Work Plan to Conduct Investigation and Remediation Activities at 9201 San Leandro Street Oakland, California (Fuel Leak Case #RO0000320)

November 14, 2008
001-09679-00

Prepared for
Service West Inc.
9201 San Leandro Street
Oakland, California 94603

Prepared by
LFR Inc.
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ServiceWest

November 14, 2008

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

Subject: Work Plan to Conduct Investigation and Remediation Activities at
9201 San Leandro Street, Oakland, California (Fuel Leak Case #RO0000320)

Dear Mr. Wickham:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions or comments, please call me at (510) 729-0414 or Ron Goloubow of LFR Inc. at (510) 652-4500.

Sincerely,

Mark Vignoles
President

LFR ENVIRONMENTAL MANAGEMENT & CONSULTING ENGINEERING

November 14, 2008 001-09679-00

Mr. Jerry Wickham
Alameda County Environmental Heath Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Subject: Work Plan to Conduct Investigation and Remedial Activities at 9201 San Leandro Street, Oakland, California (Fuel Leak Case #RO0000320)

Dear Mr. Wickham:

As we briefly discussed on October 22, 2008, LFR Inc. (LFR) has been retained by Service West Inc. ("Service West") to further investigate the affected soil and groundwater that is present at the property located at 9201 San Leandro Street, Oakland, California ("the Site"; Figures 1 and 2). LFR has reviewed and compiled the analytical data for soil and groundwater samples collected at the Site. Based on our review of the data, we have prepared the enclosed work plan that presents the scope of work to conduct an additional soil and groundwater investigation and an air sparging (groundwater remediation) pilot test at the Site. The work plan is also intended to respond to technical comments provided by Alameda County Environmental Health in its letter dated September 26, 2008. As we discussed, Service West is interested in selling the property and the environmental issues are affecting the transaction; therefore, we will try to complete this project in a timely manner. LFR will contact you during the week of November 17, 2008 to follow-up on any questions you may have regarding the work plan or the project in general.

Service West and LFR thank you in advance for your prompt attention to this project and look forward to bringing it to closure. If you have any questions regarding this work plan, please contact either of the undersigned at (510) 652-4500.

Sincerely,

Ron Goloubow
Senior Associate Geologist

Lucas Goldstein, P.E., P.G.
Senior Associate Engineer

cc: Mark Vignoles – Service West, Inc.

Enclosure

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CERTIFICATION

LFR Inc. has prepared this work plan, on behalf of Service West, Inc., in a manner consistent with the level of care and skill ordinarily exercised by professional geologists and engineers. This investigation work plan was prepared under the technical direction of the undersigned California Professional Geologist-Engineer.

November 14, 2008

Lucas Goldstein, P.G., P.E.*
Senior Associate Engineer
California Professional Geologist (7035)
California Professional Civil Engineer (72455)

Date

* A registered geologist's or registered environmental assessor's certification of conditions comprises a declaration of his or her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations, and ordinances.

1.0 INTRODUCTION

This work plan has been prepared by LFR Inc. (LFR) on behalf of Service West Inc. ("Service West") for the property located at 9201 San Leandro Street, Oakland, California ("the Site"; Figures 1 and 2). The objective of the work plan is to address the environmental issues presented in the letter from Alameda County Environmental Health (ACEH) dated September 26, 2008 ("the ACEH Letter"; ACEH 2008). In addition, the scope of this work plan includes a pilot test to collect field data to assess whether air/ozone injection in conjunction with SVE is a potentially viable remediation technology to address petroleum-affected groundwater beneath a portion of this Site.

1.1 Site Description

The site consists of an -approximately 4.6-acre parcel that is generally bounded by: an access road and heavy industrial/manufacturing business to the north; San Leandro Street, Union Pacific Railroad tracks, and elevated Bay Area Rapid Transit (BART) tracks to the east; Union Pacific Railroad tracks and easements for petroleum pipelines to the west; and industrial/warehousing businesses to the south. The surrounding area is a mix of industrial and heavy industrial (manufacturing) use. The western portion of the Site is occupied by a parking lot and a warehouse used for furniture storage. The eastern portion of the Site is occupied by several smaller buildings used as offices and furniture storage.

The Site is currently owned by Service West and is used as a warehouse for the storage of office furniture and as an office. Service West would like to sell the property and is engaged in discussion with a potential purchaser. The potential purchaser would use the property for a metal recycling business, and the property would continue to be used for commercial-industrial purposes. This land use is appropriate as this portion of Oakland is zoned as "M-40 Heavy Industrial" or commercial-industrial land use. The surrounding properties are also zoned for commercial-industrial purposes. Previous environmental investigations are summarized in the following reports:

- ERAS Environmental Inc. (ERAS), "Subsurface Investigation and Groundwater Monitoring Report, Quarter 2, 2008, Former Paco Pumps Facility, 9201 San Leandro Street, Oakland, California," dated July 31, 2008 ("the ERAS Report"; ERAS 2008)
- Jonas and Associates Inc. (Jonas), "Site Characterization Report, PACO Pumps Facility, 9201 San Leandro Street in Oakland, California," dated October 16, 1992 ("the Jonas Report"; Jonas 1992)
- Dames and Moore, "Site Contamination Study, PACO Pumps Facility, 9201 San Leandro Street, Oakland, California, dated August 12, 1987

Based on LFR's review of the data provided in the ERAS Report, LFR has identified the following areas of concern (AOCs) at the Site (Figure 2):

- Area 1: Total petroleum hydrocarbons (TPH) as diesel (TPHd), TPH as motor oil (TPHmo), and TPH as kerosene (TPHk) in shallow soil along the eastern boundary of the Site southwest of the workshop building
- Area 2: TPHmo in shallow soil in an area south of the warehouse storage area building adjacent to the southern property boundary.
- Area 3: Polychlorinated biphenyls (PCBs) in shallow soil near the northwestern corner of the Site.
- Area 4: TPH as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) in soil and groundwater associated with historical release(s) from the former 550-gallon underground storage tank (UST) near groundwater monitoring well MW-3.
- Area 5: The reported location of a presumed former UST in the warehouse building near well MW-4.

LFR reviewed the data presented in the ERAS Report and compared the available analytical results of soil, soil-gas, and groundwater samples collected at the Site to the Environmental Screening Levels (ESLs) developed by the Regional Water Quality Control Board (RWQCB; revised release dated May 2008) for sites where the land use is commercial-industrial and, as a conservative assumption, where groundwater is considered a source of drinking water. However, groundwater at the Site is reportedly not currently used as a drinking water source and is not anticipated to be used for this purpose in the foreseeable future. Additionally, a deed restriction may be placed on the property that prohibits use of shallow groundwater for domestic purposes. The rationale for a deed restriction (i.e., land use covenant [LUC]) is described in more detail in Section 1.2. Given the proximity of the property to San Francisco Bay and the commercial nature of the land use in this portion of Oakland, shallow groundwater at the Site is likely not a source of drinking water and ultimate groundwater remediation goals may consider this scenario. LFR's summary of the available analytical data for soil samples, groundwater samples, groundwater elevations, and soil-vapor samples collected at the Site is provided in Tables 1 through 4, respectively.

The following sections present a summary of the environmental issues at the five areas of concern at the Site and LFR's approach to resolving these issues.

1.1.1 Area 1: Shallow Soil Quality - Near Groundwater Monitoring Well MW-2

Area 1 is located along the eastern boundary of the Site southwest of the workshop building (Figure 2). A soil sample collected approximately 0.5 to 1.5 feet below ground surface (bgs) from soil boring B-18, located near groundwater monitoring well MW-2, by Jonas in April 1992 contained TPHmo at 7,800 milligrams per kilogram (mg/kg; Table 1). This concentration is greater than the ESL for TPHmo of 2,500

mg/kg for sites where groundwater is not considered a source of drinking water and the land use is commercial-industrial.

To further assess the lateral and vertical extent of TPHmo-affected soil, ERAS collected soil samples from approximately 1 to 1.25 feet bgs and approximately 2.75 to 3.0 feet bgs from three hand-augured soil borings (HA-4, HA-5, and HA-6) near groundwater monitoring well MW-2 in June 2008 (Figure 2; Table 1). Two of the soil samples collected from approximately 1 to 1.25 feet bgs during this phase of work contained concentrations of TPHd, TPHmo, and TPHk above their respective ESLs.

According to the data collected by Jonas and ERAS, the vertical extent of the TPH-affected soil in this area is limited to approximately 1.5 to 2 feet bgs. As presented in the ERAS Report and agreed to by ACEH in the ACEH Letter, the lateral extent of the TPH-affected soil in this area covers an area of approximately 10 feet by 30 feet (Figure 2).

Analytical results of groundwater samples collected from well MW-2 have not contained concentrations of TPHg or BTEX above analytical reporting limits (Table 2). TPHd was detected above analytical reporting limits in one sample collected in March 1993. Based on these data, the groundwater quality does not appear to be affected by the presence of TPHmo and TPHd in the upper 2 feet of soil in this portion of the Site.

Remedial Approach

As presented in the scope of work below, the proposed remedial action for this area of TPH-affected soil is excavation and off-site disposal of the soil. Based on the dimensions of the area to be excavated, LFR has estimated that excavating the TPH-affected soil in this area would result in approximately 23 to 25 cubic yards (37 to 40 tons) of soil that would require off-site disposal.

1.1.2 Area 2: Shallow Soil Quality - South of the Warehouse Storage Area Building

Area 2 is located south of the warehouse storage area building (Figure 2). Dames and Moore collected a total of eight soil samples at approximately 1.5 and 3 feet bgs from locations identified as “Pit 1” through “Pit 4,” south of the warehouse storage area building along the southern property boundary in July 1987 (approximately 21 years ago; Dames and Moore 1987). The sample collected at approximately 3 feet bgs from Pit 4 contained the highest concentration of TPHmo at 1,100 mg/kg (Table 1). This concentration is less than the ESL of 2,500 mg/kg for sites where groundwater is or is not considered a source of drinking water and the land use is commercial-industrial.

As reported by Jonas in its report entitled “Site Characterization Report, Excavation Area PACO Pumps Facility” (Jonas 1991), approximately 18 to 20 cubic yards of soil

and debris consisting of railroad ties and soil were removed from this portion of the Site in October 1987 (Jonas 1991).

To further assess soil quality at this portion of the Site, additional soil samples (B-1 through B-4; located at Pit-1 through Pit-4 on Figure 2) were collected by Jonas in 1991. In addition, soil samples were collected in this area by ERAS at approximately 1.25 to 1.5 feet bgs and 2.75 to 3.0 feet bgs from six soil borings (a total of 12 soil samples) identified as PIT-3-E, PIT-3-NE, PIT-3-NW, PIT-4-E, PIT-4-NE, and PIT-4-NW (Table 1 and Figure 2). The samples collected by ERAS were submitted for the analysis of TPHd, TPHmo, and benzo-a-pyrene (BAP). Of these compounds, BAP was detected in one sample at 0.15 mg/kg, slightly over its ESL of 0.13 mg/kg. This was the only sample that contained BAP at a concentration greater than its ESL. TPHd or TPHmo were not detected at concentrations greater than their respective ESLs for sites where groundwater is not considered a source of drinking water and the land use is commercial-industrial (RWQCB 2008). One soil sample collected at approximately 1.25 to 1.5 feet bgs from PIT-3-SE contained TPHd at 140 mg/kg, which exceeded the ESL for TPHd of 83 mg/kg for sites where groundwater *is* considered a source of drinking water and the land use is commercial-industrial.

Remedial Approach

As presented in the ERAS Report and agreed to by ACEH in the ACEH Letter, the proposed remedial action for this area of TPH-affected soil was excavation and off-site disposal of the soil. Based on the previous removal action that took place in 1987, the analytical data for the soil samples collected, and the land use for this Site, LFR does not agree that excavation of the soil is appropriate for this area of the Site. While LFR acknowledges that TPH-affected soil is present in this portion of the Site, the concentrations at which the compounds have been detected do not warrant remediation by excavation and/or off-site disposal. Based on the available data for this area (Table 1), the affected soil is localized and is present at concentrations that could remain in place.

1.1.3 Area 3: PCBs in Shallow Soil near the Southwestern Corner of the Site

Area 3 is located near the northwestern corner of the Site (Figure 2). Two surface soil samples collected from between the ground surface and approximately 0.5 foot bgs from soil borings B-6 and B-7, located near groundwater monitoring well MW-1, by Jonas in October 1991 contained PCBs at 0.400 and 0.67 mg/kg, respectively (Table 1 and Figure 2). These concentrations are less than the ESL of 0.740 mg/kg for PCBs at sites where groundwater is or is not considered a source of drinking water and the land use is commercial-industrial (RWQCB 2008).

To further assess soil quality at this portion of the Site, a total of seven soil samples were collected by ERAS at approximately 1.25 to 1.5 feet bgs (three samples); 2.5 to 2.75 feet bgs (two samples); 3 to 3.25 feet bgs (one sample); and 4.5 to 5.0 feet bgs

(one sample; see Table 1 and Figure 2). None of these soil samples contained PCBs at concentrations that exceeded the ESL for PCBs of 0.740 mg/kg for sites where groundwater is or is not considered a source of drinking water and the land use is commercial-industrial.

