20785 AND 20957 BAKER ROAD

CASTRO VALLEY, CALIFORNIA

REMEDIAL ACTION PLAN

SUBMITTED TO:
Mr. Todd Deutscher
Catalyst Development Partners
18 Crow Canyon Court, Suite 190
San Ramon, CA 94583

PREPARED BY:
ENGEO Incorporated

June 29, 2017

PROJECT NO:
13225.000.000

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Project No.
13255.000.000

June 29, 2017

Mr. Todd Deutscher
Catalyst Development Partners
18 Crow Canyon Court, Suite 190
San Ramon, CA 94583

Subject: 20785 and 20957 Baker Road
Castro Valley, California

REMEDIAL ACTION PLAN

Dear Mr. Deutscher:

ENGEO is pleased to present our Remedial Action Plan (RAP) for the subject property (Property), located in Castro Valley, California. Based on the information developed during the site characterization activities, remedial action is required for the Site, due to elevated concentrations of Chemicals of Potential Concern (COPCs).

This RAP is prepared and submitted to the Alameda County Department of Environmental Health (ACDEH) for review and approval under the Voluntary Remedial Action Program (VRAP) agreement between Catalyst Development Partners and ACDEH. A new case was opened on the ACDEH database on January 11, 2017 for the Property (Case No RO0003234).

If you have any questions regarding this report, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

Divya Bhargava, PE
db/jaa/bvv

Jeffrey A. Adams, PhD, PE

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

1.0 INTRODUCTION

1.1 PURPOSE

This Remedial Action Plan (RAP) has been prepared for the remedial actions required for the Baker Road redevelopment project located in Castro Valley, California (the Site). Based on the information developed during the historical and recent site characterization activities, remedial action is required to prepare the Site for redevelopment, due to elevated concentrations of Chemicals of Potential Concern (COPCs).

This RAP is prepared and submitted to the Alameda County Department of Environmental Health (ACDEH) for review and approval under the Voluntary Remedial Action Program (VRAP) agreement between Catalyst Development Partners and ACDEH. A new case was opened on the ACDEH database on January 11, 2017 for the Property (Case No RO0003234).

1.2 SITE DESCRIPTION

The Site is located at 20785 and 20957 Baker Road, northeast of Rutledge Road, and southeast of Castro Valley Boulevard in Castro Valley, California (Figure 1). The Site consists of two parcels measuring approximately 1.12 acres in area and identified with Assessor's Parcel Numbers (APN) 84A-16-5-9 and 84A-16-6-4.

The Site is bound to the west by Rutledge Road and to the east by Baker Road. An equipment storage yard was formerly located at the southern portion of the Site. Multi-family housing is present to the north and south of the Site. An automotive shop is present to the west, and multi-family housing occupies the properties to the east of Baker Road.

Currently, a fence traversing the east-west direction is present on the Site. The northwestern portion of the Site is overgrown with vegetation, and a remnant concrete building is present. The northeastern portion is occupied with a home and detached garage. The southern portion of the Site is generally covered with asphalt concrete pavement.

1.2.1 Proposed Development

We understand that the proposed development will include construction of three-story townhome structures to provide 20 units with at-grade garage space, along with associated access, roadways, landscaping areas, and new underground utilities (Figure 2).

1.2.2 Current and Historic Uses

1.3 PROPERTY OWNERSHIP

The Site is currently owned by Catalyst Development Partners.

1.4 BACKGROUND

Based on previous investigations conducted at the Site, the following COPCs have been identified:

- Organochlorine pesticides (OCPs) and arsenic in shallow soil within portions of the Site.
- Petroleum hydrocarbons soil in the area of the former underground storage tanks (USTs).

1.5 REMEDIAL ACTION PROCESS

The Remedial Action process, including the regulatory background and the objectives, is described in the following sections.

1.5.1 Regulatory Basis for the Remedial Action Plan

This RAP has been prepared in accordance with California Health and Safety Code (HSC) § 25395.94 and the requirements of the VRAP Agreement between Catalyst Development Partners and ACDEH (Case No RO0003234). The RAP is required to contain the following information as specified in HSC § 25395.96(a) and (b):

The objectives of this RAP are to:

- Present and evaluate existing site conditions.
- Document site characterization activities.
- Establish cleanup levels for protection of human health and the environment.
- Present proposed remedial actions as necessary to prevent an unreasonable risk to public health and safety or the environment and any other condition imposed by the Regional Water Board.
- Provide a plan for the public to review and comment on the scope of the RAP.

1.5.2 Elements of the RAP

To accomplish the objectives stated in the preceding section and satisfy regulatory requirements, this Plan includes the following elements:

- A description of the nature and extent of the COPCs at the Site.
- The goals and cleanup levels for soil to be achieved by the remedial actions proposed in this RAP the Site.
- A description of the mitigation actions proposed for the impacted soil at the Site.

2.0 SITE CHARACTERIZATION

2.1 PREVIOUS STUDIES

Characterization activities and previous environmental investigations conducted at the Site are summarized below. Details regarding investigations are provided in the individual reports.

AEI, Preliminary Site Investigation Report, 20957 Baker Road, Castro Valley, California, June 7, 2005

AEI performed a preliminary site investigation for the Site in June 2005. The scope of work was performed to determine the extent of soil contamination and impact to groundwater resulting from the hydrocarbon release from former USTs at the Site.

In April 2004, two 1,000-gallon USTs (one diesel and one gasoline) were removed from the Site. The tanks, which had been unused for over 15 years, were reported to contain a small amount of fuel and sludge, but appeared to be intact with no obvious leaks. Two soil samples were collected from underneath each UST and analyzed for total petroleum hydrocarbons as gasoline (TPH-g), benzene, toluene, ethylbenzene, and xylene(s) (BTEX), methyl tertiary butyl ether (MTBE), total petroleum hydrocarbons as diesel (TPH-d), and total lead. Hydrocarbons were reported in all the soil samples analyzed. TPH-g was reported at concentrations ranging from 160 milligrams per kilogram (mg/kg) to 1,400 mg/kg. TPH-d was reported at concentrations ranging from 1,400 mg/kg to 10,000 mg/kg. Lower concentrations of xylene(s) and lead were also detected.

Eight soil borings were advanced during the 2005 investigation to depths ranging from 14 to 18 feet below ground surface in the locations depicted on Figures 3 and 4. Borings logs are presented in Appendix A. No detectable concentrations of TPH-g, TPH-d, total petroleum hydrocarbons as diesel (TPH-mo), MTBE or BTEX, were reported in any of the soil samples. TPH-g was reported in one groundwater sample at concentration of 7,300 micrograms per liter (μg/L) (Figure 6). The groundwater sample from this boring also exhibited a TPH-d concentration of 23,000 μg/L. No TPH-g was reported in groundwater samples from any other boring. TPH-d was detected in other groundwater samples to a maximum concentration of 670 μg/L. TPH- mo was reported at concentrations ranging from 300 μg/L to 1,400 μg/L. No MTBE was reported in the groundwater samples.

Based on the findings of the study, AEI recommended the installation of four groundwater monitoring wells, a one-year monitoring program, and the preparation of a remedial action plan, if deemed necessary.

AEI, Additional Information Report, 20957 Baker Road, Castro Valley, California, November 15, 2008

AEI prepared an Additional Information Report for the 20957 Baker Road parcel in November 2008. The document provided an overview of past investigations and reporting for the Site. The following was presented in the report, as well as supplemental information provided in a Case Closure Letter from ACDEH dated September 8, 2009.

In October 2007, five groundwater monitoring wells were installed, one on each side of the former UST location, one through the center of the tank backfill, and two downgradient of the former UST location, as shown in Figures 3 and 6. Low-level hydrocarbons were detected in samples collected in a boring near the former tank location. Depth to water at the time the wells were developed ranged from approximately 11 to 14 ½ feet below the ground surface. Groundwater samples collected during the October 2007 groundwater monitoring event did not identify the presence of TPH-g, BTEX or MTBE in any of the groundwater samples. TPH-d was detected in one sample, but not during three subsequent events.

Following four quarters of groundwater monitoring, AEI opined that the data for the Site met the established Regional Water Quality Control Board (RWQCB) standard for closure. Following a comment and rebuttal period between AEI and ACDEH, ACDEH did provide case closure in a letter dated September 9, 2009. In the case closure letter, ACDEH did note the absence of soil gas testing, but given the elapsed time since the release (prior to 1989); the potential for vapor intrusion appeared to be low. ACDEH did comment in the document that the closure was based on the determination that the reported release did not appear to present a risk to human health, given the Site use and conditions at the time of the closure.

ENGEO, Phase I Environmental Site Assessment, 20957 Baker Road, Castro Valley, California, Project Number 13255.000.000, August 23, 2016 (DRAFT)

ENGEO conducted a concurrent phase I environmental site assessment for the 20957 Baker Road property in August 2016. The property was reportedly used a corporation yard/storage area for heavy equipment. Prior to development in the 1950s, the property appeared to be under cultivation for row crops.

Based on the findings of the ENGEO phase I assessment and previous assessments of the property, the following potential environmental concerns were identified for the property:

- Although the former leaking USTs at the property were removed and a case closure was subsequently granted, information in the former case file indicated that potential risks via vapor intrusion may not have been adequately assessed during past characterization activities.

- Historical records for the property indicated the property was under agricultural cultivation in the past. Recalcitrant agricultural chemicals could be present in near-surface soils.

A phase II environmental assessment was recommended for the property to (1) evaluate potential vapor intrusion impacts in the area of the former USTs and (2) evaluate potential impacts to near surface soil due to the past agricultural activity.

ENGEO, Phase I Environmental Site Assessment, 20785 Baker Road, Castro Valley, California, Project Number 13255.000.000, August 23, 2016 (DRAFT)

ENGEO conducted a concurrent phase I environmental site assessment for the 20785 Baker Road property in August 2016. The property was reportedly used as a corporation yard/storage area for heavy equipment. Prior to development in the 1950s, the property appeared to be under cultivation for row crops surrounding the single-family residential structures.

