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By Alameda County Environmental Health 8:55 am, Apr 11, 2017

Mr. Mark Detterman
Alameda County Environmental Health Care Services
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: Former Olympic Service Station
1436 Grant Avenue
San Lorenzo, California
ACEHD Case No. RO0000373, GeoTracker No. T0600102256

Dear Mr. Detterman:

I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document or report submitted on my behalf to ACDEH's FTP server and the SWRCB's GeoTracker website.

Sincerely,
George and Frida Jaber 1989 Family Trust

Philip Jaber, Trustee

STRATUS
ENVIRONMENTAL, INC.

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Cameron Park, California 95682
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April 6, 2017
Project No. 2115-1436-01

Mr. Mark Detterman, P.G.
Alameda County Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: **Work Plan for Additional Subsurface Investigation and Focused Site Conceptual Model**
Former Olympic Service Station
1436 Grant Avenue, San Lorenzo, California
LOP Case #RO0000373

Dear Mr. Detterman:

Stratus Environmental, Inc. (Stratus), on behalf of Mr. Philip Jaber and the George and Frida Jaber 1989 Family Trust, has prepared this *Work Plan for Additional Subsurface Investigation (Work Plan)* for the Former Olympic Service Station located at 1436 Grant Avenue in San Lorenzo, California (the site, see Figures 1 through 3). Alameda County Environmental Health Department (ACEHD) currently regulates an environmental case on the subject property relating to a historical release of motor vehicle fuel to the subsurface. Between September and November 2016, Stratus prepared and submitted several documents on behalf of the subject site, which included the results of a post remediation subsurface investigation, the findings of a door-to-door reconnaissance intended to identify water supply wells near the site, the results of sampling of six offsite water supply wells, and findings of a quarterly groundwater monitoring and sampling event. After reviewing the content of these reports, ACEHD issued a letter, dated January 11, 2017, requesting that the site's Site Conceptual Model (SCM) be updated. The January 2017 letter also requested a work plan proposing activities needed to address 'data gaps' identified by the SCM as impediments to eventual closure of the site's environmental case. After reviewing the content of the letter, Stratus, ACEHD, and Mr. Jaber met to discuss the site, and develop a framework for the requested scope of work.

This document proposes to advance four direct push soil borings for collection of soil and/or groundwater samples; one boring will be advanced onsite, at a location requested by ACEHD, and three borings will be advanced offsite, between the site and the location of a water supply well impacted with the fuel oxygenate methyl tertiary butyl ether (MTBE). This document also proposes to expand efforts to locate additional water supply wells to the west, northwest, and southwest of the site, with the intention of identifying any additional potential groundwater sensitive receptors.

SITE DESCRIPTION

The subject site is located on the southern corner of the intersection of Grant Avenue and Channel Street in San Lorenzo, California. The site previously operated as the Olympic Service Station; it is currently operated as San Lorenzo Auto Repair. The current configuration of the property is depicted on Figure 2.

The adjoining property to the southwest and south is developed as the Arroyo Center strip mall. Properties to the north and northwest (across Grant Avenue) are developed as single family detached residences, and the property to the east and northeast (across Channel Street) has been developed as multi-family housing units (apartments or condominiums). A parking lot and athletic fields for Arroyo High School are situated on property north of Grant Avenue, across the intersection.

SITE BACKGROUND SUMMARY

The following information has been summarized based on information presented in reports prepared by Reese Construction, Aqua Science Engineers, Inc. (ASE), and Conestoga-Rovers & Associates (CRA), and work performed by Stratus.

The former underground storage tanks (USTs) and associated product dispensers were removed in 1998. Ten groundwater monitoring wells (MW-1 through MW-4, MW-5A/B, MW-6A/B, MW-7A/B, and MW-8A/B), seven soil vapor sampling points (SV-1 through SV-7), seven extraction wells (EX-1 through EX-7), two ozone injection wells (IW-1 and IW-2), and nineteen exploratory soil borings (BH-A through BH-C, B-1 through B-13, and B-13A through B-13C) were installed between 1999 and 2015. Locations of the wells, vapor sampling points, and soil borings are shown on Figure 2. Drilling and well construction details are summarized in Table 1.

Chemicals of concern (COCs) at this site include gasoline-range organics (GRO)/total petroleum hydrocarbons as gasoline (TPHG), benzene, toluene, ethylbenzene, and total xylenes (BTEX), and the gasoline additive methyl tertiary butyl ether (MTBE). Between 1999 and 2015, groundwater levels beneath the property have ranged between approximately 5.2 and 11.2 feet below ground surface (bgs). The site is currently under a semi-annual groundwater monitoring and sampling program; although ACEHD requested in the May 5, 2016 letter that all wells be sampled quarterly until further notice. A review of Table 1 indicates that five site wells (MW-4, MW-5A, MW-6A, MW-7A, and MW-8A) have been installed to approximately 10 to 12 feet bgs, while the other monitoring / extraction wells have been installed to depths ranging from approximately 20 to 26 feet bgs. In general, fuel contaminant concentrations in the MW-4, MW-5A, and MW-6A samples are higher than contaminant levels in the other wells.

Groundwater samples have historically been analyzed for diesel-range organics (DRO) and the fuel additives di-isopropyl ether (DIPE), tertiary amyl butyl ether (TAME), ethyl tertiary butyl ether (ETBE), tertiary butyl alcohol (TBA), 1,2-dichlorethane (1,2-DCA), 1,2-dibromoethane (EDB), and ethanol. These analytes are not currently included in the groundwater analytical suite.

In general, most soils situated in the upper 15 to 18 feet of the subsurface appear to be predominately fine grained (mixtures of silt/clay, exclusive of fill material). Below this depth, to approximately 25 feet bgs, soil strata have been described as silty sand, clayey sand, and sand.

Soil vapor sampling was performed at the site in 2010; in general, relatively high concentrations of GRO and BTEX were detected in these samples. GRO and benzene were reported at maximum levels of 52,000,000 micrograms per cubic meter ($\mu g/m^3$) and 160,000 $\mu g/m^3$, respectively, at that time.

Most of the petroleum hydrocarbon impact to the subsurface appears to have been situated above approximately 20 feet bgs, and in relatively close proximity to the former USTs and fuel dispenser islands (soil sample analytical data collected prior to Dual Phase Extraction [DPE] remediation is discussed below). In a September 2012 Corrective Action Plan (CAP), Stratus estimated that a mass of 955 pounds of TPHG/GRO were present in soil at the site above 20 feet bgs.

Based on our general understanding of the distribution of contaminants beneath the property, site geologic conditions, and depth to groundwater levels, DPE was selected as a possible remedial alternative for the site. In June 2011, a DPE pilot test was performed at the site, using wells EX-1 through EX-3 for extraction. Based on the findings of this test, DPE was deemed by Stratus to be a viable remedial alternative for the site. Stratus subsequently prepared a CAP for the property, recommending use of DPE at the site, and after receiving approval of this document, installed four additional extraction wells (EX-4 through EX-7).

In July 2014, Stratus initiated full scale DPE at the subject site. As of December 2, 2015, an estimated mass of 983 pounds of GRO have been removed from the subsurface in the vapor phase. Since initiation of DPE, a total of approximately 1,491,520 gallons of groundwater have been extracted from the subsurface, treated onsite using granular activated carbon (GAC), and discharged to the local sewer system. Influent vapor phase concentrations of fuel contaminants have declined appreciably over time, and since the summer of 2015, relatively low concentrations of fuel contaminants were being removed from the subsurface. DPE has been discontinued and the DPE thermal oxidizer has been removed from the site.

In December 2015, Stratus directed the installation of two groundwater monitoring wells (MW-7A and MW-8A), and two additional soil vapor probes (SV-6 and SV-7). After shut down of the DPE system, and allowing approximately one month for equilibration of subsurface conditions, Stratus performed a soil vapor survey on January 28, 2016, (five of the seven wells could be sampled; two of the wells contained moisture and could not be sampled). GRO was detected in one sample (SV-6, 6,900 $\mu g/m^3$); benzene, ethylbenzene, and naphthalene were not detected in any of the samples. Given the findings of the 2016 soil vapor sampling event, DPE appears to have significantly reduced contaminant concentrations in shallow soil vapor.

In September 2016, Stratus conducted a post DPE subsurface investigation at the site, which consisted of conducting additional soil vapor sampling (to supplement the January 2016 data), and advancing five direct push soil borings (GP-1 through GP-5). The data showed that soil vapor concentrations onsite, near the area where DPE was performed, remain low. In September 2016, the highest concentrations of fuel contaminants in soil vapor were detected at soil vapor probes SV-6 and SV-7 (likely outside of the radius of influence of the former DPE system), with maximum levels of GRO and benzene at 77,000 $\mu g/m^3$ and 92 $\mu g/m^3$, respectively. Borings GP-1 through GP-5 were advanced in relative close proximity to boreholes where elevated levels of fuel contaminants were detected prior to remediation. At borings GP-1 through GP-5, substantial reductions in fuel contaminant concentrations were observed when compared to historical data (although ACEHD has requested that a supplemental boring be advanced in the vicinity of GP-5, which is discussed later in this *Work Plan*).

