5 - 5.0	4/19/2013	ND(1.0)	-	-	ND(1.0)	ND(0.020)
IS1	IS1-03.5	3.5	4/26/1989	-	-	-	**0.4**	-
	IS1-07.0	7.0	4/26/1989	-	-	-	**0.7**	-
	IS1-10.5	10.5	4/26/1989	-	-	-	ND(0.5)	-
IS2	IS2-03.0	3.0	4/26/1989	-	-	-	**0.2**	-
	IS2-08.5	8.5	4/26/1989	-	-	-	ND(0.5)	-
B-7/MW-7	-	4	1/3/1990	ND(1)	-	-	-	-
	-	9		ND(1)	-	-	-	-
B-8/MW-8	-	4	1/3/1990	ND(1)	-	-	-	-
	-	9		**2.3**	-	-	**2.3**	-
B-9	-	4	1/4/1990	ND(1)	-	-	-	-
	-	9		ND(1)	-	-	-	-
B-10	-	4	1/4/1990	ND(1)	-	-	-	-
	-	9		ND(1)	-	-	-	-
B-11	-	4	1/4/1990	**2.2**	-	-	**2.2**	-
	-	9		ND(1)	-	-	-	-
B-12	-	4	1/4/1990	ND(1)	-	-	-	-
	-	9		ND(1)	-	-	-	-
B-13	-	4	1/4/1990	**3.1**	-	-	**3.1**	-
	-	9		ND(1)	-	-	-	-
Sump	-	Confirmation	1/5/1990	**4.2**	-	-	**4.2**	-
SB20	SB20-2.5	2.5	11/30/2015	**1.7**	-	-	**1.7**	-
SB21	SB21-0.5	0.5	12/2/2015	**1.9**	-	-	**1.9**	-
SB23	SB23-0.5	0.5	12/2/2015	**0.49**	-	-	**0.49**	-
SB24	SB24-0.5	0.5	12/2/2015	**3.7**	-	-	**3.7**	-
SB25	SB25-1	1.0	12/2/2015	**0.8**	-	-	**0.8**	-
SB26	SB26-1.5	1.5	12/2/2015	**0.12**	-	-	**0.12**	-
SB27	SB27-2.5	2.5	12/2/2015	**0.59**	-	-	**0.59**	-
SB28	SB28-0.5	0.5	12/2/2015	**0.61**	-	-	**0.61**	-
	SB28-4.5	4.5	12/2/2015	**55**	-	-	**55**	-
SB29	SB29-2.5	2.5	12/2/2015	**1.9**	-	-	**1.9**	-
SB31	SB31-2	2.0	12/2/2015	**.28** [2]	-	-	**0.28**	-
	SB31-6	6.0	12/2/2015	ND(0.050)	-	-	ND(0.050)	-
SB32	SB32-1.5	1.5	12/3/2015	**0.29**	-	-	**0.29**	-
SB34	SB34-4.0	4.0	12/1/2015	**0.19**	-	-	**0.19**	-
SB35	SB35-0.5	0.5	12/2/2015	**0.62**	-	-	**0.62**	-
SB39	SB39-0.5	0.5	12/2/2015	**0.25**	-	-	**0.25**	-
SB40	SB40-1	1.0	12/2/2015	**1.9**	-	-	**1.9**	-
SB41	SB41-1	1.0	12/2/2015	**2.9**	-	-	**2.9**	-
SB42	SB42-1	1.0	12/2/2015	**2.8**	-	-	**2.8**	-
SB43	SB43-1.5	1.5	12/1/2015	**1.3**	-	-	**1.3**	-
SB45	SB45-1.5	1.5	12/1/2015	**2.8**	-	-	**2.8**	-
SB46	SB46-0.5	0.5	12/2/2015	**1.2**	-	-	**1.2**	-
SB48	SB48-1.0	1.0	12/1/2015	**8.3**	-	-	**8.3**	-
SV16	SV16-0.5	0.5	12/1/2015	ND(0.049)	-	-	ND(0.049)	-
SV32	SV32-1.0	1.0	11/30/2015	**1.8**	-	-	**1.8**	-
	SV32-7.0	7.0	11/30/2015	**0.89**	-	-	**0.89**	-
SV33	SV33-0.5	0.5	11/30/2015	**4.0**	-	-	**4.0**	-
	SV33-4.5	4.5	11/30/2015	**0.86**	-	-	**0.86**	-
SV45	SV45-1.0	1.0	11/30/2015	**6.9**	-	-	**6.9**	-
SV47	SV47-6.0	6.0	12/3/2015	ND(0.049)	-	-	ND(0.049)	-

Notes:
Detections are shown in bold.
bgs = below ground surface
mg/kg = milligrams per kilogram
DDT = Dichlorodiphenyltrichlorethane
PCBs= Polychlorinated biphenyls
ND(24) = Compound not detected at or above the indicated laboratory reporting limit
ND = Not detected
- = Not analyzed
1. All 2015 samples were prepped or analyzed beyond the specified holding time.
2. Result exceeded calibration range.

Table 4
Summary of laboratory Analytical Results for Soil - California Title 22 Metals, STLC, TCLP, and Asbestos
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (Feet bgs)	Date Collected	Antimony (mg/kg)	Arsenic [1] (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	STLC Lead (mg/L)	TCLP Lead (mg/L)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)	Bulk Asbestos (%v/v)
IS-1	IS-1	3.5	4/26/1989	**6.5**	ND(2.2)	**110**	**0.05**	**4.1**	**20.1**	**5.6**	**70**	**100**	-	-	ND(5)	**1.2**	**32.1**	-	**15.2**	-	**15.4**	**200**	-
		7		**1.4**	ND(2.2)	**130**	ND(0.025)	**4.2**	**21.5**	**6.4**	**104**	**130**	-	-	ND(5)	ND(1)	**31.5**	-	ND(0.1)	-	**17.3**	**48.9**	-
		10		**1.6**	ND(2.2)	**255**	ND(0.025)	**10.2**	**63.5**	**11.4**	**1,042**	**4,300**	-	-	ND(5)	**3.7**	**42.6**	-	ND(0.1)	-	**17.3**	**5,400**	-
IS-2	IS-2	3	4/26/1989	ND(1)	ND(2.2)	**90**	ND(0.025)	**3.2**	**18.5**	**6**	**56.7**	**90**	-	-	ND(5)	**1.2**	**30.9**	-	ND(0.1)	-	**15.6**	**270**	-
		8.5		ND(1)	ND(2.2)	**35.7**	ND(0.025)	**1.5**	**6.6**	**2.8**	**13.8**	**5.3**	-	-	ND(5)	ND(1)	**15.5**	-	ND(0.1)	-	**6.7**	**22.9**	-
B-1/MW-1	B-1/MW-1	5.5	7/5/1989	ND(1)	ND(2.2)	**92**	ND(0.025)	**1.4**	**13**	**5.7**	**28**	**61**	-	-	ND(5)	ND(1)	**14**	-	ND(0.1)	-	**15**	**94**	-
		10.5		ND(1)	ND(2.2)	**21**	ND(0.025)	**0.6**	**12.5**	**2.6**	**4**	**3**	-	-	ND(5)	ND(1)	**12.7**	-	ND(0.1)	-	**7**	**5.4**	-
		16		**4**	ND(2.2)	**78**	ND(0.025)	**12**	**42**	**12.4**	**15.3**	**160**	-	-	ND(5)	**2.4**	**30**	-	ND(0.1)	-	**32**	**6,040**	-
		20.5		ND(1)	ND(2.2)	**61**	ND(0.025)	**2.4**	**15**	**4.5**	**23**	**77**	-	-	ND(5)	ND(1)	**19**	-	ND(0.1)	-	**12**	**106**	-
		25.5		ND(1)	ND(2.2)	**67**	ND(0.025)	**2**	**10**	**8**	**13**	**8**	-	-	ND(5)	ND(1)	**24**	-	ND(0.1)	-	**12**	**27**	-
		30.5		ND(1)	ND(2.2)	**23**	ND(0.025)	**1.2**	**9.9**	**3.6**	**7.4**	**4.5**	-	-	ND(5)	ND(1)	**22**	-	ND(0.1)	-	**6.7**	**15**	-
B-2	B-2	0.5	7/5/1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		6		**1.2**	ND(2.2)	**109**	ND(0.025)	**1.6**	**11.8**	**5**	**92**	**167**	-	-	ND(5)	ND(1)	**18.5**	-	ND(0.1)	-	**9.7**	**67**	-
		10		ND(1)	ND(2.2)	**41**	ND(0.025)	ND(0.3)	**12.7**	**2.7**	**22.5**	**1,360**	-	-	ND(5)	ND(1)	**12.5**	-	ND(0.1)	-	**13**	**532**	-
		16		**1.2**	ND(2.2)	**95**	ND(0.025)	**2.4**	**43**	**12**	**10**	**11**	-	-	ND(5)	ND(1)	**79**	-	ND(0.1)	-	**10**	**23**	-
		20.5		ND(1)	ND(2.2)	**35**	ND(0.025)	**1.4**	**7.8**	**1.9**	**9**	**8.7**	-	-	ND(5)	ND(1)	**16.6**	-	ND(0.1)	-	**17**	**11**	-
R-D1	R-D1		8/18/1989	ND(1)	ND(2.2)	**2.1**	ND(0.025)	**3.6**	**18.4**	**0.62**	**31.0**	**10.5**	-	-	ND(5)	ND(1)	**9.2**	ND(5)	**345**	-	ND(0.15)	**32.5**	-
R-D2	R-D2			ND(1)	ND(2.2)	**3.6**	ND(0.025)	**5.1**	**85.8**	**1.1**	**81.5**	**46.0**	-	-	ND(5)	ND(1)	**63.5**	ND(5)	**95**	-	**0.52**	**840**	-
R-D3	R-D3			**9.2**	ND(2.2)	**2.2**	ND(0.025)	**4.2**	**330**	**0.68**	**18.0**	**155**	-	-	ND(5)	ND(1)	**30.4**	ND(5)	**143**	-	**0.60**	**2270**	-
R-D4	R-D4			**42.5**	ND(2.2)	**1.5**	ND(0.025)	**25.7**	**21.0**	**5.6**	**40**	**33.6**	-	-	ND(5)	**9.6**	**43.4**	ND(5)	ND(0.1)	-	**19.1**	**9930**	-
B-5/MW-5	B-5/MW-5	6	8/31/1989	ND(1)	ND(2.2)	**29.2**	ND(0.025)	**0.5**	**13.5**	**3.4**	**13.3**	**9.7**	-	-	ND(5)	ND(1)	**18**	-	ND(0.1)	-	**12**	**52**	-
		11		**1.05**	ND(2.2)	**167.1**	ND(0.025)	**2.15**	**15.2**	**8.7**	**64**	**164**	-	-	ND(5)	ND(1)	**22**	-	ND(0.1)	-	**23.4**	**200**	-
		15.5		**3.85**	ND(2.2)	**661**	ND(0.025)	**4.5**	**22.4**	**8.2**	**200**	**1,270**	-	-	ND(5)	ND(1)	**26.8**	-	ND(0.1)	-	**20**	**1420**	-
		22.5		ND(1)	ND(2.2)	**1,150**	ND(0.025)	**3.8**	**19**	**40**	**44.2**	**24**	-	-	ND(5)	ND(1)	**151**	-	ND(0.1)	-	**58.3**	**58.6**	-
		25.5		ND(1)	ND(2.2)	**158**	ND(0.025)	**3.1**	**21**	**12.3**	**22.6**	**12**	-	-	ND(5)	ND(1)	**54**	-	ND(0.1)	-	**31**	**42**	-
B-6/MW-6	B-6/MW-6	20.5	8/31/1989	ND(1)	ND(2.2)	**250**	ND(0.025)	**3.5**	**23**	**19**	**22.5**	**15.3**	-	-	ND(5)	ND(1)	**48**	-	ND(0.1)	-	**53**	**47**	-
		25.5		ND(1)	ND(2.2)	**56.5**	ND(0.025)	**3.3**	**25**	**11**	**22**	**15**	-	-	ND(5)	ND(1)	**54**	-	ND(0.1)	-	**25**	**42.6**	-
B-7/MW-7	B-7/MW-7	4	1/3/1990	ND(10)	ND(16)	**140**	**0.48**	ND(0.7)	**32**	**8.6**	**27**	ND(12)	-	-	ND(0.09)	ND(1)	**28**	-	ND(0.4)	-	**36**	**79**	-
		9		ND(10)	ND(16)	**24**	**0.13**	ND(0.7)	**21**	ND(2)	**3.6**	ND(12)	-	-	**0.088**	ND(1)	**16**	-	ND(0.4)	-	**12**	**310**	-
B-8/MW-8	B-8/MW-8	4	1/3/1990	ND(10)	ND(16)	**42**	**0.16**	ND(0.7)	**27**	**2.8**	**18**	ND(12)	-	-	ND(0.009)	ND(1)	**18**	-	ND(0.4)	-	**15**	**75**	-
		9		ND(10)	ND(16)	**85**	**0.15**	ND(0.7)	**9.6**	ND(2)	**41**	**24**	-	-	**0.36**	ND(1)	**6.8**	-	ND(0.4)	-	**8.5**	**120**	-
B-9	B-9	4	1/4/1990	ND(10)	ND(16)	**140**	**0.41**	ND(0.7)	**33**	**7.4**	**55**	**41**	-	-	**0.45**	ND(1)	**32**	-	ND(0.4)	-	**31**	**120**	-
		9		ND(16)	ND(16)	**610**	**0.31**	**44**	**180**	**15**	**2,300**	**980**	-	-	**0.66**	**27**	**350**	-	ND(0.4)	-	**26**	**6,200**	-
B-10	B-10	4	1/4/1990	ND(10)	ND(16)	**33**	**0.05**	ND(0.7)	**23**	ND(2)	**39**	**42**	-	-	**0.1**	ND(1)	**10**	-	ND(0.4)	-	**5**	**95**	-
		9		ND(16)	**21**	**590**	**0.33**	**1.3**	**34**	**6.9**	**140**	**1,500**	-	-	**0.62**	ND(1)	**24**	-	ND(0.4)	-	**28**	**410**	-
B-11	B-11	4	1/4/1990	ND(10)	ND(16)	**240**	**0.36**	**1**	**22**	**5.4**	**44**	**72**	-	-	**0.092**	ND(1)	**25**	-	ND(0.4)	-	**21**	**940**	-
		9		ND(10)	ND(16)	**160**	**0.31**	**0.7**	**21**	**3.6**	ND(4,500)	**55**	-	-	**0.012**	ND(1)	**24**	-	ND(0.4)	-	**17**	**160**	-
B-12	B-12	4	1/4/1990	ND(10)	ND(16)	**89**	**0.23**	ND(0.7)	**36**	**3.4**	**170**	**120**	-	-	ND(0.009)	ND(1)	**29**	-	ND(0.4)	-	**21**	**150**	-
		9		ND(28)	**38**	**540**	**0.26**	**7.7**	**190**	**28**	**2,200**	**3,000**	-	-	ND(0.009)	**20**	**110**	-	ND(0.4)	-	**23**	**3,600**	-
B-13	B-13	4	1/4/1990	ND(10)	ND(16)	**160**	**0.36**	ND(0.7)	**62**	**6.5**	**120**	**520**	-	-	ND(0.009)	ND(1)	**42**	-	ND(0.4)	-	**27**	**300**	-
		9		ND(10)	ND(16)	**37**	**0.15**	ND(0.7)	**29**	**2.9**	**4.9**	**12**	-	-	ND(0.009)	ND(1)	**18**	-	ND(0.4)	-	**15**	**210**	-
Sump	Sump	Confirmation	1/5/1990	ND(10)	ND(16)	**180**	**0.48**	ND(0.7)	**95**	**10**	**49**	**62**	-	-	**0.022**	ND(1)	**135**	-	ND(0.4)	-	**39**	**150**	-

Table 4
Summary of laboratory Analytical Results for Soil - California Title 22 Metals, STLC, TCLP, and Asbestos
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (Feet bgs)	Date Collected	Antimony (mg/kg)	Arsenic [1] (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	STLC Lead (mg/L)	TCLP Lead (mg/L)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)	Bulk Asbestos (%v/v)
MW-9	MW-9	8.5	4/13/1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15.5		ND(3)	4.2	190	0.43	ND(0.25)	26	12	30	19	-	-	ND(0.083)	ND(1)	36	-	ND(0.5)	-	27	61	-
MW-10	MW-10	9.5	4/14/1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		15.5		4.4	19	140	0.21	3.3	59	10	330	250	-	-	0.77	3.1	37	-	1.1	-	24	530	-
T-2	T-2	6	4/13/1994	5.1	9.3	170	0.23	1	25	8.7	2,100	330	-	-	ND(0.087)	1.5	55	-	0.5	-	26	580	-
		8.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T-5	T-5	5	4/14/1994	ND(2.9)	6	130	0.31	0.27	25	9.2	60	61	-	-	0.21	ND(0.98)	28	-	ND(0.49)	-	26	88	-
		9		ND(3)	ND(2.5)	41	ND(0.10)	ND(0.25)	23	4.2	14	1.5	-	-	ND(0.087)	ND(1)	19	-	ND(0.5)	-	15	18	-
		14.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T-7	T-7	7.5	4/14/1994	ND(3)	4.2	150	0.45	0.28	27	10	40	6.1	-	-	ND(0.087)	ND(0.99)	37	-	ND(0.5)	-	27	62	-
		14		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SG-1	SG-1	3.5-4.0	4/19/2013	5.2	11	280	ND(0.5)	1	100	22	480	990	12	ND(0.2)	0.2	4.2	220	--	0.6	-	60	490	-
SG-2	SG-2	3.0-3.5	4/19/2013	1.9	12	160	0.51	0.84	50	11	88	120	4	ND(0.2)	0.36	1.3	63	--	ND(0.5)	-	50	220	-
SG-3	SG-3	3.5-4.0	4/19/2013	8.9	7.3	230	ND(0.5)	0.94	54	9.3	160	830	-	-	0.2	1.3	51	--	ND(0.5)	-	49	240	-
SG-4	SG-4	3.5-4.0	4/19/2013	2.6	6.9	170	ND(0.5)	0.82	68	14	78	130	-	-	0.32	2.9	83	--	ND(0.5)	-	45	440	-
SG-5	SG-5	4.5-5.0	4/19/2013	1	9.9	120	ND(0.5)	0.44	44	7.3	44	75	-	-	0.12	0.5	34	--	ND(0.5)	-	41	97	-
SB1	SB1-1.0	1	11/7/2013	ND(0.51)	5.9	160	0.39	0.94	86	13	52	81	-	-	0.22	ND(0.25)	100	ND(0.51)	ND(0.25)	ND(0.51)	51	190	-
	SB1-5.5	5.5	11/7/2013	-	-	-	-	-	-	-	-	1,300	-	6.1	-	-	-	-	-	-	-	-	-
	SB1-11.75	11.75	11/7/2013	-	-	-	-	-	-	-	-	2,400	-	0.75	-	-	-	-	-	-	-	-	-
SB2	SB2-4.0	4	11/7/2013	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	-
	SB2-7.5	7.5	11/7/2013	-	-	-	-	-	-	-	-	120	2.7	-	-	-	-	-	-	-	-	-	-
	SB2-10.75	10.75	11/7/2013	-	-	-	-	-	-	-	-	240	-	-	-	-	-	-	-	-	-	-	-
SB3	SB3-1.5	1.5	11/7/2013	ND(0.46)	3.4	150	0.59	0.44	16	6.9	16	14	-	-	0.39	ND(0.23)	23	ND(0.46)	ND(0.23)	ND(0.46)	26	46	-
	SB3-7.5	7.5	11/7/2013	-	-	-	-	-	-	-	-	340	1.8	1.1	-	-	-	-	-	-	-	-	-
	SB3-11.0	11	11/7/2013	3.3	7.5	810	0.39	4.3	46	10	170	460	-	-	0.17	4.6	38	ND(0.50)	ND(0.25)	ND(0.50)	42	920	-
SB4	SB4-1.5	1.5	11/7/2013	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-
	SB4-5.0	5	11/7/2013	-	-	-	-	-	-	-	-	110	7.5	-	-	-	-	-	-	-	-	-	-
	SB4-10.0	10	11/7/2013	-	-	-	-	-	-	-	-	10,000	-	2.4	-	-	-	-	-	-	-	-	-
SB5	SB5-3.0	3	11/7/2013	-	-	-	-	-	-	-	-	430	7.7	0.27	-	-	-	-	-	-	-	-	-
	SB5-8.0	8	11/7/2013	3.1	6.7	100	0.21	0.77	39	6.3	100	100	-	-	0.19	0.34	38	ND(0.50)	ND(0.25)	ND(0.50)	29	170	-
	SB5-11.5	11.5	11/7/2013	-	-	-	-	-	-	-	-	1,100	-	1.0	-	-	-	-	-	-	-	-	-
SB6	SB6-4.0	4	11/7/2013	-	-	-	-	-	-	-	-	140	-	-	-	-	-	-	-	-	-	-	-
	SB6-8.0	8	11/7/2013	-	-	-	-	-	-	-	-	58	-	-	-	-	-	-	-	-	-	-	-
	SB6-10.0	10	11/7/2013	7.5	5.6	140	0.27	1.9	140	16	390	160	-	-	0.13	4.9	190	6.0	ND(0.26)	ND(0.52)	41	270	-
SB7	SB7-2.5	2.5	11/8/2013	0.75	5.0	160	0.25	1.2	34	9.0	74	120	-	-	0.19	0.69	49	0.66	ND(0.23)	ND(0.47)	35	220	-
	SB7-8.0	8	11/8/2013	-	-	-	-	-	-	-	-	250	39	-	-	-	-	-	-	-	-	-	-
	SB7-12.5	12.5	11/8/2013	-	-	-	-	-	-	-	-	2.1	-	-	-	-	-	-	-	-	-	-	-
SB8	SB8-3.5	3.5	11/8/2013	-	-	-	-	-	-	-	-	200	-	-	-	-	-	-	-	-	-	-	-
	SB8-8.0	8	11/8/2013	ND(0.51)	2.3	32	ND(0.10)	ND(0.25)	33	4.4	4.7	3.1	-	-	ND(0.016)	ND(0.25)	24	ND(0.51)	ND(0.25)	ND(0.51)	26	19	-
	SB8-12.0	12	11/8/2013	-	-	-	-	-	-	-	-	3.0	-	-	-	-	-	-	-	-	-	-	-
SB9	SB9-4.5	4.5	11/8/2013	ND(0.49)	5.4	120	0.32	0.81	45	10	46	41	-	-	0.12	1.5	38	ND(0.49)	ND(0.24)	ND(0.49)	36	110	-
	SB9-10.0	10	11/8/2013	-	-	-	-	-	-	-	-	50	-	-	-	-	-	-	-	-	-	-	-
SB10	SB10-2.0	2	11/8/2013	ND(0.47)	6.9	550	0.33	0.58	38	6.9	27	45	-	-	0.15	0.61	36	ND(0.47)	ND(0.23)	ND(0.47)	34	90	-
	SB10-5.0	5	11/8/2013	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-	-	-	-	-
	SB10-10.0	10	11/8/2013	-	-	-	-	-	-	-	-	21	-	-	-	-	-	-	-	-	-	-	-
SB11	SB11-2.0	2	11/8/2013	-	-	-	-	-	-	-	-	28	-	-	-	-	-	-	-	-	-	-	-
	SB11-5.5	5.5	11/8/2013	0.62	9.2	140	0.26	1.2	160	10	260	170	-	-	0.17	21	170	ND(0.54)	ND(0.27)	ND(0.54)	36	300	-
	SB11-11.5	11.5	11/8/2013	-	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	-	-	-	-	-

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SB12	SB12-2.0	2	11/8/2013	-	-	-	-	-	-	-	-	130	12	1.1	-	-	-	-	-	-	-	-	-
	SB12-5.0	5	11/8/2013	-	-	-	-	-	-	-	-	320	-	-	-	-	-	-	-	-	-	-	-
	SB12-10.0	10	11/8/2013	ND(0.49)	5.9	210	0.27	1.3	31	6.6	44	290	-	-	0.18	0.28	29	ND(0.49)	ND(0.25)	ND(0.49)	30	1,900	-
SB13	SB13-1.5	1.5	11/8/2013	-	-	-	-	-	-	-	-	68	-	-	-	-	-	-	-	-	-	-	-
	SB13-5.0	5	11/8/2013	ND(0.47)	8.4	270	0.42	0.70	23	26	30	54	-	-	0.070	0.37	27	1.6	ND(0.23)	ND(0.47)	45	100	-
	SB13-10.0	10	11/8/2013	-	-	-	-	-	-	-	-	3,300	-	-	-	-	-	-	-	-	-	-	-
SB14	SB14-3.5	3.5	11/9/2013	ND(0.46)	7.7	170	0.54	0.67	140	19	33	11	-	-	0.060	ND(0.23)	190	4.5	ND(0.23)	ND(0.46)	53	63	-
	SB14-8.5	8.5	11/9/2013	-	-	-	-	-	-	-	-	100	-	-	-	-	-	-	-	-	-	-	-
	SB14-11.5	11.5	11/9/2013	-	-	-	-	-	-	-	-	250	-	-	-	-	-	-	-	-	-	-	-
SB15	SB15-2.5	2.5	11/9/2013	-	-	-	-	-	-	-	-	8.2	-	-	-	-	-	-	-	-	-	-	-
	SB15-7.5	7.5	11/9/2013	3.8	4.6	250	0.27	13	43	6.6	450	870	-	-	0.14	0.43	48	ND(0.50)	ND(0.25)	ND(0.50)	40	1,700	-
	SB15-11.5	11.5	11/9/2013	-	-	-	-	-	-	-	-	130	-	-	-	-	-	-	-	-	-	-	-
SB16	SB16-2.5	2.5	11/9/2013	-	-	-	-	-	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-
	SB16-7.5	7.5	11/9/2013	-	-	-	-	-	-	-	-	280	14	1.8	-	-	-	-	-	-	-	-	-
	SB16-10.5	10.5	11/9/2013	1.4	11	180	0.34	0.89	53	6.7	51	210	-	-	0.24	ND(0.26)	34	3.4	ND(0.26)	ND(0.52)	41	510	-
SB17	SB17-2.0	2	11/9/2013	ND(0.47)	7.8	150	0.46	0.61	41	12	32	54	-	-	0.12	ND(0.24)	43	ND(0.47)	ND(0.24)	ND(0.47)	53	87	-
	SB17-5.0	5	11/9/2013	-	-	-	-	-	-	-	-	27	-	-	-	-	-	-	-	-	-	-	-
	SB17-9.5	9.5	11/9/2013	-	-	-	-	-	-	-	-	150	-	-	-	-	-	-	-	-	-	-	-
SB18	SB18-2.0	2	11/9/2013	-	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	-	-	-	-
	SB18-5.0	5	11/9/2013	-	-	-	-	-	-	-	-	34	-	-	-	-	-	-	-	-	-	-	-
	SB18-10.0	10	11/9/2013	ND(0.48)	49	640	0.47	5.5	43	13	450	650	-	-	0.41	5.1	190	2.8	ND(0.24)	ND(0.48)	11,000	2,500	-
SB19	SB19-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	210 [F2]	-	-	-	-	-	-	-	-	-	-	-
SB20	SB20-1.0	1.0	11/30/2015	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-	-	-	-
	SB20-2.5	2.5	11/30/2015	-	-	-	-	-	-	-	-	21	-	-	-	-	-	-	-	-	-	-	-
SB21	SB21-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	90	-	-	-	-	-	-	-	-	-	-	-
SB22	SB22-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	9.3	-	-	-	-	-	-	-	-	-	-	-
SB23	SB23-0.5	0.5	12/2/2015	ND	5.2	200	0.57	ND(0.46)	41	11	30	31	-	-	0.98	ND(0.46)	57	ND	ND	ND	30	87	ND
SB24	SB24-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	43	-	-	-	-	-	-	-	-	-	-	-
SB25	SB25-1	1.0	12/2/2015	-	-	-	-	-	-	-	-	140	-	-	-	-	-	-	-	-	-	-	-
SB26	SB26-1.5	1.5	12/2/2015	-	-	-	-	-	-	-	-	33	-	-	-	-	-	-	-	-	-	-	-
SB27	SB27-2.5	2.5	12/2/2015	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-	-	-	-	-	-
SB28	SB28-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	80	-	-	-	-	-	-	-	-	-	-	-
	SB28-4.5	4.5	12/2/2015	-	-	-	-	-	-	-	-	39	-	-	-	-	-	-	-	-	-	-	-
SB29	SB29-2.5	2.5	12/2/2015	ND	6.9	190	0.48	ND(0.45)	45	11	38	35	-	-	0.85	ND(0.45)	48	ND	ND	ND	38	130	ND
SB30	SB30-1	1.0	12/2/2015	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-
SB31	SB31-2	2.0	12/2/2015	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-	-	-	-	-	-
	SB31-6	6.0	12/2/2015	-	-	-	-	-	-	-	-	1,200 [F2]	-	-	-	-	-	-	-	-	-	-	-
SB32	SB32-1.5	1.5	12/3/2015	-	-	-	-	-	-	-	-	39	-	-	-	-	-	-	-	-	-	-	-
SB34	SB34-4.0	4.0	12/1/2015	ND	5.6	100	0.29	ND(0.34)	78	13	23	9.4	-	-	0.16	ND(1.4)	86	ND	ND	ND	59	56	ND
SB35	SB35-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	59	-	-	-	-	-	-	-	-	-	-	-
SB36	SB36-1.5	1.5	11/30/2015	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-	-	-	-
SB37	SB37-0.5	0.5	12/1/2015	-	-	-	-	-	-	-	-	7.9	-	-	-	-	-	-	-	-	-	-	-
SB38	SB38-1.5	1.5	11/30/2015	-	-	-	-	-	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-
SB39	SB39-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	59	-	-	-	-	-	-	-	-	-	-	ND
SB40	SB40-1	1.0	12/2/2015	-	-	-	-	-	-	-	-	58	-	-	-	-	-	-	-	-	-	-	-
SB41	SB41-1	1.0	12/2/2015	-	-	-	-	-	-	-	-	86	-	-	-	-	-	-	-	-	-	-	-
SB42	SB42-1	1.0	12/2/2015	ND	6.7	170	ND(0.31)	ND(0.38)	96	16	60	70	-	-	0.28	ND(1.5)	120	ND	ND	ND	43	150	ND(1) [2]
SB43	SB43-1.5	1.5	12/1/2015	-	-	-	-	-	-	-	-	160	-	-	-	-	-	-	-	-	-	-	-
SB45	SB45-1.5	1.5	12/1/2015	-	-	-	-	-	-	-	-	200	-	-	-	-	-	-	-	-	-	-	-
SB46	SB46-0.5	0.5	12/2/2015	ND	7.0	160	0.42	0.45	42	11	78	150	-	-	0.41	ND(1.6)	52	ND	ND	ND	46	240	ND
SB48	SB48-1.0	1.0	12/1/2015	ND	6.0	180	ND(0.31)	0.48	48	13	59	190	-	-	0.83	ND(1.6)	75	ND	ND	ND	58	230	ND [3]
SB49	SB49-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	24	-	-	-	-	-	-	-	-	-	-	-

Table 4
Summary of laboratory Analytical Results for Soil - California Title 22 Metals, STLC, TCLP, and Asbestos
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (Feet bgs)	Date Collected	Antimony (mg/kg)	Arsenic [1] (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	STLC Lead (mg/L)	TCLP Lead (mg/L)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Thallium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)	Bulk Asbestos (%v/v)
SV6	SV6-0.5	0.5	12/1/2015	ND	**6.0**	**160**	**0.38**	**0.56**	**42**	**18**	**22**	**48**	-	-	**0.18**	**1.5**	**63**	ND	ND	ND	**33**	**80**	ND
SV8	SV8-0.5	0.5	12/3/2015	-	-	-	-	-	-	-	-	**10**	-	-	-	-	-	-	-	-	-	-	-
SV10	SV10-0.5	0.5	12/1/2015	ND	**9.0**	**180**	**0.43**	ND(0.41)	**130**	**20**	**33**	**9.3**	-	-	**0.25**	ND(1.6)	**170**	ND	ND	ND	**51**	**67**	ND
SV14	SV14-0.5	0.5	12/1/2015	ND	**9.6**	**220**	**0.42**	ND(0.4)	**150**	**20**	**36**	**12**	-	-	**0.17**	ND(1.6)	**150**	ND	ND	ND	**52**	**94**	ND
SV16	SV16-0.5	0.5	12/1/2015	-	-	-	-	-	-	-	-	**11**	-	-	-	-	-	-	-	-	-	-	-
SV20	SV20-0.5	0.5	11/30/2015	ND	**4.7**	**160**	**0.37**	**0.18**	**55**	**12**	**26**	**16**	-	-	**0.44**	ND(0.46)	**73**	ND	ND	ND	**36**	**72**	ND
SV22	SV22-0.5	0.5	11/30/2015	-	-	-	-	-	-	-	-	**11**	-	-	-	-	-	-	-	-	-	-	-
SV32	SV32-1.0	1.0	11/30/2015	ND	**5.5**	**170**	ND(0.35)	ND(0.44)	**100**	**15**	**35**	**21**	-	-	**0.37**	ND(1.8)	**120**	ND	ND	ND	**53**	**100**	ND
	SV32-7.0	7.0	11/30/2015	ND	**7.0**	**680**	ND(0.37)	**1.9**	**44**	**8.2**	**190**	**570**	-	-	**0.23**	**3.2**	**64** [F1]	ND	ND	ND	**61**	**790**	ND
SV33	SV33-0.5	0.5	11/30/2015	-	-	-	-	-	-	-	-	**120**	-	-	-	-	-	-	-	-	-	-	-
	SV33-4.5	4.5	11/30/2015	-	-	-	-	-	-	-	-	**100**	-	-	-	-	-	-	-	-	-	-	-
SV38	SV38-1.0	1.0	11/30/2015	ND	**3.7**	**140**	ND(0.36)	ND(0.45)	**110**	**17**	**30**	**22**	-	-	**0.33**	ND(1.8)	**160**	ND	ND	ND	**74**	**63**	-
SV43	SV43-1.0	1.0	11/30/2015	-	-	-	-	-	-	-	-	**12**	-	-	-	-	-	-	-	-	-	-	-
SV45	SV45-1.0	1.0	11/30/2015	-	-	-	-	-	-	-	-	**90**	-	-	-	-	-	-	-	-	-	-	-
SV47	SV47-1.5	1.5	12/3/2015	-	-	-	-	-	-	-	-	**11**	-	-	-	-	-	-	-	-	-	-	-
	SV47-6.0	6.0	12/3/2015	-	-	-	-	-	-	-	-	**350**	-	-	-	-	-	-	-	-	-	-	-

Notes:
Detections are shown in bold.
bgs = Below ground surface
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
ND(0.24) = Not detected at or above the indicated laboratory reporting limit
ND = Not detected
- = Not analyzed
STLC = Soluble Threshold Limit Concentration
TCLP = Toxicity Characteristic Leaching Procedure
F1 = Matrix spike (MS) and/or matrix spike duplicate (MSD) recovery was outside acceptance limits.
F2 = Matrix spike/matrix spike duplicate (MS/MSD) relative percent differences exceeded control limits.
1. Background concentration of arsenic in soil in the San Francisco Bay Area, calculated as the 95th percentile of 1,395 data points, is 17 mg/kg (LBL, 2002).
2. As chrysotile asbestos.
3. Insufficient soil volume was available to collect a sample from the 1 to 1.5 foot bgs interval for asbestos analysis. Therefore, the sample for asbestos analysis was collected from the 1.5 to 2 feet bgs interval.

Reference:
Lawrence Berkeley National Laboratory (LBL) Environmental Restoration Program. 2002. Analysis of Background Distributions of Metals in the Soil at Lawrence Berkeley National Laboratory. June.

Table 5
Summary of Laboratory Analytical Results for Soil - Total Petroleum Hydrocarbons (TPH)
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Rationale	Sample Depths (feet bgs)	TPH (mg/kg) Oil & Grease	TPH-Gas	TPH-Diesel	TPH-Motor Oil
IS-1	4/26/1989	Former Drum Area	3.5	**1,915**	<10	**46**	-
			7.0	**3,390**	<10	**200**	-
			10.5	**2,185**	**300**	<10	-
IS-2	4/26/1989	Former Drum Area	3.0	**1,305**	<10	**50**	-
			8.5	**36,535**	<10	<10	-
B-1/MW-1	7/5/1989	West of Tanks	5.5	**845**	<10	**12**	-
			10.5	<50	<10	<10	-
			16	**1,600**	<10	**63**	-
			20.5	**80**	<10	<10	-
			25.5	**95**	<10	<10	-
			30.5	<50	<10	<10	-
B-2	7/5/1989	West of Office	6.0	**1,160**	<10	**19**	-
			10	**14,900**	**20**	**172**	-
			16	<50	<10	<10	-
			20.5	<50	<10	<10	-
B-3/MW-3	8/28/1989	SE of Tanks	5.0	**1,845**	<10	**30**	-
			12.0	**95**	<10	**20**	-
			15.0	**625**	**120**	**260**	-
			20.0	<10	<10	<10	-
			25.0	**20**	<10	<10	-
B-4	8/28/1989	Location unknown	4.5	**6,685**	<10	<10	-
			10.0	**25,470**	<10	**170**	-
			14.5	<10	<10	<10	-
B-5/MW-5	8/31/1989	At trench and drum area	6.0	**330**	<10	<10	-
			11.0	**3,580**	**25**	**15**	-
			15.5	**1,200**	**20**	**15**	-
			22.5	**110**	<10	**20**	-
			25.5	**115**	<10	<10	-
B-6/MW-6	8/31/1989	NW site boundary	20.5	**100**	<10	<10	-
			25.5	**190**	<10	<10	-
SS-1-E	10/5/1989	UST Confirmation	2' Beneath UST	-	**12**	**12**	-
SS-2-W	10/5/1989	UST Confirmation	2' Beneath UST	-	<10	**11**	-
SS-3-E	10/5/1989	UST Confirmation	2' Beneath UST	-	<10	<10	-
SS-4-W	10/5/1989	UST Confirmation	2' Beneath UST	-	**240**	**60**	-
SS-5-E	10/5/1989	UST Confirmation	2' Beneath UST	-	**115**	**35**	-
SS-6-W	10/5/1989	UST Confirmation	2' Beneath UST	-	**460**	**700**	-
B-7/MW-7	1/3/1990	Drum Area	4	**9,000**	<10	<10	-
			9	**8,800**	<10	**788**	-
B-8/MW-8	1/3/1990	Downgradient of USTs	4	**2,000**	<10	<10	-
			9	**20,000**	<10	<10	-
B-9	1/4/1990	At sump	4	**23,000**	<10	<10	-
			9	**15,000**	<10	**5,050**	-
B-10	1/4/1990	NW part of site	4	**9,500**	<10	**380**	-
			9	**6,300**	<10	<10	-
B-11	1/4/1990	Between office and warehouse	4	**45,000**	<10	<10	-
			9	**30,400**	<10	<10	-
B-12	1/4/1990	N of office	4	**12,000**	<10	<10	-
			9	**38,800**	<10	<10	-
B-13	1/4/1990	N part of site	4	**9,400**	<10	<10	-
			9	**3,000**	<10	<10	-
Sump	1/5/1990	Sump Excavation	Confirmation	**10,500**	<10	<10	-
MW-9	4/13/1994	W of Tank Excavation	8.5	-	-	<1	-
			15.5	**470**	-	-	-
MW-10	4/14/1994	N of Tank Excavation	9.5	-	-	-	-
			15.5	**9,400**	**2**	**7,300**	-
T-1	4/13/1994	S of Tank Excavation	8	-	-	-	-
			14	-	<1	**96**	-
T-2	4/13/1994	SE of Tank Excavation	6	**160**	-	**40**	-
			8.5	-	<1	-	-
T-3	4/13/1994	Bottom of Tank Excavation	8	-	<1	-	-
			14.5	-	-	-	-
T-4	4/14/1994	SW of Tank Excavation	9	-	<1	-	-
			14.5	-	-	-	-
T-5	4/14/1994	W of Tank Excavation	5	**710**	<1	<10	-
			9	<50	<1	<1	-
			14.5	-	-	-	-
T-7	4/14/1994	NW of Tank Excavation	7.5	**68**	<1	<10	-
			14	-	**160**	<20	-

Table 5
Summary of Laboratory Analytical Results for Soil - Total Petroleum Hydrocarbons (TPH)
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Rationale	Sample Depths (feet bgs)	TPH (mg/kg)			
				Oil & Grease	TPH-Gas	TPH-Diesel	TPH-Motor Oil
SG-1	4/19/2013	-	3.5 - 4.0	-	-	**43**	**250**
SG-2	4/19/2013	-	3.0 - 3.5	-	-	**43**	**340**
SG-3	4/19/2013	-	3.5 - 4.0	-	-	**290**	**1,400**
SG-4	4/19/2013	-	3.5 - 4.0	-	-	**200**	**400**
SG-5	4/19/2013	-	4.5 - 5.0	-	-	**33**	**290**
SB19-0.5	12/2/2015	-	0.5	-	-	**24**	**86**
SB20-1.0	11/30/2015	-	1.0	-	-	**23**	**57**
SB20-2.5	11/30/2015	-	2.5	-	-	**36**	**110**
SB21-0.5	12/2/2015	-	0.5	-	-	**110**	**380**
SB22-0.5	12/2/2015	-	0.5	-	-	**1.6**	< 50
SB23-0.5	12/2/2015	-	0.5	-	-	**26**	**130**
SB24-0.5	12/2/2015	-	0.5	-	-	**56**	**180**
SB25-1	12/2/2015	-	1.0	-	-	**87**	**410**
SB26-1.5	12/2/2015	-	1.5	-	-	**27**	**160**
SB27-2.5	12/2/2015	-	2.5	-	-	**260**	**960**
SB28-0.5	12/2/2015	-	0.5	-	-	**64**	**190**
SB28-4.5	12/2/2015	-	4.5	-	-	**200**	**890**
SB29-2.5	12/2/2015	-	2.5	-	-	**39**	**110**
SB30-1	12/2/2015	-	1.0	-	-	**5.0**	< 49
SB31-2	12/2/2015	-	2.0	-	-	**35**	**150**
SB31-6	12/2/2015	-	6.0	-	-	**110**	**510**
SB32-1.5	12/3/2015	-	1.5	-	-	**26**	**100**
SB34-4.0	12/1/2015	-	4.0	-	-	**59**	**290**
SB35-0.5	12/2/2015	-	0.5	-	-	**130**	**450**
SB36-1.5	11/30/2015	-	1.5	-	-	**16**	< 50
SB37-0.5	12/1/2015	-	0.5	-	-	**2.9**	< 50
SB38-1.5	11/30/2015	-	1.5	-	-	**11**	< 50
SB39-0.5	12/2/2015	-	0.5	-	-	**79**	**210**
SB40-1	12/2/2015	-	1.0	-	-	**84**	**300**
SB41-1	12/2/2015	-	1.0	-	-	**150**	**490**
SB42-1	12/2/2015	-	1.0	-	-	**55**	**170**
SB43-1.5	12/1/2015	-	1.5	-	-	**200**	**680**
SB45-1.5	12/1/2015	-	1.5	-	-	**460**	**1,900**
SB46-0.5	12/2/2015	-	0.5	-	-	**62**	**310**
SB48-1.0	12/1/2015	-	1.0	-	-	**110**	**410**
SB49-0.5	12/2/2015	-	0.5	-	-	**8.2**	< 50
SV6-0.5	12/1/2015	-	0.5	-	-	**2.2**	< 50
SV8-0.5	12/3/2015	-	0.5	-	-	**7.2**	< 50
SV10-0.5	12/1/2015	-	0.5	-	-	**7.4**	< 50
SV14-0.5	12/1/2015	-	0.5	-	-	**4.8**	< 50
SV16-0.5	12/1/2015	-	0.5	-	-	**130**	**380**
SV20-0.5	11/30/2015	-	0.5	-	-	**34**	**98**
SV22-0.5	11/30/2015	-	0.5	-	-	**6.6**	< 50
SV32-1.0	11/30/2015	-	1.0	-	-	**38**	**160**
SV32-7.0	11/30/2015	-	7.0	-	-	**780**	**5,300**
SV33-0.5	11/30/2015	-	0.5	-	-	**130**	**410**
SV33-4.5	11/30/2015	-	4.5	-	-	**230**	**1,000**
SV38-1.0	11/30/2015	-	1.0	-	-	**29**	**83**
SV43-1.0	11/30/2015	-	1.0	-	-	**3.7**	< 50
SV45-1.0	11/30/2015	-	1.0	-	-	**130**	**600**
SV47-1.5	12/3/2015	-	1.5	-	-	**7.3**	< 49
SV47-2.5	12/3/2015	-	2.5	-	-	**16**	< 50
SV47-6.0	12/3/2015	-	6.0	-	-	**40 H**	**140 H**

Notes:
Detections are in bold.
Only detected compounds are shown.
bgs = below ground surface
mg/kg: milligrams per kilogram
<#: Not detected at or above laboratory reporting limit shown
TPH: Total Petroleum Hydrocarbons
UST: Underground storage tank
VOC: Volatile Organic Compound
\- = Not analyzed / not applicable
H = Sample was prepped or analyzed beyond the specified holding time.

Table 6
Summary of Laboratory Analytical Results for Groundwater - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Well / Location	Date	TPH (µg/L) TPH-Diesel	TPH-Motor Oil	VOCs (µg/L) Acetone	Benzene	TBA	n-Butyl Benzene	sec-Butyl Benzene	Carbon disulfide	Chloro-benzene	cis-1,2-DCE	Trans-1,2-DCE	1,4-Dioxane	Ethyl-benzene	Isopropyl-benzene	4-Isopropyl-toluene	MEK	MIBK	4-Methyl-2 Pentanol	Naph-thalene	n-Propyl benzene	Toluene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	Vinyl Chloride	m,p-Xylene	o-Xylene	Total Xylenes
Sump Well	8/21/89	--	--	<20	<2	--	--	--	--	--	--	<3	--	<3	--	--	<20	<20	NR	--	--	<2	--	--	<4	--	--	<3
MW1	7/6/89	-	-	<20	<2	-	-	-	-	-	-	<3	--	<3	-	-	<20	<20	NR	-	-	<2	-	-	<4	--	--	<3
	9/7/89	-	-	<20	<2	-	-	-	-	-	-	<3	--	<3	-	-	<20	<20	NR	-	-	<2	-	-	<4	--	--	<3
	1/10/90	-	-	NR	<5	-	-	-	-	-	-	<5	--	<5	-	-	NR	NR	NR	-	-	<5	-	-	<30	--	--	<5
	9/5/91	-	-	<20	**7**	-	-	-	-	-	-	<5	--	<5	-	-	<20	<10	NR	-	-	**8**	-	-	<10	--	--	**3**
	5/20/93	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	8/25/93	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	11/18/93	-	-	<40	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	2/25/94	-	-	<10	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	8/8/94	-	-	<10	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	2/9/95	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	5/9/95	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	11/13/95	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	5/9/96	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
MW3	9/7/89	-	-	<20	<2	-	-	-	-	-	-	<3	--	<3	-	-	<20	<20	NR	-	-	<2	-	-	<4	--	--	<3
	1/10/90	-	-	NR	<5	-	-	-	-	-	-	<5	--	<5	-	-	NR	NR	NR	-	-	<5	-	-	<30	--	--	<5
	9/5/91	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<20	<10	NR	-	-	<5	-	-	<10	--	--	<5
	5/20/93	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	8/25/93	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	11/18/93	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	2/25/94	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	8/8/94	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
MW5	9/26/1989[1]	-	-	-	**8**	-	-	-	-	-	-	**6**	--	**6**	-	-	-	-	-	**5**	-	-	-	-	**4**	--	--	-
	1/10/90	-	-	-	**12**	-	-	-	-	<5	-	<5	--	<5	-	-	-	-	-	-	-	<5	-	-	<30	--	--	<5
MW8	1/10/90	-	-	NR	**2,100**	-	-	-	-	-	-	<1,000	--	<1,000	-	-	NR	**160,000**	NR	-	-	<1,000	-	-	<6,000	--	--	<1,000
	12/10/90	-	-	**3,200**	**160**	-	-	-	-	-	-	<25	--	<25	-	-	**10,000**	**47,000**	**130,000**	-	-	<25	-	-	<150	--	--	<25
	9/5/91	-	-	<5,000	<10,000	-	-	-	-	-	-	<5,000	--	<5,000	-	-	<20,000	**150,000**	NR	-	-	<10,000	-	-	<10,000	--	--	<5,000
	5/20/93	-	-	<10,000	<3,000	-	-	-	-	-	-	<3,000	--	<3,000	-	-	<5,000	**100,000**	NR	-	-	<3,000	-	-	<5,000	--	--	<3,000
	8/25/93	-	-	<5,000	<1,000	-	-	-	-	-	-	<1,000	--	<1,000	-	-	<3,000	**48,000**	NR	-	-	<1,000	-	-	<3,000	--	--	<1,000
	11/18/93	-	-	<100	<25	-	-	-	-	-	-	<25	--	<25	-	-	<50	**840**	NR	-	-	<25	-	-	<50	--	--	<25
	2/25/94	-	-	<2,000	<500	-	-	-	-	-	-	<500	--	<500	-	-	<1,000	**14,000**	NR	-	-	<500	-	-	<1,000	--	--	<500
	4/21/94	-	-	<2,000	<500	-	-	-	-	-	-	<500	--	<500	-	-	<1,000	**19,000**	NR	-	-	<500	-	-	<1,000	--	--	<500
	5/11/94	-	-	<10,000	<3,000	-	-	-	-	-	-	<3,000	--	<3,000	-	-	<3,000	**140,000**	NR	-	-	<3,000	-	-	<5,000	--	--	<3,000
	8/8/94	-	-	<2,000	<500	-	-	-	-	-	-	<500	--	<500	-	-	<1,000	**61,000**	NR	-	-	<500	-	-	<1,000	--	--	<500
	2/9/95	-	-	**40**	**84**	-	-	-	-	-	-	<5	--	<5	-	-	**78**	**62,000**	NR	-	-	<5	-	-	<10	--	--	<5
	5/9/95	-	-	<20	**89**	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	11/13/95	-	-	<200	**63**	-	-	-	-	-	-	<50	--	<50	-	-	<100	**85,000**	NR	-	-	<50	-	-	<100	--	--	<50
	5/9/96	-	-	<1,000	<250	-	-	-	-	-	-	<250	--	<250	-	-	<500	**15,000**	NR	-	-	<250	-	-	<500	--	--	<250

Table 6
Summary of Laboratory Analytical Results for Groundwater - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Well / Location	Date	TPH (µg/L)		VOCs (µg/L)																								
		TPH-Diesel	TPH-Motor Oil	Acetone	Benzene	TBA	n-Butyl Benzene	sec-Butyl Benzene	Carbon disulfide	Chloro-benzene	cis-1,2-DCE	Trans-1,2-DCE	1,4-Dioxane	Ethyl-benzene	Isopropyl-benzene	4-Isopropyl-toluene	MEK	MIBK	4-Methyl-2 Pentanol	Naph-thalene	n-Propyl benzene	Toluene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	Vinyl Chloride	m,p-Xylene	o-Xylene	Total Xylenes
MW9	4/21/94	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	**120**	NR	-	-	<5	-	-	<10	--	--	<5
	8/8/94	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	2/9/95	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	5/9/95	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	11/13/95	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	5/9/96	-	-	<20	<5	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
MW10	4/21/94	-	-	<20	**22**	-	-	-	-	-	-	<5	--	<5	-	-	<10	**23**	NR	-	-	<5	-	-	<10	--	--	<5
	8/8/94	-	-	<20	**14**	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	2/9/95	-	-	<20	**6**	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	5/9/95	-	-	<20	**12**	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	11/13/95	-	-	<20	**31**	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
	5/9/96	-	-	<10	**8**	-	-	-	-	-	-	<5	--	<5	-	-	<10	<10	NR	-	-	<5	-	-	<10	--	--	<5
SG-1 (10.75')	4/19/2013	**920**	**5,600**	-	<0.5	<2.0	<0.5	<0.5	**1.1**	**4.4**	<0.5	-	--	<0.5	<0.5	<0.5	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	--	--	<0.5
SG-4 (11.75')	4/19/2013	**4,700**	**12,000**	-	**2**	**2.3**	<0.5	**1.3**	**3.9**	<0.5	**0.69**	-	--	<0.5	**1.1**	<0.5	-	-	-	<0.5	<0.5	**0.54**	<0.5	<0.5	-	--	--	<0.5
SG-5 (10.29')	4/19/2013	**58,000**	**9,500**	-	**8.1**	<20	**32**	**38**	<5.0	<5.0	<5.0	-	--	**45**	**67**	**13**	-	-	-	**84**	**87**	<3.0	**350**	**24**	-	--	--	**59**
SB51	2/1/2016	-	-	--	**3.2**	--	--	--	--	--	< 0.50	--	< 10	< 0.50	--	--	--	--	--	**5**	--	< 0.50	< 0.50	< 0.50	**1.6**	-	-	--
SB56	2/4/2016	-	-	--	**5.6**	--	--	--	--	--	< 25	--	--	< 25	--	--	--	--	--	< 100	--	< 25	< 25	< 25	< 25	< 25	< 25	--
SB57	2/4/2016	-	-	--	**3.0**	--	--	--	--	--	< 8.3	--	--	< 8.3	--	--	--	--	--	< 33	--	< 8.3	**4**	**2**	< 8.3	**5**	**3**	--
SB59	2/3/2016	-	-	--	< 25	--	--	--	--	--	< 25	--	< 100	< 25	--	--	--	--	--	< 100	--	< 25	< 25	< 25	< 25	< 25	< 25	--
SB61	2/3/2016	-	-	--	**4.0**	--	--	--	--	--	**9**	--	< 100	< 13	--	--	--	--	--	< 50	--	< 13	**3**	< 13	**7.3**	< 13	< 13	--
SB62	2/4/2016	-	-	--	**3.3**	--	--	--	--	--	**2**	--	--	**1**	--	--	--	--	--	**3**	--	**2**	**3**	**2**	**2.8**	**3**	**4**	--

Notes:

Detections are in bold.

Only detected compounds are shown.

bgs = below ground surface

DCE = dichloroethene

µg/L = micrograms per liter

<# = Not detected at or above laboratory reporting limit shown

\- = Not analyzed

-- = Not analyzed or not detected

NR = Not reported

TBA = t-Butyl alcohol

MIBK = Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)

MEK = Methyl Ethyl Ketone (2-Butanone)

TPH = Total Petroleum Hydrocarbons

VOCs = Volatile Organic Compounds

1. Detections also included: 2,4-dimethylphenol at 6 µg/L

Table 7
Summary of Laboratory Analytical Results for Groundwater - Total and Dissolved California Title 22 Metals
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Location ID	Depth (feet bgs)	Date Collected	Antimony (µg/L)	Arsenic (µg/L)	Barium (µg/L)	Beryllium (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Silver (µg/L)	Thallium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
MW1	-	7/6/1989	ND(40)	ND(88)	**600**	ND(1.0)	**13**	**64**	**21**	**40**	**63**	ND(200)	ND(40)	**100**	ND(200)	**22**	ND(88)	**60**	**180**
SG-1[(1)]	10.75	4/19/2013	ND(50)	**210**	**12,000**	-	ND(25)	**4,100**	**820**	**4,200**	**2,700**	**2.7**	**77**	**4,600**	-	ND(19)	-	**2,100**	**5,900**
SG-4[(1)]	11.75	4/19/2013	**150**	**650**	**23,000**	-	**210**	**1,400**	**210**	**8,300**	**26,000**	**130**	**270**	**1,600**	-	**19**	-	**480**	**78,000**
SG-5[(1)]	10.29	4/19/2013	**94**	**1,600**	**25,000**	-	**320**	**1,800**	**490**	**34,000**	**60,000**	**52**	**180**	**2,700**	-	**53**	-	**1,900**	**160,000**
GGW-1	10 to 20	11/11/2013	ND(10)	ND(5.0)	**250**	ND(2.0)	ND(5.0)	**8.9**	ND(5.0)	ND(5.0)	**59**	**0.28**	**10**	**5.4**	**27**	ND(5.0)	ND(10)	**71**	**210**
GGW-2	10 to 20	11/11/2013	ND(10)	**6.4**	**280**	ND(2.0)	ND(5.0)	**8.0**	ND(5.0)	**9.1**	**190**	**0.41**	ND(5.0)	**8.5**	**26**	ND(5.0)	ND(10)	**22**	**360**
GGW-3	10 to 20	11/11/2013	ND(10)	**32**	**340**	ND(2.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	**17**	ND(0.20)	**8.7**	ND(5.0)	ND(10)	ND(5.0)	ND(10)	ND(5.0)	**29**
GGW-4	10 to 20	11/11/2013	ND(10)	ND(5.0)	**200**	ND(2.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	**1.3 J**	ND(0.20)	**10**	ND(5.0)	ND(10)	ND(5.0)	ND(10)	ND(5.0)	ND(20)
GGW-5	10 to 20	11/11/2013	ND(10)	ND(5.0)	**350**	ND(2.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	**9.9**	**0.21**	**6.6**	**6.4**	ND(10)	ND(5.0)	ND(10)	ND(5.0)	**23**
GGW-6	10 to 20	11/11/2013	ND(10)	ND(5.0)	**94**	ND(2.0)	ND(5.0)	ND(5.0)	ND(5.0)	ND(5.0)	**3.1 J**	ND(0.20)	**5.9**	ND(5.0)	ND(10)	ND(5.0)	ND(10)	ND(5.0)	ND(20)

Notes:
Detections are shown in bold.
µg/L = Micrograms per liter
bgs = Below ground surface
ND(5.0) = Compound not detected at or above the indicated laboratory reporting limit
- = Not analyzed
J = Estimated value
1. Samples collected in April 2013 were not filtered and represent total metals.