It is important to note that, according to the figures included in the ERAS Report, and as observed by LFR personnel on October 15, 2008, a "transformer" is located on the adjacent property approximately 15 feet north-northwest of the area where the low concentrations of PCBs have been detected on the Site. It would appear that the source of the PCBs detected in shallow soil samples collected at the Site may be from this transformer, which is located on an adjacent property.

Remedial Approach

As presented in the ERAS Report and agreed to by ACEH in the ACEH Letter, the proposed remedial action for this area of PCB-affected soil was excavation and off-site disposal of the soil. Based on the analytical data for samples collected at this portion of the Site and the land use for this Site, excavation of the soil is not appropriate for this area of the Site. While LFR acknowledges that PCB-affected soil is present in this portion of the Site, the concentrations of PCBs are well below their respective ESLs and therefore the concentrations at which the compounds have been detected in soil do not warrant remediation by excavation and off-site disposal. Based on our review, the area of PCB-affected soil is localized and at concentrations that could remain in place.

1.1.4 Area 4: Affected Soil and Groundwater Associated with the Former 550-Gallon UST

Area 4 is the portion of the Site that is associated with the former 550-gallon UST (Figure 2). Reportedly, a former 550-gallon-capacity UST that was used to store gasoline was found to have been removed from the Site in 1992. Based on soil samples collected at that time, the UST appeared to have released gasoline to the subsurface (Table 1). Reportedly, the area where the UST was located was over-excavated until the area of excavation was impinging upon the adjacent warehouse storage area building (Figure 2). At the time of excavation, soil containing TPHg and benzene was left in place due to the presence of the existing building.

Currently, a total of five shallow groundwater monitoring wells screened between approximately 5 and 20 feet bgs are present at the Site (Figure 2). Historically, the highest concentrations of TPHg and BTEX have been detected in samples collected from well MW-3 (Table 2). According to the ERAS Report, the depth to groundwater measured in the wells in June 2008 ranged from approximately 8.31 to 9.81 feet bgs and the shallow groundwater flows toward the west-southwest (Table 3). Groundwater samples collected from well MW-3 have historically contained concentrations of TPHg and/or BTEX at concentrations above their respective ESLs for sites where

groundwater is or is not considered a source of drinking water and the land use is commercial-industrial.

According to the ERAS Report, Jonas supervised the collection of grab groundwater samples from approximately 15 to 20 feet bgs from four soil borings (B1, B2, B3, and B4) located inside the warehouse storage area building in 1997 and 1998 (Table 2 and Figure 2). More recently, in June 2008, ERAS collected 22 grab groundwater samples from eight soil borings (GP-1 through GP-8) located at the Site; one location (GP-6) was inside the warehouse storage area building, and the other seven locations were outside the building. The grab groundwater samples collected by ERAS in June 2008 were from a variety of depth intervals ranging from approximately 8.5 to 13.5 bgs, 20 to 22 feet bgs, 25 to 29 feet bgs, and 31 to 35 feet bgs. Grab groundwater samples collected at soil boring locations GP2, GP4, and GP-6 contained TPHg and/or BTEX at concentrations above their respective ESLs for sites where groundwater is or is not considered a source of drinking water and the land use is commercial-industrial. Based on the analytical results of the groundwater samples collected at the Site to date, the lateral extent of TPHg- and BTEX-affected groundwater extends from the location of the former UST to the west-southwest beneath the warehouse storage area building at a location east of grab groundwater sample location B-4. The affected groundwater has not migrated to wells MW-1, MW-5, or grab groundwater sample location GP-8 located along the property boundary (Figure 2).

Remedial Approach

As presented in the ERAS Report and agreed to by ACEH in the ACEH Letter, ERAS has proposed the following scope of work to complete the characterization of this AOC:

- Install five new groundwater monitoring wells (two shallow and three deep) followed by quarterly groundwater sampling and reporting
- Collect one sub-slab soil-vapor sample
- Drill six soil borings to further assess the lateral extent of affected groundwater and collect the following at each location:
  - gas samples at 5 feet bgs
  - soil samples at 6 to 10 feet bgs
  - two grab groundwater samples; deeper sample is "blind" (i.e., no logging)

LFR's approach to this AOC is focused on accelerating the investigation and evaluating air/ozone injection and soil-vapor extraction (SVE) as a remediation technology for TPHg- and BTEX-affected soil and groundwater and would include the following scope of work (proposed sample locations are presented on Figure 3):

- Collect two grab groundwater samples from deeper groundwater (approximately 25 to 30 feet bgs); these data would be used to assess if the issue related to this deeper interval of affected groundwater may be closed using grab samples instead of wells (Figure 3).
- Install two shallow groundwater monitoring wells (completed at approximately 15 feet bgs) inside the warehouse storage area building to monitor groundwater quality in the area west-southwest of the former UST (Figure 3).
- Collect data regarding the presence of affected soil and groundwater using membrane interface probe (MIP) technology - five soil borings to a maximum of 35 feet bgs; grab groundwater samples to be collected from the "shallower" groundwater zone at approximately 15 feet bgs at two of the five MIP locations (Figure 3). MIP is a tool that is used to screen the soils during drilling and obtain a real-time vertical profile of TPH and related compounds.
- Perform an SVE and Air Sparging/Injection Pilot Test – this test will assess whether or not air can be injected into the subsurface and effectively remediate the TPHg- and BTEX-affected groundwater and if soil vapor can be extracted from the subsurface to mitigate potential soil-vapor intrusion issues at the Site (Figure 4).

1.1.5 Area 5: Presumed Former UST in the Warehouse Building Near Well MW-4

Area 5 is associated with the presumed former UST that was reported to have been located in the warehouse building (Figure 2). The location of the former UST that is illustrated on Figure 2 is based on information provided in the Jonas Report (Jonas 1992).

Reportedly, previous consultants working on this project have attempted to locate the former UST. Because the location of the suspected UST is now within the warehouse building, which has a concrete floor that is reinforced with steel rebar, conventional underground surveying equipment such as magnetometer or ground penetrating radar will not be effective to locate the former UST.

To assess soil and groundwater quality near the UST suspected to be present in this portion of the Site, Jonas installed well MW-4 in November 1992. Soil samples collected at approximately 5, 10, and 20 feet bgs from the soil boring drilled for well MW-4 contained detectable concentrations of BTEX and TPHg (see Table 1). The concentrations of benzene in the samples collected at approximately 5 and 10 feet bgs were slightly above the ESL for sites where groundwater is not considered a source of drinking water and the land use is commercial-industrial.

BTEX and TPHg have been detected in groundwater samples collected from well MW-4 since 1992. However, the concentrations of TPHg and BTEX detected in groundwater samples collected from this well have significantly decreased over time. The decrease in concentrations indicates that the groundwater is likely undergoing natural attenuation (Table 2). Grab groundwater samples collected from soil borings

GP-3 and B-23, located hydraulically downgradient from well MW-4, did not contain TPHg or BTEX at concentrations above laboratory reporting limits (Table 2).

Remedial Approach

LFR's approach to this AOC is to further assess the extent of TPHg- and BTEX-affected groundwater. To accomplish this task, we proposing to advance one MIP boring (MIP 6) and collect a grab groundwater sample (GGW-6-20) to be located at the northwestern corner if the warehouse building (Figure 4). This approach is similar to the scope of work presented for this area in the ERAS Report and agreed to by ACEH in the ACEH Letter,

1.2 Potential for Industrial Land and Land Use Covenant

Service West is considering placing an LUC on the deed to the property prohibiting the use of shallow groundwater at the Site and limiting the land use of the property to commercial-industrial. This land use is appropriate as this portion of Oakland is zoned as "M-40 Heavy Industrial" or commercial-industrial land use. In addition, the surrounding properties are also zoned for commercial-industrial purposes. Given the land use in this portion of Oakland and the soil and groundwater quality at the Site, placing an LUC on the deed to the property may be appropriate for the Site. The LUC would be prepared once the recommended remedial approach is implemented in Area 4 to reduce the compounds in soil and groundwater and to ensure that future land use at the Site will remain commercial-industrial.

1.3 Work Plan Objectives

The primary objectives for the scope of work described in this work plan are:

1. Excavate TPH-affected soil in Area 1, west of the "workshop building"
2. Further characterize the lateral and vertical extent of hydrocarbon affected soil and groundwater in Area 4, near the former UST near groundwater monitoring well MW-3
3. Conduct a pilot test in Area 4 to assess whether air/ozone injection in conjunction with SVE is a potentially viable remediation technology to address petroleum-affected soil and groundwater near the former UST near groundwater monitoring well MW-3
4. Collect additional groundwater quality data hydraulically downgradient from the presumed former UST in Area 5

The scope of work proposed to meet these objectives is described in Sections 2.0 and 3.0 below.

2.0 PROPOSED SCOPE OF WORK

The scope of work for this work plan includes the following tasks:

Task 1: Excavate TPH-Affected Soil in Area 1

Task 2: Further Characterize Soil and Groundwater Quality in Area 4

Task 3: Conduct an Air/Ozone Injection and SVE Pilot Test in Area 4

Task 4: Collect Groundwater Quality Data in Area 5

Task 5: Prepare a Summary Report

2.1 Task 1: Excavate TPH-Affected Soil in Area 1

As presented in Section 1.1.1 of this work plan and summarized in Table 1, analytical results of soil samples collected in the upper 2 feet of soil in this portion of the Site contained concentrations of TPHd, TPHmo, and TPHk above their respective ESLs. Based on the analytical results for the groundwater samples collected from well MW-2, groundwater quality does not appear to be affected by the presence of TPHmo and TPHd in the upper 2 feet of soil in this portion of the Site.

On behalf of Service West, LFR is recommending the excavation and off-site disposal of the TPH-affected soil to remove the affected soil from this portion of the Site.

2.1.1 Pre-Field Activities

Prior to excavating TPH-affected soil at Area 1, LFR will contact Underground Service Alert (USA) to notify them of the work, and will subcontract a private underground utility clearance contractor to clear the proposed excavation locations and nearby areas.

A site-specific Health and Safety Plan (HSP) will be prepared by LFR to address health and safety concerns specific to the planned field activities. Daily health and safety tailgate meetings will be conducted by the LFR field personnel prior to beginning any fieldwork, and fieldwork will be monitored to ensure that appropriate health and safety procedures are followed during the fieldwork.

2.1.2 Soil Cleanup Levels

LFR proposed applying the RWQCB ESL guidance for TPHd and TPHmo in soil at commercial sites where groundwater is not a current or potential source of drinking water as the cleanup goals for the soil excavation (RWQCB 2008).

Proposed Soil Cleanup Goals

Chemicals of Potential Concern	RWQCB ESL (mg/kg)
TPHmo & TPHk	2,500
TPHd	180

Note: mg/kg = milligrams per kilogram

2.1.3 Excavation Activities

The proposed area of excavation is shown on Figure 3. According to the analytical results for soil samples collected at this portion of the Site, the vertical extent of the TPH-affected soil in this area is limited to approximately 1.5 to 2 feet bgs. As presented in the ERAS Report and agreed to by ACEH in the ACEH Letter, the lateral extent of the TPH-affected soil in this area covers an area of approximately 10 feet by 30 feet (Figure 2).

When the proposed depth of the excavation is reached (approximately 2.5 to 3 feet bgs), confirmation soil samples will be collected. If visual observation and/or the analytical results from confirmation soil samples indicate that additional excavation is necessary, then the excavation will be extended laterally and/or vertically beyond the area proposed in this work plan; however, the excavation will not be extended onto adjacent properties or underneath existing buildings. The maximum depth of the excavation will be 5 feet bgs. Although no regulatory-defined depth for soil excavation exists, excavating TPH-affected soil to a depth of 5 feet bgs is typically considered protective of human health for residential land use areas by the Department of Toxic Substances Control (DTSC). The proposed maximum excavation depth of 5 feet bgs would be a conservative total depth, considering that this Site is likely to remain as industrial/commercial land use. In addition, 5 feet bgs generally will be deeper than future potential excavations, for example, for underground utilities or landscaping purposes.

2.1.4 Excavation Procedures and Field Documentation

LFR will retain a California-licensed General Engineering Contractor to provide equipment and experienced personnel to conduct the excavation work. The personnel will have the appropriate Occupational Safety and Health Administration (OSHA) training for sites with affected soil and groundwater (HAZWOPER). Excavation activities will be directed by an LFR representative working under the direct supervision of a California Professional Geologist or Professional Engineer.

Excavated soil will be visually inspected and screened in the field using a photoionization detector (PID), a flame ionization detector (FID), or a similar instrument, to evaluate the presence of hydrocarbons. Field observations, including

approximate excavation dimensions, locations and depths of confirmation soil samples, and field screening results, will be recorded on field reports.