CRA performed a water well survey using Department of Water Resources (DWR) well completion records obtained in 2008. At this time, no water wells were identified within a 1,000-foot radius of the site. At the request of ACEHD, Stratus conducted a door-to-door field reconnaissance (in December 2015, and again in September and October 2016) in order to attempt to identify water supply wells that are undocumented.

The following summarizes the findings of the water supply well reconnaissance and sampling activities completed to date. Table 2 presents information summarizing the findings of the water supply well survey. The locations of wells discussed below are depicted on Figure 3.

- A total of 177 residences were visited by Stratus personnel between December 2015 and October 2016, and contact was made with approximately 119 property owners/tenants. These properties are situated within approximately 1,100 feet northwest and 1,400 feet west and southwest of the site. Thirteen wells were

located and eight of these wells were confirmed to be in use. At least seven additional properties may have wells, however additional information would be needed to confirm the presence of a well (see Table 2 for summarized information).

- Groundwater samples were collected from six properties where water wells were identified (1632 Via Barrett, 1587 Via Rancho, 15857 Via Seco, 1617 Via Lacqua, 15868 Corte Ulisse, and 15772 Via Teresa) with consent of the property owner or tenant. Laboratory results for these samples were transmitted to ACEHD and the property owners in separate reports issued for each specific property. MTBE was detected in three of the samples; 57 µg/L at 1587 Via Rancho, 0.68 µg/L at 15857 Via Seco, and 1.0 µg/L at 1617 Via Lacqua. GRO and BTEX concentrations were below laboratory detection limits in all water well samples.

- Two property owners (1408 Via Barrett and 1742 Via Rancho) actively use their water wells but refused to allow sampling of the extracted groundwater.

- At five additional residences (15765 Via Teresa, 15779 Via Seco, 1769 Via Rancho, 1571 Via Chorro, and 15866 Corte Angelo), the owner/tenants indicated that wells were present, but were not in use. At one of these residences (15866 Corte Angelo), the owner indicated that they intended to begin using the well in the future to water trees for a small orchard in their yard (but the well pump is currently non-operational).

- At one residence (1540 Via Chorro), Stratus believes that a water well is present and in use, due to the presence of an East Bay Municipal Utility District anti-siphoning device in a vault box in front of the residence, however we were unable to communicate with the owner / tenant due to a language barrier (owner/tenant only speaks an Asian language).

- At three residences (15778 Via Seco, 1794 Via Rancho, and 15854 Corte Geraldo), Stratus was informed by a neighbor or family member of the likely presence of a well, but we were unable to confirm the presence of a well.

- At three residences (1587 Via Chorro, 15753 Via Teresa, and 15850 Corte Yolanda), conflicting information regarding the possible presence of a well was observed or received.

Stratus has updated the focused SCM for this site using available data; this information is presented as Table 3.

SCOPE OF WORK

The objectives of the proposed scope of work are to:

- Evaluate current concentrations of petroleum hydrocarbons in shallow soil near former sample location T-3E-7.0.
- Identify additional offsite water wells not located during the December 2015 and September/October 2016 canvassing of the neighborhoods west, southwest, and northwest of the site.
- Assess fuel contaminant concentrations in groundwater, between the site and the water well at 1587 Via Rancho.

To accomplish this objective, Stratus is proposing the following work activities:

- Advance one (1) onsite soil boring (GP-6) to approximately 24 feet bgs using direct push methods. Boring GP-6 will be advanced approximately three feet away from previously advanced boring GP-5, at a location requested by ACEHD.
- Advance three (3) offsite soil borings (GP-7 through GP-9) to approximately 24 feet bgs using direct push methods.
- Collect soil samples during the advancement of borings GP-6 through GP-9 for lithologic comparison and chemical analysis.
- Collect groundwater samples from borings GP-7 through GP-9.
- Mail out flyers to select properties northwest, west, and southwest of the site that request the recipient of the flyers to respond regarding the presence or absence of a well on the property. The flyers were mailed to people who were not contacted previously in 2015 or 2016 (ACEHD has already conducted the mailings, based on verbal communication).
- Review flyers received and conduct follow up correspondence with the persons who indicate the presence of wells on the property.
- Collect samples from water wells identified, if permission can be obtained from the owner(s).
- Conduct additional neighborhood canvassing for water wells, if appropriate.

The proposed scope of work has been subdivided into four tasks, as outlined below. All work will be conducted under the direct supervision of a State of California Professional Geologist or Professional Engineer, and will be conducted in accordance with standards established by the *Tri-Regional Board Staff Recommendations of Preliminary Investigation and Evaluation of Underground Tank Sites* (Regional Water Quality Control Board [RWQCB], April 2004).

Task 1: Pre-Field Activities

Following approval of this *Work Plan* by ACEHD, the following activities will be completed:

- Obtain an encroachment permit from Alameda County and or the City of San Lorenzo to enable drilling of offsite borings GP-7 through GP-9.
- Obtain a drilling permit from Alameda County Public Works Agency (ACPWA).
- Retain and schedule a licensed C-57 drilling contractor.
- Update the site specific Health and Safety Plan.
- Mark boring locations and contact Underground Service Alert to locate underground utilities in the vicinity of the work site.
- Notify ACEHD, ACPWA, the Jaber's, and the facility tenant of the proposed work schedule.

Task 2: Field Work

Task 2A: Soil Borings

A Stratus geologist, under the direct supervision of a California Registered Professional Geologist, will oversee a C-57 licensed drilling contractor advance four soil sampling exploratory borings (GP-6 through GP-9) using a direct push drilling rig to a depth of approximately 24 feet bgs. The initial 5 feet of each boring will be cleared using hand tools to reduce the possibility of damaging underground utilities. The four soil borings will be continuously cored using a double-walled sampling system equipped with disposable acetate liners. During advancement of the borings, soil samples will be retained in approximately 4-foot intervals. The bottom end of the acrylic lined soil sample section will be lined with Teflon™ sheets, capped, and sealed. Each sample will be labeled, placed in a resealable plastic bag, and stored in an ice-chilled cooler. The samples will remain chilled until relinquished to a state-certified analytical laboratory. Chain-of-custody procedures will be followed from the time the samples are collected

until the time the samples are relinquished to the laboratory. Stratus anticipates that approximately 3 to 4 soil samples from soil boring GP-6, and 2 soil samples from borings GP-7 through GP-9, will be submitted for chemical analysis. The exact number of samples submitted will be determined at the time of the investigation. Photoionization Detector (PID) screening of the samples (described below) will be used to assist in the determination of which samples will be submitted for chemical analysis.

The entire soil core will be classified onsite using the Unified Soil Classification System and recorded, along with other pertinent geologic information, on a boring log. Select sections of the soil core will also be placed and sealed in plastic bags to allow the accumulation of volatile organic compound (VOC) vapors within the airspace in the bags. A PID will be used to measure VOC concentrations from each sample in parts per million (ppm), and will be recorded on the boring log. Soil boring logs will be uploaded to GeoTracker.

Stratus will collect two groundwater samples from borings GP-7 through GP-9. Our intention is to collect a grab groundwater sample immediately upon reaching first encountered groundwater. Stratus also intends to collect groundwater samples near the base of the borehole using a hydropunch sampler. The deeper groundwater samples will target sandy strata that could function as a pathway for lateral migration of fuel contaminants away from the site. The groundwater samples will be transferred to properly preserved glass containers (40 milliliter VOAs) provided by the laboratory. After retention of the samples, the VOAs will be labeled, identified on a chain-of-custody form, and stored on ice until delivery to the analyzing laboratory.

Task 2B: Waste Management

Drill cuttings and wastewater generated during the field activities will be contained in DOT-approved 55-gallon steel drums. The drums will be appropriately labeled and stored at the site pending proper disposal. A licensed contractor will transport the soil and wastewater to an appropriate facility for disposal.

Task 2D: Water Well Sampling

Groundwater samples will be collected from the nearby water wells if access is granted from the property owner. Prior to sampling, water will be allowed to run for approximately 10 minutes in order to purge the water lines and force the well to pump fresh water from the surrounding strata. The water samples will be collected in properly preserved glass vials (VOAs). The samples will then be labeled, identified on a chain-of-custody form, and stored on ice pending delivery to a laboratory for chemical analysis.

Task 3: Laboratory Analysis

Groundwater samples will be analyzed by a state-certified laboratory for the same analyte suite already in place for the site's groundwater monitoring and sampling program. The samples will be analyzed for GRO using U.S. Environmental Protection Agency (USEPA) Method 8015/8260, and for BTEX and MTBE using USEPA Method 8260. Groundwater analytical data will be uploaded to the State of California's GeoTracker database. Soil samples will also be analyzed for GRO, benzene, and MTBE using USEPA Method 8260. Soil samples collected above 10 feet bgs will be additionally analyzed for naphthalene using USEPA Method 8260 and for PAHs using USEPA Method 8270. Soil and groundwater analytical data will also be uploaded to GeoTracker.