Based on the findings of the ENGEO phase I assessment and previous assessments of the property, the following potential environmental concerns were identified for the property:

- Although the former leaking USTs at the parcel to the south were removed and a case closure was subsequently granted, information in the former case file indicated that potential risks via vapor intrusion may not have been adequately assessed during past characterization activities.

- Historical records for the property indicated the property was under agricultural cultivation in the past. Recalcitrant agricultural chemicals could be present in near-surface soils.

- Lead-based paint and/or asbestos-containing building materials may be present within structures at the property.

A phase II environmental assessment was recommended for the property to evaluate potential impacts to near surface soil due to the past agricultural activity.

ENGEO, Phase II Environmental Site Assessment, 20785 Baker Road, Castro Valley, California, Project Number 13255.000.000, August 31, 2016

A phase II environmental site assessment was performed at the 20785 Baker Road property in August 2016. Soil samples were collected from six locations across the property (Figure 5). Soil borings S-2 and S-3 were advanced to a total depth of 2 feet below ground surface using a Geoprobe® direct-push rig. Continuous soil cores were retrieved from each boring. Soil samples were collected at approximate depths of 3 to 9 inches and 12 to 18 inches below the ground surface from each of the borings. The remaining soil borings were advanced to 9 inches using a hand auger. Samples were collected at the approximate depth of 3 to 9 inches below the ground surface and analyzed for the presence of OCPs, arsenic, and lead.

Locations S-7 and S-8 exhibited low levels of detectable concentrations of OCPs. Detected analytes included gamma-chlordane, alpha-chlordane, 4,4-DDE, dieldrin, 4,4-DDT, heptachlor epoxide and chlordane; these concentrations were below respective screening levels. All of the collected soil samples exhibited detectable lead concentrations; the detected concentrations ranged between 6.49 and 49.6 milligrams per kilogram (mg/kg). These concentrations were below the corresponding residential Environmental Screening Level (ESLs)[1] established by the RWQCB.

Detected arsenic concentrations in the collected soil samples ranged between 3.88 and 27.3 mg/kg. The detected concentrations were in excess of the respective arsenic screening level assuming a residential land use scenario. Although several detected concentrations were within expected background concentrations, some detected arsenic concentrations were in excess of expected background concentrations observed in the San Francisco Bay Area. Soil data is presented in Table A and Figure 5.

Given the reported arsenic and pesticide concentrations, it appeared the surface soil at the Site may have been impacted from historic agricultural activities.

ENGEO, Phase II Environmental Site Assessment, 20957 Baker Road, Castro Valley, California, Project Number 13255.000.000, August 31, 2016

A phase II environmental site assessment was performed at the 20957 Baker Road property in August 2016. Soil samples were collected from two locations across the property (Figure 5). The soil borings were advanced to a total depth of 2 feet below ground surface using a Geoprobe direct-push rig. Continuous soil cores were retrieved from each boring. Soil samples were collected at approximate depths of 3 to 9 inches and 12 to 18 inches below the ground surface from each of the borings and analyzed for the presence of OCPs, arsenic, and lead.

None of the soil samples exhibited detectable concentrations of OCPs. All of the collected soil samples exhibited detectable lead concentrations; the detected concentrations for S-1 and S-4 were 7.41 and 33.2 milligrams per kilogram (mg/kg), respectively. These concentrations were below the respective screening level assuming a residential land use scenario. Detected arsenic concentrations in the collected soil samples for S-1 and S-4 were 13.7 and 26.5 mg/kg, respectively. This is in excess of the respective arsenic screening level assuming a residential

[1] Regional Water Quality Control Board (RWQCB), Direct Exposure Human Health Risk Screening Levels for Soil (Residential Land Use), Table S-1, February 2016 (Revision 3).

land use scenario and in excess of expected background concentrations observed in the San Francisco Bay Area. Given the reported arsenic concentrations, it appeared the surface soil at the property may have been impacted from historic agricultural activities.

In order to evaluate potential vapor intrusion concerns, a soil gas assessment was conducted at the property. Three temporary soil gas monitoring wells (SG-1 through SG-3) were installed at the property using a Geoprobe rig at the locations shown in Figure 7.

Each of the soil gas samples exhibited detectable target analyte concentrations; the detected analytes are typically associated with gasoline and/or other refined petroleum hydrocarbon product. Elevated concentrations of TPH-g were detected in all three samples; however, concentrations were below the corresponding vapor intrusion human health risk ESLs[2]. Two of the three samples exhibited ethylbenzene concentrations in excess of the human risk ESL. One sample also exhibited a naphthalene concentration in excess of the respective human risk screening level. As the soil gas samples were collected in the immediate vicinity of the former UST location, additional soil gas sampling was recommended to determine the extent of soil gas impact at the property. Soil data is presented in Table A, and soil gas data is presented in Table B.

ENGEO, Site Characterization Report, 20785 and 20975 Baker Road, Castro Valley, California, Project Number 13255.000.000, April 14, 2017; DRAFT

ENGEO implemented the approved Workplan in March 2017. Thirteen soil borings (SS-1 through SS-13) were installed to 2 feet below ground surface (Figure 5). For each sample location, two samples were recovered at approximate depths of 0 to 12 inches and 12 to 24 inches below the ground surface. All samples were analyzed for lead, arsenic, and OCPs (Table A). All soil samples collected from the Site exhibited detectable concentrations of arsenic ranging between 2.47 to 19.8 mg/kg. These concentrations are within background concentrations observed in the San Francisco Bay Area, within the exception of arsenic concentrations observed in samples collected at six locations. OCPs, including dieldrin, beta-BHC, delta-BHC, alpha-chlordane, gamma-chlordane, DDD, DDE, DDT, chlordane, endosulfan II, endrin aldehyde, endosulfan sulfate, and heptachlor epoxide were detected in the soil samples collected from the Site. In both shallow and deep samples collected from the Site, all OCPs were detected at levels below the corresponding residential screening levels.

Additionally, 14 temporary soil gas monitoring borings (SG-A through SG-N) were installed in the vicinity of the former UST, as presented on Figures 7 and 8. Borings logs for these are presented in Appendix A. Each of the soil gas samples (all collected in the immediate vicinity of the former UST location) exhibited detectable target analyte concentrations; the detected analytes are typically associated with gasoline and/or other refined petroleum hydrocarbon products (Table B). TPH-g concentrations ranged between non-detect to 13,000 micrograms per cubic meter (μg/m^3). All detected concentrations were below respective residential ESLs. The soil gas samples were also analyzed for mixed gases, including carbon dioxide, carbon monoxide, oxygen, and methane (Table C). Oxygen levels ranged between 1.5 to 15 percent. These levels of oxygen demonstrate that natural bioattenuation will likely occur in the subsurface. Methane and carbon monoxide were not detected in any of the soil gas samples collected from the Site.

[2] RWQCB, Subslab/Soil Gas Vapor Intrusion Human Health Risk Screening Levels (Residential Land Use), Table SG-1, February 2016 (Revision 3).

ENGEO, Workplan for Additional Site Characterization, 20785 and 20957 Baker Road (Site Cleanup Program Case No. R00003234), Castro Valley, California, June 15, 2017

We met with the ACDEH staff on June 1, 2017, to discuss the findings of the previous analytical results for the Site and to discuss the next steps. A Workplan for additional characterization was recommended for the Site. The purpose of the proposed additional characterization was to perform a soil and groundwater assessment to further evaluate potential residual subsurface impairments associated with the historical land use and presence of former USTs at the Site, and to determine if a bioattenuation zone exists in the upper five feet of soil. The Workplan was approved by ACDEH on June 15, 2017.

2.2 ADDITIONAL CHARACTERIZATION – MAY 2017

The approved Workplan was implemented in May 2017. A C57-licensed direct push drilling subcontractor was retained to advance soil and groundwater borings at the Site. Sample locations are presented on Figures 7 and 9. Cross-sections are presented on Figure 11.

Three direct-push borings (GW-1 through GW-3) were advanced until groundwater was encountered (Figure 6). Groundwater was encountered at depths of approximately 11 to 12 feet below ground surface. Temporary PVC casings were used in each of the three boreholes to facilitate collection; groundwater samples were collected using dedicated bailers. A duplicate grab groundwater sample was collected at GW-2.

Groundwater samples were then placed in laboratory-provided sample jars. Four grab groundwater samples were collected and analyzed for TPH-g and VOCs including BTEX and naphthalene (EPA Method 8260), TPH-d and TPH-mo (EPA Method 8015B with silica gel cleanup) and dissolved metals (EPA Method 6010). Two of the groundwater borings were moved from the original locations since refusal was encountered at a depth of approximately 10 feet.

A geophysical radar survey was conducted as a part of this characterization to verify the extent of the backfill associated with the former USTs on the Site.

In order to further define the vertical and lateral extent of residual impact associated with the former USTs, one soil boring (B-11) was advanced within the footprint of the former tank excavation, and four borings were advanced along the perimeter of the former tank excavation (B-7, B-10, B-12, and B-16). All borings were screened with a PID for volatile organic vapors. B-11 was originally planned to be advanced to a depth of 10 feet below ground surface. However, a PID detection of 14.8 parts per million (ppm) was noted at a depth of 12 feet, and the boring was extended to a total depth of 16 feet below ground surface. Samples were collected from B-11 at depths of 4½ to 5 feet, 7½ to 8 feet, 11½ to 12 feet, and 13 to 13½ feet below ground surface.

B-7 was originally planned to be advanced to a depth of 10 feet below ground surface. However, a PID detection of 254 ppm was noted at a depth of 10 feet, and the boring was extended to a total depth of 12 feet below ground surface. Samples were collected from B-7 at depths of 4½ to 5 feet, 7½ to 8 feet, 9½ to 10 feet, and 11½ to 12 feet below ground surface.

B-12 and B-16 were advanced to a total depth of 8 feet below ground surface, and soil samples were collected at depths of 4½ to 5 feet and 7½ to 8 feet below ground surface.

An additional 17 soil borings (B-1 through B-6, B-8, B-9, B-13 through B-15, and B-17 through B-22) were advanced within the vicinity of the former UST excavation to assess the potential presence of impact within the upper five feet of soil. One soil sample from each of the 17 soil borings was recovered from an approximate depth interval of 4½ to 5 feet below the ground surface. Duplicate samples were collected from B-15 and B-21.