Table 8
Summary of Laboratory Analytical Results for Soil Gas
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

					VOCs (μg/m³)																										Fixed Gases (% by volume)					
Sample Location	Date Sampled	Sample ID	Sample Depth (feet bgs)	Depth to Water (ft bgs)	Acetone	Benzene	Carbon disulfide	Chloroform	Chloro-methane	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	4-Ethyl-toluene	2-Hexanone	2-Butanone (MEK)	Methyl Isobutyl Ketone (MIBK)	Naphthalene	1,1,2,2-PCA	PCE	Toluene	1,1,1-TCA	TCE	1,2,4-Trimethyl-benzene	1,3,5- Trimethyl-benzene	Vinyl chloride	m,p-Xylene	o-Xylene	Xylenes	Other VOCs	1,1-DFA (Leak Check)	Methane	Carbon Dioxide	Oxygen and Argon	Oxygen	Helium	Nitrogen
SG-1	4/22/2013	SG-1	4.5	10.75	< 7.2	8.6	ND	ND	< 1.6	< 3.0	ND	< 3.3	< 3.7	--	< 6.7	ND	--	ND	< 5.2	3.4	ND	< 4.1	< 11	< 3.7	ND	ND	ND	< 13	ND	< 8.2	< 0.5	8.49	8.9	-	-	82.6
SG-2	4/22/2013	SG-2	4.5	-	< 13	< 4.5	ND	ND	< 2.9	< 5.6	ND	< 6.1	13	--	< 12	ND	--	ND	< 9.6	< 5.3	ND	< 7.6	37	16	ND	ND	ND	< 24	ND	< 15	< 0.5	10.7	12	-	-	77.2
SG-3	4/22/2013	SG-3	4.5	-	< 38	73	ND	ND	< 8.3	24	ND	< 17	< 20	--	< 35	ND	--	ND	30	18	ND	< 21	< 59	< 20	ND	ND	ND	< 69	ND	140	0.864	< 0.5	19.9	-	-	79.3
SG-4	4/22/2013	SG-4	4.5	11.75	19	37	ND	ND	2.4	< 2.9	ND	4.6	< 3.6	--	7.7	ND	--	ND	< 4.9	16	ND	9.6	< 11	< 3.6	ND	ND	ND	21.8	ND	< 7.8	< 0.5	9.52	11.4	-	-	79.1
SG-5	4/22/2013	SG-5	4.5	10.29	19	9.5	ND	ND	< 1.7	< 3.3	ND	6.2	< 4.0	--	< 7.3	ND	--	ND	< 5.6	6.1	ND	9.1	< 12	< 4.0	ND	ND	ND	38	ND	< 8.9	< 0.5	8.5	13.6	-	-	77.9
SG-2-Shroud	4/22/2013	SG-2-Shroud	-	NE	-	-	ND	ND	-	-	ND	-	-	--	-	ND	--	ND	-	-	ND	-	-	-	ND	ND	ND	-	ND	130,000	-	-	-	-	-	-
SV1	4/24/2015	SV1-5.0	5.0	-	-	6.68	ND	ND	< 2.07	< 3.97	ND	< 4.34	-	--	28.6	ND	--	ND	< 6.78	6.41	ND	< 5.37	< 4.92	< 4.92	ND	ND	ND	34.2	ND	< 10.0	< 0.100	11.4	-	6.92	-	-
	4/24/2015	SV1-10.0	10.0	-	-	5.72	ND	ND	-	< 3.97	ND	< 4.34	-	--	< 5.89	ND	--	ND	< 6.78	6.86	ND	< 5.37	< 4.92	< 4.92	ND	ND	ND	31.6	ND	< 10.0	< 0.100	13.6	-	6.53	-	-
SV2	4/24/2015	SV2-5.0	5.0	-	-	76.3	ND	ND	-	< 79.3	ND	< 86.8	-	--	< 118	ND	--	ND	< 136	< 75.4	ND	< 107	< 98.3	< 98.3	ND	ND	ND	< 86.8	ND	< 10.0	< 0.100	4.52	-	15.9	-	-
	4/24/2015	SV2-9.5	9.5	-	-	19.6	ND	ND	-	< 7.93	ND	< 8.68	-	--	37.0	ND	--	ND	< 13.6	14.0	ND	< 10.7	< 9.83	< 9.83	ND	ND	ND	< 8.68	ND	< 10.0	< 0.100	6.57	-	15.4	-	-
SV3	4/24/2015	SV3-5.0	5.0	-	-	< 6.39	ND	ND	-	< 7.93	ND	< 8.68	-	--	28.9	ND	--	ND	< 13.6	< 7.54	ND	< 10.7	< 9.83	< 9.83	ND	ND	ND	< 8.68	ND	< 10.0	< 0.100	6.17	-	12.4	-	-
	4/24/2015	SV1-9.5	9.5	-	-	< 63.9	ND	ND	-	< 79.3	ND	< 86.8	-	--	< 118	ND	--	ND	< 136	< 75.4	ND	< 107	< 98.3	< 98.3	ND	ND	ND	< 86.8	ND	< 10.0	< 0.100	7.74	-	11.2	-	-
SV5	12/2/2015	SV5-5	5.0	-	120	12	3.9	7.2	ND	< 1.6	< 1.6	2.6	< 2.0	--	55	< 1.6	--	< 2.7	< 2.7	8.9	< 1.6	< 2.1	8.5	3.2	< 1.0	25	3.8	ND	ND	-	< 0.96	4.1	-	17	1.5	-
	12/2/2015	SV5-10	10.0	-	76	< 2.1	< 4.2	10	ND	< 2.7	< 2.7	< 2.9	< 3.3	--	43	< 2.8	--	< 4.6	< 4.6	2.9	< 2.8	< 3.6	< 6.6	< 3.3	< 1.7	< 5.8	< 2.9	ND	ND	-	-	-	-	-	< 0.17	-
SV6	12/2/2015	SV6-5	5.0	-	270	31	120	21	ND	5.4	< 2.7	3.2	< 3.4	--	73	< 2.8	--	< 4.7	< 4.6	16	< 2.8	< 3.7	< 6.7	< 3.4	< 1.7	9.3	< 3.0	ND	3.9 (Freon 21)	-	-	-	-	-	< 0.17	-
	12/2/2015	SV6-10	10.0	-	37	< 2.9	< 5.7	< 3.4	ND	< 3.6	< 3.6	< 4.0	< 4.5	--	12	< 3.8	--	< 6.3	< 6.2	< 3.5	< 3.7	< 4.9	< 9	< 4.5	< 2.3	< 8.0	< 4.0	ND	4.8 (Freon 21)	-	-	-	-	-	0.57	-
SV7	12/2/2015	SV7-10	10.0	-	< 9,400	< 1,000	< 2,000	< 1,200	ND	< 1,300	< 1,300	< 1,400	< 1,600	--	< 1,900	88,000	--	< 2,200	< 2,100	< 1,200	< 1,300	< 1,700	< 3,100	< 1,600	< 810	< 2,700	< 1,400	ND	ND	-	-	-	-	-	< 0.17	-
SV8	12/3/2015	SV8-5	5.0	-	76	11	33	< 1.5	2.9	7.0	9.1	< 1.7	< 2.0	--	4.0	< 1.6	--	< 2.7	7.8	13	< 1.6	< 2.1	< 3.9	< 2.0	110	5.4	1.9	ND	3.2 (MC)	-	0.69	1.0	-	1.4	< 0.10	-
	12/3/2015	SV8-10	10.0	-	200	4.8	18	< 4.6	ND	< 5.0	< 5.0	< 5.5	< 6.2	--	35	< 5.2	--	< 8.7	< 8.6	9.7	< 5.2	< 6.8	< 12	< 6.2	7.8	< 11	< 5.5	ND	ND	-	1.6	2.2	-	4.3	< 0.19	-
SV9	12/2/2015	SV9-5	5.0	-	500	8.2	< 11	< 6.7	ND	< 7.3	< 7.3	< 8.0	< 9.0	--	100	840	--	< 13	< 12	23	< 7.5	< 9.9	< 18	< 9.0	< 4.7	20	< 8.0	ND	ND	-	-	-	-	-	0.93	-
	12/2/2015	SV9-10	10.0	-	160	< 2.6	< 5.0	< 2.9	ND	< 3.2	< 3.2	< 3.5	< 3.9	--	48	140	--	< 5.5	< 5.4	3.9	< 3.3	< 4.3	< 7.9	< 3.9	< 2.0	7.5	3.9	ND	ND	-	-	-	-	-	0.67	-
SV10	12/2/2015	SV10-5	5.0	-	630	30	< 19	< 11	ND	22	< 12	< 13	< 15	--	67	300	--	< 21	< 21	26	< 12	< 16	< 30	< 15	< 7.8	< 26	< 13	ND	ND	-	2.4	3.3	-	1.8	0.76	-
	12/2/2015	SV10-10	10.0	-	180	150	< 7.7	< 4.5	ND	4.8	< 4.9	< 5.3	< 6.1	--	41	68	--	< 8.5	59	11	< 5.0	< 6.6	< 12	7.1	< 3.1	< 11	5.9	ND	ND	-	< 0.96	5.3	-	1.7	0.71	-
SV11	12/3/2015	SV11-5	5.0	-	330	84	170	< 8.8	ND	43	< 9.5	< 10	< 12	--	81	< 9.8	--	< 16	< 16	13	< 9.8	< 13	< 24	< 12	< 6.1	27	< 10	ND	ND	-	2.5	3.6	-	2.3	0.44	-
	12/3/2015	SV11-10	10.0	-	770	900	< 38	< 23	ND	< 24	< 24	< 27	< 30	--	140	< 25	--	< 42	< 42	85	< 25	< 33	< 61	< 30	< 16	< 53	< 27	ND	ND	-	6.1	1.7	-	1.9	< 0.19	-
SV12	12/3/2015	SV12-5	5.0	-	300	40	63	< 7.1	ND	< 7.7	< 7.7	< 8.4	< 9.6	--	37	< 8.0	--	< 13	< 13	15	< 8.0	< 10	< 19	< 9.6	< 5.0	< 17	< 8.4	ND	ND	-	-	-	-	-	0.56	-
	12/3/2015	SV12-10	10.0	-	190	7.1	26	< 5.7	ND	< 6.2	< 6.2	< 6.7	< 7.6	--	58	< 6.4	--	< 11	< 11	7.8	< 6.4	< 8.3	< 15	< 7.6	< 4.0	< 13	< 6.7	ND	ND	-	-	-	-	-	0.64	-
SV13	12/2/2015	SV13-5	5.0	-	380	17	31	< 10	ND	< 11	< 11	< 12	< 14	--	65	< 12	--	< 20	< 19	48	< 12	< 15	< 28	< 14	< 7.3	160	< 12	ND	ND	-	13	1.1	-	1.6	0.90	-
	12/2/2015	SV13-10	10.0	-	420	36	44	< 6.7	ND	< 7.3	< 7.3	8.4	< 9.0	--	55	< 7.5	--	< 13	< 12	67	< 7.5	< 9.8	< 18	< 9.0	< 4.7	27	8.5	ND	ND	-	15	< 1.0	-	1.8	< 0.20	-
SV14	12/2/2015	SV14-5	5.0	-	590	83	140	< 14	ND	< 15	< 15	< 17	< 19	--	96	< 16	--	< 26	< 26	32	< 16	< 21	< 38	< 19	< 9.8	< 33	< 17	ND	ND	-	< 0.96	2.0	-	19	< 0.19	-
	12/2/2015	SV14-10	10.0	-	530	610	< 24	< 14	ND	< 15	< 15	28	< 19	--	64	< 16	--	< 26	< 26	71	< 16	< 20	< 37	< 19	< 9.7	110	23	ND	ND	-	13	1.9	-	1.7	1.2	-
SV15	12/2/2015	SV15-5	5.0	-	2,400	39	71	< 33	ND	< 36	< 36	< 40	< 45	--	56	310	--	< 63	< 62	< 34	< 37	< 49	< 90	< 45	< 23	< 79	< 40	ND	ND	-	-	-	-	-	< 0.18	-
	12/2/2015	SV15-8	8.0	-	460	120	190	< 9.5	ND	24	< 10	19	< 13	--	< 15	< 11	--	< 18	< 18	49	< 11	< 14	< 25	< 13	< 6.6	54	22	ND	ND	-	-	-	-	-	< 0.19	-
SV16	12/2/2015	SV16-5	5.0	-	630	59	28	< 17	ND	< 18	< 18	< 20	< 22	--	64	< 19	--	< 31	< 31	43	< 19	< 25	< 45	< 22	< 12	< 40	< 20	ND	ND	-	39	5.6	-	1.3	< 0.18	-
	12/2/2015	SV16-10	10.0	-	590	< 5.6	< 11	< 6.4	ND	13	< 7.0	8.9	< 8.7	--	77	< 7.2	--	< 12	< 12	20	< 7.2	< 9.5	< 17	< 8.7	5.4	27	8.5	ND	9 (1,1-DCA)	-	27	2.3	-	1.3	0.81	-
SV17	12/1/2015	SV17-5	5.0	-	400	130	120	31	ND	< 10	< 10	24	< 13	--	93	< 11	--	< 18	< 18	120	< 11	< 14	< 26	< 13	< 6.7	130	26	ND	ND	-	-	-	-	-	< 0.20	-
	12/1/2015	SV17-10	10.0	-	< 290	4,200	< 62	< 36	ND	< 39	< 39	< 43	< 49	--	< 58	< 40	--	120	< 67	180	< 40	< 53	< 97	< 49	< 25	< 86	< 43	ND	ND	-	-	-	-	-	< 0.20	-
SV18	12/2/2015	SV18-5	5.0	-	780	210	120	< 9.4	ND	29	< 10	< 11	< 13	--	100	< 11	--	< 18	< 17	32	< 10	< 14	< 25	< 13	83	43	< 11	ND	ND	-	-	-	-	-	< 0.18	-
	12/2/2015	SV18-10	10.0	-	380	84	280	< 6.1	20	< 6.6	< 6.6	8.9	< 8.2	--	72	< 6.8	--	< 11	< 11	39	< 6.8	< 8.9	< 16	< 8.2	57	27	9.2	ND	ND	-	-	-	-	-	0.29	-
SV19	12/1/2015	SV19-5	5.0	-	760	300	66	< 10	ND	14	< 11	< 12	< 14	--	150	< 11	--	< 19	< 19	59	< 11	< 15	< 28	< 14	650	68	13	ND	ND	-	52	9.7	-	0.96	< 0.17	-
	12/1/2015	SV19-10	10.0	-	180	760	110	< 11	ND	170	< 12	< 13	< 14	--	44	< 12	--	< 20	< 20	53	< 12	34	< 29	< 14	47	45	12	ND	ND	-	75	1.8	-	0.87	< 0.18	-
SV20	12/1/2015	SV20-5	5.0	-	960	120	120	< 31	ND	< 33	< 33	< 37	< 41	--	110	< 35	--	< 58	< 57	58	< 35	< 45	< 83	< 41	23	< 73	< 37	ND	ND	-	20	5.0	-	2.3	< 0.17	-
	12/1/2015	SV20-10	10.0	-	230	110	60	< 7.3	ND	25	< 7.9	9.9	< 9.7	--	54	< 8.1	--	< 14	< 13	65	< 8.1	< 11	< 19	< 9.7	19	40	11	ND	7.9 (MC)	-	22	5.1	-	1.6	< 0.17	-
SV21	12/1/2015	SV21-5	5.0	-	620	62	120	23	ND	70	< 12	< 13	< 14	--	83	< 12	--	< 20	< 20	54	< 12	17	< 29	< 14	48	< 26	< 13	ND	ND	-	-	-	-	-	< 0.19	-
	12/1/2015	SV21-10	10.0	-	290	42	260	< 7.6	ND	75	< 8.2	< 9.0	< 10	--	64	< 8.5	--	< 14	< 14	48	< 8.5	20	< 20	< 10	140	67	< 9	ND	ND	-	-	-	-	-	< 0.17	-
SV22	12/1/2015	SV22-5	5.0	-	< 11,000	< 1,200	< 2,400	< 1,400	ND	< 1,500	< 1,500	< 1,600	< 1,900	--	< 2,200	< 1,500	--	< 2,600	< 2,600	< 1,400	< 1,500	< 2,000	< 3,700	< 1,900	83,000	< 3,300	< 1,600	ND	ND	-	35	11	-	1.4	< 0.19	-
	12/1/2015	SV22-10	10.0	-	< 5,200	< 560	< 1,100	< 640	ND	1,500	1,200	< 760	< 860	--	< 1,000	< 710	--	< 1,200	< 1,200	< 660	< 710	< 940	< 1,700	< 860	35,000	< 1,500	< 760	ND	ND	-	44	< 0.87	-	1.3	0.41	-
SV23	11/30/2015	SV23-5	5.0	-	210	970	18	< 9.1	ND	110	33	16	< 12	--	47	< 10	--	< 17	< 17	35	< 10	< 13	< 25	< 12	14	36	11	ND	18 (1,4-DCB)	-	< 1.0	10	-	2.0	< 0.20	-
	11/30/2015	SV23-10	10.0	-	410	27	9.0	8.5	ND	< 5.7	< 5.7	< 6.3	< 7.1	--	110	< 5.9	--	< 9.9	< 9.8	34	< 5.9	< 7.7	< 14	< 7.1	< 3.7	18	6.0	ND	ND	-	< 0.98	5.2	-	11	< 0.20	-
SV24	11/30/2015	SV24-5	5.0	-	560	12	< 11	< 6.5	ND	< 7.0	< 7.0	< 7.7	< 8.7	--	120	< 7.3	--	< 12	< 12	32	< 7.3	< 9.5	< 17	< 8.7	< 4.5	18	< 7.7	ND	ND	-	-	-	-	-	< 0.19	-
	11/30/2015	SV24-10	10.0	-	490	100	74	< 6.3	ND	< 6.8	< 6.8	95	61	--	100	< 7.1	--	< 12	< 12	110	< 7.1	< 9.3	190	76	< 4.4	280	180	ND	ND	-	-	-	-	-	< 0.19	-
SV25	12/1/2015	SV25-5	5.0	-	1,200	110	< 120	< 71	ND	130	< 77	< 84	< 95	--	< 110	< 79	--	< 130	< 130	< 73	< 79	< 100	< 190	< 95	7,300	< 170	< 84	ND	ND	-	-	-	-	-	< 0.19	-
	12/1/2015	SV25-10	10.0	-	< 1200	160	< 240	< 140	ND	2,100	210	< 170	< 190	--	< 230	< 160	--	< 270	< 260	< 150	< 160	300	< 380	< 190	11,000	< 340	< 170	ND	ND	-	-	-	-	-	< 0.17	-
SV26	12/1/2015	SV26-5	5.0	-	290	240	130	< 3.5	ND	28	< 3.7	18	< 4.6	--	63	< 3.9	--	< 6.5	< 6.4	35	< 3.9	5.8	17	10	14	120	18	ND	ND	-	2.3	1.4	-	9.5	< 0.16	-
	12/1/2015	SV26-10	10.0	-	< 180	30	< 38	< 22	ND	26	< 24	< 27	38	--	< 36	< 25	--	< 42	< 42	25	< 25	< 33	180	82	72	110	45	ND	56 (CB)	-	3.3	2.8	-	1.8	< 0.18	-
SV27	11/30/2015	SV27-5	5.0	-	180	7.8	9.8	< 2.3	ND	< 2.5	< 2.5	< 2.8	< 3.1	4.7	26	< 2.6	--	< 4.4	< 4.3	44	< 2.6	5.3	< 6.3	< 3.1	< 1.6	15	2.8	ND	ND	-	-	-	-	-	< 0.16	-
	11/30/2015	SV27-10	10.0	-	110	9.8	16	< 4.2	ND	8.2	< 4.5	< 4.9	< 5.6	--	11	< 4.7	--	< 7.8	< 7.7	15	< 4.6	< 6.1	< 11	< 5.6	10	10	< 4.9	ND	ND	-	-	-	-	-	< 0.16	-
SV28R	12/3/2015	SV28R-5	5.0	-	220	18	17	< 5.7	ND	11	< 6.2	82	8.3	--	33	< 6.4	--	< 11	< 11	110	< 6.4	< 8.4	46	35	23	420	64	ND	ND	-	13	1.0	-	2.0	0.58	-
	12/3/2015	SV28R-10	10.0	-	27	< 1.3	< 2.5	< 1.5	ND	1.7	< 1.6	< 1.7	< 2.0	--	< 2.4	< 1.6	--	< 2.7	< 2.7	< 1.5	< 1.6	< 2.1	< 3.9	< 2.0	83	< 3.5	< 1.7	ND	7.5 (Freon 21)	-	21	< 0.97	-	1.4	< 0.19	-
SV29	11/30/2015	SV29-5	5.0	-	210	10	30	14	ND	< 3.0	< 3.0	11	< 3.7	--	31	< 3.1	--	< 5.2	< 5.1	27	< 3.1	< 4.0	7.3	< 3.7	< 1.9	200	5.8	ND	ND	-	-	-	-	-	< 0.19	-
	11/30/2015	SV29-10	10.0	-	160	35	63	< 2.7	ND	< 2.9	< 2.9	8.0	< 3.6	--	30	< 3.0	--	< 5.0	< 5.0	21	< 3.0	6.2	7.1	5.1	< 1.9	47	7.8	ND	3.4 (MC)	-	-	-	-	-	< 0.18	-
SV30	12/1/2015	SV30-5	5.0	-	110	12	41	7.3	ND	6.7	3.4	< 3.6	< 4.1	--	22	< 3.4	--	< 5.8	< 5.7	11	< 3.4	110	< 8.3	< 4.1	< 2.1	11	< 3.6	ND	ND	-	-	-	-	-	< 0.17	-
	12/1/2015	SV30-10	10.0	-	130	67	97	6.8	ND	28	13	8.0	< 8.9	--	30	< 7.4	--	< 12	< 12	24	< 7.4	23	< 18	< 8.9	33	21	8.6	ND	33 (1,1-DCE), 10 (Freon 11)	-	-	-	-	-	< 0.18	-
SV31	12/1/2015	SV31-5	5.0	-	75	13	21	8.5	ND	< 2.7	< 2.7	4.0	< 3.4	--	13	< 2.8	--	< 4.7	< 4.6	19	< 2.8	13	< 6.7	< 3.4	< 1.7	14	6.3	ND	3.5 (MC)	-	-	-	-	-	< 0.17	-
	12/1/2015	SV31-10	10.0	-	38	17	11	11	4	< 1.6	2.8	4.0	< 2.0	--	4.8	< 1.6	--	< 2.7	< 2.7	15	< 1.6	23	< 3.9	< 2.0	< 1.0	22	6.6	ND	ND	-	-	-	-	-	< 0.16	-
SV32	12/1/2015	SV32-5	5.0	-	150	14	8.0	19	ND	< 5.1	< 5.1	< 5.6	< 6.4	--	22	< 5.3	--	< 8.9	< 8.8	16	< 5.3	11	< 13	< 6.4	< 3.3	< 11	< 5.6	ND	ND	-	-	-	-	-	< 0.16	-
	12/1/2015	SV32-10	10.0	-	330	43	< 18	< 10	ND	< 11	< 11	< 12	< 14	--	49	< 12	--	< 19	< 19	17	< 12	< 15	< 28	< 14	< 7.2	< 24	< 12	ND	ND	-	-	-	-	-	< 0.17	-
SV33	12/1/2015	SV33-5	5.0	-	230	37	24	< 12	ND	< 13	< 13	< 14	< 16	--	34	< 14	--	< 23	< 22	20	< 14	< 18	< 33	< 16	< 8.5	30	< 14	ND	ND	-	-	-	-	-	< 0.17	-
	12/1/2015	SV33-10	10.0	-	< 200	< 22	< 43	< 25	ND	< 27	< 27	70	< 34	--	< 40	970	--	430	< 46	65	< 28	< 37	< 67	< 34	47	350	80	ND	ND	-	-	-	-	-	< 0.17	-
SV36	12/1/2015	SV36-5	5.0	-	77	5.7	< 7.2	< 4.3	ND	< 4.6	< 4.6	< 5.1	< 5.7	--	16	8.3	--	21	< 7.9	9.0	< 4.8	< 6.3	< 11	< 5.7	3.0	< 10	5.0	ND	ND	-	< 1.2	3.6	-	17	< 0.23	-
	12/1/2015	SV36-10	10.0	-	< 260	150	53	< 31	ND	< 34	< 34	210	< 42	--	< 51	370	--	2,500	< 58	41	< 35	< 46	< 85	< 42	< 22	< 75	250	ND	170 (BC)	-	11	2.0	-	10	< 0.17	-
SV38	11/30/2015	SV38-5	5.0	-	460	18	110	48	ND	< 9.7	< 9.7	< 11	< 12	--	85	< 10	--	< 17	< 17	24	< 10	< 13	< 24	< 12	25	< 21	< 11	ND	ND	-	13	0.99	-	2.4	< 0.18	-
	11/30/2015	SV38-10	10.0	-	310	150	320	< 22	ND	160	54	< 26	< 29	--	78	< 24	--	< 41	< 40	30	< 24	< 32	< 59	< 29	1,800	< 52	< 26	ND	ND	-	67	< 0.89	-	1.6	< 0.18	-
SV39	12/1/2015	SV39-5	5.0	-	290	17	110	4.1	ND	< 4.4	< 4.4	39	< 5.5	--	61	< 4.6	--	< 7.6	< 7.5	17	< 4.6	< 6.0	< 11	< 5.5	< 2.8	23	4.8	ND	ND	-	< 0.96	< 0.96	-	24	0.19	-
	12/1/2015	SV39-10	10.0	-	200	130	140	< 4.4	ND	38	63	99	23	--	49	< 4.9	--	< 8.2	< 8.1	71	< 4.9	9.0	62	43	7.5	220	65	ND	ND	-	3.4	< 0.94	-	22	< 0.19	-
SV40	12/1/2015	SV40-5	5.0	-	180	25	43	< 9.2	ND	42	10	< 11	< 12	--	29	38	--	27	< 17	14	< 10	13	< 25	< 12	24	< 22	< 11	ND	ND	-	-	-	-	-	< 0.19	-
	12/1/2015	SV40-10	10.0	-	< 270	50	< 57	< 34	ND	< 36	< 36	< 40	< 45	--	< 54	73	--	640	< 62	< 35	< 38	< 49	< 90	< 45	110	160	130	ND	ND	-	-	-	-	-	< 0.18	-
SV43	12/1/2015	SV43-5	5.0	-	76	25	15	12	ND	< 5.0	< 5.0	< 5.4	< 6.2	--	17	21	--	< 8.6	< 8.5	9.1	< 5.1	< 6.7	< 12	< 6.2	< 3.2	< 11	< 5.4	ND	ND	-	-	-	-	-	< 0.19	-
	12/1/2015	SV43-10	10.0	-	42	5.1	6.5	< 1.6	ND	1.8	< 1.8	< 1.9	< 2.2	--	15	< 1.8	--	7.5	< 3	4.9	< 1.8	< 2.4	< 4.4	< 2.2	< 1.1	5.3	1.9	ND	3.3 (BC)	-	-	-	-	-	< 0.18	-
SV44	12/1/2015	SV44-5	5.0	-	220	50	60	< 2.4	ND	< 2.6	< 2.6	30	6.9	--	49	< 2.7	17	< 4.6	< 4.5	17	< 2.7	< 3.6	16	3.7	< 1.7	22	13	ND	ND	-	< 0.83	< 0.83	-	24	< 0.17	-
	12/1/2015	SV44-10	10.0	-	130	5.6	26	< 3.2	ND	21	< 3.5	< 3.8	< 4.3	--	28	< 3.6	--	< 6.0	< 5.9	4.7	< 3.6	< 4.7	< 8.6	< 4.3	3.1	< 7.6	< 3.8	ND	ND	-	0.92	9.3	-	2.3	< 0.16	-
SV45	12/1/2015	SV45-5	5.0	-	540	51	45	22	ND	6.6	< 6.8	10	< 8.4	--	110	< 7.0	--	< 12	< 12	14	< 7.0	< 9.2	< 17	< 8.4	< 4.4	50	15	ND	ND	-	< 0.90	5.8	-	14	0.34	-
	12/1/2015	SV45-10	10.0	-	170	16	7.7	4.9	ND	9.5	< 2.9	6.0	< 3.5	--	76	< 2.9	--	< 4.9	< 4.9	8.3	< 2.9	< 3.9	9.7	4.4	< 1.8	33	12	ND	3.4 (BC)	-	< 0.90	11	-	4.0	0.36	-
SV47	12/3/2015	SV47-5	5.0	-	250	13	22	< 3.9	ND	8.8	< 4.2	< 4.6	< 5.2	--	38	< 4.3	--	< 7.2	< 7.2	24	5.7	< 5.7	< 10	< 5.2	< 2.7	11	< 4.6	ND	ND	-	-	-	-	-	< 0.21	-
SV7R	2/4/2016	SV7R-10	10.0	-	43	18	< 6.9	< 4.1	ND	< 4.4	< 4.4	5.3	< 5.4	--	17.0	250	--	< 7.6	< 7.5	39	< 4.5	< 6.0	< 11	< 5.4	< 2.8	22	9.1	--	8.8 (Freon 12), 4.2 (MC)	--	< 0.86	8.2	--	5.9	< 0.17	--
SV48	2/1/2016	SV48-5	5.0	-	200	34	< 6.7	< 3.9	ND	< 4.2	< 4.2	36	12	--	21	< 4.4	--	< 7.3	< 7.2	210	< 4.4	< 5.7	27	12	< 2.7	150	52	--	ND	--	< 0.96	6.2	--	5.6	0.43	--
	2/1/2016	SV48-10	10.0	-	150	14	80	< 2.8	ND	8.2	< 3	9.2	5.3	--	44	< 3.1	--	< 5.2	< 5.1	64	< 3.1	< 4.1	11	3.9	3.2	39	12	--	5.8 (CB)	--	2.6	8.2	--	2	< 0.19	--
SV49	2/1/2016	SV49-5	5.0	-	90	59	6.6	< 2.7	ND	14	< 2.9	14	4.5	--	37	< 3	--	< 5.1	< 5.0	28	< 3	6.5	9.9	5	< 1.9	57	24	--	ND	--	1.3	6.8	--	2.1	< 0.19	--
SV50	2/2/2016	SV50-5	5.0	-	270	210	33	< 14	ND	< 16	< 16	160	20	--	40	220	--	< 27	< 27	1600	< 16	< 21	< 39	< 19	200	580	160	--	ND	--	-	-	--	-	< 0.24	--
SV51	2/2/2016	SV51-5	5.0	-	< 650	160	< 140	< 81	ND	< 87	< 87	< 96	< 110	--	< 130	< 90	--	< 150	< 150	260.0	< 90	< 120	< 220	< 110	6500.0	< 190	< 96	--	ND	--	-	-	--	-	< 0.2	--
SV52	2/2/2016	SV52-5	5.0	-	150	130	< 14	< 8	ND	72	< 8.6	< 9.5	< 11	--	38	< 8.9	--	< 15	< 15	53	< 8.9	< 12	< 21	< 11	220	33	10	--	ND	--	-	-	--	-	< 0.18	--
SV53	2/2/2016	SV53-5	5.0	-	140	79	55	2.1	2.6	24	3.2	20	5.8	--	32	< 1.6	--	< 2.7	3.2	200	1.8	13	11	5.5	110	75	25	--	3.3 (1,1-DCE), 3.9 (Freon 12), 4.1 (MC), 3.5 (Freon 11), 6.6 (VA)	--	-	-	--	-	< 0.24	--
SV54	2/1/2016	SV54-5	5.0	-	< 670	200	< 140	< 82	ND	< 89	< 89	< 98	< 110	--	< 130	< 92	--	< 150	< 150	< 85	< 92	< 120	< 220	< 110	5,100	< 200	< 98	--	ND	--	45	8.5	--	2	< 0.19	--

Table 8
Summary of Laboratory Analytical Results for Soil Gas
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Date Sampled	Sample ID	Sample Depth (feet bgs)	Depth to Water (ft bgs)	VOCs (μg/m³) Acetone	Benzene	Carbon disulfide	Chloroform	Chloro-methane	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	4-Ethyl-toluene	2-Hexanone	2-Butanone (MEK)	Methyl Isobutyl Ketone (MIBK)	Naphthalene
SV55	2/2/2016	SV55-5	5.0	-	**480**	**79**	**20**	< 8.2	ND	< 8.9	< 8.9	< 9.7	< 11	--	**56**	< 9.2	--
SV56	2/2/2016	SV56-5	5.0	-	< 2,300	**270**	< 490	< 290	ND	**770**	< 310	< 340	< 380	--	< 460	< 320	--
SV57	2/2/2016	SV57-5	5.0	-	< 780	**190**	< 160	< 96	ND	**210**	< 100	< 110	< 130	--	< 160	< 110	--
SV58	2/3/2016	SV58-5	5.0	-	**99**	**38**	**18**	< 2.6	ND	< 2.8	< 2.8	**15**	**5.9**	--	**24**	< 2.9	--
	2/3/2016	SV58-10	10.0	-	**220**	**160**	**150**	< 4.7	ND	**18**	< 5.1	**22**	**9.9**	--	**63**	< 5.3	--
SV59	2/3/2016	SV59-5	5.0	-	< 11,000	< 1,200	< 2,300	< 1,400	ND	**3300**	**1700**	< 1,600	< 1,900	--	< 2,200	< 1,500	--
	2/3/2016	SV59-10	10.0	-	< 3500	< 380	< 740	< 440	ND	**5600**	**2100**	< 520	< 590	--	< 700	< 490	--
SV60	2/3/2016	SV60-5	5.0	-	< 490	**110**	< 100	< 61	ND	**720**	**220**	< 72	< 82	--	< 98	**72**	--
	2/3/2016	SV60-10	10.0	-	< 130,000	< 14,000	< 27,000	< 16,000	ND	**98000**	**41000**	< 19,000	< 21,000	--	< 26,000	< 18,000	--
SV61	2/4/2016	SV61-5	5.0	-	**260**	**37**	< 21	< 12	ND	< 13	< 13	**300.0**	**200**	--	**25**	< 14	--
	2/4/2016	SV61-10	10.0	-	< 1,800	**340**	< 380	< 230	ND	< 240	< 240	< 270	**380**	--	< 360	< 250	--
SV62	9/7/2016	SV62-5	5.0	-	**590**	**120**	**41**	**17**	< 15	< 15	--	**55**	< 18	< 15	**93**	< 15	< 39
	9/7/2016	SV62-10	10.0	-	< 1200	< 130	< 250	< 150	< 170	< 160	--	< 180	< 200	< 170	< 240	< 170	< 420
SV63	9/7/2016	SV63-5	5.0	-	**310**	**27**	**25**	**8.7**	< 3.7	< 3.5	--	**23**	**4.5**	**6.8**	**71**	**14**	< 9.3
	9/7/2016	SV63-10	10.0	-	< 740	**170**	< 160	< 91	< 100	< 99	--	< 110	< 120	< 100	< 150	< 100	< 260
SV64	9/7/2016	SV64-5	5.0	-	**190**	**12**	**9.8**	< 2.0	< 2.3	< 2.2	--	**7.5**	< 2.7	**2.8**	**40**	**3.9**	< 5.8
	9/7/2016	SV64-10	10.0	-	**100**	**19**	**37**	< 6.6	< 7.4	< 7.1	--	**8.1**	< 8.8	< 7.4	**26**	< 7.4	< 19
SV65	9/7/2016	SV65-5	5.0	-	**200**	**23**	< 6.2	< 3.6	< 4.1	< 3.9	--	**6.3**	< 4.9	< 4.0	**50**	**7.6**	< 10
	9/7/2016	SV65-10	10.0	-	**73**	**83**	**11**	< 3.5	**4.6**	< 3.7	--	**15**	< 4.6	< 3.9	**19**	< 3.9	<9.9
SV66	9/7/2016	SV66-5	5.0	-	**160**	**29**	**8.3**	**42**	**3.9**	**14**	--	**17**	< 4.0	< 3.3	**30**	< 3.3	< 8.6
	9/7/2016	SV66-10	10.0	-	**190**	**120**	**29**	< 13	<15	**23**	--	< 16	< 18	< 15	**57**	< 15	< 38
SV67	9/12/2016	SV67-5	5.0	-	**100**	**3900**	< 12	< 7.3	< 8.2	< 7.9	--	**1900**	**190**	< 8.2	**15**	< 8.2	< 130
	9/12/2016	SV67-10	10.0	-	< 59	**6.5**	< 12	< 7.3	< 8.2	< 7.9	--	< 8.6	< 9.8	< 8.1	< 12	< 8.1	< 21

Sample ID	VOCs (μg/m³) 1,1,2,2-PCA	PCE	Toluene	1,1,1-TCA	TCE	1,2,4-Trimethyl-benzene	1,3,5- Trimethyl-benzene	Vinyl chloride	m,p-Xylene	o-Xylene	Xylenes	Other VOCs	1,1-DFA (Leak Check)	Fixed Gases (% by volume) Methane	Carbon Dioxide	Oxygen and Argon	Oxygen	Helium	Nitrogen
SV55-5	< 15	< 15	**29**	< 9.2	< 12	< 22	< 11	**1200**	< 19	< 9.7	--	ND	--	-	-	--	-	**0.19**	--
SV56-5	< 540	< 530	< 290	< 320	< 420	< 770	< 380	**29000**	< 680	< 340	--	ND	--	-	-	--	-	< 0.17	--
SV57-5	< 180	< 180	**180**	< 110	< 140	< 260	< 130	**9400**	< 230	< 110	--	ND	--	-	-	--	-	< 0.21	--
SV58-5	< 4.9	< 4.9	**140**	< 2.9	< 3.8	**12**	**5**	< 1.8	**58**	**18**	--	**3.7 (Freon 12)**	--	< 0.9	< 0.9	--	**24**	< 0.18	--
SV58-10	< 8.9	< 8.8	**89**	< 5.3	**11**	**15**	**7.5**	**6.4**	**64**	**22**	--	ND	--	**35**	< 1.2	--	**14**	**0.38**	--
SV59-5	< 2,600	< 2,600	< 1,400	< 1,500	< 2,000	< 3,700	< 1,900	**120000**	< 3,300	< 1,600	--	ND	--	**9.4**	**2.6**	--	**13**	< 0.19	--
SV59-10	< 820	< 810	< 450	< 490	**680**	< 1,200	< 590	**15000**	< 1,000	< 520	--	ND	--	**39**	< 0.96	--	**2.6**	< 0.19	--
SV60-5	< 110	< 110	**500**	< 68	< 89	< 160	< 82	**3100**	**170**	**86**	--	ND	--	< 0.97	< 0.97	--	**24**	< 0.19	--
SV60-10	< 30,000	< 29,000	< 16,000	< 18,000	< 23,000	< 43,000	< 21,000	**920000**	< 38,000	< 19,000	--	ND	--	**94**	< 0.87	--	**0.59**	< 0.17	--
SV61-5	< 23	< 23	**820**	< 14	< 18	**500**	**240**	< 8.5	**1500**	**530**	--	ND	--	< 0.84	< 0.84	--	**24.0**	**0.21**	--
SV61-10	< 420	< 420	**280**	< 250	< 330	**580**	**340**	**7500**	**1400**	**410**	--	ND	--	**25**	< 0.86	--	**7.3**	< 0.17	--
SV62-5	--	--	**250**	--	< 20	**50**	**27**	< 9.4	**390**	**94**	--	ND	--	**5.0**	< 2.3	--	**8.3**	**0.77**	--
SV62-10	--	--	< 150	--	< 220	< 400	< 200	< 100	< 350	< 180	--	ND	--	**5.6**	< 5.0	--	**6.1**	**2.1**	--
SV63-5	--	--	**68**	--	< 4.8	**13**	**6.3**	< 2.3	**92**	**27**	--	ND	--	**0.22**	< 3.3	--	**9.0**	**1.1**	--
SV63-10	--	--	< 94	--	< 130	< 250	< 120	< 64	**620**	< 110	--	ND	--	**2.9**	< 3.1	--	**15**	**1.0**	--
SV64-5	--	--	**36**	--	< 3.0	**6.6**	< 2.7	< 1.4	**26**	**7.6**	--	ND	--	**0.0024**	< 2.1	--	**17**	**1.2**	--
SV64-10	--	--	**28**	--	< 9.7	< 18	< 8.8	< 4.6	**20**	< 7.8	--	ND	--	**0.0057**	< 6.8	--	**26**	**4.0**	--
SV65-5	--	--	**17**	--	< 5.3	< 9.7	< 4.9	< 2.5	**22**	**7.8**	--	ND	--	**0.0033**	< 6.3	--	**14**	**2.8**	--
SV65-10	--	--	**21**	--	< 5.1	< 9.3	< 4.6	< 0.94	**69**	**31**	--	ND	--	**0.0027**	< 3.5	--	**16**	**1.5**	--
SV66-5	--	--	**86**	--	**6.1**	**12**	**4.1**	< 2.1	**54**	**18**	--	ND	--	**0.0029**	< 3.1	--	**14**	**1.7**	--
SV66-10	--	--	**37**	--	< 19	< 36	< 18	< 9.3	**37**	< 16	--	ND	--	**0.60**	< 4.5	--	**15**	**2.1**	--
SV67-5	--	--	**4700**	--	**50**	**320**	**180**	< 5.1	**3900**	**760**	--	**15 (1,1-DCA); 18 (1,2-DCA)**	--	**0.00091**	< 2.0	--	**20**	< 0.41	--
SV67-10	--	--	< 7.5	--	< 11	< 20	< 9.8	< 5.1	< 17	< 8.6	--	ND	--	**0.043**	< 2.1	--	**20**	**0.71**	--

Notes:
Detections are in bold.
Only detected compounds are shown.
μg/m³ = micrograms per cubic meter
<## = Not detected at or above laboratory reporting limit shown
ND = Not detected
- = Not analyzed or not recorded
-- = Not analyzed or not detected
bgs = below ground surface
CB = Chlorobenzene.
DCA = Dichloroethane.
DCB = Dichlorobenzene
DCE = Dichloroethene
DFA = Difluoroethane
PCE = Tetrachloroethene
TCE = Trichloroethene
BC = Benzyl chloride
Freon 11 = Trichlorofluoromethane
Freon 12 = Dichlorodifluoromethane
Freon 21 = Dichlorofluoromethane
MC = Methylene Chloride
VA = Vinyl Acetate
VOCs = Volatile organic compounds

Table 9
Summary of Laboratory Analytical Results for Sub-Slab Vapor
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sub-Slab Port	Sample ID	Date Sampled	PCE ($\mu g/m^3$)	TCE ($\mu g/m^3$)	cis-1,2-DCE	Vinyl Chloride	1,1,1-TCA ($\mu g/m^3$)	Benzene ($\mu g/m^3$)	Toluene ($\mu g/m^3$)	Ethylbenzene	m,p-Xylene	o-Xylene ($\mu g/m^3$)	Styrene ($\mu g/m^3$)	MEK ($\mu g/m^3$)	MIBK ($\mu g/m^3$)	Other VOCs	Methane (%vol)	Carbon Dioxide	Oxygen (%vol)	1,1,-DFA (ppmV)
SSV1	**SSV1**	4/24/2015	**43.8**	ND(5.37)	ND(3.97)	ND(2.56)	ND(5.46)	ND(3.19)	ND(3.77)	ND(4.34)	ND(4.34)	ND(4.34)	ND(4.26)	**10.2**	ND(8.18)	All ND	ND(0.100)	**0.462**	**18.5**	ND(10.0)
SSV2	**SSV2**	4/24/2015	ND(6.78)	ND(5.37)	ND(3.97)	ND(2.56)	**6.66**	ND(3.19)	ND(3.77)	ND(4.34)	ND(4.34)	ND(4.34)	**9.16**	**15.8**	ND(8.18)	All ND	ND(0.100)	< 0.100	**19.1**	ND(10.0)
SSV3	**SSV3**	4/24/2015	ND(6.78)	ND(5.37)	ND(3.97)	ND(2.56)	ND(5.46)	ND(3.19)	ND(3.77)	ND(4.34)	ND(4.34)	ND(4.34)	**8.82**	**10.8**	ND(8.18)	All ND	ND(0.100)	**4.25**	**8.97**	ND(10.0)
SSV4	**SSV4**	4/24/2015	ND(6.78)	ND(5.37)	ND(3.97)	ND(2.56)	ND(5.46)	ND(3.19)	ND(3.77)	ND(4.34)	ND(4.34)	ND(4.34)	**8.18**	**8.60**	ND(8.18)	All ND	ND(0.100)	**0.272**	**17.0**	ND(10.0)

Notes:
Detections are shown in bold.
$\mu g/m^3$ = Micrograms per cubic meter
ND(678) = Not detected at or above the indicated laboratory reporting limit
ND = Not Detected
PCE = Tetrachloroethene
TCE = Trichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
MEK = Methyl ethyl ketone
MIBK = Methyl isobutyl ketone
DFA = Difluoroethane
ppmV = parts per million by volume

Table 10
Soil Risk Assessment Dataset - Construction Scenario - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

				VOCs (µg/kg)													
Sample ID	**Date**	**Location**	**Sample Depths (ft bgs)**	**Acetone**	**Benzene**	**n-Butylbenzene**	**sec-Butylbenzene**	**tert-Butylbenzene**	**Carbon Disulfide**	**Chlorobenzene**	**1,2-DCA**	**1,2-DCB**	**1,3-DCB**	**cis-1,2-DCE**	**trans-1,2-DCE**	**Ethylbenzene**	**Isopropylbenzene**
IS1	4/26/1989	Former Drum Area	3.5	-	<30	--	--	--	-	<30	<30	<30	<30	--	--	<30	--
		Former Drum Area	7.0	-	<30	--	--	--	-	<30	<30	<30	<30	--	--	<30	--
		Former Drum Area	10.5	-	**240**	--	--	--	-	**110**	**500**	<60	<60	--	--	**1,800**	--
IS2	4/26/1989	Former Drum Area	3.0	-	<30	--	--	--	-	<30	<30	<30	<30	--	--	<30	--
		Former Drum Area	8.5	-	**140**	--	--	--	-	<150	<150	<150	<150	--	--	**1,400**	--
B-7/MW-7	1/3/1990	Drum Area	4	<50	<10	--	--	--	<10	<10	<10	<10	<10	--	--	<10	--
			9	<50	<10	--	--	--	<10	<10	<10	<10	<10	--	--	**250**	--
B-9	1/4/1990	At sump	4	<50	<10	--	--	--	<10	<10	<10	<10	<10	--	--	<10	--
			9	<50	**54**	--	--	--	<10	<10	<10	<10	<10	--	--	**140**	--
B-10	1/4/1990	Northwest Parking Lot	4	<50	<10	--	--	--	<10	<10	<10	<10	<10	--	--	<10	--
			9	<100	<20	--	--	--	<20	<20	<20	<20	<20	--	--	<20	--
B-11	1/4/1990	Between office and warehouse	4	<50	<10	--	--	--	<10	<10	<10	<10	<10	--	--	<10	--
			9	<50	<10	--	--	--	<10	<10	<10	<10	<10	--	--	<10	--
-	4/1/1990	B-12	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-			9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-	4/1/1990	B-13	4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
-			9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PB-1	9/5/1991	Soil Boring in tank area	6	<20	<5	--	--	--	<5	<5	<5	<5	**2**	--	--	<5	--
			8.5	<20	<5	--	--	--	<5	<5	<5	**3**	**4**	--	--	<5	--
PB-2	9/5/1991	Soil Boring in tank area	5.5	<20	<5	--	--	--	<5	<5	<5	<5	<5	--	--	<5	--
			8	<20	**5**	--	--	--	<5	<5	<5	**4**	**4**	--	--	<5	--
MW-9	4/13/1994	W of Tank Excavation	8.5	**70**	<5	--	--	--	<5	<5	<5	NR	NR	--	--	<5	--
MW-10	4/14/1994	N of Tank Excavation	9.5	**30**	<5	--	--	--	<5	<5	<5	NR	NR	--	--	<5	--
T-2	4/13/1994	SE tank excavation	6	-	-	--	--	--	-	-	-	-	-	--	--	-	--
			8.5	**110**	<5	--	--	--	<5	<5	<5	NR	NR	--	--	<5	--
T-3	4/13/1994	Bottom tank excavation	8	**70**	**4**	--	--	--	<5	<5	<5	NR	NR	--	--	<5	--
T-4	4/14/1994	SW tank excavation	9	**50**	<5	--	--	--	**4**	<5	<5	NR	NR	--	--	<5	--
T-5	4/14/1994	W of tank excavation	5	-	-	--	--	--	-	-	-	-	-	--	--	-	--
			9	**20**	<5	--	--	--	<5	<5	<5	NR	NR	--	--	<5	--
T-6	4/14/1994	NE tank excavation	7.5	**100**	<5	--	--	--	<5	<5	<5	NR	NR	--	--	<5	--
T-7	4/14/1994	NW tank excavation	7.5	**30**	<5	--	--	--	<5	<5	<5	NR	NR	--	--	<5	--
SB2	11/07/2013	West of Warehouse	4	<20	<5	--	--	--	<5	<5	<5	<5	<5	--	--	<5	--
			7.5	**35**	<4.7	--	--	--	<4.7	<4.7	<4.7	<4.7	<4.7	--	--	<4.7	--
SB6-4.0	11/07/2013	SB6	4.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB6-10.0			10.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB7-2.5	11/08/2013	SB7	2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB7-8.0			8.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB11-2.0	11/08/2013	SB11	2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB11-5.5			5.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB13-1.5	11/08/2013	SB13	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB13-10.0			10.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB23-0.5	12/2/2015	SB23	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB28-4.5	12/2/2015	SB-28	4.5	<45	ND	--	--	--	ND	ND	ND	ND	ND	--	--	ND	--
SB29-2.5	12/2/2015	SB29	2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB34-4.0	12/1/2015	SB34	4.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB42-1	12/2/2015	SB42	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB46-0.5	12/2/2015	SB46	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SB48-1.0	12/1/2015	SB48	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV6-0.5	12/1/2015	SV6	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV10-0.5	12/1/2015	SV10	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV14-0.5	12/1/2015	SV14	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV20-0.5	11/30/2015	SV20	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV32-1.0	11/30/2015	SV32	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 10
Soil Risk Assessment Dataset - Construction Scenario - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Location	Sample Depths (ft bgs)	VOCs (µg/kg)												
				4-Isopropyl Toluene	MEK	MIBK	Naphthalene	Propylbenzene	Toluene	TCE	1,2,4-TMB	1,3,5-TMB	Vinyl chloride	m,p-Xylenes	o-Xylenes	Total Xylenes
IS1	4/26/1989	Former Drum Area	3.5	--	-	-	--	--	**60**	<30	--	--	--	--	--	**40**
		Former Drum Area	7.0	--	-	-	--	--	**200**	<30	--	--	--	--	--	**70**
		Former Drum Area	10.5	--	-	-	--	--	**1,300**	**300**	--	--	--	--	--	**11,000**
IS2	4/26/1989	Former Drum Area	3.0	--	-	-	--	--	**250**	<30	--	--	--	--	--	**100**
		Former Drum Area	8.5	--	-	-	--	--	**100**	<150	--	--	--	--	--	**4,500**
B-7/MW-7	1/3/1990	Drum Area	4	--	<50	<30	<300	--	<10	<10	--	--	--	--	--	<10
			9	--	<50	<30	**750**	--	**61**	<10	--	--	--	--	--	**1,020**
B-9	1/4/1990	At sump	4	--	<50	<30	<300	--	**12**	<10	--	--	--	--	--	<10
			9	--	<50	<30	**8,900**	--	**26**	<10	--	--	--	--	--	**380**
B-10	1/4/1990	Northwest Parking Lot	4	--	<50	<30	--	--	<10	<10	--	--	--	--	--	**43**
			9	--	<100	<60	--	--	<20	<20	--	--	--	--	--	<20
B-11	1/4/1990	Between office and warehouse	4	--	<50	<30	<300	--	**15**	<10	--	--	--	--	--	<10
			9	--	<50	<30	<300	--	<10	<10	--	--	--	--	--	<10
-	4/1/1990	B-12	4	--	--	--	<300	--	--	--	--	--	--	--	--	--
-			9	--	--	--	<300	--	--	--	--	--	--	--	--	--
-	4/1/1990	B-13	4	--	--	--	<300	--	--	--	--	--	--	--	--	--
-			9	--	--	--	<300	--	--	--	--	--	--	--	--	--
PB-1	9/5/1991	Soil Boring in tank area	6	--	<20	<10	--	--	<5	<5	--	--	--	--	--	<5
			8.5	--	<20	<10	--	--	<5	<5	--	--	--	--	--	<5
PB-2	9/5/1991	Soil Boring in tank area	5.5	--	<20	<10	--	--	<5	<5	--	--	--	--	--	<5
			8	--	<20	<10	--	--	<5	<5	--	--	--	--	--	<5
MW-9	4/13/1994	W of Tank Excavation	8.5	--	**10**	**6**	-	--	<5	<5	--	--	--	--	--	<5
MW-10	4/14/1994	N of Tank Excavation	9.5	--	<10	<10	--	--	<5	<5	--	--	--	--	--	<5
T-2	4/13/1994	SE tank excavation	6	--	-	-	<300	--	-	-	--	--	--	--	--	-
			8.5	--	**20**	<10	-	--	<5	<5	--	--	--	--	--	<5
T-3	4/13/1994	Bottom tank excavation	8	--	**10**	<10	--	--	<5	<5	--	--	--	--	--	<5
T-4	4/14/1994	SW tank excavation	9	--	**8**	**10**	--	--	<5	<5	--	--	--	--	--	<5
T-5	4/14/1994	W of tank excavation	5	--	-	-	<3,000	--	-	-	--	--	--	--	--	-
			9	--	<10	<10	<300	--	<5	<5	--	--	--	--	--	<5
T-6	4/14/1994	NE tank excavation	7.5	--	**10**	**6**	--	--	<5	<5	--	--	--	--	--	<5
T-7	4/14/1994	NW tank excavation	7.5	--	**9**	<10	--	--	<5	<5	--	--	--	--	--	<5
SB2	11/07/2013	West of Warehouse	4	--	<9.9	<9.9	<67	--	<5	<5	--	--	--	--	--	<5
			7.5	--	<9.5	<9.5	<130	--	<4.7	<4.7	--	--	--	--	--	<4.7
SB6-4.0	11/07/2013	SB6	4.0	--	--	--	**2,900**	--	--	--	--	--	--	--	--	--
SB6-10.0			10.0	--	--	--	<67	--	--	--	--	--	--	--	--	--
SB7-2.5	11/08/2013	SB7	2.5	--	--	--	**1,500**	--	--	--	--	--	--	--	--	--
SB7-8.0			8.0	--	--	--	**28,000**	--	--	--	--	--	--	--	--	--
SB11-2.0	11/08/2013	SB11	2.0	--	--	--	<1,300	--	--	--	--	--	--	--	--	--
SB11-5.5			5.5	--	--	--	<670	--	--	--	--	--	--	--	--	--
SB13-1.5	11/08/2013	SB13	1.5	--	--	--	**260**	--	--	--	--	--	--	--	--	--
SB13-10.0			10.0	--	--	--	**2,100**	--	--	--	--	--	--	--	--	--
SB23-0.5	12/2/2015	SB23	0.5	--	--	--	ND	--	--	--	--	--	--	--	--	--
SB28-4.5	12/2/2015	SB-28	4.5	--	ND	ND	--	--	ND	ND	--	--	--	--	--	ND
SB29-2.5	12/2/2015	SB29	2.5	--	--	--	ND	--	--	--	--	--	--	--	--	--
SB34-4.0	12/1/2015	SB34	4.0	--	--	--	ND	--	--	--	--	--	--	--	--	--
SB42-1	12/2/2015	SB42	1.0	--	--	--	ND	--	--	--	--	--	--	--	--	--
SB46-0.5	12/2/2015	SB46	0.5	--	--	--	ND	--	--	--	--	--	--	--	--	--
SB48-1.0	12/1/2015	SB48	1.0	--	--	--	ND	--	--	--	--	--	--	--	--	--
SV6-0.5	12/1/2015	SV6	0.5	--	--	--	ND	--	--	--	--	--	--	--	--	--
SV10-0.5	12/1/2015	SV10	0.5	--	--	--	ND	--	--	--	--	--	--	--	--	--
SV14-0.5	12/1/2015	SV14	0.5	--	--	--	ND	--	--	--	--	--	--	--	--	--
SV20-0.5	11/30/2015	SV20	0.5	--	--	--	ND	--	--	--	--	--	--	--	--	--
SV32-1.0	11/30/2015	SV32	1.0	--	--	--	ND	--	--	--	--	--	--	--	--	--

Table 10
Soil Risk Assessment Dataset - Construction Scenario - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Location	Sample Depths (ft bgs)	VOCs (µg/kg)													
				Acetone	Benzene	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Carbon Disulfide	Chlorobenzene	1,2-DCA	1,2-DCB	1,3-DCB	cis-1,2-DCE	trans-1,2-DCE	Ethylbenzene	Isopropylbenzene
SV32-7.0	11/30/2015	SV-32	7.0	<41	ND	--	--	--	ND	ND	ND	ND	ND	--	--	ND	--
SV33-4.5	11/30/2015	SV-33	4.5	**47**	ND	--	--	--	ND	ND	ND	ND	ND	--	--	ND	--
SV38-1.0	11/30/2015	SV38	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SV47-2.5	12/03/2015	SV-47	2.5	<37	ND	--	--	--	ND	ND	ND	ND	ND	--	--	ND	--
SB50-0.5	2/1/2016	SB50	0.5	< 42	< 4.2	< 4.2	< 4.2	< 4.2	--	--	--	--	--	< 4.2	< 4.2	< 4.2	< 4.2
SB50-5	2/1/2016		5.0	< 37	< 3.7	< 3.7	< 3.7	< 3.7	--	--	--	--	--	**6.2**	< 3.7	< 3.7	< 3.7
SB51-0.5	2/1/2016	SB51	0.5	< 35	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SB51-4.5	2/1/2016		4.5	**38**	**9.8**	**95**	**86**	**4.6**	--	--	--	--	--	< 3.6	< 3.6	**97**	**90**
SB51-10	2/1/2016		10.0	**22**	< 3.5	**6.4**	**5.6**	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SB52-0.5	2/1/2016	SB52	0.5	< 40	< 4	< 4	< 4	< 4	--	--	--	--	--	< 4	< 4	< 4	< 4
SB52-4.5	2/1/2016		4.5	**55**	< 3.9	< 3.9	< 3.9	< 3.9	--	--	--	--	--	< 3.9	< 3.9	< 3.9	< 3.9
SB53-0.5	2/1/2016	SB53	0.5	< 38	< 3.8	< 3.8	< 3.8	< 3.8	--	--	--	--	--	< 3.8	< 3.8	< 3.8	< 3.8
SB53-5	2/1/2016		5.0	< 31	< 3.1	< 3.1	< 3.1	< 3.1	--	--	--	--	--	< 3.1	< 3.1	< 3.1	< 3.1
SB53-10	2/1/2016		10.0	< 35	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SB54-0.5	2/2/2016	SB54	0.5	< 14	< 3.4	< 3.4	< 3.4	< 3.4	--	--	--	--	--	< 3.4	< 3.4	< 3.4	< 3.4
SB54-5	2/2/2016		5.0	< 13	< 3.3	< 3.3	< 3.3	< 3.3	--	--	--	--	--	< 3.3	< 3.3	< 3.3	< 3.3
SB55-0.5	2/2/2016	SB55	0.5	< 15	< 3.7	< 3.7	< 3.7	< 3.7	--	--	--	--	--	< 3.7	< 3.7	< 3.7	< 3.7
SB55-5.5	2/2/2016		5.0	**35**	< 4.6	< 4.6	< 4.6	< 4.6	--	--	--	--	--	**300**	**56**	< 4.6	< 4.6
SB55-10	2/2/2016		10.0	< 3,200	< 810	< 810	< 810	< 810	--	--	--	--	--	**24,000**	**8,300**	< 810	< 810
SB56-10	2/4/2016	SB56	10.0	**69**	< 4.2	< 4.2	< 4.2	< 4.2	--	--	--	--	--	< 4.2	< 4.2	< 4.2	< 4.2
SB57-10	2/4/2016	SB57	10.0	**21**	< 3.8	< 3.8	< 3.8	< 3.8	--	--	--	--	--	< 3.8	< 3.8	< 3.8	< 3.8
SB58-0.5	2/3/2016	SB58	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SB58-5	2/3/2016		5.0	**36**	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6
SB59-0.5	2/3/2016	SB59	0.5	< 12	< 3.0	< 3	< 3	< 3	--	--	--	--	--	< 3.0	< 3.0	< 3.0	< 3
SB59-5	2/3/2016		5.0	**19**	< 3.7	< 3.7	< 3.7	< 3.7	--	--	--	--	--	**130**	**19**	< 3.7	< 3.7
SB59-10	2/3/2016		10.0	< 12,000	< 2,900	< 2900	< 2900	< 2900	--	--	--	--	--	**73,000**	**81,000**	< 2,900	< 2900
SB60-0.5	2/3/2016	SB60	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SB60-5	2/3/2016		5.0	< 13	< 3.2	< 3.2	< 3.2	< 3.2	--	--	--	--	--	< 3.2	< 3.2	< 3.2	< 3.2
SB61-0.5	2/3/2016	SB61	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SB61-5	2/3/2016		5.0	**18**	< 3.9	< 3.9	< 3.9	< 3.9	--	--	--	--	--	< 3.9	< 3.9	< 3.9	< 3.9
SB61-10	2/3/2016		10.0	< 4,900	< 1,200	< 1200	< 1200	< 1200	--	--	--	--	--	< 1,200	< 1,200	< 1,200	< 1200
SV50-0.5	2/2/2016	SV50	0.5	< 14	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6
SV50-4.5	2/2/2016		4.5	**27**	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SV51-0.5	2/2/2016	SV51	0.5	< 16	< 4.0	< 4	< 4	< 4	--	--	--	--	--	< 4.0	< 4.0	< 4.0	< 4
SV51-5	2/2/2016		5.0	**34**	< 3.8	< 3.8	< 3.8	< 3.8	--	--	--	--	--	< 3.8	< 3.8	< 3.8	< 3.8
SV52-0.5	2/2/2016	SV52	0.5	< 15	< 3.8	< 3.8	< 3.8	< 3.8	--	--	--	--	--	< 3.8	< 3.8	< 3.8	< 3.8
SV52-5	2/2/2016		5.0	**16**	< 3.7	< 3.7	< 3.7	< 3.7	--	--	--	--	--	< 3.7	< 3.7	< 3.7	< 3.7
SV53-0.5	2/2/2016	SV53	0.5	< 13	< 3.3	< 3.3	< 3.3	< 3.3	--	--	--	--	--	< 3.3	< 3.3	< 3.3	< 3.3
SV53-5	2/2/2016		5.0	**18**	< 3.2	< 3.2	< 3.2	< 3.2	--	--	--	--	--	< 3.2	< 3.2	< 3.2	< 3.2
SV54-0.5	2/4/2016	SV54	0.5	< 13	< 3.3	< 3.3	< 3.3	< 3.3	--	--	--	--	--	< 3.3	< 3.3	< 3.3	< 3.3
SV54-5	2/4/2016		5.0	**40**	< 4.3	< 4.3	< 4.3	< 4.3	--	--	--	--	--	< 4.3	< 4.3	< 4.3	< 4.3
SV55-0.5	2/2/2016	SV55	0.5	< 14	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6
SV55-5	2/2/2016		5.0	< 14	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6
SV56-0.5	2/2/2016	SV56	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SV56-5	2/2/2016		5.0	**23**	< 4.2	< 4.2	< 4.2	< 4.2	--	--	--	--	--	< 4.2	< 4.2	< 4.2	< 4.2