Task 4: Water Supply Well Survey

Stratus prepared a draft copy of the flyer for distribution to the neighborhood surrounding the site and transmitted a copy of the flyer to ACEHD for review. ACEHD subsequently modified Stratus' version of the flyer, and after receiving additional comments from Stratus, finalized the document for distribution on ACEHD letterhead. Based on verbal communication with ACEHD, the flyer was mailed out in multiple languages in order to allow for communication with as many nearby residents as possible. ACEHD selected the recipients of the flyer.

The flyers request that property owners return information about potential wells on the property. Upon receiving the flyers, information will be reviewed and appropriate actions will be taken. This may include requesting to inspect the well(s), if located, and collect groundwater samples to investigate for the potential presence of fuel contaminants (most notably MTBE), if the well(s), if located, are in use.

Task 5: Site Assessment Report Preparation

Following completion of the additional site characterization activities, a site assessment report will be prepared. The report will include, but not be limited to, a scaled site plan, soil boring logs, tabulated analytical results, certified analytical results, and findings of the additional water supply well survey. The report will be uploaded to GeoTracker upon finalization.

LIMITATIONS

This document was prepared in general accordance with accepted standards of care that existed at the time this work was performed. No other warranty, expressed or implied, is made. Conclusions and recommendations are based on field observations and data

obtained from this work and previous investigations. It should be recognized that definition and evaluation of geologic conditions is a difficult and somewhat inexact science. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the subsurface conditions present. More extensive studies may be performed to reduce uncertainties. This document is solely for the use and information of our client unless otherwise noted.

If you have any questions regarding this document, or the project in general, please contact Scott Bittinger at (530) 676-2062 or Gowri Kowtha at (530) 676-6001.

Sincerely,
STRATUS ENVIRONMENTAL, INC.

PROFESSIONAL GEOLOGIST
Scott G. Bittinger
No. 7477
STATE OF CALIFORNIA

Scott G. Bittinger, P.G.
Project Geologist

Gowri S. Kowtha, P.E.
Project Manager / Principal

ATTACHMENTS:

Table 1	Well Construction Detail Summary
Table 2	Door-to-Door Well Search Results
Table 3	Focused Site Conceptual Model
Table 4	Intended Recipients of Water Supply Well Survey Flyer
Figure 1	Site Location Map
Figure 2	Site Plan
Figure 3	Area Map
Figure 4	Hypothetical GRO Plume Lengths based on LTCP Justification
Figure 5	Hypothetical Benzene Plume Lengths based on LTCP Justification
Figure 6	Hypothetical MTBE Plume Lengths based on LTCP Justification
Appendix A	Field Practices and Procedures

cc: Mr. Philip Jaber
Ms. Cherie McCaulou, RWQCB (via GeoTracker)

TABLE 1
WELL CONSTRUCTION DETAIL SUMMARY
Former Olympic Service Station, 1436 Grant Avenue, San Lorenzo, CA

Boring/Well I.D.	Date	Boring Depth (feet)	Boring Diameter (inches)	Well Diameter (inches)	Screen Interval (feet bgs)	Slot Size (inches)	Drilling Method	Consultant
Groundwater Monitoring Wells								
MW-1	09/24/99	26.5	8	2	5 - 26.5	0.020	HSA	Aqua Science Engineers
MW-2	09/24/99	20	8	2	5-20	0.020	HSA	Aqua Science Engineers
MW-3	09/24/99	21.5	8	2	5-21	0.020	HSA	Aqua Science Engineers
MW-4	02/09/10	10	10	4	5-10	0.020	Air Knife	Conestoga-Rovers & Associates
MW-5A	05/28/14	10	8	2	5-10	0.020	HSA	Stratus Environmental
MW-5B	05/28/14	20	8	2	15-20	0.020	HSA	Stratus Environmental
MW-6A	05/28/14	10	8	2	5-10	0.020	HSA	Stratus Environmental
MW-6B	05/28/14	20	8	2	15-20	0.020	HSA	Stratus Environmental
MW-7A	12/04/15	12	8	2	4-12	0.020	HSA	Stratus Environmental
MW-8A	12/04/15	12	8	2	4-12	0.020	HSA	Stratus Environmental
Extraction Wells								
EX-1	05/19/11	20	10	4	5-20	0.020	HSA	Stratus Environmental
EX-2	05/19/11	20	10	4	5-20	0.020	HSA	Stratus Environmental
EX-3	05/19/11	20	10	4	5-20	0.020	HSA	Stratus Environmental
EX-4	02/20/14	20	10	4	5-20	0.020	HSA	Stratus Environmental
EX-5	02/20/14	20	10	4	5-20	0.020	HSA	Stratus Environmental
EX-6	02/21/14	20	10	4	5-20	0.020	HSA	Stratus Environmental
EX-7	02/20/14	20	10	4	5-20	0.020	HSA	Stratus Environmental
Injection Wells								
IW-1	05/20/11	11.5	8	0.75	9.5-11.5	microporous	HSA	Stratus Environmental
IW-2	05/20/11	16	8	0.75	14-16	microporous	HSA	Stratus Environmental
Soil Vapor Sampling Points								
SV-1	02/12/10	5.5	3.25	0.375	5-5.1	0.002	HA	Conestoga-Rovers & Assoc.
SV-2	02/09/10	5.5	3.25	0.375	5-5.1	0.002	HA	Conestoga-Rovers & Assoc.
SV-3	02/09/10	5.5	3.25	0.375	5-5.1	0.002	HA	Conestoga-Rovers & Assoc.
SV-4	02/09/10	5.5	3.25	0.375	5-5.1	0.002	HA	Conestoga-Rovers & Assoc.
SV-5	05/20/11	5.5	3.25	0.375	5-5.1	0.002	HA	Stratus Environmental, Inc.
SV-6	12/04/15	6	2.5	0.25	5.3-5.5	mesh	HA	Stratus Environmental, Inc.
SV-7	12/04/15	6	2.5	0.25	5.3-5.5	mesh	HA	Stratus Environmental, Inc.

Notes:
HSA = Hollow Stem Auger
HA = Hand Auger
Data regarding the construction of wells MW-1 through MW-4 obtained from groundwater monitoring reports prepared by Conestoga-Rovers & Associates

Table 2
Door-to-Door Well Search Results
Former Olympic Service Station
1436 Grant Avenue, San Lorenzo, California

Date	Address	Status
9/24/2016	15850 Corte Angelo	No Answer, house boarded up and vacant
9/24/2016	15851 Corte Angelo	No Answer
9/24/2016	15858 Corte Angelo	No Answer
9/24/2016	15859 Corte Angelo	No Well
9/24/2016	15866 Corte Angelo	Well present, but currently inactive. Owner wants to use well in future to water small orchard (4-5 fruit trees) in back yard once pump replaced (Underwood well)
9/24/2016	15867 Corte Angelo	No Well
12/16/2015	1408 Via Barrett	Well In Use. Owner refused access to sample by phone on 8/10/16 (Robinson well)
10/1/2016		Spoke to Mr. Robinson in person on 10/1/16; again refused access to sample
12/16/2015	1416 Via Barrett	No Well
12/16/2015	1417 Via Barrett	No Well
12/16/2015	1424 Via Barrett	No Well
12/16/2015	1425 Via Barrett	No Well
9/24/2016	1432 Via Barrett	Elderly owner/tenant unable to answer question about well
12/16/2015	1433 Via Barrett	No Answer
9/24/2016		No Answer
9/24/2016	1440 Via Barrett	No Well
12/16/2015	1455 Via Barrett	No Well
9/24/2016	1456 Via Barrett	Owner/tenant unable to answer question due to language barrier
12/16/2015	1464 Via Barrett	No Well
12/16/2015	1477 Via Barrett	No Answer
9/24/2016		No Answer
12/16/2015	1478 Via Barrett	No Well
12/16/2015	1484 Via Barrett	No Well
12/16/2015	1520 Via Barrett	No Well
9/24/2016	1523 Via Barrett	Tenant not aware of a well
12/16/2015	1544 Via Barrett	No Well
9/24/2016	1557 Via Barrett	No Answer
10/1/2016		No Answer
12/16/2015	1568 Via Barrett	No Answer
9/24/2016		No Answer
10/1/2016		No Answer
9/24/2016	1575 Via Barrett	No Well
9/24/2016	1582 Via Barrett	No Answer
10/1/2016		No Answer
9/24/2016	1590 Via Barrett	No Well
9/24/2016	1604 Via Barrett	No Well
9/24/2016	1618 Via Barrett	No Answer
10/1/2016	1632 Via Barrett	Well in use and sampled with permission of tenant; sample absent of fuel contaminants
9/24/2016	1625 Via Barrett	No Well
9/24/2016	1639 Via Barrett	Empty house, construction workers didn't know about well
9/24/2016	1646 Via Barrett	No Well
10/1/2016	1540 Via Chorro	Owner/tenant unable to answer question due to language barrier, likely well present, 2 EBMUD vaults
9/24/2016	1554 Via Chorro	No Answer
10/1/2016		No Answer
10/1/2016	1555 Via Chorro	No Well
9/24/2016	1570 Via Chorro	No Answer
10/1/2016		No Answer
9/24/2016	1571 Via Chorro	Water well present, owner indicates not used in their 30 years living there
10/1/2016	1587 Via Chorro	May have well because neighbor's father supposedly helped install well here, however owner/tenant indicates no well present, and only one EBMUD vault observed at street
9/24/2016	1603 Via Chorro	No Answer
9/24/2016	1619 Via Chorro	No Well
9/24/2016	1635 Via Chorro	No Answer
12/16/2015	15752 Via Esmond	No Answer
12/16/2015	15755 Via Esmond	No Answer
12/16/2015	15758 Via Esmond	No Well