Soil samples were retrieved within continuous Geoprobe acetate core liners measuring 5 feet in length. Continuous soil cores from each boring were logged by an ENGEO Staff Engineer and Environmental Specialist. Boring logs are presented in Appendix A. Specific soil samples were collected for laboratory analysis by cutting 6-inch portions of the Geoprobe soil core liners corresponding to the respective desired sampling depths in each location. The sample sleeves were sealed using Teflon® sheets secured by tight-fitting plastic end caps. Upon collection of samples, a sample label was placed on the sample, and included a unique sample number, sample location, time/date collected, laboratory analysis, and the sampler's identification. The soil samples were placed in an ice-cooled chest and submitted under documented chain-of-custody to Torrent Laboratory, Inc, a fixed-base analytical laboratory in Milpitas, California. All soil samples were analyzed for TPH-g and VOCs, including BTEX and naphthalene (EPA Method 8260), and TPH-d and TPH-mo (EPA Method 8015B with silica gel cleanup). Analytical laboratory reports are presented in Appendix B.

Detectable concentrations of TPH-g were reported at B-7 and B-11 (Table A and Figure 9). All of these concentrations were below the corresponding residential screening levels. TPH-d was detected at concentrations exceeding its corresponding residential screening level of 230 mg/kg in samples collected at B-7 at depths of 7½ to 8 feet and 9½ to 10 feet. TPH-mo was detected at trace concentrations in a few of the samples, all below the corresponding residential screening level for TPH-mo. Naphthalene and n-butylbenzene were the only VOCs detected in samples collected from location B-7.

None of the three grab groundwater samples collected from the Site exhibited detectable concentrations of VOCs, TPH-g, TPH-d, or TPH-mo. Dissolved metals, including barium, cobalt, nickel, and zinc were detected at low concentrations in the grab groundwater samples. Groundwater analytical results are presented in Table D. Analytical laboratory reports are presented in Appendix B.

2.3 GEOLOGY AND HYDROGEOLOGY

Review of published topographic maps found that the Site is situated at an approximate elevation of 163 feet above mean sea level. The relatively level Site has a gentle slope toward the south-southwest. A review of the 1997 Helley and Graymer, et al. Geologic Map (USGS 1997) found that the Site is primarily underlain by Pleistocene-age alluvial and fluvial fan deposits, (Qpaf).

Based on the boring logs prepared by AEI, fill material was encountered to a depth of approximately 2 feet in two borings at the Site, both located near the former UST. Fill material was not encountered in the geotechnical borings advanced by ENGEO in 2017. Thus, fill material appears to be present in isolated areas of the Site up to a depth of 2 feet below ground surface (outside the UST excavation).

Silty clay is present to depths of 3 to 4 feet below the ground surface. This material is, in turn, underlain by dark yellowish brown clayey silt, which grades into sand between 6 and 9 feet below the ground surface. Silty and gravelly sand is present to depths of 15 to 18 feet below the ground surfaces, where it is underlain by claystone bedrock.

During the recent site investigations, groundwater was encountered at the Site at depths of approximately 11 to 12 feet below ground surface. Based on a review of the 2007 and 2008 groundwater elevation data, there is a slight flow gradient generally directed toward the south-southwest.

2.4 NATURE AND EXTENT OF CONTAMINATION

Details on Site geology and hydrogeology are presented on Section 2.3.The nature and extent of environmental impacts is described below.

2.4.1 Surface Soil

Intermittent surface soil samples exhibited low levels of detectable concentrations of OCPs; these concentrations were below respective screening levels. However, cumulative concentrations of OCPs exceeded the risk level in two sample locations (SS-7 and SS-13) (Table A and Figure 5).

Lead concentrations in three samples (SS-7@0-12", SS-11@0-12", SS-13@12-24") exceeded the corresponding residential ESL of 80 mg/kg. A statistical evaluation was conducted on the lead data set for the Site. A 95 percent upper confidence level (UCL) concentration was calculated for lead concentrations following the methods established by the USEPA. A 95 percent UCL represents a threshold concentration with the following characteristic: the true mean concentration of the analyte within the study area has a 95 percent probability of being less than or equal to the UCL concentration. The analysis was performed using USEPA's ProUCL Version 5.00.00 software. The UCL value for lead was calculated to be 42.2 mg/kg, which is below its corresponding residential ESL. The UCL calculation worksheet is presented in Appendix C.

Arsenic concentrations in soil at the Site ranged between 2.47 to 27.3 mg/kg. A background concentration of 11 mg/kg will be used for the Site for screening purposes. Shallow samples (0 to 12 inches) at 12 locations exceeded this level, and deeper samples (12 to 24 inches) at two locations (SS-7 and SS-11) exceeded this level (Table A). Samples exhibiting arsenic concentrations above this level would need to be mitigated prior to redevelopment.

For the shallow samples exhibiting elevated concentrations of OCPs and arsenic, the soil would be excavated to a depth of 1 foot (12 inches), and for the deeper samples exhibiting elevated concentrations of OCPs and arsenic, soil would be excavated to a depth of 2.5 feet (30 inches).

2.4.2 Subsurface Soil

At the time of UST removal (2004), soil samples collected from the resulting excavation exhibited elevated TPH-g, TPH-d, and xylene(s) concentrations. However, subsequent soil sampling of soil in 2005 and 2007 during site characterization and well installation events did not identify hydrocarbon impacts within soil at or near the former UST locations. Several of the samples collected were very close or corresponded to the locations of the 2004 samples.

In the samples collected in 2017 within and in the vicinity of the UST excavation, samples collected from B-7 exhibited elevated concentrations of TPH-d and naphthalene (Table A and Figure 9). Boring B-7 is located within the former UST excavation. Soil impacts were observed to a depth of 10 feet below ground surface.

Based on these sampling events, it does not appear that soil hydrocarbon impact is present in subsurface soils, with the exception of one location. The soil at the this sample location within the former UST excavation would need to be mitigated prior to redevelopment.

2.4.3 Groundwater

Groundwater samples were collected during the 2005 soil sampling program (Figure 6). Several samples exhibited detectable TPH-g and TPH-d concentrations above respective screening levels. However, when monitoring wells were installed at the Site in 2007, including wells at the locations of the 2005 sampling locations, none of the groundwater samples exhibited detectable concentrations of petroleum hydrocarbons, with the exception of a TPH-d concentration of 56 μg/L in one well. Subsequent sampling of the wells in 2008 did not identify detectable concentrations of TPH or related analytes.

Grab groundwater sampling was conducted at three locations of the Site in June 2017 (Table D and Figure 6). None of the three grab groundwater samples collected from the Site exhibited detectable concentrations of VOCs, TPH-g, TPH-d, or TPH-mo. Dissolved metals, including barium, cobalt, nickel, and zinc were detected at low concentrations in the grab groundwater samples.

Therefore, based on the previous investigations and the most recent sampling, groundwater at the Site does not appear to exhibit evidence of impact.

2.4.4 Soil Gas

Two soil gas samples collected in 2016 exhibited elevated concentrations of ethylbenzene. Each of the 2017 soil gas samples (all collected in the immediate vicinity of the former UST location) exhibited detectable target analyte concentrations; the detected analytes are typically associated with gasoline and/or other refined petroleum hydrocarbon product. However, concentrations were below the corresponding residential screening levels. All VOCs were detected at concentrations below their corresponding screening levels during the 2017 sampling (Figure 8). Oxygen levels in the soil gas samples ranged between 1.5 to 15 percent. These levels of oxygen demonstrate that natural bioattenuation is likely to occur in the subsurface.

2.5 DISCUSSION OF BIOATTENUATION ZONE

Based on the results of the results of the investigations conducted at the Site, the Site meets the requirements for case closure outlined in the State Water Resources Control Board's (SWRCB) *Low-Threat Underground Storage Tank Case Closure Policy (LTCP).*

As discussed in Appendix 3 Scenario 3 and Appendix 4 Scenario 4 of the LTCP document, the Site meets the following criteria:

- Benzene is lead than 1,000 mg/L in groundwater (Appendix 3 Scenario 3) and benzene, ethylbenzene, and naphthalene concentrations were below threshold levels in soil gas (Appendix 4 Scenario 4).

- There is more than 5 feet of separation between the groundwater and the foundation of the proposed buildings, and there was more than 5 feet of separation between the depth of soil gas sampling and the proposed foundations.

- As discussed in Section 2.4.4, oxygen concentrations of greater than 4 percent and up to 15 percent were prevalent in soil gas samples collected at the Site.

- TPH-g and TPH-d are less than 100 mg/kg throughout the entire depth of the bioattenuation zone. Although samples collected at B-7 exhibited combined total TPH concentrations greater than 100 mg/kg, these samples were collected at depths ranging from 7½ to 10 feet, below the bioattenuation zone depth.

3.0 REMEDIAL ACTION OBJECTIVES

Soil characterization has revealed the presence of COPCs above acceptable levels at the Site. The removal action objective (RAO) is to reduce the human health risks associated with the COPCs within Site soil to a level that is acceptable for the planned future redevelopment and to allow for unrestricted future use of the Site.

A review of pertinent laws, regulations, and other criteria was performed to identify applicable or relevant and appropriate requirements (ARARs) and other criteria to be considered (TBC) for remediating the Site. Based on the RAO, soil cleanup levels were developed that establish specific concentrations of chemicals in soil that are protective of both human health and the environment. The soil cleanup levels have been developed for the Site from: (1) information obtained during soil characterizations conducted at the Site; and (2) risk management decisions based upon the current and proposed future use of the Site.

3.1 DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES

The following criterion was applied for the development of the Site-specific RAOs:

- Individual Maximum Exposure Point Concentrations (EPC_{max}) for OCPs, TPH-d, and TPH-g
- Background concentrations for arsenic

3.1.1 Maximum Exposure Point Concentration

The RWQCB Environmental Screening Level (ESL)[3] for the COPCs is applied for the Site as the EPC_{max} as follows:

Table 3.1.1-1: Potential RAOs Based on EPC_{max}

COPC	EPC_{max}
Arsenic	11 mg/kg[4]
Dieldrin	38 µg/kg[5]

[3] San Francisco Regional Water Quality Control Board; Soil Tier 1 Environmental Screening Level; Table S-1; 22 February 2016, Revision 3.