Visual inspections of each excavation's sidewalls and bottom will be conducted during the excavation activities. Soil samples will be collected from the sidewalls of the excavation to document concentrations (if any) that may remain in place. Soil samples from the sidewalls will be field-screened with a PID, FID, or similar instrument, for the presence of petroleum hydrocarbons. In addition to the visual inspections and field screening, confirmation soil samples will be collected for laboratory analyses from the sidewalls and bottom of each excavation, as described below. If the visual inspection, the field screening, and/or the analytical results from the soil sampling warrant additional excavation, the excavation may be vertically deepened and/or expanded laterally if deemed feasible, safe, and appropriate. Excavations will not be advanced deeper than approximately 5 feet bgs.

Excavated TPH-affected soil will be profiled for disposal at an appropriate landfill. Based on the analytical results of the soil samples collected at the Site to date, excavated soils are expected to be disposed of as a Class II or III non-hazardous solid waste at an appropriate disposal facility, in accordance with the facility's waste soil disposal criteria.

2.1.5 Excavation Entry

Workers will not enter excavations greater than 4 feet in depth without appropriate protective systems such as benching or sloping or a soil wall-retaining structure. Access to the excavations by on-site personnel will be limited and strictly monitored. No confined space entry is anticipated for this project.

Vehicle and equipment entry to the excavations will be by a ramp or ramps advanced as each excavation progresses, as deemed appropriate by the selected excavation contractor.

2.1.6 Excavation Design, Process, and Equipment

Excavation of affected soil will continue until the proposed excavation dimensions are reached and/or the analytical results of the confirmation soil samples are below the proposed cleanup levels. Soil removal will be accomplished by use of earthmoving equipment (backhoes, articulated loaders, or other equipment as appropriate).

2.1.7 Temporary Storage Operations/Stock Pile Management

Excavated soil will either be temporarily stockpiled on-site or loaded directly into soil bins. If the soil is stockpiled, the stockpiled soil will be placed on plastic sheeting for temporary storage in a suitable location at the Site. Soil stockpiles will be spaced to allow continued site access as needed. Temporary berms will be constructed around the

stockpile area to control runoff from draining from the wet soil and/or caused by precipitation. The soil stockpiles will be covered with plastic sheeting at the end of each workday and/or during events of significant precipitation. The plastic sheeting will be secured with sandbags or other suitable method.

For purposes of waste profiling, samples of the excavated soil will be analyzed for TPHd, TPHmo, TPHg, BTEX compounds, and leaking underground fuel tank (LUFT) metals concentrations.

2.1.8 Dust Control

Dust control measures will be implemented during excavation activities. Dust suppressant measures may include spraying the excavation area and stockpiles with water, and/or covering stockpiled soil with plastic or other appropriate material. If, during excavation activities, dust is observed in the area being excavated, appropriate dust suppression measures will be undertaken (e.g., spraying soil with water).

2.1.9 Confirmation Soil Sample Collection and Analyses

Soil samples will be collected from inside the excavation after the proposed dimensions of the excavation are reached and prior to backfilling. As presented in the ERAS Report and agreed to by ACEH in the ACEH Letter, the lateral extent of the TPH-affected soil in this area covers an area of approximately 10 feet by 30 feet (Figure 2). For this excavation, we anticipate the collection and analysis of four sidewall samples and one bottom sample would be collected and submitted for laboratory analyses.

The soil samples will be collected in clean, laboratory-supplied containers from soil collected from the backhoe bucket. The sample containers will be labeled with the sample identification, the time and date of collection, the analysis requested, and the initials of the sampler. The samples will be stored in ice-chilled coolers and submitted to the laboratory under strict chain-of-custody protocols.

LFR will submit the confirmation soil samples to a state-certified laboratory when the limits of the excavation are achieved. Each soil sample will be submitted for the analysis of TPHd and TPHmo using U.S. Environmental Protection Agency (EPA) test Method 8015, modified, after silica-gel cleanup. If appropriate, soil samples will be analyzed on a rapid turnaround schedule so that analytical results can be reviewed and the need for additional soil excavation can be evaluated and conducted while the excavation contractor is at the Site.

2.1.10 Backfill

After the excavation has been advanced at least to the depth and extent proposed in this scope of work (2.5 feet bgs), and analytical results from the confirmation soil samples indicate that the excavation has been advanced sufficiently to remove TPH-affected

soil, the excavation will be backfilled with clean fill material. Representative composite soil samples will be collected from the stockpiled material at a sample rate of approximately one four-point composite soil sample for every 250 cubic yards. This sampling frequency is consistent with the DTSC's October 2001 "Information Advisory: Clean Imported Fill Material" guidance document. This document is a non-regulatory fact sheet specific to sensitive land use properties (e.g., hospitals and schools) and, as such, is used only as guidance for sample frequency. Fill material proposed to be imported to the Site for backfilling the excavation will be sampled and analyzed for TPHd, TPHmo, TPHg, BTEX, and LUFT metals.

2.2 Task 2: Further Characterize Soil and Groundwater Quality in Area 4

As presented in Section 1.1.4 of this work plan and summarized in Tables 1 and 2, analytical results of soil and groundwater samples collected in this portion of the Site contained concentrations of TPHg and BTEX above their respective ESLs. On behalf of Service West, LFR is recommending the following investigation to further assess the lateral and vertical extent of the affected soil and groundwater at the Site. The scope of this investigation will include the following:

- Advance five soil borings using MIP technology (locations MIP-1 through MIP-5)
- Collect two shallow-zone grab groundwater samples (GGW-2-20 and GGW-3-20)
- Install two shallow-zone groundwater monitoring wells (MW-6 and MW-7)
- Collect two deeper-zone grab groundwater samples (GGW-4-30 and GGW-5-30)
- Install two clusters of three wells each for the Air/Ozone Injection and SVE Pilot Test in Area 4; one cluster of test wells (SVE-1, AS-IS, and AS-1D) and one cluster of monitoring wells (SVMW-2, ASMW-2S, and ASMW-2D)
- Survey the wells and conduct a round of water levels (pilot test)

The proposed locations of the soil borings and groundwater monitoring wells are illustrated on Figure 3. The details regarding this investigation are provided below. The methods to be used to install the groundwater monitoring wells are provided in Section 2.3 of this work plan.

2.2.1 Permitting

LFR will apply for the appropriate drilling permits with Alameda County Public Works Agency, Water Resources Department.

2.2.2 Subsurface Utility Clearance

Similarly to the subsurface utility clearance activities described in Section 2.1.1 for the excavation work, each proposed drilling location will be cleared by first contacting USA and then by a qualified private underground utility locating contractor. If

underground utilities are identified within approximately 5 feet of a proposed drilling location, LFR will revise the proposed location accordingly, and will repeat the underground utility clearance procedures as necessary. As an added precaution, soil borings will be started by hand augering to approximately 5 feet bgs to bypass potentially undetected shallow underground utilities.

LFR will coordinate with Service West personnel so that proposed field activities do not significantly interfere with its operations and so that each proposed drilling area is cleared of office furniture that is currently stored near each drilling location.

2.2.3 Health and Safety Plan

As described in Section 2.1.1, the HSP will also address health and safety concerns specific to the new field procedures proposed in this task, including well installation and sampling activities. Health and safety meetings will be conducted in the field at the start of the project and at the beginning of each day of fieldwork. All fieldwork will be monitored according to the HSP to ensure that appropriate health and safety procedures are followed. A copy of the HSP will be kept on-site during scheduled field activities.

2.2.4 Proposed Locations and Target Depths

The proposed MIP boring and grab groundwater sample locations were selected to further characterize the lateral and vertical extent of petroleum hydrocarbons in soil and groundwater in the vicinity of and hydraulically downgradient from the former UST (Figure 3).

As described further below, drilling and field screening methods chosen will, where possible, provide real-time preliminary results that will be evaluated to select successive sample locations in a step-out fashion, if necessary. As such, additional MIP borings may be advanced based on field conditions and field observations. The proposed locations of the MIP borings, grab groundwater samples, and groundwater monitoring wells are illustrated on Figure 3.

2.2.5 MIP Boring Advancement and Grab Groundwater Sampling

The proposed soil and grab groundwater investigation will involve the simultaneous collection of MIP data and electrical conductivity (EC) data. The MIP probe will be equipped with an EC detector to collect data while drilling, from which lithology will be inferred and a gas chromatograph detector to indicate the presence of hydrocarbon-affected sediments. This drilling technology allows for the “real-time” collection of lithologic data as well as indicators for hydrocarbon-affected sediments. LFR will contract with California-licensed drilling subcontractors to advance the MIP soil borings to depths of approximately 30 to 35 feet bgs, and the proposed soil borings for the collection of grab groundwater will be advanced to approximately 15 to 30 feet bgs, depending upon their purpose, location, and achievable depths.

2.2.5.1 MIP Technology and Grab Groundwater Sampling

The MIP investigation proposed for lateral characterization of affected soil and groundwater will involve the simultaneous collection of both lithologic identification and indicator of petroleum hydrocarbon concentration. The proposed soil borings will be advanced using a direct-push (Geoprobe®-type) drill rig equipped with an MIP tool. The tubing that houses the carrier gas and conductivity cable is connected to the MIP tool and is strung through the probe rod. As the probe is driven below grade into undisturbed soil, the advancement is stopped at desired intervals (typically 6 inches) to heat the permeable membrane interface located on the wall of the probe and gather volatile organic compound (VOC) data. Conductivity logging data (which provide lithologic soil-type information) are gathered on a continuous basis. VOCs that are exposed to the membrane are volatilized and picked up by the carrier gas behind the membrane, which in turn delivers the gas to the gas chromatograph detector at the surface (typically an electron capture detector [ECD], PID, and/or FID). A stringpot, which is mounted on the probe, senses movement of the probe and measures depth and speed. The data are stored in spreadsheet-compatible format for later graphing and analysis.

Based on a preliminary evaluation of the MIP data, another soil boring located adjacent to the MIP boring will be advanced using a Geoprobe®-type drill rig to collect depth-discrete grab groundwater samples at target depths. Based on previous soil borings completed at the Site, LFR is anticipating collecting “shallow-zone” grab groundwater samples from the first groundwater-bearing sediments and the deeper groundwater-bearing sediments estimated to be encountered between approximately 8 and 15 feet bgs and 20 and 30 feet bgs, respectively. The final sample intervals will be selected in the field based on observations made concerning soil type and presence of hydrocarbon vapors. If no hydrocarbon vapors are present, the samples will be collected from the intervals described above.

The groundwater samples will be collected using a hydraulically driven temporary piezometer consisting of a hollow-rod assembly with a 3-foot-long stainless steel screen attached at the leading end of the assembly (Hydropunch). The temporary piezometer will be advanced to the desired depth interval based upon the MIP’s results. At the selected depths, the rod assembly will then be retracted to raise the outer piezometer sleeve, exposing the screen and allowing groundwater to pass through the screen into the piezometer. Grab groundwater samples will be collected using a disposable or clean stainless steel bailer lowered through the hollow-push rods into the piezometer screen. The groundwater will be transferred into clean, laboratory-provided sample containers, stored in an ice-chilled cooler, and transported under chain-of-custody protocol to the laboratory for analysis.

2.2.5.2 Groundwater Analyses

The grab groundwater samples will be analyzed by a state-certified analytical laboratory for the following compounds:

- TPHg using modified EPA Method 8015
- BTEX and fuel additives (including methyl tertiary-butyl ether (MTBE), tertiary butyl alcohol (TBA), ethylene dibromide (EDB), and 1,2-dichloroethane (1,2-DCA) using EPA Method 8260B

2.2.5.3 Methodology for Well Installation

Prior to the well drilling and installation work, LFR will obtain the appropriate drilling permits from the Alameda County Public Works Agency, Department of Water Resources. As described above, LFR will contact USA to notify them of the surface drilling work, and will subcontract a private underground utility clearance contractor to clear the proposed well locations and nearby areas.

Down-hole drilling equipment will be appropriately cleaned with high-pressure hot water (steam cleaned) before use at each new drilling location. Waste soil generated during drilling will be placed in 55-gallon steel drums and will be disposed of as necessary during future land development activities. Wastewater generated during drilling and/or well development and sampling will be temporarily placed in 55-gallon steel drums, properly labeled as non-hazardous wastewater, and properly characterized for disposal.

The site-specific HSP discussed above in section 2.1.1 will address health and safety concerns specific to the planned field activities. Daily health and safety tailgate meetings will be conducted by the LFR field geologist prior to beginning any fieldwork, and fieldwork will be monitored to ensure that appropriate health and safety procedures are followed during the field investigations.

2.2.5.4 Advancement of Borings

The air injection monitoring (ASM), SVE, soil-vapor monitoring (SVM), and groundwater monitoring wells proposed to be installed inside the warehouse storage area will be installed using the hollow-stem auger drilling method. The drilling is proposed to be completed by a California-licensed, hollow-stem auger drilling subcontractor under the direction of an LFR field geologist. Continuous soil cores will be collected during drilling. The soil cores will be visually logged and screened in the field using a PID to evaluate the presence of hydrocarbons or other VOCs. The LFR field geologist will classify the soils encountered using American Society for Testing and Materials D 2488-00, based on the Unified Soil Classification System. Lithologic soil descriptions and field screening results will be recorded on field boring logs that will be reviewed, edited, and signed by a California Professional Geologist. Soil

samples for laboratory analyses may be collected from the continuous soil cores from intervals where visual and PID screening results indicate the potential presence of petroleum hydrocarbons.