Table 2
Door-to-Door Well Search Results
Former Olympic Service Station
1436 Grant Avenue, San Lorenzo, California

Date	Address	Status
12/16/2015	15761 Via Esmond	No Answer
12/16/2015	15764 Via Esmond	No Well
12/16/2015	15767 Via Esmond	No Well
12/16/2015	15770 Via Esmond	No Answer
12/16/2015	15773 Via Esmond	No Well
12/16/2015	15776 Via Esmond	No Answer
12/16/2015	15782 Via Esmond	No Well
12/16/2015	15788 Via Esmond	No Answer
10/1/2016	15854 Corte Geraldo	No Answer, neighbor at 15862 Corte Geraldo indicates that well is present
10/1/2016	15855 Corte Geraldo	Owner/tenant unable to answer question due to language barrier
10/1/2016	15862 Corte Geraldo	No Well
10/1/2016	15863 Corte Geraldo	No Well
10/1/2016	15871 Corte Geraldo	No Well
10/1/2016	1482 Via Lacqua	No Well
12/16/2015	1521 Via Lacqua	No Well
12/16/2015	1522 Via Lacqua	No Well
12/16/2015	1543 Via Lacqua	No Well
12/16/2015	1544 Via Lacqua	No Well
12/16/2015	1565 Via Lacqua	No Well
12/16/2015	1589 Via Lacqua	No Answer
10/1/2016	1603 Via Lacqua	No Answer
10/1/2016	1617 Via Lacqua	Well in Use, sampled 10/1/16; MTBE detected at 1.0 ug/L (Mangini Well)
10/1/2016	1618 Via Lacqua	No Answer
10/1/2016	1631 Via Lacqua	No Answer
10/1/2016	1632 Via Lacqua	No Answer
10/1/2016	1645 Via Lacqua	No Well
10/1/2016	1661 Via Lacqua	No Well
10/1/2016	1669 Via Lacqua	No Answer
9/24/2016	1670 Via Lacqua	No Well
10/1/2016	1677 Via Lacqua	No Well
9/24/2016	1678 Via Lacqua	No Well
10/1/2016	1685 Via Lacqua	No Well
10/1/2016	1693 Via Lacqua	No Well
10/1/2016	1705 Via Lacqua	No Well
10/1/2016	1717 Via Lacqua	Owner/tenant unable to answer question due to language barrier
10/1/2016	1722 Via Lacqua	No Answer
10/1/2016	1729 Via Lacqua	Tenant not aware of a well
10/1/2016	1737 Via Lacqua	No Answer
10/1/2016	1738 Via Lacqua	No Answer
10/1/2016	1745 Via Lacqua	No Well
10/1/2016	1757 Via Lacqua	Mental capacity of owner/tenant not sufficient to answer question about well
10/1/2016	1771 Via Lacqua	No Answer
10/1/2016	1783 Via Lacqua	Elderly owner/tenant unable to answer question about well
12/16/2015	1503 Via Rancho	No Well
9/24/2016	1504 Via Rancho	No Well
12/16/2015	1517 Via Rancho	No Well
12/16/2015	1518 Via Rancho	No Well
12/16/2015	1531 Via Rancho	No Well
12/16/2015	1532 Via Rancho	No Answer
9/24/2016		No Answer
12/16/2015	1545 Via Rancho	No Answer
9/24/2016		No Answer
10/1/2016		Resident home, but refused to answer door
12/16/2015	1546 Via Rancho	No Answer
9/24/2016		No Answer
10/1/2016		Resident home, but refused to answer door
12/16/2015	1559 Via Rancho	No Well

Table 2
Door-to-Door Well Search Results
Former Olympic Service Station
1436 Grant Avenue, San Lorenzo, California

Date	Address	Status
12/16/2015	1560 Via Rancho	No Well
12/16/2015	1573 Via Rancho	No Well
9/24/2016	1574 Via Rancho	Owner/tenant wasn't sure
12/16/2015	1587 Via Rancho	Well In Use: sample impacted with MTBE at 57 ug/L (DeCero well)
9/24/2016	1588 Via Rancho	No Well
9/24/2016	1601 Via Rancho	No Answer
10/1/2016		No Answer
9/24/2016	1602 Via Rancho	No Answer
10/1/2016		No Answer
9/24/2016	1615 Via Rancho	No Answer
10/1/2016		No Answer
9/24/2016	1616 Via Rancho	No Answer
10/1/2016		Spoke to housekeeper only, unable to answer question about well
9/24/2016	1629 Via Rancho	No Well
10/1/2016	1630 Via Rancho	Owner/tenant did not believe that a well is present
10/1/2016	1643 Via Rancho	No Well
9/24/2016	1644 Via Rancho	No Well
9/24/2016	1657 Via Rancho	No Answer
10/1/2016		No Answer
9/24/2016	1658 Via Rancho	No Well
9/24/2016	1671 Via Rancho	No Answer
10/1/2016		No Answer
10/1/2016	1672 Via Rancho	No Well
9/24/2016	1685 Via Rancho	No Answer
9/24/2016	1686 Via Rancho	Owner/tenant wasn't sure
9/24/2016	1700 Via Rancho	No Well
9/24/2016	1701 Via Rancho	No Answer
9/24/2016	1714 Via Rancho	No Well
9/24/2016	1715 Via Rancho	No Answer
9/24/2016	1728 Via Rancho	No Answer
9/24/2016	1741 Via Rancho	No Well
9/24/2016	1742 Via Rancho	Well In Use: Owner refused access to sample (Angotti well)
9/24/2016	1755 Via Rancho	No Answer
9/24/2016	1756 Via Rancho	No Answer
9/24/2016	1769 Via Rancho	Water well present, but reportedly dry
9/24/2016	1770 Via Rancho	Owner/tenant not aware of any well
9/24/2016	1781 Via Rancho	No Well
9/24/2016	1782 Via Rancho	No Well
9/24/2016	1793 Via Rancho	No Well according to neighbor (house vacant)
9/24/2016	1794 Via Rancho	No Answer; neighbor indicates well present
10/1/2016		No Answer, neighbor indicates well present
10/1/2016	15762 Via Seco	No Well
10/1/2016	15763 Via Seco	No Answer
10/1/2016	15770 Via Seco	No Answer
10/1/2016	15771 Via Seco	No Well
10/1/2016	15778 Via Seco	Granddaughter (25-30 yr old) believes well present, but needed to ask her grandparents (owners)
10/1/2016	15779 Via Seco	Water well present, 2 EBMUD vaults, owner indicates hasn't been used in 15 years & inaccessible
12/16/2015	15786 Via Seco	No Well
12/16/2015	15787 Via Seco	No Well
12/16/2015	15794 Via Seco	No Answer
10/1/2016		No Answer
12/16/2015	15800 Via Seco	No Well
12/16/2015	15801 Via Seco	No Well
12/16/2015	15816 Via Seco	No Well
12/16/2015	15824 Via Seco	No Well
12/16/2015	15825 Via Seco	No Well
12/16/2015	15832 Via Seco	No Well

Table 2
Door-to-Door Well Search Results
Former Olympic Service Station
1436 Grant Avenue, San Lorenzo, California