[4] Based on background concentrations established for the Site.

[5] San Francisco Regional Water Quality Control Board; Direct Exposure Human Health Risk Screening Levels for Soil (Residential Land Use), Table S-1; 22 February 2016, Revision 3.

COPC	EPC_{max}
Chlordane	480 µg/kg
TPH-g	740 mg/kg
TPH-d	230 mg/kg

3.2 REMEDIAL ACTION OBJECTIVE

The remedial action objectives for the Site are summarized in the following table:

Table 3.2-1: Respective RAO for Remedial Action

COPC	BASIS FOR CLEANUP LEVEL	CLEANUP LEVEL
Arsenic	Established background concentration	11 mg/kg
Dieldrin	RWQCB Direct Exposure Human Health Risk Level	38 µg/kg
Chlordane	RWQCB Direct Exposure Human Health Risk Level	480 µg/kg
TPH-d	RWQCB Direct Exposure Human Health Risk Level	230 mg/kg
TPH-g	RWQCB Direct Exposure Human Health Risk Level	740 mg/kg

4.0 ALTERNATIVES EVALUATION

4.1 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The response actions to address the identified COPCs in Site soil include Alternative 1: no further action, Alternative 2: onsite encapsulation with institutional controls, and Alternative 3: excavation and offsite disposal. These response actions are considered the appropriate removal action alternatives for the Site.

4.1.1 Alternative 1 – No Further Action

The DTSC, the No Further Action alternative has been included to provide a baseline for comparisons among other removal alternatives. The No Further Action alternative would not require implementing any measures at the Site, and no costs would be incurred. This action includes no institutional controls, no treatment of soil, and no monitoring.

4.1.2 Alternative 2 – Soil Containment/Capping-in-Place

This alternative would consist of removing approximately 1,750 cubic yards of OCP and arsenic-impacted soil on the Site. For the TPH-impacted soil, the overburden is assumed to be clean, and can be excavated and stockpiled on site. The soil below the overburden will be excavated to a depth of approximately 10 feet below ground surface. This would yield a volume of approximately 20 cubic yards of TPH-impacted soil to be offhauled from the Site. This would include placing it under proposed hardscaped areas and/or under a minimum of one foot of clean soil in common areas of the planned redevelopment.

The impacted portions of the Site that exhibit COPC concentrations in excess of the soil cleanup would be divided into 30-foot-square grids. An ENGEO representative will observe the excavation activities, providing oversight and coordination when necessary. The initial excavation areas have been determined based on the results of the site investigations performed in 2016 and 2017 (refer to Figure 10 for proposed depths).

Following excavation of impacted soil, each of the remedial grids will be sampled by the collection of one discrete soil sample from the center-base of the grid and one sample from the two-thirds point of the grid's corresponding sidewalls (two thirds of the vertical distance up the sidewall from the base). The confirmation samples recovered from the OCP and arsenic impacted grids will be analyzed for OCPs (EPA Method 8081) and arsenic (EPA Method 6010). Confirmation samples recovered from the former UST excavation will be analyzed for TPH-g and VOCs (EPA Method 8260). Grids with base confirmation sampling concentrations exceeding the soil cleanup levels will be re-excavated an additional 12 inches and re-sampled. Grids with sidewall confirmation sampling concentrations exceeding the soil cleanup levels would be re-excavated laterally an additional 10 feet and re-sampled. Excavation will proceed until the soil cleanup levels are achieved. Grids with confirmation samples below the soil cleanup levels will be considered complete with no further excavation conducted.

Excavation operations will generate dust emissions. Suppressant, water spray, monitoring, and other forms of dust control may be required during excavation; however, based on the reported concentrations, there are no worker exposure issues with regard to dust hazards. Sloping excavation sidewalls may result in increased volume of soil requiring excavation.

Soil remaining within the Site, which has been shown to contain COPC concentrations below the soil cleanup levels, can be used to backfill the contaminated soil excavations. Import soil, if imported from offsite sources to achieve grading balance at the Site, will be tested in accordance with the DTSC import fill guidelines.

Excavated soil would be temporarily stockpiled pending placement within the designated encapsulation areas as engineered fill. Specific encapsulation areas would be based on the final approved site redevelopment plan. The soil stockpiles will be covered with 10-mil plastic sheeting and secured to prevent dust or runoff during storm events. Stockpiles will be managed in accordance with the Dust Control Plan (Appendix D).

A land use covenant would be executed between ACDEH and the property owner and recorded to ensure that the cap integrity is maintained and that future uses of the property are consistent with the operation and maintenance of the cap. An operation and maintenance plan would be submitted and approved by ACDEH. An operation and maintenance agreement signed with ACDEH specifying the operation and maintenance requirements and providing financial assurance for future operation and maintenance of the cap.

4.1.3 Alternative 3 – Soil Excavation/Offsite Disposal

The excavation/offsite disposal remedial action would consist of removing impacted soil from the Site. The excavated soil will be directly placed into trucks and off-hauled to an appropriate waste management facility, likely Altamont Landfill in Livermore, California or Vasco Road Landfill in Livermore, California. Excavation includes using loaders, scrapers, and/or other appropriate equipment.

The impacted portions of the Site that exhibit COPC concentrations in excess of the soil cleanup would be divided into 30-foot-square grids. An ENGEO representative will observe the excavation activities, providing oversight and coordination when necessary. The initial excavation areas have been determined based on the results of the site investigations performed in 2016 and 2017 (refer to Figure 10 for proposed depths).

Following excavation of impacted soil, each of the remedial grids will be sampled by the collection of one discrete soil sample from the center-base of the grid and one sample from the two-thirds point of the grid's corresponding sidewalls (two thirds of the vertical distance up the sidewall from the base). The confirmation samples recovered from the OCP and arsenic impacted grids will be analyzed for OCPs (EPA Method 8081) and arsenic (EPA Method 6010). Confirmation samples recovered from the former UST excavation will be analyzed for TPH-g and VOCs (EPA Method 8260). Grids with base confirmation sampling concentrations exceeding the soil cleanup levels will be re-excavated an additional 12 inches and re-sampled. Grids with sidewall confirmation sampling concentrations exceeding the soil cleanup levels would be re-excavated laterally an additional 10 feet and re-sampled. Excavation will proceed until the soil cleanup levels are achieved. Grids with confirmation samples below the soil cleanup levels will be considered complete with no further excavation conducted.

Excavation operations will generate dust emissions. Suppressant, water spray, monitoring, and other forms of dust control may be required during excavation; however, based on the reported concentrations, there are no worker exposure issues with regard to dust hazards. Sloping excavation sidewalls may result in increased volume of soil requiring excavation.

Soil remaining within the Site, which has been shown to contain COPC concentrations below the soil cleanup levels, can be used to backfill the contaminated soil excavations. Import soil, if imported from offsite sources to achieve grading balance at the Site, will be tested in accordance with the DTSC import fill guidelines.

4.2 EVALUATION CRITERIA

Each removal action alternative was independently analyzed without consideration to the other alternatives. Each of the removal action alternatives is screened based on effectiveness, implementability, and cost.

4.2.1 Effectiveness

In the effectiveness evaluation, the following factors are considered:

- Overall Protection of Human Health and the Environment - This criterion evaluates whether the removal alternative provides adequate protection to human health and the environment and is able to meet the Site's RAOs.

- Compliance with ARARs/TBCs - This criterion evaluates the ability of the removal alternative to comply with ARARs and TBCs.

- Short-Term Effectiveness - This criterion evaluates the effects of the removal alternative during the construction and implementation phase until removal objectives are met. It accounts for the protection of workers and the community during removal activities and environmental impacts from implementing the removal action.

- Long-Term Effectiveness and Permanence - This criterion addresses issues related to the management of residual risk remaining on site after a removal action has been performed and has met it objectives. The primary focus is on the controls that may be required to manage risk posed by treatment residuals and/or untreated wastes.

- Reduction of Toxicity, Mobility, or Volume - This criterion evaluates whether the removal technology employed results in significant reduction in toxicity, mobility, or volume of the hazardous substances.

4.2.2 Implementability

This criterion evaluates the technical and administrative feasibility of implementing the alternative, as well as the availability of the necessary equipment and services. This includes the ability to design and perform a removal alternative, ability to obtain services and equipment, ability to monitor the performance and effectiveness of technologies, and the ability to obtain necessary permits and approvals from agencies, and acceptance by the State and the community.

4.2.3 Cost

This criterion assesses the relative cost of each technology based on estimated fixed capital for construction or initial implementation and ongoing operational and maintenance costs. The actual costs will depend on true labor and material cost, competitive market conditions, final project scope, and the implementation schedule.

4.3 ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Each alternative is discussed in the following sections.

4.3.1 Alternative 1 – No Further Action

The No Further Action alternative would not require implementing any measures at the Site, and no costs would be incurred. Consequently, there would be no activities that would disturb Site soil, and, therefore, no short-term risks to Site workers or the community as a result of implementing this alternative.

However, under the No Further Action alternative, the impacts due to the presence of COPCs in soil would not be addressed and there would be no reduction in the potential risks. This alternative, therefore, does not meet the effectiveness criterion. As a result, acceptance by the State and the community would be unobtainable.

4.3.2 Alternative 2 – Soil Containment/Capping-in-Place

4.3.2.1 Effectiveness

Potential short-term risks to on-site workers, public health, and the environment could result from dust or particulates that may be generated during excavation and soil handling activities. These risks could be mitigated using personal protective equipment for on-site workers and engineering controls, such as dust suppression and monitoring, and additional traffic and equipment operating safety procedures, for protection of the surrounding community and to meet all ARARs.