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Sample ID	Date	Location	Sample Depths (ft bgs)	VOCs (µg/kg) 4-Isopropyl Toluene	MEK	MIBK	Naphthalene	Propylbenzene	Toluene	TCE	1,2,4-TMB	1,3,5-TMB	Vinyl chloride	m,p-Xylenes	o-Xylenes	Total Xylenes
SV32-7.0	11/30/2015	SV-32	7.0	--	ND	ND	ND	--	ND	ND	--	--	--	--	--	ND
SV33-4.5	11/30/2015	SV-33	4.5	--	ND	ND	--	--	ND	ND	--	--	--	--	--	ND
SV38-1.0	11/30/2015	SV38	1.0	--	--	--	ND	--	--	--	--	--	--	--	--	--
SV47-2.5	12/03/2015	SV-47	2.5	--	ND	ND	--	--	ND	ND	--	--	--	--	--	ND
SB50-0.5	2/1/2016	SB50	0.5	-	-	--	< 8.5	-	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	-	-	--
SB50-5	2/1/2016		5.0	-	-	--	< 7.3	-	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	-	-	--
SB51-0.5	2/1/2016		0.5	-	-	--	< 7	-	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	-	-	--
SB51-4.5	2/1/2016	SB51	4.5	**91**	**8.6**	--	**110**	**150**	**59**	< 3.6	**990**	**370**	**35**	**270**	**110**	--
SB51-10	2/1/2016		10.0	**4.2**	< 7.1	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	--
SB52-0.5	2/1/2016	SB52	0.5	-	-	--	< 8.1	-	< 4	< 4	< 4	< 4	< 4	-	-	--
SB52-4.5	2/1/2016		4.5	-	-	--	< 7.8	-	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	-	-	--
SB53-0.5	2/1/2016		0.5	-	-	--	< 7.5	-	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	-	-	--
SB53-5	2/1/2016	SB53	5.0	-	-	--	< 6.3	-	< 3.1	< 3.1	< 3.1	< 3.1	< 3.1	-	-	--
SB53-10	2/1/2016		10.0	-	-	--	< 6.9	-	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	-	-	--
SB54-0.5	2/2/2016	SB54	0.5	< 3.4	< 6.8	--	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 6.8	< 3.4	< 3.4	--
SB54-5	2/2/2016		5.0	< 3.3	< 6.5	--	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 6.5	< 3.3	< 3.3	--
SB55-0.5	2/2/2016		0.5	< 3.7	< 7.4	--	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 7.4	< 3.7	< 3.7	--
SB55-5.5	2/2/2016	SB55	5.0	< 4.6	< 9.1	--	< 4.6	< 4.6	< 4.6	< 4.6	< 4.6	< 4.6	**60**	< 4.6	< 4.6	--
SB55-10	2/2/2016		10.0	< 810	< 1,600	--	< 810	< 810	< 810	< 810	< 810	< 810	< 1,600	< 810	< 810	--
SB56-10	2/4/2016	SB56	10.0	< 4.2	**16**	--	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 8.4	< 4.2	< 4.2	--
SB57-10	2/4/2016	SB57	10.0	< 3.8	< 7.6	--	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 7.6	< 3.8	< 3.8	--
SB58-0.5	2/3/2016	SB58	0.5	< 3.5	< 7	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7	< 3.5	< 3.5	--
SB58-5	2/3/2016		5.0	< 3.6	**8.5**	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	--
SB59-0.5	2/3/2016		0.5	< 3	< 6.1	--	< 3.0	< 3	< 3.0	< 3.0	< 3	< 3	< 6.1	< 3.0	< 3.0	--
SB59-5	2/3/2016	SB59	5.0	< 3.7	< 7.4	--	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	**38**	< 3.7	< 3.7	--
SB59-10	2/3/2016		10.0	< 2900	< 5,900	--	< 2,900	< 2900	< 2,900	**20,000**	< 2900	< 2900	**14,000**	< 2,900	< 2,900	--
SB60-0.5	2/3/2016	SB60	0.5	< 3.5	< 7	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7	< 3.5	< 3.5	--
SB60-5	2/3/2016		5.0	< 3.2	< 6.3	--	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	< 6.3	< 3.2	< 3.2	--
SB61-0.5	2/3/2016		0.5	< 3.5	< 7	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7	< 3.5	< 3.5	--
SB61-5	2/3/2016	SB61	5.0	< 3.9	< 7.7	--	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 7.7	< 3.9	< 3.9	--
SB61-10	2/3/2016		10.0	< 1200	< 2,500	--	**9,200**	**1300**	< 1,200	< 1,200	< 1200	< 1200	< 2,500	< 1,200	< 1,200	--
SV50-0.5	2/2/2016	SV50	0.5	< 3.6	< 7.1	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	--
SV50-4.5	2/2/2016		4.5	< 3.5	< 7.1	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	--
SV51-0.5	2/2/2016	SV51	0.5	< 4	< 7.9	--	< 4.0	< 4	< 4.0	< 4.0	< 4	< 4	< 7.9	< 4.0	< 4.0	--
SV51-5	2/2/2016		5.0	< 3.8	**7.8**	--	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 7.6	< 3.8	< 3.8	--
SV52-0.5	2/2/2016	SV52	0.5	< 3.8	< 7.7	--	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	< 7.7	< 3.8	< 3.8	--
SV52-5	2/2/2016		5.0	< 3.7	< 7.3	--	**4**	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 7.3	< 3.7	< 3.7	--
SV53-0.5	2/2/2016	SV53	0.5	< 3.3	< 6.6	--	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 6.6	< 3.3	< 3.3	--
SV53-5	2/2/2016		5.0	< 3.2	< 6.4	--	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	< 3.2	< 6.4	< 3.2	< 3.2	--
SV54-0.5	2/4/2016	SV54	0.5	< 3.3	< 6.7	--	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 3.3	< 6.7	< 3.3	< 3.3	--
SV54-5	2/4/2016		5.0	< 4.3	< 8.6	--	< 4.3	< 4.3	< 4.3	< 4.3	< 4.3	< 4.3	< 8.6	< 4.3	< 4.3	--
SV55-0.5	2/2/2016	SV55	0.5	< 3.6	< 7.1	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	--
SV55-5	2/2/2016		5.0	< 3.6	< 7.1	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.1	< 3.6	< 3.6	--
SV56-0.5	2/2/2016	SV56	0.5	< 3.5	< 7.1	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	--
SV56-5	2/2/2016		5.0	< 4.2	< 8.3	--	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 8.3	< 4.2	< 4.2	--

Table 10
Soil Risk Assessment Dataset - Construction Scenario - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Location	Sample Depths (ft bgs)	VOCs (µg/kg)													
				Acetone	Benzene	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Carbon Disulfide	Chlorobenzene	1,2-DCA	1,2-DCB	1,3-DCB	cis-1,2-DCE	trans-1,2-DCE	Ethylbenzene	Isopropylbenzene
SV57-0.5	2/2/2016	SV57	0.5	< 16	< 3.9	< 3.9	< 3.9	< 3.9	--	--	--	--	--	< 3.9	< 3.9	< 3.9	< 3.9
SV57-5	2/2/2016		5.0	< 14	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6
SV58-0.5	2/3/2016	SV58	0.5	< 17	< 4.2	< 4.2	< 4.2	< 4.2	--	--	--	--	--	< 4.2	< 4.2	< 4.2	< 4.2
SV58-5	2/3/2016		5.0	**20**	< 3.6	< 3.6	< 3.6	< 3.6	--	--	--	--	--	< 3.6	< 3.6	< 3.6	< 3.6
SV58-10	2/3/2016		10.0	< 16	< 4	< 4	< 4	< 4	--	--	--	--	--	< 4	< 4	< 4	< 4
SV60-0.5	2/3/2016	SV60	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SV60-5	2/3/2016		5.0	< 14	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SV60-10	2/3/2016		10.0	< 1,600	< 400	< 400	**610**	< 400	--	--	--	--	--	**13,000**	**5,800**	< 400	**430**
SV61-0.5	2/1/2016	SV61	0.5	< 35	< 3.5	< 3.5	< 3.5	< 3.5	--	--	--	--	--	< 3.5	< 3.5	< 3.5	< 3.5
SV61-5	2/1/2016		5.0	< 38	< 3.8	< 3.8	< 3.8	< 3.8	--	--	--	--	--	< 3.8	< 3.8	< 3.8	< 3.8
SV61-10	2/1/2016		10.0	**43**	**5.2**	**130**	**210**	**39**	--	--	--	--	--	< 3.5	< 3.5	**16**	**450**
SV62-5	9/7/2016	SV62	5.0	**100**	--	--	--	--	< 8.3	--	--	--	--	--	--	--	--
SV62-10	9/7/2016		10.0	**130**	--	--	--	--	**6.3**	--	--	--	--	--	--	--	--
SV63-5	9/7/2016	SV63	5.0	< 40	--	--	--	--	< 4.0	--	--	--	--	--	--	--	--
SV63-10	9/7/2016		10.0	**57**	--	--	--	--	< 3.6	--	--	--	--	--	--	--	--
SV64-5	9/7/2016	SV64	5.0	< 57	--	--	--	--	< 5.7	--	--	--	--	--	--	--	--
SV64-10	9/7/2016		10.0	**48**	--	--	--	--	< 3.9	--	--	--	--	--	--	--	--
SV65-5	9/7/2016	SV65	5.0	< 41	--	--	--	--	< 4.1	--	--	--	--	--	--	--	--
SV65-10	9/7/2016		10.0	< 51	--	--	--	--	< 5.1	--	--	--	--	--	--	--	--
SV66-5	9/7/2016	SV66	5.0	**47**	--	--	--	--	< 3.6	--	--	--	--	--	--	--	--
SV66-10	9/7/2016		10.0	**100**	--	--	--	--	< 3.9	--	--	--	--	--	--	--	--
SV67-5	9/12/2016	SV67	5.0	**230**	--	--	--	--	< 5.2	--	--	--	--	--	--	--	--
SV67-10	9/12/2016		10.0	**60**	--	--	--	--	< 3.7	--	--	--	--	--	--	--	--

Table 10
Soil Risk Assessment Dataset - Construction Scenario - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

				VOCs (µg/kg)												
Sample ID	**Date**	**Location**	**Sample Depths (ft bgs)**	**4-Isopropyl Toluene**	**MEK**	**MIBK**	**Naphthalene**	**Propylbenzene**	**Toluene**	**TCE**	**1,2,4-TMB**	**1,3,5-TMB**	**Vinyl chloride**	**m,p-Xylenes**	**o-Xylenes**	**Total Xylenes**
SV57-0.5	2/2/2016	SV57	0.5	< 3.9	< 7.8	--	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 7.8	< 3.9	< 3.9	--
SV57-5	2/2/2016		5.0	< 3.6	< 7.2	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.2	< 3.6	< 3.6	--
SV58-0.5	2/3/2016	SV58	0.5	< 4.2	< 8.3	--	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 8.3	< 4.2	< 4.2	--
SV58-5	2/3/2016		5.0	< 3.6	< 7.3	--	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.3	< 3.6	< 3.6	--
SV58-10	2/3/2016		10.0	< 4	< 8	--	< 4	< 4	< 4	< 4	< 4	< 4	< 8	< 4	< 4	--
SV60-0.5	2/3/2016	SV60	0.5	< 3.5	< 7.1	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	--
SV60-5	2/3/2016		5.0	< 3.5	< 7.1	--	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	< 3.5	< 3.5	--
SV60-10	2/3/2016		10.0	**590**	< 800	--	**890**	**650**	< 400	**600**	**2700**	**2600**	**3,300**	**530**	**710**	--
SV61-0.5	2/1/2016	SV61	0.5	-	-	--	< 7.1	-	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	-	-	--
SV61-5	2/1/2016		5.0	-	-	--	< 7.6	-	< 3.8	< 3.8	< 3.8	< 3.8	< 3.8	-	-	--
SV61-10	2/1/2016		10.0	**220**	**12**	--	**17**	**450**	**26**	< 3.5	**1900**	**340**	**14**	**13**	**26**	--
SV62-5	9/7/2016	SV62	5.0	< 8.3	--	--	--	--	--	--	--	--	--	--	--	< 17
SV62-10	9/7/2016		10.0	< 6.2	--	--	--	--	--	--	--	--	--	--	--	< 12
SV63-5	9/7/2016	SV63	5.0	< 4.0	--	--	--	--	--	--	--	--	--	--	--	< 8.1
SV63-10	9/7/2016		10.0	**7.1**	--	--	--	--	--	--	--	--	--	--	--	**7.2**
SV64-5	9/7/2016	SV64	5.0	< 5.7	--	--	--	--	--	--	--	--	--	--	--	< 11
SV64-10	9/7/2016		10.0	< 3.9	--	--	--	--	--	--	--	--	--	--	--	< 7.8
SV65-5	9/7/2016	SV65	5.0	< 4.1	--	--	--	--	--	--	--	--	--	--	--	< 8.1
SV65-10	9/7/2016		10.0	< 5.1	--	--	--	--	--	--	--	--	--	--	--	< 10
SV66-5	9/7/2016	SV66	5.0	< 3.6	--	--	--	--	--	--	--	--	--	--	--	< 7.2
SV66-10	9/7/2016		10.0	< 3.9	--	--	--	--	--	--	--	--	--	--	--	< 7.7
SV67-5	9/12/2016	SV67	5.0	< 5.2	--	--	--	--	--	--	--	--	--	--	--	< 10
SV67-10	9/12/2016		10.0	< 3.7	--	--	--	--	--	--	--	--	--	--	--	< 7.3

Notes:
Detections are shown in bold
Only detected compounds are shown.
ft bgs = Feet below ground surface
VOCs = Volatile organic compounds
µg/kg = Micrograms per kilogram
DCB = Dichlorobenzene
MEK = Methyl Ethyl Ketone
MIBK = Methyl Isobutyl Ketone
- = Not analyzed
<## = Not detected at or above the indicated laboratory reporting limit
ND = Not detected (reporting limit not provided)
-- = Not detected or not analyzed
NR = Not reported
DCE = Dichloroethene
TCE = Trichloroethene
TMB = Trimethylbenzene

Table 11
Soil Risk Assessment Dataset - Construction Scenario - SVOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Boring Location	Sample Number	Depth (Feet bgs)	Date Collected	SVOCs (µg/kg) Acenaphthene	Acenaphthylene	Anthracene	Benzo (a) Anthracene	Benzo (a) Pyrene	Benzo (b) Fluoranthene	Benzo (k) Fluoranthene	Benzo (g,h,i) Perylene	Chrysene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) Pyrene	2-Methyl-naphthalene	4-Methyl-phenol	N-Nitrosodi-phenylamine	Phenanthrene	Phenol	Pyrene	Bis (2-ethylhexyl) phthalate	1,2,4-TCB
SS-3-E	-	-	10/5/1989	-	-	-	ND(30)	ND(30)	-	ND(30)	-	ND(70)	ND(30)	-	-	ND(30)	**200**	-	ND(30)	-	ND(30)	ND(300)	**200**
SS-5-E	-	-	10/5/1989	-	-	-	ND(200)	ND(200)	-	ND(200)	-	ND(400)	ND(200)	-	-	**1,000**	ND(200)	-	ND(200)	-	ND(200)	ND(2,000)	ND(200)
B-7/M-7	-	4	1/3/1990	-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(2,000)	ND(300)
		9		-	-	-	ND(300)	ND(300)	-	ND(300)	-	**390**	**320**	-	-	**1,500**	ND(300)	-	**530**	-	**380**	ND(2,000)	ND(300)
B-8/MW-8	-	4	1/3/1990	-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(2,000)	ND(300)
		9		-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	**410**	ND(2,000)	ND(300)
B-9	-	4	1/4/1990	-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(2,000)	ND(300)
		9		-	-	-	ND(300)	ND(300)	-	ND(300)	-	**690**	**340**	-	-	**1,100**	ND(300)	-	**590**	-	**550**	ND(2,000)	ND(300)
B-11	-	4	1/4/1990	-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	**320**	ND(2,000)	ND(300)
		9		-	-	-	**580**	ND(300)	-	ND(300)	-	**820**	**1,100**	-	-	ND(300)	ND(300)	-	**560**	-	**1,800**	ND(2,000)	ND(300)
B-12	-	4	1/4/1990	-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	**370**	ND(2,000)	ND(300)
		9		-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(2,000)	ND(300)
B-13	-	4	1/4/1990	-	-	-	ND(300)	**470**	-	ND(300)	-	**390**	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	**920**	ND(2,000)	ND(300)
		9		-	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(2,000)	ND(300)
MW-9	-	8.5	4/13/1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T-2	-	6	4/13/1994	-	-	-	ND(300)	ND(300)	-	**200**	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	ND(300)
		8.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T-5	-	5	4/14/1994	-	-	-	ND(3,000)	ND(3,000)	-	ND(3,000)	-	ND(3,000)	ND(3,000)	-	-	ND(3,000)	ND(3,000)	-	ND(3,000)	-	ND(3,000)	ND(3,000)	ND(3,000)
		9.0		-		-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	**400**	ND(300)
SB2	SB2-4.0	4	11/7/2013	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(330)	ND(330)	ND(67)	-	ND(67)	-	-
	SB2-7.5	7.5		ND(130)	**270**	**630**	**1,200**	**970**	**970**	**360**	**330**	**1,400**	**2,100**	**210**	**340**	ND(130)	ND(660)	ND(660)	**2,400**	-	**2,300**	-	-
SB6	SB6-4.0	4	11/7/2013	ND(660)	ND(660)	**1,200**	**2,400**	**3,000**	**3,700**	**1,500**	**1,400**	**2,900**	**4,400**	**810**	**1,300**	ND(660)	ND(3,300)	ND(3,300)	**5,500**	-	**4,500**	-	-
	SB6-10.0	10		ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(330)	ND(330)	ND(67)	-	ND(67)	-	-
SB7	SB7-2.5	2.5	11/8/2013	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	**10,000**	ND(1,700)	**450**	-	ND(330)	-	-
	SB7-8.0	8		**500**	ND(330)	**340**	**340**	ND(330)	ND(330)	ND(330)	ND(330)	**470**	**1,100**	**680**	ND(330)	**9,200**	ND(1,600)	**1,700**	**2,400**	-	**1,100**	-	-
SB11	SB11-2.0	2	11/8/2013	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(1,300)	ND(6,600)	ND(6,600)	ND(1,300)	-	**1,300**	-	-
	SB11-5.5	5.5		ND(670)	ND(670)	ND(670)	ND(670)	**900**	**990**	ND(670)	ND(670)	**820**	**1,800**	ND(670)	ND(670)	ND(670)	ND(3,300)	ND(3,300)	**750**	-	**2,300**	-	-
SB13	SB13-1.5	1.5	11/8/2013	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	ND(66)	**92**	ND(330)	ND(330)	ND(66)	-	**79**	-	-
	SB13-10.0	10		ND(1,700)	ND(1,700)	ND(1,700)	**2,000**	ND(1,700)	**1,800**	ND(1,700)	ND(1,700)	**2,100**	**4,200**	ND(1,700)	ND(1,700)	**2,000**	ND(8,300)	ND(8,300)	**7,500**	-	**4,000**	-	-
SB23	SB23-0.5	0.5	12/2/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(130)	ND	ND	ND
SB29	SB29-2.5	2.5	12/2/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(130)	ND	ND	ND
SB34	SB34-4.0	4.0	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(330)	ND	ND	ND
SB42	SB42-1	1.0	12/2/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(330)	ND	ND	ND
SB46	SB46-0.5	0.5	12/2/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(330)	ND	ND	ND
SB48	SB48-1.0	1.0	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(660)	ND	ND	ND
SV6	SV6-0.5	0.5	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(67)	ND	ND	ND
SV10	SV10-0.5	0.5	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(66)	ND	ND	ND
SV14	SV14-0.5	0.5	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(67)	ND	ND	ND
SV20	SV20-0.5	0.5	11/30/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(330)	ND	ND	ND
SV32	SV32-1.0	1.0	11/30/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(330)	ND	ND	ND
SV32	SV32-7.0	7.0	11/30/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND(3,300)	ND	ND	ND
SV38	SV38-1.0	1.0	11/30/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**700**	ND	ND	ND

Notes:
Detections are shown in bold.
Only detected compounds are shown.
bgs = Below ground surface
µg/kg = Micrograms per kilogram
- = Not applicable / not analyzed or not detected
ND(67) = Not detected at or above the indicated laboratory reporting limit
ND = Not detected (reporting limit not provided)
SVOC = semi-volatile organic compound
TCB = trichlorobenzene

Table 12
Soil Risk Assessment Dataset - Construction Scenario - PCBs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample Number	Depth (feet bgs)	Date Collected	Aroclor-1260 (1) (mg/kg)	Aroclor-1262 (mg/kg)	Aroclor-1268 (mg/kg)	Total PCBs (mg/kg)	DDT (mg/kg)
SB5	SB5-3.0	3	11/7/2013	**10**	ND(0.17)	ND(0.17)	**10**	-
	SB5-8.0	8	11/7/2013	ND(0.012)	**0.018**	ND(0.012)	**0.018**	-
	SB5-11.5	11.5	11/7/2013	ND(0.012)	**0.014**	ND(0.012)	**0.014**	-
SB6	SB6-4.0	4	11/7/2013	**0.57**	ND(0.012)	ND(0.012)	**0.57**	-
	SB6-8.0	8	11/7/2013	ND(0.012)	**0.16**	ND(0.012)	**0.16**	-
	SB6-10.0	10	11/7/2013	ND(0.012)	**4.8**	ND(0.012)	**4.8**	-
SB7	SB7-2.5	2.5	11/8/2013	**1.9**	ND(0.082)	ND(0.082)	**1.9**	-
	SB7-8.0	8	11/8/2013	ND(0.042)	**1.5**	ND(0.042)	**1.5**	-
SB11	SB11-2.0	2	11/8/2013	**0.38**	ND(0.012)	ND(0.012)	**0.38**	-
	SB11-5.5	5.5	11/8/2013	**1.2**	ND(0.042)	**1.4**	**2.60**	-
SB12	SB12-2.0	2	11/8/2013	**2**	ND(0.042)	ND(0.042)	**2**	-
	SB12-5.0	5	11/8/2013	ND(0.041)	**1.2**	ND(0.041)	**1.2**	-
	SB12-10.0	10	11/8/2013	ND(0.083)	**6.5**	ND(0.083)	**6.5**	-
SB13	SB13-1.5	1.5	11/8/2013	**0.27**	ND(0.012)	ND(0.012)	**0.27**	-
	SB13-5.0	5	11/8/2013	**0.018**	ND(0.012)	ND(0.012)	**0.018**	-
	SB13-10.0	10	11/8/2013	**3.3**	ND(0.084)	**1.9**	**5.2**	-
SB14	SB14-3.5	3.5	11/9/2013	**0.013**	ND(0.012)	ND(0.012)	**0.013**	-
SG-1	-	3.5 - 4.0	4/19/2013	ND(0.5)	-	-	ND(0.5)	**0.03**
SG-2	-	3.0 - 3.5	4/19/2013	ND(1.0)	-	-	ND(1.0)	**0.068**
SG-3	-	3.5 - 4.0	4/19/2013	**14**	-	-	**14**	**0.25**
SG-4	-	3.5 - 4.0	4/19/2013	**8**	-	-	**8**	**0.42**
SG-5	-	4.5 - 5.0	4/19/2013	ND(1.0)	-	-	ND(1.0)	ND(0.020)
IS1	IS1-03.5	3.5	4/26/1989	-	-	-	**0.4**	-
	IS1-07.0	7.0	4/26/1989	-	-	-	**0.7**	-
	IS1-10.5	10.5	4/26/1989	-	-	-	ND(0.5)	-
IS2	IS2-03.0	3.0	4/26/1989	-	-	-	**0.2**	-
	IS2-08.5	8.5	4/26/1989	-	-	-	ND(0.5)	-
B-7/MW-7	-	4	1/3/1990	ND(1)	-	-	-	-
	-	9		ND(1)	-	-	-	-
B-8/MW-8	-	4	1/3/1990	ND(1)	-	-	-	-
	-	9		**2.3**	-	-	**2.3**	-
B-9	-	4	1/4/1990	ND(1)	-	-	-	-
	-	9		ND(1)	-	-	-	-
B-10	-	4	1/4/1990	ND(1)	-	-	-	-
	-	9		ND(1)	-	-	-	-
B-11	-	4	1/4/1990	**2.2**	-	-	**2.2**	-
	-	9		ND(1)	-	-	-	-
B-12	-	4	1/4/1990	ND(1)	-	-	-	-
	-	9		ND(1)	-	-	-	-
B-13	-	4	1/4/1990	**3.1**	-	-	**3.1**	-
	-	9		ND(1)	-	-	-	-
Sump	-	Confirmation	1/5/1990	**4.2**	-	-	**4.2**	-
SB20	SB20-2.5	2.5	11/30/2015	**1.7**	-	-	**1.7**	-
SB21	SB21-0.5	0.5	12/2/2015	**1.9**	-	-	**1.9**	-
SB23	SB23-0.5	0.5	12/2/2015	**0.49**	-	-	**0.49**	-
SB24	SB24-0.5	0.5	12/2/2015	**3.7**	-	-	**3.7**	-
SB25	SB25-1	1.0	12/2/2015	**0.8**	-	-	**0.8**	-
SB26	SB26-1.5	1.5	12/2/2015	**0.12**	-	-	**0.12**	-
SB27	SB27-2.5	2.5	12/2/2015	**0.59**	-	-	**0.59**	-
SB28	SB28-0.5	0.5	12/2/2015	**0.61**	-	-	**0.61**	-
	SB28-4.5	4.5	12/2/2015	**55**	-	-	**55**	-
SB29	SB29-2.5	2.5	12/2/2015	**1.9**	-	-	**1.9**	-
SB31	SB31-2	2.0	12/2/2015	**0.28**	-	-	**0.28**	-
	SB31-6	6.0	12/2/2015	ND(0.050)	-	-	ND(0.050)	-
SB32	SB32-1.5	1.5	12/3/2015	**0.29**	-	-	**0.29**	-
SB34	SB34-4.0	4.0	12/1/2015	**0.19**	-	-	**0.19**	-
SB35	SB35-0.5	0.5	12/2/2015	**0.62**	-	-	**0.62**	-
SB39	SB39-0.5	0.5	12/2/2015	**0.25**	-	-	**0.25**	-
SB40	SB40-1	1.0	12/2/2015	**1.9**	-	-	**1.9**	-
SB41	SB41-1	1.0	12/2/2015	**2.9**	-	-	**2.9**	-
SB42	SB42-1	1.0	12/2/2015	**2.8**	-	-	**2.8**	-
SB43	SB43-1.5	1.5	12/1/2015	**1.3**	-	-	**1.3**	-
SB45	SB45-1.5	1.5	12/1/2015	**2.8**	-	-	**2.8**	-
SB46	SB46-0.5	0.5	12/2/2015	**1.2**	-	-	**1.2**	-
SB48	SB48-1.0	1.0	12/1/2015	**8.3**	-	-	**8.3**	-
SV16	SV16-0.5	0.5	12/1/2015	ND(0.049)	-	-	ND(0.049)	-
SV32	SV32-1.0	1.0	11/30/2015	**1.8**	-	-	**1.8**	-
	SV32-7.0	7.0	11/30/2015	**0.89**	-	-	**0.89**	-
SV33	SV33-0.5	0.5	11/30/2015	**4.0**	-	-	**4.0**	-
	SV33-4.5	4.5	11/30/2015	**0.86**	-	-	**0.86**	-
SV45	SV45-1.0	1.0	11/30/2015	**6.9**	-	-	**6.9**	-
SV47	SV47-6.0	6.0	12/3/2015	ND(0.049)	-	-	ND(0.049)	-

Notes:
Detections are shown in bold.
Only detected compounds are shown.
bgs = below ground surface
mg/kg = milligrams per kilogram
DDT = Dichlorodiphenyltrichlorethane
PCBs= Polychlorinated biphenyls
ND(24) = Compound not detected at or above the indicated laboratory reporting limit
- = Not analyzed
1. All 2015 samples were prepped or analyzed beyond the specified holding time.

Table 13
Soil Risk Assessment Dataset - Construction Scenario - Metals
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (Feet bgs)	Date Collected	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
IS-1	IS-1	3.5	4/26/1989	6.5	ND(2.2)	110	0.05	4.1	20.1	5.6	70	100	ND(5)	1.2	32.1	-	15.2	15.4	200
		7		1.4	ND(2.2)	130	ND(0.025)	4.2	21.5	6.4	104	130	ND(5)	ND(1)	31.5	-	ND(0.1)	17.3	48.9
		10		1.6	ND(2.2)	255	ND(0.025)	10.2	63.5	11.4	1,042	4,300	ND(5)	3.7	42.6	-	ND(0.1)	17.3	5,400
IS-2	IS-2	3	4/26/1989	ND(1)	ND(2.2)	90	ND(0.025)	3.2	18.5	6	56.7	90	ND(5)	1.2	30.9	-	ND(0.1)	15.6	270
		8.5		ND(1)	ND(2.2)	35.7	ND(0.025)	1.5	6.6	2.8	13.8	5.3	ND(5)	ND(1)	15.5	-	ND(0.1)	6.7	22.9
B-1/MW-1	B-1/MW-1	5.5	7/5/1989	ND(1)	ND(2.2)	92	ND(0.025)	1.4	13	5.7	28	61	ND(5)	ND(1)	14	-	ND(0.1)	15	94
		10.5		ND(1)	ND(2.2)	21	ND(0.025)	0.6	12.5	2.6	4	3	ND(5)	ND(1)	12.7	-	ND(0.1)	7	5.4
B-2	B-2	0.5	7/5/1989	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		6		1.2	ND(2.2)	109	ND(0.025)	1.6	11.8	5	92	167	ND(5)	ND(1)	18.5	-	ND(0.1)	9.7	67
		10		ND(1)	ND(2.2)	41	ND(0.025)	ND(0.3)	12.7	2.7	22.5	1,360	ND(5)	ND(1)	12.5	-	ND(0.1)	13	532
B-5/MW-5	B-5/MW-5	6	8/31/1989	ND(1)	ND(2.2)	29.2	ND(0.025)	0.5	13.5	3.4	13.3	9.7	ND(5)	ND(1)	18	-	ND(0.1)	12	52
		11		1.05	ND(2.2)	167.1	ND(0.025)	2.15	15.2	8.7	64	164	ND(5)	ND(1)	22	-	ND(0.1)	23.4	200
B-7/MW-7	B-7/MW-7	4	1/3/1990	ND(10)	ND(16)	140	0.48	ND(0.7)	32	8.6	27	ND(12)	ND(0.09)	ND(1)	28	-	ND(0.4)	36	79
		9		ND(10)	ND(16)	24	0.13	ND(0.7)	21	ND(2)	3.6	ND(12)	0.088	ND(1)	16	-	ND(0.4)	12	310
B-8/MW-8	B-8/MW-8	4	1/3/1990	ND(10)	ND(16)	42	0.16	ND(0.7)	27	2.8	18	ND(12)	ND(0.009)	ND(1)	18	-	ND(0.4)	15	75
		9		ND(10)	ND(16)	85	0.15	ND(0.7)	9.6	ND(2)	41	24	0.36	ND(1)	6.8	-	ND(0.4)	8.5	120
B-9	B-9	4	1/4/1990	ND(10)	ND(16)	140	0.41	ND(0.7)	33	7.4	55	41	0.45	ND(1)	32	-	ND(0.4)	31	120
		9		ND(16)	ND(16)	610	0.31	44	180	15	2,300	980	0.66	27	350	-	ND(0.4)	26	6,200
B-10	B-10	4	1/4/1990	ND(10)	ND(16)	33	0.05	ND(0.7)	23	ND(2)	39	42	0.1	ND(1)	10	-	ND(0.4)	5	95
		9		ND(16)	21	590	0.33	1.3	34	6.9	140	1,500	0.62	ND(1)	24	-	ND(0.4)	28	410
B-11	B-11	4	1/4/1990	ND(10)	ND(16)	240	0.36	1	22	5.4	44	72	0.092	ND(1)	25	-	ND(0.4)	21	940
		9		ND(10)	ND(16)	160	0.31	0.7	21	3.6	ND(4,500)	55	0.012	ND(1)	24	-	ND(0.4)	17	160
B-12	B-12	4	1/4/1990	ND(10)	ND(16)	89	0.23	ND(0.7)	36	3.4	170	120	ND(0.009)	ND(1)	29	-	ND(0.4)	21	150
		9		ND(28)	38	540	0.26	7.7	190	28	2,200	3,000	ND(0.009)	20	110	-	ND(0.4)	23	3,600
B-13	B-13	4	1/4/1990	ND(10)	ND(16)	160	0.36	ND(0.7)	62	6.5	120	520	ND(0.009)	ND(1)	42	-	ND(0.4)	27	300
		9		ND(10)	ND(16)	37	0.15	ND(0.7)	29	2.9	4.9	12	ND(0.009)	ND(1)	18	-	ND(0.4)	15	210
Sump	Sump	Confirmation	1/5/1990	ND(10)	ND(16)	180	0.48	ND(0.7)	95	10	49	62	0.022	ND(1)	135	-	ND(0.4)	39	150

Table 13
Soil Risk Assessment Dataset - Construction Scenario - Metals
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (Feet bgs)	Date Collected	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
MW-9	MW-9	8.5	4/13/1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-10	MW-10	9.5	4/14/1994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T-2	T-2	6	4/13/1994	5.1	9.3	170	0.23	1	25	8.7	2,100	330	ND(0.087)	1.5	55	-	0.5	26	580
		8.5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T-5	T-5	5	4/14/1994	ND(2.9)	6	130	0.31	0.27	25	9.2	60	61	0.21	ND(0.98)	28	-	ND(0.49)	26	88
		9		ND(3)	ND(2.5)	41	ND(0.10)	ND(0.25)	23	4.2	14	1.5	ND(0.087)	ND(1)	19	-	ND(0.5)	15	18
T-7	T-7	7.5	4/14/1994	ND(3)	4.2	150	0.45	0.28	27	10	40	6.1	ND(0.087)	ND(0.99)	37	-	ND(0.5)	27	62
SG-1	SG-1	3.5-4.0	4/19/2013	5.2	11	280	ND(0.5)	1	100	22	480	990	0.2	4.2	220	--	0.6	60	490
SG-2	SG-2	3.0-3.5	4/19/2013	1.9	12	160	0.51	0.84	50	11	88	120	0.36	1.3	63	--	ND(0.5)	50	220
SG-3	SG-3	3.5-4.0	4/19/2013	8.9	7.3	230	ND(0.5)	0.94	54	9.3	160	830	0.2	1.3	51	--	ND(0.5)	49	240
SG-4	SG-4	3.5-4.0	4/19/2013	2.6	6.9	170	ND(0.5)	0.82	68	14	78	130	0.32	2.9	83	--	ND(0.5)	45	440
SG-5	SG-5	4.5-5.0	4/19/2013	1	9.9	120	ND(0.5)	0.44	44	7.3	44	75	0.12	0.5	34	--	ND(0.5)	41	97
SB1	SB1-1.0	1	11/7/2013	ND(0.51)	5.9	160	0.39	0.94	86	13	52	81	0.22	ND(0.25)	100	ND(0.51)	ND(0.25)	51	190
	SB1-5.5	5.5	11/7/2013	-	-	-	-	-	-	-	-	1,300	-	-	-	-	-	-	-
	SB1-11.75	11.75	11/7/2013	-	-	-	-	-	-	-	-	2,400	-	-	-	-	-	-	-
SB2	SB2-4.0	4	11/7/2013	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-	-
	SB2-7.5	7.5	11/7/2013	-	-	-	-	-	-	-	-	120	-	-	-	-	-	-	-
	SB2-10.75	10.75	11/7/2013	-	-	-	-	-	-	-	-	240	-	-	-	-	-	-	-
SB3	SB3-1.5	1.5	11/7/2013	ND(0.46)	3.4	150	0.59	0.44	16	6.9	16	14	0.39	ND(0.23)	23	ND(0.46)	ND(0.23)	26	46
	SB3-7.5	7.5	11/7/2013	-	-	-	-	-	-	-	-	340	-	-	-	-	-	-	-
	SB3-11.0	11	11/7/2013	3.3	7.5	810	0.39	4.3	46	10	170	460	0.17	4.6	38	ND(0.50)	ND(0.25)	42	920
SB4	SB4-1.5	1.5	11/7/2013	-	-	-	-	-	-	-	-	18	-	-	-	-	-	-	-
	SB4-5.0	5	11/7/2013	-	-	-	-	-	-	-	-	110	-	-	-	-	-	-	-
	SB4-10.0	10	11/7/2013	-	-	-	-	-	-	-	-	10,000	-	-	-	-	-	-	-
SB5	SB5-3.0	3	11/7/2013	-	-	-	-	-	-	-	-	430	-	-	-	-	-	-	-
	SB5-8.0	8	11/7/2013	3.1	6.7	100	0.21	0.77	39	6.3	100	100	0.19	0.34	38	ND(0.50)	ND(0.25)	29	170
	SB5-11.5	11.5	11/7/2013	-	-	-	-	-	-	-	-	1,100	-	-	-	-	-	-	-
SB6	SB6-4.0	4	11/7/2013	-	-	-	-	-	-	-	-	140	-	-	-	-	-	-	-
	SB6-8.0	8	11/7/2013	-	-	-	-	-	-	-	-	58	-	-	-	-	-	-	-
	SB6-10.0	10	11/7/2013	7.5	5.6	140	0.27	1.9	140	16	390	160	0.13	4.9	190	6.0	ND(0.26)	41	270
SB7	SB7-2.5	2.5	11/8/2013	0.75	5.0	160	0.25	1.2	34	9.0	74	120	0.19	0.69	49	0.66	ND(0.23)	35	220
	SB7-8.0	8	11/8/2013	-	-	-	-	-	-	-	-	250	-	-	-	-	-	-	-
SB8	SB8-3.5	3.5	11/8/2013	-	-	-	-	-	-	-	-	200	-	-	-	-	-	-	-
	SB8-8.0	8	11/8/2013	ND(0.51)	2.3	32	ND(0.10)	ND(0.25)	33	4.4	4.7	3.1	ND(0.016)	ND(0.25)	24	ND(0.51)	ND(0.25)	26	19
	SB8-12.0	12	11/8/2013	-	-	-	-	-	-	-	-	3.0	-	-	-	-	-	-	-
SB9	SB9-4.5	4.5	11/8/2013	ND(0.49)	5.4	120	0.32	0.81	45	10	46	41	0.12	1.5	38	ND(0.49)	ND(0.24)	36	110
	SB9-10.0	10	11/8/2013	-	-	-	-	-	-	-	-	50	-	-	-	-	-	-	-
SB10	SB10-2.0	2	11/8/2013	ND(0.47)	6.9	550	0.33	0.58	38	6.9	27	45	0.15	0.61	36	ND(0.47)	ND(0.23)	34	90
	SB10-5.0	5	11/8/2013	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-	-
	SB10-10.0	10	11/8/2013	-	-	-	-	-	-	-	-	21	-	-	-	-	-	-	-
SB11	SB11-2.0	2	11/8/2013	-	-	-	-	-	-	-	-	28	-	-	-	-	-	-	-
	SB11-5.5	5.5	11/8/2013	0.62	9.2	140	0.26	1.2	160	10	260	170	0.17	21	170	ND(0.54)	ND(0.27)	36	300
	SB11-11.5	11.5	11/8/2013	-	-	-	-	-	-	-	-	1.7	-	-	-	-	-	-	-

Table 13
Soil Risk Assessment Dataset - Construction Scenario - Metals
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (Feet bgs)	Date Collected	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
SB12	SB12-2.0	2	11/8/2013	-	-	-	-	-	-	-	-	**130**	-	-	-	-	-	-	-
	SB12-5.0	5	11/8/2013	-	-	-	-	-	-	-	-	**320**	-	-	-	-	-	-	-
	SB12-10.0	10	11/8/2013	ND(0.49)	**5.9**	**210**	**0.27**	**1.3**	**31**	**6.6**	**44**	**290**	**0.18**	**0.28**	**29**	ND(0.49)	ND(0.25)	**30**	**1,900**
SB13	SB13-1.5	1.5	11/8/2013	-	-	-	-	-	-	-	-	**68**	-	-	-	-	-	-	-
	SB13-5.0	5	11/8/2013	ND(0.47)	**8.4**	**270**	**0.42**	**0.70**	**23**	**26**	**30**	**54**	**0.070**	**0.37**	**27**	**1.6**	ND(0.23)	**45**	**100**
	SB13-10.0	10	11/8/2013	-	-	-	-	-	-	-	-	**3,300**	-	-	-	-	-	-	-
SB14	SB14-3.5	3.5	11/9/2013	ND(0.46)	**7.7**	**170**	**0.54**	**0.67**	**140**	**19**	**33**	**11**	**0.060**	ND(0.23)	**190**	**4.5**	ND(0.23)	**53**	**63**
	SB14-8.5	8.5	11/9/2013	-	-	-	-	-	-	-	-	**100**	-	-	-	-	-	-	-
	SB14-11.5	11.5	11/9/2013	-	-	-	-	-	-	-	-	**250**	-	-	-	-	-	-	-
SB15	SB15-2.5	2.5	11/9/2013	-	-	-	-	-	-	-	-	**8.2**	-	-	-	-	-	-	-
	SB15-7.5	7.5	11/9/2013	**3.8**	**4.6**	**250**	**0.27**	**13**	**43**	**6.6**	**450**	**870**	**0.14**	**0.43**	**48**	ND(0.50)	ND(0.25)	**40**	**1,700**
	SB15-11.5	11.5	11/9/2013	-	-	-	-	-	-	-	-	**130**	-	-	-	-	-	-	-
SB16	SB16-2.5	2.5	11/9/2013	-	-	-	-	-	-	-	-	**19**	-	-	-	-	-	-	-
	SB16-7.5	7.5	11/9/2013	-	-	-	-	-	-	-	-	**280**	-	-	-	-	-	-	-
	SB16-10.5	10.5	11/9/2013	**1.4**	**11**	**180**	**0.34**	**0.89**	**53**	**6.7**	**51**	**210**	**0.24**	ND(0.26)	**34**	**3.4**	ND(0.26)	**41**	**510**
SB17	SB17-2.0	2	11/9/2013	ND(0.47)	**7.8**	**150**	**0.46**	**0.61**	**41**	**12**	**32**	**54**	**0.12**	ND(0.24)	**43**	ND(0.47)	ND(0.24)	**53**	**87**
	SB17-5.0	5	11/9/2013	-	-	-	-	-	-	-	-	**27**	-	-	-	-	-	-	-
	SB17-9.5	9.5	11/9/2013	-	-	-	-	-	-	-	-	**150**	-	-	-	-	-	-	-
SB18	SB18-2.0	2	11/9/2013	-	-	-	-	-	-	-	-	**30**	-	-	-	-	-	-	-
	SB18-5.0	5	11/9/2013	-	-	-	-	-	-	-	-	**34**	-	-	-	-	-	-	-
	SB18-10.0	10	11/9/2013	ND(0.48)	**49**	**640**	**0.47**	**5.5**	**43**	**13**	**450**	**650**	**0.41**	**5.1**	**190**	**2.8**	ND(0.24)	**11,000**	**2,500**
SB19	SB19-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	**210**	-	-	-	-	-	-	-
SB20	SB20-1.0	1.0	11/30/2015	-	-	-	-	-	-	-	-	**14**	-	-	-	-	-	-	-
	SB20-2.5	2.5	11/30/2015	-	-	-	-	-	-	-	-	**21**	-	-	-	-	-	-	-
SB21	SB21-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	**90**	-	-	-	-	-	-	-
SB22	SB22-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	**9.3**	-	-	-	-	-	-	-
SB23	SB23-0.5	0.5	12/2/2015	ND	**5.2**	**200**	**0.57**	ND(0.46)	**41**	**11**	**30**	**31**	**0.98**	ND(0.46)	**57**	ND	ND	**30**	**87**
SB24	SB24-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	**43**	-	-	-	-	-	-	-
SB25	SB25-1	1.0	12/2/2015	-	-	-	-	-	-	-	-	**140**	-	-	-	-	-	-	-
SB26	SB26-1.5	1.5	12/2/2015	-	-	-	-	-	-	-	-	**33**	-	-	-	-	-	-	-
SB27	SB27-2.5	2.5	12/2/2015	-	-	-	-	-	-	-	-	**32**	-	-	-	-	-	-	-
SB28	SB28-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	**80**	-	-	-	-	-	-	-
	SB28-4.5	4.5	12/2/2015	-	-	-	-	-	-	-	-	**39**	-	-	-	-	-	-	-
SB29	SB29-2.5	2.5	12/2/2015	ND	**6.9**	**190**	**0.48**	ND(0.45)	**45**	**11**	**38**	**35**	**0.85**	ND(0.45)	**48**	ND	ND	**38**	**130**
SB30	SB30-1	1.0	12/2/2015	-	-	-	-	-	-	-	-	**16**	-	-	-	-	-	-	-
SB31	SB31-2	2.0	12/2/2015	-	-	-	-	-	-	-	-	**45**	-	-	-	-	-	-	-
	SB31-6	6.0	12/2/2015	-	-	-	-	-	-	-	-	**1,200** [F2]	-	-	-	-	-	-	-
SB32	SB32-1.5	1.5	12/3/2015	-	-	-	-	-	-	-	-	**39**	-	-	-	-	-	-	-
SB34	SB34-4.0	4.0	12/1/2015	ND	**5.6**	**100**	**0.29**	ND(0.34)	**78**	**13**	**23**	**9.4**	**0.16**	ND(1.4)	**86**	ND	ND	**59**	**56**
SB35	SB35-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	**59**	-	-	-	-	-	-	-
SB36	SB36-1.5	1.5	11/30/2015	-	-	-	-	-	-	-	-	**14**	-	-	-	-	-	-	-
SB37	SB37-0.5	0.5	12/1/2015	-	-	-	-	-	-	-	-	**7.9**	-	-	-	-	-	-	-
SB38	SB38-1.5	1.5	11/30/2015	-	-	-	-	-	-	-	-	**19**	-	-	-	-	-	-	-
SB39	SB39-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	**59**	-	-	-	-	-	-	-
SB40	SB40-1	1.0	12/2/2015	-	-	-	-	-	-	-	-	**58**	-	-	-	-	-	-	-
SB41	SB41-1	1.0	12/2/2015	-	-	-	-	-	-	-	-	**86**	-	-	-	-	-	-	-
SB42	SB42-1	1.0	12/2/2015	ND	**6.7**	**170**	ND(0.31)	ND(0.38)	**96**	**16**	**60**	**70**	**0.28**	ND(1.5)	**120**	ND	ND	**43**	**150**
SB43	SB43-1.5	1.5	12/1/2015	-	-	-	-	-	-	-	-	**160**	-	-	-	-	-	-	-
SB45	SB45-1.5	1.5	12/1/2015	-	-	-	-	-	-	-	-	**200**	-	-	-	-	-	-	-
SB46	SB46-0.5	0.5	12/2/2015	ND	**7.0**	**160**	**0.42**	**0.45**	**42**	**11**	**78**	**150**	**0.41**	ND(1.6)	**52**	ND	ND	**46**	**240**
SB48	SB48-1.0	1.0	12/1/2015	ND	**6.0**	**180**	ND(0.31)	**0.48**	**48**	**13**	**59**	**190**	**0.83**	ND(1.6)	**75**	ND	ND	**58**	**230**
SB49	SB49-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	**24**	-	-	-	-	-	-	-

Table 13
Soil Risk Assessment Dataset - Construction Scenario - Metals
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (Feet bgs)	Date Collected	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
SV6	SV6-0.5	0.5	12/1/2015	ND	**6.0**	**160**	**0.38**	**0.56**	**42**	**18**	**22**	**48**	**0.18**	**1.5**	**63**	ND	ND	**33**	**80**
SV8	SV8-0.5	0.5	12/3/2015	-	-	-	-	-	-	-	-	**10**	-	-	-	-	-	-	-
SV10	SV10-0.5	0.5	12/1/2015	ND	**9.0**	**180**	**0.43**	ND(0.41)	**130**	**20**	**33**	**9.3**	**0.25**	ND(1.6)	**170**	ND	ND	**51**	**67**
SV14	SV14-0.5	0.5	12/1/2015	ND	**9.6**	**220**	**0.42**	ND(0.4)	**150**	**20**	**36**	**12**	**0.17**	ND(1.6)	**150**	ND	ND	**52**	**94**
SV16	SV16-0.5	0.5	12/1/2015	-	-	-	-	-	-	-	-	**11**	-	-	-	-	-	-	-
SV20	SV20-0.5	0.5	11/30/2015	ND	**4.7**	**160**	**0.37**	**0.18**	**55**	**12**	**26**	**16**	**0.44**	ND(0.46)	**73**	ND	ND	**36**	**72**
SV22	SV22-0.5	0.5	11/30/2015	-	-	-	-	-	-	-	-	**11**	-	-	-	-	-	-	-
SV32	SV32-1.0	1.0	11/30/2015	ND	**5.5**	**170**	ND(0.35)	ND(0.44)	**100**	**15**	**35**	**21**	**0.37**	ND(1.8)	**120**	ND	ND	**53**	**100**
	SV32-7.0	7.0	11/30/2015	ND	**7.0**	**680**	ND(0.37)	**1.9**	**44**	**8.2**	**190**	**570**	**0.23**	**3.2**	**64**	ND	ND	**61**	**790**
SV33	SV33-0.5	0.5	11/30/2015	-	-	-	-	-	-	-	-	**120**	-	-	-	-	-	-	-
	SV33-4.5	4.5	11/30/2015	-	-	-	-	-	-	-	-	**100**	-	-	-	-	-	-	-
SV38	SV38-1.0	1.0	11/30/2015	ND	**3.7**	**140**	ND(0.36)	ND(0.45)	**110**	**17**	**30**	**22**	**0.33**	ND(1.8)	**160**	ND	ND	**74**	**63**
SV43	SV43-1.0	1.0	11/30/2015	-	-	-	-	-	-	-	-	**12**	-	-	-	-	-	-	-
SV45	SV45-1.0	1.0	11/30/2015	-	-	-	-	-	-	-	-	**90**	-	-	-	-	-	-	-
SV47	SV47-1.5	1.5	12/3/2015	-	-	-	-	-	-	-	-	**11**	-	-	-	-	-	-	-
	SV47-6.0	6.0	12/3/2015	-	-	-	-	-	-	-	-	**350**	-	-	-	-	-	-	-

Notes:
Detections are shown in bold.
Only detected metals are shown.
bgs = Below ground surface
mg/kg = Milligrams per kilogram
ND(0.24) = Not detected at or above the indicated laboratory reporting limit
ND = Not detected (reporting limit not provided)
- = Not analyzed

Table 14
Soil Risk Assessment Dataset - Construction Scenario - Total Petroleum Hydrocarbons (TPH)
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Sample Depths (feet bgs)	TPH (mg/kg) Oil & Grease	TPH-Gas	TPH-Diesel	TPH-Motor Oil
IS-1	4/26/1989	3.5	**1,915**	<10	**46**	-
		7.0	**3,390**	<10	**200**	-
		10.5	**2,185**	**300**	<10	-
IS-2	4/26/1989	3.0	**1,305**	<10	**50**	-
		8.5	**36,535**	<10	<10	-
B-1/MW-1	7/5/1989	5.5	**845**	<10	**12**	-
		10.5	<50	<10	<10	-
B-2	7/5/1989	6.0	**1,160**	<10	**19**	-
		10	**14,900**	**20**	**172**	-
B-3/MW-3	8/28/1989	5.0	**1,845**	<10	**30**	-
		12.0	**95**	<10	**20**	-
B-4	8/28/1989	4.5	**6,685**	<10	<10	-
		10.0	**25,470**	<10	**170**	-
B-5/MW-5	8/31/1989	6.0	**330**	<10	<10	-
		11.0	**3,580**	**25**	**15**	-
SS-1-E	10/5/1989	2' Beneath UST	-	**12**	**12**	-
SS-2-W	10/5/1989	2' Beneath UST	-	<10	**11**	-
SS-3-E	10/5/1989	2' Beneath UST	-	<10	<10	-
SS-4-W	10/5/1989	2' Beneath UST	-	**240**	**60**	-
SS-5-E	10/5/1989	2' Beneath UST	-	**115**	**35**	-
SS-6-W	10/5/1989	2' Beneath UST	-	**460**	**700**	-
B-7/MW-7	1/3/1990	4	**9,000**	<10	<10	-
		9	**8,800**	<10	**788**	-
B-8/MW-8	1/3/1990	4	**2,000**	<10	<10	-
		9	**20,000**	<10	<10	-
B-9	1/4/1990	4	**23,000**	<10	<10	-
		9	**15,000**	<10	**5,050**	-
B-10	1/4/1990	4	**9,500**	<10	**380**	-
		9	**6,300**	<10	<10	-
B-11	1/4/1990	4	**45,000**	<10	<10	-
		9	**30,400**	<10	<10	-
B-12	1/4/1990	4	**12,000**	<10	<10	-
		9	**38,800**	<10	<10	-
B-13	1/4/1990	4	**9,400**	<10	<10	-
		9	**3,000**	<10	<10	-
Sump	1/5/1990	Confirmation	**10,500**	<10	<10	-
MW-9	4/13/1994	8.5	-	-	<1	-
MW-10	4/14/1994	9.5	-	-	-	-
T-1	4/13/1994	8	-	-	-	-
T-2	4/13/1994	6	**160**	-	**40**	-
		8.5	-	<1	-	-
T-3	4/13/1994	8	-	<1	-	-
T-4	4/14/1994	9	-	<1	-	-
T-5	4/14/1994	5	**710**	<1	<10	-
		9	<50	<1	<1	-
T-7	4/14/1994	7.5	**68**	<1	<10	-
SG-1	4/19/2013	3.5 - 4.0	-	-	**43**	**250**
SG-2	4/19/2013	3.0 - 3.5	-	-	**43**	**340**
SG-3	4/19/2013	3.5 - 4.0	-	-	**290**	**1,400**
SG-4	4/19/2013	3.5 - 4.0	-	-	**200**	**400**
SG-5	4/19/2013	4.5 - 5.0	-	-	**33**	**290**
SB19-0.5	12/2/2015	0.5	-	-	**24**	**86**
SB20-1.0	11/30/2015	1.0	-	-	**23**	**57**
SB20-2.5	11/30/2015	2.5	-	-	**36**	**110**
SB21-0.5	12/2/2015	0.5	-	-	**110**	**380**
SB22-0.5	12/2/2015	0.5	-	-	**1.6**	< 50
SB23-0.5	12/2/2015	0.5	-	-	**26**	**130**
SB24-0.5	12/2/2015	0.5	-	-	**56**	**180**
SB25-1	12/2/2015	1.0	-	-	**87**	**410**
SB26-1.5	12/2/2015	1.5	-	-	**27**	**160**
SB27-2.5	12/2/2015	2.5	-	-	**260**	**960**
SB28-0.5	12/2/2015	0.5	-	-	**64**	**190**
SB28-4.5	12/2/2015	4.5	-	-	**200**	**890**
SB29-2.5	12/2/2015	2.5	-	-	**39**	**110**
SB30-1	12/2/2015	1.0	-	-	**5.0**	< 49
SB31-2	12/2/2015	2.0	-	-	**35**	**150**
SB31-6	12/2/2015	6.0	-	-	**110**	**510**
SB32-1.5	12/3/2015	1.5	-	-	**26**	**100**
SB34-4.0	12/1/2015	4.0	-	-	**59**	**290**
SB35-0.5	12/2/2015	0.5	-	-	**130**	**450**
SB36-1.5	11/30/2015	1.5	-	-	**16**	< 50
SB37-0.5	12/1/2015	0.5	-	-	**2.9**	< 50
SB38-1.5	11/30/2015	1.5	-	-	**11**	< 50
SB39-0.5	12/2/2015	0.5	-	-	**79**	**210**
SB40-1	12/2/2015	1.0	-	-	**84**	**300**
SB41-1	12/2/2015	1.0	-	-	**150**	**490**
SB42-1	12/2/2015	1.0	-	-	**55**	**170**
SB43-1.5	12/1/2015	1.5	-	-	**200**	**680**
SB45-1.5	12/1/2015	1.5	-	-	**460**	**1,900**
SB46-0.5	12/2/2015	0.5	-	-	**62**	**310**
SB48-1.0	12/1/2015	1.0	-	-	**110**	**410**
SB49-0.5	12/2/2015	0.5	-	-	**8.2**	< 50
SV6-0.5	12/1/2015	0.5	-	-	**2.2**	< 50
SV8-0.5	12/3/2015	0.5	-	-	**7.2**	< 50
SV10-0.5	12/1/2015	0.5	-	-	**7.4**	< 50
SV14-0.5	12/1/2015	0.5	-	-	**4.8**	< 50
SV16-0.5	12/1/2015	0.5	-	-	**130**	**380**
SV20-0.5	11/30/2015	0.5	-	-	**34**	**98**
SV22-0.5	11/30/2015	0.5	-	-	**6.6**	< 50
SV32-1.0	11/30/2015	1.0	-	-	**38**	**160**
SV32-7.0	11/30/2015	7.0	-	-	**780**	**5,300**
SV33-0.5	11/30/2015	0.5	-	-	**130**	**410**
SV33-4.5	11/30/2015	4.5	-	-	**230**	**1,000**
SV38-1.0	11/30/2015	1.0	-	-	**29**	**83**
SV43-1.0	11/30/2015	1.0	-	-	**3.7**	< 50
SV45-1.0	11/30/2015	1.0	-	-	**130**	**600**
SV47-1.5	12/3/2015	1.5	-	-	**7.3**	< 49
SV47-2.5	12/3/2015	2.5	-	-	**16**	< 50
SV47-6.0	12/3/2015	6.0	-	-	**40**	**140**

Notes:
Detections are in bold.
Only detected compounds are shown.
bgs = below ground surface
mg/kg: milligrams per kilogram
<50: Not detected at or above laboratory reporting limit shown
TPH: Total Petroleum Hydrocarbons
UST: Underground storage tank
- = Not analyzed / not applicable

Table 15
Soil Risk Assessment Dataset - Residential Scenario - PCBs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample Number	Depth (feet bgs)	Date Collected	Aroclor-1260 [1] (mg/kg)
SB21	SB21-0.5	0.5	12/2/2015	**1.9**
SB23	SB23-0.5	0.5	12/2/2015	**0.49**
SB24	SB24-0.5	0.5	12/2/2015	**3.7**
SB25	SB25-1	1.0	12/2/2015	**0.8**
SB26	SB26-1.5	1.5	12/2/2015	**0.12**
SB40	SB40-1	1.0	12/2/2015	**1.9**
SB41	SB41-1	1.0	12/2/2015	**2.9**
SB42	SB42-1	1.0	12/2/2015	**2.8**
SB43	SB43-1.5	1.5	12/1/2015	**1.3**
SB45	SB45-1.5	1.5	12/1/2015	**2.8**
SB46	SB46-0.5	0.5	12/2/2015	**1.2**
SB48	SB48-1.0	1.0	12/1/2015	**8.3**

Notes:

Detections are shown in bold.

Only detected compounds are shown.

bgs = below ground surface

mg/kg = milligrams per kilogram

PCBs= Polychlorinated biphenyls

1. All 2015 samples were prepped or analyzed beyond the specified holding time.

Table 16
Soil Risk Assessment Dataset - Residential Scenario - Metals
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (Feet bgs)	Date Collected	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
SB1	SB1-1.0	1	11/7/2013	**5.9**	**160**	**0.39**	**0.94**	**86**	**13**	**52**	**81**	**0.22**	**100**	**51**	**190**
SB4	SB4-1.5	1.5	11/7/2013	-	-	-	-	-	-	-	**18**	-	-	-	-
SB19	SB19-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	**210**	-	-	-	-
SB20	SB20-1.0	1.0	11/30/2015	-	-	-	-	-	-	-	**14**	-	-	-	-
SB21	SB21-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	**90**	-	-	-	-
SB22	SB22-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	**9.3**	-	-	-	-
SB23	SB23-0.5	0.5	12/2/2015	**5.2**	**200**	**0.57**	ND(0.46)	**41**	**11**	**30**	**31**	**0.98**	**57**	**30**	**87**
SB24	SB24-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	**43**	-	-	-	-
SB25	SB25-1	1.0	12/2/2015	-	-	-	-	-	-	-	**140**	-	-	-	-
SB26	SB26-1.5	1.5	12/2/2015	-	-	-	-	-	-	-	**33**	-	-	-	-
SB36	SB36-1.5	1.5	11/30/2015	-	-	-	-	-	-	-	**14**	-	-	-	-
SB40	SB40-1	1.0	12/2/2015	-	-	-	-	-	-	-	**58**	-	-	-	-
SB41	SB41-1	1.0	12/2/2015	-	-	-	-	-	-	-	**86**	-	-	-	-
SB42	SB42-1	1.0	12/2/2015	**6.7**	**170**	ND(0.31)	ND(0.38)	**96**	**16**	**60**	**70**	**0.28**	**120**	**43**	**150**
SB43	SB43-1.5	1.5	12/1/2015	-	-	-	-	-	-	-	**160**	-	-	-	-
SB45	SB45-1.5	1.5	12/1/2015	-	-	-	-	-	-	-	**200**	-	-	-	-
SB46	SB46-0.5	0.5	12/2/2015	**7.0**	**160**	**0.42**	**0.45**	**42**	**11**	**78**	**150**	**0.41**	**52**	**46**	**240**
SB48	SB48-1.0	1.0	12/1/2015	**6.0**	**180**	ND(0.31)	**0.48**	**48**	**13**	**59**	**190**	**0.83**	**75**	**58**	**230**
SB49	SB49-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	**24**	-	-	-	-

Notes:

Detections are shown in bold.