Date	Address	Status
12/16/2015	15835 Via Seco	No Well
12/16/2015	15848 Via Seco	No Answer
10/1/2016		No Answer
10/1/2016	15849 Via Seco	No Well
12/16/2015	15850 Via Seco	No Well
12/16/2015	15856 Via Seco	No Well
12/16/2015	15857 Via Seco	Well In Use: sample impacted with MTBE at 0.68 ug/L (Hatcher well)
12/16/2015	15864 Via Seco	No Well
12/16/2015	15865 Via Seco	No Well
9/24/2016	15753 Via Teresa	Owner/tenant indicates no well present, but 2 EBMUD vaults observed at street
9/24/2016	15756 Via Teresa	No Well
9/24/2016	15764 Via Teresa	No Well
9/24/2016	15765 Via Teresa	Water well present, owner/tenant indicates well buried and not in use
9/24/2016	15772 Via Teresa	Well in use; absent of fuel contaminants (Johnson well)
9/24/2016	15773 Via Teresa	No known well (didn't think they had one)
9/24/2016	15780 Via Teresa	No Well
9/24/2016	15781 Via Teresa	No Answer
12/16/2015	15788 Via Teresa	No Well
9/24/2016	15789 Via Teresa	No Well
9/24/2016	15852 Corte Ulisse	No Well
9/24/2016	15853 Corte Ulisse	No Well
9/24/2016	15860 Corte Ulisse	No Answer
9/24/2016	15861 Corte Ulisse	No Well
9/24/2016	15868 Corte Ulisse	Well in use: absent of fuel contaminants (Bratton well)
9/24/2016	15869 Corte Ulisse	No Answer
10/1/2016	15850 Corte Yolanda	Owner/tenant indicates no well present, but owner at 1617 Lacqua indicates there is a well here and owner/tenant is lying about not having one
10/1/2016	15851 Corte Yolanda	No Answer
10/1/2016	15858 Corte Yolanda	No Answer
10/1/2016	15859 Corte Yolanda	No Answer
10/1/2016	15866 Corte Yolanda	No Answer
10/1/2016	15867 Corte Yolanda	No Answer

Table 3
Focused Site Conceptual Model

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
Geology and Hydrogeology	Site	Silt/clay mixtures predominately observed to depths ranging from about 15 to 25 feet bgs, except in areas of overexcavation. Some sandy stratum observed near surface grade extending a few feet in depth (likely fill). Below the 15 to 25 foot level, silty sand and clayey sand have been observed. The thickness of these sandy strata is unknown. Most contaminant impact appears to be present within fine grained silt/clay soils. Historically, groundwater levels in the monitoring wells have ranged from approximately 5 to 8.5 feet bgs with only minimal seasonal fluctuation. Groundwater flow is predominately towards the southwest and west-southwest at a low gradient.	None	N/A
Geology and Hydrogeology	Regional	The site is situated on the East Bay Plain, at an elevation of approximately 15 to 18 feet above mean sea level. The East Bay Plain slopes gently from East to West. The base of the San Leandro Hills are situated approximately 3 miles to the east. Regional groundwater in the area also flows from east to west, following surface water drainage patterns.	None	N/A
Surface Water Bodies		The closest surface water body to the site is San Lorenzo Creek, which is located approximately 1,000 to 1,500 feet north-northwest of the site (San Lorenzo Creek is concrete lined). The property is located approximately 7,000 feet northeast of San Francisco Bay.	None	N/A
Nearby Water Wells		No water wells within 1,000 feet of the site are on file with the Department of Water Resources. A canvas of the neighborhood west, northwest, and southwest has identified 13 undocumented water wells, at least 8 of which are still in use. It is likely that more undocumented water wells have yet to be identified. Six water wells have been sampled, and three samples were impacted with MTBE. One well was impacted at 57 µg/L; the other two wells were impacted at 1 µg/L or less.	None	N/A

Table 3
Focused Site Conceptual Model (Continued)

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
Release Source and Volume		Two gasoline USTs, a diesel UST, a waste oil UST, six fuel dispensers, and associated fuel product lines were removed in July 1998. Compliance soil samples confirmed the presence of a petroleum hydrocarbon release to the subsurface. Several phases of assessment were completed in order to investigate the release. In a September 2012 Corrective Action Plan, Stratus compiled the available data and calculated the estimated fuel contaminant mass. In these calculations, Stratus estimated that 955 pounds of GRO, 5.32 pounds of benzene, and 8.71 pounds of MTBE were present in soil beneath the site. Using available groundwater analytical data from 2012, Stratus estimated that approximately 2.5 pounds of GRO, 0.13 pounds of benzene, and 0.98 pounds of MTBE were dissolved in groundwater beneath the site.	None	N/A
LNAPL		No free product is present at the site.	None	N/A
Source Removal Activities	Over-excavation	In 1998, soil was overexcavated in the vicinity of the waste oil UST and the southern fuel dispenser island. The waste oil UST pit was expanded from 8 to 12 feet bgs. The fuel dispenser excavation extended to about 3.5 feet bgs.	None	N/A
	DPE	Dual phase extraction (DPE) was performed between July 2014 and December 2015, removing an estimated mass of 983 pounds of GRO in the vapor phase. DPE significantly reduced concentrations of fuel contaminants in soil vapor, soil, and groundwater onsite, based on available data.	None	N/A
Contaminants of Concern		Based on historical soil investigations and groundwater monitoring events conducted at the site, diesel range organics (DRO), gasoline range organics (GRO), benzene, toluene, ethyl-benzene, total xylenes (collectively BTEX), and methyl tertiary butyl ether (MTBE), are the contaminants of concern. Analyzing groundwater for DRO is no longer performed.	None	N/A
Petroleum		All soil analytical data was collected prior to initiating DPE, and thus	None	N/A

Table 3
Focused Site Conceptual Model (Continued)

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
Hydrocarbons in Soil		available data is not current. Historically, most (over 95%) of fuel contaminant mass in soil was calculated to be present above 15 feet bgs, or within about 6 to 7 feet of the historical low groundwater level. Most fuel contaminant mass in soil appears to be onsite. Pre-DPE iso-concentration contour maps for soil were presented in the September 2012 CAP.		
Petroleum Hydrocarbons in Groundwater		Five wells (MW-4, and MW-5A through MW-8A) extend to only 10 to 12 feet bgs (typically 2-6 feet below static groundwater) and the other wells extend to depths of 20 to 26 feet bgs, In January 2017, GRO, benzene, and MTBE was detected at maximum concentrations of 170 µg/L, 53 µg/L, and 9.3 µg/L, respectively, for the shallow monitoring well network. In the deeper wells, benzene and MTBE were reported at maximum levels of 13 µg/L, and 110 µg/L, respectively. GRO was not detected in any of the deeper well samples collected in January 2017. The lateral extent of impact is not fully constrained by the site's monitoring well network. ACEHD has asked for additional site assessment, and this work plan proposes to complete three offsite direct push soil borings, between the site and the offsite water supply well impacted with MTBE at 57 µg/L. North of the site, a busy roadway strongly inhibits site assessment. Stratus attempted to find a suitable well location in the median/left turn lane of Grant Avenue in the summer of 2014, but underground utility corridors inhibited installation. It is our understanding that ACEHD deems wells installed on the northern shoulder of Grant Avenue to be 'too far away'. All water wells sampled to the north of Grant Avenue have been absent of fuel contaminants. At the request of ACEHD, Stratus has prepared figures that superimpose the State Water Resources Control Board's Technical Criteria Groundwater Media Specific criteria for GRO, benzene, and MTBE plume lengths to an area map of the site vicinity. Based on historical groundwater flow direction computation data, and	Not fully assessed	Work Plan requested by ACEHD

Table 3
Focused Site Conceptual Model (Continued)

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
		available analytical results, the plume(s) are assumed to have predominately migrated to the west and southwest (see Figures 4 through 6 for GRO, benzene, and MTBE, respectively).		
Petroleum Hydrocarbons in Soil Vapor		Since the site is not an active gas station, it is not exempt from soil gas survey requirements. In February 2010, relatively high concentrations of petroleum hydrocarbons in soil gas were detected. At four sampling locations (SV-1 through SV-4, GRO concentrations ranged from 36,000,000 to 52,000,000 micrograms per cubic meter, and benzene concentrations ranged from 18,000 to 160,000 micrograms per cubic meter. These concentrations were well above Environmental Screening Levels established by the California Regional Water Quality Control Board. Post DPE soil vapor sampling was completed in January and September 2016. The data show substantial reductions in soil vapor concentrations onsite. In SV-1, SV-2, SV-4, and SV-5, GRO and benzene concentrations in soil vapor were below laboratory detection limits for 2016 samples. GRO was detected in SV-6 and SV-7 (near the strip mall west of the site), at a maximum concentration of 77,000 micrograms per cubic meter. Benzene was detected at SV-6, at 92 micrograms per cubic meter.	None	N/A
Risk Evaluation		The site is a currently used as an auto repair business. The property is located in a mixed residential and commercial neighborhood. The auto repair business is part of a larger shopping center complex. Behind the shopping center, downgradient of the site, is a residential neighborhood.	None	N/A
		Based on historical depth to groundwater data, subgrade utility trenches could potentially function as conduits for preferential contaminant migration. In particular, large diameter storm drain		

Table 3
Focused Site Conceptual Model (Continued)