2.2.5.5 Construction of Wells

The ASM wells will be constructed using 2-inch-diameter, solid polyvinyl chloride (PVC) casing and slotted well screen. The well screen will be surrounded by sand pack to approximately 1 to 2 feet above the screen. The filter pack for ASM, SVE, and SVM wells will extend to the top of the well screens, but not above them. Approximately 2 feet of hydrated bentonite will be placed on top of the sand pack. The annular space between the bentonite and the surface will be sealed using a bentonite and cement grout to limit short-circuiting of the air injection/SVE system from the surface. The surface completions will consist of an at-grade, traffic-rated well box installed in concrete. The top of the PVC casing will be equipped with a locking well cap.

The SVE and SVM wells will be installed to a maximum depth of 8 feet bgs with a 5-foot screen. The shallow air injection well (AS-1S) will be installed to a maximum depth of approximately 16 to 20 feet bgs with a 2-foot-long well screen. The shallow air injection monitoring well (ASMW-2S) and the groundwater monitoring wells proposed to be installed inside the warehouse storage area will be installed to a maximum depth of approximately 20 feet bgs with a maximum of 10-foot-long well screen. The deep air injection well (AS-1D) will be installed to a maximum depth of approximately 32 feet bgs with a 2- to 3-foot-long well screen. The deep air injection monitoring well (ASMW-2D) will be installed to a maximum depth of approximately 32 feet bgs with a maximum of 10 feet of well screen. Final well depths will be assessed in the field at the time of installation, with the objective of installing the air injection points within the two more permeable or sandy sediment units located between 14 to 16 feet bgs and 22 to 32 feet bgs.

2.2.5.6 Well Development

The cement grout around the new wells will be allowed to cure for a minimum of 24 hours, after which the new air injection wells will be developed by bailing, swabbing, or pumping. The development will remove any sediment left in the well during construction and will enhance the hydraulic communication between the well and surrounding sediments. Observations concerning the quantity and clarity of water withdrawn will be recorded during this process. Indicator parameters (pH, temperature, and specific conductance) will be recorded during well development. Approximately three to 10 well casing volumes will be removed from each well during the development process. This process will continue until the indicator parameters stabilize. Groundwater samples will be collected from each well following development.

2.2.5.7 Groundwater Analyses

The groundwater samples will be analyzed by a state-certified analytical laboratory for the following compounds:

- TPHg using modified EPA Method 8015
- BTEX and fuel additives (including MTBE, TBA, EDB, and 1,2-DCA using EPA Method 8260B

2.2.5.8 Water-Level Measurements

After well development and sampling are complete, the wells will be allowed to recover for a minimum of 24 hours and the depth to water will be measured in the newly installed wells and the five previously existing wells. Water levels will be measured in each well with an electronic water-level probe. Water levels and casing elevations will be used to assess the groundwater flow direction and gradient beneath the Site.

2.2.6 MIP Boring Methodology

The MIP will be equipped with an EC detector to collect data while drilling, from which lithology will be inferred. Continuous MIP and EC measurements will be made at each of the shallow soil boring locations for lateral characterization.

After field screening, soil logging, and grab groundwater samples are collected, as appropriate, soil borings will be abandoned by filling the borings from the bottom to ground surface with neat cement grout in accordance with the drilling permits.

2.2.7 Equipment Decontamination Procedures

Drilling and sampling equipment will be properly decontaminated before each use and between each location. Down-hole drilling equipment, including drill rods and bits, will be decontaminated by steam cleaning at a designated wash pad or within a portable containment unit. Soil sampling equipment and down-well development equipment will be decontaminated by washing in non-phosphate detergent solution, potable water rinse, and final potable water rinse before each use. Groundwater samples will be collected using either dedicated or single-use, disposable sampling devices such as bailers or tubing.

2.2.8 Waste Characterization, Handling, and Disposal

Investigation-derived waste generated during the field activities, including soil cuttings, decontamination or rinse water, and personal protective equipment, will be stored

temporarily at the Site in clean, labeled, Department of Transportation-approved 55-gallon drums or similar, until waste disposal is arranged.

2.2.9 Field Documentation

All relevant field activities will be appropriately documented using field forms, including field logs of soil borings, well development forms, groundwater sampling forms, sample labels, chain-of-custody forms, and waste management and hazardous waste labels. Field forms will be kept on file at LFR's office and will be available upon request. Copies of relevant field forms will be included in the summary report.

2.3 Task 3: Conduct an Air/Ozone Injection - SVE Pilot Test in Area 4

The overall objective of the pilot testing activities described in this work plan is to collect field data to assess whether air/ozone injection in conjunction with SVE is a potentially viable remediation approach to address the TPH- and BTEX- affected soil and groundwater located in Area 4 of the Site.

SVE is one of the EPA's Presumptive Remedies for the remediation of VOC-affected soil, and is generally considered the most practical means of limiting potential VOC vapor intrusion into the buildings and removing VOCs from beneath a building. One of the objectives of this pilot test, therefore, is to evaluate the potential effectiveness of SVE and air/ozone injection working in tandem to remediate both soil and groundwater at the Site.

Air and ozone injection are known to be effective and proved technologies to remediate VOC-affected groundwater such as is located in Area 4 of the Site. The key limiting factor for the viability of these technologies is the permeability of the formation. If the soil has a low permeability, then the vapor cannot be extracted from the subsurface and SVE would not be effective in recovering the vapors containing VOCs. Similarly, if the soil has a low permeability, then the air that is injected into the subsurface will not effectively come in contact with the VOC-affected groundwater and will not be effective in remediating the groundwater. Thus, one of the overall objectives of this pilot test is to collect field data to evaluate the formation permeability, and the ability of the formation to accept and distribute injected gas.

The following specific objectives were developed from the overall objectives described above:

- Collect unsaturated-zone air flow and pressure response data to assess SVE well spacing requirements.
- Assess if air can be injected into shallow saturated sediments at reasonable flow rates (i.e., flow rates between 2 cubic feet per minute [ft^3/min] and 10 ft^3/min) at a pressure below the soil overburden pressure.

- Assess the distribution of injected gas into the formation through the collection of groundwater elevation, dissolved oxygen, and helium tracer gas.
- Collect data to develop injection well spacing requirements for the design of a full-scale ozone system to address affected groundwater in Area 4 of the Site, if deemed viable.
- Collect soil-vapor concentration data to estimate the VOC mass removal rates. The data will be used to assess the mass loading rates for sizing the emission control systems and estimating total system operating time frames.

2.3.1 Air/Ozone Injection - SVE Pilot Test Overview

The SVE pilot test will be performed first to assess its effectiveness and measure baseline concentrations of VOCs in the vadose zone before beginning the air injection test. Upon completion of the initial SVE test, a 2- to 4-hour air injection test will be performed. The air injection pilot test will be performed to assess if air can effectively be injected into the subsurface. Upon cessation of the air injection test, the pilot SVE system will be re-started to assess changes in VOC concentrations within the vadose zone as a result of the injection of air.

The specific tasks that comprise this scope of work include the following and are described in more detail in the following sections.

- Install, Develop, and Sample Proposed Wells
- Conduct SVE Pilot Step Test
- Conduct Air Injection Test
- Re-Start and Monitor SVE System
- Data Analysis and Reporting

2.3.2 Install, Develop, and Sample Proposed Wells

To achieve these goals, LFR proposes to install two sets of clustered air injection and SVE wells (total of six wells) as illustrated on Figure 4. One primary air injection and SVE well cluster (AS-1I, AS-1D, and SVE-1) and another cluster of co-located SVE and air injection monitoring wells (SVMW-2, ASMW-2I, and ASMW-2D) will be installed approximately 15 feet from the primary co-located air injection and SVE wells (Figure 4). This spacing is designed to investigate the radius of influence of each technology.

Well nomenclature for this pilot test is provided below.

Well ID Designation	Description/Purpose
AS	Air Injection Well
SVE	Soil-Vapor Extraction Well
ASMW	Air Injection Monitoring Well
SVMW	Soil-Vapor Monitoring Well
S	Well Screened in Shallow Zone (approximately 10 to 16 feet bgs)
D	Well Screened in Deep Zone (approximately 25 to 30 feet bgs)

The methodology for well installation and development is described in Section 2.2.5.3.

2.3.2.1 Collection and Analysis of Baseline (Pre-Air Injection Test) Groundwater Samples

One set of groundwater samples will be collected from the air injection wells and the closest two groundwater monitoring wells after well development. The purpose of these samples is to assess the quality of the groundwater prior to initiating the pilot test.

The containers will be labeled with the well identification number, the time and date of collection, the analysis requested, and the initials of the sampler. The samples will be stored in an ice-chilled cooler and maintained under strict chain-of-custody protocols until they are submitted to the analytical laboratory.

The groundwater samples will be submitted to a state-certified laboratory and will be analyzed for TPHg, TPHd, and TPHmo using EPA test Method 8015, modified. The samples will also be analyzed for BTEX and fuel additives using EPA test Method 8260B.

2.3.3 Conduct SVE Pilot Step Test

LFR will perform an SVE pilot step test at well SVE-1 to provide data to assess the most efficient vacuum and flow rate combination for this Site. This step test will include applying a series of different vacuum rates to the extraction well, and measuring resulting flow rates and vacuum responses. The initial vacuum will be applied to the extraction well, as the extraction well (and surrounding wells) are monitored for SVE flow rate, SVMW vacuum, and extracted vapor PID readings as the flow rate comes to a state of equilibrium. The vacuum is then increased and the process is repeated. The data are then plotted on a graph to illustrate the flow rate versus vacuum. This curve is useful in assessing the full-scale system equipment requirements and performance.

A pre-packaged, skid-mounted SVE system will be used to apply a vacuum to the well as described below. Extracted vapor will be treated by passing the SVE system exhaust

through two vapor-phase carbon canisters connected in series. Each step of the pilot test will continue until vacuum rates have stabilized in the SVMWs monitoring wells as evidenced by a less than 10 percent change in vacuum between readings for two consecutive measurements taken 15 minutes apart.

The subsurface response to the applied vacuum will be monitored by measuring the vacuum at proposed SVE monitoring point SV-2 (Figure 3). Vacuum measurements will be collected at approximately 30-second intervals or as frequently as practical during the initial stage of the test, and then at a decreasing frequency as the test continues and pressure differentials begin to stabilize. Field monitoring of organic vapors using Tedlar™ bags and a handheld PID also will be conducted from the extraction well at a similar frequency to the vacuum readings.

Vapor samples for laboratory analyses will be collected and submitted to the laboratory for TO-15 analysis using procedures described below. The vapor samples will be collected at the beginning of the test, after approximately 15 minutes, and near the end of the test. Additional samples may be collected after the air injection test to assess any impacts on contaminants of concern (COC) concentrations within the vadose zone due to the air injection test. After the air injection test, the SVE system will be re-started and a vapor sample will be collected immediately upon reactivation of the SVE test well.

One potential effect of air injection and SVE is the upwelling of the shallow groundwater in response to the applied vacuum and induced pressure. To evaluate the potential effect on the groundwater elevations at the Site, water-level measurements will be collected using a water-level meter from existing groundwater monitoring well MW-3. Water-level measurements will be recorded on field sheets and collected before a vacuum or pressure is applied, as frequently as is practical for the first 15 minutes, and then at 15-minute intervals for the remainder of the tests.

2.3.3.1 SVE Test Equipment

A variety of extraction and instrumentation equipment will be used to perform the SVE pilot test. The extraction blower, piping, and emissions control equipment will be configured to provide maximum flexibility so that a range of air flow rates and vacuums can be achieved.

The following parameters will be measured during the SVE test:

- air pressure (vacuum)
- air flow rate
- extracted air temperature
- TPHg, BTEX, and fuel additives concentrations

A summary description of the types of frequencies of measurements is provided below.

Summary of SVE Monitoring Parameters and Frequency

Parameter	Water Level	Vacuum	Flow Rate and Temperature	Organic Vapor Concentration	
Instrumentation	**Water-Level Meter**	**Magnehelic Gauge**	**Pitot Tube or Anemometer and Thermometer**	**PID**	**Laboratory Sample (TO-15)**
SVE Well (SVE-1)	NA	Initially: 30-second interval Duration: 5-minute interval	Every 5 minutes or as frequently as practical	Every 5 minutes	At start of test, after 15 minutes of extraction, and at test completion
SVE Monitoring Points (SVMW-2)	NA	Initially: 30-second interval Duration: 5-minute interval	NA	Before start of test	Before start of test
Groundwater Monitoring Wells ASMW-2S, ASMW-2D, MW-3, and MW-6	5- to 15-minute intervals or as frequently as practical	NA	NA	NA	NA
Carbon Effluent	NA	NA	NA	Every 30 minutes	NA

Notes:
NA = test not applicable
PID and laboratory samples will be collected in and analyzed in 1-liter Tedlar™ bags.