Only detected metals are shown.

bgs = Below ground surface

mg/kg = Milligrams per kilogram

ND(0.24) = Not detected at or above the indicated laboratory reporting limit

ND = Not detected (reporting limit not provided)

- = Not analyzed

Table 17

Soil Risk Assessment Dataset - Residential Scenario - Total Petroleum Hydrocarbons (TPH)
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Sample Depths (feet bgs)	TPH (mg/kg)	
			TPH-Diesel	TPH-Motor Oil
SB19-0.5	12/2/2015	0.5	**24**	**86**
SB20-1.0	11/30/2015	1.0	**23**	**57**
SB21-0.5	12/2/2015	0.5	**110**	**380**
SB22-0.5	12/2/2015	0.5	**1.6**	< 50
SB23-0.5	12/2/2015	0.5	**26**	**130**
SB24-0.5	12/2/2015	0.5	**56**	**180**
SB25-1	12/2/2015	1.0	**87**	**410**
SB26-1.5	12/2/2015	1.5	**27**	**160**
SB36-1.5	11/30/2015	1.5	**16**	< 50
SB40-1	12/2/2015	1.0	**84**	**300**
SB41-1	12/2/2015	1.0	**150**	**490**
SB42-1	12/2/2015	1.0	**55**	**170**
SB43-1.5	12/1/2015	1.5	**200**	**680**
SB45-1.5	12/1/2015	1.5	**460**	**1,900**
SB46-0.5	12/2/2015	0.5	**62**	**310**
SB48-1.0	12/1/2015	1.0	**110**	**410**
SB49-0.5	12/2/2015	0.5	**8.2**	< 50

Notes:

Detections are in bold.

Only detected compounds are shown.

bgs = below ground surface

mg/kg: milligrams per kilogram

<50: Not detected at or above laboratory reporting limit shown

TPH: Total Petroleum Hydrocarbons

Table 18
Soil Risk Assessment Dataset - Utility/Maintenance Scenario - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Location	Sample Depths (ft bgs)	VOCs (µg/kg)								
				Acetone	Benzene	cis-1,2-DCE	trans-1,2-DCE	Ethylbenzene	Naphthalene	Toluene	Vinyl chloride	Total Xylenes
B-9	1/4/1990	At sump	4	<50	<10	--	--	<10	<300	**12**	--	<10
			9	<50	**54**	--	--	**140**	**8,900**	**26**	--	**380**
-	4/1/1990	B-13	4	--	--	--	--	--	<300	--	--	--
-			9	--	--	--	--	--	<300	--	--	--
SB6-4.0	11/07/2013	SB6	4.0	--	--	--	--	--	**2,900**	--	--	--
SB6-10.0			10.0	--	--	--	--	--	<67	--	--	--
SB23-0.5	12/2/2015	SB23	0.5	--	--	--	--	--	ND	--	--	--
SB28-4.5	12/2/2015	SB-28	4.5	<45	ND	--	--	ND	--	ND	--	ND
SB29-2.5	12/2/2015	SB29	2.5	--	--	--	--	--	ND	--	--	--
SB34-4.0	12/1/2015	SB34	4.0	--	--	--	--	--	ND	--	--	--
SB48-1.0	12/1/2015	SB48	1.0	--	--	--	--	--	ND	--	--	--
SV47-2.5	12/03/2015	SV-47	2.5	<37	ND	--	--	ND	--	ND	--	ND
SB55-0.5	2/2/2016	SB55	0.5	< 15	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 3.7	< 7.4	--
SB55-5.5	2/2/2016		5.0	**35**	< 4.6	**300**	**56**	< 4.6	< 4.6	< 4.6	**60**	--
SB55-10	2/2/2016		10.0	< 3,200	< 810	**24,000**	**8,300**	< 810	< 810	< 810	< 1,600	--
SV56-0.5	2/2/2016	SV56	0.5	< 14	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 3.5	< 7.1	--
SV56-5	2/2/2016		5.0	**23**	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 4.2	< 8.3	--
SV57-0.5	2/2/2016	SV57	0.5	< 16	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 3.9	< 7.8	--
SV57-5	2/2/2016		5.0	< 14	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 7.2	--

Notes:

Detections are shown in bold

Only detected compounds are shown.

ft bgs = Feet below ground surface

VOCs = Volatile organic compounds

µg/kg = Micrograms per kilogram

<## = Not detected at or above the indicated laboratory reporting limit

ND = Not detected (reporting limit not provided)

-- = Not detected or not analyzed

DCE = Dichloroethene

Table 19
Soil Risk Assessment Dataset - Utility/Maintenance Scenario - SVOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Boring Location	Sample Number	Depth (Feet bgs)	Date Collected	SVOCs (µg/kg)														
				Anthracene	Benzo (a) Anthracene	Benzo (a) Pyrene	Benzo (b) Fluoranthene	Benzo (k) Fluoranthene	Benzo (g,h,i) Perylene	Chrysene	Fluoranthene	Fluorene	Indeno (1,2,3-cd) Pyrene	2-Methyl-naphthalene	4-Methyl-phenol	Phenanthrene	Pyrene	1,2,4-TCB
SS-3-E	-	-	10/5/1989	-	ND(30)	ND(30)	-	ND(30)	-	ND(70)	ND(30)	-	-	ND(30)	**200**	ND(30)	ND(30)	**200**
B-9	-	4	1/4/1990	-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)
		9		-	ND(300)	ND(300)	-	ND(300)	-	**690**	**340**	-	-	**1,100**	ND(300)	**590**	**550**	ND(300)
B-13	-	4	1/4/1990	-	ND(300)	**470**	-	ND(300)	-	**390**	ND(300)	-	-	ND(300)	ND(300)	ND(300)	**920**	ND(300)
		9		-	ND(300)	ND(300)	-	ND(300)	-	ND(300)	ND(300)	-	-	ND(300)	ND(300)	ND(300)	ND(300)	ND(300)
SB6	SB6-4.0	4	11/7/2013	**1,200**	**2,400**	**3,000**	**3,700**	**1,500**	**1,400**	**2,900**	**4,400**	**810**	**1,300**	ND(660)	ND(3,300)	**5,500**	**4,500**	-
	SB6-10.0	10		ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(67)	ND(330)	ND(67)	ND(67)	-
SB23	SB23-0.5	0.5	12/2/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB29	SB29-2.5	2.5	12/2/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SB48	SB48-1.0	1.0	12/1/2015	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
Detections are shown in bold.
Only detected compounds are shown.
bgs = Below ground surface
µg/kg = Micrograms per kilogram
- = Not analyzed or not detected
ND(67) = Not detected at or above the indicated laboratory reporting limit
ND = Not detected (reporting limit not provided)
SVOC = semi-volatile organic compound
TCB = trichlorobenzene

Table 20
Soil Risk Assessment Dataset - Utility/Maintenance Scenario - PCBs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample Number	Depth (feet bgs)	Date Collected	Aroclor-1260 [(1)] (mg/kg)	Aroclor-1262 (mg/kg)	Total PCBs (mg/kg)
SB6	SB6-4.0	4	11/7/2013	**0.57**	ND(0.012)	**0.57**
	SB6-8.0	8	11/7/2013	ND(0.012)	**0.16**	**0.16**
	SB6-10.0	10	11/7/2013	ND(0.012)	**4.8**	**4.8**
B-9	-	4	1/4/1990	ND(1)	-	-
	-	9		ND(1)	-	-
B-13	-	4	1/4/1990	**3.1**	-	**3.1**
	-	9		ND(1)	-	-
SB20	SB20-2.5	2.5	11/30/2015	**1.7**	-	**1.7**
SB21	SB21-0.5	0.5	12/2/2015	**1.9**	-	**1.9**
SB23	SB23-0.5	0.5	12/2/2015	**0.49**	-	**0.49**
SB24	SB24-0.5	0.5	12/2/2015	**3.7**	-	**3.7**
SB25	SB25-1	1.0	12/2/2015	**0.8**	-	**0.8**
SB26	SB26-1.5	1.5	12/2/2015	**0.12**	-	**0.12**
SB27	SB27-2.5	2.5	12/2/2015	**0.59**	-	**0.59**
SB28	SB28-0.5	0.5	12/2/2015	**0.61**	-	**0.61**
	SB28-4.5	4.5	12/2/2015	**55**	-	**55**
SB29	SB29-2.5	2.5	12/2/2015	**1.9**	-	**1.9**
SB31	SB31-2	2.0	12/2/2015	**0.28**	-	**0.28**
	SB31-6	6.0	12/2/2015	ND(0.050)	-	ND(0.050)
SB32	SB32-1.5	1.5	12/3/2015	**0.29**	-	**0.29**
SB34	SB34-4.0	4.0	12/1/2015	**0.19**	-	**0.19**
SB39	SB39-0.5	0.5	12/2/2015	**0.25**	-	**0.25**
SB43	SB43-1.5	1.5	12/1/2015	**1.3**	-	**1.3**
SB45	SB45-1.5	1.5	12/1/2015	**2.8**	-	**2.8**
SB48	SB48-1.0	1.0	12/1/2015	**8.3**	-	**8.3**
SV47	SV47-6.0	6.0	12/3/2015	ND(0.049)	-	ND(0.049)

Notes:
Detections are shown in bold.
Only detected compounds are shown.
bgs = below ground surface
mg/kg = milligrams per kilogram
PCBs= Polychlorinated biphenyls
ND(24) = Compound not detected at or above the indicated laboratory reporting limit
- = Not analyzed
1. All 2015 samples were prepped or analyzed beyond the specified holding time.

Table 21
Soil Risk Assessment Dataset - Utility/Maintenance Scenario - Metals
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Sample Depth (Feet bgs)	Date Collected	Antimony (mg/kg)	Arsenic (mg/kg)	Barium (mg/kg)	Beryllium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Cobalt (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Molybdenum (mg/kg)	Nickel (mg/kg)	Selenium (mg/kg)	Vanadium (mg/kg)	Zinc (mg/kg)
B-9	B-9	4	1/4/1990	ND(10)	ND(16)	140	0.41	ND(0.7)	33	7.4	55	41	0.45	ND(1)	32	-	31	120
		9		ND(16)	ND(16)	610	0.31	44	180	15	2,300	980	0.66	27	350	-	26	6,200
B-13	B-13	4	1/4/1990	ND(10)	ND(16)	160	0.36	ND(0.7)	62	6.5	120	520	ND(0.009)	ND(1)	42	-	27	300
		9		ND(10)	ND(16)	37	0.15	ND(0.7)	29	2.9	4.9	12	ND(0.009)	ND(1)	18	-	15	210
SB6	SB6-4.0	4	11/7/2013	-	-	-	-	-	-	-	-	140	-	-	-	-	-	-
	SB6-8.0	8	11/7/2013	-	-	-	-	-	-	-	-	58	-	-	-	-	-	-
	SB6-10.0	10	11/7/2013	7.5	5.6	140	0.27	1.9	140	16	390	160	0.13	4.9	190	6.0	41	270
SB10	SB10-2.0	2	11/8/2013	ND(0.47)	6.9	550	0.33	0.58	38	6.9	27	45	0.15	0.61	36	ND(0.47)	34	90
	SB10-5.0	5	11/8/2013	-	-	-	-	-	-	-	-	49	-	-	-	-	-	-
	SB10-10.0	10	11/8/2013	-	-	-	-	-	-	-	-	21	-	-	-	-	-	-
SB19	SB19-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	210	-	-	-	-	-	-
SB20	SB20-1.0	1.0	11/30/2015	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-
	SB20-2.5	2.5	11/30/2015	-	-	-	-	-	-	-	-	21	-	-	-	-	-	-
SB21	SB21-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	90	-	-	-	-	-	-
SB22	SB22-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	9.3	-	-	-	-	-	-
SB23	SB23-0.5	0.5	12/2/2015	ND	5.2	200	0.57	ND(0.46)	41	11	30	31	0.98	ND(0.46)	57	ND	30	87
SB24	SB24-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	43	-	-	-	-	-	-
SB25	SB25-1	1.0	12/2/2015	-	-	-	-	-	-	-	-	140	-	-	-	-	-	-
SB26	SB26-1.5	1.5	12/2/2015	-	-	-	-	-	-	-	-	33	-	-	-	-	-	-
SB27	SB27-2.5	2.5	12/2/2015	-	-	-	-	-	-	-	-	32	-	-	-	-	-	-
SB28	SB28-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	80	-	-	-	-	-	-
	SB28-4.5	4.5	12/2/2015	-	-	-	-	-	-	-	-	39	-	-	-	-	-	-
SB29	SB29-2.5	2.5	12/2/2015	ND	6.9	190	0.48	ND(0.45)	45	11	38	35	0.85	ND(0.45)	48	ND	38	130
SB30	SB30-1	1.0	12/2/2015	-	-	-	-	-	-	-	-	16	-	-	-	-	-	-
SB31	SB31-2	2.0	12/2/2015	-	-	-	-	-	-	-	-	45	-	-	-	-	-	-
	SB31-6	6.0	12/2/2015	-	-	-	-	-	-	-	-	1,200	-	-	-	-	-	-
SB32	SB32-1.5	1.5	12/3/2015	-	-	-	-	-	-	-	-	39	-	-	-	-	-	-
SB34	SB34-4.0	4.0	12/1/2015	ND	5.6	100	0.29	ND(0.34)	78	13	23	9.4	0.16	ND(1.4)	86	ND	59	56
SB36	SB36-1.5	1.5	11/30/2015	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-
SB39	SB39-0.5	0.5	12/2/2015	-	-	-	-	-	-	-	-	59	-	-	-	-	-	-
SB43	SB43-1.5	1.5	12/1/2015	-	-	-	-	-	-	-	-	160	-	-	-	-	-	-
SB45	SB45-1.5	1.5	12/1/2015	-	-	-	-	-	-	-	-	200	-	-	-	-	-	-
SB48	SB48-1.0	1.0	12/1/2015	ND	6.0	180	ND(0.31)	0.48	48	13	59	190	0.83	ND(1.6)	75	ND	58	230
SV47	SV47-1.5	1.5	12/3/2015	-	-	-	-	-	-	-	-	11	-	-	-	-	-	-
	SV47-6.0	6.0	12/3/2015	-	-	-	-	-	-	-	-	350	-	-	-	-	-	-

Notes:
Detections are shown in bold.
Only detected metals are shown.
bgs = Below ground surface
mg/kg = Milligrams per kilogram
ND(0.24) = Not detected at or above the indicated laboratory reporting limit
ND = Not detected (reporting limit not provided)
- = Not analyzed

Table 22
Soil Risk Assessment Dataset - Utility/Maintenance Scenario - Total Petroleum Hydrocarbons (TPH)
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Sample ID	Date	Sample Depths (feet bgs)	TPH (mg/kg)			
			Oil & Grease	TPH-Gas	TPH-Diesel	TPH-Motor Oil
SS-1-E	10/5/1989	2' Beneath UST	-	**12**	**12**	-
SS-3-E	10/5/1989	2' Beneath UST	-	<10	<10	-
B-9	1/4/1990	4	**23,000**	<10	<10	-
		9	**15,000**	<10	**5,050**	-
B-13	1/4/1990	4	**9,400**	<10	<10	-
		9	**3,000**	<10	<10	-
SB19-0.5	12/2/2015	0.5	-	-	**24**	**86**
SB20-1.0	11/30/2015	1.0	-	-	**23**	**57**
SB20-2.5	11/30/2015	2.5	-	-	**36**	**110**
SB21-0.5	12/2/2015	0.5	-	-	**110**	**380**
SB22-0.5	12/2/2015	0.5	-	-	**1.6**	< 50
SB23-0.5	12/2/2015	0.5	-	-	**26**	**130**
SB24-0.5	12/2/2015	0.5	-	-	**56**	**180**
SB25-1	12/2/2015	1.0	-	-	**87**	**410**
SB26-1.5	12/2/2015	1.5	-	-	**27**	**160**
SB27-2.5	12/2/2015	2.5	-	-	**260**	**960**
SB28-0.5	12/2/2015	0.5	-	-	**64**	**190**
SB28-4.5	12/2/2015	4.5	-	-	**200**	**890**
SB29-2.5	12/2/2015	2.5	-	-	**39**	**110**
SB30-1	12/2/2015	1.0	-	-	**5.0**	< 49
SB31-2	12/2/2015	2.0	-	-	**35**	**150**
SB31-6	12/2/2015	6.0	-	-	**110**	**510**
SB32-1.5	12/3/2015	1.5	-	-	**26**	**100**
SB34-4.0	12/1/2015	4.0	-	-	**59**	**290**
SB36-1.5	11/30/2015	1.5	-	-	**16**	< 50
SB39-0.5	12/2/2015	0.5	-	-	**79**	**210**
SB43-1.5	12/1/2015	1.5	-	-	**200**	**680**
SB45-1.5	12/1/2015	1.5	-	-	**460**	**1,900**
SB48-1.0	12/1/2015	1.0	-	-	**110**	**410**
SV47-1.5	12/3/2015	1.5	-	-	**7.3**	< 49
SV47-2.5	12/3/2015	2.5	-	-	**16**	< 50
SV47-6.0	12/3/2015	6.0	-	-	**40**	**140**

Notes:
Detections are in bold.
Only detected compounds are shown.
bgs = below ground surface
mg/kg: milligrams per kilogram
<##: Not detected at or above laboratory reporting limit shown
TPH: Total Petroleum Hydrocarbons
UST: Underground Storage Tank
- = Not analyzed

Table 23
Groundwater Risk Assessment Dataset - VOCs
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Well / Location	Date	TPH (µg/L)		VOCs (µg/L)																		
		TPH-Diesel	TPH-Motor Oil	Benzene	TBA	n-Butyl Benzene	sec-Butyl Benzene	Carbon disulfide	Chloro-benzene	cis-1,2-DCE	Ethyl-benzene	Isopropyl-benzene	4-Isopropyl-toluene	Naph-thalene	n-Propyl benzene	Toluene	1,2,4-Trimethyl-benzene	1,3,5-Trimethyl-benzene	Vinyl Chloride	m,p-Xylene	o-Xylene	Total Xylenes
SG-1 (10.75')	4/19/2013	**920**	**5,600**	<0.5	<2.0	<0.5	<0.5	**1.1**	**4.4**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	--	--	<0.5
SG-4 (11.75')	4/19/2013	**4,700**	**12,000**	**2**	**2.3**	<0.5	**1.3**	**3.9**	<0.5	**0.69**	<0.5	**1.1**	<0.5	<0.5	<0.5	**0.54**	<0.5	<0.5	-	--	--	<0.5
SG-5 (10.29')	4/19/2013	**58,000**	**9,500**	**8.1**	<20	**32**	**38**	<5.0	<5.0	<5.0	**45**	**67**	**13**	**84**	**87**	<3.0	**350**	**24**	-	--	--	**59**
SB51	2/1/2016	-	-	**3.2**	--	--	--	--	--	< 0.50	< 0.50	--	--	**5**	--	< 0.50	< 0.50	< 0.50	**1.6**	-	-	--
SB56	2/4/2016	-	-	**5.6**	--	--	--	--	--	< 25	< 25	--	--	< 100	--	< 25	< 25	< 25	< 25	< 25	< 25	--
SB57	2/4/2016	-	-	**3.0**	--	--	--	--	--	< 8.3	< 8.3	--	--	< 33	--	< 8.3	**4**	**2**	< 8.3	**5**	**3**	--
SB59	2/3/2016	-	-	< 25	--	--	--	--	--	< 25	< 25	--	--	< 100	--	< 25	< 25	< 25	< 25	< 25	< 25	--
SB61	2/3/2016	-	-	**4.0**	--	--	--	--	--	**9**	< 13	--	--	< 50	--	< 13	**3**	< 13	**7.3**	< 13	< 13	--
SB62	2/4/2016	-	-	**3.3**	--	--	--	--	--	**2**	**1**	--	--	**3**	--	**2**	**3**	**2**	**2.8**	**3**	**4**	--

Notes:

Detections are in bold.

Only detected compounds are shown.

DCE = dichloroethene

µg/L = micrograms per liter

<## = Not detected at or above laboratory reporting limit shown

- = Not analyzed

-- = Not analyzed or not detected

TBA = t-Butyl alcohol

TPH = Total Petroleum Hydrocarbons

VOCs = Volatile Organic Compounds

Table 24
Groundwater Risk Assessment Dataset - Metals
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

Location ID	Depth (feet bgs)	Date Collected	Arsenic (µg/L)	Barium (µg/L)	Chromium (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Molybdenum (µg/L)	Nickel (µg/L)	Selenium (µg/L)	Vanadium (µg/L)	Zinc (µg/L)
GGW-1	10 to 20	11/11/2013	ND(5.0)	**250**	**8.9**	ND(5.0)	**59**	**0.28**	**10**	**5.4**	**27**	**71**	**210**
GGW-2	10 to 20	11/11/2013	**6.4**	**280**	**8.0**	**9.1**	**190**	**0.41**	ND(5.0)	**8.5**	**26**	**22**	**360**
GGW-3	10 to 20	11/11/2013	**32**	**340**	ND(5.0)	ND(5.0)	**17**	ND(0.20)	**8.7**	ND(5.0)	ND(10)	ND(5.0)	**29**
GGW-4	10 to 20	11/11/2013	ND(5.0)	**200**	ND(5.0)	ND(5.0)	**1.3**	ND(0.20)	**10**	ND(5.0)	ND(10)	ND(5.0)	ND(20)
GGW-5	10 to 20	11/11/2013	ND(5.0)	**350**	ND(5.0)	ND(5.0)	**9.9**	**0.21**	**6.6**	**6.4**	ND(10)	ND(5.0)	**23**
GGW-6	10 to 20	11/11/2013	ND(5.0)	**94**	ND(5.0)	ND(5.0)	**3.1**	ND(0.20)	**5.9**	ND(5.0)	ND(10)	ND(5.0)	ND(20)

Notes:
Detections are shown in bold.
Only detected metals are shown.
µg/L = Micrograms per liter
bgs = Below ground surface
ND(5.0) = Compound not detected at or above the indicated laboratory reporting limit

Table 25
Soil Gas Risk Assessment Dataset
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

				VOCs ($\mu g/m^3$)																								
Sample Location	Date Sampled	Sample ID	Sample Depth (feet bgs)	Acetone	Benzene	Carbon disulfide	Chloroform	Chloro-methane	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	4-Ethyl-toluene	2-Hexanone	2-Butanone (MEK)	Methyl Isobutyl Ketone (MIBK)	Naphthalene	1,1,2,2-PCA	PCE	Toluene	1,1,1-TCA	TCE	1,2,4-Trimethyl-benzene	1,3,5- Trimethyl-benzene	Vinyl chloride	m,p-Xylene	o-Xylene	Xylenes	Other VOCs
SG-1	4/22/2013	SG-1	4.5	< 7.2	8.6	ND	ND	< 1.6	< 3.0	ND	< 3.3	< 3.7	--	< 6.7	ND	--	ND	< 5.2	3.4	ND	< 4.1	< 11	< 3.7	ND	ND	ND	< 13	ND
SG-2	4/22/2013	SG-2	4.5	< 13	< 4.5	ND	ND	< 2.9	< 5.6	ND	< 6.1	13	--	< 12	ND	--	ND	< 9.6	< 5.3	ND	< 7.6	37	16	ND	ND	ND	< 24	ND
SG-3	4/22/2013	SG-3	4.5	< 38	73	ND	ND	< 8.3	24	ND	< 17	< 20	--	< 35	ND	--	ND	30	18	ND	< 21	< 59	< 20	ND	ND	ND	< 69	ND
SG-4	4/22/2013	SG-4	4.5	19	37	ND	ND	2.4	< 2.9	ND	4.6	< 3.6	--	7.7	ND	--	ND	< 4.9	16	ND	9.6	< 11	< 3.6	ND	ND	ND	21.8	ND
SG-5	4/22/2013	SG-5	4.5	19	9.5	ND	ND	< 1.7	< 3.3	ND	6.2	< 4.0	--	< 7.3	ND	--	ND	< 5.6	6.1	ND	9.1	< 12	< 4.0	ND	ND	ND	38	ND
SV1	4/24/2015	SV1-5.0	5.0	-	6.68	ND	ND	< 2.07	< 3.97	ND	< 4.34	-	--	28.6	ND	--	ND	< 6.78	6.41	ND	< 5.37	< 4.92	< 4.92	ND	ND	ND	34.2	ND
	4/24/2015	SV1-10.0	10.0	-	5.72	ND	ND	-	< 3.97	ND	< 4.34	-	--	< 5.89	ND	--	ND	< 6.78	6.86	ND	< 5.37	< 4.92	< 4.92	ND	ND	ND	31.6	ND
SV2	4/24/2015	SV2-5.0	5.0	-	76.3	ND	ND	-	< 79.3	ND	< 86.8	-	--	< 118	ND	--	ND	< 136	< 75.4	ND	< 107	< 98.3	< 98.3	ND	ND	ND	< 86.8	ND
	4/24/2015	SV2-9.5	9.5	-	19.6	ND	ND	-	< 7.93	ND	< 8.68	-	--	37.0	ND	--	ND	< 13.6	14.0	ND	< 10.7	< 9.83	< 9.83	ND	ND	ND	< 8.68	ND
SV3	4/24/2015	SV3-5.0	5.0	-	< 6.39	ND	ND	-	< 7.93	ND	< 8.68	-	--	28.9	ND	--	ND	< 13.6	< 7.54	ND	< 10.7	< 9.83	< 9.83	ND	ND	ND	< 8.68	ND
	4/24/2015	SV1-9.5	9.5	-	< 63.9	ND	ND	-	< 79.3	ND	< 86.8	-	--	< 118	ND	--	ND	< 136	< 75.4	ND	< 107	< 98.3	< 98.3	ND	ND	ND	< 86.8	ND
SV5	12/2/2015	SV5-5	5.0	120	12	3.9	7.2	ND	< 1.6	< 1.6	2.6	< 2.0	--	55	< 1.6	--	< 2.7	< 2.7	8.9	< 1.6	< 2.1	8.5	3.2	< 1.0	25	3.8	ND	ND
	12/2/2015	SV5-10	10.0	76	< 2.1	< 4.2	10	ND	< 2.7	< 2.7	< 2.9	< 3.3	--	43	< 2.8	--	< 4.6	< 4.6	2.9	< 2.8	< 3.6	< 6.6	< 3.3	< 1.7	< 5.8	< 2.9	ND	ND
SV6	12/2/2015	SV6-5	5.0	270	31	120	21	ND	5.4	< 2.7	3.2	< 3.4	--	73	< 2.8	--	< 4.7	< 4.6	16	< 2.8	< 3.7	< 6.7	< 3.4	< 1.7	9.3	< 3.0	ND	3.9 (Freon 21)
	12/2/2015	SV6-10	10.0	37	< 2.9	< 5.7	< 3.4	ND	< 3.6	< 3.6	< 4.0	< 4.5	--	12	< 3.8	--	< 6.3	< 6.2	< 3.5	< 3.7	< 4.9	< 9	< 4.5	< 2.3	< 8.0	< 4.0	ND	4.8 (Freon 21)
SV7	12/2/2015	SV7-10	10.0	< 9,400	< 1,000	< 2,000	< 1,200	ND	< 1,300	< 1,300	< 1,400	< 1,600	--	< 1,900	88,000	--	< 2,200	< 2,100	< 1,200	< 1,300	< 1,700	< 3,100	< 1,600	< 810	< 2,700	< 1,400	ND	ND
SV8	12/3/2015	SV8-5	5.0	76	11	33	< 1.5	2.9	7.0	9.1	< 1.7	< 2.0	--	4.0	< 1.6	--	< 2.7	7.8	13	< 1.6	< 2.1	< 3.9	< 2.0	110	5.4	1.9	ND	3.2 (MC)
	12/3/2015	SV8-10	10.0	200	4.8	18	< 4.6	ND	< 5.0	< 5.0	< 5.5	< 6.2	--	35	< 5.2	--	< 8.7	< 8.6	9.7	< 5.2	< 6.8	< 12	< 6.2	7.8	< 11	< 5.5	ND	ND
SV9	12/2/2015	SV9-5	5.0	500	8.2	< 11	< 6.7	ND	< 7.3	< 7.3	< 8.0	< 9.0	--	100	840	--	< 13	< 12	23	< 7.5	< 9.9	< 18	< 9.0	< 4.7	20	< 8.0	ND	ND
	12/2/2015	SV9-10	10.0	160	< 2.6	< 5.0	< 2.9	ND	< 3.2	< 3.2	< 3.5	< 3.9	--	48	140	--	< 5.5	< 5.4	3.9	< 3.3	< 4.3	< 7.9	< 3.9	< 2.0	7.5	3.9	ND	ND
SV10	12/2/2015	SV10-5	5.0	630	30	< 19	< 11	ND	22	< 12	< 13	< 15	--	67	300	--	< 21	< 21	26	< 12	< 16	< 30	< 15	< 7.8	< 26	< 13	ND	ND
	12/2/2015	SV10-10	10.0	180	150	< 7.7	< 4.5	ND	4.8	< 4.9	< 5.3	< 6.1	--	41	68	--	< 8.5	59	11	< 5.0	< 6.6	< 12	7.1	< 3.1	< 11	5.9	ND	ND
SV11	12/3/2015	SV11-5	5.0	330	84	170	< 8.8	ND	43	< 9.5	< 10	< 12	--	81	< 9.8	--	< 16	< 16	13	< 9.8	< 13	< 24	< 12	< 6.1	27	< 10	ND	ND
	12/3/2015	SV11-10	10.0	770	900	< 38	< 23	ND	< 24	< 24	< 27	< 30	--	140	< 25	--	< 42	< 42	85	< 25	< 33	< 61	< 30	< 16	< 53	< 27	ND	ND
SV12	12/3/2015	SV12-5	5.0	300	40	63	< 7.1	ND	< 7.7	< 7.7	< 8.4	< 9.6	--	37	< 8.0	--	< 13	< 13	15	< 8.0	< 10	< 19	< 9.6	< 5.0	< 17	< 8.4	ND	ND
	12/3/2015	SV12-10	10.0	190	7.1	26	< 5.7	ND	< 6.2	< 6.2	< 6.7	< 7.6	--	58	< 6.4	--	< 11	< 11	7.8	< 6.4	< 8.3	< 15	< 7.6	< 4.0	< 13	< 6.7	ND	ND
SV13	12/2/2015	SV13-5	5.0	380	17	31	< 10	ND	< 11	< 11	< 12	< 14	--	65	< 12	--	< 20	< 19	48	< 12	< 15	< 28	< 14	< 7.3	160	< 12	ND	ND
	12/2/2015	SV13-10	10.0	420	36	44	< 6.7	ND	< 7.3	< 7.3	8.4	< 9.0	--	55	< 7.5	--	< 13	< 12	67	< 7.5	< 9.8	< 18	< 9.0	< 4.7	27	8.5	ND	ND
SV14	12/2/2015	SV14-5	5.0	590	83	140	< 14	ND	< 15	< 15	< 17	< 19	--	96	< 16	--	< 26	< 26	32	< 16	< 21	< 38	< 19	< 9.8	< 33	< 17	ND	ND
	12/2/2015	SV14-10	10.0	530	610	< 24	< 14	ND	< 15	< 15	28	< 19	--	64	< 16	--	< 26	< 26	71	< 16	< 20	< 37	< 19	< 9.7	110	23	ND	ND
SV15	12/2/2015	SV15-5	5.0	2,400	39	71	< 33	ND	< 36	< 36	< 40	< 45	--	56	310	--	< 63	< 62	< 34	< 37	< 49	< 90	< 45	< 23	< 79	< 40	ND	ND
	12/2/2015	SV15-8	8.0	460	120	190	< 9.5	ND	24	< 10	19	< 13	--	< 15	< 11	--	< 18	< 18	49	< 11	< 14	< 25	< 13	< 6.6	54	22	ND	ND
SV16	12/2/2015	SV16-5	5.0	630	59	28	< 17	ND	< 18	< 18	< 20	< 22	--	64	< 19	--	< 31	< 31	43	< 19	< 25	< 45	< 22	< 12	< 40	< 20	ND	ND
	12/2/2015	SV16-10	10.0	590	< 5.6	< 11	< 6.4	ND	13	< 7.0	8.9	< 8.7	--	77	< 7.2	--	< 12	< 12	20	< 7.2	< 9.5	< 17	< 8.7	5.4	27	8.5	ND	9 (1,1-DCA)
SV17	12/1/2015	SV17-5	5.0	400	130	120	31	ND	< 10	< 10	24	< 13	--	93	< 11	--	< 18	< 18	120	< 11	< 14	< 26	< 13	< 6.7	130	26	ND	ND
	12/1/2015	SV17-10	10.0	< 290	4,200	< 62	< 36	ND	< 39	< 39	< 43	< 49	--	< 58	< 40	--	120	< 67	180	< 40	< 53	< 97	< 49	< 25	< 86	< 43	ND	ND
SV18	12/2/2015	SV18-5	5.0	780	210	120	< 9.4	ND	29	< 10	< 11	< 13	--	100	< 11	--	< 18	< 17	32	< 10	< 14	< 25	< 13	83	43	< 11	ND	ND
	12/2/2015	SV18-10	10.0	380	84	280	< 6.1	20	< 6.6	< 6.6	8.9	< 8.2	--	72	< 6.8	--	< 11	< 11	39	< 6.8	< 8.9	< 16	< 8.2	57	27	9.2	ND	ND
SV19	12/1/2015	SV19-5	5.0	760	300	66	< 10	ND	14	< 11	< 12	< 14	--	150	< 11	--	< 19	< 19	59	< 11	< 15	< 28	< 14	650	68	13	ND	ND
	12/1/2015	SV19-10	10.0	180	760	110	< 11	ND	170	< 12	< 13	< 14	--	44	< 12	--	< 20	< 20	53	< 12	34	< 29	< 14	47	45	12	ND	ND
SV20	12/1/2015	SV20-5	5.0	960	120	120	< 31	ND	< 33	< 33	< 37	< 41	--	110	< 35	--	< 58	< 57	58	< 35	< 45	< 83	< 41	23	< 73	< 37	ND	ND
	12/1/2015	SV20-10	10.0	230	110	60	< 7.3	ND	25	< 7.9	9.9	< 9.7	--	54	< 8.1	--	< 14	< 13	65	< 8.1	< 11	< 19	< 9.7	19	40	11	ND	7.9 (MC)
SV21	12/1/2015	SV21-5	5.0	620	62	120	23	ND	70	< 12	< 13	< 14	--	83	< 12	--	< 20	< 20	54	< 12	17	< 29	< 14	48	< 26	< 13	ND	ND
	12/1/2015	SV21-10	10.0	290	42	260	< 7.6	ND	75	< 8.2	< 9.0	< 10	--	64	< 8.5	--	< 14	< 14	48	< 8.5	20	< 20	< 10	140	67	< 9	ND	ND
SV22	12/1/2015	SV22-5	5.0	< 11,000	< 1,200	< 2,400	< 1,400	ND	< 1,500	< 1,500	< 1,600	< 1,900	--	< 2,200	< 1,500	--	< 2,600	< 2,600	< 1,400	< 1,500	< 2,000	< 3,700	< 1,900	83,000	< 3,300	< 1,600	ND	ND
	12/1/2015	SV22-10	10.0	< 5,200	< 560	< 1,100	< 640	ND	1,500	1,200	< 760	< 860	--	< 1,000	< 710	--	< 1,200	< 1,200	< 660	< 710	< 940	< 1,700	< 860	35,000	< 1,500	< 760	ND	ND
SV23	11/30/2015	SV23-5	5.0	210	970	18	< 9.1	ND	110	33	16	< 12	--	47	< 10	--	< 17	< 17	35	< 10	< 13	< 25	< 12	14	36	11	ND	18 (1,4-DCB)
	11/30/2015	SV23-10	10.0	410	27	9.0	8.5	ND	< 5.7	< 5.7	< 6.3	< 7.1	--	110	< 5.9	--	< 9.9	< 9.8	34	< 5.9	< 7.7	< 14	< 7.1	< 3.7	18	6.0	ND	ND
SV24	11/30/2015	SV24-5	5.0	560	12	< 11	< 6.5	ND	< 7.0	< 7.0	< 7.7	< 8.7	--	120	< 7.3	--	< 12	< 12	32	< 7.3	< 9.5	< 17	< 8.7	< 4.5	18	< 7.7	ND	ND
	11/30/2015	SV24-10	10.0	490	100	74	< 6.3	ND	< 6.8	< 6.8	95	61	--	100	< 7.1	--	< 12	< 12	110	< 7.1	< 9.3	190	76	< 4.4	280	180	ND	ND
SV25	12/1/2015	SV25-5	5.0	1,200	110	< 120	< 71	ND	130	< 77	< 84	< 95	--	< 110	< 79	--	< 130	< 130	< 73	< 79	< 100	< 190	< 95	7,300	< 170	< 84	ND	ND
	12/1/2015	SV25-10	10.0	< 1200	160	< 240	< 140	ND	2,100	210	< 170	< 190	--	< 230	< 160	--	< 270	< 260	< 150	< 160	300	< 380	< 190	11,000	< 340	< 170	ND	ND
SV26	12/1/2015	SV26-5	5.0	290	240	130	< 3.5	ND	28	< 3.7	18	< 4.6	--	63	< 3.9	--	< 6.5	< 6.4	35	< 3.9	5.8	17	10	14	120	18	ND	ND
	12/1/2015	SV26-10	10.0	< 180	30	< 38	< 22	ND	26	< 24	< 27	38	--	< 36	< 25	--	< 42	< 42	25	< 25	< 33	180	82	72	110	45	ND	56 (CB)
SV27	11/30/2015	SV27-5	5.0	180	7.8	9.8	< 2.3	ND	< 2.5	< 2.5	< 2.8	< 3.1	4.7	26	< 2.6	--	< 4.4	< 4.3	44	< 2.6	5.3	< 6.3	< 3.1	< 1.6	15	2.8	ND	ND
	11/30/2015	SV27-10	10.0	110	9.8	16	< 4.2	ND	8.2	< 4.5	< 4.9	< 5.6	--	11	< 4.7	--	< 7.8	< 7.7	15	< 4.6	< 6.1	< 11	< 5.6	10	10	< 4.9	ND	ND
SV28R	12/3/2015	SV28R-5	5.0	220	18	17	< 5.7	ND	11	< 6.2	82	8.3	--	33	< 6.4	--	< 11	< 11	110	< 6.4	< 8.4	46	35	23	420	64	ND	ND
	12/3/2015	SV28R-10	10.0	27	< 1.3	< 2.5	< 1.5	ND	1.7	< 1.6	< 1.7	< 2.0	--	< 2.4	< 1.6	--	< 2.7	< 2.7	< 1.5	< 1.6	< 2.1	< 3.9	< 2.0	83	< 3.5	< 1.7	ND	7.5 (Freon 21)
SV29	11/30/2015	SV29-5	5.0	210	10	30	14	ND	< 3.0	< 3.0	11	< 3.7	--	31	< 3.1	--	< 5.2	< 5.1	27	< 3.1	< 4.0	7.3	< 3.7	< 1.9	200	5.8	ND	ND
	11/30/2015	SV29-10	10.0	160	35	63	< 2.7	ND	< 2.9	< 2.9	8.0	< 3.6	--	30	< 3.0	--	< 5.0	< 5.0	21	< 3.0	6.2	7.1	5.1	< 1.9	47	7.8	ND	3.4 (MC)
SV30	12/1/2015	SV30-5	5.0	110	12	41	7.3	ND	6.7	3.4	< 3.6	< 4.1	--	22	< 3.4	--	< 5.8	< 5.7	11	< 3.4	110	< 8.3	< 4.1	< 2.1	11	< 3.6	ND	ND
	12/1/2015	SV30-10	10.0	130	67	97	6.8	ND	28	13	8.0	< 8.9	--	30	< 7.4	--	< 12	< 12	24	< 7.4	23	< 18	< 8.9	33	21	8.6	ND	33 (1,1-DCE), 10 (Freon 11)
SV31	12/1/2015	SV31-5	5.0	75	13	21	8.5	ND	< 2.7	< 2.7	4.0	< 3.4	--	13	< 2.8	--	< 4.7	< 4.6	19	< 2.8	13	< 6.7	< 3.4	< 1.7	14	6.3	ND	3.5 (MC)
	12/1/2015	SV31-10	10.0	38	17	11	11	4	< 1.6	2.8	4.0	< 2.0	--	4.8	< 1.6	--	< 2.7	< 2.7	15	< 1.6	23	< 3.9	< 2.0	< 1.0	22	6.6	ND	ND
SV32	12/1/2015	SV32-5	5.0	150	14	8.0	19	ND	< 5.1	< 5.1	< 5.6	< 6.4	--	22	< 5.3	--	< 8.9	< 8.8	16	< 5.3	11	< 13	< 6.4	< 3.3	< 11	< 5.6	ND	ND
	12/1/2015	SV32-10	10.0	330	43	< 18	< 10	ND	< 11	< 11	< 12	< 14	--	49	< 12	--	< 19	< 19	17	< 12	< 15	< 28	< 14	< 7.2	< 24	< 12	ND	ND
SV33	12/1/2015	SV33-5	5.0	230	37	24	< 12	ND	< 13	< 13	< 14	< 16	--	34	< 14	--	< 23	< 22	20	< 14	< 18	< 33	< 16	< 8.5	30	< 14	ND	ND
	12/1/2015	SV33-10	10.0	< 200	< 22	< 43	< 25	ND	< 27	< 27	70	< 34	--	< 40	970	--	430	< 46	65	< 28	< 37	< 67	< 34	47	350	80	ND	ND
SV36	12/1/2015	SV36-5	5.0	77	5.7	< 7.2	< 4.3	ND	< 4.6	< 4.6	< 5.1	< 5.7	--	16	8.3	--	21	< 7.9	9.0	< 4.8	< 6.3	< 11	< 5.7	3.0	< 10	5.0	ND	ND
	12/1/2015	SV36-10	10.0	< 260	150	53	< 31	ND	< 34	< 34	210	< 42	--	< 51	370	--	2,500	< 58	41	< 35	< 46	< 85	< 42	< 22	< 75	250	ND	170 (BC)
SV38	11/30/2015	SV38-5	5.0	460	18	110	48	ND	< 9.7	< 9.7	< 11	< 12	--	85	< 10	--	< 17	< 17	24	< 10	< 13	< 24	< 12	25	< 21	< 11	ND	ND
	11/30/2015	SV38-10	10.0	310	150	320	< 22	ND	160	54	< 26	< 29	--	78	< 24	--	< 41	< 40	30	< 24	< 32	< 59	< 29	1,800	< 52	< 26	ND	ND
SV39	12/1/2015	SV39-5	5.0	290	17	110	4.1	ND	< 4.4	< 4.4	39	< 5.5	--	61	< 4.6	--	< 7.6	< 7.5	17	< 4.6	< 6.0	< 11	< 5.5	< 2.8	23	4.8	ND	ND
	12/1/2015	SV39-10	10.0	200	130	140	< 4.4	ND	38	63	99	23	--	49	< 4.9	--	< 8.2	< 8.1	71	< 4.9	9.0	62	43	7.5	220	65	ND	ND
SV40	12/1/2015	SV40-5	5.0	180	25	43	< 9.2	ND	42	10	< 11	< 12	--	29	38	--	27	< 17	14	< 10	13	< 25	< 12	24	< 22	< 11	ND	ND
	12/1/2015	SV40-10	10.0	< 270	50	< 57	< 34	ND	< 36	< 36	< 40	< 45	--	< 54	73	--	640	< 62	< 35	< 38	< 49	< 90	< 45	110	160	130	ND	ND
SV43	12/1/2015	SV43-5	5.0	76	25	15	12	ND	< 5.0	< 5.0	< 5.4	< 6.2	--	17	21	--	< 8.6	< 8.5	9.1	< 5.1	< 6.7	< 12	< 6.2	< 3.2	< 11	< 5.4	ND	ND
	12/1/2015	SV43-10	10.0	42	5.1	6.5	< 1.6	ND	1.8	< 1.8	< 1.9	< 2.2	--	15	< 1.8	--	7.5	< 3	4.9	< 1.8	< 2.4	< 4.4	< 2.2	< 1.1	5.3	1.9	ND	3.3 (BC)

Table 25
Soil Gas Risk Assessment Dataset
Human Health Risk Assessment Report
6701 - 6707 Shellmound Street, Emeryville, California

				VOCs ($\mu g/m^3$)																								
Sample Location	Date Sampled	Sample ID	Sample Depth (feet bgs)	Acetone	Benzene	Carbon disulfide	Chloroform	Chloro-methane	cis-1,2-DCE	trans-1,2-DCE	Ethyl-benzene	4-Ethyl-toluene	2-Hexanone	2-Butanone (MEK)	Methyl Isobutyl Ketone (MIBK)	Naphthalene	1,1,2,2-PCA	PCE	Toluene	1,1,1-TCA	TCE	1,2,4-Trimethyl-benzene	1,3,5- Trimethyl-benzene	Vinyl chloride	m,p-Xylene	o-Xylene	Xylenes	Other VOCs
SV44	12/1/2015	SV44-5	5.0	**220**	**50**	**60**	< 2.4	ND	< 2.6	< 2.6	**30**	**6.9**	--	**49**	< 2.7	**17**	< 4.6	< 4.5	**17**	< 2.7	< 3.6	**16**	**3.7**	< 1.7	**22**	**13**	ND	ND
	12/1/2015	SV44-10	10.0	**130**	**5.6**	**26**	< 3.2	ND	**21**	< 3.5	< 3.8	< 4.3	--	**28**	< 3.6	--	< 6.0	< 5.9	**4.7**	< 3.6	< 4.7	< 8.6	< 4.3	**3.1**	< 7.6	< 3.8	ND	ND
SV45	12/1/2015	SV45-5	5.0	**540**	**51**	**45**	**22**	ND	**6.6**	< 6.8	**10**	< 8.4	--	**110**	< 7.0	--	< 12	< 12	**14**	< 7.0	< 9.2	< 17	< 8.4	< 4.4	**50**	**15**	ND	ND
	12/1/2015	SV45-10	10.0	**170**	**16**	**7.7**	**4.9**	ND	**9.5**	< 2.9	**6.0**	< 3.5	--	**76**	< 2.9	--	< 4.9	< 4.9	**8.3**	< 2.9	< 3.9	**9.7**	**4.4**	< 1.8	**33**	**12**	ND	**3.4 (BC)**
SV47	12/3/2015	SV47-5	5.0	**250**	**13**	**22**	< 3.9	ND	**8.8**	< 4.2	< 4.6	< 5.2	--	**38**	< 4.3	--	< 7.2	< 7.2	**24**	**5.7**	< 5.7	< 10	< 5.2	< 2.7	**11**	< 4.6	ND	ND
SV7R	2/4/2016	SV7R-10	10.0	**43**	**18**	< 6.9	< 4.1	ND	< 4.4	< 4.4	**5.3**	< 5.4	--	**17.0**	**250**	--	< 7.6	< 7.5	**39**	< 4.5	< 6.0	< 11	< 5.4	< 2.8	**22**	**9.1**	--	**8.8 (Freon 12), 4.2 (MC)**
SV48	2/1/2016	SV48-5	5.0	**200**	**34**	< 6.7	< 3.9	ND	< 4.2	< 4.2	**36**	**12**	--	**21**	< 4.4	--	< 7.3	< 7.2	**210**	< 4.4	< 5.7	**27**	**12**	< 2.7	**150**	**52**	--	ND
	2/1/2016	SV48-10	10.0	**150**	**14**	**80**	< 2.8	ND	**8.2**	< 3	**9.2**	**5.3**	--	**44**	< 3.1	--	< 5.2	< 5.1	**64**	< 3.1	< 4.1	**11**	**3.9**	**3.2**	**39**	**12**	--	**5.8 (CB)**
SV49	2/1/2016	SV49-5	5.0	**90**	**59**	**6.6**	< 2.7	ND	**14**	< 2.9	**14**	**4.5**	--	**37**	< 3	--	< 5.1	< 5.0	**28**	< 3	**6.5**	**9.9**	**5**	< 1.9	**57**	**24**	--	ND
SV50	2/2/2016	SV50-5	5.0	**270**	**210**	**33**	< 14	ND	< 16	< 16	**160**	**20**	--	**40**	**220**	--	< 27	< 27	**1600**	< 16	< 21	< 39	< 19	**200**	**580**	**160**	--	ND
SV51	2/2/2016	SV51-5	5.0	< 650	**160**	< 140	< 81	ND	< 87	< 87	< 96	< 110	--	< 130	< 90	--	< 150	< 150	**260.0**	< 90	< 120	< 220	< 110	**6500.0**	< 190	< 96	--	ND
SV52	2/2/2016	SV52-5	5.0	**150**	**130**	< 14	< 8	ND	**72**	< 8.6	< 9.5	< 11	--	**38**	< 8.9	--	< 15	< 15	**53**	< 8.9	< 12	< 21	< 11	**220**	**33**	**10**	--	ND
SV53	2/2/2016	SV53-5	5.0	**140**	**79**	**55**	**2.1**	**2.6**	**24**	**3.2**	**20**	**5.8**	--	**32**	< 1.6	--	< 2.7	**3.2**	**200**	**1.8**	**13**	**11**	**5.5**	**110**	**75**	**25**	--	**3.3 (1,1-DCE), 3.9 (Freon 12), 4.1 (MC), 3.5 (Freon 11), 6.6 (VA)**
SV54	2/1/2016	SV54-5	5.0	< 670	**200**	< 140	< 82	ND	< 89	< 89	< 98	< 110	--	< 130	< 92	--	< 150	< 150	< 85	< 92	< 120	< 220	< 110	**5,100**	< 200	< 98	--	ND
SV55	2/2/2016	SV55-5	5.0	**480**	**79**	**20**	< 8.2	ND	< 8.9	< 8.9	< 9.7	< 11	--	**56**	< 9.2	--	< 15	< 15	**29**	< 9.2	< 12	< 22	< 11	**1200**	< 19	< 9.7	--	ND
SV56	2/2/2016	SV56-5	5.0	< 2,300	**270**	< 490	< 290	ND	**770**	< 310	< 340	< 380	--	< 460	< 320	--	< 540	< 530	< 290	< 320	< 420	< 770	< 380	**29000**	< 680	< 340	--	ND
SV57	2/2/2016	SV57-5	5.0	< 780	**190**	< 160	< 96	ND	**210**	< 100	< 110	< 130	--	< 160	< 110	--	< 180	< 180	**180**	< 110	< 140	< 260	< 130	**9400**	< 230	< 110	--	ND
SV58	2/3/2016	SV58-5	5.0	**99**	**38**	**18**	< 2.6	ND	< 2.8	< 2.8	**15**	**5.9**	--	**24**	< 2.9	--	< 4.9	< 4.9	**140**	< 2.9	< 3.8	**12**	**5**	< 1.8	**58**	**18**	--	**3.7 (Freon 12)**
	2/3/2016	SV58-10	10.0	**220**	**160**	**150**	< 4.7	ND	**18**	< 5.1	**22**	**9.9**	--	**63**	< 5.3	--	< 8.9	< 8.8	**89**	< 5.3	**11**	**15**	**7.5**	**6.4**	**64**	**22**	--	ND
SV59	2/3/2016	SV59-5	5.0	< 11,000	< 1,200	< 2,300	< 1,400	ND	**3300**	**1700**	< 1,600	< 1,900	--	< 2,200	< 1,500	--	< 2,600	< 2,600	< 1,400	< 1,500	< 2,000	< 3,700	< 1,900	**120000**	< 3,300	< 1,600	--	ND
	2/3/2016	SV59-10	10.0	< 3500	< 380	< 740	< 440	ND	**5600**	**2100**	< 520	< 590	--	< 700	< 490	--	< 820	< 810	< 450	< 490	**680**	< 1,200	< 590	**15000**	< 1,000	< 520	--	ND
SV60	2/3/2016	SV60-5	5.0	< 490	**110**	< 100	< 61	ND	**720**	**220**	< 72	< 82	--	< 98	**72**	--	< 110	< 110	**500**	< 68	< 89	< 160	< 82	**3100**	**170**	**86**	--	ND
	2/3/2016	SV60-10	10.0	< 130,000	< 14,000	< 27,000	< 16,000	ND	**98000**	**41000**	< 19,000	< 21,000	--	< 26,000	< 18,000	--	< 30,000	< 29,000	< 16,000	< 18,000	< 23,000	< 43,000	< 21,000	**920000**	< 38,000	< 19,000	--	ND
SV61	2/4/2016	SV61-5	5.0	**260**	**37**	< 21	< 12	ND	< 13	< 13	**300.0**	**200**	--	**25**	< 14	--	< 23	< 23	**820**	< 14	< 18	**500**	**240**	< 8.5	**1500**	**530**	--	ND
	2/4/2016	SV61-10	10.0	< 1,800	**340**	< 380	< 230	ND	< 240	< 240	< 270	**380**	--	< 360	< 250	--	< 420	< 420	**280**	< 250	< 330	**580**	**340**	**7500**	**1400**	**410**	--	ND
SV62	9/7/2016	SV62-5	5.0	**590**	**120**	**41**	**17**	< 15	< 15	--	**55**	< 18	< 15	**93**	< 15	< 39	--	--	**250**	--	< 20	**50**	**27**	< 9.4	**390**	**94**	--	ND
	9/7/2016	SV62-10	10.0	< 1200	< 130	< 250	< 150	< 170	< 160	--	< 180	< 200	< 170	< 240	< 170	< 420	--	--	< 150	--	< 220	< 400	< 200	< 100	< 350	< 180	--	ND
SV63	9/7/2016	SV63-5	5.0	**310**	**27**	**25**	**8.7**	< 3.7	< 3.5	--	**23**	**4.5**	**6.8**	**71**	**14**	< 9.3	--	--	**68**	--	< 4.8	**13**	**6.3**	< 2.3	**92**	**27**	--	ND
	9/7/2016	SV63-10	10.0	< 740	**170**	< 160	< 91	< 100	< 99	--	< 110	< 120	< 100	< 150	< 100	< 260	--	--	< 94	--	< 130	< 250	< 120	< 64	**620**	< 110	--	ND
SV64	9/7/2016	SV64-5	5.0	**190**	**12**	**9.8**	< 2.0	< 2.3	< 2.2	--	**7.5**	< 2.7	**2.8**	**40**	**3.9**	< 5.8	--	--	**36**	--	< 3.0	**6.6**	< 2.7	< 1.4	**26**	**7.6**	--	ND
	9/7/2016	SV64-10	10.0	**100**	**19**	**37**	< 6.6	< 7.4	< 7.1	--	**8.1**	< 8.8	< 7.4	**26**	< 7.4	< 19	--	--	**28**	--	< 9.7	< 18	< 8.8	< 4.6	**20**	< 7.8	--	ND
SV65	9/7/2016	SV65-5	5.0	**200**	**23**	< 6.2	< 3.6	< 4.1	< 3.9	--	**6.3**	< 4.9	< 4.0	**50**	**7.6**	< 10	--	--	**17**	--	< 5.3	< 9.7	< 4.9	< 2.5	**22**	**7.8**	--	ND
	9/7/2016	SV65-10	10.0	**73**	**83**	**11**	< 3.5	**4.6**	< 3.7	--	**15**	< 4.6	< 3.9	**19**	< 3.9	<9.9	--	--	**21**	--	< 5.1	< 9.3	< 4.6	< 0.94	**69**	**31**	--	ND
SV66	9/7/2016	SV66-5	5.0	**160**	**29**	**8.3**	**42**	**3.9**	**14**	--	**17**	< 4.0	< 3.3	**30**	< 3.3	< 8.6	--	--	**86**	--	**6.1**	**12**	**4.1**	< 2.1	**54**	**18**	--	ND
	9/7/2016	SV66-10	10.0	**190**	**120**	**29**	< 13	<15	**23**	--	< 16	< 18	< 15	**57**	< 15	< 38	--	--	**37**	--	< 19	< 36	< 18	< 9.3	**37**	< 16	--	ND
SV67	9/12/2016	SV67-5	5.0	**100**	**3900**	< 12	< 7.3	< 8.2	< 7.9	--	**1900**	**190**	< 8.2	**15**	< 8.2	< 130	--	--	**4700**	--	**50**	**320**	**180**	< 5.1	**3900**	**760**	--	**15 (1,1-DCA); 18 (1,2-DCA)**
	9/12/2016	SV67-10	10.0	< 59	**6.5**	< 12	< 7.3	< 8.2	< 7.9	--	< 8.6	< 9.8	< 8.1	< 12	< 8.1	< 21	--	--	< 7.5	--	< 11	< 20	< 9.8	< 5.1	< 17	< 8.6	--	ND

Notes:
Detections are in bold.
Only detected compounds are shown.
$\mu g/m^3$ = micrograms per cubic meter
<## = Not detected at or above laboratory reporting limit shown
ND = Not detected
\- = Not analyzed
-- = Not analyzed or not detected
bgs = below ground surface
CB = Chlorobenzene.
DCA = Dichloroethane.
DCB = Dichlorobenzene
DCE = Dichloroethene
PCA = tetrachloroethane
TCA = trichloroethane
DFA = Difluoroethane
PCE = Tetrachloroethene
TCE = Trichloroethene
BC = Benzyl chloride
Freon 11 = Trichlorofluoromethane
Freon 12 = Dichlorodifluoromethane
Freon 21 = Dichlorofluoromethane
MC = Methylene Chloride
VA = Vinyl Acetate
VOCs = Volatile organic compounds

Table 26
Soil Screening Evaluation
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical [a]	Maximum Detected Concentration [b] (mg/kg)			Direct-Exposure ESLs [c] (mg/kg)		Chemical of Potential Concern (COPC)? [d]		
	Construction	Utility Worker	Residential	Construction	Residential	Construction	Utility Worker	Residential
VOCs								
Acetone	2.3E-01	3.5E-02	ND	2.6E+05	5.9E+04	No	No	No
Benzene	2.4E-01	5.4E-02	ND	2.4E+01	2.3E-01	No	No	No
n-Butylbenzene	1.3E-01	ND	ND	5.8E+04	3.9E+03	No	No	No
sec-Butylbenzene	6.1E-01	ND	ND	1.2E+05	7.8E+03	No	No	No
tert-Butylbenzene	3.9E-02	ND	ND	1.2E+05	7.8E+03	No	No	No
Carbon Disulfide	6.3E-03	ND	ND	3.5E+03	7.7E+02	No	No	No
Chlorobenzene	1.1E-01	ND	ND	1.1E+03	2.5E+02	No	No	No
1,2-Dichloroethane	5.0E-01	ND	ND	3.7E+01	3.7E-01	No	No	No
1,2-Dichlorobenzene	4.0E-03	ND	ND	8.5E+03	2.0E+03	No	No	No
1,3-Dichlorobenzene	4.0E-03	ND	ND	8.5E+03	2.0E+03	No	No	No
cis-1,2-Dichloroethene	7.3E+01	2.4E+01	ND	8.2E+01	1.9E+01	No	No	No
trans-1,2-Dichloroethene	8.1E+01	8.3E+00	ND	6.8E+02	1.6E+02	No	No	No
Ethylbenzene	1.8E+00	1.4E-01	ND	4.8E+02	5.1E+00	No	No	No
Isopropylbenzene	4.5E-01	ND	ND	9.9E+03	1.9E+03	No	No	No
4-Isopropyltoluene	5.9E-01	ND	ND	4.1E+03	9.7E+02	No	No	No
2-Butanone (MEK)	2.0E-02	ND	ND	1.4E+05	3.1E+04	No	No	No
Methyl Isobutyl Ketone (MIBK)	1.0E-02	ND	ND	2.6E+04	5.8E+03	No	No	No
Naphthalene	2.8E+01	8.9E+00	ND	3.5E+02	3.3E+00	No	No	No
Propylbenzene	1.3E+00	ND	ND	2.4E+04	3.8E+03	No	No	No
Toluene	1.3E+00	2.6E-02	ND	4.1E+03	9.7E+02	No	No	No
Trichloroethene	2.0E+01	ND	ND	2.3E+01	1.2E+00	No	No	No
1,2,4-Trimethylbenzene	2.7E+00	ND	ND	2.4E+02	5.8E+01	No	No	No
1,3,5-Trimethylbenzene	2.6E+00	ND	ND	1.2E+04	7.8E+02	No	No	No
Vinyl chloride	1.4E+01	6.0E-02	ND	3.4E+00	8.2E-03	**Yes**	No	No
m,p-Xylene	5.3E-01	ND	ND	2.4E+03	5.5E+02	No	No	No
o-Xylene	7.1E-01	ND	ND	2.8E+03	6.5E+02	No	No	No
Total Xylenes	1.1E+01	3.8E-01	ND	2.4E+03	5.6E+02	No	No	No
SVOCs								
Acenaphthene	5.0E-01	ND	ND	1.0E+04	3.6E+03	No	No	No
Acenaphthylene	2.7E-01	ND	ND	1.0E+04	3.6E+03	No	No	No
Anthracene	1.2E+00	1.2E+00	ND	5.0E+04	1.8E+04	No	No	No
Benzo(a)anthracene	2.4E+00	2.4E+00	ND	1.6E+01	1.6E-01	No	No	No
Benzo(a)pyrene	3.0E+00	3.0E+00	ND	1.6E+00	1.6E-02	**Yes**	**Yes**	No
Benzo(b)fluoranthene	3.7E+00	3.7E+00	ND	1.6E+01	1.6E-01	No	No	No
Benzo(k)fluoranthene	1.5E+00	1.5E+00	ND	1.5E+02	1.6E+00	No	No	No
Benzo(g,h,i)perylene	1.4E+00	1.4E+00	ND	5.0E+03	1.8E+03	No	No	No
Chrysene	2.9E+00	2.9E+00	ND	1.5E+03	1.5E+01	No	No	No
Fluoranthene	4.4E+00	4.4E+00	ND	6.7E+03	2.4E+03	No	No	No
Fluorene	8.1E-01	8.1E-01	ND	6.7E+03	2.4E+03	No	No	No
Indeno(1,2,3-cd)pyrene	1.3E+00	1.3E+00	ND	1.6E+01	1.6E-01	No	No	No
2-Methylnaphthalene	9.2E+00	1.1E+00	ND	6.7E+02	2.4E+02	No	No	No
4-Methylphenol	1.0E+01	2.0E-01	ND	8.2E+04	6.3E+03	No	No	No
n-Nitrosodiphenylamine	1.7E+00	ND	ND	4.7E+02	1.1E+02	No	No	No
Phenanthrene	7.5E+00	5.5E+00	ND	5.0E+03	1.8E+03	No	No	No
Phenol	7.0E-01	ND	ND	9.8E+04	2.3E+04	No	No	No
Pyrene	4.5E+00	4.5E+00	ND	5.0E+03	1.8E+03	No	No	No
Bis(2-ethylhexyl)phthalate	4.0E-01	ND	ND	9.5E+02	3.9E+01	No	No	No
1,2,4-Trichlorobenzene	2.0E-01	2.0E-01	ND	3.1E+02	2.4E+01	No	No	No
PCBs/Pesticides								
Aroclor-1260	5.5E+01	5.5E+01	8.3E+00	9.9E-01	2.4E-01	**Yes**	**Yes**	**Yes**
Aroclor-1262	6.5E+00	4.8E+00	ND	9.9E-01	2.4E-01	**Yes**	**Yes**	No
Aroclor-1268	1.9E+00	ND	ND	9.9E-01	2.4E-01	**Yes**	No	No
Total PCBs	5.5E+01	5.5E+01	ND	5.6E+00	2.5E-01	**Yes**	**Yes**	No
DDT	4.2E-01	ND	ND	5.7E+01	1.9E+00	No	No	No
Metals								
Antimony	8.9E+00	7.5E+00	ND	1.4E+02	3.1E+01	No	No	No
Arsenic	4.9E+01	6.9E+00	7.0E+00	9.8E-01	6.7E-02	**Yes**	**Yes**	**Yes**
Barium	8.1E+02	6.1E+02	2.0E+02	3.0E+03	1.5E+04	No	No	No
Beryllium	5.9E-01	5.7E-01	5.7E-01	4.2E+01	1.5E+02	No	No	No
Cadmium	4.4E+01	4.4E+01	9.4E-01	4.3E+01	3.9E+01	**Yes**	**Yes**	No
Chromium	1.9E+02	1.8E+02	9.6E+01	5.3E+05	1.2E+05	No	No	No
Cobalt	2.8E+01	1.6E+01	1.6E+01	2.8E+01	2.3E+01	**Yes**	No	No
Copper	2.3E+03	2.3E+03	7.8E+01	1.4E+04	3.1E+03	No	No	No
Lead	1.0E+04	1.2E+03	2.1E+02	1.6E+02	8.0E+01	**Yes**	**Yes**	**Yes**
Mercury	9.8E-01	9.8E-01	9.8E-01	4.4E+01	1.3E+01	No	No	No
Molybdenum	2.7E+01	2.7E+01	ND	1.8E+03	3.9E+02	No	No	No
Nickel	3.5E+02	3.5E+02	1.2E+02	8.6E+01	8.2E+02	**Yes**	**Yes**	No
Selenium	6.0E+00	6.0E+00	ND	1.7E+03	3.9E+02	No	No	No
Silver	1.5E+01	ND	ND	1.8E+03	3.9E+02	No	No	No
Vanadium	1.1E+04	5.9E+01	5.8E+01	4.7E+02	3.9E+02	**Yes**	No	No
Zinc	6.2E+03	6.2E+03	2.4E+02	1.1E+05	2.3E+04	No	No	No
TPH								
Oil & Grease	4.5E+04	2.3E+04	ND	3.2E+04	1.1E+04	**Yes**	No	No
TPH-Gas	4.6E+02	1.2E+01	ND	2.8E+03	7.4E+02	No	No	No
TPH-Diesel	5.1E+03	5.1E+03	4.6E+02	8.8E+02	2.3E+02	**Yes**	**Yes**	**Yes**
TPH-Motor Oil	5.3E+03	1.9E+03	1.9E+03	3.2E+04	1.1E+04	No	No	No

Abbreviations:
ESL = environmental screening level
mg/kg = milligrams per kilogram
VOCs = volatile organic compounds
MEK = methyl ethyl ketone
SVOCs = semi-volatile organic compounds
DDT = Dichlorodiphenyltrichloroethane
PCBs = polychlorinated biphenyls
TPH = total petroleum hydrocarbons
ND = not detected

Footnotes:
[a] Only chemicals detected in at least one sample in at least one soil dataset are included in the table.
[b] Maximum detected concentrations from receptor-specific soil datasets (Tables 10 through 22).
[c] Environmental screening levels (ESLs) for direct exposure from Table S-1 (Direct Exposure Screening Levels) of RWQCB (2016).
Regional screening levels (RSLs) from USEPA (2016a) were used, where available, in the absence of ESL values; where RSLs were used, industrial soil values were used for the construction scenario.
Where no ESL or RSL was available, values for structurally similar chemicals were used. Surrogates were used for the following chemicals (surrogate chemicals follow in parentheses):
1,3-dichlorobenzene (1,2-dichlorobenzene), 4-isopropyltoluene (toluene), acenaphthylene (acenaphthene), benzo(g,h,i)perylene and phenanthrene (pyrene), aroclors 1262 and 1268 (aroclor 1260),
chromium (chromium III), and oil & grease (TPH - motor oil). Construction worker ESLs (or industrial soil RSLs) were also used to identify COPCs for maintenance/utility workers.
[d] Chemicals with a maximum detected concentration above the ESL for the corresponding receptor were identified as COPCs for that receptor.