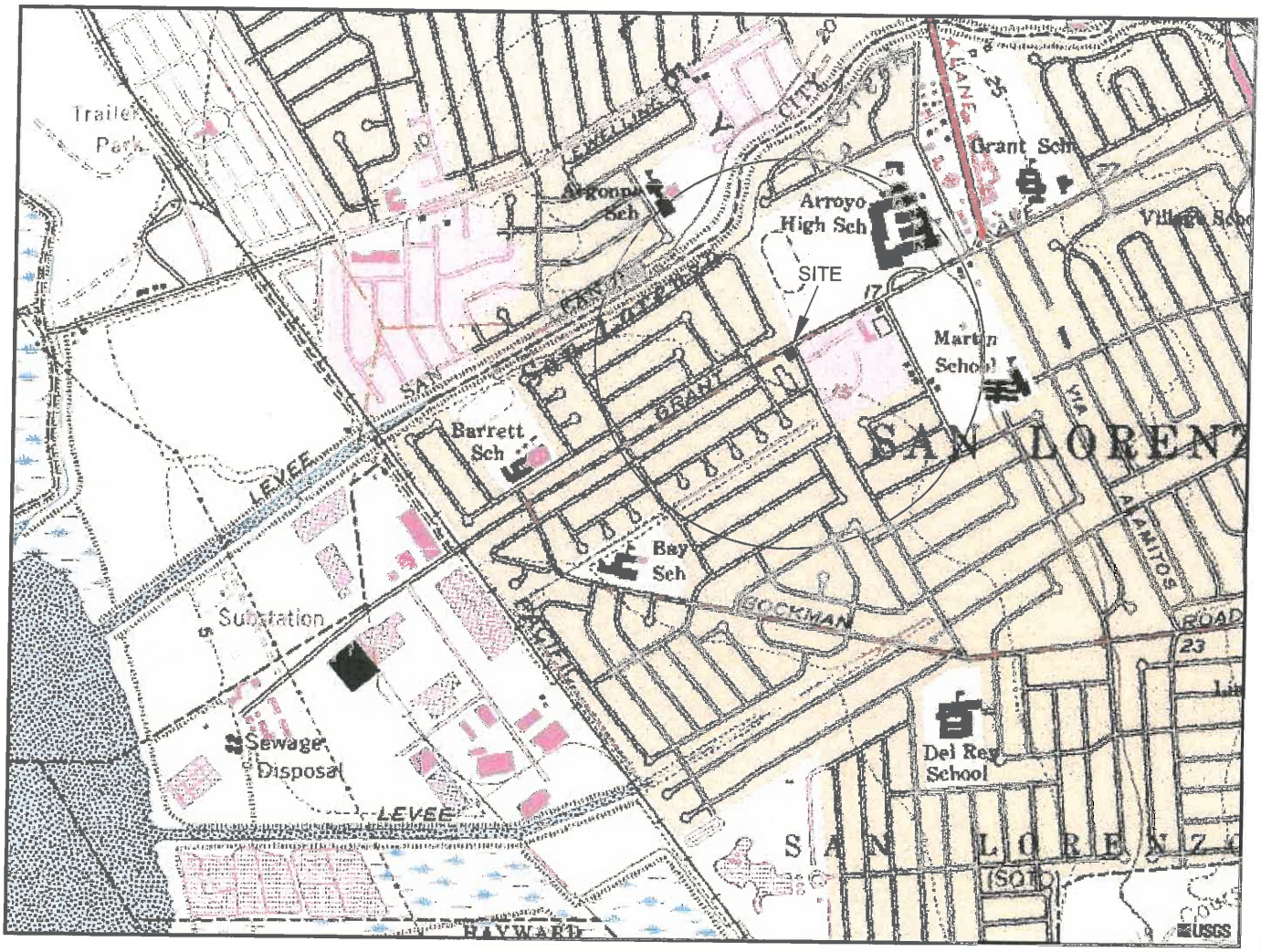
SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
		conduits are situated beneath the Grant Avenue right-of-way. Conestoga Rovers Associates also has stated that sewer lines in Grant Avenue are also a preferential pathway for contaminant migration. Proper personal protective equipment should be used if excavation work is performed near the site.		

Table 4
Intended Recipients of Water Supply Well Survey Flyer
Former Olympic Service Station
1436 Grant Avenue, San Lorenzo, California

Address	Results of 2015 and 2016 Reconnaissance of Area
15850 Corte Angelo	No Answer, house boarded up and vacant (in fall 2016)
15851 Corte Angelo	No Answer
15858 Corte Angelo	No Answer
1432 Via Barrett	Elderly owner/tenant unable to answer question about well
1433 Via Barrett	No Answer
1456 Via Barrett	Owner/tenant unable to answer question due to language barrier
1477 Via Barrett	No Answer
1557 Via Barrett	No Answer
1568 Via Barrett	No Answer
1582 Via Barrett	No Answer
1618 Via Barrett	No Answer
1639 Via Barrett	Empty house, construction workers didn't know about well
1540 Via Chorro	Owner/tenant unable to answer question due to language barrier, likely well present, 2 EBMUD vaults
1554 Via Chorro	No Answer
1570 Via Chorro	No Answer
1587 Via Chorro	May have well because neighbor's father supposedly helped install well here, however owner/tenant indicates no well present, and only one EBMUD vault observed at street
1603 Via Chorro	No Answer
1635 Via Chorro	No Answer
15752 Via Esmond	No Answer
15755 Via Esmond	No Answer
15761 Via Esmond	No Answer
15770 Via Esmond	No Answer
15776 Via Esmond	No Answer
15788 Via Esmond	No Answer
15854 Corte Geraldo	No Answer, neighbor at 15862 Corte Geraldo indicates that well is present
15855 Corte Geraldo	Owner/tenant unable to answer question due to language barrier
1589 Via Lacqua	No Answer
1603 Via Lacqua	No Answer
1618 Via Lacqua	No Answer
1631 Via Lacqua	No Answer
1632 Via Lacqua	No Answer
1669 Via Lacqua	No Answer
1717 Via Lacqua	Owner/tenant unable to answer question due to language barrier
1722 Via Lacqua	No Answer
1737 Via Lacqua	No Answer
1738 Via Lacqua	No Answer
1757 Via Lacqua	Mental capacity of owner/tenant not sufficient to answer question about well
1771 Via Lacqua	No Answer
1783 Via Lacqua	Elderly owner/tenant unable to answer question about well
1532 Via Rancho	No Answer
1545 Via Rancho	No Answer
1546 Via Rancho	No Answer
1574 Via Rancho	Owner/tenant wasn't sure
1601 Via Rancho	No Answer
1602 Via Rancho	No Answer
1615 Via Rancho	No Answer
1616 Via Rancho	Spoke to housekeeper only, unable to answer question about well
1657 Via Rancho	No Answer
1671 Via Rancho	No Answer
1685 Via Rancho	No Answer
1686 Via Rancho	Owner/tenant wasn't sure
1701 Via Rancho	No Answer

Table 4
Intended Recipients of Water Supply Well Survey Flyer
Former Olympic Service Station
1436 Grant Avenue, San Lorenzo, California

Address	Results of 2015 and 2016 Reconnaissance of Area
1715 Via Rancho	No Answer
1728 Via Rancho	No Answer
1755 Via Rancho	No Answer
1756 Via Rancho	No Answer
1794 Via Rancho	No Answer; neighbor indicates well present
15763 Via Seco	No Answer
15770 Via Seco	No Answer
15778 Via Seco	Granddaughter (25-30 yr old) believes well present, but needed to ask her grandparents (owners)
15794 Via Seco	No Answer
15848 Via Seco	No Answer
15753 Via Teresa	Owner/tenant indicates no well present, but 2 EBMUD vaults observed at street
15781 Via Teresa	No Answer
15860 Corte Ulisse	No Answer
15869 Corte Ulisse	No Answer
15850 Corte Yolanda	Owner/tenant indicates no well present, but owner at 1617 Lacqua indicates there is a well here and owner/tenant is lying about not having one
15851 Corte Yolanda	No Answer
15858 Corte Yolanda	No Answer
15859 Corte Yolanda	No Answer
15866 Corte Yolanda	No Answer
15867 Corte Yolanda	No Answer