2.3.3.2 Vacuum Pressure Monitoring

The SVE monitoring point (SVMW-2) will be equipped with a vacuum gauge to measure pressure changes in unsaturated-zone soils. The extraction well vacuum will be monitored with a pressure gauge connected to a sample port installed at the wellhead.

2.3.3.3 Vapor Flow Monitoring

The vapor flow rate of the extraction system will be monitored with a pitot tube and differential pressure gauge or with an anemometer installed in the conveyance piping where it exits the extraction well. The temperature of the extracted air will also be measured using a thermometer.

2.3.3.4 Field Monitoring Samples

Screening-level vapor samples will be collected from the extraction well before, during, and after the SVE test. Samples will be collected directly from the sample port mounted to ASMW-1 or in 1-liter Tedlar™ bags for monitoring using a PID. Samples may be collected using a vacuum pump connected to a Tedlar™ bag. The Tedlar™ bag will be connected to the SVE well sampling port using inert Teflon™ or silicon tubing. To overcome the vacuum in the extraction well, a small vacuum pump will be connected to the well. When the vacuum of the pump exceeds the vacuum in the well, soil vapor will flow from the well into the Tedlar™ bag. Once filled, the Tedlar™ bag will be connected to a calibrated PID and a concentration reading will be taken.

2.3.3.5 Soil-Vapor Laboratory Sample Collection and Analysis

Soil-vapor samples will be collected for laboratory analysis from the extraction well and from the SVE monitoring point (SVMW-2) before the start of the test. In addition, one sample for laboratory analysis will be collected from the extraction well at the beginning of the test, during the test, and near the end of the extraction period. An additional sample will be collected from the extraction well at the end of the air injection test and at the beginning of the SVE system re-start. Samples for laboratory analysis will be collected in clean, 1-liter Summa™ canisters provided by the state-certified laboratory. The Summa™ canister will be connected to the well or conveyance line. Pre- and post-sampling vacuum will be recorded, and the canister will be shipped to the laboratory under standard chain-of-custody protocols. Samples will be analyzed for TPHg, BTEX, and fuel additives (including MTBE, TBA, EDB, and 1,2-DCA) by a California-certified analytical laboratory using EPA Method TO-15.

2.3.4 Conduct Air Injection Test

After the initial SVE step test has been completed, LFR will initiate injection of air into the newly installed injection wells, and measure responses in the formation, as described below.

2.3.4.1 Air Injection Test Equipment and Operation

Air injection system piping will be configured to provide maximum flexibility so that a range of tests can be performed. Key test equipment to be used during the air injection portion of this test is described below.

Because of the temporary nature of the pilot test program, a rental air injection system will be used that will include a blower capable of providing a range of injection pressures and flow rates, up to 20 ft^3/min at 10 pounds per square inch gauge. Air injection wells AS-1S and AS-1D will be connected to the blower using PVC piping and heavy-wall flexible tubing. All conveyance piping will be sized adequately to

minimize flow restrictions and pressure losses, and sampling ports will be installed downstream from the injection unit. The air injection system will also include a dilution air inlet for increased operational flexibility.

2.3.4.2 Air Injection Pressure, Rates, and Duration

Air injection wells AS-1S and AS-1D will be tested at a flow rate of approximately 15 ft^3/min or at the highest flow rate obtainable. Air injection will be conducted for approximately 1 to 2 hours in each injection well. In general, the operating pressure for an air injection well is determined by the total depth of the air injection well relative to the water level in the well, and the permeability of the water-bearing sediments.

Injection pressures will be regulated using a vent valve. This valve will be fully open at the beginning of the test and will be slowly closed while monitoring pressure and flow rate increase to the desired flow rate. During this process, care will be taken not to exceed the upper pressure limit for the system. The air injection pressure and flow rate will be recorded approximately every minute until the pressure and flow stabilize, and less frequently thereafter.

The air steam will be amended with helium at a concentration of approximately 10 percent helium. Helium is the most common tracer gas used, because it is relatively inexpensive and readily available, and analytical instrumentation is available for field use. Typical field instrumentation is a Marks Product helium detector. The detector can detect helium concentrations from 0.1 to 100 percent. Detectors are typically factory calibrated; however, calibration checks will be conducted using helium standards to verify the instrument is operating properly. Helium concentrations will be measured in nearby SVE wells. Soil-vapor samples will be collected in Tedlar™ bags. The helium detector will be attached directly to the Tedlar™ bags for measurement.

2.3.5 Re-Start and Monitor SVE System

The SVE system will be reactivated after the first two to four hours of the injection test to allow for evaluation of TPHg, BTEX, and fuel oxygenates concentrations that may be volatilized into the vadose zone during air injection. Samples for laboratory analysis will be collected in clean, 1-liter Summa™ canisters provided by the state-certified laboratory that will be connected to the well or conveyance line. Pre- and post-sampling vacuum will be recorded, and the canisters will be shipped to the laboratory under standard chain-of-custody protocols. Samples will be analyzed for TPHg, BTEX, and fuel oxygenates by a California-certified analytical laboratory using EPA Method TO-15.

2.4 Task 4: Collect Groundwater Quality Data in Area 5

One grab groundwater sample is proposed to be collected from a soil boring to be located approximately 160 feet west of a UST that was reportedly located adjacent to

exiting well MW4 located in the warehouse building (Figure 3). This grab groundwater sample will be collected from the first groundwater-bearing sediments estimated to be present between 8 and 20 feet bgs. The sample will be collected using methods described in Section 2.2 and analyzed for:

- TPHg using modified EPA Method 8015
- BTEX and fuel additives (including MTBE, TBA, EDB, and 1,2-DCA) using EPA Method 8260B

2.5 Task 5: Preparation of Summary Report

LFR will prepare a summary report for submittal to ACEH, presenting the results of the additional characterization investigation and the pilot test conducted at the Site. The report will include site background and environmental setting information, a description of the pilot test design, implementation, and monitoring, and field procedures for the subsurface investigation. All analytical results will be presented and discussed. The report also will include soil boring logs, construction details of the new injection wells and soil-gas sample points, and copies of drilling permits, field sheets, and certified analytical laboratory reports.

The report will include an evaluation of the results of the pilot test and determine whether the selected groundwater remediation alternative of injecting oxygen (air, pure oxygen, or ozone) is an appropriate alternative for this Site. Based on the results of the pilot test evaluation, a full-scale remediation plan may be proposed for the Site.

The report will be uploaded to the GeoTracker system and ACEH file transfer protocol (FTP) site in accordance with RWQCB and ACEH requirements.

3.0 SCHEDULE

After receiving approval from ACEH for this work plan, LFR will oversee the installation, development, and sampling of the proposed wells as described above. Subsequently, LFR will initiate the pilot test and provide a summary of the tests within 60 days after the approval of this work plan.

In accordance with ACEH requirements, all reports will be uploaded to the ACEH FTP site and to the RWQCB GeoTracker database.

4.0 REFERENCES

Alameda County Environmental Health (ACEH). 2008. Letter to PCC Flow Technologies Holding Inc.; 9201 San Leandro LLC; and GP Holdings LLC from Jerry Wickham, re: Fuel Leak Case No. RO0000320, PACO Pumps, 9201 San Leandro Street, Oakland, California. September 26.

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ERAS Environmental, Inc. (ERAS). 2008. Subsurface Investigation and Groundwater Monitoring Report, Quarter 2, 2008, Former PACO Pumps Facility, 9201 San Leandro Street, Oakland, California. July 31.

Jonas and Associates Inc. (Jonas). 1991. Site Characterization Report Excavation Area, PACO Pumps Facility, 9201 San Leandro Street in Oakland, California. October 30.

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Regional Water Quality Control Board (RWQCB). 2008. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater. May.

Table 1
Analytical Results for Soil Samples
9201 San Leandro Street
Oakland, California
concentrations in milligrams per kilogram

Sample Location	Date Collected	Depth feet bgs	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Fuel Oxygenates	VOCs	PCBs	Arsenic
LFR Area 1 - Southwestern Corner of the Site, west of the "workshop building"														
Samples Collected by Jonas & Associates 1992														
B-16	13-Apr-92	0.5-1.5	45	190	<1.0	NA	<0.005	0.008	<0.005	<0.005	NA	ND	NA	<0.25
B-17	13-Apr-92	0.5-1.5	<1.0	520	290	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
B-18	13-Apr-92	0.5-1.5	<1.0	**7,800**	**8,000**	NA	0.005	0.049	0.088	1.20	NA	ND	NA	<0.25
B-19	13-Apr-92	0.5-1.5	<1.0	170	27	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
MW-2	3-Nov-92	0.5-1.5	NA	NA	NA	<1.0	<0.200	<0.200	1.90	9.60	NA	NA	NA	NA
	3-Nov-92	5	<1.0	310	14	<1.0	<0.005	<0.005	0.025	0.041	NA	NA	NA	NA
	3-Nov-92	10	<1.0	230	8	<1.0	<0.005	<0.005	0.011	0.020	NA	NA	NA	NA
	3-Nov-92	15	<1.0	<10	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA
Samples Collected by ERAS 2008														
HA-4	12-Jun-08	1.25-1.5	2.8	21	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12-Jun-08	2.75-3	16	69	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
HA-5	12-Jun-08	1.25-1.5	**1,000**	1,600	1,200	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12-Jun-08	2.75-3	78	180	61	NA	NA	NA	NA	NA	NA	NA	NA	NA
HA-6	12-Jun-08	1.25-1.5	**7,600**	**20,000**	**2,700**	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12-Jun-08	2.75-3	2.3	9.6	<1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
LFR Area 2- Area South of the Warehouse Storage Area Building Adjacent to the Southern Property Boundary														
Soil Samples Collected by Dames & Moore 1987														
Pit 1	27-Jul-87	1.5	NA	250	NA	NA	<0.025	0.600	<0.030	NA	NA	ND	NA	NA
	27-Jul-87	3	NA	130	NA	NA	<0.025	0.470	<0.030	NA	NA	ND	NA	NA
Pit 2	27-Jul-87	1.5	NA	<10	NA	<10	<0.025	0.420	<0.030	NA	NA	ND	<0.200	NA
	27-Jul-87	3	NA	<10	NA	NA	<0.025	0.600	<0.030	NA	NA	ND	NA	NA
Pit 3	27-Jul-87	1.5	NA	780/800	NA	NA	<0.025	0.230	<0.030	NA	NA	ND	NA	14
	27-Jul-87	3	NA	600	NA	<10	<0.025	0.380	<0.030	NA	NA	ND	<0.200	NA
Pit 4	27-Jul-87	1.5	NA	780	NA	NA	<0.025	0.110	<0.030	NA	NA	ND	NA	NA
	27-Jul-87	3	NA	1,100	NA	NA	<0.025	0.045	<0.030	NA	NA	ND	NA	NA

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Sample Location	Date Collected	Depth feet bgs	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Fuel Oxygenates	VOCs	PCBs	Arsenic
Soil Samples Collected by Jonas & Associates 1991														
B-1 (Pit 1)	1-Oct-91	3.5	<1.0	NA	NA	<1.0	<0.005	<0.005	<0.005	<0.005	NA	ND	<0.100	NA
B-2 (Pit 2)	1-Oct-91	3.5	<1.0	NA	NA	<1.0	<0.005	<0.005	<0.005	<0.005	NA	ND	<0.100	NA
B-3 (Pit 3)	1-Oct-91	3.5	<1.0	NA	NA	<1.0	<0.005	<0.005	<0.005	<0.005	NA	ND	<0.100	NA
B-4 (Pit 4)	1-Oct-91	3.5	<1.0	NA	NA	<1.0	<0.005	<0.005	<0.005	<0.005	NA	ND	<0.100	NA
B-5 (duplicate of B-4)	1-Oct-91	3.5	<1.0	NA	NA	<1.0	<0.005	<0.005	<0.005	<0.005	NA	ND	<0.100	NA
B-8	3-Aug-92	6	NA	NA	NA	7.4	**0.750**	0.0092	0.180	0.026	NA	NA	NA	NA
B-9	3-Aug-92	6	NA	NA	NA	2.3	0.039	0.058	0.008	0.009	NA	NA	NA	NA
Samples Collected by ERAS 2008 *														
Pit 3SE	12-Jun-08	1.25-1.5	140	550	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12-Jun-08	2.75-3	11	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit 3E	12-Jun-08	1.25-1.5	2.3	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12-Jun-08	2.75-3	4.7	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit 3NW	12-Jun-08	1.25-1.5	55	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12-Jun-08	2.75-3	2.3	6.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit 4SE	12-Jun-08	1.25-1.5	6.5	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12-Jun-08	2.75-3	<1.0	<5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit 4E	12-Jun-08	1.25-1.5	71	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12-Jun-08	2.75-3	2.8	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit 4NW	12-Jun-08	1.25-1.5	8.2	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	12-Jun-08	2.75-3	<1.0	<5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LFR AREA 3 - Northwestern Corner of the Site														
Samples Collected by Jonas & Associates 1991 & 1992														
B-6	1-Oct-91	0-0.5	<1.0	NA	NA	<1.0	<0.005	<0.005	<0.005	<0.005	NA	NA	0.400	NA
B-7	1-Oct-91	0-0.5	<1.0	NA	NA	<1.0	<0.005	<0.005	<0.005	<0.005	NA	NA	0.670	NA
B-10	11-Aug-92	6	NA	NA	NA	4.4	**0.371**	0.005	0.080	0.028	NA	NA	NA	NA