References:

California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). 2016. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Lookup Tables and User Guide: Derivation and Application of Environmental Screening Levels (ESLs). Interim Final. February.
United States Environmental Protection Agency (USEPA). 2016a. Regional Screening Levels Table. May. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016

Table 27
Groundwater Screening Evaluation
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical [a]	Maximum Detected Concentration [b] (µg/L)	Vapor Intrusion ESLs (µg/L) [c]		Chemical of Potential Concern (COPC)? [d]	
		Residential	Commercial	Residential	Commercial
VOCs					
Benzene	8.1E+00	3.0E+01	2.6E+02	No	No
tert-Butyl Alcohol	2.3E+00	--	--	No	No
n-Butylbenzene	3.2E+01	3.7E+02	3.3E+03	No	No
sec-Butylbenzene	3.8E+01	3.7E+02	3.3E+03	No	No
Carbon Disulfide	3.9E+00	--	--	No	No
Chlorobenzene	4.4E+00	3.1E+04	2.6E+05	No	No
cis-1,2-Dichloroethene	9.2E+00	1.5E+04	1.3E+05	No	No
Ethylbenzene	4.5E+01	3.7E+02	3.3E+03	No	No
Isopropylbenzene	6.7E+01	3.7E+02	3.3E+03	No	No
4-Isopropyltoluene	1.3E+01	1.0E+05	--	No	No
Naphthalene	8.4E+01	1.8E+02	1.6E+03	No	No
n-Propylbenzene	8.7E+01	3.7E+02	3.3E+03	No	No
Toluene	1.9E+00	1.0E+05	--	No	No
1,2,4-Trimethylbenzene	3.5E+02	3.7E+02	3.3E+03	No	No
1,3,5-Trimethylbenzene	2.4E+01	3.7E+02	3.3E+03	No	No
Vinyl Chloride	7.3E+00	2.0E+00	1.7E+01	**Yes**	No
m,p-Xylene	5.3E+00	3.8E+04	--	No	No
o-Xylene	3.8E+00	3.8E+04	--	No	No
Total Xylenes	5.9E+01	3.8E+04	--	No	No

Abbreviations:
VOCs = volatile organic compounds
ESL = environmental screening level
µg/L = micrograms per liter
-- = not available or not applicable

Footnotes:
[a] Only chemicals detected in at least one sample are included in the table.
[b] Maximum detected concentrations from Table 23.
[c] Groundwater environmental screening levels (ESLs) for evaluation of potential vapor intrusion from Table GW-3 (Groundwater Vapor Intrusion Screening Levels) of RWQCB (2016). Values based on a fine-coarse soil mix were used based on information provided in PES (2016b and 2015b).
Where no ESL was available, values for structurally similar chemicals were used when possible. Surrogates were used for the following chemicals (surrogate chemicals follow in parentheses): n- and sec-butylbenzene, isopropylbenzene, n-propylbenzene, and 1,2,4- and 1,3,5-trimethylbenzene (ethylbenzene), 4-isopropyltoluene (toluene), and m,p- and o-xylene (total xylenes).
[d] Chemicals with a maximum detected concentration above the ESL for the corresponding receptor were identified as COPCs for that receptor. Chemicals without available ESLs or suitable surrogates are addressed in the uncertainty section of the risk assessment report.

References:

California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). 2016. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Lookup Tables and User Guide: Derivation and Application of Environmental Screening Levels (ESLs). Interim Final. February.
PES Environmental, Inc. (PES). 2016b. Northern Extant Onsite Building Investigation Report, 6701, 6705, and 6707 Shellmound Street, Emeryville California. September 30.
PES. 2015b. Conceptual Site Model, 6701-6707 Shellmound Street, Emeryville, California. February 6.

Table 28
Soil Gas Screening Evaluation
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical [a]	Maximum Detected Concentration [b] (µg/m³)	Vapor Intrusion ESLs (µg/m³) [c]		Chemical of Potential Concern (COPC)? [d]	
		Residential	Commercial	Residential	Commercial
VOCs					
Acetone	2.4E+03	1.6E+07	1.4E+08	No	No
Benzene	4.2E+03	4.8E+01	4.2E+02	**Yes**	**Yes**
Benzyl Chloride	1.7E+02	--	--	No	No
Carbon Disulfide	3.2E+02	--	--	No	No
Chlorobenzene	5.6E+01	2.6E+04	2.2E+05	No	No
Chloroform	4.8E+01	6.1E+01	5.3E+02	No	No
Chloromethane	2.0E+01	4.7E+04	3.9E+05	No	No
1,4-Dichlorobenzene	1.8E+01	1.3E+02	1.1E+03	No	No
1,1-Dichloroethane	1.5E+01	8.8E+02	7.7E+03	No	No
1,2-Dichloroethane	1.8E+01	5.4E+01	4.7E+02	No	No
1,1-Dichloroethene	3.3E+01	3.7E+04	3.1E+05	No	No
cis-1,2-Dichloroethene	9.8E+04	4.2E+03	3.5E+04	**Yes**	**Yes**
trans-1,2-Dichloroethene	4.1E+04	4.2E+04	3.5E+05	No	No
Ethylbenzene	1.9E+03	5.6E+02	4.9E+03	**Yes**	No
4-Ethyltoluene	3.8E+02	1.6E+05	1.3E+06	No	No
Freon 11	1.0E+01	--	--	No	No
Freon 12	8.8E+00	--	--	No	No
Freon 21	7.5E+00	--	--	No	No
2-Hexanone	6.8E+00	--	--	No	No
Methylene Chloride	7.9E+00	5.1E+02	1.2E+04	No	No
2-Butanone (MEK)	1.5E+02	2.6E+06	2.2E+07	No	No
Methyl Isobutyl Ketone (MIBK)	8.8E+04	1.6E+06	1.3E+07	No	No
Naphthalene	1.7E+01	4.1E+01	3.6E+02	No	No
1,1,2,2-Tetrachloroethane	2.5E+03	2.4E+01	2.1E+02	**Yes**	**Yes**
Tetrachloroethene	5.9E+01	2.4E+02	2.1E+03	No	No
Toluene	4.7E+03	1.6E+05	1.3E+06	No	No
1,1,1-Trichloroethane	5.7E+00	5.2E+05	4.4E+06	No	No
Trichloroethene	6.8E+02	2.4E+02	3.0E+03	**Yes**	No
1,2,4-Trimethylbenzene	5.8E+02	5.6E+02	4.9E+03	**Yes**	No
1,3,5-Trimethylbenzene	3.4E+02	5.6E+02	4.9E+03	No	No
Vinyl Acetate	6.6E+00	--	--	No	No
Vinyl Chloride	9.2E+05	4.7E+00	1.6E+02	**Yes**	**Yes**
m,p-Xylene	3.9E+03	5.2E+04	4.4E+05	No	No
o-Xylene	7.6E+02	5.2E+04	4.4E+05	No	No
Total Xylenes	3.8E+01	5.2E+04	4.4E+05	No	No

Abbreviations:

VOCs = volatile organic compounds
ESL = environmental screening level
µg/m³ = micrograms per cubic meter
-- = not available

Footnotes:

[a] Only chemicals detected in at least one sample are included in the table.
[b] Maximum detected concentrations from Table 25.
[c] Soil gas environmental screening levels (ESLs) for evaluation of potential vapor intrusion from Table SG-1 (Subslab and Soil Gas Vapor Intrusion Human Health Risk Screening Levels) of RWQCB (2016). Where no ESL was available, values for structurally similar chemicals were used when possible. Surrogates were used for the following chemicals (surrogate chemicals follow in parentheses): 4-ethyltoluene (toluene), 1,2,4- and 1,3,5-trimethylbenzene (ethylbenzene), and m,p- and o-xylene (total xylenes).
[d] Chemicals with a maximum detected concentration above the ESL for the corresponding receptor were identified as COPCs for that receptor. Chemicals without available ESLs or suitable surrogates are addressed in the uncertainty section of the risk assessment report.

References:

California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). 2016. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Lookup Tables and User Guide: Derivation and Application of Environmental Screening Levels (ESLs). Interim Final. February.

Table 29
Toxicity Values
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical of Potential Concern (COPC)	Gastrointestinal Absorption Factor	Toxicity Values [a]														
		Cancer					Noncancer									
		Oral Slope Factor		Dermal Slope Factor [b]	Inhalation Unit Risk		Oral Reference Dose		Dermal Reference Dose [b]	Reference Concentration		Subchronic Values [c]				
	ABSgi	SFo $(mg/kg\text{-}d)^{-1}$	Source	SFd $(mg/kg\text{-}d)^{-1}$	IUR $(\mu g/m^3)^{-1}$	Source	RfDo (mg/kg-d)	Source	RfDd (mg/kg-d)	RfC or REL $(\mu g/m^3)$	Source	UF	RfDo (mg/kg-d)	RfDd [b] (mg/kg-d)	UF	RfC $(\mu g/m^3)$
VOCs																
Benzene	1	1.0E-01	CalEPA, 2016	1.0E-01	2.9E-05	CalEPA, 2016	4.0E-03	USEPA, 2016a	4.0E-03	3.0E+00	CalEPA, 2016	3	1.2E-02	1.2E-02	1	3.0E+00
tert-Butyl Alcohol	1	--	--	--	--	--	2.0E+00	USEPA, 2016a	2.0E+00	3.0E+04	USEPA, 2016a	--	--	--	--	--
n-Butylbenzene	1	--	--	--	--	--	5.0E-02	USEPA, 2016a	5.0E-02	--	--	3	1.5E-01	1.5E-01	--	--
sec-Butylbenzene	1	--	--	--	--	--	1.0E-01	USEPA, 2016a	1.0E-01	--	--	--	--	--	--	--
Carbon Disulfide	1	--	--	--	--	--	1.0E-01	USEPA, 2016a	1.0E-01	8.0E+02	CalEPA, 2016	--	--	--	--	--
Chlorobenzene	1	--	--	--	--	--	2.0E-02	USEPA, 2016a	2.0E-02	1.0E+03	CalEPA, 2016	10	2.0E-01	2.0E-01	--	--
cis-1,2-Dichloroethene	1	--	--	--	--	--	2.0E-03	USEPA, 2016a	2.0E-03	--	--	10	2.0E-02	2.0E-02	--	--
Ethylbenzene	1	1.1E-02	CalEPA, 2016	1.1E-02	2.5E-06	CalEPA, 2016	1.0E-01	USEPA, 2016a	1.0E-01	2.0E+03	CalEPA, 2016	10	1.0E+00	1.0E+00	--	--
Isopropylbenzene	1	--	--	--	--	--	1.0E-01	USEPA, 2016a	1.0E-01	4.0E+02	USEPA, 2016a	3	3.0E-01	3.0E-01	3	1.2E+03
4-Isopropyltoluene	1	--	--	--	--	--	8.0E-02	Toluene	8.0E-02	3.0E+02	Toluene	10	8.0E-01	8.0E-01	10	3.0E+03
Naphthalene	1	1.2E-01	CalEPA, 2016	1.2E-01	3.4E-05	CalEPA, 2016	2.0E-02	USEPA, 2016a	2.0E-02	9.0E+00	CalEPA, 2016	10	2.0E-01	2.0E-01	--	--
Propylbenzene	1	--	--	--	--	--	1.0E-01	USEPA, 2016a	1.0E-01	1.0E+03	USEPA, 2016a	10	1.0E+00	1.0E+00	10	1.0E+04
1,1,2,2-Tetrachloroethane	1	2.0E-01	CalEPA, 2016	2.0E-01	5.8E-05	CalEPA, 2016	2.0E-02	USEPA, 2016a	2.0E-02	--	--	3	6.0E-02	6.0E-02	--	--
Toluene	1	--	--	--	--	--	8.0E-02	USEPA, 2016a	8.0E-02	3.0E+02	CalEPA, 2016	10	8.0E-01	8.0E-01	10	3.0E+03
Trichloroethene	1	5.9E-03	CalEPA, 2016	5.9E-03	2.0E-06	CalEPA, 2016	5.0E-04	USEPA, 2016a	5.0E-04	6.0E+02	CalEPA, 2016	1	5.0E-04	5.0E-04	--	--
1,2,4-Trimethylbenzene	1	--	--	--	--	--	1.0E-02	IRIS	1.0E-02	6.0E+01	IRIS	3	3.0E-02	3.0E-02	10	6.0E+02
1,3,5-Trimethylbenzene	1	--	--	--	--	--	1.0E-02	USEPA, 2016a	1.0E-02	6.0E+01	IRIS	10	1.0E-01	1.0E-01	3	1.8E+02
Vinyl Chloride	1	2.7E-01	CalEPA, 2016	2.7E-01	7.8E-05	CalEPA, 2016	3.0E-03	USEPA, 2016a	3.0E-03	1.0E+02	USEPA, 2016a	--	--	--	--	--
m,p-Xylene	1	--	--	--	--	--	2.0E-01	USEPA, 2016a	2.0E-01	1.0E+02	USEPA, 2016a	--	--	--	3	3.0E+02
o-Xylene	1	--	--	--	--	--	2.0E-01	USEPA, 2016a	2.0E-01	1.0E+02	USEPA, 2016a	--	--	--	3	3.0E+02
Total Xylenes	1	--	--	--	--	--	2.0E-01	USEPA, 2016a	2.0E-01	7.0E+02	CalEPA, 2016	--	--	--	--	--
SVOCs																
Benzo(a)pyrene	1	2.9E+00	CalEPA, 2016	2.9E+00	1.1E-03	CalEPA, 2016	--	--	--	--	--	--	--	--	--	--
PCBs/Pesticides																
Aroclor-1260	1	2.0E+00	USEPA, 2016a	2.0E+00	5.7E-04	USEPA, 2016a	--	--	--	--	--	--	--	--	--	--
Aroclor-1262	1	2.0E+00	Aroclor 1260	2.0E+00	5.7E-04	Aroclor 1260	--	--	--	--	--	--	--	--	--	--
Aroclor-1268	1	2.0E+00	Aroclor 1260	2.0E+00	5.7E-04	Aroclor 1260	--	--	--	--	--	--	--	--	--	--
Metals																
Arsenic	1	9.5E+00	CalEPA, 2016	9.5E+00	3.3E-03	CalEPA, 2016	3.5E-06	CalEPA, 2016	3.5E-06	1.5E-02	CalEPA, 2016	--	--	--	--	--
Barium	0.07	--	--	--	--	--	2.0E-01	USEPA, 2016a	1.4E-02	5.0E-01	USEPA, 2016a	--	--	--	--	--
Cadmium	0.001	--	--	--	4.2E-03	CalEPA, 2016	5.0E-04	CalEPA, 2016	5.0E-07	2.0E-02	CalEPA, 2016	--	--	--	--	--
Chromium	0.013	--	--	--	--	--	1.5E+00	USEPA, 2016a	2.0E-02	--	--	--	--	--	--	--
Cobalt	1	--	--	--	9.0E-03	--	3.0E-04	USEPA, 2016a	3.0E-04	6.0E-03	USEPA, 2016a	--	--	--	--	--
Copper	1	--	--	--	--	--	4.0E-02	USEPA, 2016a	4.0E-02	--	--	--	--	--	--	--
Lead	1	8.5E-03	CalEPA, 2016	8.5E-03	1.2E-05	CalEPA, 2016	--	--	--	--	--	--	--	--	--	--
Mercury	0.07	--	--	--	--	--	1.6E-04	CalEPA, 2016	1.1E-05	3.0E-02	CalEPA, 2016		--	--	--	--
Molybdenum	1	--	--	--	--	--	5.0E-03	USEPA, 2016a	5.0E-03	--	--	--	--	--	--	--
Nickel	0.04	--	--	--	2.6E-04	CalEPA, 2016	1.1E-02	CalEPA, 2016	4.4E-04	1.4E-02	CalEPA, 2016	--	--	--	1	1.4E-02
Selenium	1	--	--	--	--	--	5.0E-03	CalEPA, 2016	5.0E-03	2.0E+01	CalEPA, 2016	--	--	--	1	2.0E+01
Vanadium	0.026	--	--	--	--	--	5.0E-03	USEPA, 2016a	1.3E-04	1.0E-01	USEPA, 2016a	10	5.0E-02	1.3E-03	10	1.0E+00
Zinc	1	--	--	--	--	--	3.0E-01	USEPA, 2016a	3.0E-01	--	--	--	--	--	--	--
TPH																
Oil & Grease	1	--	--	--	--	--	1.7E-01	TPH-Motor Oil	1.7E-01	--	--	--	--	--	--	--
TPH-Diesel, soil	1	--	--	--	--	--	2.0E-02	RWQCB, 2016	2.0E-02	1.3E+02	RWQCB, 2016	--	--	--	--	--
TPH-Diesel, water	1	--	--	--	--	--	3.0E-02	RWQCB, 2016	3.0E-02	1.3E+02	RWQCB, 2016	--	--	--	--	--
TPH-Motor Oil, soil	1	--	--	--	--	--	1.7E-01	RWQCB, 2016	1.7E-01	--	--	--	--	--	--	--
TPH-Motor Oil, water	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Abbreviations:
mg/kg-day = milligrams per kilogram body weight per day
$\mu g/m^3$ = micrograms per cubic meter
UF = uncertainty factor
-- = not available or applicable
VOCs = volatile organic compounds
SVOCs = semi-volatile organic compounds
PCBs = polychlorinated biphenyls
TPH = total petroleum hydrocarbons
IRIS = Integrated Risk Information System (USEPA)

Footnotes:
[a] Toxicity values (for chemicals other than TPH) were obtained from the following sources of information in order of priority:
CalEPA (2016), USEPA (2016a). Values for TPH-diesel are from RWQCB (2016). Values for trimethylbenzenes were recently updated by USEPA in IRIS (September, 2016); these values supersede those from USEPA (2016a).
sec-Butyl alcohol values were used for tert-butyl alcohol in the absence of chemical-specific values. Other chemicals used as surrogates for toxicity values are listed in the "Source" columns.
[b] Dermal RfD = Oral RfD x GIABS. Dermal SF = Oral SF / GIABS. Gastrointestinal absorption factors from USEPA (2004b).
[c] Subchronic values were calculated by removing any subchronic-to-chronic extrapolation from the final RfD/RfC (RfD x UF or RfC x UF).

References:

California Environmental Protection Agency (CalEPA). 2016. Office of Environmental Health Hazard Assessment (OEHHA). Toxicity Criteria Database. Online database, accessed November 2016. http://oehha.ca.gov/chemicals
California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). 2016. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Lookup Tables and User Guide: Derivation and Application of Environmental Screening Levels (ESLs). Interim Final. February.
United States Environmental Protection Agency (USEPA). 2016a. Regional Screening Levels Table. May. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016
USEPA. 2004b. Risk Assessment Guidance for Superfund (RAGS) Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP. July 2004.

Table 30
Exposure Intake Assumptions
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Hypothetical Receptor/Parameter	Acronym	Value	Unit	Rationale	Reference
Future Construction Worker Receptor					
Averaging Time - Noncarcinogens	ATnc	365	days	ATn = ED x 365 days.	CalEPA, 2014
Averaging Time - Carcinogens	ATc	25,550	days	ATc = Lifetime x 365 days.	CalEPA, 2014
Lifetime	--	70	years	Default value.	CalEPA, 2014
Body Weight	BW	80	kg	Default value.	CalEPA, 2014
Exposure Duration	ED	1	year	Default value.	CalEPA, 2014
Exposure Frequency	EF	250	days/year	Default value.	CalEPA, 2014
Exposure Time	ET	8	hours/day	Standard work day.	--
Soil Ingestion Rate	IRs	330	mg/day	Default value.	CalEPA, 2014
Particulate Emission Factor	PEF	1.0E+06	m^3/kg	Default value.	CalEPA, 2014
Skin Surface Area	SA	6,032	cm^2/day	Default value.	CalEPA, 2014
Soil Adherence Factor	AF	0.8	mg/cm^2	Default value.	CalEPA, 2014
Event Duration	t_{event}	1	hours/event	Best professional judgement in the absence of a recommended value.	--
Event Frequency	EV	1	events/day	Best professional judgement in the absence of a recommended value.	--
Future Utility/Maintenance Worker Receptor					
Averaging Time - Noncarcinogens	ATnc	9,125	days	ATn = ED x 365 days.	CalEPA, 2014
Averaging Time - Carcinogens	ATc	25,550	days	ATc = Lifetime x 365 days.	CalEPA, 2014
Lifetime	--	70	years	Default value.	CalEPA, 2014
Body Weight	BW	80	kg	Default value.	CalEPA, 2014
Exposure Duration	ED	25	year	Default value for commercial/industrial worker.	CalEPA, 2014
Exposure Frequency	EF	12	days/year	Best professional judgement in the absence of a recommended value. Assumes worker visits the site once per month to perform maintenance activities.	--
Exposure Time	ET	8	hours/day	Standard work day.	--
Soil Ingestion Rate	IRs	330	mg/day	Default value for construction worker.	CalEPA, 2014
Particulate Emission Factor	PEF	1.0E+06	m^3/kg	Default value for construction worker.	CalEPA, 2014
Skin Surface Area	SA	6,032	cm^2/day	Default value for construction worker.	CalEPA, 2014
Soil Adherence Factor	AF	0.8	mg/cm^2	Default value for construction worker.	CalEPA, 2014
Event Duration	t_{event}	1	hours/event	Best professional judgement in the absence of a recommended value.	--
Event Frequency	EV	1	events/day	Best professional judgement in the absence of a recommended value.	--
Conversion Factor	CF1	1E-06	kg/mg		--
Conversion Factor	CF2	1/24	days/hour		--
Conversion Factor	CF3	1.0E+03	µg/mg		--
Conversion Factor	CF4	1.0E-03	L/cm^3		--
Future Resident Receptor					
Averaging Time - Noncarcinogens	ATnc	2,190	days	ATn = EDc x 365 days.	CalEPA, 2014
Averaging Time - Carcinogens	ATc	25,550	days	ATc = Lifetime x 365 days.	CalEPA, 2014
Lifetime	--	70	years	Default value.	CalEPA, 2014
Body Weight	BWc	15	kg	Default value.	CalEPA, 2014
Body Weight	BWa	80	kg	Default value.	CalEPA, 2014
Exposure Duration, total	ED	26	years	Sum of child and adult resident exposure durations.	CalEPA, 2014
Exposure Duration, child	EDc	6	years	Default value.	CalEPA, 2014
Exposure Duration, adult	EDa	20	years	Default value.	CalEPA, 2014
Exposure Frequency	EF	350	days/year	Default value.	CalEPA, 2014
Exposure Time	ET	24	hours/day	Default value. Defined herein as exposure time rather than exposure duration (hours/day) to better distinguish from exposure duration (in years).	CalEPA, 2014
Soil Ingestion Rate, child	IRs,c	200	mg/day	Default value.	CalEPA, 2014
Soil Ingestion Rate, adult	IRs,a	100	mg/day	Default value.	CalEPA, 2014
Particulate Emission Factor	PEF	1.4E+09	m^3/kg	Default value.	CalEPA, 2014
Skin Surface Area, child	SA,c	2,900	cm^2/day	Default value.	CalEPA, 2014
Skin Surface Area, adult	SA,a	6,032	cm^2/day	Default value.	CalEPA, 2014
Soil Adherence Factor, child	AF,c	0.2	mg/cm^2	Default value.	CalEPA, 2014
Soil Adherence Factor, adult	AF,a	0.07	mg/cm^2	Default value.	CalEPA, 2014
Age-Adjusted for Carcinogens					
Age-adjusted soil ingestion factor	IFSadj	105	mg-year/kg-day	(EDc*IRs,c/BWc) + (EDa*IRs,a/BWa)	USEPA, 2016b
Age-adjusted soil dermal contact factor	DFSadj	338	mg-year/kg-day	(EDc*AFc*SAs,c/BWc) + (EDa*AFa*SAs,a/BWa)	USEPA, 2016b

Table 30
Exposure Intake Assumptions
Human Health Risk Assessment Report
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Emeryville, California

Hypothetical Receptor/Parameter	Acronym	Value	Unit	Rationale	Reference
Future Commerical/Industrial Worker Receptor					
Averaging Time - Noncarcinogens	ATn	9,125	days	ATn = ED x 365 days.	CalEPA, 2014
Averaging Time - Carcinogens	ATc	25,550	days	ATc = Lifetime x 365 days.	CalEPA, 2014
Lifetime	-	70	years	Default value.	CalEPA, 2014
Exposure Duration	ED	25	years	Default value.	CalEPA, 2014
Exposure Frequency	EF	250	days/year	Default value.	CalEPA, 2014
Exposure Time	ET	8	hours/day	Default value. Defined herein as exposure time rather than exposure duration (hours/day) to better distinguish from exposure duration (in years).	CalEPA, 2014
Chemical-Specific					
Dermal Absorption Fraction	ABS	-	-	Chemical-specific (USEPA, 2004b, Exhibit 3-4).	USEPA, 2004b
	VOCs	0	--	Volatile organic compounds	USEPA, 2004b
	PAHs	0.13	--	Benzo(a)pyrene and other polycyclic aromatic hydrocarbons (PAHs)	USEPA, 2004b
	PCBs	0.14	--	Total Polychlorinated Biphenyls (PCBs)	USEPA, 2004b
	As	0.03	--	Arsenic	USEPA, 2004b
	Cd	0.001	--	Cadmium	USEPA, 2004b
	Other Metals	0	--	Cobalt, lead, nickel, vanadium	USEPA, 2004b
	TPH-d	0.1	--	Total petroleum hydrocarbons as diesel; value for semivolatile organic compounds (SVOCs)	USEPA, 2004b
Volatilization Factor, soil	VF	-	-	Chemical-specific (RWQCB, 2016); values used for Environmental Screening Level (ESL) calculations.	RWQCB, 2016
	VC	9.6E+02	m^3/kg	Vinyl chloride	RWQCB, 2016
	TPH-d	2.0E+03	m^3/kg	Total petroleum hydrocarbons as diesel	RWQCB, 2016
Conversion Factors					
Conversion Factor	CF1	1E-06	kg/mg		--
Conversion Factor	CF2	1/24	days/hour		--
Conversion Factor	CF3	1.0E+03	µg/mg		--
Conversion Factor	CF4	1.0E-03	L/cm^3		--

Abbreviations:
cm^2 = centimeters squared; cm^3 = centimeters cubed; kg = kilograms; mg = milligrams ; m^3 = cubic meters; µg = micrograms; L = liters
- = Chemical-specific
-- = Not applicable

References:

California Environmental Protection Agency (CalEPA). 2014. Human Health Risk Assessment (HHRA) Note Number: 1. Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities. September 30.
California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). 2016. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Lookup Tables and User Guide: Derivation and Application of Environmental Screening Levels (ESLs). Interim Final. February.
United States Environmental Protection Agency (USEPA). 2004b. Risk Assessment Guidance for Superfund (RAGS) Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP. July 2004.
USEPA. 2016b. Regional Screening Level User's Guide. May. https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide-may-2016

Table 31
Soil Exposure Point Concentrations
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical of Potential Concern (COPC)	Exposure Point Concentrations (EPCs) [a] (mg/kg)		
	Construction Worker (EPCc) [b]	Maintenance/Utility Worker (EPCm) [c]	Resident (EPCr) [d]
VOCs			
Vinyl Chloride	1.8	--	--
SVOCs			
Benzo(a)pyrene	0.47	3.0	--
PCBs/Pesticides			
Aroclor-1260	13	25	3.5
Aroclor-1262	1.7	4.8	--
Aroclor-1268	1.9	--	--
Metals			
Arsenic	11	6.6	6.8
Cadmium	5.2	15	--
Cobalt	11	--	--
Lead	444	247	113
Nickel	81	188	--
Vanadium	937	--	--
TPH			
Oil & Grease	15,245	--	--
TPH-Diesel	213	909	157

Abbreviations:
mg/kg = milligrams per kilogram
VOCs = volatile organic compounds
SVOCs = semi-volatile organic compounds
PCBs = polychlorinated biphenyls
TPH = total petroleum hydrocarbons
-- = not applicable; not a COPC for the applicable receptor

Footnotes:
[a] Lesser of the maximum and the upper confidence limit on the unknown mean recommended from ProUCL software (USEPA, 2016c). See Appendix A for ProUCL outputs. Maximum concentrations were used as the EPCs for chemicals with fewer than four detected values.
[b] Construction workers were assumed to have potential exposure to soil across the site to an excavation depth of 12 feet. All soil samples collected from 0-12 feet bgs were therefore included in the construction worker soil EPC calculations.
[c] Maintenance/utility workers were assumed to have potential exposure to soil to an excavation depth of 12 feet in locations of utility trenches. Maintenance/utility worker soil EPC calculations therefore include soil samples collected from 0-12 feet bgs from locations of utility trenches.
[d] Residents were assumed to have potential exposure to surface soil (0 - 2 feet) in locations outside of the footprint of the planned building and concrete walkways/pavers. Resident soil EPC calculations therefore includesurface soil samples collected from 0-2 feet bgs from locations outside of the footprint of the planned building and concrete walkways/pavers.

References:
USEPA. 2016c. ProUCL Version 5.1, A Statistical Software. National Exposure Research Lab, EPA, Las Vegas, Nevada. Updated June 20, 2016. Available for download at: https://www.epa.gov/land-research/proucl-software

Table 32
Risk Characterization for the Future Construction Worker Receptor - Soil
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical of Potential Concern (COPC)	Noncancer Hazard Quotient (HQ) [a,d]				Lifetime Excess Cancer Risk (LECR) [b,d]			
	Soil Ingestion	Dermal Soil Contact	Dust / Vapor Inhalation	Multi-Pathway	Soil Ingestion	Dermal Soil Contact	Dust / Vapor Inhalation	Multi-Pathway
VOCs								
Vinyl Chloride	0.0017	0	0.0042	0.0058	1.9E-08	0.0E+00	4.7E-07	4.9E-07
SVOCs								
Benzo(a)pyrene	--	--	--	--	5.4E-08	1.0E-07	1.7E-09	1.6E-07
PCBs								
Aroclor-1260	--	--	--	--	1.0E-06	2.1E-06	2.4E-08	3.2E-06
Aroclor-1262	--	--	--	--	1.4E-07	2.8E-07	3.1E-09	4.2E-07
Aroclor-1268	--	--	--	--	1.5E-07	3.1E-07	3.5E-09	4.7E-07
Metals								
Arsenic	9.0	4.0	0.17	13	4.3E-06	1.9E-06	1.2E-07	6.3E-06
Cadmium	0.029	0.43	0.059	0.52	--	--	7.1E-08	7.1E-08
Cobalt	0.10	0	0.42	0.53	--	--	3.3E-07	3.3E-07
Lead	--	--	--	--	1.5E-07	0.0E+00	1.7E-08	1.7E-07
Nickel	0.021	0	1.3	1.3	--	--	6.8E-08	6.8E-08
Vanadium	0.053	0	0.21	0.27	--	--	--	--
TPH								
Oil & Grease	0.25	0.37	--	0.62	--	--	--	--
TPH-Diesel	0.030	0.044	0.19	0.26	--	--	--	--
Total HI or LECR [c]	10	5	2	17	6.E-06	5.E-06	1.E-06	1.E-05

Abbreviations:
-- = not applicable; toxicity or pathway-specific value not available
HI = hazard index
VOCs = volatile organic compounds
SVOCs = semi-volatile organic compounds
PCBs = polychlorinated biphenyls
TPH = total petroleum hydrocarbons

Footnotes:
[a] HQ soil ingestion= [(EPCc x IRs x EF x ED x CF1) / (BW x ATnc)] / RfDo
HQ dermal soil contact = [(EPCc x SA x AF x ABS x EF x ED x CF1) / (BW x ATnc)] / RfDd
HQ dust inhalation (non-volatiles) = [(EPCc x 1/PEF x ET x EF x ED x CF2 x CF3) / ATnc] / RfCi
HQ dust and vapor inhalation (volatiles) = [(EPCc x (1/PEF + 1/VF) x ET x EF x ED x CF2 x CF3) / ATnc] / RfCi
HQ multi-pathway = sum of HQs for soil ingestion, dermal soil contact, and dust and/or vapor inhalation
[b] LECR soil ingestion= [(EPCc x IRs x EF x ED x CF1) / (BW x ATc)] x SFo
LECR dermal soil contact = [(EPCc x SA x AF x ABS x EF x ED x CF1) / (BW x ATc)] x SFd
LECR dust inhalation (non-volatiles) = [(EPCc x 1/PEF x ET x EF x ED x CF2 x CF3) / ATc] * IUR
LECR dust and vapor inhalation (volatiles) = [(EPCc x (1/PEF + 1/VF) x ET x EF x ED x CF2 x CF3) / ATc] * IUR
LECR multi-pathway = sum of LECRs for soil ingestion, dermal soil contact, and dust and/or vapor inhalation
[c] Total HI or LECR = sum of chemical-specific HQs or LECRs, respectively, for each pathway or for all pathways combined (i.e., multi-pathway)
[d] Refer to Table 29 for toxicity values and sources. Refer to Tables 30 and 31 for explanation of acronyms used in equations.

Table 33
Risk Characterization for the Future Maintenance / Utility Worker Receptor - Soil
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical of Potential Concern (COPC)	Noncancer Hazard Quotient (HQ) [a,d]				Lifetime Excess Cancer Risk (LECR) [b,d]			
	Soil Ingestion	Dermal Soil Contact	Dust / Vapor Inhalation	Multi-Pathway	Soil Ingestion	Dermal Soil Contact	Dust / Vapor Inhalation	Multi-Pathway
SVOCs								
Benzo(a)pyrene	--	--	--	--	4.2E-07	8.0E-07	1.3E-08	1.2E-06
PCBs								
Aroclor-1260	--	--	--	--	2.4E-06	5.0E-06	5.6E-08	7.5E-06
Aroclor-1262	--	--	--	--	4.6E-07	9.5E-07	1.1E-08	1.4E-06
Metals								
Arsenic	0.25	0.11	0.0048	0.37	3.0E-06	1.3E-06	8.5E-08	4.4E-06
Cadmium	0.0041	0.061	0.0084	0.073	--	--	2.5E-07	2.5E-07
Lead	--	--	--	--	1.0E-07	0.0E+00	1.2E-08	1.1E-07
Nickel	0.0023	0.00000	0.15	0.15	--	--	1.9E-07	1.9E-07
TPH								
TPH-Diesel	0.0062	0.0090	0.038	0.053	--	--	--	--
Total HI or LECR [c]	0.3	0.2	0.2	0.6	6.E-06	8.E-06	6.E-07	2.E-05

Abbreviations:
-- = not applicable; toxicity or pathway-specific value not available
HI = hazard index
SVOCs = semi-volatile organic compounds
PCBs = polychlorinated biphenyls
TPH = total petroleum hydrocarbons

Footnotes:
[a] HQ soil ingestion= [(EPCm x IRs x EF x ED x CF1) / (BW x ATnc)] / RfDo
HQ dermal soil contact = [(EPCm x SA x AF x ABS x EF x ED x CF1) / (BW x ATnc)] / RfDd
HQ dust inhalation (non-volatiles) = [(EPCm x 1/PEF x ET x EF x ED x CF2 x CF3) / ATnc] / RfCi
HQ dust and vapor inhalation (volatiles) = [(EPCm x (1/PEF + 1/VF) x ET x EF x ED x CF2 x CF3) / ATnc] / RfCi
HQ multi-pathway = sum of HQs for soil ingestion, dermal soil contact, and dust and/or vapor inhalation
[b] LECR soil ingestion= [(EPCm x IRs x EF x ED x CF1) / (BW x ATc)] x SFo
LECR dermal soil contact = [(EPCm x SA x AF x ABS x EF x ED x CF1) / (BW x ATc)] x SFd
LECR dust inhalation (non-volatiles) = [(EPCm x 1/PEF x ET x EF x ED x CF2 x CF3) / ATc] * IUR
LECR dust and vapor inhalation (volatiles) = [(EPCm x (1/PEF + 1/VF) x ET x EF x ED x CF2 x CF3) / ATc] * IUR
LECR multi-pathway = sum of LECRs for soil ingestion, dermal soil contact, and dust and/or vapor inhalation
[c] Total HI or LECR = sum of chemical-specific HQs or LECRs, respectively, for each pathway or for all pathways combined (i.e., multi-pathway)
[d] Refer to Table 29 for toxicity values and sources. Refer to Tables 30 and 31 for explanation of acronyms used in equations.

Table 34
Risk Characterization for the Future Resident Receptor - Soil
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical of Potential Concern (COPC)	Noncancer Hazard Quotient (HQ) [a,d]				Lifetime Excess Cancer Risk (LECR) [b,d]			
	Soil Ingestion	Dermal Soil Contact	Dust / Vapor Inhalation	Multi-Pathway	Soil Ingestion	Dermal Soil Contact	Dust / Vapor Inhalation	Multi-Pathway
PCBs								
Aroclor-1260	--	--	--	--	1.0E-05	4.5E-06	5.2E-10	1.4E-05
Metals								
Arsenic	25	2.2	0.0014	27	9.3E-05	9.0E-06	5.9E-09	1.0E-04
Lead	--	--	--	--	1.4E-06	0.0E+00	3.5E-10	1.4E-06
TPH								
TPH-Diesel	0.10	0.029	2.5	2.60	--	--	--	--
Total HI or LECR [c]	25	2	2	30	1.E-04	1.E-05	7.E-09	1.E-04

Abbreviations:
-- = not applicable; toxicity or pathway-specific value not available
HI = hazard index
PCBs = polychlorinated biphenyls
TPH = total petroleum hydrocarbons

Footnotes:
[a] HQ soil ingestion= [(EPCr x IRs x EF x ED x CF1) / (BW x ATnc)] / RfDo
HQ dermal soil contact = [(EPCr x SA x AF x ABS x EF x ED x CF1) / (BW x ATnc)] / RfDd
HQ dust inhalation (non-volatiles) = [(EPCr x 1/PEF x ET x EF x ED x CF2 x CF3) / ATnc] / RfCi
HQ dust and vapor inhalation (volatiles) = [(EPCr x (1/PEF + 1/VF) x ET x EF x ED x CF2 x CF3) / ATnc] / RfCi
HQ multi-pathway = sum of HQs for soil ingestion, dermal soil contact, and dust and/or vapor inhalation
HQ estimates for soil ingestion and dermal contact are for child residents only; the lower child body weight results in higher HQ estimates than for adult residents. For inhalation, HQs are based on the the total child + adul
[b] LECR soil ingestion= [(EPCr x IFSadj x EF x CF1) / (ATc)] x SFo
LECR dermal soil contact = [(EPCr x DFSadj x ABS x EF x CF1) / (ATc)] x SFd
LECR dust inhalation (non-volatiles) = [(EPCr x 1/PEF x ET x EF x ED x CF2 x CF3) / ATc] * IUR
LECR dust and vapor inhalation (volatiles) = [(EPCr x (1/PEF + 1/VF) x ET x EF x ED x CF2 x CF3) / ATc] * IUR
LECR multi-pathway = sum of LECRs for soil ingestion, dermal soil contact, and dust and/or vapor inhalation
LECR estimates use age-adjusted intake rates for soil ingestion and dermal contact, and the total child + adult ED for inhalation.
[c] Total HI or LECR = sum of chemical-specific HQs or LECRs, respectively, for each pathway or for all pathways combined (i.e., multi-pathway)
[d] Refer to Table 29 for toxicity values and sources. Refer to Tables 30 and 31 for explanation of acronyms used in equations.

Table 35
Risk Characterization for Groundwater - Future Construction and Maintenance / Utility Worker Receptors
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical of Potential Concern (COPC)	Exposure Point Concentration (EPCw) [a] (µg/L)	Dermal Factors [b]					DA_{event} [c]	Risk Characterization [d]			
		Kp	τ	t*	FA	B		Construction Worker		Maintenance/Utility Worker	
		(cm/hr)	(hr/event)	(hr/event)	(Unitless)	(Unitless)	cm/event	HQ	LECR	HQ	LECR
VOCs											
Benzene	8.1E+00	1.5E-02	2.9E-01	6.9E-01	1.0E+00	5.1E-02	2.3E-02	0.00081	1.4E-08	0.00012	1.7E-08
tert-Butyl Alcohol	2.3E+00	1.5E-03	2.7E-01	6.6E-01	--	5.1E-03	--	--	--	--	--
n-Butylbenzene	3.2E+01	2.3E-01	5.9E-01	2.3E+00	--	1.0E+00	--	--	--	--	--
sec-Butylbenzene	3.8E+01	3.0E-01	5.9E-01	2.3E+00	--	1.3E+00	--	--	--	--	--
Carbon Disulfide	3.9E+00	1.1E-02	2.8E-01	6.7E-01	1.0E+00	3.8E-02	1.8E-02	0.000035	--	0.0000017	--
Chlorobenzene	4.4E+00	2.8E-02	4.5E-01	1.1E+00	1.0E+00	1.2E-01	5.2E-02	0.000059	--	0.000028	--
cis-1,2-Dichloroethene	9.2E+00	1.1E-02	3.7E-01	8.8E-01	--	4.2E-02	--	--	--	--	--
Ethylbenzene	4.5E+01	4.9E-02	4.1E-01	9.9E-01	1.0E+00	2.0E-01	9.0E-02	0.00021	3.3E-08	0.00010	3.9E-08
Isopropylbenzene	6.7E+01	9.0E-02	5.0E-01	1.2E+00	--	3.8E-01	--	--	--	--	--
4-Isopropyltoluene	1.3E+01	--	--	--	--	--	--	--	--	--	--
Naphthalene	8.4E+01	4.7E-02	5.5E-01	1.3E+00	1.0E+00	2.0E-01	9.5E-02	0.0021	7.1E-07	0.00099	8.5E-07
Propylbenzene	8.7E+01	9.4E-02	5.0E-01	1.2E+00	--	4.0E-01	--	--	--	--	--
Toluene	1.9E+00	3.1E-02	3.5E-01	8.3E-01	1.0E+00	1.1E-01	5.2E-02	0.0000064	--	0.0000030	--
1,2,4-Trimethylbenzene	3.5E+02	8.6E-02	5.0E-01	1.2E+00	--	3.6E-01	--	--	--	--	--
1,3,5-Trimethylbenzene	2.4E+01	6.2E-02	5.0E-01	1.2E+00	--	2.6E-01	--	--	--	--	--
Vinyl Chloride	7.3E+00	8.4E-03	2.4E-01	5.7E-01	1.0E+00	2.5E-02	1.2E-02	0.0015	1.8E-08	0.000074	2.1E-08
m,p-Xylene	5.3E+00	5.3E-02	4.1E-01	9.9E-01	1.0E+00	2.1E-01	9.7E-02	0.00013	--	0.0000064	--
o-Xylene	3.8E+00	4.7E-02	4.1E-01	9.9E-01	--	1.9E-01	--	--	--	--	--
Total Xylenes	5.9E+01	5.0E-02	4.1E-01	9.9E-01	1.0E+00	2.0E-01	9.1E-02	0.0014	--	0.000067	--
Metals											
Arsenic	3.2E+01	1.0E-03	2.8E-01	6.6E-01	--	3.3E-03	1.0E-03	0.47	2.2E-07	0.023	2.7E-07
Barium	3.5E+02	1.0E-03	6.2E-01	1.5E+00	--	4.5E-03	1.0E-03	0.0013	--	0.000062	--
Chromium	8.9E+00	1.0E-03	2.1E-01	4.9E-01	--	2.8E-03	1.0E-03	0.000024	--	0.0000011	--
Copper	9.1E+00	1.0E-03	2.4E-01	5.7E-01	--	3.1E-03	1.0E-03	0.000012	--	0.00000056	--
Lead	1.9E+02	1.0E-04	1.5E+00	3.7E+00	--	5.5E-04	1.0E-04	--	1.2E-10	--	1.4E-10
Mercury	4.1E-01	1.0E-03	1.4E+00	3.4E+00	--	5.4E-03	1.0E-03	0.0019	--	0.000091	--
Molybdenum	1.0E+01	1.0E-03	3.6E-01	8.7E-01	--	3.8E-03	1.0E-03	0.00010	--	0.0000050	--
Nickel	8.5E+00	2.0E-04	2.2E-01	5.4E-01	--	5.9E-04	2.0E-04	0.00020	--	0.0000096	--
Selenium	2.7E+01	1.0E-03	2.9E-01	7.0E-01	--	3.4E-03	1.0E-03	0.00028	--	0.000013	--
Vanadium	7.1E+01	1.0E-03	2.0E-01	4.9E-01	--	2.7E-03	1.0E-03	0.0028	--	0.0014	--
Zinc	3.6E+02	6.0E-04	2.4E-01	5.9E-01	--	1.9E-03	6.0E-04	0.000037	--	0.0000018	--
TPH											
TPH-Diesel	5.8E+04	6.9E-02	6.0E-01	1.4E+00	1.0E+00	3.1E-01	1.5E-01	15	--	0.71	--
TPH-Motor Oil	1.2E+04	--	--	--	1.0E+00	--	--	--	--	--	--
Cumulative Hazard Index (HI) or LECR [e]								15	1E-06	0.7	1E-06

Table 35
Risk Characterization for Groundwater - Future Construction and Maintenance / Utility Worker Receptors
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Abbreviations:
-- = not available or applicable
Kp: dermal permeability coefficient of compound in water
τ: lag time per event
t*: time to reach steady state
FA: fraction absorbed water
B: ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis
HQ = hazard quotient
LECR = lifetime excess cancer risk
TPH = total petroleum hydrocarbons

Footnotes:
[a] Maximum detected concentrations from Tables 23 and 24. All chemicals detected in groundwater are included in the dermal evaluation.
[b] FA values are from USEPA (2004b). Dermal permeability coefficients, τ, and B values are from USEPA (2016a). t* = 2.4*τ (USEPA 2004b).
[c] For organics, where $t_{event} \leq t^*$, $DA_{event} = 2*FA*Kp*(6*\tau*t_{event}/\pi)^{0.5}$
For organics, where $t_{event} > t^*$, $DA_{event} = FA*Kp*((t_{event}/1+B) + (2*\tau*(1+3*B+3*B^2/(1+B)^2)$
For inorganics, $DA_{event} = Kp*t_{event}$
DA_{event} equations are from USEPA (2004b).
[d] HQ dermal water contact = [(EPCw x EF x ED x EV x SA x DAevent x CF4) / (BW x ATnc x CF3)] / RfDd
LECR dermal water contact = [(EPCw x EF x ED x EV x SA x DAevent x CF4) / (BW x ATc x CF3)] * SFd
Refer to Table 29 for toxicity values and sources. Refer to Table 30 for explanation of acronyms used in equations.
[e] Pathway-specific HI = sum of chemical-specific HQs. Pathway-specific total LECR = sum of chemical-specific LECRs.

References:
United States Environmental Protection Agency (USEPA). 2016a. Regional Screening Levels Table. May. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016
USEPA. 2004b. Risk Assessment Guidance for Superfund (RAGS) Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP. July 2004.

Table 36
Risk Characterization for the Vapor Intrusion Pathway - Future Resident and Commercial / Industrial Worker Receptors
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

COPC	Soil Gas Maximum [a]	Location(s) of Maximum [a]	Sample Depth	Resident			Commercial/Industrial Worker		
				Indoor Air EPC [b]	Noncarcinogenic Effects (HQ) [b]	Carcinogenic Effects (LECR) [b]	Indoor Air EPC [b]	Noncarcinogenic Effects (HQ) [b]	Carcinogenic Effects (LECR) [b]
	µg/m³		ft-bgs	µg/m³	Unitless		µg/m³	Unitless	
VOCs									
Benzene	4,200	SV17	10	2.8	0.90	2.9E-05	1.4	0.11	3.3E-06
cis-1,2-Dichloroethene	98,000	SV60	10	65	8.9	NA	33	1.1	NA
Ethylbenzene	1,900	SV67	5	1.8	0.0017	1.6E-06	--	--	--
1,1,2,2-Tetrachloroethane	2,500	SV36	10	1.0	0.014	2.2E-05	0.52	0.0017	2.5E-06
Trichloroethene	680	SV69	10	0.37	0.18	5.4E-07	--	--	--
1,2,4-Trimethylbenzene	580	SV61	10	0.29	0.040	NA	--	--	--
Vinyl chloride	920,000	SV60	10	700	6.7	1.9E-02	350	0.80	2.2E-03
Cumulative Hazard Index (HI) or LECR [c]					17	2E-02		2	2E-03

Abbreviations:
COPC = chemical of potential concern
EPC = exposure point concentration
µg/m³ = micrograms per cubic meter
ft-bgs = feet below ground surface
VOC = volatile organic compound
-- = not applicable; not a COPC for the applicable receptor
NA = not applicable; not a known carcinogen

Footnotes:
[a] Maximum concentrations detected in soil vapor samples. Values and locations from Table 25.
[b] Indoor air EPCs, HQs, and LECRs calculated directly in DTSC-modified Johnson and Ettinger (J&E) model using a soil type of sandy loam, sample depths corresponding to the maximum detected soil vapor concentration for each COPC, and default receptor exposure assumptions. Modeling spreadsheets are provided in Appendix B.
HQ Indoor Air Inhalation = ((EPC x EF x ED x (ET x CF2)) / ATn) / RfC
LECR Indoor Air Inhalation = ((EPC x EF x ED x (ET x CF2)) / ATc) x IUR
Refer to Table 29 for toxicity values and sources. Refer to Tables 30 and 31 for explanation of acronyms used in equations.
[c] Pathway-specific HI = sum of chemical-specific HQs. Pathway-specific total LECR = sum of chemical-specific LECRs.

Table 37
Summary of Human Health Risk Characterization Results
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Exposure Pathway	**Receptor-, Medium, and/or Pathway-Specific Hazard and Risk Estimates**							
	Construction Worker		**Maintenance/Utility Worker**		**Commercial/Industrial Worker**		**Resident**	
	HI	**LECR**	**HI**	**LECR**	**HI**	**LECR**	**HI**	**LECR**
COPC Risk Estimates [a]								
Soil Pathways								
Ingestion	10	6E-06	0.3	6E-06	--	--	25	1E-04
Dermal Contact	5	5E-06	0.2	8E-06	--	--	2	1E-05
Outdoor Air Inhalation	2	1E-06	0.2	6E-07	--	--	2	7E-09
All Soil Pathways	17	1E-05	0.6	2E-05	--	--	30	1E-04
Groundwater Pathways								
Dermal Contact	15	1E-06	0.7	1E-06	--	--	--	--
Air Pathways								
Indoor Air Inhalation	--	--	--	--	2	2E-03	17	2E-02
Multi-Pathway Totals [b]	32	1E-05	1	2E-05	2	2E-03	46	2E-02
Non-COPC Screening Level Quotients [c]								
All Soil Pathways	3	7E-07	2	8E-07	--	--	1	5E-08
Indoor Air Inhalation	--	--	--	--	0.2	1E-06	1	3E-06
Multi-Pathway Totals [b]	3	7E-07	2	8E-07	0.2	1E-06	2	3E-06
Total Estimates for COPCs and Non-COPCs [d]	35	1E-05	4	2E-05	2	2E-03	49	2E-02

Abbreviations:
HI = pathway-specific hazard index
LECR = pathway-specific lifetime excess cancer risk
COPC = chemical of potential concern
-- = not applicable

Footnotes:
[a] Pathway specific estimates for COPCs are provided in detail in Tables 32 through 36.
[b] Multi-pathway HI for each receptor is the sum of pathway-specific HIs. Multi-pathway LECR is the sum of pathway-specific LECRs.
For non-COPCs, multi-pathway values are based on screening level quotients evuivalent to HI or LECR estimates.
[c] Screening level quotients for non-COPCs are provided in detail in Tables 37 and 38.
[d] Total estimates are equal to the sums of multi-pathway totals for COPCs and non-COPCs.

