May 15, 2015

Karel Detterman
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: **Milligan & Casentini Property**
385 26th Street, Oakland, CA
Fuel Leak Case No. RO0003125

Dear Ms. Detterman:

Enclosed is the *Request for Closure Addendum* for the subject LUFT site. In compliance with state and local regulations, electronic submittals of this report have been uploaded to the Geotracker database and the Alameda County ftp website.

I declare under penalty of perjury that the information and/or recommendations contained in the attached report are true and correct to the best of my knowledge.

Please contact Tim Cook at Cook Environmental Services at (925) 478-8390 if you have questions or comments in regard to the technical content of this report.

Very truly yours,

Susan Casentini

Susan Casentini

cc: Tim Cook, Cook Environmental Services, Inc.

May 15, 2015

Karel Detterman
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: **Request for Closure Addendum for Fuel Leak Case No. RO0003125**
Milligan & Casentini Property, 385 26th Street, Oakland, CA 94612

Dear Ms. Detterman:

This Request for Closure Addendum was prepared in response to your Closure Addendum Request letter for the subject site dated April 7, 2015. Your letter provided technical comments in response to the *Site Investigation and Request for No Further Action Report* (RFC), dated January 5, 2015. Your technical comments and our response to those comments follow:

1. **Methane Concentrations in Soil Vapor Sample SV-2**: A methane concentration of 150 microliters per liter (µL/L) was detected in soil vapor sample SV-2 at a depth of 5 feet. The location of SV-2 is adjacent to boring SB-3, in which Total Petroleum Hydrocarbons as diesel (TPH-d) was detected in soil a the highest current site investigation concentration of 7,900 milligrams per kilogram (mg/kg) at 9.5 feet below ground surface (bgs). To verify that methane concentrations in soil gas are not in exceedance of methane's Lower Explosive Limit (LEL), please revise **Table 4** by adding a column showing the methane concentrations found in both soil vapor samples and include in a RFC Addendum. Please include an analysis of the methane generation potential from residual source and associated explosive hazard risk.

   Response: The revised **Table 4** (attached) presents methane concentrations in soil vapor and compares them to the LEL. As stated previously, the highest methane concentration in soil vapor samples is 0.000150 percent (150 µL/L). The LEL is 5 percent (50,000,000 µL/L). Thus, the highest methane concentration in soil vapor is 0.0003 percent of the LEL. Based on these findings, the methane generation potential from the residual source area does not pose an explosive hazard risk to the nearby building.

2. **VOCs in Grab Groundwater Sample from Boring SB-6**: The VOCs 1,1-Dichloroethane (1,1 DCA) 1,2-Dichloroethane (1,2 DCA), 1,1-Dichloroethene (1,1 DCE), 1,1,2-Trichloroethane (1,1,2 TCA) and Trichloroethene (TCE) were detected above their respective Environmental Screening Levels (ESLs) in a grab groundwater sample from boring SB-6 located approximately 80 feet south of the former redwood UST in the southern part of the site (see **Figure 2**) but were not detected in grab groundwater samples in the vicinity of the former redwood UST. The Sanborne Map included in the RFC shows infrastructure in the southern corner of the property near the location of SB-6. Consequently, it would appear that the UST was not a source of the VOCs and additional

evaluation of the southern portion of the site must be presented in the RFC Addendum to preclude this area of the chlorinated hydrocarbons.

Please assess soil vapor intrusion risk in the vicinity of SB-6 by evaluating the case using the San Francisco Bay Regional Water Quality Control Board's Draft Final July 31, 2009, *Assessment Tool for Closure of Low-Threat Chlorinated Solvent Sites* and include the evaluation in the RFC Addendum. Based on your evaluation, if warranted, please present a work plan in the RFC Addendum to fill identified data gaps.