GENERAL NOTES:
BASE MAP FROM U.S.G.S.
SAN LORENZO, CA.
7.5 MINUTE TOPOGRAPHIC
PHOTOREVISED 1978

QUADRANGLE LOCATION

N

0 1800 FT

APPROXIMATE SCALE

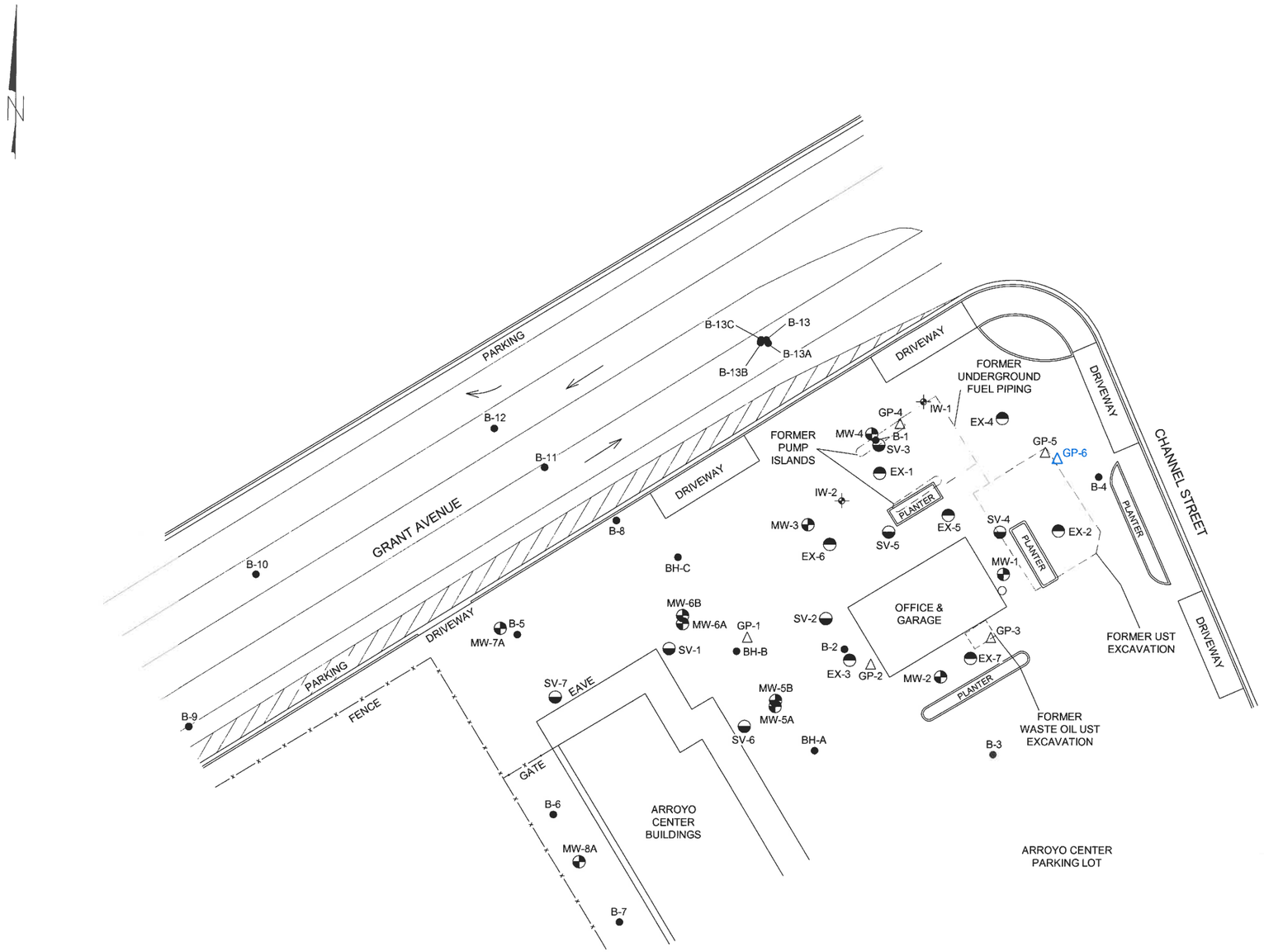
STRATUS
ENVIRONMENTAL, INC.

FORMER OLYMPIC SERVICE STATION
1436 GRANT AVENUE
SAN LORENZO, CALIFORNIA

SITE LOCATION MAP

FIGURE
1

PROJECT NO.
2115-1436-01



BASED ON SURVEY PREPARED BY MORROW SURVEYING ON 6/15/11 & UPDATED IN JUNE 2014 & DECEMBER 2015.

STRATUS ENVIRONMENTAL, INC.

PATH NAME: Olympic
DRAFTER INITIALS: DMG
DATE LAST REVISED: November 1, 2016
FILENAME: Olympic Siteplan

0 40 FT
SCALE

FORMER OLYMPIC SERVICE STATION
1436 GRANT AVENUE
SAN LORENZO, CALIFORNIA

SITE PLAN

FIGURE
2

PROJECT NO.
2115-1436-01

LEGEND:

- ACTIVE WELL, OWNER REFUSED TO ALLOW SAMPLING
- ACTIVE WELL, SAMPLED WITH OWNER/TENANT CONSENT
- WELL PRESENT, BUT INACTIVE FOR A LONG TIME
- WELL SUSPECTED, BUT NOT CONFIRMED TO BE PRESENT
- CONFLICTING INFORMATION ABOUT PRESENCE OF WELL

STRATUS ENVIRONMENTAL, INC.

PATH NAME: Olympic
DRAFTER INITIALS: DMG
DATE LAST REVISED: October 11, 2016
FILENAME: Olympic Siteplan

0 120 FT
SCALE

FORMER OLYMPIC SERVICE STATION
1436 GRANT AVENUE
SAN LORENZO, CALIFORNIA

AREA MAP

FIGURE
3
PROJECT NO.
2115-1436-01

LEGEND:

- ACTIVE WELL, OWNER REFUSED TO ALLOW SAMPLING
- ACTIVE WELL, SAMPLED WITH OWNER/TENANT CONSENT
- WELL PRESENT, BUT INACTIVE FOR A LONG TIME
- WELL SUSPECTED, BUT NOT CONFIRMED TO BE PRESENT
- CONFLICTING INFORMATION ABOUT PRESENCE OF WELL
- AVERAGE PLUME LENGTH (100 µg/L), BASED ON SWRCP LTCP GUIDELINES
- 90TH PERCENTILE PLUME (100 µg/L), BASED ON SWRCP LTCP GUIDELINES
- MAXIMUM PLUME LENGTH (100 µg/L), BASED ON SWRCP LTCP GUIDELINES

PREDOMINANT GW FLOW DIRECTION

STRATUS ENVIRONMENTAL, INC.

PATH NAME: Olympic
DRAFTER INITIALS: DMG
DATE LAST REVISED: October 11, 2016
FILENAME: Olympic Siteplan

0 120 FT
SCALE

FORMER OLYMPIC SERVICE STATION
1436 GRANT AVENUE
SAN LORENZO, CALIFORNIA

HYPOTHETICAL GRO PLUME LENGTH
BASED ON LTCP JUSTIFICATION

FIGURE
4

PROJECT NO.
2115-1436-01

LEGEND:

- ACTIVE WELL, OWNER REFUSED TO ALLOW SAMPLING
- ACTIVE WELL, SAMPLED WITH OWNER/TENANT CONSENT
- WELL PRESENT, BUT INACTIVE FOR A LONG TIME
- WELL SUSPECTED, BUT NOT CONFIRMED TO BE PRESENT
- CONFLICTING INFORMATION ABOUT PRESIENCE OF WELL
- AVERAGE PLUME LENGTH (5 µg/L), BASED ON SWRCP LTCP GUIDELINES
- 90TH PERCENTILE PLUME (5 µg/L), BASED ON SWRCP LTCP GUIDELINES
- MAXIMUM PLUME LENGTH (5 µg/L), BASED ON SWRCP LTCP GUIDELINES

PREDOMINANT GW FLOW DIRECTION

STRATUS ENVIRONMENTAL, INC.

PATH NAME: Olympic
DRAFTER INITIALS: DMG
DATE LAST REVISED: October 11, 2016
FILENAME: Olympic Siteplan

0 120 FT
SCALE

FORMER OLYMPIC SERVICE STATION
1436 GRANT AVENUE
SAN LORENZO, CALIFORNIA

HYPOTHETICAL BENZENE PLUME LENGTH
BASED ON LTCP JUSTIFICATION

FIGURE
5

PROJECT NO.
2115-1436-01

LEGEND:

- ACTIVE WELL, OWNER REFUSED TO ALLOW SAMPLING
- ACTIVE WELL, SAMPLED WITH OWNER/TENANT CONSENT
- WELL PRESENT, BUT INACTIVE FOR A LONG TIME
- WELL SUSPECTED, BUT NOT CONFIRMED TO BE PRESENT
- CONFLICTING INFORMATION ABOUT PRESIENCE OF WELL
- AVERAGE PLUME LENGTH (5 µg/L), BASED ON SWRCP LTCP GUIDELINES
- 90TH PERCENTILE PLUME (5 µg/L), BASED ON SWRCP LTCP GUIDELINES
- MAXIMUM PLUME LENGTH (5 µg/L), BASED ON SWRCP LTCP GUIDELINES
- = < 0.5 PPB
- = < 5.0 PPB
- = > 5.0 PPB

PREDOMINANT GW FLOW DIRECTION

STRATUS ENVIRONMENTAL, INC.

PATH NAME: Olympic
DRAFTER INITIALS: DMG
DATE LAST REVISED: October 11, 2016
FILENAME: Olympic Siteplan

0 120 FT
SCALE

FORMER OLYMPIC SERVICE STATION
1436 GRANT AVENUE
SAN LORENZO, CALIFORNIA

HYPOTHETICAL MTBE PLUME LENGTH
BASED ON LTCP JUSTIFICATION

FIGURE
6

PROJECT NO.
2115-1436-01

APPENDIX A

FIELD PRACTICES AND PROCEDURES

FIELD PRACTICES AND PROCEDURES

General procedures used by Stratus in site assessments for drilling exploratory borings, collecting samples, and installing monitoring wells are described herein. These general procedures are used to provide consistent and reproducible results; however, some procedure may be modified based on site conditions. A California state-registered geologist supervises the following procedures.