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Sample Location	Date Collected	Depth feet bgs	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Fuel Oxygenates	VOCs	PCBs	Arsenic
MW-1	4-Nov-92	5	<1.0	530	<1.0	NA	NA	NA	NA	NA	NA	NA	0.290	NA
	4-Nov-92	10	<1.0	<10	<1.0	NA	NA	NA	NA	NA	NA	NA	<0.100	NA
	4-Nov-92	15	<1.0	<10	<1.0	NA	NA	NA	NA	NA	NA	NA	<0.100	NA
Samples Collected by ERAS 2008														
HA-1	12-Jun-08	1.25-1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA
	12-Jun-08	3-3.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA
HA-2	12-Jun-08	1.25-1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA
	12-Jun-08	2.5-2.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05	NA
HA-3	12-Jun-08	1.25-1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA
	12-Jun-08	2.5-2.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.14	NA
Samples Collected by Jonas & Associates 1992														
B-8	13-Apr-92	0.5-1.5	22	110	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
B-9	13-Apr-92	0.5-1.5	<1.0	660	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
B-10	13-Apr-92	0.5-1.5	27	63	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
B-11	09-Apr-92	0.5-1.5	120	410	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
B-12	09-Apr-92	0.5-1.5	<1.0	<1.0	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
LFR Area 4 - Former UST near Groundwater Monitoring Well MW-3														
Samples Collected by Jonas & Associates 1992														
B-1	30-Jun-92	6	ND	NA	NA	9.2	0.043	<0.005	0.086	0.067	NA	NA	NA	NA
B-2	27-Jul-92	6	NA	NA	NA	6.2	**1.800**	<0.005	0.180	<0.005	NA	NA	NA	NA
B-3	27-Jul-92	6	NA	NA	NA	7.3	0.053	<0.005	0.200	<0.005	NA	NA	NA	NA
B-4	27-Jul-92	6	NA	NA	NA	5.3	**0.650**	<0.005	0.160	0.014	NA	NA	NA	NA
B-5	27-Jul-92	6	NA	NA	NA	1.9	0.034	<0.005	0.012	<0.005	NA	NA	NA	NA
B-6	3-Aug-92	6	NA	NA	NA	13	**2.100**	0.018	0.340	0.190	NA	NA	NA	NA
B-7	3-Aug-92	6	NA	NA	NA	11	**2.100**	0.011	0.230	0.067	NA	NA	NA	NA

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Oakland, California
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Sample Location	Date Collected	Depth feet bgs	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Fuel Oxygenates	VOCs	PCBs	Arsenic
B-11	11-Aug-92	6	NA	NA	NA	13	**0.670**	0.008	0.160	0.100	NA	NA	NA	NA
B-12	11-Aug-92	6	NA	NA	NA	ND	0.010	<0.005	<0.005	<0.005	NA	NA	NA	NA
B-13	11-Aug-92	6	NA	NA	NA	1.1	0.013	<0.005	<0.005	0.007	NA	NA	NA	NA
B-22	13-Apr-92	0.5-1.5	<1.0	29	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	3.0
MW-3	4-Nov-92	5	NA	NA	NA	9.5	**1.90**	0.0095	0.240	110.0	NA	NA	NA	NA
	4-Nov-92	10	NA	NA	NA	**250**	**3.70**	**11.00**	2.200	6.400	NA	NA	NA	NA
	4-Nov-92	15	NA	NA	NA	<1	<0.005	0.0054	<0.005	0.028	NA	NA	NA	NA
	4-Nov-92	20	NA	NA	NA	<1	<0.005	0.010	<0.005	0.012	NA	NA	NA	NA
	4-Nov-92	25	NA	NA	NA	1.2	0.031	0.065	0.0078	0.023	NA	NA	NA	NA
	4-Nov-92	30	NA	NA	NA	10	0.200	0.300	0.039	0.110	NA	NA	NA	NA
Samples Collected by Jonas & Associates 1997														
B-1	31-Jan-97	8.5	NA	NA	NA	<1.0	0.012	<0.005	<0.005	<0.005	NA	NA	NA	NA
B-2	31-Jan-97	8.5	NA	NA	NA	9.5	0.042	0.014	0.035	0.058	NA	NA	NA	NA
Samples Collected by ERAs 2008														
GP-2	12-Jun-08	9.5-10	NA	NA	NA	**340**	**1.200**	0.190	2.20	2.00	ND	NA	NA	NA
SG-1	12-Jun-08	9.5-10	NA	NA	NA	**400**	**1.200**	2.80	1.90	2.90	ND	NA	NA	NA
GP-4	12-Jun-08	9.5-10	NA	NA	NA	**450**	**0.720**	<0.100	2.10	1.40	ND	NA	NA	NA
GP-6	12-Jun-08	11.5-12	NA	NA	NA	**520**	**4.600**	2.60	2.60	7.40	ND	NA	NA	NA
GP-8	12-Jun-08	9.5-10	NA	NA	NA	<1.0	<0.005	<0.005	<0.005	<0.005	ND	NA	NA	NA
LFR Area 5 - Suspected Former UST near Groundwater Monitoring Well MW-4														
Samples Collected by Jonas & Associates 1992														
B-23	13-Apr-92	0.5-1.5	<1.0	430	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
MW-4	9-Nov-92	0.5	<1.0	<10	<1.0	5.9	0.078	<0.005	0.010	0.058	NA	NA	NA	NA
	9-Nov-92	5	<1.0	<10	<1.0	6.3	**0.700**	0.014	0.130	0.590	NA	NA	NA	NA
	9-Nov-92	10	<1.0	<10	<1.0	32	**0.340**	0.760	0.910	4.200	NA	NA	NA	NA
	9-Nov-92	15	<1.0	<10	<1.0	<1	<0.005	<0.005	<0.005	<0.005	NA	NA	NA	NA
	9-Nov-92	20	<1.0	<10	<1.0	<1	0.010	0.009	0.013	0.053	NA	NA	NA	NA

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GP-3	12-Jun-08	9.5-10	<1.0	NA	NA	<1.0	<0.005	<0.005	<0.005	<0.005	ND	NA	NA	NA
Samples from the Northern Portion of the Property														
Samples Collected by Jonas & Associates 1992														
B-13	09-Apr-92	0.5-1.5	55	98	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
B-14	09-Apr-92	0.5-1.5	<1.0	21	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
B-21	13-Apr-92	0.5-1.5	<1.0	<1.0	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
B-24	13-Apr-92	0.5-1.5	<1.0	<1.0	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
B-25	13-Apr-92	0.5-1.5	49	210	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	<0.25
B-26	13-Apr-92	0.5-1.5	12	57	<1.0	NA	<0.005	<0.005	<0.005	<0.005	NA	ND	NA	5.4
REGULATORY CONCENTRATIONS														
RWQCB ESLS - Groundwater is a source of drinking water			83	2,500	2,500	83	0.044	2.9	3.3	2.3	0.023	Varies	0.740	1.6
RWQCB ESLS - Groundwater is not a source of drinking water			180	2,500	2,500	180	0.270	9.3	4.7	11	8.4	Varies	0.740	1.6

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Oakland, California
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Sample Location	Date Collected	Depth feet bgs	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Fuel Oxygenates	VOCs	PCBs	Arsenic

Notes:
Samples collected by Jonas & Associates in 1991 and 1992 were analyzed by Chroma Lab Inc.; VOCs by EPA Method 8240; SVOCs by EPA Method 827(
* Samples were also analyzed for SVOCs
bgs = below ground surface
TPHd = total petroleum hydrocarbons as diesel
TPHmo = total petroleum hydrocarbons as motor oil
TPHk=total petroleum hydrocarbons as kerosene
TPHg = total petroleum hydrocarbons as gasoline
VOCs = volatile organic compounds
PCBs = polychlorinated biphenyls
SVOCs = semivolatile organic compounds

ESL denotes environmental screening criteria - these ESLs are screening criteria established by the Regional Water Quality Control Board (RWQCB) to address environmental protection. The ESLs used for this project are based on a commercial-industrial land use scenario where groundwater is and is not considered a source of drinking water. Under most circumstances, the presence of a chemical in soil or groundwater at concentrations below the corresponding ESL can be assumed to not pose a significant threat to human health. ESLs can be obtained from http://www.swrcb.ca.gov/rwqcb2/ESL.htm.
NA = parameter not analyzed
Bold Font denotes concentration was greater than the ESL.

Table 2
Analytical Results for Volatile Organic Analyses
Groundwater Samples
9201 San Leandro Street
Oakland, California
concentrations in micrograms per liter

Sample Location	Date Collected	Depth feet bgs	TPHd	TPHmo	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	Other Fuel Oxygenates
LFR Area 1 - Southwestern Corner of the Site, west of the "workshop building"											
MW-2	16-Nov-92	5.25-20.25	<50	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	9-Mar-93		430	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	21-Jul-93		<50	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	29-Jan-94		<50	NA	<50	<2.0	<2.0	<2.0	<2.0	NA	NA
	26-May-94		<50	NA	<50	2.3	0.8	<0.5	<0.5	NA	NA
	24-Aug-94		<50	NA	<50	3.1	1.4	0.5	0.6	NA	NA
	22-Nov-94		<50	NA	<50	3.4	1.8	<0.5	0.5	NA	NA
	8-Feb-95		<50	NA	<50	4.5	1.3	<0.5	0.5	NA	NA
	31-May-95		<50	NA	NA	NA	NA	NA	NA	NA	NA
	8-Aug-95		<50	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	29-Nov-95		<50	NA	NA	NA	NA	NA	NA	NA	NA
	29-Feb-96		<50	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	23-May-96		<50	NA	NA	NA	NA	NA	NA	NA	NA
	4-Nov-96		<50	NA	NA	NA	NA	NA	NA	NA	ND
	13-Nov-03		NA	NA	<50	<0.5	<0.5	<0.5	<2.0	NA	ND
	17-Jun-08		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	1.1	ND
LFR Area 2 - Area South of the Warehouse Storage Area Building Adjacent to the Southern Property Boundary											
MW-1	15-Nov-92	5.25-20.25	<50	NA	NA	NA	NA	NA	NA	NA	NA
	9-Mar-93		140	NA	NA	NA	NA	NA	NA	NA	NA
	21-Jul-93		<50	NA	NA	NA	NA	NA	NA	NA	NA
	29-Jan-94		<50	NA	NA	NA	NA	NA	NA	NA	NA
	26-May-94		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	24-Aug-94		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	22-Nov-94		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	8-Feb-95		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	31-May-95		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	23-May-96		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA

Table 2
Analytical Results for Volatile Organic Analyses
Groundwater Samples
9201 San Leandro Street
Oakland, California
concentrations in micrograms per liter

Sample Location	Date Collected	Depth feet bgs	TPHd	TPHmo	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	Other Fuel Oxygenates
	27-Oct-00		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA
	14-Nov-07		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<2.0	NA
	17-Jun-08		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	0.67	ND
LFR Area 4 - Former UST near Groundwater Monitoring Well MW-3											
B-1	3-Feb-97	15-20	NA	NA	**31,000**	**7,100**	**4,100**	**520**	**1,400**	NA	NA
B-2	3-Feb-97	15-20	NA	NA	**41,000**	**14,000**	**2,600**	**740**	**1,700**	NA	NA
B-3	3-Feb-97	15-20	NA	NA	**1,400**	**310**	9.9	27	56	NA	NA
B-4	3-Feb-97	15-20	NA	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
GP-1	12-Jun-08	13.5-16	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ND
GP-1	12-Jun-08	24-28	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ND
GP-1	12-Jun-08	32-36	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ND
GP-2	12-Jun-08	8.5-13.5	NA	NA	**45,000**	**2,900**	**2,600**	**450**	**1,100**	<10	14 (1,2-DCA)
GP-2	12-Jun-08	25-29	NA	NA	**210**	7.1	7.1	1.0	2.7	1.2	ND
GP-2	12-Jun-08	31-35	NA	NA	70	5.2	3.0	<0.5	1.2	1.0	ND
GP-4	13-Jun-08	13-15	NA	NA	**19,000**	**860**	**670**	**260**	**420**	<0.5	ND
GP-4	13-Jun-08	25-29	NA	NA	**12,000**	**240**	**230**	**130**	**240**	<0.5	ND
GP-4	13-Jun-08	31-35	NA	NA	**330**	15	12	5.7	10	<0.5	ND
GP-5	13-Jun-08	16-20	NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
GP-5	13-Jun-08	25-29	NA	NA	<50	<0.5	0.69	<0.5	<0.5	<0.5	ND
GP-5	13-Jun-08	31-35	NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
GP-6	16-Jun-08	13.5-18	NA	NA	**3,100**	**170**	30	22	35	<0.5	ND
GP-6	16-Jun-08	25-29	NA	NA	**3,000**	**160**	39	40	75	<0.5	ND
GP-8	16-Jun-08	20-24	NA	NA	<50	<0.5	<0.5	<0.5	<0.5	**6.1**	1.9 (1,2-DCA)
GP-8	16-Jun-08	25-29	NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
GP-8	16-Jun-08	31-35	NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND

Table 2
Analytical Results for Volatile Organic Analyses
Groundwater Samples
9201 San Leandro Street
Oakland, California
concentrations in micrograms per liter

Sample Location	Date Collected	Depth feet bgs	TPHd	TPHmo	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	Other Fuel Oxygenates
MW-3	16-Nov-92	5.25-20.25	<50	NA	**40,000**	**2,900**	**6,100**	**550**	**1,700**	NA	NA
	9-Mar-93		290	NA	**12,000**	**1,000**	**300**	**110**	**170**	NA	NA
	21-Jul-93		<50	NA	**3,400**	**420**	63	36	37	NA	NA
	29-Jan-94		<50	NA	**5,600**	**910**	**220**	**47**	36	NA	NA
	26-May-94		<50	NA	**5,200**	**890**	**180**	**45**	43	NA	NA
	24-Aug-94		<50	NA	**5,200**	**580**	76	29	22	NA	NA
	22-Nov-94		<50	NA	**2,200**	**670**	**130**	31	28	NA	NA
	8-Feb-95		<50	NA	**2,900**	**780**	**120**	31	33	NA	NA
	31-May-95		NA	NA	**9,100**	**2,800**	**160**	**91**	72	NA	NA
D	31-May-95		NA	NA	**5,300**	**1,300**	**170**	37	44	NA	NA
	28-Aug-95		NA	NA	**1,400**	<0.5	<0.5	1.7	8.9	NA	NA
D	28-Aug-95		NA	NA	**4,800**	**2,500**	**150**	**53**	44	NA	NA
	29-Nov-95		NA	NA	**3,000**	**780**	43	32	32	NA	NA
D	29-Nov-95		NA	NA	**2,400**	**830**	38	21	16	NA	NA
	29-Feb-96		NA	NA	**3,800**	**1,200**	**130**	36	35	NA	NA
D	29-Feb-96		NA	NA	**8,000**	**3,400**	**430**	**100**	99	NA	NA
	23-May-96		NA	NA	**6,900**	**3,300**	**340**	**71**	74	NA	NA
D	23-May-96		NA	NA	**4,300**	**3,200**	**350**	**72**	74	NA	NA
	4-Nov-96		NA	NA	**4,900**	**2,100**	110	**70**	44	NA	NA
D	4-Nov-96		NA	NA	**4,500**	**2,100**	**130**	**61**	39	NA	NA
	13-May-97		NA	NA	**10,000**	**4,800**	**530**	**100**	92	<100	NA
	26-Jan-98		NA	NA	**12,000**	**5,000**	**250**	**91**	**100**	NA	NA
	27-Oct-00		NA	NA	**19,000**	**9,000**	**1,000**	**250**	**130**	NA	NA
	3-Nov-03		NA	NA	**13,000**	**3,900**	**370**	**300**	**130**	<40	NA
	17-Jun-08		NA	NA	**13,000**	**4,400**	**600**	**300**	**150**	<100	ND
MW-5	24-Aug-94	5.25-20.25	**130**	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
D	22-Nov-94		<50	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	8-Feb-95		<50	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA

Table 2
Analytical Results for Volatile Organic Analyses
Groundwater Samples
9201 San Leandro Street
Oakland, California
concentrations in micrograms per liter

Sample Location	Date Collected	Depth feet bgs	TPHd	TPHmo	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	Other Fuel Oxygenates
	31-May-95		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	8-Aug-95		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	29-Feb-96		NA	NA	<50	0.6	<0.5	<0.5	<0.5	NA	NA
	13-May-97		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	27-Oct-00		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
	13-Nov-03		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<2.0	NA
	17-Jun-08		NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
LFR Area 5 - Suspected Former UST near Groundwater Monitoring Well MW-4											
GP-3	13-Jun-08	19.5-22	180	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	2.1 (TBA)
GP-3	13-Jun-08	25-29	<50	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
GP-3	13-Jun-08	31-35	NA	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
GP-7	16-Jun-08	13-18	**280**	NA	<50	<0.5	<0.5	<0.5	<0.5	0.93	ND
GP-7	16-Jun-08	25-29	<50	NA	<50	<0.5	<0.5	<0.5	<0.5	<0.5	ND
MW-4	16-Nov-92	5.25-20.25	<50	NA	**560**	**66**	73	16	**130**	NA	NA
D	16-Nov-92		<50	NA	**520**	**63**	67	15	**140**	NA	NA
	9-Mar-93		<50	NA	**750**	**67**	12	29	62	NA	NA
	21-Jul-93		<50	NA	**250**	21	4.2	8.4	11	NA	NA
	29-Jan-94		<50	NA	180	28	2.2	6.2	10	NA	NA
	26-May-94		NA	NA	130	14	3.2	6.1	4.7	NA	NA
	24-Aug-94		NA	NA	70	6.7	0.9	2.8	2.6	NA	NA
	22-Nov-94		NA	NA	90	16	1.7	5.6	3.4	NA	NA
	8-Feb-95		NA	NA	90	17	1.3	5.5	3.0	NA	NA
	31-May-95		NA	NA	90	13	0.6	2.3	1.2	NA	NA
	8-Aug-95		NA	NA	80	3.6	<0.5	1.4	0.6	NA	NA
	29-Nov-95		NA	NA	<50	4.5	0.7	1.0	0.7	NA	NA
	29-Feb-96		NA	NA	<50	7.4	1.0	3.2	2.4	NA	NA
	23-May-96		NA	NA	80	11	2.0	2.3	1.0	NA	NA
	3-Nov-03		<50	NA	<50	6.3	0.56	3.4	1.0	<2.0	NA
	18-Jun-08		<50	NA	81	11	0.51	4.7	1.6	<0.5	ND

Table 2
Analytical Results for Volatile Organic Analyses
Groundwater Samples
9201 San Leandro Street
Oakland, California
concentrations in micrograms per liter

Sample Location	Date Collected	Depth feet bgs	TPHd	TPHmo	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	Other Fuel Oxygenates
REGULATORY CONCENTRATIONS											
RWQCB ESLS - Groundwater is a source of drinking water			100	100	100	1.0	40	30	20	5.0	varies
RWQCB ESLS - Groundwater is not a source of drinking water			210	210	210	46	130	43	100	1,400	varies

Notes:
bgs = below ground surface
NA = parameter not analyzed
ND = parameter not present above laboratory reporting limits
TPHd = total petroleum hydrocarbons as diesel
TPHmo = total petroleum hydrocarbons as motor oil
TPHg = total petroleum hydrocarbons as gasoline
MTBE = methyl tertiary-butyl ether
D = duplicate sample
1,2-DCE = 1,2-dichloroethene
TBA - tertiary butyl alcohol

ESL denotes environmental screening criteria - these ESLs are screening criteria established by the Regional Water Quality Control Board (RWQCB) to address environmental protection. The ESLs used for this project are based on a commercial-industrial land use scenario where groundwater is and is not considered a source of drinking water. Under most circumstances, the presence of a chemical in soil or groundwater at concentrations below the corresponding ESL can be assumed to not pose a significant threat to human health. ESLs can be obtained from http://www.swrcb.ca.gov/rwqcb2/ESL.htm.
Bold Font denotes concentration was greater than the ESL.

Table 3
Groundwater Elevations
9201 San Leandro Street
Oakland, California

Well Identification	Date Collected	Top-of-Casing Elevation [1]	Depth to Groundwater [2]	Groundwater Elevation [1]
MW-1	15-Nov-92	18.05	9.34	8.71
	9-Mar-93		8.50	9.55
	21-Jul-93		9.00	9.05
	26-May-94		9.06	8.99
	24-Aug-94		8.40	9.65
	22-Nov-94		8.20	9.85
	8-Feb-95		8.30	9.75
	31-May-95		9.35	8.70
	8-Aug-95		9.16	8.89
	29-Nov-95		9.28	8.77
	29-Feb-96		7.62	10.43
	23-May-96		8.28	9.77
	4-Nov-96		9.20	8.85
	13-May-97		9.04	9.01
	14-Nov-07		8.50	9.55
	17-Jun-08		9.04	9.01
MW-2	15-Nov-92	19.40	10.05	9.35
	9-Mar-93		9.21	10.19
	21-Jul-93		9.72	9.68
	26-May-94		9.58	9.82
	24-Aug-94		9.98	9.42
	22-Nov-94		8.70	10.70
	8-Feb-95		8.68	10.72
	31-May-95		9.48	9.92
	8-Aug-95		9.64	9.76
	29-Nov-95		9.86	9.54
	29-Feb-96		8.12	11.28
	23-May-96		8.70	10.70
	4-Nov-96		9.50	9.90
	13-May-97		9.44	9.96
	14-Nov-07		8.94	10.46
	17-Jun-08		9.57	9.83
MW-3	15-Nov-92	19.70	10.35	9.35
	9-Mar-93		9.19	10.51
	21-Jul-93		11.07	8.63
	26-May-94		10.04	9.66
	24-Aug-94		11.08	8.62
	22-Nov-94		8.92	10.78
	8-Feb-95		8.90	10.80
	31-May-95		10.16	9.54
	8-Aug-95		9.92	9.78
	29-Nov-95		10.7	9.00

Table 3
Groundwater Elevations
9201 San Leandro Street
Oakland, California

Well Identification	Date Collected	Top-of-Casing Elevation [1]	Depth to Groundwater [2]	Groundwater Elevation [1]
	29-Feb-96		8.52	11.18
	23-May-96		8.15	11.55
	4-Nov-96		7.21	12.49
	13-May-97		9.82	9.88
	14-Nov-07		9.21	10.49
	17-Jun-08		9.81	9.89
MW-4	15-Nov-92	19.65	8.87	10.78
	9-Mar-93		7.96	11.69
	21-Jul-93		8.06	11.59
	26-May-94		8.57	11.08
	24-Aug-94		8.75	10.90
	22-Nov-94		7.41	12.24
	8-Feb-95		7.20	12.45
	31-May-95		8.32	11.33
	8-Aug-95		8.66	10.99
	29-Nov-95		8.93	10.72
	29-Feb-96		6.54	13.11
	23-May-96		7.24	12.41
	4-Nov-96		8.58	11.07
	13-May-97		8.42	11.23
	14-Nov-07		7.61	12.04
	17-Jun-08		8.31	11.34
MW-5	24-Aug-94	18.49	8.22	10.27
	22-Nov-94		7.90	10.59
	8-Feb-95		7.92	10.57
	31-May-95		8.74	9.75
	8-Aug-95		8.93	9.56
	29-Nov-95		9.11	9.38
	29-Feb-96		7.36	11.13
	23-May-96		7.92	10.57
	4-Nov-96		8.78	9.71
	13-May-97		8.82	9.67
	14-Nov-07		8.16	10.33
	17-Jun-08		8.75	9.74

Notes:

[1] Top-of-casing and groundwater elevation in North America Vertical Datum 1988

[2] Depth to water measured in feet below top of casing.

Table 4
Analytical Results for Volatile Organic Analyses
Soil-Vapor Samples
9201 San Leandro Street
Oakland, California
concentrations in micrograms per cubic meter

Sample Location	Depth in feet bgs	Date Collected	TPHg C5 or greater	TPHg (C2 -C4)	Benzene	Toluene	Ethyl benzene	Total Xylenes
B-5	3	23-Sep-98	**52,871.17**	**563,959.10**	**162,928.83**	25,623.07 J	**10,854.81**	19,106.26 J
B-6	3	23-Sep-98	**3,4542,494.89 B**	**7,049,488.75**	**92,645.81**	19,970.92 J	**<9,118.04**	21,277.42 J
Screening Criteria								
Soil-Vapor Intrusion ESL			29,000	29,000	280	180,000	3,300	58,000

Notes:
Samples collected in September 1998 were analyzed by Air Toxics, Ltd., using EPA Test Method TO3 GC/PID/FID

ESLs denote environmental screening criteria established by the Regional Water Quality Control Board (RWQCB) to address environmental protection. ESLs provided in this table are indoor air screening levels for an industrial/commercial land use from Table E of the RWQCB ESL publication. The ESLs can be obtained from http://www.swrcb.ca.gov/sanfranciscobay/esl.htm.

Bold Font denotes concentration was greater than the ESL.
bgs - below ground surface
TPHg denotes total petroleum hydrocarbons as gasoline
B - denotes analyte was detected in the associated method blank
J - denotes estimated value. Analyte was detected at a level less than the reporting limit and greater than or equal to the method detection limit. The user of these data should be aware that the data are of limited reliability.