Table 38
Soil Screening Level Quotient Evaluation
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical [a]	Maximum Detected Concentration [b] (mg/kg)			Direct-Exposure ESLs [c] (mg/kg)				Screening Level (SL) Quotient [d]					
				Construction		Residential		Construction		Maintenance / Utility Worker		Residential	
	Construction	Utility Worker	Residential	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer
VOCs													
Acetone	2.3E-01	3.5E-02	ND	2.6E+05	--	5.9E+04	--	0.00000087	--	0.00000013	--	--	--
Benzene	2.4E-01	5.4E-02	ND	3.2E+01	2.4E+01	7.7E+00	2.3E-01	0.0075	1.0E-08	0.0017	2.3E-09	--	--
n-Butylbenzene	1.3E-01	ND	ND	5.8E+04	--	3.9E+03	--	0.0000022	--	--	--	--	--
sec-Butylbenzene	6.1E-01	ND	ND	1.2E+05	--	7.8E+03	--	0.0000051	--	--	--	--	--
tert-Butylbenzene	3.9E-02	ND	ND	1.2E+05	--	7.8E+03	--	0.00000033	--	--	--	--	--
Carbon Disulfide	6.3E-03	ND	ND	3.5E+03	--	7.7E+02	--	0.0000018	--	--	--	--	--
Chlorobenzene	1.1E-01	ND	ND	1.1E+03	--	2.5E+02	--	0.00010	--	--	--	--	--
1,2-Dichloroethane	5.0E-01	ND	ND	1.0E+02	3.7E+01	2.5E+01	3.7E-01	0.0050	1.4E-08	--	--	--	--
1,2-Dichlorobenzene	4.0E-03	ND	ND	8.5E+03	--	2.0E+03	--	0.00000047	--	--	--	--	--
1,3-Dichlorobenzene	4.0E-03	ND	ND	8.5E+03	--	2.0E+03	--	0.00000047	--	--	--	--	--
cis-1,2-Dichloroethene	7.3E+01	2.4E+01	ND	8.2E+01	--	1.9E+01	--	0.89	--	0.29	--	--	--
trans-1,2-Dichloroethene	8.1E+01	8.3E+00	ND	6.8E+02	--	1.6E+02	--	0.12	--	0.012	--	--	--
Ethylbenzene	1.8E+00	1.4E-01	ND	1.3E+04	4.8E+02	3.1E+03	5.1E+00	0.00014	3.8E-09	0.000011	2.9E-10	--	--
Isopropylbenzene	4.5E-01	ND	ND	9.9E+03	--	1.9E+03	--	0.000045	--	--	--	--	--
4-Isopropyltoluene	5.9E-01	ND	ND	4.1E+03	--	9.7E+02	--	0.00014	--	--	--	--	--
2-Butanone (MEK)	2.0E-02	ND	ND	1.4E+05	--	3.1E+04	--	0.00000015	--	--	--	--	--
Methyl Isobutyl Ketone (MIBK)	1.0E-02	ND	ND	2.6E+04	--	5.8E+03	--	0.00000039	--	--	--	--	--
Naphthalene	2.8E+01	8.9E+00	ND	4.4E+02	3.5E+02	1.1E+02	3.3E+00	0.064	8.0E-08	0.020	2.6E-08	--	--
Propylbenzene	1.3E+00	ND	ND	2.4E+04	--	3.8E+03	--	0.000054	--	--	--	--	--
Toluene	1.3E+00	2.6E-02	ND	4.1E+03	--	9.7E+02	--	0.00032	--	0.0000063	--	--	--
Trichloroethene	2.0E+01	ND	ND	2.3E+01	1.6E+02	5.4E+00	1.2E+00	0.88	1.3E-07	--	--	--	--
1,2,4-Trimethylbenzene	2.7E+00	ND	ND	2.4E+02	--	5.8E+01	--	0.011	--	--	--	--	--
1,3,5-Trimethylbenzene	2.6E+00	ND	ND	1.2E+04	--	7.8E+02	--	0.00022	--	--	--	--	--
Vinyl chloride	1.4E+01	6.0E-02	ND	3.0E+02	3.4E+00	7.0E+01	8.2E-03	NA	NA	0.00020	1.8E-08	--	--
m,p-Xylene	5.3E-01	ND	ND	2.4E+03	--	5.5E+02	--	0.00022	--	--	--	--	--
o-Xylene	7.1E-01	ND	ND	2.8E+03	--	6.5E+02	--	0.00025	--	--	--	--	--
Total Xylenes	1.1E+01	3.8E-01	ND	2.4E+03	--	5.6E+02	--	0.0047	--	0.00016	--	--	--
									--		--		--
SVOCs									--		--		--
Acenaphthene	5.0E-01	ND	ND	1.0E+04	--	3.6E+03	--	0.000050	--	--	--	--	--
Acenaphthylene	2.7E-01	ND	ND	1.0E+04	--	3.6E+03	--	0.000027	--	--	--	--	--
Anthracene	1.2E+00	1.2E+00	ND	5.0E+04	--	1.8E+04	--	0.000024	--	0.000024	--	--	--
Benzo(a)anthracene	2.4E+00	2.4E+00	ND	--	1.6E+01	--	1.6E-01	--	1.5E-07	--	1.5E-07	--	--
Benzo(a)pyrene	3.0E+00	3.0E+00	ND	--	1.6E+00	--	1.6E-02	NA	NA	NA	NA	--	--
Benzo(b)fluoranthene	3.7E+00	3.7E+00	ND	--	1.6E+01	--	1.6E-01	--	2.3E-07	--	2.3E-07	--	--
Benzo(k)fluoranthene	1.5E+00	1.5E+00	ND	--	1.5E+02	--	1.6E+00	--	9.7E-09	--	9.7E-09	--	--
Benzo(g,h,i)perylene	1.4E+00	1.4E+00	ND	5.0E+03	--	1.8E+03	--	0.00028	--	0.00028	--	--	--
Chrysene	2.9E+00	2.9E+00	ND	--	1.5E+03	--	1.5E+01	--	1.9E-09	--	1.9E-09	--	--
Fluoranthene	4.4E+00	4.4E+00	ND	6.7E+03	--	2.4E+03	--	0.00066	--	0.00066	--	--	--
Fluorene	8.1E-01	8.1E-01	ND	6.7E+03	--	2.4E+03	--	0.00012	--	0.00012	--	--	--
Indeno(1,2,3-cd)pyrene	1.3E+00	1.3E+00	ND	--	1.6E+01	--	1.6E-01	--	8.1E-08	--	8.1E-08	--	--
2-Methylnaphthalene	9.2E+00	1.1E+00	ND	6.7E+02	--	2.4E+02	--	0.014	--	0.0016	--	--	--
4-Methylphenol	1.0E+01	2.0E-01	ND	8.2E+04	--	6.3E+03	--	0.00012	--	0.0000024	--	--	--
n-Nitrosodiphenylamine	1.7E+00	ND	ND	--	4.7E+02	--	1.1E+02	--	3.6E-09	--	--	--	--
Phenanthrene	7.5E+00	5.5E+00	ND	5.0E+03	--	1.8E+03	--	0.0015	--	0.0011	--	--	--
Phenol	7.0E-01	ND	ND	9.8E+04	--	2.3E+04	--	0.0000071	--	--	--	--	--
Pyrene	4.5E+00	4.5E+00	ND	5.0E+03	--	1.8E+03	--	0.00089	--	0.00089	--	--	--
Bis(2-ethylhexyl)phthalate	4.0E-01	ND	ND	3.8E+03	9.5E+02	1.3E+03	3.9E+01	0.00011	4.2E-10	--	--	--	--
1,2,4-Trichlorobenzene	2.0E-01	2.0E-01	ND	3.1E+02	8.5E+02	7.5E+01	2.4E+01	0.00065	2.4E-10	0.00065	2.4E-10	--	--

Table 38
Soil Screening Level Quotient Evaluation
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical [a]	Maximum Detected Concentration [b] (mg/kg)			Direct-Exposure ESLs [c] (mg/kg)				Screening Level (SL) Quotient [d]					
				Construction		Residential		Construction		Maintenance / Utility Worker		Residential	
	Construction	Utility Worker	Residential	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer
PCBs/Pesticides													
Aroclor-1260	5.5E+01	5.5E+01	8.3E+00	--	9.9E-01	--	2.4E-01	NA	NA	NA	NA	NA	NA
Aroclor-1262	6.5E+00	4.8E+00	ND	--	9.9E-01	--	2.4E-01	NA	NA	NA	NA	--	--
Aroclor-1268	1.9E+00	ND	ND	--	9.9E-01	--	2.4E-01	NA	NA	--	--	--	--
Total PCBs	5.5E+01	5.5E+01	ND	--	5.6E+00	--	2.5E-01	NA	NA	NA	NA	--	--
DDT	4.2E-01	ND	ND	1.4E+02	5.7E+01	3.7E+01	1.9E+00	0.0030	7.3E-09	--	--	--	--
Metals													
Antimony	8.9E+00	7.5E+00	ND	1.4E+02	--	3.1E+01	--	0.063	--	0.053	--	--	--
Arsenic	4.9E+01	6.9E+00	7.0E+00	2.0E+00	9.8E-01	2.6E-01	6.7E-02	NA	NA	NA	NA	NA	NA
Barium	8.1E+02	6.1E+02	2.0E+02	3.0E+03	--	1.5E+04	--	0.27	--	0.20	--	0.013	--
Beryllium	5.9E-01	5.7E-01	5.7E-01	4.2E+01	1.8E+02	1.5E+02	1.6E+03	0.014	3.3E-09	0.014	3.2E-09	0.0037	3.6E-10
Cadmium	4.4E+01	4.4E+01	9.4E-01	4.3E+01	1.1E+02	3.9E+01	9.1E+02	NA	NA	NA	NA	0.024	1.0E-09
Chromium	1.9E+02	1.8E+02	9.6E+01	5.3E+05	--	1.2E+05	--	0.00036	--	0.00034	--	0.00082	--
Cobalt	2.8E+01	1.6E+01	1.6E+01	2.8E+01	4.9E+01	2.3E+01	4.2E+02	NA	NA	0.57	3.3E-07	0.68	3.8E-08
Copper	2.3E+03	2.3E+03	7.8E+01	1.4E+04	--	3.1E+03	--	0.16	--	0.16	--	0.025	--
Lead	1.0E+04	1.2E+03	2.1E+02	1.6E+02	--	8.0E+01	--	NA	NA	NA	NA	NA	NA
Mercury	9.8E-01	9.8E-01	9.8E-01	4.4E+01	--	1.3E+01	--	0.022	--	0.022	--	0.078	--
Molybdenum	2.7E+01	2.7E+01	ND	1.8E+03	--	3.9E+02	--	0.015	--	0.015	--	--	--
Nickel	3.5E+02	3.5E+02	1.2E+02	8.6E+01	1.7E+03	8.2E+02	1.5E+04	NA	NA	NA	NA	0.15	8.0E-09
Selenium	6.0E+00	6.0E+00	ND	1.7E+03	--	3.9E+02	--	0.0034	--	0.0034	--	--	--
Silver	1.5E+01	ND	ND	1.8E+03	--	3.9E+02	--	0.0086	--	--	--	--	--
Vanadium	1.1E+04	5.9E+01	5.8E+01	4.7E+02	--	3.9E+02	--	NA	NA	0.13	--	0.15	--
Zinc	6.2E+03	6.2E+03	2.4E+02	1.1E+05	--	2.3E+04	--	0.058	--	0.058	--	0.010	--
TPH													
Oil & Grease	4.5E+04	2.3E+04	ND	3.2E+04	--	1.1E+04	--	NA	NA	0.71	--	--	--
TPH-Gas	4.6E+02	1.2E+01	ND	2.8E+03	--	7.4E+02	--	0.17	--	0.0043	--	--	--
TPH-Diesel	5.1E+03	5.1E+03	4.6E+02	8.8E+02	--	2.3E+02	--	NA	NA	NA	NA	NA	NA
TPH-Motor Oil	5.3E+03	1.9E+03	1.9E+03	3.2E+04	--	1.1E+04	--	0.16	--	0.059	--	0.18	--
Cumulative Noncancer or Cancer SL Quotient [c]								3	7E-07	2	8E-07	1	5E-08

Abbreviations:
ESL = environmental screening level
mg/kg = milligrams per kilogram
VOCs = volatile organic compounds
MEK = methyl ethyl ketone
SVOCs = semi-volatile organic compounds
DDT = Dichlorodiphenyltrichloroethane
PCBs = polychlorinated biphenyls
TPH = total petroleum hydrocarbons
ND = not detected
-- = not available
NA = not applicable; chemical evaluated as a chemical of potential concern (COPC) in the risk assessment

Footnotes:
[a] All chemicals detected in at least one sample in at least one soil dataset are included in the table.
[b] Maximum detected concentrations from receptor-specific soil datasets (Tables 10 through 22).
[c] Environmental screening levels (ESLs) for direct exposure from Table S-1 (Direct Exposure Screening Levels) of RWQCB (2016).
Regional screening levels (RSLs) from USEPA (2016a) were used, where available, in the absence of ESL values. Industrial soil values were used for the construction and maintenance/utility worker scenarios.
Where no ESL or RSL was available, values for structurally similar chemicals were used. Surrogates were used for the following chemicals (surrogate chemicals follow in parentheses):
1,3-dichlorobenzene (1,2-dichlorobenzene), 4-isopropyltoluene (toluene), acenaphthylene (acenaphthene), benzo(g,h,i)perylene and phenanthrene (pyrene), aroclors 1262 and 1268 (aroclor 1260),
chromium (chromium III), and oil & grease (TPH - motor oil). Construction worker values were also used to evaluate maintenance/utility workers.
[d] Maximum detected concentrations of chemicals not identified as COPCs for each receptor were divided by noncancer and cancer-based ESLs or RSLs to calculate SL quotients equivalent to noncancer hazard quotients or cancer risk estimates.
For noncancer effects, the SL Quotient = Maximum / ESL or RSL. For cancer effects, the SL Quotient = (Maximum x 1E-06) / ESL or RSL.

References:

California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). 2016. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Lookup Tables and User Guide: Derivation and Application of Environmental Screening Levels (ESLs). Interim Final. February.
United States Environmental Protection Agency (USEPA). 2016a. Regional Screening Levels Table. May. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016

Table 39
Soil Gas Screening Level Quotient Evaluation
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

Chemical [a]	Maximum Detected Concentration [b] (µg/m³)	Vapor Intrusion ESLs (µg/m³) [c]				ESL Quotient [d]			
		Residential		Commercial		Residential		Commercial	
		Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer	Noncancer	Cancer
VOCs									
Acetone	2.4E+03	1.6E+07	--	1.4E+08	--	0.00015	--	0.000018	--
Benzene	4.2E+03	1.6E+03	4.8E+01	1.3E+04	4.2E+02	NA	NA	NA	NA
Benzyl Chloride	1.7E+02	--	--	--	--	--	--	--	--
Carbon Disulfide	3.2E+02	--	--	--	--	--	--	--	--
Chlorobenzene	5.6E+01	2.6E+04	--	2.2E+05	--	0.0021	--	0.00026	--
Chloroform	4.8E+01	5.1E+04	6.1E+01	4.3E+05	5.3E+02	0.00094	7.9E-07	0.00011	9.0E-08
Chloromethane	2.0E+01	4.7E+04	--	3.9E+05	--	0.00043	--	0.000051	--
1,4-Dichlorobenzene	1.8E+01	4.2E+05	1.3E+02	3.5E+06	1.1E+03	0.000043	1.4E-07	0.0000051	1.6E-08
1,1-Dichloroethane	1.5E+01	--	8.8E+02	--	7.7E+03	--	1.7E-08	--	2.0E-09
1,2-Dichloroethane	1.8E+01	3.7E+03	5.4E+01	3.1E+04	4.7E+02	0.0049	3.3E-07	0.00058	3.8E-08
1,1-Dichloroethene	3.3E+01	3.7E+04	--	3.1E+05	--	0.00090	--	0.00011	--
cis-1,2-Dichloroethene	9.8E+04	4.2E+03	--	3.5E+04	--	NA	NA	NA	NA
trans-1,2-Dichloroethene	4.1E+04	4.2E+04	--	3.5E+05	--	0.98	--	0.12	--
Ethylbenzene	1.9E+03	5.2E+05	5.6E+02	4.4E+06	4.9E+03	NA	NA	0.00043	3.9E-07
4-Ethyltoluene	3.8E+02	1.6E+05	--	1.3E+06	--	0.0024	--	0.00029	--
Freon 11	1.0E+01	--	--	--	--	--	--	--	--
Freon 12	8.8E+00	--	--	--	--	--	--	--	--
Freon 21	7.5E+00	--	--	--	--	--	--	--	--
2-Hexanone	6.8E+00	--	--	--	--	--	--	--	--
Methylene Chloride	7.9E+00	2.1E+05	5.1E+02	1.8E+06	1.2E+04	0.000038	1.6E-08	0.0000044	6.4E-10
2-Butanone (MEK)	1.5E+02	2.6E+06	--	2.2E+07	--	0.000058	--	0.0000068	--
Methyl Isobutyl Ketone (MIBK)	8.8E+04	1.6E+06	--	1.3E+07	--	0.056	--	0.0067	--
Naphthalene	1.7E+01	1.6E+03	4.1E+01	1.3E+04	3.6E+02	0.011	4.1E-07	0.0013	4.7E-08
1,1,2,2-Tetrachloroethane	2.5E+03	--	2.4E+01	--	2.1E+02	NA	NA	NA	NA
Tetrachloroethene	5.9E+01	1.8E+04	2.4E+02	1.5E+05	2.1E+03	0.0033	2.5E-07	0.00039	2.8E-08
Toluene	4.7E+03	1.6E+05	--	1.3E+06	--	0.030	--	0.0036	--
1,1,1-Trichloroethane	5.7E+00	5.2E+05	--	4.4E+06	--	0.000011	--	0.0000013	--
Trichloroethene	6.8E+02	1.0E+03	2.4E+02	8.8E+03	3.0E+03	NA	NA	0.077	2.3E-07
1,2,4-Trimethylbenzene	5.8E+02	5.2E+05	5.6E+02	4.4E+06	4.9E+03	NA	NA	0.00013	1.2E-07
1,3,5-Trimethylbenzene	3.4E+02	5.2E+05	5.6E+02	4.4E+06	4.9E+03	0.00065	6.1E-07	0.000077	6.9E-08
Vinyl Acetate	6.6E+00	--	--	--	--	--	--	--	--
Vinyl Chloride	9.2E+05	5.2E+04	4.7E+00	4.4E+05	1.6E+02	NA	NA	NA	NA
m,p-Xylene	3.9E+03	5.2E+04	--	4.4E+05	--	0.075	--	0.0089	--
o-Xylene	7.6E+02	5.2E+04	--	4.4E+05	--	0.015	--	0.0017	--
Total Xylenes	3.8E+01	5.2E+04	--	4.4E+05	--	0.00073	--	0.000087	--
Cumulative Noncancer or Cancer SL Quotient [c]						1	3E-06	0.2	1E-06

ESLs < Maximum detected concentration are shown in bold font.

Abbreviations:
VOCs = volatile organic compounds
MEK = methyl ethyl ketone
ESL = environmental screening level
µg/m³ = micrograms per cubic meter
-- = not available
NA = not applicable; chemical evaluated as a chemical of potential concern (COPC) in the risk assessment

Footnotes:
[a] All chemicals detected in at least one sample are included in the table.
[b] Maximum detected concentrations from Table 25.
[c] Soil gas environmental screening levels (ESLs) for evaluation of potential vapor intrusion from Table SG-1 (Subslab and Soil Gas Vapor Intrusion Human Health Risk Screening Levels) of RWQCB (2016). Where no ESL was available, values for structurally similar chemicals were used when possible. Surrogates were used for the following chemicals (surrogate chemicals follow in parentheses): 4-ethyltoluene (toluene), 1,2,4- and 1,3,5-trimethylbenzene (ethylbenzene), and m,p- and o-xylene (total xylenes).
[d] Maximum detected concentrations of chemicals not identified as COPCs for each receptor were divided by noncancer and cancer-based ESLs to calculate SL quotients equivalent to noncancer hazard quotients or cancer risk estimates. For noncancer effects, the SL Quotient = Maximum / ESL. For cancer effects, the SL Quotient = (Maximum x 1E-06) / ESL.

References:
California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB). 2016. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. Lookup Tables and User Guide: Derivation and Application of Environmental Screening Levels (ESLs). Interim Final. February.

Table 40
Target Cleanup Levels for Soil Gas
Human Health Risk Assessment Report
6701-6707 Shellmound Street
Emeryville, California

COPC	Target Cleanup Levels (TCLs) ($\mu g/m^3$)															
	Resident							Location of Maximum Concentration	Additional Sample Locations with Concentrations > Residential TCL [c]	Commercial/Industrial Worker						
	Noncarcinogenic Effects [a]	Carcinogenic Effects [a]			TCL [b]					Noncarcinogenic Effects [a]	Carcinogenic Effects [a]			TCL [b]		
		Target LECR = 10^{-6}	Target LECR = 10^{-5}	Target LECR = 10^{-4}	Target LECR = 10^{-6}	Target LECR = 10^{-5}	Target LECR = 10^{-4}				Target LECR = 10^{-6}	Target LECR = 10^{-5}	Target LECR = 10^{-4}	Target LECR = 10^{-6}	Target LECR = 10^{-5}	Target LECR = 10^{-4}
<u>VOCs</u>																
Benzene	4,600	145	1,400	14,400	145	1,400	4,600	SV17	10, 11, 14, 18 (5), 19 (both), 23 (5), 25, 26 (5), 36, 38, 50 (5), 51 (5), 54 (5), 56 (5), 57 (5), 58, 61, 63, 67 (5)	39,200	1,200	12,600	126,200	1,200	12,600	39,200
cis-1,2-Dichloroethene	11,000	NA	NA	NA	11,000	11,000	11,000	SV60	None	92,400	NA	NA	NA	92,400	92,400	92,400
Ethylbenzene	1,126,600	1,200	12,100	121,300	1,200	12,100	121,300	SV67	None	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	174,700	116	1,100	11,500	116	1,100	11,500	SV36	17, 33, 40	1,468,100	1,000	10,100	101,200	1,000	10,100	101,200
Vinyl chloride	137,100	47	473	4,700	47	473	4,700	SV60	8 (5), 18 (both), 19 (5), 21 (both), 22 (both), 25 (both), 26, 28R, 38, 40, 50-57 (5), 59 (both), 60 (5), 61	1,151,700	400	4,100	41,300	400	4,100	41,300

Abbreviations:
COPC = chemical of potential concern
$\mu g/m^3$ = micrograms per cubic meter
VOC = volatile organic compound
-- = not applicable; not a COPC for the applicable receptor
NA = not applicable; not a known carcinogen

Footnotes:
[a] TCL = (Soil Gas Maximum Concentration x Target HQ or LECR) / (COPC-specific HQ or LECR). Target HQ for noncancer TCLs is 1. Target LECRs for cancer-based TCLs are 1E-06, 1E-05, and 1E-04. See Table 36 for soil gas maximum concentrations and associated HQ and LECR estimates. Values over 1,000 $\mu g/m^3$ were rounded down to the nearest hundred for presentation.
[b] TCL is the lower of noncarcinogen and carcinogen TCLs. TCLs were calculated based on three different target LECRs; for each target LECR the TCL is the lower of the noncarcinogen TCL and the carcinogen TCL corresponding to that target LECR.
[c] Locations shown have concentrations above the TCL based on a target LECR of 1E-06 and a target HQ of 1. All sample locations begin with SV (SG- locations did not have concentrations > TCLs). Depths of concentrations > TCLs are 10 feet unless otherwise specified (5 feet or both in parentheses). For all COPCs except cis-1,2-dichloroethene, some detection limits for non-detect results are also > TCLs.

PLATES

0 2000 4000

Scale in Feet

N

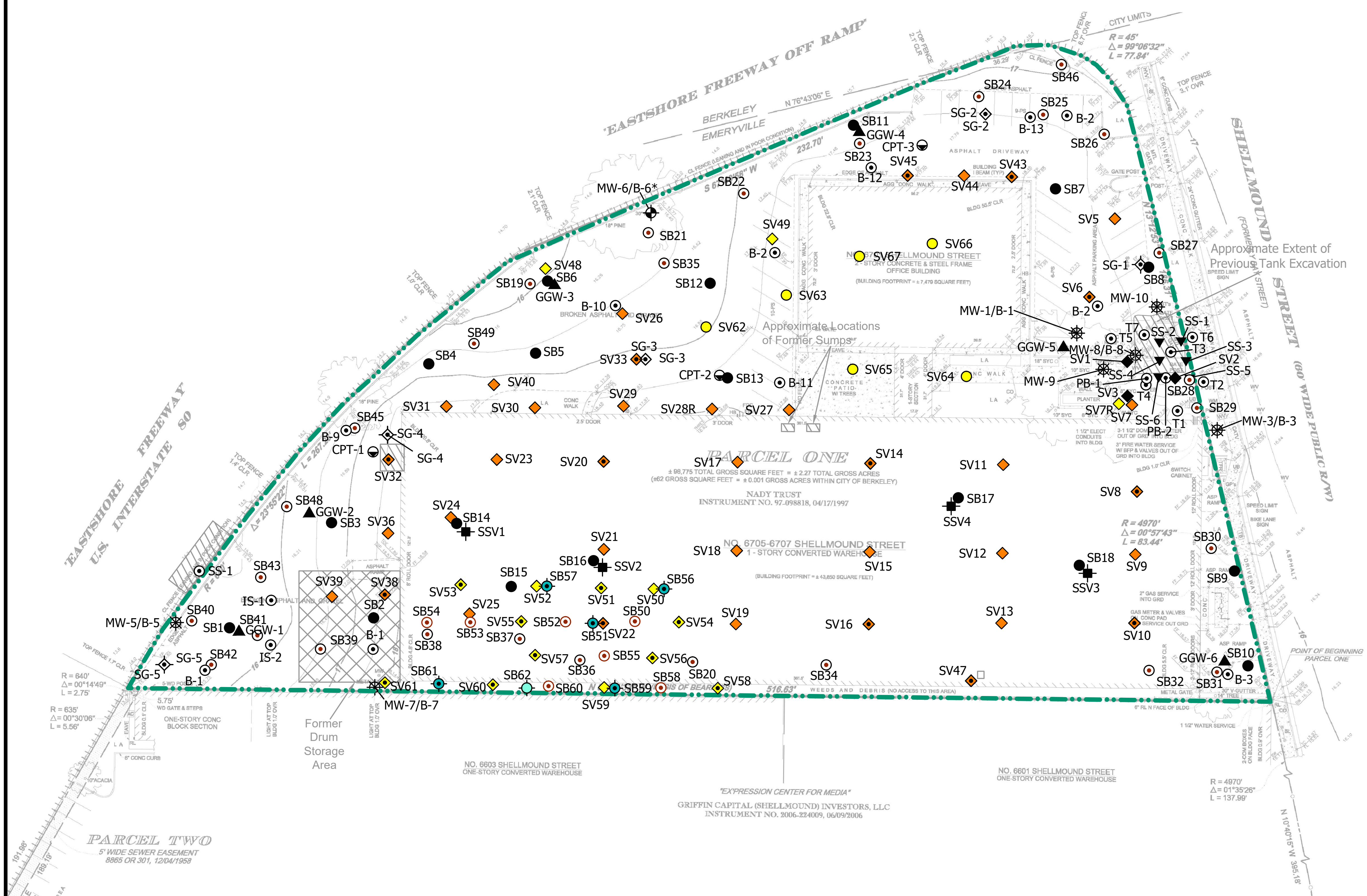
U.S.G.S. Topo Map - Oakland West, California, 7.5-minute quadrangle.1997

SLR

Site Location Map
Human Health Risk Assessment Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE 1

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.021	144800101021_HHRAR_1-6	AB	11/16



Explanation

- Approximate Property Boundary
- SV66 — Soil Vapor and Soil Sampling Location (PES, Sep. 2016)
- SV7 — Soil Vapor Sampling Location (PES, Nov.-Dec. 2015)
- SB24 — Soil Sampling Location (PES, Nov.-Dec. 2015)
- SV33 — Soil Vapor and Soil Sampling Location (PES, Nov. 2015)
- SB50 — Soil Sampling Location (PES, Feb. 2016)
- SV7R — Soil Vapor Sampling Location (PES, Feb. 2016)
- SV54 — Soil Vapor and Soil Sampling Location (PES, Feb. 2016)
- SB56 — Soil and Grab Groundwater Sample Location (PES, Feb. 2016)
- SB62 — Grab Groundwater Sample Location (PES, Feb. 2016)
- SG-5 — Soil, Soil Gas and Groundwater Sampling Location (Environ, 2013)
- SG-3 — Soil Gas and Soil Sampling Location (Environ, 2013)
- MW-5/B-5 — Monitoring Well - Destroyed (Environ, 2013)
- MW-6/B-6* — Well not found, assumed to be destroyed
- SSV1 — Sub-Slab Vapor Sampling Location (PES, April 2015)
- SV1 — Soil Vapor Sampling Location (PES, April 2015)
- SB13 — Soil Boring (PES, November 2013)
- GGW1 — Grab Groundwater Boring (PES, November 2013)
- B-1 — Geotechnical Boring (Geosphere, 2013)
- B-1 — Geotechnical Boring (URS, 2005)
- CPT-1 — CPT Location (URS, 2005)
- T2 — Historical Test Boring (Various, 1989-2005)
- SS-5 — Historical Confirmation Sample from Tank Excavation (Environ, 2013)

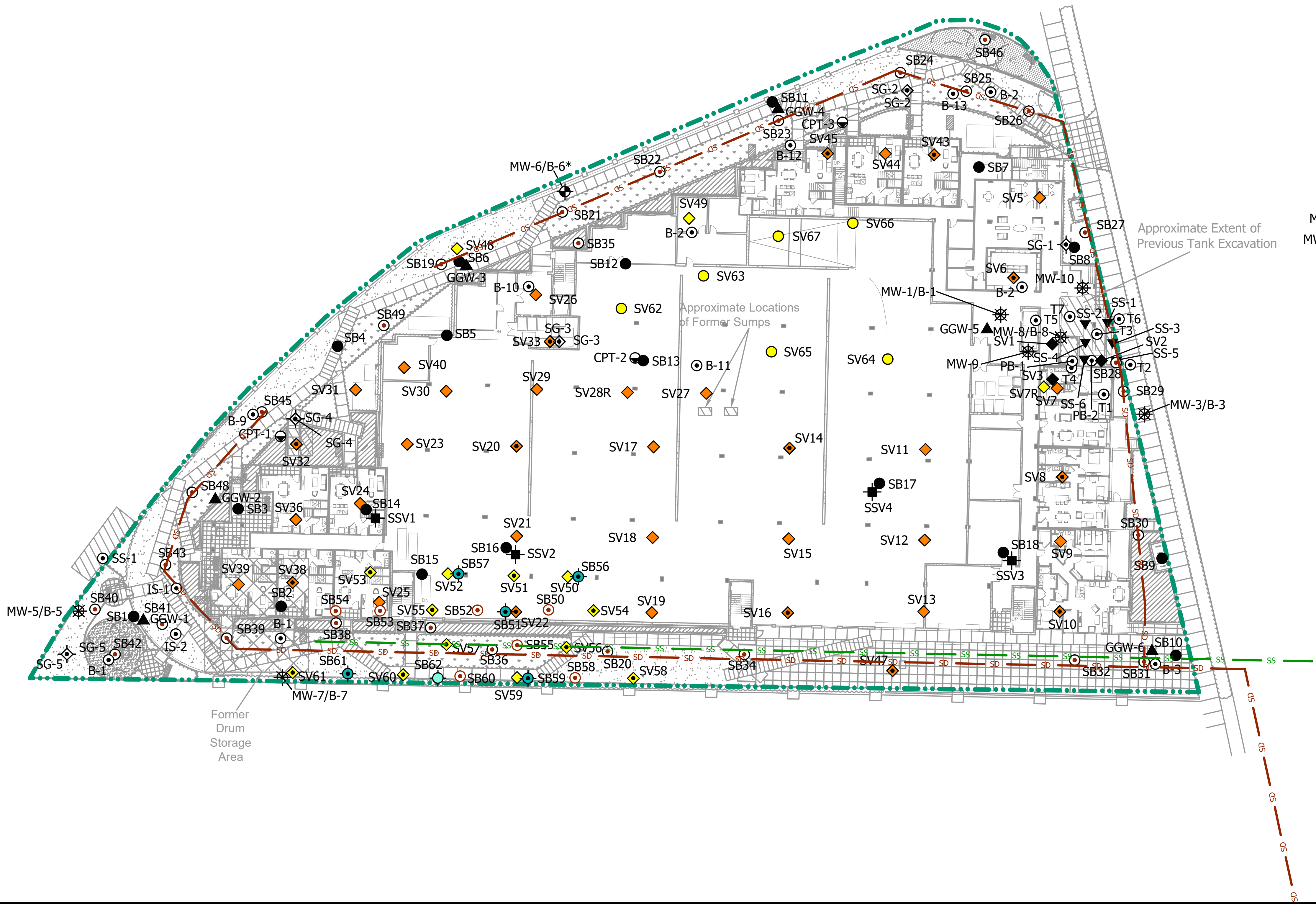
Basemap from ALTA/ACSM Land Title Survey (4/12/2013)

SLR

Site Plan and Sample Locations
Human Health Risk Assessment Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE 2

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.021	144800101021_HHRAR_1-6	AB	11/16



Explanation

- Approximate Property Boundary
- SV66 — Soil Vapor and Soil Sampling Location (PES, Sep. 2016)
- SV7 — Soil Vapor Sampling Location (PES, Nov.-Dec. 2015)
- SB24 — Soil Sampling Location (PES, Nov.-Dec. 2015)
- SV33 — Soil Vapor and Soil Sampling Location (PES, Nov. 2015)
- SB50 — Soil Sampling Location (PES, Feb. 2016)
- SV7R — Soil Vapor Sampling Location (PES, Feb. 2016)
- SV54 — Soil Vapor and Soil Sampling Location (PES, Feb. 2016)
- SB56 — Soil and Grab Groundwater Sample Location (PES, Feb. 2016)
- SB62 — Grab Groundwater Sample Location (PES, Feb. 2016)
- SG-5 — Soil, Soil Gas and Groundwater Sampling Location (Environ, 2013)
- SG-3 — Soil Gas and Soil Sampling Location (Environ, 2013)
- MW-5/B-5 — Monitoring Well - Destroyed (Environ, 2013)
- MW-6/B-6* — Well not found, assumed to be destroyed
- SSV1 — Sub-Slab Vapor Sampling Location (PES, April 2015)
- SV1 — Soil Vapor Sampling Location (PES, April 2015)
- SB13 — Soil Boring (PES, November 2013)
- GGW1 — Grab Groundwater Boring (PES, November 2013)
- B-1 — Geotechnical Boring (Geosphere, 2013)
- B-1 — Geotechnical Boring (URS, 2005)
- CPT-1 — CPT Location (URS, 2005)
- T2 — Historical Test Boring (Various, 1989-2005)
- SS-5 — Historical Confirmation Sample from Tank Excavation (Environ, 2013)
- Future Driveway - Grasscrete
- Future Driveway - Decomposed Granite
- Future Driveway - Permeable Pavers
- Future Planter/Infiltration Gallery
- Future Concrete Walkway
- SS — Future Sanitary Sewer Alignment
- SD — Future Storm Sewer Alignment

0 50
SCALE IN FEET

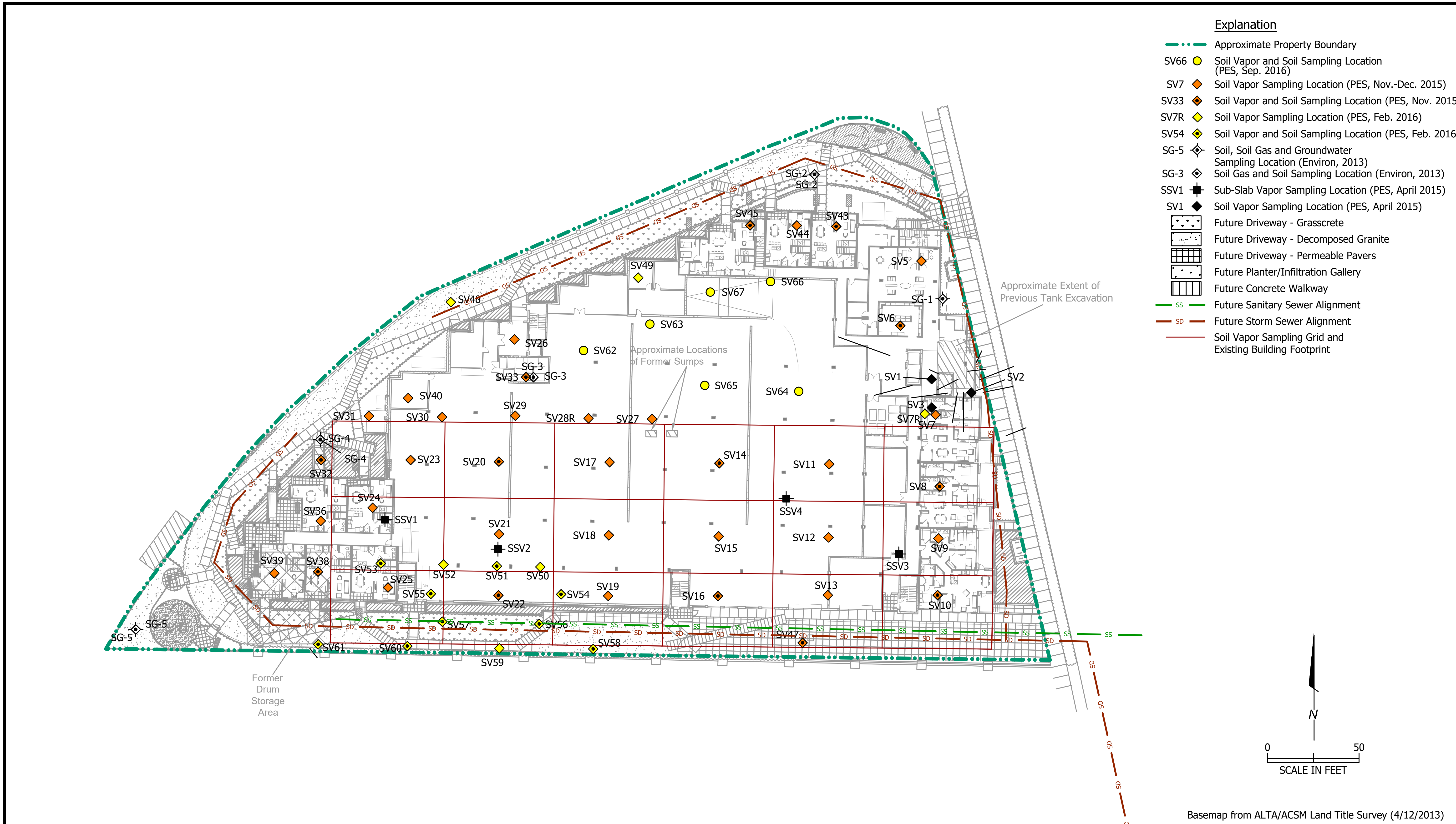
Basemap from ALTA/ACSM Land Title Survey (4/12/2013)

SLR

Site Plan, Sample Locations, and Proposed Ground Level Development Plan
Human Health Risk Assessment Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
3

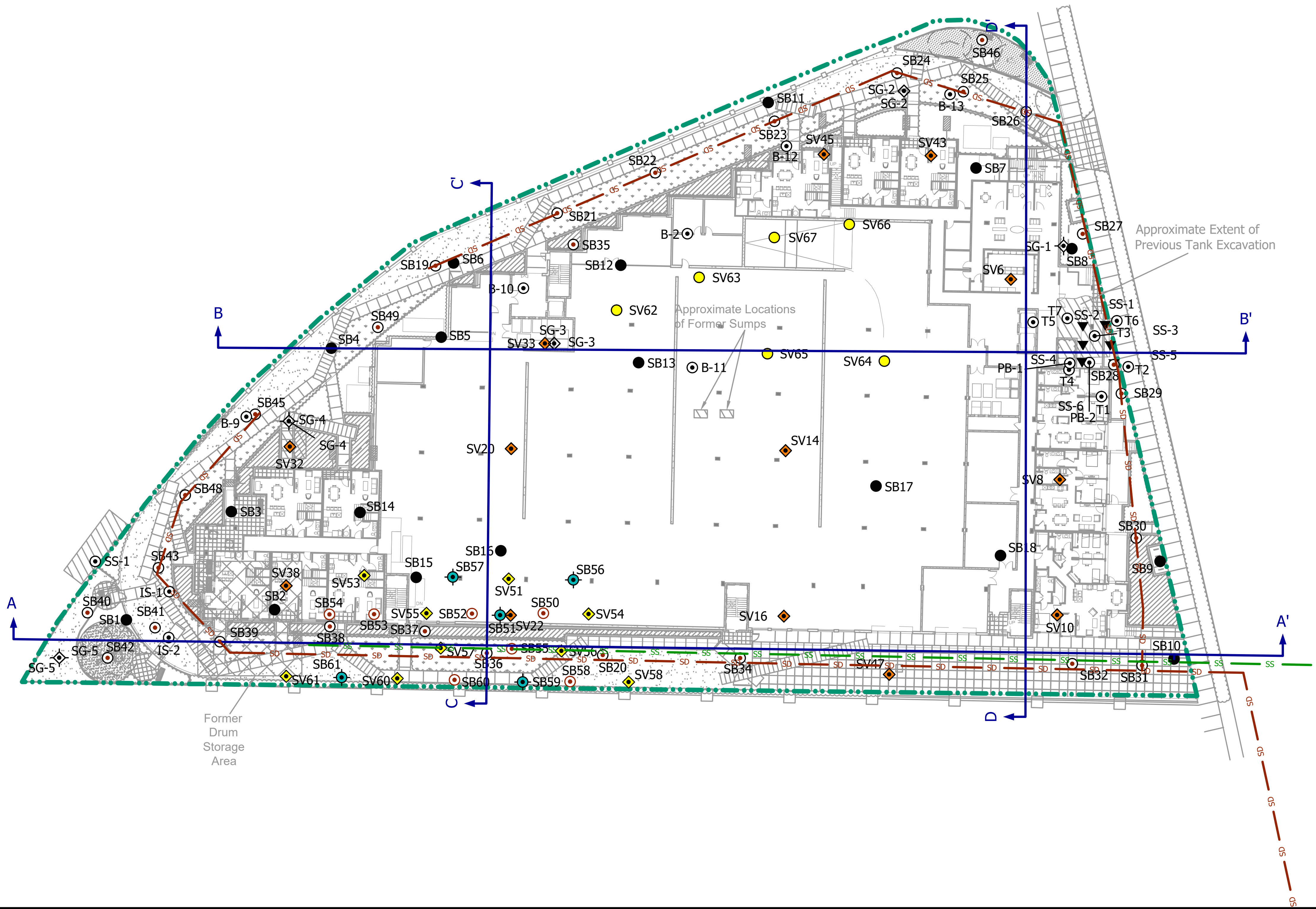
1448.001.01.021	144800101021_HHRAR_1-6	AB	11/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Soil Vapor Sample Locations and Proposed Ground Level Development Plan
Human Health Risk Assessment Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
4

1448.001.01.021	144800101021_HHRAR_1-6	AB	11/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



Explanation

- Approximate Property Boundary
- SV66 — Soil Vapor and Soil Sampling Location (PES, Sep. 2016)
- SB24 — Soil Sampling Location (PES, Nov.-Dec. 2015)
- SV33 — Soil Vapor and Soil Sampling Location (PES, Nov. 2015)
- SB50 — Soil Sampling Location (PES, Feb. 2016)
- SV54 — Soil Vapor and Soil Sampling Location (PES, Feb. 2016)
- SB56 — Soil and Grab Groundwater Sample Location (PES, Feb. 2016)
- SG-5 — Soil, Soil Gas and Groundwater Sampling Location (Environ, 2013)
- SG-3 — Soil Gas and Soil Sampling Location (Environ, 2013)
- SB13 — Soil Boring (PES, November 2013)
- T2 — Historical Test Boring (Various, 1989-2005)
- SS-5 — Historical Confirmation Sample from Tank Excavation (Environ, 2013)
- Future Driveway - Grasscrete
- Future Driveway - Decomposed Granite
- Future Driveway - Permeable Pavers
- Future Planter/Infiltration Gallery
- Future Concrete Walkway
- SS — Future Sanitary Sewer Alignment
- SD — Future Storm Sewer Alignment
- A A' — Hydrogeologic Cross Section Location (Arrows show direction of view)

Basemap from ALTA/ACSM Land Title Survey (4/12/2013)

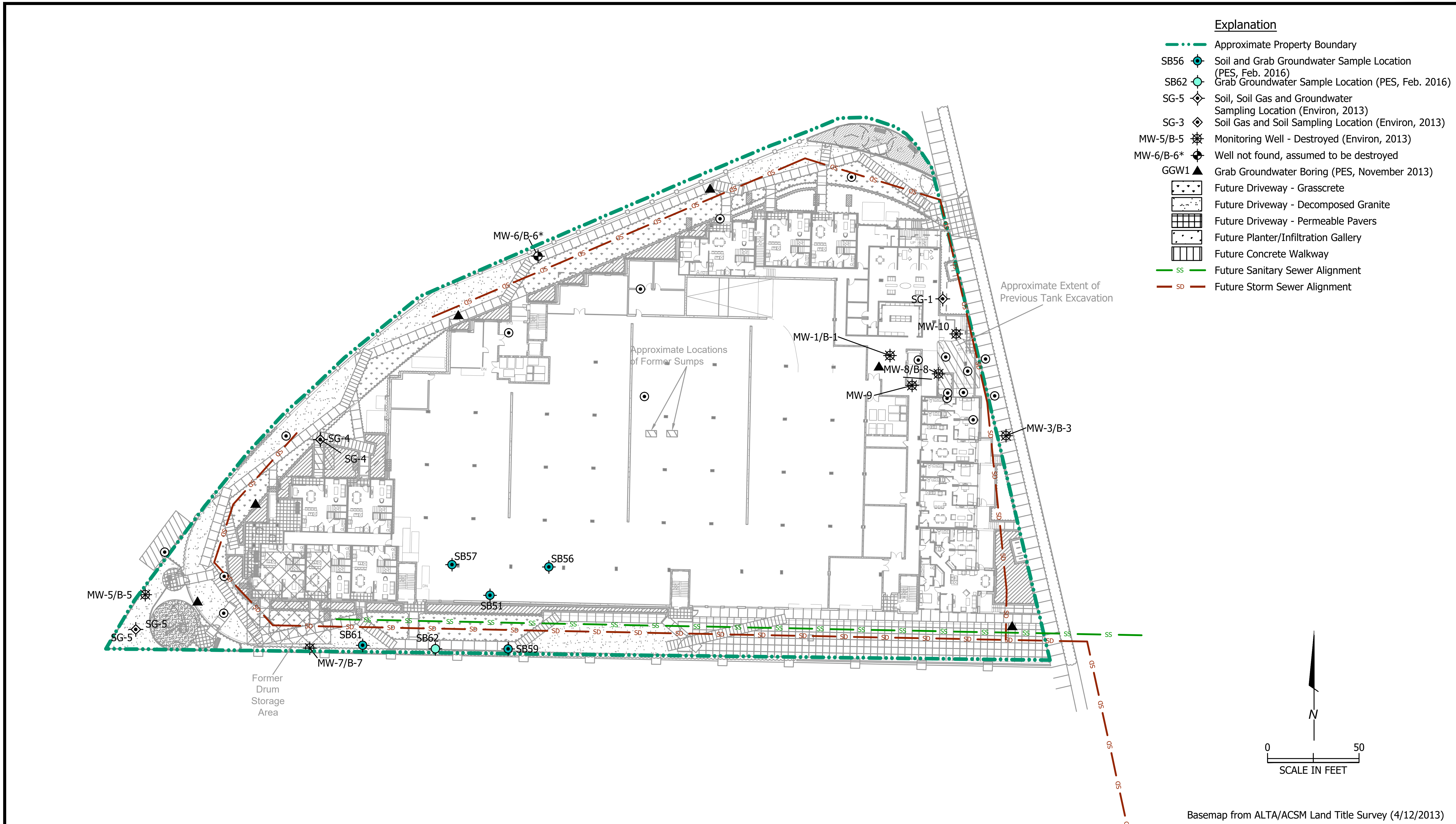
SLR

Soil Sample Locations and Proposed Ground Level Development Plan

Human Health Risk Assessment Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE 5

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.01.021	144800101021_HHRAR_1-6	AB	11/16



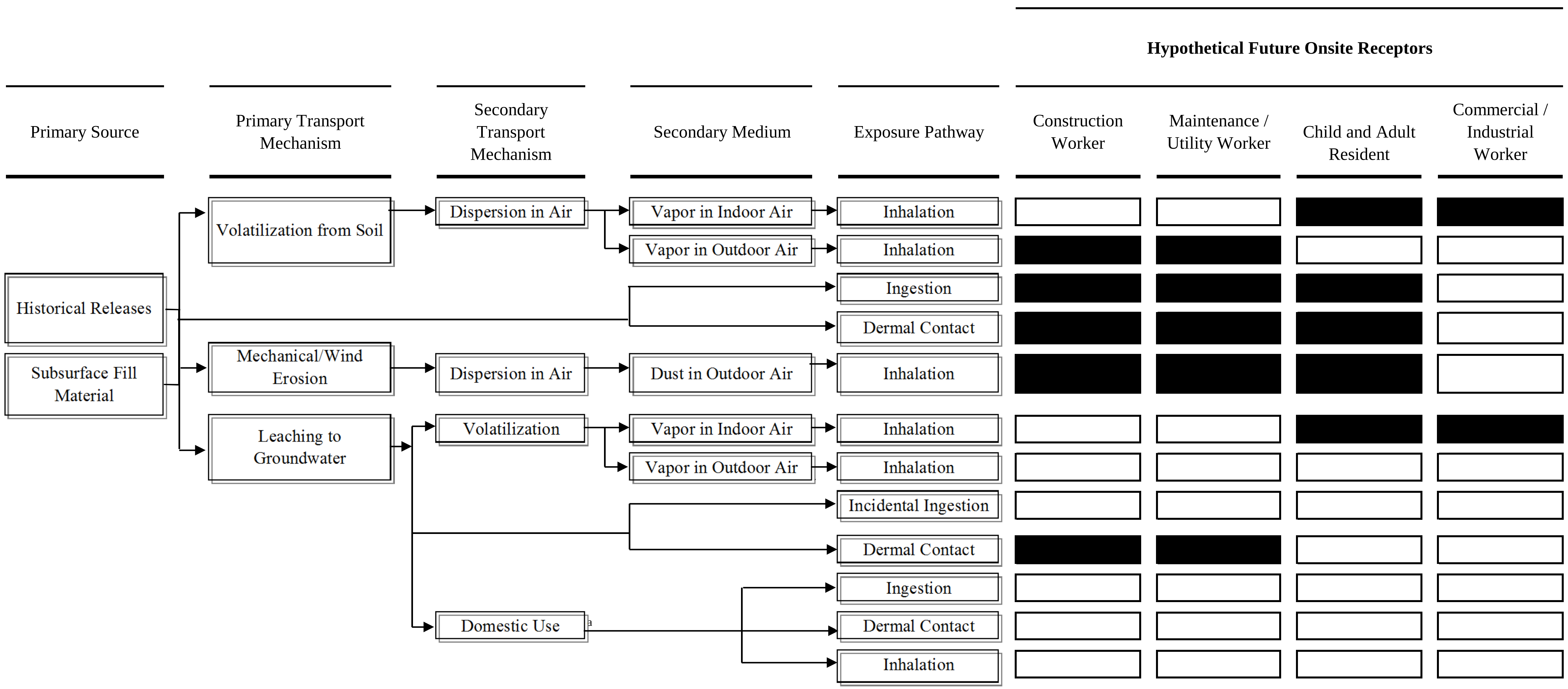
SLR

Groundwater Sample Locations and Proposed Ground Level Development Plan
Human Health Risk Assessment Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
6

1448.001.01.021	144800101021_HHRAR_1-6	AB	11/16
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

Plate 7
Conceptual Site Model Diagram
Human Health Risk Assessment Report
6701, 6705, and 6707 Shellmound Street
Emeryville, California



Key:

■ Exposure pathway is considered potentially complete and was evaluated in Tier 1

□ Pathway is incomplete

Footnotes:

[a] City of Emeryville Ordinance No. 07-006 prohibits extraction of groundwater for drinking, industrial or irrigation purposes. Domestic water in Emeryville is supplied by the East Bay Municipal Utility District.

APPENDIX A

PROUCL OUTPUT

FUTURE CONSTRUCTION WORKER

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/7/2016 2:40:49 PM
From File	Soil_EPC_data.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (aroclor-1260)

General Statistics

Total Number of Observations	67	Number of Distinct Observations	46
Number of Detects	43	Number of Non-Detects	24
Number of Distinct Detects	38	Number of Distinct Non-Detects	8
Minimum Detect	0.013	Minimum Non-Detect	0.012
Maximum Detect	55	Maximum Non-Detect	1
Variance Detects	72.85	Percent Non-Detects	35.82%
Mean Detects	3.664	SD Detects	8.535
Median Detects	1.8	CV Detects	2.33
Skewness Detects	5.469	Kurtosis Detects	32.8
Mean of Logged Detects	0.226	SD of Logged Detects	1.59

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.393	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.943	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.335	Lilliefors GOF Test
5% Lilliefors Critical Value	0.134	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.407	KM Standard Error of Mean	0.861
KM SD	6.966	95% KM (BCA) UCL	4.077
95% KM (t) UCL	3.844	95% KM (Percentile Bootstrap) UCL	3.897
95% KM (z) UCL	3.824	95% KM Bootstrap t UCL	6.303
90% KM Chebyshev UCL	4.991	95% KM Chebyshev UCL	6.161
97.5% KM Chebyshev UCL	7.786	99% KM Chebyshev UCL	10.98

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.172	Anderson-Darling GOF Test
5% A-D Critical Value	0.806	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.153	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.142	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.579	k star (bias corrected MLE)	0.554
Theta hat (MLE)	6.328	Theta star (bias corrected MLE)	6.612
nu hat (MLE)	49.79	nu star (bias corrected)	47.65
Mean (detects)	3.664		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.355
Maximum	55	Median	0.49
SD	7.034	CV	2.987
k hat (MLE)	0.293	k star (bias corrected MLE)	0.29
Theta hat (MLE)	8.034	Theta star (bias corrected MLE)	8.122
nu hat (MLE)	39.28	nu star (bias corrected)	38.85
Adjusted Level of Significance (β)	0.0464		
Approximate Chi Square Value (38.85, α)	25.58	Adjusted Chi Square Value (38.85, β)	25.34
95% Gamma Approximate UCL (use when n>=50)	3.577	95% Gamma Adjusted UCL (use when n<50)	3.611

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.407	SD (KM)	6.966
Variance (KM)	48.52	SE of Mean (KM)	0.861
k hat (KM)	0.119	k star (KM)	0.124
nu hat (KM)	16	nu star (KM)	16.62
theta hat (KM)	20.16	theta star (KM)	19.41
80% gamma percentile (KM)	2.189	90% gamma percentile (KM)	6.879
95% gamma percentile (KM)	13.68	99% gamma percentile (KM)	34.25

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.62, α)	8.399	Adjusted Chi Square Value (16.62, β)	8.27
95% Gamma Approximate KM-UCL (use when n>=50)	4.762	95% Gamma Adjusted KM-UCL (use when n<50)	4.836

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.943	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.111	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.134	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.4	Mean in Log Scale	-0.79
SD in Original Scale	7.02	SD in Log Scale	1.982
95% t UCL (assumes normality of ROS data)	3.831	95% Percentile Bootstrap UCL	3.865
95% BCA Bootstrap UCL	4.808	95% Bootstrap t UCL	6.547
95% H-UCL (Log ROS)	6.655		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.029	KM Geo Mean	0.357
KM SD (logged)	2.316	95% Critical H Value (KM-Log)	3.128
KM Standard Error of Mean (logged)	0.311	95% H-UCL (KM -Log)	12.74
KM SD (logged)	2.316	95% Critical H Value (KM-Log)	3.128
KM Standard Error of Mean (logged)	0.311		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.455	Mean in Log Scale	-0.645
SD in Original Scale	7.003	SD in Log Scale	2.04
95% t UCL (Assumes normality)	3.882	95% H-Stat UCL	8.949

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	12.74

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (aroclor-1262)

General Statistics

Total Number of Observations	17	Number of Distinct Observations	12
Number of Detects	7	Number of Non-Detects	10
Number of Distinct Detects	7	Number of Distinct Non-Detects	5
Minimum Detect	0.014	Minimum Non-Detect	0.012
Maximum Detect	6.5	Maximum Non-Detect	0.17
Variance Detects	6.705	Percent Non-Detects	58.82%
Mean Detects	2.027	SD Detects	2.589
Median Detects	1.2	CV Detects	1.277
Skewness Detects	1.173	Kurtosis Detects	-0.162
Mean of Logged Detects	-0.87	SD of Logged Detects	2.536

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.802	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.843	KM Standard Error of Mean	0.479
KM SD	1.83	95% KM (BCA) UCL	1.717
95% KM (t) UCL	1.68	95% KM (Percentile Bootstrap) UCL	1.65
95% KM (z) UCL	1.631	95% KM Bootstrap t UCL	3.56
90% KM Chebyshev UCL	2.281	95% KM Chebyshev UCL	2.933
97.5% KM Chebyshev UCL	3.837	99% KM Chebyshev UCL	5.613

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.326	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.765	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.176	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.331	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.415	k star (bias corrected MLE)	0.332
Theta hat (MLE)	4.887	Theta star (bias corrected MLE)	6.101
nu hat (MLE)	5.808	nu star (bias corrected)	4.652
Mean (detects)	2.027		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.841
Maximum	6.5	Median	0.01
SD	1.887	CV	2.245
k hat (MLE)	0.246	k star (bias corrected MLE)	0.242
Theta hat (MLE)	3.416	Theta star (bias corrected MLE)	3.476
nu hat (MLE)	8.367	nu star (bias corrected)	8.224
Adjusted Level of Significance (β)	0.0346		
Approximate Chi Square Value (8.22, α)	2.865	Adjusted Chi Square Value (8.22, β)	2.544
95% Gamma Approximate UCL (use when n>=50)	2.413	95% Gamma Adjusted UCL (use when n<50)	2.718

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.843	SD (KM)	1.83
Variance (KM)	3.349	SE of Mean (KM)	0.479
k hat (KM)	0.212	k star (KM)	0.214
nu hat (KM)	7.214	nu star (KM)	7.274
theta hat (KM)	3.973	theta star (KM)	3.94
80% gamma percentile (KM)	1.149	90% gamma percentile (KM)	2.548
95% gamma percentile (KM)	4.266	99% gamma percentile (KM)	8.944

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.27, α)	2.322	Adjusted Chi Square Value (7.27, β)	2.04
95% Gamma Approximate KM-UCL (use when n>=50)	2.64	95% Gamma Adjusted KM-UCL (use when n<50)	3.006

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.882	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.232	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.836	Mean in Log Scale	-4.694
SD in Original Scale	1.89	SD in Log Scale	3.884
95% t UCL (assumes normality of ROS data)	1.636	95% Percentile Bootstrap UCL	1.622
95% BCA Bootstrap UCL	1.888	95% Bootstrap t UCL	3.658
95% H-UCL (Log ROS)	41914		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.924	KM Geo Mean	0.0537
KM SD (logged)	2.294	95% Critical H Value (KM-Log)	4.936
KM Standard Error of Mean (logged)	0.603	95% H-UCL (KM -Log)	12.64
KM SD (logged)	2.294	95% Critical H Value (KM-Log)	4.936
KM Standard Error of Mean (logged)	0.603		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.849	Mean in Log Scale	-2.837
SD in Original Scale	1.884	SD in Log Scale	2.425
95% t UCL (Assumes normality)	1.647	95% H-Stat UCL	25.75

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.68

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (arsenic)

General Statistics

Total Number of Observations	65	Number of Distinct Observations	34
Number of Detects	40	Number of Non-Detects	25
Number of Distinct Detects	31	Number of Distinct Non-Detects	3
Minimum Detect	2.3	Minimum Non-Detect	2.2
Maximum Detect	49	Maximum Non-Detect	16
Variance Detects	75.23	Percent Non-Detects	38.46%
Mean Detects	9.02	SD Detects	8.673
Median Detects	6.9	CV Detects	0.962
Skewness Detects	3.664	Kurtosis Detects	14.13
Mean of Logged Detects	1.992	SD of Logged Detects	0.561

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.525	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.94	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.139	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	7.097	KM Standard Error of Mean	0.937
KM SD	7.331	95% KM (BCA) UCL	8.828
95% KM (t) UCL	8.661	95% KM (Percentile Bootstrap) UCL	8.678
95% KM (z) UCL	8.638	95% KM Bootstrap t UCL	9.887
90% KM Chebyshev UCL	9.908	95% KM Chebyshev UCL	11.18
97.5% KM Chebyshev UCL	12.95	99% KM Chebyshev UCL	16.42

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.215	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	Detected Data Not Gamma Distributed at 5% Significance Level

K-S Test Statistic	0.21	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.141	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.561	k star (bias corrected MLE)	2.385
Theta hat (MLE)	3.523	Theta star (bias corrected MLE)	3.782
nu hat (MLE)	204.8	nu star (bias corrected)	190.8
Mean (detects)	9.02		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	6.636
Maximum	49	Median	5.9
SD	7.947	CV	1.198
k hat (MLE)	0.439	k star (bias corrected MLE)	0.429
Theta hat (MLE)	15.12	Theta star (bias corrected MLE)	15.47
nu hat (MLE)	57.07	nu star (bias corrected)	55.77
Adjusted Level of Significance (β)	0.0463		
Approximate Chi Square Value (55.77, α)	39.61	Adjusted Chi Square Value (55.77, β)	39.3
95% Gamma Approximate UCL (use when n>=50)	9.344	95% Gamma Adjusted UCL (use when n<50)	9.418

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	7.097	SD (KM)	7.331
Variance (KM)	53.74	SE of Mean (KM)	0.937
k hat (KM)	0.937	k star (KM)	0.904
nu hat (KM)	121.8	nu star (KM)	117.5
theta hat (KM)	7.572	theta star (KM)	7.849
80% gamma percentile (KM)	11.51	90% gamma percentile (KM)	16.75
95% gamma percentile (KM)	22.03	99% gamma percentile (KM)	34.39

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (117.54, α)	93.51	Adjusted Chi Square Value (117.54, β)	93.03
95% Gamma Approximate KM-UCL (use when n>=50)	8.921	95% Gamma Adjusted KM-UCL (use when n<50)	8.967

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.94	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.156	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.139	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	7.159	Mean in Log Scale	1.7
SD in Original Scale	7.403	SD in Log Scale	0.687
95% t UCL (assumes normality of ROS data)	8.692	95% Percentile Bootstrap UCL	8.895
95% BCA Bootstrap UCL	9.397	95% Bootstrap t UCL	10.14
95% H-UCL (Log ROS)	8.233		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.692	KM Geo Mean	5.43
KM SD (logged)	0.676	95% Critical H Value (KM-Log)	1.992
KM Standard Error of Mean (logged)	0.0918	95% H-UCL (KM -Log)	8.075
KM SD (logged)	0.676	95% Critical H Value (KM-Log)	1.992
KM Standard Error of Mean (logged)	0.0918		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	7.356	Mean in Log Scale	1.661
SD in Original Scale	7.414	SD in Log Scale	0.866
95% t UCL (Assumes normality)	8.891	95% H-Stat UCL	9.67

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	11.18

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (benzo(a)pyrene)

General Statistics

Total Number of Observations	27	Number of Distinct Observations	12
Number of Detects	4	Number of Non-Detects	23
Number of Distinct Detects	4	Number of Distinct Non-Detects	9
Minimum Detect	0.47	Minimum Non-Detect	0.03
Maximum Detect	3	Maximum Non-Detect	3
Variance Detects	1.281	Percent Non-Detects	85.19%
Mean Detects	1.335	SD Detects	1.132
Median Detects	0.935	CV Detects	0.848
Skewness Detects	1.765	Kurtosis Detects	3.358
Mean of Logged Detects	0.0519	SD of Logged Detects	0.77

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.797	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.376	Lilliefors GOF Test
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.234	KM Standard Error of Mean	0.135
KM SD	0.601	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.465	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.457	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.64	95% KM Chebyshev UCL	0.824
97.5% KM Chebyshev UCL	1.079	99% KM Chebyshev UCL	1.58