Response: VOCs were detected above ESLs for the listed constituents in the grab groundwater sample from boring SB-6. SB-6 is located in the suspected downgradient direction from the former UST site. The water sample was collected in the interval from 25 to 30 feet bgs. VOCs were not detected in soil samples from 2, 9, 19 and 24.5 feet bgs in this boring. Groundwater was first encountered in SB-6 at 24.5 feet bgs. This suggests SB-6 is not a source area for the VOCs but rather migrated to this location via groundwater transport. A thorough review of the infrastructure identified in Sanborne Maps from 1912 through 1951 did not identify any equipment or storage containers that suggest VOC usage in this area. However, chlorinated VOCs were commonly used in the automobile repair industry to clean parts. Based on the City Directory, the site was an auto repair facility from 1924 to 1940. A one-story auto repair garage was constructed on the site in 1924. The address is listed as 391 26th Street and the listed business is Ernest Rehor Auto Repair. Activities at the site include auto repair in the rear of the building and auto sales in the front of the building. The 1945 and 1951 Sanborne Maps show the site is occupied by an "Auto Top, Body & Paint Shop". The 1970 Sanborne Map shows the front of shop is occupied by "Parts Servicing" and a "Small Mech Shop" [sic] is located in the back of the shop.

As mentioned previously, the surrounding area has been occupied by auto repair businesses since the 1920s. In fact, this area is referred to as the "Garage District" in historical records. Businesses in this area to this day are primarily dedicated to automotive repair, body and paint shops, etc. Based on the history of the area, it is likely that the source of the VOCs is from solvents used to clean auto parts.

There is a record of a "Domestic Laundry" on the adjacent property on the 1912 Sanborne Map. A review of the Reverse Business Directory for the site at 489 25th Street lists a "Gee Eye Laundry". This laundry is not listed after 1918. Chlorinated VOCs were not widely used in the dry cleaning industry until the early 1930s, thus it is not likely that a dry cleaning facility was located at this address. In fact, the presence of TCE, 1,1,2 TCA and daughter products DCE and DCA without the presence of Perchloroethylene (PCE) suggests the VOCs detected in SB-6 are not from dry cleaning solvent but solvents used for some other application.

We evaluated the existing conceptual site model (CSM) for data gaps using the referenced *Assessment Tool for Closure of Low-Threat Chlorinated Solvent Sites* (see attached **Table 1**).

Data gaps with regard to the VOC evaluation include identifying the source of the VOCs. If the site is the source of the VOCs, then additional investigation is warranted to determine the risks to human health and the environment. The second data gap involves the evaluation of chlorinated VOC vapor intrusion risks to the occupants of two nearby buildings (381 and 385 26th Street).

To fill the data gaps we recommend:

- The installation of two additional borings north (upgradient) of SB-6 to a depth of 30 feet bgs to collect groundwater samples only. The proposed locations of the groundwater borings are shown on **Figure 2**.
- The installation of two additional soil vapor probes to a depth of 5 feet below the foundations of each building. The proposed locations of the soil vapor probes are shown on **Figure 3**.

The borings will be advanced using direct push technologies and will follow SOPs described in *Groundwater Sampling and Monitoring with Direct Push Technologies*, OSWER No. 9200.1-51, EPA 540/R-04/005, August 2005. Soil cores from these borings will be continuously logged using the Unified Soil Classification System. The field geologist will prepare a detailed log for each boring that includes the project name, boring number, drilling contractor, date, start and finish time, drilling method, total depth, depth to water, type of sampler, name of the field geologist, PID readings, graphic log and a lithologic description of soils encountered.

Groundwater samples will be collected from the borings using either a disposable bailer or a peristaltic pump and will be labeled with a unique sample identification designation. Samples will be collected in four laboratory preserved 40-milliliter vials and will be chilled in a cooler to 4 degrees Celsius. Samples will be delivered to the laboratory under chain-of-custody control and analyzed for chlorinated VOCs using EPA method 8260B.

Soil vapor probes will be located within two feet of the buildings at 381 and 385 26th Street. Soil vapor samples will be collected from a depth of 5 feet below the foundation of each building using direct push technology. The collection of soil vapor samples will follow SOPs described in the *Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance)*, Department of Toxics Substance Control, October 2011. The soil vapor sampling method consists of withdrawing of an aliquot of soil vapor from the subsurface with a sampling probe, followed by analysis of the withdrawn vapor. Soil vapor samples will be collected in Summa containers. This method is quantitative and chlorinated VOC concentrations will be reported in concentration units (e.g., µg/m3). Soil gas samples will be analyzed for chlorinated VOCs and the leak tracer compound (helium) by EPA Method TO-15, and fixed gases including oxygen, carbon dioxide, and methane by ASTM D-1946. Results for 1,1 DCA, 1,2 DCA, 1,1 DCE, 1,1,2 TCA and TCE will be compared to soil gas ESLs for these constituents listed in *Derivation and Application of Environmental Screening Levels*, San Francisco Bay Regional Water Quality Control Board, May 2013.