With regard to long-term effectiveness, on-site encapsulation would not lessen toxicity or volume of the COPCs, but would limit or eliminate direct contact for future residents and workers. Under the Operation and Maintenance Agreement required as part of this alternative, periodic inspections would be required for settlement, cracking, ponding of liquids, erosion, and naturally occurring invasion by deep-rooted vegetation. On-site encapsulation would also require long-term inspection and maintenance and a land use covenant to meet ARARs, provide long-term effectiveness, and to ensure that the integrity of the cap is not compromised by land use activities. A Soil Management Plan would also be required if the encapsulated soil was to be disturbed in the future.

4.3.2.2 Implementability

Encapsulation is a relatively simple technology that is easily implemented and can be quickly installed. As COPCs would remain on site, obtaining permits and regulatory approval can be more difficult. In addition, community acceptance for this alternative may be more difficult since the COPCs would remain on site. Encapsulation may require "triple" handling of soil and a longer period of time (one to two weeks) to complete the encapsulation. This alternative would result in the potential for a greater degree of dust generation and noise from operations.

4.3.2.3 Cost

Containment technologies typically involve low to moderate costs. Based on previous estimates, costs for this alternative are in the range of $30 per cubic yard. Total project cost for Alternative 2 would be approximately $53,100 (See Section 4.4 Table). This alternative would include an annual maintenance cost of approximately $7,500.

4.3.3 Alternative 3 – Soil Excavation/Off-Site Disposal

4.3.3.1 Effectiveness

Potential short-term risks to on-site workers, public health, and the environment could result from dust or particulates that may be generated during excavation and soil handling activities. These risks could be reduced using personal protective equipment for on-site workers and engineering controls, such as dust suppression and monitoring, and additional traffic and equipment operating safety procedures, for protection of the surrounding community and to meet all ARARs. Excavation and disposal would remove the COPCs from the Site, and therefore, eliminates the long-term risks and accomplishes the RAO.

Although the COPCs will be removed from the Site, excavation and offsite land disposal does not result in the reduction of toxicity or volume of the COPC. However, the impacted material will be relocated and the potential for exposure is reduced to the future residents of the Site.

4.3.3.2 Implementability

Excavation/offsite disposal is a well-proven, readily implementable technology that is a common method for remediation of impacted sites. It is a relatively simple process, with proven results. Equipment and labor required to implement this alternative are uncomplicated and readily available. The shallow depths of the identified impacts make excavation readily implementable. It is anticipated that regulatory approval would be granted since it is a proven and permanent technology. Acceptance by the State and the community for this alternative is considered high. Alternative three will result in greater transport truck traffic to and from the Site as soil loads will be transported from the Site to landfills. Approximately 210 truck loads will be required over the course of a two- to three-week period to remove the estimated 1,770 cubic yards. Also, approximately 2,510 cubic yards of clean soil will need to be imported to the Site to backfill the open excavation, resulting in an additional 210 truck trips for a total of approximately 420 truck trips for the entire project. Alternative 3 will generally result in less noise and dust generation as opposed to Alternative 2.

4.3.3.3 Cost

The estimated cost for excavation, transportation, and disposal of the impacted soils is approximately $120 per cubic yard. This estimate includes permitting, excavation/removal, confirmation sampling/reporting, transportation, disposal at an approved offsite disposal facility, and import fill. The total cost for implementation of Alternative 3 is $212,400.

4.4 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

A comparative analysis was conducted to identify the advantages and disadvantages of each removal alternative. The comparative analysis of the removal alternatives was conducted to address the criteria listed in Section 4.2.

4.4.1 Effectiveness

Under the no further action alternative, the impacts associated with the site-specific COPCs would not be addressed. Consequently, there would be no reduction in the potential risks and the RAO would not be achieved. The no further action alternative does not involve activities that would disturb the impacted soil. Therefore, there would be no short-term risks to on-site workers or the community as a result of implementing these alternatives. Alternatives 2 and 3 would require removing, handling, and/or transporting the impacted soil, resulting in higher short-term exposure risks. However, it is expected that these risks can be sufficiently mitigated through site control measures.

Alternatives 2 and 3 reduce or eliminate, respectively, potential exposure to COPCs, and therefore, accomplish the RAO. Once implemented, the encapsulation alternative presented in Alternative 2 would require long-term monitoring and institutional controls to ensure its effectiveness. In addition, future changes in land use could disturb the soil. A soil management plan would be required in the event the encapsulated soil was to be disturbed in the future. The excavation/offsite disposal alternative in Alternative 3 would remove the COPCs from the Site, and would not require any further management or site controls.

Based upon this evaluation, Alternative 3 is favored under this criterion.

4.4.2 Implementability

No measures would be implemented for the no further action alternative. Alternatives 2 and 3 are both well proven, readily implementable technologies. However, Alternative 2 requires additional handling of soil, and therefore a potential increase in dust and noise generation, and also requires a long-term Operations and Maintenance program. Alternative 3 will result in greater impacts to transportation/traffic; however, the impacts are of short duration and can be effectively managed to minimize disturbances. Accordingly, Alternative 3 is favored by this criterion.

4.4.3 Cost Effectiveness

A summary of estimated costs to implement the proposed alternatives is presented in the following table. Costs are based on encapsulation or excavation/offsite disposal of 1,930 cubic yards (2,895 tons) of soil. Post removal costs are based on a 50-year project lifespan.

Table 4.4.3-1: Estimated Alternative Costs

SUMMARY OF ESTIMATED COSTS			
Costs	Removal Action Alternative		
	Alternative 1 No Further Action	Alternative 2 Soil Containment/ Capping In-Place	Alternative 3 Soil Excavation/ Offsite Disposal
Direct Capital Costs			
Estimated Costs	$ -	$53,100.00	$212,400.00
Annual Post Removal Action Site Control Costs			
Maintenance Costs	$ -	$7,500.00	$ -
Total	$ -	$60,600.00	$212,400.00

4.5 RECOMMENDED REMOVAL ACTION ALTERNATIVE

Based on the comparative analysis described in Section 4.4, Alternative 3, Excavation and Offsite Disposal is the preferred and recommended removal action alternative for addressing the Site.

4.6 EXCAVATION AND OFFSITE DISPOSAL

The excavation/offsite disposal remedial action will consist of removing COPC-impacted soil from the Site. The excavated soil will be properly disposed of by directly loading it into trucks for transport to a landfill. Excavation includes using loaders, scrapers, and/or other appropriate equipment. Approximately 1,750 cubic yards of OCP and arsenic- impacted soil would need to be excavated from the Site. For the TPH-impacted soil around B-7 (Figure 10), the overburden is assumed to be clean, and can be excavated and stockpiled on site. The soil below the overburden will be excavated to a depth of approximately 10 feet below ground surface. This would yield a volume of approximately 20 cubic yards of TPH-impacted soil to be offhauled from the Site.

The impacted portions of the Site that exhibit COPC concentrations in excess of the soil cleanup would be divided into 30-foot-square grids. An ENGEO representative will observe the excavation activities, providing oversight and coordination when necessary. The initial excavation areas have been determined based on the results of the site investigations performed in 2016 and 2017 (refer to Figure 10 for proposed depths).

Following excavation of impacted soil, each of the remedial grids will be sampled by the collection of one discrete soil sample from the center-base of the grid and one sample from the two-thirds point of the grid's corresponding sidewalls (two thirds of the vertical distance up the sidewall from the base). The confirmation samples recovered from the OCP and arsenic impacted grids will be analyzed for OCPs (EPA Method 8081) and arsenic (EPA Method 6010). Confirmation samples recovered from the former UST excavation will be analyzed for TPH-g and VOCs (EPA Method 8260). Grids with base confirmation sampling concentrations exceeding the soil cleanup levels will be re-excavated an additional 12 inches and re-sampled. Grids with sidewall confirmation sampling concentrations exceeding the soil cleanup levels would be re-excavated laterally an additional 10 feet and re-sampled. Excavation will proceed until the soil cleanup levels are achieved. Grids with confirmation samples below the soil cleanup levels will be considered complete with no further excavation conducted.

Excavation operations would generate dust emissions. Suppressant, water spray, monitoring, and other forms of dust control may be required during excavation, and workers would be required to use personal protective equipment (PPE) to reduce exposure to the COPCs. Sloping excavation sidewalls may result in increased volume of soil requiring excavation. Confirmation soil sampling and analysis would be conducted to verify that cleanup criteria were met at the excavation bottom and sidewall perimeter and excavation would proceed until the confirmation samples show the removal goal has been achieved.

The excavated soil may be temporarily stockpiled onsite. As necessary, the soil stockpiles would be covered with 10-mil plastic sheeting and secured to prevent dust or runoff during storm events. Stockpiles would be managed in accordance with the Dust Control Plan (Appendix D). The soil stockpiles would be maintained at the Site until transported offsite.

Soil remaining within the Site, which has been shown to contain COPCs concentrations below the soil cleanup levels, could be used to backfill the contaminated soil excavations. Clean import soil, if any additional soil is needed to achieve a grading balance, would be imported from offsite sources and tested in accordance with the DTSC import fill guidelines.

5.0 REMOVAL ACTION IMPLEMENTATION

Implementation of the removal action consists of a series of separate tasks. The following sections discuss each task and the activities of which they consist: Selecting excavation locations (Section 5.1); permits, notifications, and Site preparation (Section 5.2); excavation methodology (Section 5.3); control measures (Section 5.4); and field variances (Section 5.5). The Dust Control Plan is provided as Appendix D.

5.1 SELECTING EXCAVATION LOCATIONS

Figure 10 shows the proposed excavation area and depth of excavation. The anticipated depth of excavation in the areas of the OCP and arsenic-impacted soil is approximately 12 inches and 30 inches (in two areas). The anticipated depth of excavation in the areas of the TPH-impacted soil is approximately 10 feet.

5.2 PERMITTING AND SITE PREPARATION

The removal action will be conducted in accordance with all applicable California Code of Regulations, including Cal/OSHA regulations. Prior to implementation of the RAP, and if required, a grading permit will be obtained from Alameda County to facilitate the proposed excavation work. If required, the Transportation Plan will be submitted to the City prior to work activities. Since no volatile constituents are present at the Site, no permits/notifications are required from Bay Area Air Quality Management District (BAAQMD) for the removal action.