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.417	Anderson-Darling GOF Test
5% A-D Critical Value	0.66	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.34	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.398	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.262	k star (bias corrected MLE)	0.732
Theta hat (MLE)	0.59	Theta star (bias corrected MLE)	1.823
nu hat (MLE)	18.1	nu star (bias corrected)	5.858
Mean (detects)	1.335		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.206
Maximum	3	Median	0.01
SD	0.615	CV	2.98
k hat (MLE)	0.296	k star (bias corrected MLE)	0.288
Theta hat (MLE)	0.697	Theta star (bias corrected MLE)	0.717
nu hat (MLE)	15.97	nu star (bias corrected)	15.53

Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (15.53, α)	7.632	Adjusted Chi Square Value (15.53, β)	7.279
95% Gamma Approximate UCL (use when n>=50)	0.42	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.234	SD (KM)	0.601
Variance (KM)	0.362	SE of Mean (KM)	0.135
k hat (KM)	0.152	k star (KM)	0.159
nu hat (KM)	8.187	nu star (KM)	8.611
theta hat (KM)	1.545	theta star (KM)	1.469
80% gamma percentile (KM)	0.267	90% gamma percentile (KM)	0.7
95% gamma percentile (KM)	1.273	99% gamma percentile (KM)	2.917

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.61, α)	3.094	Adjusted Chi Square Value (8.61, β)	2.885
95% Gamma Approximate KM-UCL (use when n>=50)	0.652	95% Gamma Adjusted KM-UCL (use when n<50)	0.699

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.293	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.26	Mean in Log Scale	-2.556
SD in Original Scale	0.6	SD in Log Scale	1.448
95% t UCL (assumes normality of ROS data)	0.457	95% Percentile Bootstrap UCL	0.463
95% BCA Bootstrap UCL	0.572	95% Bootstrap t UCL	0.804
95% H-UCL (Log ROS)	0.543		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.933	KM Geo Mean	0.0532
KM SD (logged)	1.328	95% Critical H Value (KM-Log)	2.977
KM Standard Error of Mean (logged)	0.307	95% H-UCL (KM -Log)	0.279
KM SD (logged)	1.328	95% Critical H Value (KM-Log)	2.977
KM Standard Error of Mean (logged)	0.307		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.401	Mean in Log Scale	-1.665
SD in Original Scale	0.632	SD in Log Scale	1.213
95% t UCL (Assumes normality)	0.609	95% H-Stat UCL	0.771

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.465

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cadmium)

General Statistics

Total Number of Observations	65	Number of Distinct Observations	43
Number of Detects	44	Number of Non-Detects	21
Number of Distinct Detects	36	Number of Distinct Non-Detects	10
Minimum Detect	0.18	Minimum Non-Detect	0.25

Maximum Detect	44	Maximum Non-Detect	0.7
Variance Detects	47.11	Percent Non-Detects	32.31%
Mean Detects	2.912	SD Detects	6.864
Median Detects	0.97	CV Detects	2.357
Skewness Detects	5.318	Kurtosis Detects	31.29
Mean of Logged Detects	0.217	SD of Logged Detects	1.099

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.384	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.944	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.345	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.132	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.063	KM Standard Error of Mean	0.717
KM SD	5.717	95% KM (BCA) UCL	3.452
95% KM (t) UCL	3.26	95% KM (Percentile Bootstrap) UCL	3.37
95% KM (z) UCL	3.243	95% KM Bootstrap t UCL	5.48
90% KM Chebyshev UCL	4.215	95% KM Chebyshev UCL	5.19
97.5% KM Chebyshev UCL	6.543	99% KM Chebyshev UCL	9.201

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.748	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.794	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.139	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.708	k star (bias corrected MLE)	0.675
Theta hat (MLE)	4.111	Theta star (bias corrected MLE)	4.313
nu hat (MLE)	62.33	nu star (bias corrected)	59.41
Mean (detects)	2.912		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.974
Maximum	44	Median	0.61
SD	5.79	CV	2.933
k hat (MLE)	0.335	k star (bias corrected MLE)	0.33
Theta hat (MLE)	5.892	Theta star (bias corrected MLE)	5.985
nu hat (MLE)	43.56	nu star (bias corrected)	42.88
Adjusted Level of Significance (β)	0.0463		
Approximate Chi Square Value (42.88, α)	28.87	Adjusted Chi Square Value (42.88, β)	28.61
95% Gamma Approximate UCL (use when n>=50)	2.933	95% Gamma Adjusted UCL (use when n<50)	2.96

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.063	SD (KM)	5.717
Variance (KM)	32.68	SE of Mean (KM)	0.717
k hat (KM)	0.13	k star (KM)	0.134
nu hat (KM)	16.93	nu star (KM)	17.48
theta hat (KM)	15.84	theta star (KM)	15.34
80% gamma percentile (KM)	2.038	90% gamma percentile (KM)	6.005
95% gamma percentile (KM)	11.58	99% gamma percentile (KM)	28.14

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (17.48, α)	9.017	Adjusted Chi Square Value (17.48, β)	8.879
95% Gamma Approximate KM-UCL (use when n>=50)	4	95% Gamma Adjusted KM-UCL (use when n<50)	4.062

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk GOF Test**

5% Shapiro Wilk Critical Value	0.944	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.132	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.039	Mean in Log Scale	-0.413
SD in Original Scale	5.769	SD in Log Scale	1.33
95% t UCL (assumes normality of ROS data)	3.234	95% Percentile Bootstrap UCL	3.322
95% BCA Bootstrap UCL	4.243	95% Bootstrap t UCL	5.429
95% H-UCL (Log ROS)	2.319		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.291	KM Geo Mean	0.747
KM SD (logged)	1.183	95% Critical H Value (KM-Log)	2.234
KM Standard Error of Mean (logged)	0.153	95% H-UCL (KM -Log)	2.093
KM SD (logged)	1.183	95% Critical H Value (KM-Log)	2.234
KM Standard Error of Mean (logged)	0.153		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.057	Mean in Log Scale	-0.302
SD in Original Scale	5.763	SD in Log Scale	1.194
95% t UCL (Assumes normality)	3.25	95% H-Stat UCL	2.105

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	5.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cobalt)

General Statistics

Total Number of Observations	65	Number of Distinct Observations	43
Number of Detects	62	Number of Non-Detects	3
Number of Distinct Detects	42	Number of Distinct Non-Detects	1
Minimum Detect	2.6	Minimum Non-Detect	2
Maximum Detect	28	Maximum Non-Detect	2
Variance Detects	32.58	Percent Non-Detects	4.615%
Mean Detects	10.07	SD Detects	5.708
Median Detects	9.1	CV Detects	0.567
Skewness Detects	1.072	Kurtosis Detects	1.111
Mean of Logged Detects	2.149	SD of Logged Detects	0.588

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.915	**Normal GOF Test on Detected Observations Only**	
5% Shapiro Wilk P Value	2.1744E-4	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.118	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.112	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	9.694	KM Standard Error of Mean	0.723
KM SD	5.783	95% KM (BCA) UCL	10.88
95% KM (t) UCL	10.9	95% KM (Percentile Bootstrap) UCL	10.93
95% KM (z) UCL	10.88	95% KM Bootstrap t UCL	11.02
90% KM Chebyshev UCL	11.86	95% KM Chebyshev UCL	12.85
97.5% KM Chebyshev UCL	14.21	99% KM Chebyshev UCL	16.89

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.226	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0618	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.114	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.278	k star (bias corrected MLE)	3.13
Theta hat (MLE)	3.071	Theta star (bias corrected MLE)	3.216
nu hat (MLE)	406.5	nu star (bias corrected)	388.1
Mean (detects)	10.07		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.374	Mean	9.642
Maximum	28	Median	8.7
SD	5.903	CV	0.612
k hat (MLE)	2.342	k star (bias corrected MLE)	2.244
Theta hat (MLE)	4.117	Theta star (bias corrected MLE)	4.296
nu hat (MLE)	304.5	nu star (bias corrected)	291.7
Adjusted Level of Significance (β)	0.0463		
Approximate Chi Square Value (291.75, α)	253.2	Adjusted Chi Square Value (291.75, β)	252.4
95% Gamma Approximate UCL (use when n>=50)	11.11	95% Gamma Adjusted UCL (use when n<50)	11.15

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.694	SD (KM)	5.783
Variance (KM)	33.44	SE of Mean (KM)	0.723
k hat (KM)	2.81	k star (KM)	2.691
nu hat (KM)	365.3	nu star (KM)	349.8
theta hat (KM)	3.45	theta star (KM)	3.603
80% gamma percentile (KM)	14.01	90% gamma percentile (KM)	17.61
95% gamma percentile (KM)	21	99% gamma percentile (KM)	28.38

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (349.79, α)	307.5	Adjusted Chi Square Value (349.79, β)	306.6
95% Gamma Approximate KM-UCL (use when n>=50)	11.03	95% Gamma Adjusted KM-UCL (use when n<50)	11.06

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.964	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.16	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0707	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.112	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	9.699	Mean in Log Scale	2.084
SD in Original Scale	5.822	SD in Log Scale	0.648
95% t UCL (assumes normality of ROS data)	10.9	95% Percentile Bootstrap UCL	10.91
95% BCA Bootstrap UCL	11.01	95% Bootstrap t UCL	10.97
95% H-UCL (Log ROS)	11.63		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.082	KM Geo Mean	8.019
KM SD (logged)	0.647	95% Critical H Value (KM-Log)	1.969
KM Standard Error of Mean (logged)	0.0809	95% H-UCL (KM -Log)	11.59
KM SD (logged)	0.647	95% Critical H Value (KM-Log)	1.969
KM Standard Error of Mean (logged)	0.0809		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	9.648	Mean in Log Scale	2.05

SD in Original Scale	5.893	SD in Log Scale	0.732
95% t UCL (Assumes normality)	10.87	95% H-Stat UCL	12.24

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	11.03	95% GROS Approximate Gamma UCL	11.11

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (lead)

General Statistics

Total Number of Observations	134	Number of Distinct Observations	92
Number of Detects	131	Number of Non-Detects	3
Number of Distinct Detects	92	Number of Distinct Non-Detects	1
Minimum Detect	1.5	Minimum Non-Detect	12
Maximum Detect	10000	Maximum Non-Detect	12
Variance Detects	1103504	Percent Non-Detects	2.239%
Mean Detects	343.6	SD Detects	1050
Median Detects	68	CV Detects	3.057
Skewness Detects	6.863	Kurtosis Detects	57.06
Mean of Logged Detects	4.297	SD of Logged Detects	1.673

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.349	Normal GOF Test on Detected Observations Only
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.372	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0778	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	336.1	KM Standard Error of Mean	89.83
KM SD	1036	95% KM (BCA) UCL	514.4
95% KM (t) UCL	484.9	95% KM (Percentile Bootstrap) UCL	499.1
95% KM (z) UCL	483.9	95% KM Bootstrap t UCL	631.9
90% KM Chebyshev UCL	605.6	95% KM Chebyshev UCL	727.7
97.5% KM Chebyshev UCL	897.1	99% KM Chebyshev UCL	1230

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	7.515	Anderson-Darling GOF Test
5% A-D Critical Value	0.838	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.2	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.087	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.423	k star (bias corrected MLE)	0.418
Theta hat (MLE)	812.9	Theta star (bias corrected MLE)	821.8
nu hat (MLE)	110.8	nu star (bias corrected)	109.6
Mean (detects)	343.6		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	335.9
Maximum	10000	Median	61.5
SD	1040	CV	3.095

k hat (MLE)	0.385	k star (bias corrected MLE)	0.381
Theta hat (MLE)	872.5	Theta star (bias corrected MLE)	880.8
nu hat (MLE)	103.2	nu star (bias corrected)	102.2
Adjusted Level of Significance (β)	0.0482		
Approximate Chi Square Value (102.21, α)	79.89	Adjusted Chi Square Value (102.21, β)	79.67
95% Gamma Approximate UCL (use when n>=50)	429.8	95% Gamma Adjusted UCL (use when n<50)	431

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	336.1	SD (KM)	1036
Variance (KM)	1073040	SE of Mean (KM)	89.83
k hat (KM)	0.105	k star (KM)	0.108
nu hat (KM)	28.21	nu star (KM)	28.92
theta hat (KM)	3193	theta star (KM)	3115
80% gamma percentile (KM)	259	90% gamma percentile (KM)	921
95% gamma percentile (KM)	1940	99% gamma percentile (KM)	5138

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (28.92, α)	17.64	Adjusted Chi Square Value (28.92, β)	17.55
95% Gamma Approximate KM-UCL (use when n>=50)	550.9	95% Gamma Adjusted KM-UCL (use when n<50)	553.9

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.98	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.469	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0561	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0778	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	336.1	Mean in Log Scale	4.239
SD in Original Scale	1040	SD in Log Scale	1.699
95% t UCL (assumes normality of ROS data)	484.9	95% Percentile Bootstrap UCL	517.6
95% BCA Bootstrap UCL	557.4	95% Bootstrap t UCL	633.8
95% H-UCL (Log ROS)	451.1		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	4.241	KM Geo Mean	69.5
KM SD (logged)	1.691	95% Critical H Value (KM-Log)	2.907
KM Standard Error of Mean (logged)	0.147	95% H-UCL (KM -Log)	444.4
KM SD (logged)	1.691	95% Critical H Value (KM-Log)	2.907
KM Standard Error of Mean (logged)	0.147		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	336.1	Mean in Log Scale	4.241
SD in Original Scale	1040	SD in Log Scale	1.695
95% t UCL (Assumes normality)	484.9	95% H-Stat UCL	448.4

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 444.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (nickel)

General Statistics

Total Number of Observations	65	Number of Distinct Observations	50
		Number of Missing Observations	0
Minimum	6.8	Mean	64.82

Maximum	350	Median	38
SD	64.46	Std. Error of Mean	7.995
Coefficient of Variation	0.994	Skewness	2.102

Normal GOF Test

Shapiro Wilk Test Statistic	0.755	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	1.965E-14	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.228	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.11	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	78.16	95% Adjusted-CLT UCL (Chen-1995)	80.19
		95% Modified-t UCL (Johnson-1978)	78.51

Gamma GOF Test

A-D Test Statistic	1.793	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.77	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.143	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.463	k star (bias corrected MLE)	1.406
Theta hat (MLE)	44.31	Theta star (bias corrected MLE)	46.11
nu hat (MLE)	190.2	nu star (bias corrected)	182.7
MLE Mean (bias corrected)	64.82	MLE Sd (bias corrected)	54.67
		Approximate Chi Square Value (0.05)	152.5
Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	151.8

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	77.68	95% Adjusted Gamma UCL (use when n<50)	78

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.268	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0947	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.11	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.917	Mean of logged Data	3.792
Maximum of Logged Data	5.858	SD of logged Data	0.857

Assuming Lognormal Distribution

95% H-UCL	80.6	90% Chebyshev (MVUE) UCL	86.73
95% Chebyshev (MVUE) UCL	97.22	97.5% Chebyshev (MVUE) UCL	111.8
99% Chebyshev (MVUE) UCL	140.4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	77.97	95% Jackknife UCL	78.16
95% Standard Bootstrap UCL	77.84	95% Bootstrap-t UCL	81.68
95% Hall's Bootstrap UCL	80.43	95% Percentile Bootstrap UCL	78.88
95% BCA Bootstrap UCL	80.92		
90% Chebyshev(Mean, Sd) UCL	88.8	95% Chebyshev(Mean, Sd) UCL	99.67
97.5% Chebyshev(Mean, Sd) UCL	114.7	99% Chebyshev(Mean, Sd) UCL	144.4

Suggested UCL to Use

95% H-UCL	80.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Result (oil & grease)

General Statistics

Total Number of Observations	34	Number of Distinct Observations	33
Number of Detects	32	Number of Non-Detects	2
Number of Distinct Detects	32	Number of Distinct Non-Detects	1
Minimum Detect	68	Minimum Non-Detect	50
Maximum Detect	45000	Maximum Non-Detect	50
Variance Detects	1.564E+8	Percent Non-Detects	5.882%
Mean Detects	10746	SD Detects	12505
Median Detects	6493	CV Detects	1.164
Skewness Detects	1.415	Kurtosis Detects	1.145
Mean of Logged Detects	8.312	SD of Logged Detects	1.754

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.801	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	10117	KM Standard Error of Mean	2126
KM SD	12203	95% KM (BCA) UCL	13743
95% KM (t) UCL	13716	95% KM (Percentile Bootstrap) UCL	13709
95% KM (z) UCL	13615	95% KM Bootstrap t UCL	14788
90% KM Chebyshev UCL	16496	95% KM Chebyshev UCL	19386
97.5% KM Chebyshev UCL	23396	99% KM Chebyshev UCL	31274

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.218	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.798	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.085	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.163	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.632	k star (bias corrected MLE)	0.594
Theta hat (MLE)	16998	Theta star (bias corrected MLE)	18098
nu hat (MLE)	40.46	nu star (bias corrected)	38
Mean (detects)	10746		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	10114
Maximum	45000	Median	4940
SD	12389	CV	1.225
k hat (MLE)	0.395	k star (bias corrected MLE)	0.38
Theta hat (MLE)	25603	Theta star (bias corrected MLE)	26631
nu hat (MLE)	26.86	nu star (bias corrected)	25.83
Adjusted Level of Significance (β)	0.0422		
Approximate Chi Square Value (25.83, α)	15.24	Adjusted Chi Square Value (25.83, β)	14.84
95% Gamma Approximate UCL (use when n>=50)	17133	95% Gamma Adjusted UCL (use when n<50)	17598

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	10117	SD (KM)	12203
Variance (KM)	1.489E+8	SE of Mean (KM)	2126
k hat (KM)	0.687	k star (KM)	0.646
nu hat (KM)	46.74	nu star (KM)	43.95
theta hat (KM)	14720	theta star (KM)	15655
80% gamma percentile (KM)	16664	90% gamma percentile (KM)	25872
95% gamma percentile (KM)	35443	99% gamma percentile (KM)	58443

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (43.95, α)	29.74	Adjusted Chi Square Value (43.95, β)	29.16
95% Gamma Approximate KM-UCL (use when n>=50)	14948	95% Gamma Adjusted KM-UCL (use when n<50)	15245

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.933	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.93	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.138	Lilliefors GOF Test
5% Lilliefors Critical Value	0.154	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	10118	Mean in Log Scale	8.073
SD in Original Scale	12386	SD in Log Scale	1.961
95% t UCL (assumes normality of ROS data)	13713	95% Percentile Bootstrap UCL	13452
95% BCA Bootstrap UCL	13930	95% Bootstrap t UCL	14453
95% H-UCL (Log ROS)	80379		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	8.054	KM Geo Mean	3145
KM SD (logged)	1.969	95% Critical H Value (KM-Log)	3.822
KM Standard Error of Mean (logged)	0.343	95% H-UCL (KM -Log)	81070
KM SD (logged)	1.969	95% Critical H Value (KM-Log)	3.822
KM Standard Error of Mean (logged)	0.343		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	10116	Mean in Log Scale	8.013
SD in Original Scale	12388	SD in Log Scale	2.091
95% t UCL (Assumes normality)	13711	95% H-Stat UCL	115664

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

usted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	15245

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (tph-diesel)

General Statistics

Total Number of Observations	94	Number of Distinct Observations	59
Number of Detects	72	Number of Non-Detects	22
Number of Distinct Detects	57	Number of Distinct Non-Detects	2
Minimum Detect	1.6	Minimum Non-Detect	1
Maximum Detect	5050	Maximum Non-Detect	10
Variance Detects	366225	Percent Non-Detects	23.4%
Mean Detects	174.6	SD Detects	605.2
Median Detects	41.5	CV Detects	3.466
Skewness Detects	7.606	Kurtosis Detects	61.48
Mean of Logged Detects	3.837	SD of Logged Detects	1.514

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.27	**Normal GOF Test on Detected Observations Only**	
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.387	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.104	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	134.7	KM Standard Error of Mean	55.14
KM SD	530.9	95% KM (BCA) UCL	250.5
95% KM (t) UCL	226.3	95% KM (Percentile Bootstrap) UCL	237.8
95% KM (z) UCL	225.4	95% KM Bootstrap t UCL	452
90% KM Chebyshev UCL	300.1	95% KM Chebyshev UCL	375.1
97.5% KM Chebyshev UCL	479.1	99% KM Chebyshev UCL	683.4

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.592	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.822	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.176	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.111	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.482	k star (bias corrected MLE)	0.471
Theta hat (MLE)	362.4	Theta star (bias corrected MLE)	370.7
nu hat (MLE)	69.38	nu star (bias corrected)	67.83
Mean (detects)	174.6		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	133.7
Maximum	5050	Median	28
SD	534	CV	3.992
k hat (MLE)	0.236	k star (bias corrected MLE)	0.236
Theta hat (MLE)	566.3	Theta star (bias corrected MLE)	567.4
nu hat (MLE)	44.4	nu star (bias corrected)	44.32
Adjusted Level of Significance (β)	0.0474		
Approximate Chi Square Value (44.32, α)	30.05	Adjusted Chi Square Value (44.32, β)	29.87
95% Gamma Approximate UCL (use when n>=50)	197.3	95% Gamma Adjusted UCL (use when n<50)	198.5

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	134.7	SD (KM)	530.9
Variance (KM)	281824	SE of Mean (KM)	55.14
k hat (KM)	0.0644	k star (KM)	0.0694
nu hat (KM)	12.11	nu star (KM)	13.06
theta hat (KM)	2092	theta star (KM)	1940
80% gamma percentile (KM)	47.37	90% gamma percentile (KM)	288.9
95% gamma percentile (KM)	774.2	99% gamma percentile (KM)	2548

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.06, α)	5.93	Adjusted Chi Square Value (13.06, β)	5.855
95% Gamma Approximate KM-UCL (use when n>=50)	296.6	95% Gamma Adjusted KM-UCL (use when n<50)	300.4

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.989	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0.942	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0546	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.104	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	134.8	Mean in Log Scale	3.193

SD in Original Scale	533.7	SD in Log Scale	1.829
95% t UCL (assumes normality of ROS data)	226.2	95% Percentile Bootstrap UCL	241.8
95% BCA Bootstrap UCL	352.1	95% Bootstrap t UCL	443.3
95% H-UCL (Log ROS)	237.6		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.213	KM Geo Mean	24.86
KM SD (logged)	1.775	95% Critical H Value (KM-Log)	3.118
KM Standard Error of Mean (logged)	0.193	95% H-UCL (KM -Log)	213.1
KM SD (logged)	1.775	95% Critical H Value (KM-Log)	3.118
KM Standard Error of Mean (logged)	0.193		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	134.8	Mean in Log Scale	3.266
SD in Original Scale	533.7	SD in Log Scale	1.712
95% t UCL (Assumes normality)	226.3	95% H-Stat UCL	194.5

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 213.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (vanadium)

General Statistics

Total Number of Observations	65	Number of Distinct Observations	44
		Number of Missing Observations	0
Minimum	5	Mean	201
Maximum	11000	Median	31
SD	1360	Std. Error of Mean	168.7
Coefficient of Variation	6.767	Skewness	8.061

Normal GOF Test

Shapiro Wilk Test Statistic	0.133	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.522	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.11	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	482.7	95% Adjusted-CLT UCL (Chen-1995)	658.9
		95% Modified-t UCL (Johnson-1978)	510.8

Gamma GOF Test

A-D Test Statistic	17.25	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.851	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.474	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.119	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.355	k star (bias corrected MLE)	0.349
Theta hat (MLE)	566.2	Theta star (bias corrected MLE)	576.2
nu hat (MLE)	46.16	nu star (bias corrected)	45.36
MLE Mean (bias corrected)	201	MLE Sd (bias corrected)	340.3
		Approximate Chi Square Value (0.05)	30.91

Adjusted Level of Significance	0.0463	Adjusted Chi Square Value	30.64

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	295	95% Adjusted Gamma UCL (use when n<50)	297.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.726	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	4.441E-16	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.202	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.11	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.609	Mean of logged Data	3.414
Maximum of Logged Data	9.306	SD of logged Data	0.955

Assuming Lognormal Distribution

95% H-UCL	62.54	90% Chebyshev (MVUE) UCL	67.25
95% Chebyshev (MVUE) UCL	76.21	97.5% Chebyshev (MVUE) UCL	88.65
99% Chebyshev (MVUE) UCL	113.1		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	478.6	95% Jackknife UCL	482.7
95% Standard Bootstrap UCL	479.7	95% Bootstrap-t UCL	15968
95% Hall's Bootstrap UCL	2839	95% Percentile Bootstrap UCL	538.8
95% BCA Bootstrap UCL	708.5		
90% Chebyshev(Mean, Sd) UCL	707.3	95% Chebyshev(Mean, Sd) UCL	936.6
97.5% Chebyshev(Mean, Sd) UCL	1255	99% Chebyshev(Mean, Sd) UCL	1880

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	936.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (vinyl chloride)

General Statistics

Total Number of Observations	52	Number of Distinct Observations	35
Number of Detects	6	Number of Non-Detects	46
Number of Distinct Detects	6	Number of Distinct Non-Detects	29
Minimum Detect	0.014	Minimum Non-Detect	0.0031
Maximum Detect	14	Maximum Non-Detect	2.5
Variance Detects	31.23	Percent Non-Detects	88.46%
Mean Detects	2.908	SD Detects	5.589
Median Detects	0.049	CV Detects	1.922
Skewness Detects	2.183	Kurtosis Detects	4.808
Mean of Logged Detects	-1.645	SD of Logged Detects	2.836

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.629	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.361	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.338	KM Standard Error of Mean	0.299
KM SD	1.966	95% KM (BCA) UCL	0.878
95% KM (t) UCL	0.839	95% KM (Percentile Bootstrap) UCL	0.877
95% KM (z) UCL	0.83	95% KM Bootstrap t UCL	54.01

90% KM Chebyshev UCL	1.234	95% KM Chebyshev UCL	1.64
97.5% KM Chebyshev UCL	2.203	99% KM Chebyshev UCL	3.31

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.749	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.781	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.383	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.36	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.26	k star (bias corrected MLE)	0.241
Theta hat (MLE)	11.18	Theta star (bias corrected MLE)	12.06
nu hat (MLE)	3.122	nu star (bias corrected)	2.894
Mean (detects)	2.908		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.344
Maximum	14	Median	0.01
SD	1.984	CV	5.761
k hat (MLE)	0.226	k star (bias corrected MLE)	0.226
Theta hat (MLE)	1.525	Theta star (bias corrected MLE)	1.527
nu hat (MLE)	23.48	nu star (bias corrected)	23.46
Adjusted Level of Significance (β)	0.0454		
Approximate Chi Square Value (23.46, α)	13.44	Adjusted Chi Square Value (23.46, β)	13.22
95% Gamma Approximate UCL (use when n>=50)	0.601	95% Gamma Adjusted UCL (use when n<50)	0.611

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.338	SD (KM)	1.966
Variance (KM)	3.864	SE of Mean (KM)	0.299
k hat (KM)	0.0296	k star (KM)	0.0407
nu hat (KM)	3.081	nu star (KM)	4.237
theta hat (KM)	11.42	theta star (KM)	8.306
80% gamma percentile (KM)	0.0202	90% gamma percentile (KM)	0.379
95% gamma percentile (KM)	1.64	99% gamma percentile (KM)	7.946

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.24, α)	0.817	Adjusted Chi Square Value (4.24, β)	0.777
95% Gamma Approximate KM-UCL (use when n>=50)	1.754	95% Gamma Adjusted KM-UCL (use when n<50)	1.844

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.824	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.326	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data Not Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.336	Mean in Log Scale	-13.62
SD in Original Scale	1.985	SD in Log Scale	5.239
95% t UCL (assumes normality of ROS data)	0.797	95% Percentile Bootstrap UCL	0.874
95% BCA Bootstrap UCL	1.349	95% Bootstrap t UCL	69.58
95% H-UCL (Log ROS)	527.1		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.292	KM Geo Mean	0.00503
KM SD (logged)	1.59	95% Critical H Value (KM-Log)	3.029
KM Standard Error of Mean (logged)	0.242	95% H-UCL (KM -Log)	0.0349
KM SD (logged)	1.59	95% Critical H Value (KM-Log)	3.029
KM Standard Error of Mean (logged)	0.242		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.378	Mean in Log Scale	-5.075
SD in Original Scale	1.989	SD in Log Scale	1.918
95% t UCL (Assumes normality)	0.84	95% H-Stat UCL	0.0998

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	1.754

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

FUTURE MAINTENANCE/UTILITY WORKER

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/7/2016 3:56:10 PM
From File	Soil_EPC_data.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (aroclor-1260)

General Statistics

Total Number of Observations	26	Number of Distinct Observations	22
Number of Detects	19	Number of Non-Detects	7
Number of Distinct Detects	18	Number of Distinct Non-Detects	4
Minimum Detect	0.12	Minimum Non-Detect	0.012
Maximum Detect	55	Maximum Non-Detect	1
Variance Detects	153.8	Percent Non-Detects	26.92%
Mean Detects	4.415	SD Detects	12.4
Median Detects	0.8	CV Detects	2.809
Skewness Detects	4.191	Kurtosis Detects	17.92
Mean of Logged Detects	0.0774	SD of Logged Detects	1.479

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.353	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.418	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.197	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.263	KM Standard Error of Mean	2.114
KM SD	10.49	95% KM (BCA) UCL	7.669
95% KM (t) UCL	6.875	95% KM (Percentile Bootstrap) UCL	7.24
95% KM (z) UCL	6.741	95% KM Bootstrap t UCL	29.53
90% KM Chebyshev UCL	9.606	95% KM Chebyshev UCL	12.48
97.5% KM Chebyshev UCL	16.47	99% KM Chebyshev UCL	24.3

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.76	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.811	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.211	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.458	k star (bias corrected MLE)	0.42
Theta hat (MLE)	9.65	Theta star (bias corrected MLE)	10.5
nu hat (MLE)	17.39	nu star (bias corrected)	15.97
Mean (detects)	4.415		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.229
Maximum	55	Median	0.53
SD	10.71	CV	3.317
k hat (MLE)	0.294	k star (bias corrected MLE)	0.285
Theta hat (MLE)	10.99	Theta star (bias corrected MLE)	11.31
nu hat (MLE)	15.28	nu star (bias corrected)	14.85
Adjusted Level of Significance (β)	0.0398		
Approximate Chi Square Value (14.85, α)	7.154	Adjusted Chi Square Value (14.85, β)	6.803
95% Gamma Approximate UCL (use when n>=50)	6.701	95% Gamma Adjusted UCL (use when n<50)	7.047

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.263	SD (KM)	10.49
Variance (KM)	110.1	SE of Mean (KM)	2.114
k hat (KM)	0.0967	k star (KM)	0.111
nu hat (KM)	5.03	nu star (KM)	5.783
theta hat (KM)	33.74	theta star (KM)	29.35
80% gamma percentile (KM)	2.614	90% gamma percentile (KM)	9.035
95% gamma percentile (KM)	18.78	99% gamma percentile (KM)	49.13

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.78, α)	1.53	Adjusted Chi Square Value (5.78, β)	1.391
95% Gamma Approximate KM-UCL (use when n>=50)	12.34	95% Gamma Adjusted KM-UCL (use when n<50)	13.57

95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.124	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.197	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.263	Mean in Log Scale	-0.629
SD in Original Scale	10.7	SD in Log Scale	1.804
95% t UCL (assumes normality of ROS data)	6.848	95% Percentile Bootstrap UCL	7.436
95% BCA Bootstrap UCL	9.968	95% Bootstrap t UCL	29.44
95% H-UCL (Log ROS)	10.28		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.854	KM Geo Mean	0.426
KM SD (logged)	2.135	95% Critical H Value (KM-Log)	4.228
KM Standard Error of Mean (logged)	0.447	95% H-UCL (KM -Log)	25.29
KM SD (logged)	2.135	95% Critical H Value (KM-Log)	4.228
KM Standard Error of Mean (logged)	0.447		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.287	Mean in Log Scale	-0.701
SD in Original Scale	10.69	SD in Log Scale	2.077
95% t UCL (Assumes normality)	6.869	95% H-Stat UCL	23.87

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL 25.29

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (arsenic)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	5
Number of Detects	6	Number of Non-Detects	4
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	5.2	Minimum Non-Detect	16
Maximum Detect	6.9	Maximum Non-Detect	16
Variance Detects	0.515	Percent Non-Detects	40%
Mean Detects	6.033	SD Detects	0.717
Median Detects	5.8	CV Detects	0.119
Skewness Detects	0.455	Kurtosis Detects	-1.807

Mean of Logged Detects	1.791	SD of Logged Detects	0.118

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.866	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	6.033	KM Standard Error of Mean	0.293
KM SD	0.655	95% KM (BCA) UCL	N/A
95% KM (t) UCL	6.57	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	6.515	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	6.912	95% KM Chebyshev UCL	7.31
97.5% KM Chebyshev UCL	7.862	99% KM Chebyshev UCL	8.947

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.47	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.696	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.242	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.332	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	86.36	k star (bias corrected MLE)	43.29
Theta hat (MLE)	0.0699	Theta star (bias corrected MLE)	0.139
nu hat (MLE)	1036	nu star (bias corrected)	519.5
Mean (detects)	6.033		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	5.2	Mean	6.032
Maximum	6.9	Median	5.898
SD	0.647	CV	0.107
k hat (MLE)	97.57	k star (bias corrected MLE)	68.37
Theta hat (MLE)	0.0618	Theta star (bias corrected MLE)	0.0882
nu hat (MLE)	1951	nu star (bias corrected)	1367
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (N/A, α)	1282	Adjusted Chi Square Value (N/A, β)	1268
95% Gamma Approximate UCL (use when n>=50)	6.431	95% Gamma Adjusted UCL (use when n<50)	6.504

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	6.033	SD (KM)	0.655
Variance (KM)	0.429	SE of Mean (KM)	0.293
k hat (KM)	84.87	k star (KM)	59.48
nu hat (KM)	1697	nu star (KM)	1190
theta hat (KM)	0.0711	theta star (KM)	0.101
80% gamma percentile (KM)	6.68	90% gamma percentile (KM)	7.055
95% gamma percentile (KM)	7.375	99% gamma percentile (KM)	8.001

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	1110	Adjusted Chi Square Value (N/A, β)	1097
95% Gamma Approximate KM-UCL (use when n>=50)	6.463	95% Gamma Adjusted KM-UCL (use when n<50)	6.541

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.221	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	6.029	Mean in Log Scale	1.791
SD in Original Scale	0.645	SD in Log Scale	0.106
95% t UCL (assumes normality of ROS data)	6.403	95% Percentile Bootstrap UCL	6.361
95% BCA Bootstrap UCL	6.366	95% Bootstrap t UCL	6.45
95% H-UCL (Log ROS)	6.431		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.791	KM Geo Mean	5.998
KM SD (logged)	0.107	95% Critical H Value (KM-Log)	1.807
KM Standard Error of Mean (logged)	0.048	95% H-UCL (KM -Log)	6.436
KM SD (logged)	0.107	95% Critical H Value (KM-Log)	1.807
KM Standard Error of Mean (logged)	0.048		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	6.82	Mean in Log Scale	1.907
SD in Original Scale	1.148	SD in Log Scale	0.173
95% t UCL (Assumes normality)	7.485	95% H-Stat UCL	7.602

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	6.57

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cadmium)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	8
Number of Detects	4	Number of Non-Detects	6
Number of Distinct Detects	4	Number of Distinct Non-Detects	4
Minimum Detect	0.48	Minimum Non-Detect	0.34
Maximum Detect	44	Maximum Non-Detect	0.7
Variance Detects	463	Percent Non-Detects	60%
Mean Detects	11.74	SD Detects	21.52
Median Detects	1.24	CV Detects	1.833
Skewness Detects	1.995	Kurtosis Detects	3.982
Mean of Logged Detects	0.787	SD of Logged Detects	2.089

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.654	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.426	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	4.923	KM Standard Error of Mean	4.759
KM SD	13.03	95% KM (BCA) UCL	N/A
95% KM (t) UCL	13.65	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	12.75	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	19.2	95% KM Chebyshev UCL	25.67
97.5% KM Chebyshev UCL	34.64	99% KM Chebyshev UCL	52.28

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.618	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.693	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.376	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.414	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.394	k star (bias corrected MLE)	0.265
Theta hat (MLE)	29.83	Theta star (bias corrected MLE)	44.29
nu hat (MLE)	3.149	nu star (bias corrected)	2.121
Mean (detects)	11.74		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.702
Maximum	44	Median	0.01
SD	13.82	CV	2.939
k hat (MLE)	0.186	k star (bias corrected MLE)	0.197
Theta hat (MLE)	25.25	Theta star (bias corrected MLE)	23.87
nu hat (MLE)	3.724	nu star (bias corrected)	3.94
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (3.94, α)	0.698	Adjusted Chi Square Value (3.94, β)	0.5
95% Gamma Approximate UCL (use when n>=50)	26.54	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.923	SD (KM)	13.03
Variance (KM)	169.9	SE of Mean (KM)	4.759
k hat (KM)	0.143	k star (KM)	0.167
nu hat (KM)	2.853	nu star (KM)	3.331
theta hat (KM)	34.51	theta star (KM)	29.56
80% gamma percentile (KM)	5.802	90% gamma percentile (KM)	14.77
95% gamma percentile (KM)	26.51	99% gamma percentile (KM)	59.9

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.33, α)	0.477	Adjusted Chi Square Value (3.33, β)	0.331
95% Gamma Approximate KM-UCL (use when n>=50)	34.39	95% Gamma Adjusted KM-UCL (use when n<50)	49.54

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.834	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.739	Mean in Log Scale	-1.847
SD in Original Scale	13.81	SD in Log Scale	2.766
95% t UCL (assumes normality of ROS data)	12.74	95% Percentile Bootstrap UCL	13.41
95% BCA Bootstrap UCL	17.84	95% Bootstrap t UCL	289.7
95% H-UCL (Log ROS)	5952		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.28	KM Geo Mean	0.756
KM SD (logged)	1.445	95% Critical H Value (KM-Log)	4.079
KM Standard Error of Mean (logged)	0.531	95% H-UCL (KM -Log)	15.3
KM SD (logged)	1.445	95% Critical H Value (KM-Log)	4.079
KM Standard Error of Mean (logged)	0.531		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.864	Mean in Log Scale	-0.474
SD in Original Scale	13.76	SD in Log Scale	1.638
95% t UCL (Assumes normality)	12.84	95% H-Stat UCL	28.28

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	N/A	95% Hall's Bootstrap	15.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (lead)

General Statistics

Total Number of Observations	35	Number of Distinct Observations	29
		Number of Missing Observations	0
Minimum	9.3	Mean	145.6
Maximum	1200	Median	45
SD	260.2	Std. Error of Mean	43.99
Coefficient of Variation	1.787	Skewness	3.149

Normal GOF Test

Shapiro Wilk Test Statistic	0.541	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.934	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.148	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	220	95% Adjusted-CLT UCL (Chen-1995)	243
		95% Modified-t UCL (Johnson-1978)	223.9

Gamma GOF Test

A-D Test Statistic	1.853	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.795	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.214	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.155	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.674	k star (bias corrected MLE)	0.635
Theta hat (MLE)	216	Theta star (bias corrected MLE)	229.2
nu hat (MLE)	47.18	nu star (bias corrected)	44.47
MLE Mean (bias corrected)	145.6	MLE Sd (bias corrected)	182.7
		Approximate Chi Square Value (0.05)	30.18
Adjusted Level of Significance	0.0425	Adjusted Chi Square Value	29.62

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	214.6	95% Adjusted Gamma UCL (use when n<50)	218.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.934	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.13	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.148	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.23	Mean of logged Data	4.08
Maximum of Logged Data	7.09	SD of logged Data	1.276

Assuming Lognormal Distribution

95% H-UCL	247.3	90% Chebyshev (MVUE) UCL	230.3
95% Chebyshev (MVUE) UCL	276.6	97.5% Chebyshev (MVUE) UCL	340.7
99% Chebyshev (MVUE) UCL	466.7		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	218	95% Jackknife UCL	220
95% Standard Bootstrap UCL	214.9	95% Bootstrap-t UCL	306.7
95% Hall's Bootstrap UCL	493.2	95% Percentile Bootstrap UCL	222.5
95% BCA Bootstrap UCL	252.5		
90% Chebyshev(Mean, Sd) UCL	277.6	95% Chebyshev(Mean, Sd) UCL	337.3
97.5% Chebyshev(Mean, Sd) UCL	420.3	99% Chebyshev(Mean, Sd) UCL	583.3

Suggested UCL to Use

95% H-UCL	247.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

Result (nickel)

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	18	Mean	93.4
Maximum	350	Median	52.5
SD	102.4	Std. Error of Mean	32.38
Coefficient of Variation	1.096	Skewness	2.156

Normal GOF Test

Shapiro Wilk Test Statistic	0.704	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.329	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.262	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	152.8	95% Adjusted-CLT UCL (Chen-1995)	170.2
		95% Modified-t UCL (Johnson-1978)	156.4

Gamma GOF Test

A-D Test Statistic	0.603	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.226	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.272	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.426	k star (bias corrected MLE)	1.065
Theta hat (MLE)	65.52	Theta star (bias corrected MLE)	87.74
nu hat (MLE)	28.51	nu star (bias corrected)	21.29
MLE Mean (bias corrected)	93.4	MLE Sd (bias corrected)	90.52
		Approximate Chi Square Value (0.05)	11.81
Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	10.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	168.4	95% Adjusted Gamma UCL (use when n<50)	187.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.262	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.89	Mean of logged Data	4.147
Maximum of Logged Data	5.858	SD of logged Data	0.874

Assuming Lognormal Distribution

95% H-UCL	212.6	90% Chebyshev (MVUE) UCL	164.6
95% Chebyshev (MVUE) UCL	199.1	97.5% Chebyshev (MVUE) UCL	247.1
99% Chebyshev (MVUE) UCL	341.3		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	146.7	95% Jackknife UCL	152.8
95% Standard Bootstrap UCL	143.1	95% Bootstrap-t UCL	323.2
95% Hall's Bootstrap UCL	412.3	95% Percentile Bootstrap UCL	151.5
95% BCA Bootstrap UCL	172.9		
90% Chebyshev(Mean, Sd) UCL	190.5	95% Chebyshev(Mean, Sd) UCL	234.5
97.5% Chebyshev(Mean, Sd) UCL	295.6	99% Chebyshev(Mean, Sd) UCL	415.6

Suggested UCL to Use

95% Adjusted Gamma UCL	187.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (tph-diesel)

General Statistics

Total Number of Observations	32	Number of Distinct Observations	24
Number of Detects	28	Number of Non-Detects	4
Number of Distinct Detects	23	Number of Distinct Non-Detects	1
Minimum Detect	1.6	Minimum Non-Detect	10
Maximum Detect	5050	Maximum Non-Detect	10
Variance Detects	892278	Percent Non-Detects	12.5%
Mean Detects	256.4	SD Detects	944.6
Median Detects	39.5	CV Detects	3.684
Skewness Detects	5.202	Kurtosis Detects	27.32
Mean of Logged Detects	3.883	SD of Logged Detects	1.533

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.261	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.427	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	224.9	KM Standard Error of Mean	156.9
KM SD	871.7	95% KM (BCA) UCL	538.8
95% KM (t) UCL	491	95% KM (Percentile Bootstrap) UCL	532.9
95% KM (z) UCL	483	95% KM Bootstrap t UCL	2756
90% KM Chebyshev UCL	695.7	95% KM Chebyshev UCL	908.9
97.5% KM Chebyshev UCL	1205	99% KM Chebyshev UCL	1786

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.116	**Anderson-Darling GOF Test**

5% A-D Critical Value	0.833	Detected Data Not Gamma Distributed at 5% Significance Level		
K-S Test Statistic	0.289	**Kolmogorov-Smirnov GOF**		
5% K-S Critical Value	0.177	Detected Data Not Gamma Distributed at 5% Significance Level		

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.396	k star (bias corrected MLE)	0.378
Theta hat (MLE)	647.2	Theta star (bias corrected MLE)	679.1
nu hat (MLE)	22.19	nu star (bias corrected)	21.14
Mean (detects)	256.4		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	224.3
Maximum	5050	Median	35.5
SD	885.8	CV	3.948
k hat (MLE)	0.271	k star (bias corrected MLE)	0.266
Theta hat (MLE)	828.9	Theta star (bias corrected MLE)	843.1
nu hat (MLE)	17.32	nu star (bias corrected)	17.03
Adjusted Level of Significance (β)	0.0416		
Approximate Chi Square Value (17.03, α)	8.694	Adjusted Chi Square Value (17.03, β)	8.375
95% Gamma Approximate UCL (use when n>=50)	439.5	95% Gamma Adjusted UCL (use when n<50)	456.2

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	224.9	SD (KM)	871.7
Variance (KM)	759792	SE of Mean (KM)	156.9
k hat (KM)	0.0666	k star (KM)	0.0812
nu hat (KM)	4.261	nu star (KM)	5.195
theta hat (KM)	3378	theta star (KM)	2771
80% gamma percentile (KM)	110.1	90% gamma percentile (KM)	538.2
95% gamma percentile (KM)	1309	99% gamma percentile (KM)	3956

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.20, α)	1.243	Adjusted Chi Square Value (5.20, β)	1.145
95% Gamma Approximate KM-UCL (use when n>=50)	939.8	95% Gamma Adjusted KM-UCL (use when n<50)	1021

95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.924	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.118	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.164	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	224.8	Mean in Log Scale	3.558
SD in Original Scale	885.6	SD in Log Scale	1.687
95% t UCL (assumes normality of ROS data)	490.3	95% Percentile Bootstrap UCL	528.5
95% BCA Bootstrap UCL	713	95% Bootstrap t UCL	2829
95% H-UCL (Log ROS)	402.8		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.567	KM Geo Mean	35.42
KM SD (logged)	1.653	95% Critical H Value (KM-Log)	3.311
KM Standard Error of Mean (logged)	0.304	95% H-UCL (KM -Log)	371.4
KM SD (logged)	1.653	95% Critical H Value (KM-Log)	3.311
KM Standard Error of Mean (logged)	0.304		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	225	Mean in Log Scale	3.599
SD in Original Scale	885.6	SD in Log Scale	1.622

95% t UCL (Assumes normality)	490.4	95% H-Stat UCL	352.6

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	908.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

FUTURE RESIDENT

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.111/7/2016 5:55:20 PM
From File	Soil_EPC_data.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (aroclor-1260)

General Statistics

Total Number of Observations	12	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	0.12	Mean	2.351
Maximum	8.3	Median	1.9
SD	2.166	Std. Error of Mean	0.625
Coefficient of Variation	0.921	Skewness	2.032

Normal GOF Test

Shapiro Wilk Test Statistic	0.801	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.233	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	3.474	95% Adjusted-CLT UCL (Chen-1995)	3.771
		95% Modified-t UCL (Johnson-1978)	3.535

Gamma GOF Test

A-D Test Statistic	0.235	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.749	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.128	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.25	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.333	k star (bias corrected MLE)	1.055
Theta hat (MLE)	1.763	Theta star (bias corrected MLE)	2.227
nu hat (MLE)	32	nu star (bias corrected)	25.33
MLE Mean (bias corrected)	2.351	MLE Sd (bias corrected)	2.288
		Approximate Chi Square Value (0.05)	14.87
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	13.65

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.006	95% Adjusted Gamma UCL (use when n<50)	4.361

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.159	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.12	Mean of logged Data	0.435
Maximum of Logged Data	2.116	SD of logged Data	1.094

Assuming Lognormal Distribution

95% H-UCL	7.773	90% Chebyshev (MVUE) UCL	5.285
95% Chebyshev (MVUE) UCL	6.494	97.5% Chebyshev (MVUE) UCL	8.171
99% Chebyshev (MVUE) UCL	11.47		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.379	95% Jackknife UCL	3.474
95% Standard Bootstrap UCL	3.324	95% Bootstrap-t UCL	4.115
95% Hall's Bootstrap UCL	8.284	95% Percentile Bootstrap UCL	3.417
95% BCA Bootstrap UCL	3.75		
90% Chebyshev(Mean, Sd) UCL	4.226	95% Chebyshev(Mean, Sd) UCL	5.076
97.5% Chebyshev(Mean, Sd) UCL	6.255	99% Chebyshev(Mean, Sd) UCL	8.572

Suggested UCL to Use

95% Student's-t UCL	3.474

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (arsenic)

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	5.2	Mean	6.16
Maximum	7	Median	6
SD	0.709	Std. Error of Mean	0.317
Coefficient of Variation	0.115	Skewness	-0.182

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use

guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.

For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.189	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.836	95% Adjusted-CLT UCL (Chen-1995)	6.654
		95% Modified-t UCL (Johnson-1978)	6.832

Gamma GOF Test

A-D Test Statistic	0.257	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.678	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.204	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.357	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	92.77	k star (bias corrected MLE)	37.24
Theta hat (MLE)	0.0664	Theta star (bias corrected MLE)	0.165
nu hat (MLE)	927.7	nu star (bias corrected)	372.4
MLE Mean (bias corrected)	6.16	MLE Sd (bias corrected)	1.009
		Approximate Chi Square Value (0.05)	328.7
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	310.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.979	95% Adjusted Gamma UCL (use when n<50)	7.388

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.178	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.649	Mean of logged Data	1.813
Maximum of Logged Data	1.946	SD of logged Data	0.117

Assuming Lognormal Distribution

95% H-UCL	6.957	90% Chebyshev (MVUE) UCL	7.125
95% Chebyshev (MVUE) UCL	7.562	97.5% Chebyshev (MVUE) UCL	8.168
99% Chebyshev (MVUE) UCL	9.359		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6.682	95% Jackknife UCL	6.836
95% Standard Bootstrap UCL	6.61	95% Bootstrap-t UCL	7.001
95% Hall's Bootstrap UCL	7.203	95% Percentile Bootstrap UCL	6.66
95% BCA Bootstrap UCL	6.66		
90% Chebyshev(Mean, Sd) UCL	7.112	95% Chebyshev(Mean, Sd) UCL	7.543
97.5% Chebyshev(Mean, Sd) UCL	8.141	99% Chebyshev(Mean, Sd) UCL	9.316

Suggested UCL to Use

95% Student's-t UCL	6.836

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Result (lead)

General Statistics

Total Number of Observations	19	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	9.3	Mean	85.33
Maximum	210	Median	70
SD	68.78	Std. Error of Mean	15.78
Coefficient of Variation	0.806	Skewness	0.637

Normal GOF Test

Shapiro Wilk Test Statistic	0.882	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.197	Data appear Normal at 5% Significance Level	

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	112.7	95% Adjusted-CLT UCL (Chen-1995)	113.7
		95% Modified-t UCL (Johnson-1978)	113.1

Gamma GOF Test

A-D Test Statistic	0.399	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.76	Detected data appear Gamma Distributed at 5% Significance Level	

K-S Test Statistic	0.134	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.203	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.387	k star (bias corrected MLE)	1.203
Theta hat (MLE)	61.54	Theta star (bias corrected MLE)	70.94
nu hat (MLE)	52.69	nu star (bias corrected)	45.71
MLE Mean (bias corrected)	85.33	MLE Sd (bias corrected)	77.8
		Approximate Chi Square Value (0.05)	31.2
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	30.15

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	125	95% Adjusted Gamma UCL (use when n<50)	129.4

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.13	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.197	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.23	Mean of logged Data	4.045
Maximum of Logged Data	5.347	SD of logged Data	1.004

Assuming Lognormal Distribution

95% H-UCL	175.4	90% Chebyshev (MVUE) UCL	161.1
95% Chebyshev (MVUE) UCL	192.9	97.5% Chebyshev (MVUE) UCL	236.9
99% Chebyshev (MVUE) UCL	323.5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	111.3	95% Jackknife UCL	112.7
95% Standard Bootstrap UCL	110.7	95% Bootstrap-t UCL	117.4
95% Hall's Bootstrap UCL	112.2	95% Percentile Bootstrap UCL	111.8
95% BCA Bootstrap UCL	114.1		
90% Chebyshev(Mean, Sd) UCL	132.7	95% Chebyshev(Mean, Sd) UCL	154.1
97.5% Chebyshev(Mean, Sd) UCL	183.9	99% Chebyshev(Mean, Sd) UCL	242.3

Suggested UCL to Use

95% Student's-t UCL	112.7

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (tph-diesel)

General Statistics

Total Number of Observations	17	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	1.6	Mean	88.22
Maximum	460	Median	56
SD	110	Std. Error of Mean	26.67
Coefficient of Variation	1.246	Skewness	2.685

Normal GOF Test

Shapiro Wilk Test Statistic	0.693	**Shapiro Wilk GOF Test**

5% Shapiro Wilk Critical Value	0.892	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	134.8	95% Adjusted-CLT UCL (Chen-1995)	150.6
		95% Modified-t UCL (Johnson-1978)	137.7

Gamma GOF Test

A-D Test Statistic	0.241	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.77	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.125	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.216	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.9	k star (bias corrected MLE)	0.78
Theta hat (MLE)	98.05	Theta star (bias corrected MLE)	113.1
nu hat (MLE)	30.59	nu star (bias corrected)	26.53
MLE Mean (bias corrected)	88.22	MLE Sd (bias corrected)	99.88
		Approximate Chi Square Value (0.05)	15.79
Adjusted Level of Significance	0.0346	Adjusted Chi Square Value	14.92

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	148.3	95% Adjusted Gamma UCL (use when n<50)	156.8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.141	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.207	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.47	Mean of logged Data	3.83
Maximum of Logged Data	6.131	SD of logged Data	1.327

Assuming Lognormal Distribution

95% H-UCL	320.4	90% Chebyshev (MVUE) UCL	215
95% Chebyshev (MVUE) UCL	266.3	97.5% Chebyshev (MVUE) UCL	337.4
99% Chebyshev (MVUE) UCL	477		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	132.1	95% Jackknife UCL	134.8
95% Standard Bootstrap UCL	131.1	95% Bootstrap-t UCL	183.3
95% Hall's Bootstrap UCL	321.8	95% Percentile Bootstrap UCL	134.3
95% BCA Bootstrap UCL	149.9		
90% Chebyshev(Mean, Sd) UCL	168.2	95% Chebyshev(Mean, Sd) UCL	204.5
97.5% Chebyshev(Mean, Sd) UCL	254.8	99% Chebyshev(Mean, Sd) UCL	353.6

Suggested UCL to Use

95% Adjusted Gamma UCL	156.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

APPENDIX B

SOIL VAPOR J&E MODELING SPREADSHEETS

FUTURE RESIDENT

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Benzene**

Results Summary

Soil Gas Conc. (µg/m³)	Attenuation Factor (unitless)	Indoor Air Conc. (µg/m³)	Cancer Risk	Noncancer Hazard
4.20E+03	6.7E-04	2.8E+00	2.9E-05	9.0E-01

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (µg/m³)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.20E+03			Benzene

MESSAGE: See VLOOKUP table comments on chemical properties and/or toxicity criteria for this chemical.

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	304.8	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm³/cm³)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SL	1.62	0.387	0.103	5

Lookup Soil Parameters

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Residential	70	26	26	350	24	0.5
					(NEW)	(NEW)

END

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **cis-1,2-Dichloroethylene**

Results Summary

Soil Gas Conc. (μg/m³)	Attenuation Factor (unitless)	Indoor Air Conc. (μg/m³)	Cancer Risk	Noncancer Hazard
9.80E+04	**6.6E-04**	**6.5E+01**	**NA**	**8.9E+00**

MESSAGE: Risk and/or hazard quotient is based on route-to-route extrapolation.

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m³)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
156592	9.80E+04			**cis-1,2-Dichloroethylene**

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	304.8	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm³/cm³)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SL	1.62	0.387	0.103	5

Lookup Soil Parameters

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Residential	70	26	26	350	24	0.5
					(NEW)	(NEW)

END

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

DATA ENTRY SHEET

Scenario: Residential
Chemical: Ethylbenzene

Results Summary

Soil Gas Conc. (μg/m³)	Attenuation Factor (unitless)	Indoor Air Conc. (μg/m³)	Cancer Risk	Noncancer Hazard
1.90E+03	9.3E-04	1.8E+00	1.6E-06	1.7E-03

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
100414	1.90E+03			Ethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	152.4	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SL	1.62	0.387	0.103	5

Lookup Soil Parameters

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	70	26	26	350	24	0.5
					(NEW)	(NEW)

END

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

DATA ENTRY SHEET

Scenario: Residential
Chemical: 1,1,2,2-Tetrachloroethane

Results Summary

Soil Gas Conc. (μg/m^3)	Attenuation Factor (unitless)	Indoor Air Conc. (μg/m^3)	Cancer Risk	Noncancer Hazard
2.50E+03	4.2E-04	1.0E+00	2.2E-05	1.4E-02

MESSAGE: Risk and/or hazard quotient is based on route-to-route extrapolation.

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
79345	2.50E+03			1,1,2,2-Tetrachloroethane

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	304.8	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SL	1.62	0.387	0.103	5

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Residential	70	26	26	350	24	0.5
					(NEW)	(NEW)

END

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

Scenario: **Residential**
Chemical: **Trichloroethylene**

DATA ENTRY SHEET

Results Summary

Soil Gas Conc. (μg/m^3)	Attenuation Factor (unitless)	Indoor Air Conc. (μg/m^3)	Cancer Risk	Noncancer Hazard
6.80E+02	**5.5E-04**	**3.7E-01**	**5.4E-07**	**1.8E-01**

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
79016	6.80E+02			**Trichloroethylene**

MESSAGE: See VLOOKUP table comments on chemical properties and/or toxicity criteria for this chemical.

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	304.8	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
Lookup Soil Parameters				
SL	1.62	0.387	0.103	5

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Residential	70	26	26	350	24	0.5
					(NEW)	(NEW)

END

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **1,2,4-Trimethylbenzene**

Results Summary				
Soil Gas Conc. (μg/m^3)	Attenuation Factor (unitless)	Indoor Air Conc. (μg/m^3)	Cancer Risk	Noncancer Hazard
5.80E+02	5.0E-04	2.9E-01	NA	4.0E-02

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
95636	5.80E+02			1,2,4-Trimethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	304.8	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SL	1.62	0.387	0.103	5

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Residential	70	26	26	350	24	0.5
					(NEW)	(NEW)

END

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

Scenario: Residential
Chemical: Vinyl chloride (chloroethene)

DATA ENTRY SHEET

Results Summary

Soil Gas Conc. (μg/m³)	Attenuation Factor (unitless)	Indoor Air Conc. (μg/m³)	Cancer Risk	Noncancer Hazard
9.20E+05	7.6E-04	7.0E+02	1.9E-02	6.7E+00

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m³)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
75014	9.20E+05			Vinyl chloride (chloroethene)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	304.8	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm³/cm³)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SL	1.62	0.387	0.103	5

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Residential	70	26	26	350	24	0.5
					(NEW)	(NEW)

END

FUTURE COMMERCIAL/INDUSTRIAL WORKER

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

Scenario: **Commercial**
Chemical: **Benzene**

DATA ENTRY SHEET

Results Summary

Soil Gas Conc. (μg/m³)	Attenuation Factor (unitless)	Indoor Air Conc. (μg/m³)	Cancer Risk	Noncancer Hazard
4.20E+03	3.3E-04	1.4E+00	3.3E-06	1.1E-01

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m³)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.20E+03			Benzene

MESSAGE: See VLOOKUP table comments on chemical properties and/or toxicity criteria for this chemical.

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm²)
15	304.8	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm³/cm³)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SL	1.62	0.387	0.103	5

Lookup Soil Parameters

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Commercial	70	25	25	250	8	1
					(NEW)	(NEW)

END

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

DATA ENTRY SHEET

Scenario: **Commercial**
Chemical: **cis-1,2-Dichloroethylene**

Results Summary				
Soil Gas Conc. (μg/m^3)	Attenuation Factor (unitless)	Indoor Air Conc. (μg/m^3)	Cancer Risk	Noncancer Hazard
9.80E+04	**3.3E-04**	**3.3E+01**	**NA**	**1.1E+00**

MESSAGE: Risk and/or hazard quotient is based on route-to-route extrapolation.

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
156592	9.80E+04			**cis-1,2-Dichloroethylene**

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	304.8	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SL	1.62	0.387	0.103	5

Lookup Soil Parameters

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Commercial	70	25	25	250	8	1
					(NEW)	(NEW)

END

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

Scenario: Commercial
Chemical: 1,1,2,2-Tetrachloroethane

DATA ENTRY SHEET

Results Summary

Soil Gas Conc. (μg/m^3)	Attenuation Factor (unitless)	Indoor Air Conc. (μg/m^3)	Cancer Risk	Noncancer Hazard
2.50E+03	**2.1E-04**	**5.2E-01**	**2.5E-06**	**1.7E-03**

MESSAGE: Risk and/or hazard quotient is based on route-to-route extrapolation.