After groundwater or sol vapor samples have been collected, the borings will be abandoned in compliance with Alameda County requirements. Borings will be backfilled with neat cement grout and will match the surrounding grade and conditions. An inspector from the Alameda County Department of Public Works will verify well abandonments.

Upon completion of fieldwork and receipt of laboratory results, a Summary Report will be prepared. The report will summarize Site activities and will include the following information:

- A summary table of groundwater sample results. Results will be compared to commercial/industrial environmental screening levels (ESLs)
- A figure showing soil boring locations
- A summary table of soil vapor sample results. Results will be compared to commercial/industrial environmental screening levels (ESLs)
- A figure showing soil vapor boring locations
- Laboratory reports, chain of custody forms and data evaluation QA/QC performance of the laboratory instruments
- Photographs of field activities
- An evaluation of site data with regard to low-threat closure criteria for chlorinated solvents.
- Conclusions, identification of any data gaps and recommendations for additional work, if necessary

If the data is sufficient to close this site under low threat closure criteria for chlorinated solvent sites, then a request for closure will be included in the report. If the data will not support site closure then additional work to fill data gaps to advance the site towards closure will be recommended. The report will be prepared and stamped by a licensed professional engineer.

Upon approval of this work plan by ACEH, a boring permit application will be submitted to the Alameda County Department of Public Works. Installation of soil borings will commence within 30 days of receipt of the boring permit. Installing the borings is expected to take one day. Analysis of groundwater and soil vapor samples will take five working days.

The summary report will be submitted to ACEH within 60 days of the completion of fieldwork.

With your assistance and cooperation, we look forward to moving this site toward closure. Please contact me if you have any questions or comments related to this Request for Closure Addendum.

Very truly yours,

Cook Environmental Services, Inc.

Tim Cook, P.E.
President

cc: Kyle Milligan and Susan Casentini

TABLES

Table 4. Soil Vapor Sample Results
385 26th Street, Oakland, CA

				Petroleum Hydrocarbons							Light Gases			
Sample ID	**Analytical Method**	**Date**	**Depth (ft)**	**TPH-g (ug/m^3)**	**TPH-d (ug/m3)**	**Benzene (ug/m3)**	**Ethyl-benzene (ug/m3)**	**Naph-thalene (ug/m3)**	**Toluene (ug/m3)**	**Xylenes (ug/m3)**	**Carbon Dioxide (uL/L)**	**Methane (uL/L)**	**Oxygen (%)**	**Helium (%)**
SV-1	TO-15	11/13/14	5.0	11,000	NA	7.1	2.9	12	7.4	21	130	2.9	17	0.0088
SV-1	TO-17	11/13/14	5.0	NA	1,600	NA	NA	13	NA	NA	NA	NA	NA	<0.0060
SV-2	TO-15	11/13/14	5.0	98,000	NA	68	20	<21	47	65	<50	150	3.1	0.037
LTCP Soil Gas Criteria[1]				NE	NE	280,000	3,600,000	310,000	NE	NE	NE	50,000,000[3]	NE	5.0[2]

Notes:

ug/m^3 = micrograms per cubic meter

uL/L = microliters per liter

[1]LTCP Scenario 4 soil gas criteria with bioattenuation zone and commercial land use

There was five vertical feet of soil between the soil vapor measurement and the foundation of the building

A 1,000-fold bioattenuation is assumed for petroleum vapors in the bioattenuation zone

[2]Helium is a leak check compound used to determine the integrity of the field sampling method. The DTSC established 5% helium as the threshold above which leaks may have compromised the data quality.