5.3 EXCAVATION METHODOLOGY

Excavation work will be conducted by a licensed grading contractor with current hazardous substance removal certifications. Excavations will be performed using a combination of scrapers, track-mounted excavators, and/or loaders. The approximate extent of the proposed excavation area is shown on Figure 10. Shoring, if necessary, will comply with applicable Alameda County and Cal/OSHA requirements.

Upon completion of the excavation work and confirmation sampling, the excavations will be backfilled with clean import fill that, following confirmation testing as appropriate, exhibits COPC concentrations below the below the RAOs (Section 3.2). Import fill will be tested in accordance with DTSC requirements, prior to acceptance.

5.4 CONTROL MEASURES

The Site will be cordoned off to be protective of the general public and access to the Site will be through a specific locked entrance. Dust control measures will be performed in accordance with applicable BAAQMD Standards. The applicable guidelines are available in Tables 8-1 and 8-2 of the California Environmental Quality Act - Air Quality Guidelines (updated May 2011). Dust control procedures are described in Appendix D. Onsite health and safety measures are detailed in Appendix F.

Because the anticipated disturbance area will be greater than 1 acre in area, a Construction Stormwater Pollution Prevention Plan should be prepared prior to work activities.

Noise control measures implemented within the Site will be undertaken in accordance with applicable Alameda County requirements. Alameda County requires that construction activities are conducted between 7 a.m. and 7 p.m. on any day, except Saturday or Sunday. Work conducted on Saturday or Sunday must be completed between 8 a.m. and 5 p.m. Noise control measures will include but are not limited to the following:

- All equipment driven by internal combustion engines will be equipped with appropriate mufflers in good operating condition.
- When feasible, “quiet” models of stationary equipment such as air compressors, generators, and other noise sources.
- Stationary noise-generating equipment will be located as far as possible from sensitive receptors.
- No unnecessary idling of internal combustion engines will occur onsite.

5.5 FIELD VARIANCES

Variances from the work plan will be recorded in journal form, including emergency actions (when an immediate response is required). The field variances will also be documented in the Removal Action Completion Report prepared for the project.

5.6 MANAGEMENT OF IMPACTED SOIL

All excavated soil at the Site is anticipated to be Class II material. The excavated soil from the Site is anticipated to be disposed of at the Altamont Landfill in Livermore, California or Vasco Road Landfill in Livermore, California.

6.0 SAMPLING AND ANALYSIS PLAN

The proposed removal action will require the collection and analysis of samples to confirm the removal of impacted soil. Sampling will be conducted in general accordance with the applicable field procedures presented in Appendix E. In the following sections, confirmation sampling and waste disposal classification sampling are discussed.

6.1 CONFIRMATION SAMPLING OF EXCAVATED AREAS

The impacted areas of the Site (Figure 10) will initially be excavated to a depth of 1 foot below ground surface, and 2.5 feet below ground surface in certain areas of the OCP and arsenic impacts.

Following excavation, each of the excavated grids would be sampled by the collection of one discrete soil sample from the center-base of the grid and one sample from the mid-point of the grid's corresponding sidewalls. The confirmation samples recovered from the grids would be analyzed for OCPs (EPA Method 8081) and arsenic (EPA Method 6010). Grids with base confirmation sampling concentrations exceeding the soil cleanup level would be re-excavated an additional foot (12 inches) and resampled. Grids with sidewall confirmation sampling concentrations exceeding the soil cleanup levels would be re-excavated laterally an additional 10 feet and resampled. Excavation would proceed until the soil cleanup levels are achieved. The excavated soil will be managed in accordance with Section 5.6. Areas with confirmation samples below the soil cleanup levels would be considered complete with no further excavation conducted.

The area with the TPH-impacts will be excavated to a depth of 10 feet below ground surface (Figure 10). Following excavation, the excavated area would be sampled by the collection of one discrete soil sample from the center-base of the grid and one sample from the mid-point of the grid's corresponding sidewalls. The confirmation samples recovered from the former UST excavation would be analyzed for VOCs (EPA Method 8260).

Upon completion of excavation work and confirmation sampling, the approved excavations will be backfilled with clean import fill. Import fill will be tested in accordance with DTSC requirements, prior to acceptance.

7.0 HEALTH AND SAFETY PLAN

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

In addition, California OSHA's Construction Safety Orders (especially Cal. Code Regs., title 8, sections 1539 and 1541) will be followed as appropriate. A site-specific HASP has been prepared for the Site in accordance with current health and safety standards as specified by the federal and California OSHA and submitted to the Regional Water Board prior to initiation of field work. The HASP is presented in Appendix F.

The provisions of the HASP are mandatory for all personnel who are at the Site. The contractor and its subcontractors performing fieldwork in association with this RAP will either adopt and abide by the HASP or shall develop their own safety plans, which at a minimum, meet the requirements of the HASP. All onsite personnel shall read the HASP and sign the Plan "Acknowledgement" (Attachment E of the HASP) before starting Site activities.

8.0 REPORTING

A Remedial Action Implementation Plan (RAIP) will be prepared describing proposed methodology for implementing the selected remedial alternative to address soil impacts identified at the Site. On completion of all remedial and sampling activities, a Remedial Action Plan Completion Report will be prepared and submitted to the ACDEH for review, documenting the implementation activities described in this document and the Remedial Action Implementation Plan (RAIP).

SELECTED REFERENCES

AEI, Preliminary Site Investigation Report, 20957 Baker Road, Castro Valley, California, June 7, 2005.

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Dibblee, T.W., Jr., 2005, Geologic Map of the Hayward Quadrangle, Alameda and Contra Costa Counties, California, DF 163, 2005.

ENGEO, Phase I Environmental Site Assessment, 20957 Baker Road, Castro Valley, California, Project Number 13255.000.000, August 23, 2016 (DRAFT).

ENGEO, Phase I Environmental Site Assessment, 20785 Baker Road, Castro Valley, California, Project Number 13255.000.000, August 23, 2016 (DRAFT).

ENGEO, Phase II Environmental Site Assessment, 20785 Baker Road, Castro Valley, California, Project Number 13255.000.000, August 31, 2016.

ENGEO, Phase II Environmental Site Assessment, 20957 Baker Road, Castro Valley, California, Project Number 13255.000.000, August 31, 2016.

ENGEO, Workplan for Site Characterization, 20785 and 20957 Baker Road (Former Case #R00002739), Castro Valley, California, December 29, 2016.

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ENGEO, Geotechnical Exploration, 20785 and 20957 Baker Road, Castro Valley, California, Project Number 13255.000.000, March 22, 2017, Revised June 7, 2017.

ENGEO, Workplan for Additional Site Characterization, 20785 and 20957 Baker Road (Site Cleanup Program Case No. R00003234), Castro Valley, California, June 15, 2017.

State Water Resources Control Board, Water Quality Control Policy for Low-Threat Underground Storage Tank Closure.

TABLES

TABLE A - Summary of Soil Analytical Results
TABLE B - Summary of Soil Gas Analytical Results: VOCs
TABLE C - Summary of Soil Gas Analytical Results: Fixed Gases
TABLE D – Summary of Groundwater Analytical Results