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (μg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
79345	2.50E+03			**1,1,2,2-Tetrachloroethane**

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	304.8	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SL	1.62	0.387	0.103	5

Lookup Soil Parameters

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Commercial	70	25	25	250	8	1
					(NEW)	(NEW)

END

USEPA SG-SCREEN
Version 2.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Soil Gas

DATA ENTRY SHEET

Scenario: **Commercial**
Chemical: **Vinyl chloride (chloroethene)**

Results Summary				
Soil Gas Conc. (µg/m^3)	Attenuation Factor (unitless)	Indoor Air Conc. (µg/m^3)	Cancer Risk	Noncancer Hazard
9.20E+05	3.8E-04	3.5E+02	2.2E-03	8.0E-01

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (µg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
75014	9.20E+05			Vinyl chloride (chloroethene)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (°C)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	304.8	24	SL		

MORE ↓

ENTER Vandose zone SCS soil type	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SL	1.62	0.387	0.103	5

Lookup Soil Parameters

MORE ↓

Lookup Receptor Parameters

	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Commercial	70	25	25	250	8	1
					(NEW)	(NEW)

END

APPENDIX C

GROUNDWATER VAPOR INTRUSION EVALUATION

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

Reset to Defaults

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Vinyl chloride (chloroethene)**

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) (μg/m³)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) (μg/m³)	Cancer Risk	Noncancer Hazard	Cancer Risk $= 10^{-6}$ (μg/L)	Noncancer HQ = 1 (μg/L)
8.10E+03	9.2E-05	7.5E-01	2.1E-05	7.2E-03	NA	NA

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
75014	7.30E+00	Vinyl chloride (chloroethene)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm²)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm³)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm³/cm³)
SL			SL	1.62	0.387	0.103

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24	0.5
	Used to calculate risk-based groundwater concentration.						(NEW)	(NEW)

END

APPENDIX C

DECEMBER 2016 REMEDIAL PROGRESS REPORT

HQ Bay Area Office
950 Tower Lane, Ste. 1225
Foster City, CA 94404

AntonDev.com

December 16, 2016

Alameda County Department of Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Attention: Mr. Mark Detterman, PG, CEG, Senior Hazardous Materials Specialist

TRANSMITTAL LETTER
DECEMBER 2016 REMEDIAL PROGRESS REPORT
SOIL VAPOR SYSTEM OPERATIONS FROM NOVEMBER 8 THROUGH 15, 2016
6701, 6705, and 6707 SHELLMOUND STREET
EMERYVILLE, CALIFORNIA
Fuel Leak Case No. RO0000548
Geotracker Global ID T0600100894

Dear Mr. Detterman:

Submitted herewith for your review is the *December 2016 Remedial Progress Report, Soil Vapor System Operations from November 8 Through 15, 2016, 6701, 6705, and 6707 Shellmound Street, Emeryville, California* dated December 16, 2016, prepared by PES Environmental, Inc.

I declare, under penalty of perjury, that the information and/or recommendations contained in the above-referenced document for the subject property are true and correct to the best of my knowledge.

Very truly yours,

ANTON EMERYVILLE, LLC

R. Green

Rachel Green
Development Manager

PES Environmental, Inc.
Engineering & Environmental Services

December 16, 2016

1448.001.02.005

Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Attention: Mr. Mark Detterman, P.G., C.E.G.

Re: December 2016 Remedial Progress Report
Soil Vapor System Operations from November 8 through 15, 2016
6701, 6705, and 6707 Shellmound Street
Emeryville, California
Fuel Leak Case No. RO0000548
Geotracker Global Id T0600100894

Dear Mr. Detterman:

PES Environmental, Inc. (PES) has prepared this December 2016 Remedial Progress Report (RPR) on behalf of Anton Emeryville, LLC (Anton) to fulfill the monthly remedial progress reporting requirements[1] requested by Alameda County Environmental Health (ACEH) for the property at 6701, 6705, and 6707 Shellmound Street in Emeryville, California (collectively, the subject property or site). The subject property is currently listed as an open Spills, Leaks, Investigation and Cleanup (SLIC) case (listed under Mike Roberts Color Production at 6707 Bay Street) with ACEH as the lead environmental regulatory agency.

This RPR has been prepared in accordance with the November 8, 2016 letter from ACEH requesting monthly RPRs during operation of the soil vapor extraction (SVE) system as an interim remediation method (IRM), and includes:

1. Diagram of the SVE system;
2. Operation, Maintenance, Monitoring, and Sampling Plan (O&M Plan);
3. Startup and summary of SVE monitoring activities;

[1] ACEH, 2016. *Request for Interim Remedial Action Monitoring Plan and Schedule; SCP Case RO000548 and Geotracker Global ID T0600100894, Mike Roberts Color Production 6707 Bay Street, Emeryville, CA 94608.* November 8.

4. Summary tables of laboratory analytical data for baseline vapor samples collected prior to startup; and

5. Anticipated field activities for following month.

Operation of the SVE system commenced on November 8, 2016. The reporting period covered by this RPR is inclusive of November 8 through 15, 2016. Future RPR reporting periods will generally cover a 30-day reporting period (e.g., the next RPR will present a summary of the November 15 through December 15, 2016 SVE operation period).

SVE System Diagram

The SVE well network consists of 19 soil vapor extraction wells (wells SVE-1 through SVE-19) connected through schedule 40 polyvinyl chloride (PVC) piping plumbed to the SVE system air inlet. The extracted airstream is conveyed from the air inlet through a water knockout vessel, vacuum blower and through one treatment vessel containing 2,000 lb. of granular activated carbon (GAC) and two vessels containing 4,000 lb. of granular Hydrosil HS-600 potassium permangenate (7%) zeolite to remove volatile organic compounds (VOCs) contained in the extracted vapors. After treatment, the airstream is conveyed through an exhaust stack prior to discharge to the atmosphere above the roof line of the building. Monitoring points near each wellhead, between vessels, as well as at multiple points past the air inlet are monitored. Influent, mid-point, and effluent monitoring is conducted in accordance with the Authority to Construct (ATC) permit obtained from Bay Area Air Monitoring District (BAAQMD), presented in Attachment A of Appendix A.

A schematic diagram of the SVE system is presented in Attachment B of the Standard Operating Procedure (SOP), provided in Appendix A. Photographs of the SVE system components are presented in Appendix B.

O&M Plan

The O&M Plan, presented in Appendix A, presents the methods and procedures for routine operation, maintenance, and monitoring of the SVE system. The procedures were developed in general accordance with the DTSC' *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (Vapor Intrusion Guidance), dated October 2011.

Implementation of the O&M Plan is performed by Environmental Engineering, Consulting, and Remediation, Inc. (E2CR).

Summary of SVE Monitoring

SVE field measurements completed during the RPR reporting period includes:

- Daily SVE system monitoring by E2CR, in compliance with conditions of the BAAQMD ATC permit. A summary of SVE operational data is presented in Table 1;

- Weekly field measurements conducted by PES of individual SVE well vacuum[2], flow rates[3], and total VOCs using a photoionization detector (PID)[4]. PID and vacuum measurements at SVE wells are presented in Table 2. Time-concentration plots SVE influent concentration trends will be provided in future RPRs; and

- Baseline (pre-startup) samples were collected by PES on October 31, 2016 from the extraction wells, and analyzed for the full list of VOCs using U.S. Environmental Protection Agency (EPA) Test Method TO-15. Laboratory analytical results for detected VOCs are presented in Table 3. Time-concentration plots of select COCs detected (e.g., vinyl chloride) will be presented in future RPRs.

SVE System Observed Vacuum and Flow Rate

During November 8 through 15, observed operating vacuum ranged from 4.89 to 6.5 inches of mercury.

SVE influent flow rate is estimated utilizing the blower manufacturer curve based on measured vacuum at an influent sample port upstream of the blower. As shown in Table 1, average operating flow rates during the RPR reporting period ranged from 712 to 760 standard cubic feet per minute (scfm).

Vacuum at Vapor Extraction Wells

Table 2 summarizes vacuum observations at each extraction well. In general, observed vacuum pressures from November 9 and 15, 2016, indicate well-distributed vacuum pressure through the SVE well network (i.e., similar vacuum at each well).

[2] Measured with Dwyer Series 477 digital manometer.
[3] Measured with TSI inc., Velocicalc Model 9535 digital anemometer. Due to the presence of turbulent flow at accessible SVE well monitoring points, accurate measurement of individual well flow rates were not obtained.
[4] Measured with a MiniRAE 2000 PID.

VOC Mass Removal

PID readings of total VOCs in influent vapor collected by E2CR during daily SVE system monitoring ranged from 7.0 to 17.7 parts per million by volume (ppmv). The estimated cumulative pounds of vinyl chloride extracted during this reporting period was 0.16 pounds (mass based on vinyl chloride as the primary COC).

Anticipated Upcoming IRM Field Activities

- Continue daily monitoring of SVE system in accordance with BAAQMD requirements;
- Conduct weekly field measurements of SVE flow, vacuum, and total VOCs; and
- Conduct first 30-day interval vapor sampling of select SVE wells.

If you have any questions regarding this RPR, please call the undersigned at (415) 899-1600.

Very truly yours,

PES ENVIRONMENTAL, INC.

Christopher J. Baldassari, P.G.
Senior Geologist

Kyle S. Flory, P.G.
Principal Geologist

Attachments:	Table 1	Summary of SVE System Operational Data
	Table 2	Summary of SVE Well Field Measurements
	Table 3	Summary of Laboratory Analytical Results for Vapor Samples
	Appendix A	Standard Operating Procedure (SOP), Soil Vapor Extraction System Operations, Maintenance, Compliance Monitoring, and Vapor Sampling Schedule
	Appendix B	Photographs of SVE System

TABLES

Table 1
Summary of SVE System Operational Data
Soil Vapor Extraction System
6701-6707 Shellmound Street
Emeryville, Cailifornia

Date	System Status on Arrival	Total Operating Hours	System Vacuum Reading (in. of Hg)	Average Flow Rate scfm	PID Influent (ppmv)	Lab Influent (mg/m^3)	VC Extracted (grams)	Cumulative lbs VC Extracted
11/8/16	Started	0	6.5	712	**7.0**	**0.25**	0.00	0.00
11/9/16	ON	18.7	6.2	721	**17.7**		14.6	0.03
11/10/16	ON	42.6	5.3	748	**13.0**		19.4	0.07
11/11/16	ON	63.6	4.89	760	**12.7**		17.3	0.11
11/12/16	OFF	63.6	0.00	0	**NA**		0.0	0.11
11/13/16	OFF	63.6	0.0	0	**NA**		0.0	0.11
11/14/16	ON	65.1	6.0	727	**9.0**		1.2	0.12
11/15/16	ON	90.4	6.0	727	**11.3**		19.9	0.16

Notes:
-- = Data not available
NA = Not Applicable or Not Available
in. = inches
VOC = Volatile Organic Compounds
scfm = Standard cubic feet per minute
ppmv = Parts per million by volume
lbs = Pounds
VC = Vinyl Chloride
Mass extracted are estimated on laboratory analytical data.
mg/m^3 = milligrams per cubic meter air
SVE = Soil vapor extraction

Table 2
SVE Well Field Measurements
6701 - 6707 Shellmound Street
Emeryville, California

	Units	11/9/2016	11/15/2016
SVE-1			
Total VOCs	PPMv	49.3	115.7
Vacuum	in. H2O	67.6	77.8
SVE-2			
Total VOCs	PPMv	44.3	36.5
Vacuum	in. H2O	64.2	72.3
SVE-3			
Total VOCs	PPMv	12.5	17.9
Vacuum	in. H2O	65.9	75.3
SVE-4			
Total VOCs	PPMv	26.8	40.8
Vacuum	in. H2O	66.4	75.7
SVE-5			
Total VOCs	PPMv	35.4	79.4
Vacuum	in. H2O	66.8	76.3
SVE-6			
Total VOCs	PPMv	126.2	93.3
Vacuum	in. H2O	65.2	76.9
SVE-7			
Total VOCs	PPMv	17.1	66.4
Vacuum	in. H2O	64.9	77.0
SVE-8			
Total VOCs	PPMv	5.7	40.2
Vacuum	in. H2O	65.0	77.2
SVE-9			
Total VOCs	PPMv	1.7	13.1
Vacuum	in. H2O	67.6	77.8
SVE-10			
Total VOCs	PPMv	1.7	24.9
Vacuum	in. H2O	67.7	77.9
SVE-11			
Total VOCs	PPMv	12.3	31.1
Vacuum	in. H2O	67.5	77.7
SVE-12			
Total VOCs	PPMv	15.2	46.1
Vacuum	in. H2O	67.6	77.7
SVE-13			
Total VOCs	PPMv	4.2	50.2
Vacuum	in. H2O	67.8	77.6
SVE-14			
Total VOCs	PPMv	4.5	1.2
Vacuum	in. H2O	67.7	77.8
SVE-15			
Total VOCs	PPMv	2.5	34.2
Vacuum	in. H2O	67.6	77.8
SVE-16			
Total VOCs	PPMv	127.1	121.7
Vacuum	in. H2O	67.5	77.8
SVE-17			
Total VOCs	PPMv	15.2	32.1
Vacuum	in. H2O	67.8	77.9
SVE-18			
Total VOCs	PPMv	8.5	60.3
Vacuum	in. H2O	67.7	77.6
SVE-19			
Total VOCs	PPMv	8.3	83.9
Vacuum	in. H2O	67.5	77.6

Note:
SVE = Soil vapor extraction
PID = Photoionization Detector
-- = Not measured
PPMv = parts per million by volume
in. H2O = inches of water

Table 3
Summary of Laboratory Analytical Results for Vapor Samples
Soil Vapor Extraction System
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Date	Sample Depth (feet bgs)	TCE (µg/m^3)	cis-1,2-DCE (µg/m^3)	trans-1,2-DCE (µg/m^3)	Vinyl chloride (µg/m^3)	1,1,1-TCA (µg/m^3)	1,1,2,2-PCA (µg/m^3)	MEK (µg/m^3)	MIBK (µg/m^3)	Acetone (µg/m^3)	Benzene (µg/m^3)	Toluene (µg/m^3)	Ethylbenzene (µg/m^3)	m,p-Xylene (µg/m^3)	o-Xylene (µg/m^3)	1,2,4-TMB (µg/m^3)	1,3,5-TMB (µg/m^3)	1,3-DCB (µg/m^3)	4-Ethyltoluene (µg/m^3)	Carbon disulfide (µg/m^3)	Chloroform (µg/m^3)	Other VOCs (µg/m^3)
SVE Wells																								
SVE-1	SVE-1	7/13/2016	5 to 10	< 140	< 110	< 110	**3,400**	< 110	< 180	< 160	< 110	< 790	< 85	< 100	< 120	< 230	< 120	< 260	< 130	< 160	< 130	< 170	< 98	
SVE-1	SVE-1	7/14/2016	5 to 10	< 1600	**3,500**	**1,900**	**40,000**	< 1200	< 2000	< 1700	< 1200	< 8600	< 930	< 1100	< 1300	< 2500	< 1300	< 2900	< 1400	< 1800	< 1400	< 1800	< 1100	
SVE-1	SVE-1-103116	10/31/2016	5 to 10	**120**	**670**	**270**	**16,000**	< 74	< 120	**10,000**	< 75	**7,700**	**130**	**66**	< 79	< 160	< 79	< 180	< 89	< 110	< 89	< 110	< 67	**150 (1,1-DCE)**
SVE-2	SVE-2-103116	10/31/2016	5 to 10	< 26	< 19	< 19	**20**	< 20	< 34	**2,400**	< 20	**1,700**	**41**	< 18	< 21	< 42	< 21	< 48	< 24	< 29	< 24	< 30	< 18	
SVE-3	SVE-3-103116	10/31/2016	3.96 to 8.96	< 16	**14**	< 12	**40**	< 13	< 21	**280**	< 13	**190**	**290**	**240**	**92**	**770**	**130**	**110**	**53**	< 18	**27**	**190**	< 11	
SVE-4	SVE-4-103116	10/31/2016	5 to 10	**18**	**51**	**12**	**170**	< 7.1	< 12	**290**	< 7.1	**360**	**67**	**12**	**8.3**	**27**	**10**	< 17	< 8.5	< 10	< 8.5	**240**	< 6.3	**21 (1,2-DCB)**
SVE-5	SVE-5-103116	10/31/2016	5 to 10	**69**	**160**	**23**	**230**	< 7.3	< 12	**320**	< 7.3	**150**	**170**	**33**	**19**	**110**	**23**	**23**	**15**	**24**	< 8.8	< 11	< 6.6	**31 (1,4-DCB)**
SVE-6	SVE-6-103116	10/31/2016	5 to 10	< 29	< 21	< 21	< 14	< 22	< 37	**1,400**	< 22	**600**	**150**	< 20	**27**	**88**	**52**	< 53	< 26	< 32	< 26	< 33	< 20	
SVE-7	SVE-7-103116	10/31/2016	5 to 10	< 7.5	< 5.6	< 5.6	**40**	< 5.7	< 9.6	**140**	< 5.8	**58**	< 4.5	< 5.3	< 6.1	< 12	< 6.1	< 14	< 6.9	< 8.4	< 6.9	< 8.7	< 5.1	
SVE-8	SVE-8-103116	10/31/2016	5 to 10	< 2.1	< 1.6	< 1.6	< 1	< 1.6	< 2.7	**26**	**3.0**	**34**	< 1.3	< 1.5	< 1.7	< 3.5	< 1.7	< 3.9	< 2	< 2.4	< 2	**17**	< 1.5	
SVE-9	SVE-9-103116	10/31/2016	5 to 10	< 22	**38**	< 16	**340**	< 17	< 28	**390**	< 17	**240**	**160**	**68**	**19**	**120**	**32**	< 40	**25**	< 25	< 20	**26**	< 15	
SVE-10	SVE-10-103116	10/31/2016	5 to 10	< 150	< 110	< 110	**3,900**	< 110	< 190	< 160	< 110	< 800	**200**	< 100	< 120	< 240	< 120	< 270	< 130	< 160	< 130	< 170	< 99	
SVE-11	SVE-11-103116	10/31/2016	5 to 10	< 95	**180**	< 70	< 45	< 73	< 120	**2,300**	< 73	**3,300**	**130**	< 67	< 77	< 150	< 77	< 170	< 87	< 110	< 87	< 110	< 65	
SVE-12	SVE-12-103116	10/31/2016	5 to 10	< 1300	**18,000**	**27,000**	**62,000**	< 970	< 1600	< 1400	< 970	< 7000	< 760	< 890	< 1000	< 2100	< 1000	< 2300	< 1200	< 1400	< 1200	< 1500	< 870	**2900 (1,1-DCE)**
SVE-13	SVE-13-103116	10/31/2016	5 to 10	< 54	**160**	< 40	**1,600**	< 41	< 69	**660**	< 41	**330**	**42**	< 38	< 44	< 88	< 44	< 99	< 50	< 61	< 50	< 63	< 37	
SVE-14	SVE-14-103116	10/31/2016	5 to 10	< 20	**49**	< 15	**24**	< 15	< 25	**790**	< 15	**330**	**21**	< 14	< 16	< 32	< 16	< 36	< 18	< 22	< 18	< 23	< 14	
SVE-15	SVE-15-103116	10/31/2016	5 to 10	< 360	< 270	< 270	**11,000**	< 280	< 460	**1,100**	< 280	< 2000	< 210	< 250	< 290	< 580	< 290	< 660	< 330	< 400	< 330	< 420	< 250	
SVE-16	SVE-16-103116	10/31/2016	5 to 10	< 7400	**130,000**	**45,000**	**410,000**	< 5700	< 9500	< 8200	< 5700	< 41000	< 4400	< 5200	< 6000	< 12000	< 6000	< 14000	< 6800	< 8300	< 6800	< 8600	< 5100	
SVE-17	SVE-17-103116	10/31/2016	4.79 to 9.79	< 500	**1,300**	**2,200**	**14,000**	< 380	< 640	**680**	< 380	< 2800	< 300	< 350	< 410	< 810	< 410	< 920	**950**	< 560	< 460	< 580	< 340	
SVE-18	SVE-18-103116	10/31/2016	5 to 10	< 680	< 500	< 500	**52,000**	< 520	< 870	< 750	< 520	< 3800	**880**	< 480	< 550	< 1100	< 550	< 1200	< 620	< 760	< 620	< 790	< 460	
SVE-19	SVE-19-103116	10/31/2016	5 to 10	< 99	< 73	< 73	< 47	< 76	< 130	**4,200**	< 76	**1,400**	< 59	< 70	< 80	< 160	< 80	< 180	< 91	< 110	< 91	< 120	< 68	
Soil Vapor Monitoring Probes																								
SVP-1-7.5	SVP-1-7.5	7/12/2016	7.5	< 250	**250**	< 180	**13,000**	< 190	< 310	< 270	< 190	< 1400	**250**	< 170	< 200	< 400	< 200	< 450	< 220	< 270	< 220	< 280	< 170	
SVP-2-3.5	SVP-2-3.5	7/12/2016	3.5	< 17	< 12	< 12	**920**	< 13	< 21	< 18	< 13	< 92	**28**	**31**	**14**	**55**	**23**	< 31	< 15	< 19	< 15	**83**	**78**	
SVP-2-7.5	SVP-2-7.5	7/12/2016	7.5	< 1300	< 990	< 990	**75,000**	< 1000	< 1700	< 1500	< 1000	< 7400	< 800	< 950	< 1100	< 2200	< 1100	< 2500	< 1200	< 1500	< 1200	< 1600	< 920	
SVP-3-7.5	SVP-3-7.5	7/12/2016	7.5	< 38	< 28	< 28	**2,400**	< 29	< 49	**57**	< 29	**260**	**310**	**170**	< 31	< 61	< 31	< 70	< 35	< 43	< 35	**130**	< 26	
SVP-4-3.5	SVP-4-3.5	7/12/2016	3.5	**6.9**	< 1.6	< 1.6	< 1	**9.5**	**4.8**	**19**	**11**	**44**	**19**	**18**	**23**	**120**	**54**	**17**	**8.7**	< 2.4	**3.9**	**3.1**	**57**	**2.0 (BDCM), 2.4 (Freon 12), 1.5 (MC), 2.6 (Freon 11)**
SVP-4-7.5	SVP-4-7.5	7/12/2016	7.5	**19**	**57**	**9.1**	**180**	< 4.5	< 7.6	**23**	< 4.5	**84**	**230**	**59**	**21**	**210**	**24**	**20**	**10**	**59**	< 5.4	**20**	< 4.1	**72 (1,4-DCB), 23 (NAPH)**

Table 3
Summary of Laboratory Analytical Results for Vapor Samples
Soil Vapor Extraction System
6701, 6705, and 6707 Shellmound Street, Emeryville, California

Sample Location	Sample ID	Date	Sample Depth (feet bgs)	TCE ($\mu g/m^3$)	cis-1,2-DCE ($\mu g/m^3$)	trans-1,2-DCE ($\mu g/m^3$)	Vinyl chloride ($\mu g/m^3$)	1,1,1-TCA ($\mu g/m^3$)	1,1,2,2-PCA ($\mu g/m^3$)	MEK ($\mu g/m^3$)	MIBK ($\mu g/m^3$)	Acetone ($\mu g/m^3$)	Benzene ($\mu g/m^3$)	Toluene ($\mu g/m^3$)	Ethylbenzene ($\mu g/m^3$)	m,p-Xylene ($\mu g/m^3$)	o-Xylene ($\mu g/m^3$)	1,2,4-TMB ($\mu g/m^3$)	1,3,5-TMB ($\mu g/m^3$)	1,3-DCB ($\mu g/m^3$)	4-Ethyltoluene ($\mu g/m^3$)	Carbon disulfide ($\mu g/m^3$)	Chloroform ($\mu g/m^3$)	Other VOCs ($\mu g/m^3$)
SVP-5-7.5	SVP-5-7.5	7/12/2016	7.5	< 510	< 370	< 370	**22,000**	< 390	< 650	< 560	< 390	< 2800	**490**	< 360	< 410	< 820	< 410	< 930	< 460	< 570	< 460	< 590	< 350	
SVP-6-3.5	SVP-6-3.5	7/12/2016	3.5	< 1700	**14,000**	**6,100**	**100,000**	< 1300	< 2200	< 1900	< 1300	< 9600	< 1000	< 1200	< 1400	< 2800	< 1400	< 3200	< 1600	< 2000	< 1600	< 2000	< 1200	
SVP-6-7.5	SVP-6-7.5	7/12/2016	7.5	< 1800	**16,000**	**6,300**	**98,000**	< 1400	< 2300	< 2000	< 1400	< 10000	< 1100	< 1300	< 1500	< 3000	< 1500	< 3400	< 1700	< 2000	< 1700	< 2100	< 1200	
Residential Land Use ESL [1]				*240*	*4,200*	*31,000*	*4.7*	*520,000*	*24*	*2,600,000*	*1,600,000*	*16,000,000*	*48*	*160,000*	*560*	*52,000*	*52,000*	*NE*	*NE*	*NE*	*NE*	*61*	*NE*	*Varies*
Commercial/Industrial Land Use ESL [2]				*3,000*	*35,000*	*260,000*	*160*	*4,400,000*	*210*	*22,000,000*	*13,000,000*	*140,000,000*	*420*	*1,300,000*	*4,900*	*440,000*	*440,000*	*NE*	*NE*	*NE*	*NE*	*530*	*NE*	*Varies*

Notes:

Detections are shown in bold. Results equal to or exceeding commercial/industrial ESLs are shaded.

Only detected analytes are summarized on table. Refer to Appendix D for laboratory report to access entire list of compounds analyzed.

SVE = Soil vapor extraction

BDCM = Bromodichloromethane

DCB = Dichlorobenzene

DCE = Dichloroethene.

Freon 11 = Trichlorofluoromethane

Freon 12 = Dichlorodifluoromethane

MC = Methylene Chloride

MEK = Methyl Ethyl Ketone

MIBK = Methyl Isobutyl Ketone

NAPH = Naphthalene

PCA = Tetrachloroethane

TCA = Trichloroethane.

TCE = Trichloroethene.

TMB = Trimethylbenzene.

VOCs = Volatile organic compounds.

bgs = Below ground surface.

$\mu g/m^3$ = Micrograms per cubic meter.

< 2.9 = Not detected at or above the indicated laboratory method reporting limit.

NE = Not established.

-- = Not applicable/not analyzed.

1. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table SG-1 Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels. Residential.

2. February 2016 Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs), Table SG-1 Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels. Commercial/Industrial.

APPENDIX A

STANDARD OPERATING PROCEDURE (SOP), SOIL VAPOR EXTRACTION SYSTEM OPERATIONS, MAINTENANCE, COMPLIANCE MONITORING, AND VAPOR SAMPLING SCHEDULE

APPENDIX A

STANDARD OPERATING PROCEDURE (SOP)
SOIL VAPOR EXTRACTION SYSTEM OPERATIONS, MAINTENANCE, COMPLIANCE MONITORING, AND VAPOR SAMPLING SCHEDULE

A1. INTRODUCTION

The purpose of this Standard Operating Procedure (SOP) is to establish methods and procedures for operation, maintenance, and monitoring of the soil vapor extraction (SVE) system at the 6701-6707 Shellmound Street site in Emeryville, California. The procedures described below have been developed in accordance with the DTSC' *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (Vapor Intrusion Guidance), dated October 2011.

An Authority to Construct (ATC) permit was obtained from the Bay Area Air Quality Management District (BAAQMD) prior to construction and installation of the SVE system. A Start-up Notification was also filed with BAAQMD prior to SVE system startup. Copies of these documents are included as Attachment A. Permission for startup operations was granted by BAAQMD and the Alameda County Department of Environmental Health (ACEH) on November 8, 2016. Operation of the SVE system commenced on November 8, 2016. A schematic of the SVE system is included as Attachment B.

A1.1 SVE System Configuration and Monitoring

The SVE well network consists of 19 vapor extraction wells (wells SVE-1 through SVE-19) connected through schedule 40 polyvinyl chloride (PVC) piping to the SVE system air inlet. The extracted airstream is conveyed through a vacuum blower and through one 2,000 lb. granular activated carbon (GAC) and two- 4,000 lb. granular potassium permangenate zeolite to remove volatile organic compounds (VOCs) contained in the extracted vapors. After treatment, the airstream is conveyed through an exhaust stack. In addition to the extraction wells described above, the SVE system includes 10 air inlet wells (wells AI-1 through AI-10) and 6 multi-depth vapor monitoring probes to allow for periodic monitoring of VOC concentrations and vacuum pressure.

Monitoring of flow rates, vacuum pressures, and temperatures at various locations in the SVE system will be conducted in accordance with the ATC permit from BAAQMD presented in Attachment A. The SVE system will be started up and operated in accordance with manufacturer's specification by the SVE subcontractor. In accordance with the BAAQMD ATC permit the soil vapor flow rate shall not exceed 850 standard cubic feet per minute (scfm).

A2. SYSTEM MAINTENANCE

This section presents maintenance activities for the SVE system. All maintenance activities will be conducted in conjunction with the system performance monitoring activities (as described below). The maintenance activities will be conducted by the SVE system subcontractor in accordance with the following schedule:

Vapor extraction wells	Monthly	Inspection for damage and functionality
Piping manifold	Monthly	Inspection for damage and functionality
Valves	Monthly	Inspection for damage and functionality
Portable PID	Annual	Send to manufacturer for calibration
Portable Anemometer	Annual	Send to Manufacturer for calibration
Vacuum/Pressure Gauges	as needed when suspect readings are obtained	Inspection for damage and functionality
Aboveground piping	Monthly	Inspection for damage and integrity.
Air/Water separator (AWS)	Every two months or before rainy replace filter season	Inspect level switch for damage and functionality,
Water transfer pump	Weekly	Inspection for functionality
Vacuum relief valve	Annual	Inspection for functionality
Vacuum blower	Every two weeks	Lube and oil
	Every two months (approx. 1500 hours)	Change oil
	Weekly	Measure motor amperage
	Monthly	Check belt for tension and damage
Inlet/Outlet silencers	Annual	Inspection for integrity
High pressure switch	Annual	Inspection for functionality and adjusting
Vapor Filtration system	Monthly	Inspection for damage and functionality

Maintenance procedures for items listed in the above system maintenance schedule are discussed in the following sections.

A2.1 Soil Vapor Extraction (SVE) System Maintenance

This section details the required maintenance activities for the SVE system. All maintenance activities will be recorded using a General Maintenance Log (or equivalent), located in Attachment C. All form entries should be legible and recorded in permanent ink. Any adjustments or repairs made to the system that are not specifically indicated on the maintenance checklists should also be recorded.

A2.2 Vapor Extraction Wells

No routine servicing is necessary for the vapor extraction wells. A monthly, visual inspection of the PVC casing, well vaults, and instrumentation for functionality or damage is recommended.

A2.1.1 Valves

No maintenance or regular servicing is required. A monthly inspection of valves should be performed to confirm the free operation of valves and to check for any leaks. The valve stem packing on valves should be tightened in the event of valve leakage at the stem; however, excessive tightening of the stem packing will make valve operation sluggish. For gate and globe valves, the operator should ensure that the valve is not at the fully open or fully closed position. If fully open operation is desired, rotate the handle counterclockwise until the stop is encountered. Then rotate the handle one-half turn in the clockwise direction. This will help prevent the valve from sticking against the fully open stop. If fully-closed operation is desired, rotate the handle clockwise until flow is stopped. Threaded fittings should be visually checked for leakage and corrosion at the same time that valves are inspected.

A.2.1.2 Measurement Equipment

Due to the number of wells in the SVE system, system measurement equipment is not permanently mounted to the piping system or manifolds. The system has been designed with sample ports and screwed-on plugs where portable equipment can measure operational parameters. The use of common measuring devices to obtain data from all measurement locations significantly reduces the relative errors usually associated with the use of multiple measurement devices that are not regularly calibrated.

Portable measurement equipment to be used during routine monitoring and maintenance include:

- **Photoionization Detector (PID)**: The PID should be calibrated prior to each daily use. For calibration instructions see the equipment's operation and maintenance manual. In addition, the PID should be sent back to the manufacturer for calibration annually;

- **Portable Anemometer**: The probe tip of the anemometer should be kept clean. To remove dust, gently blow air or run water through the probe. To remove oils, rinse the probe tip with isopropyl alcohol and gently blow air through the probe tip. The humidity sensor (located at the base of the probe window) must be kept dry at all times. The anemometer should be sent back to the manufacturer for calibration annually; and

- **Portable Manometer**: The manometer should be kept clean and dry at all times. The manometer should be sent back to the manufacturer for calibration annually.

A2.2.3 Aboveground Piping

No specific maintenance is required. It is recommended that the operator make monthly visual inspections of all aboveground piping. The inspection should include a check of pipe support integrity, listening for audible vacuum or pressure leaks, and a visual check for pipe integrity (cracks, weathering, etc.). Data collected from the monitoring program should also be monitored for observable trends which may indicate that a pipe leak or obstruction has occurred somewhere in the system.

A2.2.4 Air/Water Separator (AWS)

The air/water separator (AWS) requires no lubrication or periodic maintenance; however, the level switches should be inspected bi-monthly or before the start of the rainy season to assure appropriate operation. The level switches could become inoperable if they accumulate dirt and other foreign matter. Remove and inspect the switches; check for and remove any sediment buildup. In addition, the in-line filter should be replaced every two months to prevent clogging.

Periodically verify that the inlet, level-switch sensor, and bottom drain openings are clear of debris.

A2.2.5 Vacuum Relief Valve

No regular maintenance is required. The operator should manually unseat the valve to ensure that the valve is not frozen shut on an annual basis. Before attempting to unseat the valve, the operator should shut off the power to the vapor extraction unit. The relief valve is set to operate at a vacuum of 10 inches of mercury.

A2.2.6 Vacuum Blower System

The vacuum blower oil level should be checked every two weeks. For specific oil level checking procedures, see the OEM literature. If the oil level is low, add oil as specified in manufacturer's documentation. The oil should be drained, flushed, and replaced in accordance with manufacturer's specifications, of if operating conditions are dusty or hot. Used oil should be stored in appropriate containers and taken to a waste-oil recycling center on a periodic basis.

The blower drive end bearings should be greased with No. 2 non-corrosive bearing grease every two weeks of operation. When regreasing, the old grease will be displaced and forced out the grease wells. For specific grease fitting locations, see OEM literature. To prevent seal damage, the grease wells must be open at all times. Once grease begins venting, stop injecting new grease.

The amperage and voltage at the blower motor should be checked weekly or if modifications or adjustments are made to the blower operation. The motor is rated for a specified range of electrical amperage and voltage. If the measured amperage exceeds the rated amperage, the blower dilution valve should be opened to decrease the work the motor is performing. Amperage exceedance may be due to an increased resistance to flow in the remedial system well and header system. The increased resistance may be caused by a blocked pipe, clogged well screens, or lack or vapor flow yielded from the underlying formation. Appropriate maintenance or remedial measures should be taken if a blockage is encountered. A protective circuit will shut down the motor if amperage exceeds the motors specified range. If this occurs, the SVE system should be restarted and adjusted to prevent repeated shutdowns due to excessive amperage.

All belt drives should be checked monthly for proper belt tension, damage or deterioration, and for proper alignment. The manufacturer's literature should be consulted for detailed alignment and belt replacement instructions.

A2.2.7 Inlet/Discharge Silencers

No regular maintenance is required. The operator should inspect the vessel's connections and the overall vessel integrity on an annual basis.

A2.2.8 High-Pressure Switch

No regular maintenance is required. The pressure switch operation should be verified and readjusted (if necessary) on an annual basis. The pressure switch should be set at 50-inches of water.

A2.2.9 Vapor Phase Carbon And Potassium Permangenate Zeolite Abatement Vessels

The abatement vessels themselves require no regular maintenance other than a monthly visual inspection. The monthly inspection should include:

- **A check of all piping connections.** Rigid 4" ABS piping is used to connect the vessels to the vapor extraction unit, and to the discharge pipe. If a leak is suspected, check connections for leaks using a soap and water solution. Check fittings for damage or signs of wear. Repair as needed; and

- **A check of all sample ports.** Ensure that all sample ports are closed and not leaking. Repair or replace leaking sample ports, as needed.

A check of filter vessel manhole covers. Ensure that manhole covers are not leaking. Each vessel has one top manhole. If a cover is leaking, tighten the lock ring nut. If the cover continues to leak, shut down the vapor extraction unit and replace the manhole cover gasket. Restart the vapor extraction unit and check the cover for leaks.

A2.2.10 Pressure Relief Valve

The pressure relief valve should be inspected and operation verified annually.

A2.3 Compliance Monitoring for Air Emission

This section presents the permit compliance monitoring requirements for the SVE system. The treated vapor discharge from the SVE is regulated by the BAAQMD under the ATC, as well as the permit to operate (PTO) upon issuance.

A2.3.1 Compliance Monitoring with Organic Vapor Meter (PID)

The ATC stipulates how the treatment system is to be operated, when change-outs are to occur, and how to monitor the system. A copy of the ATC is included in Attachment A. Compliance monitoring data will be recorded using General Maintenance Log or equivalent (Attachment C).

The ATC regulates the discharge of total non-methane hydrocarbons in the treated vapor discharge. Because methane occurs naturally, the BAAQMD does not regulate methane discharge from the SVE system. The ATC defines procedures for determining the amount of non-methane hydrocarbons.

The primary requirement of the ATC governs when the carbon and/or potassium permanganate zeolite must be changed-out. According to ATC Conditions 4 and 5, the carbon and/or potassium permanganate zeolite must be changed when either one of the following conditions is detected:

1. 10% of the inlet stream concentration to the second to last carbon vessel; or

2. 10 ppmv or greater (measured as methane).

The above conditions are to be determined by measuring the inlet and outlet vapor concentrations of the abatement vessels as noted on the monitoring log. Other conditions regarding the change-out sequence, storage of records, and determination of methane content are detailed in the ATC. The ATC should be reviewed thoroughly by all personnel responsible for operating and maintaining the SVE system.

In accordance with the BAAQMD ATC, on-Site monitoring of the extracted vapors using a PID will be performed to provide a qualitative means of assessing VOC concentrations in the SVE system influent vapor stream.

Samples analyzed by the PID will be collected in a vacuum sample collection box in dedicated Tedlar bags from the individual extraction wells, and SVE system sample ports at the following locations: influent, effluent from primary carbon vessel, and effluent. The samples will be analyzed using the PID immediately after collection and recorded in the on-Site system operations log book. In accordance with the permit issued by BAAQMD, the PID measurements will be converted to methane equivalent values (C1) using a conversion factor of 2 (the conversion factor for vinyl chloride, the primary VOC of concern) in accordance with the PID manufacturer's specifications.

A2.4 Vapor Sampling for Laboratory Analysis

Samples from SVE wells will be collected and analyzed on a periodic basis to confirm field VOC wellhead measurements and to monitor changes in the relative concentrations of individual VOC constituents in the vapor stream. As such, vapor samples will be periodically collected from select SVE wells using the sample ports at each wellhead. Vapor samples for off-Site laboratory analysis will be collected in batch-certified clean stainless-steel SUMMA canisters.

A2.4.1 Vapor Sampling Schedule

The anticipated schedule for submittal of vapor samples from the SVE wells for laboratory analysis follows:

1. Prior to startup (baseline): All 19 SVE wells (completed on 10/31/16);
2. 30-days after startup: 9 SVE well samples, and one sample of vapor stream (pre-dilution) before blower motor;
3. 60-days after startup: 9 SVE well samples, and one sample of vapor stream (pre-dilution) before blower motor;
4. 90-days after startup: 9 SVE well samples, and one sample of vapor stream (pre-dilution) before blower motor;
5. 120-days after startup: 9 SVE well samples, and one sample of vapor stream (pre-dilution) before blower motor;
6. 150-days after startup: 9 SVE well samples, and one sample of vapor stream (pre-dilution) before blower motor; and
7. 180-days after startup: all 19 SVE wells, 6 vapor monitoring probes, and one sample of vapor stream (pre-dilution) before blower motor.

Samples for laboratory analysis from the SVE wells, probes, and inlet will be obtained using dedicated sample ports. Teflon tubing will be used to connect the sample port to a SUMMA canister. The samples will be transported to the project laboratory under chain-of-custody protocol and analyzed for VOCs using U.S. Environmental Protection Agency (EPA) Test Method TO-15.

Attachments: A – BAAQMD Authority to Construct Permit and Start-up Notification
B – Schematic of SVE System
C – General Maintenance Log

ATTACHMENT A

BAAQMD AUTHORITY TO CONSTRUCT PERMIT AND START-UP NOTIFICATION

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

November 3, 2016

Environmental Engineering,Consulting & Remediation
1020 Winding Creek Rd, Ste 110
Roseville, CA 95678

Attention: Aiguo Xu

Authority to Construct for Permit Application No. 28241, Plant No. 23705

Required Action

Your Authority to Construct is enclosed. This Authority to Construct is not a Permit to Operate. **To receive your Permit to Operate you must:**

1. Complete the Start-up Notification portion of the Authority to Construct.
2. Send the Start-up Notification to the assigned Permit Engineer via e-mail, fax or mail **at least seven days** prior to operating your equipment.

Note: Operation of equipment without sending the Start-up Notification to the District may result in enforcement action.

Authorization of Limited Use

The Authority to Construct authorizes operation during the start-up period from the date of initial operation indicated in your Start-up Notification until the Permit to Operate is issued, up to a maximum of 90 days. All conditions (specific or implied) included in this Authority to Construct will be in effect during the start-up period.

Contact Information

If you have any questions, please contact your assigned Permit Engineer:

Stanley Tom, Air Quality Engineer II

Tel: (415) 749-8681 **Fax:** (415) 749-5030 **Email:** stom@baaqmd.gov

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BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 23705
Application No. 28241

Environmental Engineering,Consulting & Remediation
6701 Shellmound Street, Emeryville, CA 94608
is hereby granted an *Authority to Construct* for the following equipment:

S-1 Soil Vapor Extraction System, 850 scfm max.

abated by

A-1 SVE Abatement System

Adsorption System, 2 potassium permanganate vessels (4000 lbs each), 1 carbon vessel (2000 lbs)

Approved by Carol A Allen for SK

for JAIME A. WILLIAMS
DIRECTOR OF ENGINEERING

Issue date: November 2, 2016
Expiration date: November 2, 2018

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Stanley Tom, Air Quality Engineer II
Tel: (415) 749-8681 **Fax:** (415) 749-5030
Email: stom@baaqmd.gov

Plant No. 23705
Source No. S-1
Application No. 28241

The initial operation of this equipment is scheduled for ______________ (month/day/year)

Print your first and last name ____

Telephone No. ____

1. The owner/operator shall abate the organic emissions from Source S-1 by A-1 SVE Abatement System, consisting of two (4,000 pounds minimum capacity) Potassium Permanganate Vessels and one (2,000 pounds minimum capacity) Activated Carbon Vessels arranged in series during all periods of operation. Start-up and subsequent operation of each abatement device shall take place only after written notification of same has been received by the District's Engineering Division. The owner/operator shall operate the sources such that the soil vapor flow rate from S-1 shall not exceed 850 scfm. In no event shall POC emissions to the atmosphere exceed 0.07 pounds per day from Source S-1. [Basis: Cumulative Increase, Regulation. 8-47-301, Regulation 2-5]

2. The owner/operator of this source shall monitor with a photo-ionization detector (PID), flame-ionization detector (FID), or other method approved in writing by the Air Pollution Control Officer at the following locations:
   a. At the inlet to the second to last Carbon vessel in series.
   b. At the inlet to the last Carbon vessel in series.
   c. At the outlet of the carbon vessel that is last in series prior to venting to the atmosphere. When using an FID to monitor breakthrough, readings may be taken with and without a carbon filter tip fitted on the FID probe. Concentrations measured with the carbon filter tip in place shall be considered methane for the purposes of these permit conditions. [Basis: Cumulative Increase, Regulation 2-5]

3. The owner/operator shall record these monitor readings in a monitoring log at the time they are taken. The owner/operator shall use the monitoring results to estimate the frequency of carbon change-out necessary to maintain compliance with conditions number 4 and 5, and monitoring shall be conducted on a daily basis. The owner/operator of this source may propose for District review, based on actual measurements taken at the site during operation of the source, that the monitoring schedule be changed based on the decline in organic emissions and/or the demonstrated breakthrough rates of the carbon vessels. Written approval by the District's Engineering Division must be received by the owner/operator prior to a change to the monitoring schedule. [Basis: Cumulative Increase, Regulation 2-5]

4. The owner/operator shall change out the second to last carbon vessel with unspent carbon upon breakthrough, defined as the detection at its outlet of the higher of the following:
   a. 10% of the inlet stream concentration to the Carbon

vessel.

b. 10 ppmv or greater (measured as C1).

[Basis: Cumulative Increase, Regulation 2-5]

5. The owner/operator shall change out the last Carbon vessel with unspent Carbon upon detection at its outlet of 10 ppmv or greater (measured as C1). [Basis: Cumulative Increase, Regulation 2-5]

6. The owner/operator of this source shall maintain the following records for each month of operation of the source:
   a. The hours and times of operation.
   b. Each emission test, monitor reading or analysis result for the day of operation they were taken.
   c. The number of Carbon vessels removed from service.
   d. Total throughput of soil vapor from Source S-1 in Standard Cubic Feet.

   All measurements, records and data required to be maintained by the owner/operator shall be retained and made available for inspection by the District for at least two years following the date the data is recorded. [Basis: Regulation 1-523]

7. The owner/operator shall report any non-compliance with parts 4 and/or 5 to the Director of the Compliance & Enforcement Division at the time that it is discovered. The submittal shall detail the corrective action taken and shall include the data showing the exceedance as well as the time of occurrence. [Basis: Cumulative Increase, Regulation 2-5]

8. Upon final completion of the remediation project, the owner/operator of Source S-1 shall notify the Engineering Division within two weeks of decommissioning the operation. [Basis: Cumulative Increase, Regulation 2-5]

End of Conditions

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Authority to Construct

(This is not a Permit to Operate)

Plant No. 23705
Application No. 28241

Environmental Engineering,Consulting & Remediation
6701 Shellmound Street, Emeryville, CA 94608
is hereby granted an *Authority to Construct* for the following equipment:

S-1 Soil Vapor Extraction System, 850 scfm max.

abated by

A-1 SVE Abatement System

Adsorption System, 2 potassium permanganate vessels (4000 lbs each), 1 carbon vessel (2000 lbs)

Approved by Carol A Allen for AK

for JAIME A. WILLIAMS
DIRECTOR OF ENGINEERING

Issue date: November 2, 2016
Expiration date: November 2, 2018

Start-up Notification

Instructions: At least **seven days** before the scheduled initial operation contact your assigned Permit Engineer via email or complete and send this Start-up Notification to the District via fax or mail.

Engineer: Stanley Tom, Air Quality Engineer II
Tel: (415) 749-8681 **Fax:** (415) 749-5030
Email: stom@baaqmd.gov

Plant No. 23705
Source No. S-1
Application No. 28241

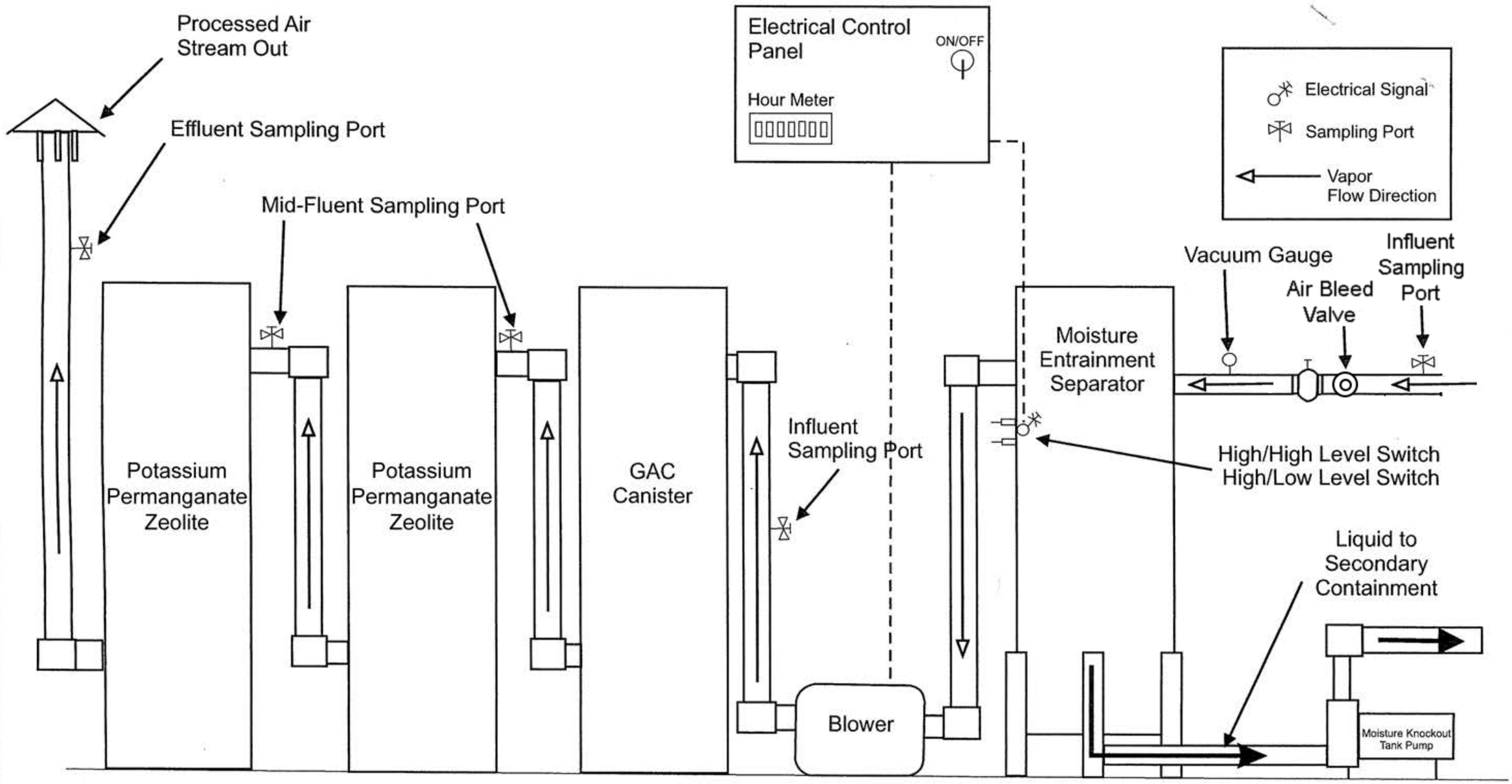
The initial operation of this equipment is scheduled for Nov. 8, 2016 (month/day/year)

Print your first and last name AIGUO XU

Telephone No. (916) 782-8700 OR (916) 580-9113 (cell)

ATTACHMENT B

SCHEMATIC OF SVE SYSTEM



6701 - 6707 SHELLMOUND STREET
EMERYVILLE, CALIFORNIA

PROCESS AND INSTRUMENTATION FLOW DIAGRAM

ATTACHMENT C

GENERAL MAINTENANCE LOG

PES - EMERYVILLE
6701 SHELLMOUND STREET, EMERYVILLE, CA
VAPOR EXTRACTION SYSTEM DATA LOG

GENERAL MAINTENANCE LOG

DATE: ______________ **TECHNICIAN:** ______________

ARRIVAL TIME: ______________ **DEPARTURE TIME:** ______________ **PROJECT #:** 2069

SYSTEM RUNNING UPON ARRIVAL? YES / NO *IF NO:* ______________

RUNNING UPON DEPARTURE? YES / NO *IF NO:* ______________

DESCRIPTION	UNITS	UPON ARRIVAL	UPON DEPARTURE
FLOW RATE	(CFM)		
OPERATING TIME	(hr:mm)		(TIME)
ELECTRICAL USAGE	(KWhr)		
WELL FIELD VACUUM	("Hg)		
SYSTEM VACUUM	("Hg)		
AIR COMPRESSOR DUTY CYCLE	(seconds)	ON OFF	ON OFF
AIR COMPRESSOR SETTING	(psi)		
AIR COMPRESSOR HOURS	(hr:mm)		

VAPOR CONCENTRATIONS	OVA Instrument used: PID / FID	Calibrated: YES / NO	
INFLUENT (PRE-OXIDIZER)	(ppmv)		
EFLUENT (STACK)	(ppmv)		
VAPOR SAMPLED	INFLUENT : YES / NO		EFFLUENT : YES / NO

WEEKLY SERVICE RENDERED	YES	NO	COMMENTS
CLEAN UP COMPOUND			
AIR COMPRESSOR MOTOR BELT CHECKED			
CLEAN AIR COMPRESSOR FILTER			
INSPECT SPARGE WELLS			
OTHER (specify)			

QUARTERLY SERVICE RENDERED	YES	NO	COMMENTS
AIR COMPRESSOR LUBED			
AIR COMPRESSOR OIL CHANGED			
AIR COMPRESSOR MOTOR LUBED			
CONTROL PANEL INSPECTED/CLEANED			
OTHER (specify)			

Environmental Engineering, Consulting & Remediation, Inc.

FIELD NOTES	
SITE:	DATE:
COMMENTS:	NAME:

1020 Winding Creek Road, Suite 100, Roseville, CA 95678 tel 916.782.8700 fax 916.782.8750 www.e2cr.net

APPENDIX B

PHOTOGRAPHS OF SVE SYSTEM

Photo 1.
View of SVE equipment. Extracted vapor influent collector pipe (at angle) is plumbed through water knockout tank before blower (at center), then through the three treatment vessels (right side of photo).

Photo 2.
View of SVE well piping and central collection piping. SVE system visible in distance.

PES Environmental, Inc.
Engineering & Environmental Services

SVE System Photographs
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
B1

JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE
1448.001.02.005	144800102005_photos	CJB	12/16

APPENDIX D

SOIL VAPOR PROBE INSTALLATION AND SAMPLING PLAN

APPENDIX D

SOIL VAPOR PROBE INSTALLATION AND SAMPLING

Scope of Work

As described in Section 7.0, one on-site, and two off-site temporary soil vapor probes will be installed and samples as part of the Supplemental Soil Vapor Sampling Plan. Additionally, a total of four soil vapor monitoring probes will be installed within the off-site 6601-6603 Shellmound Street building interior at the approximate locations shown on Plate 4. The purpose of the temporary soil vapor probes are to collect vapor data that will remove data gaps in on- and off-site characterization, and the permanent off-site soil vapor probes will be utilized to monitor subsurface vapor and vacuum conditions to the south of the subject property during implementation of SVE.

The scope of work for additional characterization at the site includes the following activities: (1) field preparation activities; (2) installation of SVE pilot study wells and soil vapor monitoring probes; (3) performing a 3-day SVE pilot study; (4) design and installation of full-scale SVE; (5) performance of full-scale IRM using soil vapor extraction; and (6) reporting. These tasks are further described below.

Field Planning Activities

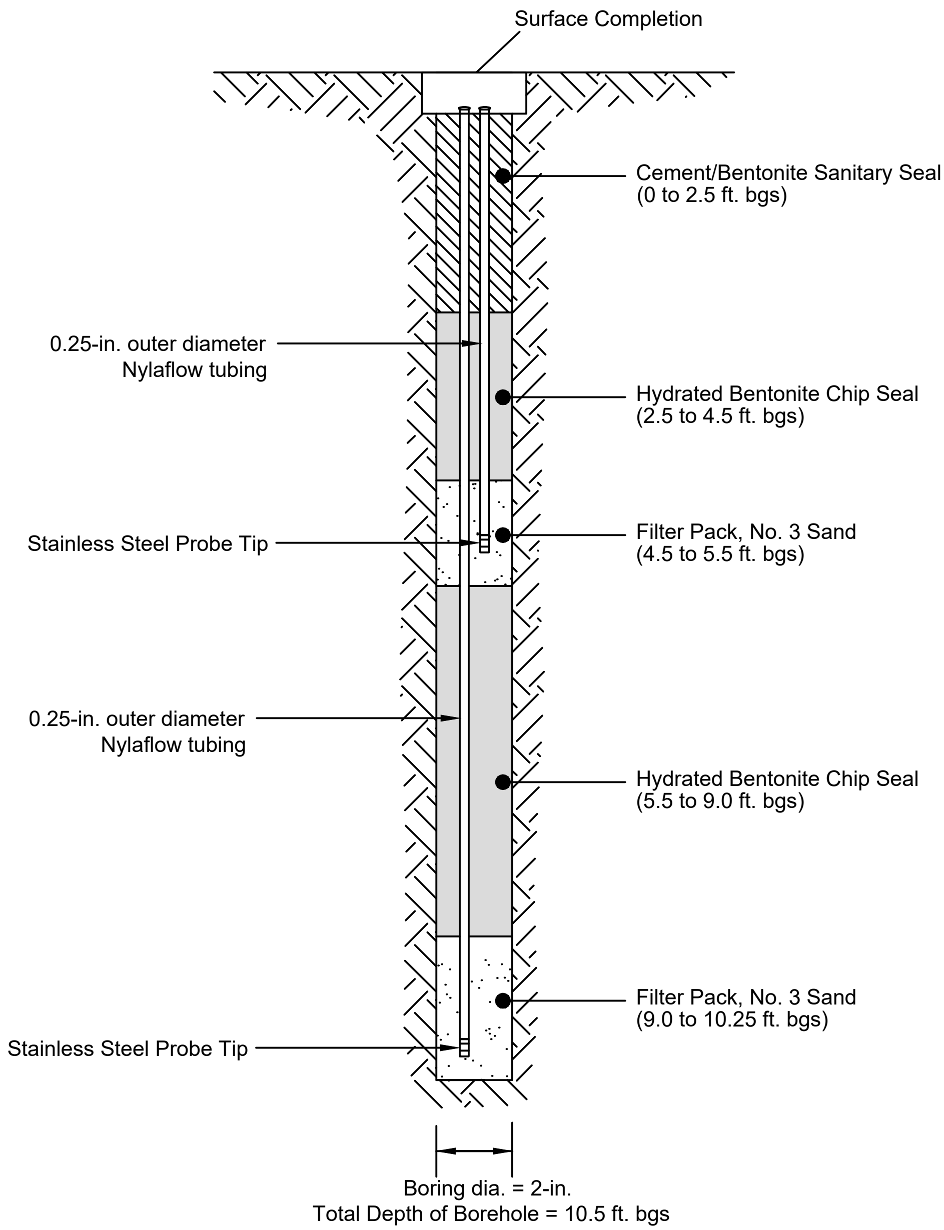
A drilling permit for the temporary and permanent probes will be obtained from the Alameda County Public Works Agency, Water Resources Section (ACPWA).

Underground Service Alert will be contacted to schedule visits by public and private utility companies to locate their underground utilities. In addition, a private underground utility locating service will be contracted to conduct a subsurface electromagnetic survey to screen the proposed sampling locations for the presence of subsurface utilities. Work at 6601-6603 Shellmound Street will be conducted in accordance with the existing access agreement.

Soil Gas Probe Installation and Sampling

Temporary soil vapor monitoring probes shown on Plate 4 will be constructed using a direct-push drill rig equipped with 1- to 1 1/2-inch diameter sampling rods. The sampling rods will be driven to the desired depth and soil will be continuously sampled and logged at each location. Soil borings for vapor monitoring probe installation will be continuously cored by driving a 4-foot long by 2-inch outside-diameter sampler into undisturbed soil. The continuous soil cores will be utilized to identify lithologic conditions within the target depth of the probes. A PES geologist or engineer will supervise the drilling activities and prepare a lithologic log of each boring using the Unified Soil Classification System and Munsell Color Index. Selected soil samples will be screened in the field for the presence of VOCs in the sample headspace using a photoionization detector (PID). The PID readings will be recorded on the boring logs.

Plate D1 presents generalized construction details for the permanent nested soil vapor monitoring probes to be constructed at the proposed locations shown on Plate 4. The soil vapor monitoring probes will be equipped with inlets at approximately 5 and 10 feet bgs. Final construction depths will be determined based on field observations obtained during drilling and lithologic logging activities, and will be selected to target permeable zones identified in the undisturbed soil cores. Each monitoring probe will consist of 1/4-inch outside diameter (OD) Nylaflow® (or equivalent) tubing and a stainless steel vapor probe tip. The probe tip will be approximately 1-3/4 inches in length and consist of Type 316 stainless steel, with a porous filtration rating of 50 microns (or equivalent). The probe tip will contain a push-in brass fitting to connect to the Nylaflow® tubing that will extend to near ground surface. The top of the tubing will be equipped with a sealable and removable cap. Installation will be performed in accordance with the California Environmental Protection Agency's (Cal-EPA) July 2015, *Advisory – Active Soil Gas Investigation* (Advisory) (DTSC, 2015). Surface completion at each probe location will include installation of a protective flush-mounted housing.



Not to Scale

PES Environmental, Inc.
Engineering & Environmental Services

Construction Details for Soil Vapor Monitoring Probe (Typical)
Corrective Action Plan
6701, 6705, and 6707 Shellmound Street
Emeryville, California

PLATE
D1

1448.001.01.044	144800101044_CAP_D1	DRAFT	1/17
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE

DISTRIBUTION

CORRECTIVE ACTION PLAN
6701, 6705, AND 6707 SHELLMOUND STREET
EMERYVILLE, CALIFORNIA
FUEL LEAK CASE NO. RO0000548
GEOTRACKER GLOBAL ID T0600100894

JANUARY 30, 2017

COPY NO. _____

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2 Copies	Anton Emeryville, LLC 950 Tower Lane, Suite 1225 Foster City, California 94404 Attention: Ms. Rachel Green	1 – 2
2 Copies	Griffin Capital Griffin Capital Plaza 1520 E. Grand Avenue El Segundo, California 91245 Attention: Ms. Julie Treinen	3 – 4
1 Copy	Griffin Capital Corporation 790 Estate Drive, Suite 180 Deerfield, Illinois 60015 Attention: Ms. Mary Higgins, Esq.	5
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