SOURCE: GOOGLE EARTH PRO

N

0 500 FEET

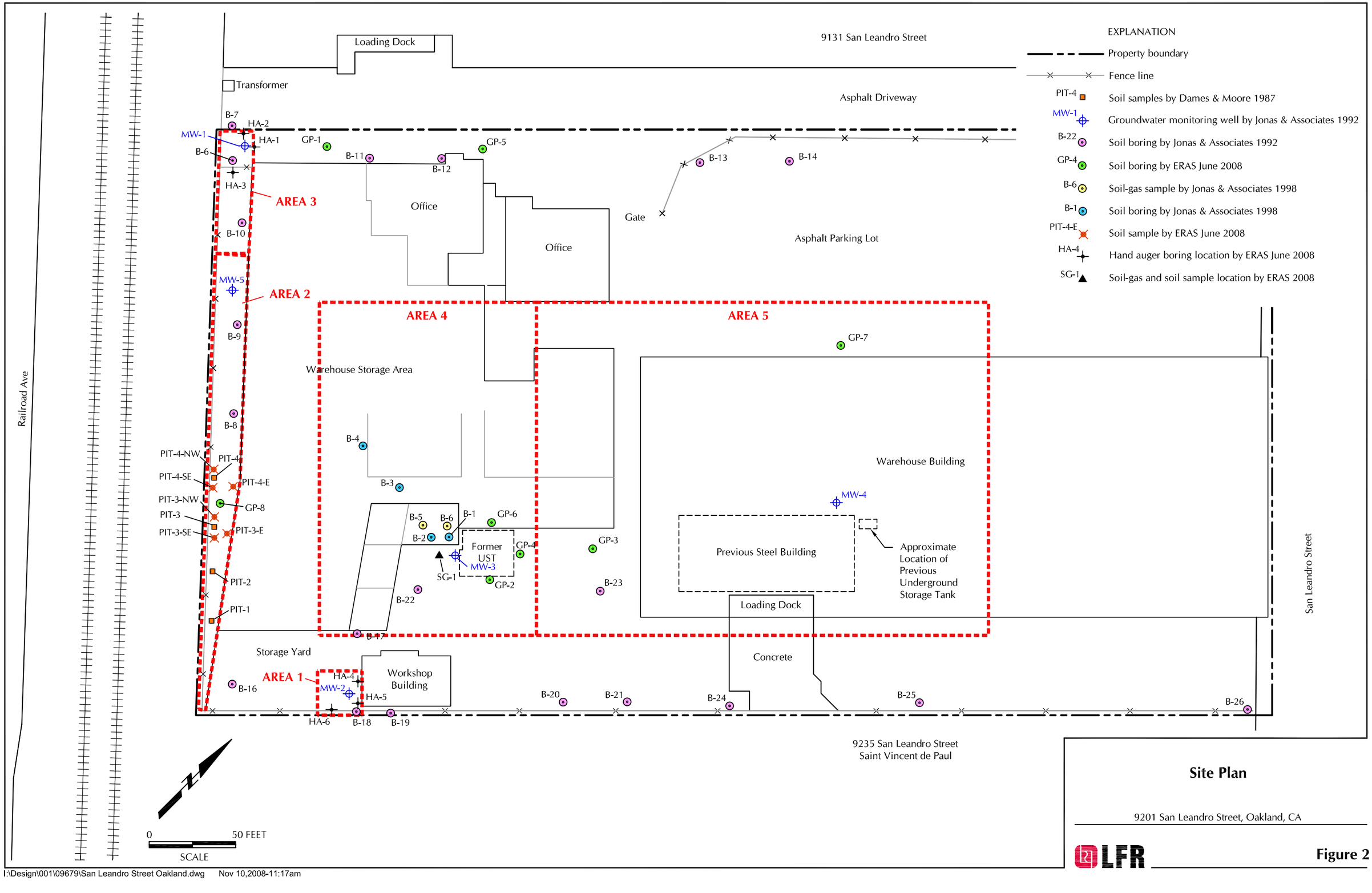
Site Vicinity Map

9201 San Leandro Street, Oakland, CA

LFR

Figure 1

I:\Design\001\09679\San Leandro Street Oakland.dwg Nov 10,2008-11:18am



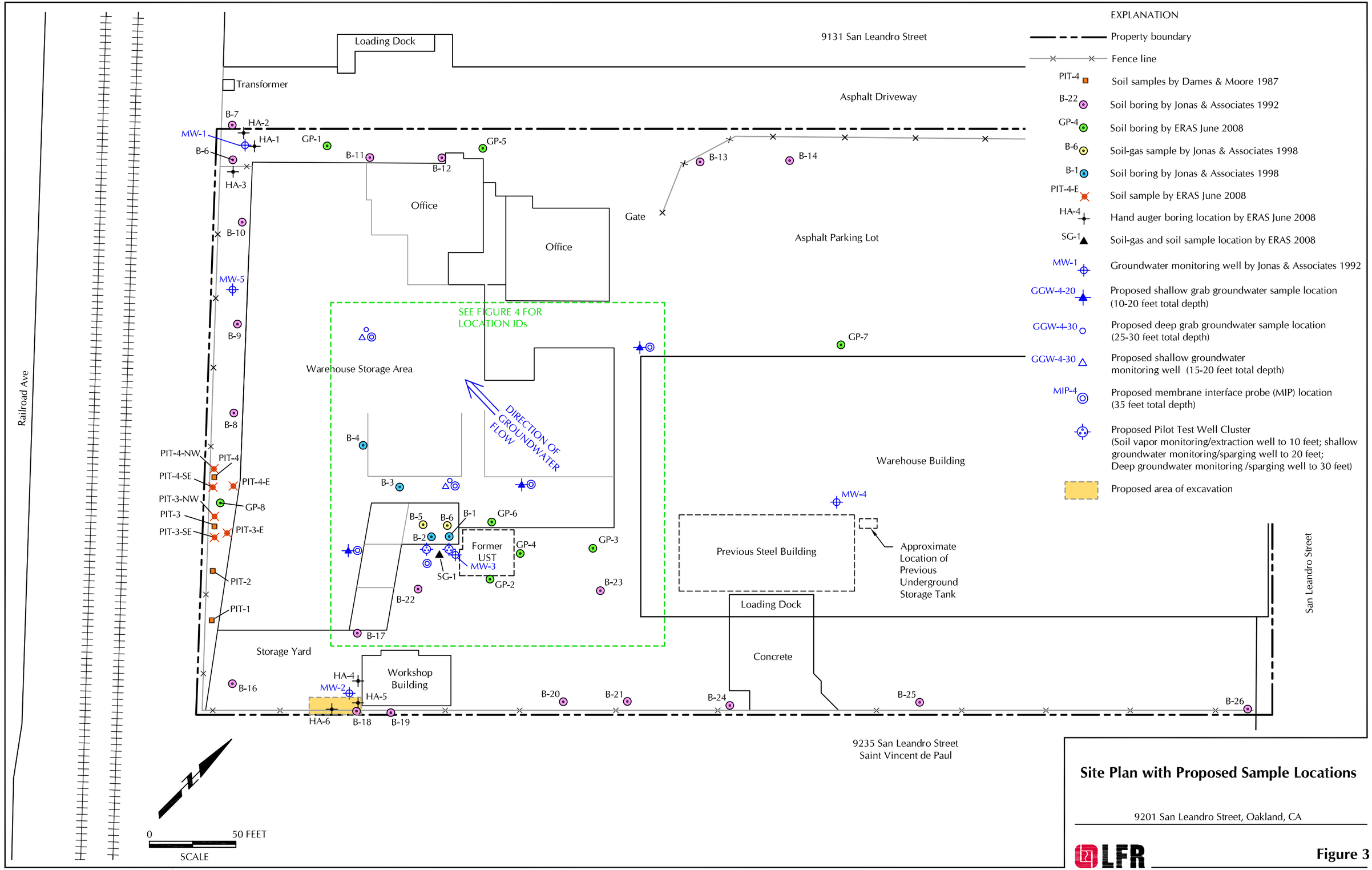
Site Plan

9201 San Leandro Street, Oakland, CA

LFR

Figure 2

I:\Design\001\09679\San Leandro Street Oakland.dwg Nov 10,2008-11:17am



Site Plan with Proposed Sample Locations

9201 San Leandro Street, Oakland, CA

LFR

Figure 3

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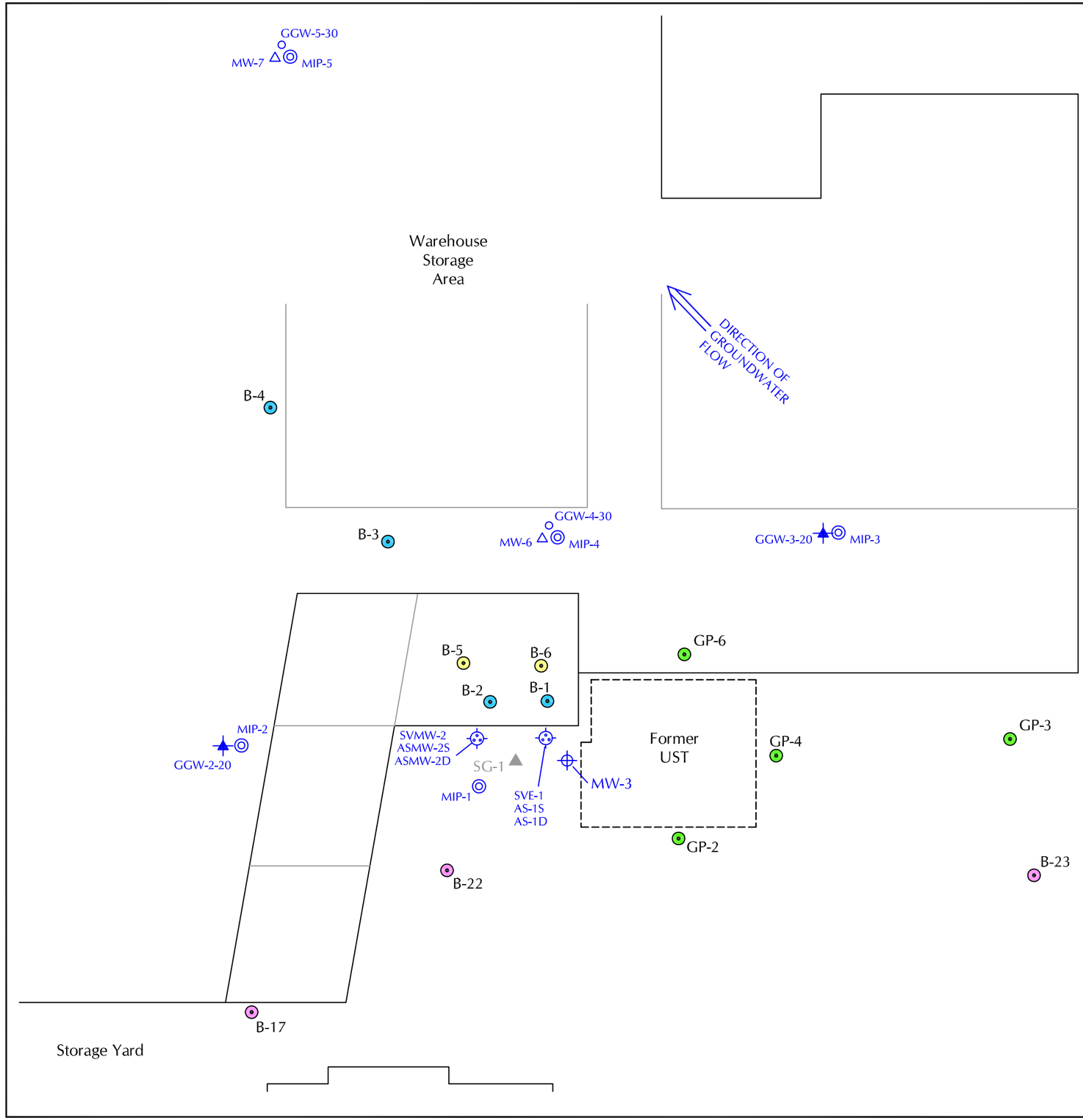

EXPLANATION

- Property boundary
- B-22 — Soil boring by Jonas & Associates 1992
- GP-4 — Soil boring by ERAS June 2008
- B-6 — Soil-gas sample by Jonas & Associates 1998
- B-1 — Soil boring by Jonas & Associates 1998
- PIT-4-E — Soil sample by ERAS June 2008
- HA-4 — Hand auger boring location by ERAS June 2008
- SG-1 — Soil-gas and soil sample location by ERAS 2008
- MW-1 — Groundwater monitoring well by Jonas & Associates 1992
- GGW-4-20 — Proposed shallow grab groundwater sample location (10-20 feet total depth)
- GGW-4-30 — Proposed deep grab groundwater sample location (25-30 feet total depth)
- GGW-4-30 — Proposed shallow groundwater monitoring well (15-20 feet total depth)
- MIP-4 — Proposed membrane interface probe (MIP) location (35 feet total depth)
- Proposed Pilot Test Well Cluster
  Soil vapor monitoring/extraction well to 10 feet total depth;
  Shallow groundwater monitoring/sparging well to 20 feet total depth;
  Deep groundwater monitoring /sparging well to 30 feet

0 20 FEET
SCALE

Site Plan with Proposed Sample Locations Former UST Area

9201 San Leandro Street, Oakland, CA

LFR

Figure 4

I:\Design\001\09679\Storage Area.dwg Nov 12,2008-2:26pm