Table A - Summary of Soil Analytical Results

Sample ID	Date Collected	Sample Depth (feet)	TPH			VOCs			Arsenic	Lead	Soluble lead (STLC)	Organochlorine pesticides (OCPs)													
			TPH-g	TPH-d	TPH-mo	Naphthalene	n-Butylbenzene	Other VOCs				beta-BHC	delta-BHC	gamma-Chlordane	alpha-Chlordane	4,4-DDE	Dieldrin	4,4-DDD	4,4-DDT	Endosulfan II	Endrin Aldehyde	Endosulfan Sulfate	Chlordane	Heptachlor Epoxide	Other OCPs
			µg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	mg/kg	mg/kg	mg/L	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
RWQCB Direct Exposure ESLs [1]			7.40E+05	230	1.10E+04	3.30E+03	--	N/A	0.067[2]	80	5[3]	-	-	-	-	1,900	38	2,700	1,900	-	-	-	480	67	N/A
RWQCB Groundwater Leaching ESLs[2]			7.70E+05	570	--	33	--	N/A	-	-	-	-	-	-	-	1.1E+06	0.17	7.5E+05	4,300	-	-	-	15,000	0.42	N/A
PREVIOUS CHARACTERIZATION																									
S-1@3-9"	8/19/2016	0.25 - 0.75	NA	NA	NA	NA	NA	NA	13.7	7.41	NA	<3.2	<1.6	<1.6	<1.7	<1.9	<1.5	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
S-1@12-18"	8/19/2016	1 - 1.5	NA	NA	NA	NA	NA	NA	2.9	13.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
S-2@3-9"	8/19/2016	0.25 - 0.75	NA	NA	NA	NA	NA	NA	27.3	6.49	NA	<1.3	<0.62	<0.65	<0.69	<0.78	<0.59	<2.3	<0.52	<2.3	<0.60	<0.47	<8.4	<0.31	ND
S-2@12-18"	8/19/2016	1 - 1.5	NA	NA	NA	NA	NA	NA	1.92	19.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
S-3@3-9"	8/19/2016	0.25 - 0.75	NA	NA	NA	NA	NA	NA	17.9	14.1	NA	<1.3	<0.62	<0.65	<0.69	<0.78	<0.59	<2.3	<0.52	<2.3	<0.60	<0.47	<8.4	<0.31	ND
S-3@12-18"	8/19/2016	1 - 1.5	NA	NA	NA	NA	NA	NA	5.51	8.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
S-4@3-9"	8/19/2016	0.25 - 0.75	NA	NA	NA	NA	NA	NA	26.5	33.2	NA	<1.3	<0.62	<0.65	<0.69	<0.78	<0.59	<2.3	<0.52	<2.3	<0.60	<0.47	<8.4	<0.31	ND
S-4@12-18"	8/19/2016	1 - 1.5	NA	NA	NA	NA	NA	NA	6.64	12.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
S-5@3-9"	8/24/2016	0.25 - 0.75	NA	NA	NA	NA	NA	NA	13.1	48.4	NA	<6.3	<3.1	<3.3	<3.5	<3.9	<3.0	<11	<2.6	<12	<3.0	<2.3	<42	<1.6	ND
S-6@3-9"	8/24/2016	1 - 1.5	NA	NA	NA	NA	NA	NA	7.51	9.71	NA	<0.32	<0.16	<0.16	<0.17	<0.19	<0.15	<0.57	<0.13	<0.58	<0.15	<0.12	<2.1	<0.078	ND
S-7@3-9"	8/24/2016	0.25 - 0.75	NA	NA	NA	NA	NA	NA	3.88	49.6	NA	<3.2	<1.6	9.71	8.55	26.6	36.8	<5.7	87.9	<5.8	<1.5	<1.2	73.1	<0.78	ND
S-8@3-9"	8/24/2016	1 - 1.5	NA	NA	NA	NA	NA	NA	13.5	43.1	NA	<3.2	<1.6	<0.16	<0.17	1.9	<1.5	<5.7	8.03	<5.8	<1.5	<1.2	73.1	0.78	ND
ADDITIONAL CHARACTERIZATION - MARCH 2017																									
SS-1@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	9.67	22.4	NA	<3.2	<1.6	<1.6	<1.7	6.44	1.7	<5.7	7.84	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-1@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	5.14	9.02	NA	<1.3	<0.62	<0.65	<0.69	4.29	0.9	<2.3	<0.52	<2.3	<0.60	<0.47	<8.4	<0.31	ND
SS-2@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	10.2	12.9	NA	<3.2	<1.6	2.1	2.34	4.98	2.51	<5.7	12.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-2@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	8.33	6.01	NA	<3.2	<1.6	<1.6	<1.7	4.62	<1.5	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-3@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	13.6	8.21	NA	<0.95	<0.47	<0.49	<0.52	<0.58	<0.44	<1.7	<0.39	<1.7	<0.45	<0.35	<6.3	<0.23	ND
SS-3@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	11	7.96	NA	<6.3	<3.1	<3.3	<3.5	5.08	<3.0	<11	<2.6	<12	<3.0	<2.3	<42	<1.6	ND
SS-4@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	10.7	10.5	NA	45.6	61.3	<1.6	<1.7	<1.9	5.31	7.88	10.8	37.8	72.5	60	<21	<0.78	ND
SS-4@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	4.72	6.68	NA	<3.2	<1.6	<1.6	<1.7	2.61	<1.5	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-5@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	16.4	5.11	NA	<3.2	5.34	<1.6	<1.7	<1.9	<1.5	<5.7	<1.3	8.93	17.6	<1.2	<21	<0.78	ND
SS-5@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	6.1	7.99	NA	<3.2	<1.6	<1.6	<1.7	2.37	1.81	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-6@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	8.79	15.1	NA	<3.2	6.4	<1.6	<1.7	<1.9	<1.5	<5.7	8.72	13.4	18.7	<1.2	<21	<0.78	ND
SS-6@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	2.47	3.46	NA	<3.2	<1.6	<1.6	<1.7	<1.9	<1.5	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-7@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	10.3	83.1	3.23	<3.2	<1.6	<1.6	<1.7	<1.9	15.3	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-7@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	17.7	10.8	NA	<3.2	<1.6	<1.6	<1.7	<1.9	<1.5	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-8@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	13.2	5.46	NA	<0.95	<0.47	<0.49	<0.52	<0.58	2.44	<1.7	<0.39	<1.7	<0.45	<0.35	<6.3	<0.23	ND
SS-8@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	10.7	10.1	NA	<3.2	<1.6	<1.6	<1.7	2.81	<1.5	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-9@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	11.1	24.8	NA	<3.2	<1.6	<1.6	<1.7	<1.9	12	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-9@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	8.34	10	NA	<3.2	<1.6	<1.6	<1.7	2.02	<1.5	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-10@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	12.9	36.2	NA	<3.2	<1.6	<1.6	<1.7	<1.9	13.5	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-10@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	8.79	10.4	NA	<3.2	<1.6	<1.6	<1.7	2.11	1.78	<5.7	<1.3	<5.8	<1.5	<1.2	<21	<0.78	ND
SS-11@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	19.8	110	4.57	<0.95	<0.47	<0.49	<0.52	<0.58	4.22	<1.7	<0.39	<1.7	<0.45	<0.35	<6.3	<0.23	ND
SS-11@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	11.1	11.5	NA	<1.3	<0.62	<0.65	<0.69	<0.78	<0.59	<2.3	<0.52	<2.3	<0.60	<0.47	<8.4	<0.31	ND
SS-12@0-12"	3/16/2017	0 - 1	NA	NA	NA	NA	NA	NA	3.67	8.54	NA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ND
SS-12@12-24"	3/16/2017	1 - 2	NA	NA	NA	NA	NA	NA	6.17	5.2	NA	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	ND
SS-13@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	8.58	64.1	1.55	<0.95	<0.47	58.3	60.6	9.08	32.4	<1.7	26.7	<1.7	<0.45	<0.35	401	11.3	ND
SS-13@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	8.18	89.6	2.21	<3.2	<1.6	32.1	37.2	55.5	36.1	<5.7	47.3	<5.8	<1.5	<1.2	170	7.92	ND
Dup-1@0-12"	3/3/2017	0 - 1	NA	NA	NA	NA	NA	NA	10.1	7.16	NA	<0.95	<0.47	<0.49	<0.52	<0.58	2.59	<1.7	<0.39	<1.7	<0.45	<0.35	<6.3	<0.23	ND
Dup-2@12-24"	3/3/2017	1 - 2	NA	NA	NA	NA	NA	NA	8.74	13.9	NA	<1.3	<0.62	<0.65	<0.69	<0.78	<0.59	<2.3	<0.52	<2.3	<0.60	<0.47	<8.4	<0.31	ND

ENGEO
Expect Excellence

Table A - Summary of Soil Analytical Results

Sample ID	Date Collected	Sample Depth (feet)	TPH			VOCs			Arsenic	Lead	Soluble lead (STLC)	Organochlorine pesticides (OCPs)													
			TPH-g	TPH-d	TPH-mo	Naphthalene	n-Butylbenzene	Other VOCs				beta-BHC	delta-BHC	gamma-Chlordane	alpha-Chlordane	4,4-DDE	Dieldrin	4,4-DDD	4,4-DDT	Endosulfan II	Endrin Aldehyde	Endosulfan Sulfate	Chlordane	Heptachlor Epoxide	Other OCPs
			µg/kg	mg/kg	mg/kg	µg/kg	µg/kg	µg/kg	mg/kg	mg/kg	mg/L	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
RWQCB Direct Exposure ESLs [1]			7.40E+05	230	1.10E+04	3.30E+03	--	N/A	0.067[2]	80	5[3]	-	-	-	-	1,900	38	2,700	1,900	-	-	-	480	67	N/A
RWQCB Groundwater Leaching ESLs[2]			7.70E+05	570	--	33	--	N/A	-	-	-	-	-	-	-	1.1E+06	0.17	7.5E+05	4,300	-	-	-	15,000	0.42	N/A
JUNE 2017 CHARACTERIZATION																									
B-1 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-2 @ 4.5-5'	6/22/2017	4.5-5	<100	3.26	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-3 @ 4.5-5'	6/22/2017	4.5-5	<100	2.47	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-4 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-5 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-6 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-7 @ 4.5-5'	6/22/2017	4.5-5	<100	8.14	17.9	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-7 @ 7.5-8'	6/22/2017	7.5-8	29,500	**2,390**	<320	**221**	<150	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-7 @ 9.5-10'	6/22/2017	9.5-10	95,700	**4,990**	<320	<170	275	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-7 @ 11.5-12'	6/22/2017	11.5-12	<100	23.7	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-8 @ 4.5-5'	6/22/2017	4.5-5	<100	3.64	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-9 @ 4.5-5'	6/21/2017	4.5-5	<100	4.68	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-10 @ 4.5-5'	6/22/2017	4.5-5	<100	5.67	19.6	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-10 @ 7.5-8'	6/22/2017	7.5-8	<100	7.31	17.8	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-11 @ 4.5-5'	6/22/2017	4.5-5	<100	2.15	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-11 @ 7.5-8'	6/22/2017	7.5-8	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-11 @ 11.5-12'	6/22/2017	11.5-12	13,500	<2.0	<10	<170	<150	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-11 @ 13-13.5'	6/22/2017	13-13.5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-12 @ 4.5-5'	6/22/2017	4.5-5	<100	7.48	12.5	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-12 @ 7.5-8'	6/22/2017	7.5-8	<100	2.05	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-13 @ 4.5-5'	6/22/2017	4.5-5	<100	6.96	12.7	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-14 @ 4.5-5'	6/21/2017	4.5-5	<100	3.17	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-15 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-16 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-16 @ 7.5-8'	6/22/2017	7.5-8	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-17 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-18 @ 4.5-5'	6/21/2017	4.5-5	<100	2.31	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-19 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-20 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-21 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
B-22 @ 4.5-5'	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dup-1	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dup-2	6/22/2017	4.5-5	<100	<2.0	<10	<10	<10	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
N/A = Not Applicable
ND = Not Detected
NA = Not Analyzed
<3.2 mg/kg indicates that the result is less than the laboratory reporting limit of 3.2 mg/kg.
Yellow highlighted cell indicate concentrations exceeed corresponding residential screening levels.

[1] Regional Water Quality Control Board (RWQCB), Direct Exposure Human Health Risk Screening Levels for Soil (Residential Land Use), Table S-1, February 2016 (Revision 3).

[2] Regional Water Quality Control Board (RWQCB), Soil Leaching to Groundwater Screening Levels for Soil (Drinking Water Resource), Table S-2, February 2016 (Revision 3).

[2] Although arsenic concentrations exceed the corresponding residential screening levels, concentrations are within expected background concentrations observed in the San Francisco Bay Area, with the exception of the yellow highlighted results (which exceed the estimated background concentration of 11 mg/kg).

[3] Used for California regulated hazardous waste. Source is California Code of Regulations, Title 22, Chapter 11, Article 3. If a substance is ten times the STLC value found in the TTLC, the Waste Extraction Test (WET) is indicated. If any substance in the waste extract is equal to or greater than the STLC value, it is considered a hazardous toxic waste.