PRE-FIELD WORK ACTIVITIES

Health and Safety Plan

Field work performed by Stratus at the site is conducted according to guidelines established in a Site Health and Safety Plan (SHSP). The SHSP is a document which describes the hazards that may be encountered in the field and specifies protective equipment, work procedures, and emergency information. A copy of the SHSP is at the site and available for reference by appropriate parties during work at the site.

Locating Underground Utilities

Prior to commencement of any work that is to be below surface grade, the location of the excavation, boring, etc., is marked with white paint as required by law. An underground locating service such as Underground Service Alert (USA) is contacted. The locating company contacts the owners of the various utilities in the vicinity of the site to mark the locations of their underground utilities. Any invasive work is preceded by hand augering to a minimum depth of five feet below surface grade to avoid contact with underground utilities.

FIELD METHODS AND PROCEDURES

Exploratory Soil Borings

Soil borings will be drilled using a truck-mounted, hollow stem auger drill rig. Soil samples for logging will be obtained from auger-return materials and by advancing a modified California split-spoon sampler equipped with brass or stainless steel liners into undisturbed soil beyond the tip of the auger. Soils will be logged by a geologist according to the Unified Soil Classification System and standard geological techniques. Drill cuttings will be screened using a portable photoionization detector (PID) or a flame ionization detector (FID). Exploratory soil borings not used for monitoring well installation will be backfilled to the surface with a bentonite-cement slurry pumped into the boring through a tremie pipe.

Soil sampling equipment will be cleaned with a detergent water solution, rinsed with clean water, and equipped with clean liners between sampling intervals. Augers and samplers will be steam cleaned between each boring to reduce the possibility of cross contamination. Steam cleaning effluent will be contained in 55-gallon drums and

temporarily stored on site. The disposal of the effluent will be the responsibility of the client, unless authorized by the client for disposal by Stratus.

Drill cuttings generated during the drilling procedure will be stockpiled on site or contained in labeled and sealed 55-gallon drums. Stockpiled drill cuttings will be placed on and covered with plastic sheeting. The stockpiled soil is typically characterized by collecting and analyzing composite samples from the stockpile. Stratus Environmental will recommend an appropriate method for disposition of the cuttings based on the analytical results. The client will be responsible for disposal of the drill cuttings.

Soil Sample Collection

During drilling, soil samples will be collected in cleaned brass, two by six inch tubes. The tubes will be set in an 18-inch-long split-barrel sampler. The sampler will be conveyed to bottom of the borehole attached to a wire-line hammer device on the drill rig. When possible, the split-barrel sampler will be driven its entire length, either hydraulically or by repeated pounding a 140-pound hammer using a 30-inch drop. The number of drops (blows) used to drive the sampler will be recorded on the boring log. The sampler will be extracted from the borehole, and the tubes containing the soil samples will be removed. Upon removal, the ends of the lowermost tube will be sealed with Teflon sheets and plastic caps. Soil samples for chemical analysis will be labeled, placed on ice, and delivered to a state-certified analytical laboratory, along with the appropriate chain-of-custody documentation.

Soil Classification

As the samples are obtained in the field, they will be classified by the field geologist in accordance with the Unified Soil Classification System. Representative portions of the samples will be retained for further examination and for verification of the field classification. Logs of the borings indicating the depth and identification of the various strata and pertinent information regarding the method of maintaining and advancing the borehole will be prepared.

Soil Sample Screening

Soil samples selected for chemical analysis will be determined from a head-space analysis using a PID or an FID. The soil will be placed in a resealable plastic bag, sealed, and allowed to reach ambient temperature, at which time the PID probe will be inserted into the resealable plastic bag. The total volatile hydrocarbons present are detected by the PID and reported in parts per million by volume (ppmv). The PID will be calibrated to an isobutylene standard.

Generally two soil samples from each soil boring will be submitted for chemical analysis unless otherwise specified in the scope of work. Soil samples selected for analysis typically represent the highest PID reading recorded for each soil boring and the sample just above first-encountered groundwater.

Drill Cuttings and Soil Sampling

Soil generated during drilling operations will be stockpiled on-site or contained in labeled and sealed 55-gallon drums. The stockpile will be set on and covered by plastic sheeting in a manner to prevent rain water from coming in contact with the soil. Prior to collecting soil samples, Stratus personnel will calculate the approximate volume of soil in the stockpile. The stockpile will then divided into sections, if warranted, containing the predetermined volume sampling interval. Soil samples will be collected at 0.5 to 2 feet below the surface of the stockpile. Four soil samples will be collected from the stockpile and composited into one sample by the laboratory prior to analysis. The soil samples will be collected in cleaned brass, two by six inch tubes using a hand driven sampling device. To reduce the potential for cross-contamination between samples, the sampler will be cleaned between each sampling event. Upon recovery, the sample container will be sealed at each end with Teflon sheeting and plastic caps to minimize the potential of volatilization and cross-contamination prior to chemical analysis. The soil sample will be labeled, placed on ice, and delivered to a state-certified analytical laboratory, along with the appropriate chain-of-custody documentation.

Direct-Push Technology, Soil Sampling

Direct-push is a drilling method of advancing small diameter borings without generating soil cuttings. The system consists of an approximately 2-inch diameter, 4- or 5-feet long, stainless steel soil sampling tool that is hydraulically advanced into subsurface soils by a small rig. The sampling tool is designed similar to a California-modified split-spoon sampler, and lined with a sample tube that enables continuous core sampling.

To collect soil samples, the sampler is advanced to the desired sampling depth. The mouth of the sampling tool is plugged to prevent soil from entering the sampler. Upon reaching the desired sampling depth, the plug at the mouth of the sample tool is disengaged and retracted, the sampler is advanced, and the sampler is filled with soil. The sample tool is then retrieved from the boring, and the sample tube removed. The sample tool is then cleaned, a new tube is placed inside and the sampling equipment is advanced back down the borehole to the next sample interval.

The Stratus geologist describes the entire interval of soil in the tube. The bottom-most 6-inch long section is cut off and retained for possible chemical analysis. The ends of the chemical sample are lined with Teflon sheets, capped, labeled, and placed in an ice-chilled cooler for transport to California Department of Health Services-certified analytical laboratory under chain-of-custody.

Direct Push Technology, Water Sampling

A well known example of direct push technology for water sampling is the Hydropunch. For the purpose of this field method the term hydropunch will be used instead of direct push technology for water sampling.

The hydropunch is typically used with a drill rig. A boring is drilled with hollow stem-augers to just above the sampling zone. In some soil conditions the drill rig can push directly from the surface to the sampling interval. The hydropunch is conveyed to the bottom of the boring using drill rods. Once on bottom the hydropunch is driven a maximum of five feet. The tool is then opened by lifting up the drill rod no more than four feet. Once the tool is opened, water enters and a sample can be collected with a bailer or tubing utilizing a peristaltic pump. Soil particles larger than silt are prevented from entering the tool by a screen within the tool. The water sample is collected, labeled, and handled according to the Quality Assurance Plan.

Monitoring Well Installation

Monitoring wells will be completed by installing 2 to 6 inch-diameter Schedule 40 polyvinyl chloride (PVC) casing. The borehole diameter for a monitoring well will be greater than four inches larger than the outside diameter of the casing. The 2-inch-diameter flush-threaded casing is generally used for wells dedicated for groundwater monitoring purposes.

A monitoring well is typically cased with threaded, factory-perforated and blank Schedule 40 PVC. The perforated interval consists of slotted casing, generally with 0.01 or 0.02 inch-wide by 1.5-inch-long slots, with 42 slots per foot. The screened sections of casing are factory machine slotted and will generally be installed approximately 5 feet above and 10 feet below first-encountered water level. The screened interval will allow for seasonal fluctuation in water level and for monitoring floating product. A threaded or slip PVC cap is secured to the bottom of the casing. The slip cap can be secured with stainless steel screws or friction; no solvents or cements are used. Centering devices may be fastened to the casing to ensure even distribution of filter material and grout within the borehole annulus. The well casing is thoroughly washed and/or steam cleaned, or may be purchased as pre-cleaned, prior to completion.

A filter pack of graded sand will be placed in the annular space between the PVC casing and the borehole wall. Sand will be added to the borehole through the hollow stem of the augers to provide a uniform filter pack around the casing and to stabilize the borehole. Generally the sand pack will be placed to a maximum of 2 feet above the screens, followed by a minimum 1- to 2-foot seal consisting of bentonite pellets.

Cement grout containing a maximum of 5 percent bentonite powder will be placed above the bentonite seal to the ground surface. A concrete traffic-rated vault box will be installed over the monitoring well(s). A watertight locking cap will be installed in the top of the well casing. Reference elevations for each monitoring well will be surveyed when more than two wells will be located on site. Monitoring well elevations will be surveyed by a California licensed surveyor to the nearest 0.01-foot relative to mean sea level (MSL). Horizontal coordinates of the wells will be measured at the same time. Exploratory boring logs and well construction details will be prepared for the final written report.