Table B - Summary of Soil Gas Analytical Results: VOCs

Sample ID	Date Collected	TPH-g	1,1-Dichloroethene	1,1-Difluoroethane	1,3-Butadiene	2-Butanone (MEK)	4-Methyl-2-Pentanone (MIBK)	Acetone	Benzene	Carbon Disulfide	cis-1,2-dichloroethene	n-hexane	n-heptane	Cyclohexane	Isopropanol	tert-Butanol	Toluene	TCE	PCE	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2-Hexanone	4-Ethyl Toluene	Ethyl benzene	m,p-Xylene	o-xylene	Naphthalene	1,2,4-Trichlorobenzene	Other VOCs
		μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3		μg/m^3	μg/m^3	μg/m^3	μg/m^3	μg/m^3			μg/m^3
RWQCB ESL[2]		3.00E+05	3.70E+04	880	--	2.60E+06	1.60E+06	1.50E+07	48	--	4,200	--	--	--	--	--	1.60E+05	240	240	--	--	--	--	560	5.20E+04	5.20E+04	41	1000	N/A
PREVIOUS CHARACTERIZATION																													
SG-1	8/19/2016	88,100	<69	<470	<39	<52	<72	8,500	<56	<54	<69	<62	NA	NA	NA	<53	<66	<94	<120	88	<86	95	<86	3,500	17,000	5,200	<92	<130	ND
SG-2	8/19/2016	15,300	<20	<140	<11	<15	<21	4,900	<16	<16	<20	<18	NA	NA	NA	<15	<19	<27	<34	<25	<25	<21	<25	210	1,100	370	<26	160	ND
SG-3	8/19/2016	245,000	<99	<680	<55	<74	<100	2,500	<80	<78	<99	<88	NA	NA	NA	<76	<94	<130	<170	5,700	2,300	170	<120	3,700	20,000	7,800	130	<190	ND
ADDITIONAL CHARACTERIZATION																													
SG-A	3/15/2017	280	<4.2	<4.3	37	<11	<4.4	28	19	63	<4.2	30	7.4	21	<11	N/A	15	<5.7	<7.3	<5.3	<5.3	<4.4	<5.3	<4.6	4.8	<4.6	<4.3	<7.9	ND
SG-B	3/14/2017	3,200	<9.6	<9.8	<5.3	<7.1	<9.9	43	8.2	35	<9.6	820	<9.9	14	<24	N/A	740	<13	<16	<12	<12	<9.9	<12	18	71	20	<9.6	<18	ND
SG-C	3/14/2017	3,400	<8.5	<8.7	<4.7	9.5	<8.8	35	11	35	<8.5	740	9.9	17	<21	N/A	280	<11	20	<11	<11	<8.8	<11	<9.3	21	<9.3	<8.6	<16	ND
SG-D	3/14/2017	210	<3.9	<4.0	<2.2	<2.9	<4.0	<9.4	<3.1	<3.1	<3.9	<3.5	<4.0	<3.4	<9.7	N/A	9.5	<5.3	<6.7	<4.8	<4.8	<4.0	<4.8	<4.3	<4.3	<4.3	<3.9	<7.3	ND
SG-E	3/15/2017	13,000	<21	<21	21	<51	<21	58	26	170	<21	3,600	<21	50	<51	N/A	2,400	<28	<36	<26	<26	<21	<26	50	220	46	<110	<39	ND
SG-F	3/15/2017	6,000	<8.0	<8.2	7.9	24	<8.3	35	18	200	<8.0	1,900	13	27	<20	N/A	870	<11	<14	11	<9.9	<8.3	<9.9	22	100	23	<42	<15	ND
SG-G	3/14/2017	4,700	<7.4	<7.5	5.2	7.5	7.6	210	8.5	42	<7.4	1,000	15	22	<18	N/A	1,800	<10	<13	<9.1	<9.1	<6.6	<9.1	31	130	33	<39	<14	ND
SG-H	3/14/2017	4,800	<12	<12	6.6	<8.7	<12	69	<9.4	180	<12	1,600	22	30	<29	N/A	870	<16	<20	<15	<15	<12	<15	22	98	25	<12	<11	ND
SG-I	3/14/2017	280	<4.5	<4.6	<2.5	3.6	<4.6	21	<3.6	5.6	<4.5	15	<4.6	<3.9	<11	N/A	80	<6.0	<7.6	<5.5	<5.5	<4.6	<5.5	<4.9	11	<4.9	<4.5	<8.3	ND
SG-J	3/14/2017	<64	<4.2	<4.2	<2.3	<3.1	<4.3	<10	<3.4	31	<4.2	15	<4.3	<3.6	<10	N/A	24	<5.6	<7.1	<5.2	<5.2	<4.3	<5.2	<4.6	<4.6	<4.6	<4.2	<7.8	ND
SG-K	3/15/2017	1,400	<4.6	<4.7	20	12	<4.7	52	11	190	<4.6	31	5	11	<11	N/A	78	<6.2	<7.8	<5.7	<5.7	<4.7	<5.7	<5.0	<5.0	<5.0	<4.6	<8.6	ND
SG-L	3/14/2017	6,600	<8.7	<8.9	<4.8	11	<9.0	61	11	180	<8.7	2100	28	30	<22	N/A	1,500	<12	<15	<11	<11	<9.0	<11	33	130	33	<46	<16	ND
SG-M	3/14/2017	790	<4.6	<4.7	<2.5	6.6	<4.7	31	4.8	40	<4.6	140	6.2	<4	13	N/A	260	<6.2	<7.8	<5.7	<5.7	<4.7	<5.7	9.4	40	11	<4.6	<8.5	ND
SG-N	3/14/2017	1,400	<4.7	<4.8	<2.6	8.7	<4.8	72	<3.8	7.6	<4.7	180	<4.8	<4.0	<12	N/A	400	<6.3	<8.0	6.9	<5.8	<4.8	<5.8	18	87	29	<4.7	<8.7	ND
SG-DUP	3/14/2017	1,300	<4.6	<4.7	<2.6	9	<4.8	72	<3.7	7.7	<4.6	190	<4.8	<4.0	<12	N/A	410	<6.3	<7.9	6.8	<5.8	<4.8	<5.8	18	89	28	<4.7	<8.7	ND

Notes:
N/A- Not Applicable
-- means no screening level exists
<4.2 indicates that the result is less than the laboratory reporting limit of 4.2 μg/m^3.
Yellow highlighted cell indicate concentrations exceeed corresponding residential screening levels.
Green highlighted cells indicate laboratory reporting limits exceed corresponding residential screening levels.
[2] Regional Water Quality Control Board (RWQCB), Subslab/Soil Gas Vapor Intrusion Human Health Risk Screening Levels (Residential Land Use), Table SG-1, February 2016 (Revision 3).

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Table C - Summary of Soil Gas Analytical Results: Fixed Gases

Sample ID	Date Collected	Helium	Carbon Monoxide	Carbon Dioxide	Oxygen	Methane
		%	%	%	%	%
SG-A	3/15/2017	<0.21	<0.21	**3.1**	**12**	<0.21
SG-B	3/14/2017	<0.24	<0.24	**5.8**	**3.6**	<0.24
SG-C	3/14/2017	<0.21	<0.21	**6**	**3.7**	<0.21
SG-D	3/14/2017	<0.20	<0.20	**2.2**	**16**	<0.20
SG-E	3/15/2017	<0.35	<0.35	**1.3**	**13**	<0.35
SG-F	3/15/2017	<0.40	<0.40	**0.8**	**12**	<0.40
SG-G	3/14/2017	<0.19	<0.19	**6.6**	**5.7**	<0.19
SG-H	3/14/2017	<0.20	<0.20	<0.20	**15**	<0.20
SG-I	3/14/2017	<0.23	<0.23	**2.4**	**15**	<0.23
SG-J	3/14/2017	<0.21	<0.21	**8.4**	**8.2**	<0.21
SG-K	3/15/2017	<0.23	<0.23	**1.6**	**12**	<0.23
SG-L	3/14/2017	<0.22	<0.22	**1.1**	**9.6**	<0.22
SG-M	3/14/2017	<0.23	<0.23	**8.9**	**2.2**	<0.23
SG-N	3/14/2017	<0.24	<0.24	**9.3**	**1.8**	<0.24
SG-DUP	3/14/2017	<0.23	<0.23	**9.5**	**1.5**	<0.23

Notes:

ND- Not Detected

Table D – Summary of Groundwater Analytical Results

Sample ID	Date	TPHs			VOCs	Dissolved Metals				
		TPH-d	TPH-mo	TPH-g		Barium	Cobalt	Nickel	Zinc	Other Metals
		mg/L	mg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L
RWQCB ESLs [1]		**0.15**	**--**	**220**	**N/A**	**1**	**0.006**	**0.1**	**5**	**N/A**
GW-1	6/22/2017	<0.10	<0.40	<50	ND	0.06	<0.0050	<0.0050	0.013	ND
GW-2	6/22/2017	<0.10	<0.40	<50	ND	0.036	<0.0050	<0.0050	0.011	ND
GW-3	6/22/2017	<0.10	<0.40	<50	ND	0.11	**0.029**	0.020	0.0098	ND
Dup-1	6/22/2017	<0.10	<0.40	<50	ND	0.034	<0.0050	<0.0050	0.012	ND

Notes:

N/A = not applicable

ND = not detected

'--' means no screening level exists

<0.1 mg/L indicates that the result is less than the laboratory reporting limit of 0.1 mg/L.

[1] Regional Water Quality Control Board (RWQCB), Direct Exposure Human Health Risk Screening Levels for Groundwater (MCL Priority), Table GW-1, February 2016 (Revision 3).

FIGURES

APPENDIX A

Environmental Boring Logs
ENGEO logs and AEI Consultants Logs

APPENDIX B

Torrent Laboratory, Inc.
Analytical Laboratory Reports

APPENDIX C

UCL Calculation Worksheet for Lead

APPENDIX D

Dust Control Plan

APPENDIX E

Sampling and Analysis Plan

APPENDIX F

Health and Safety Plan