[3] Lower explosive limit

Table 1. Closure Criteria for Low-Threat Chlorinated Solvent Sites
385 26th Street, Oakland, CA

Closure Element	Closure Sub-Element	Description	Data Gap Item #	Resolution
1a. Sources identified and evaluated	Determine if the VOC source is onsite	The presence of VOCs in shallow groundwater in the southern portion of the site was discovered after collecting a groundwater sample from boring SB-6 on November 13, 2014. This boring was drilled as a part of an investigation of an unrelated release from a UST at this same site. The source and volume of the VOC release is unknown.	1. What is the source of the VOC release? 2. What is the volume of the VOC release?	Advance two borings hydraulically upgradient of boring SB-6 and sample groundwater to determine if there is an onsite VOC source. If there is, estimate the volume of the release based on additional sampling data.
	Evaluate the possibility of an offsite VOC source	The area surrounding the site has been occupied by auto repair garages since the 1920s. A Phase 2 investigation of the Negherbon Property, a large redevelopment parcel at 24th St., found, "diffuse, low level concentrations of CVOCs are fairly widespread in the area." (Erler & Kalanowski, 2012).	3. Is there an offsite source for VOCs detected in groundwater from SB-6?	If there is no onsite source of VOCs identified in the two new borings, recommend an investigation of the offsite source(s) by the Responsible Party(s).
1b. Site adequately characterized	Site geology and hydrogeology adequately characterized	Six soil borings were advanced on the Site as described in the work plan. The primary stratigraphic units and depth range for each are listed below: • 0-20 feet bgs gravelly, sandy, silty clay, low plasticity • 20-25 feet bgs gravelly, clayey sand • 25-30 feet bgs clay, low plasticity Groundwater was encountered at approximately 25 fbg, however, the static water level may be higher.	4. What is the site specific direction of groundwater flow? What is the hydraulic gradient?	Historic groundwater data from nearby monitoring wells is adequate to determine the groundwater flow direction. A groundwater investigation (URS, 2009) at the Sears Auto Center at 2600 Telegraph Ave found that shallow groundwater flows southerly with a gradient of approximately 0.02.
	Regional geology and hydrogeology adequately characterized	The Site is approximately 1.5 miles east of the San Francisco Bay and 3 miles west of the Diablo Range on the eastern flank of the San Francisco Basin, a broad Franciscan depression. The basement rock of the basin is respectively overlain by the Santa Clara Formation, the Alameda Formation, and the Temescal Formation. These formations consist of unconsolidated sediments ranging in total thickness from approximately 300 feet to 1,000 feet. The Pleistocene Santa Clara Formation consists primarily of alluvial fan deposits that are interspersed with lake, swamp, river channel, and flood plain deposits. The overlying Alameda Formation was deposited in an estuary environment	NA	NA

Table 1. Closure Criteria for Low-Threat Chlorinated Solvent Sites
385 26th Street, Oakland, CA

		and consists of organic clays and alluvial fan deposits of sands, gravels, and silts. The uppermost Holocene Temescal Formation is an alluvial deposit ranging in thickness from 1 to 50 feet and consists primarily of silts and clays with a basal gravel unit (SFBRWQCB, June 1999). The regional groundwater flow direction based on topography is expected to be south to southwesterly toward San Francisco Bay		
	Past site activities adequately characterized	Sanborne Fire Maps show the site was occupied by three homes from 1889 through at least 1912. According to City of Oakland historian, Betty Marvin, the site was occupied by three residences until 1924. An automotive repair facility was built in 1924. The 1912 Sanborne Map shows a 1,200 gal oil UST in the same location as the redwood tank. A domestic well is shown next to the UST. A 1951 Sanborne Map indicates the site was occupied by auto body and paint shop. A 1970 Sanborne Map shows the site is used for "parts servicing" and had a small mechanics shop in back. The present building was constructed in 2006-7. It is presently used as an artist's studio.	NA	NA
	Past offsite activities adequately characterized	A "domestic laundry" was located south of the site facing 25th Street from 1911-1918. A 1936 site plan shows a domestic well, two water towers and a boiler on the site which likely supported the laundry's activities. The area surrounding the site is referred to as the "Garage District" in Sanborne maps from the 1920s and continues to be dominated by commercial auto repair and auto body shops.	NA	NA
1c. Exposure pathways, receptors, risk and threats identified and assessed.	Nearby surface water bodies are identified	The closest surface water body is Lake Merritt, which is approximately 2,000 feet southwest of the site.	NA	NA
	Contaminants of Concern identified	Groundwater samples collected from boring SB-6 detected 1,1 DCA, 1,2 DCA, 1,1 DCE, cis 1,2-DCE, 1,1,2 TCA, and TCE.	5. What is the source and extent of chlorinated VOCs in groundwater in the vicinity of SB-6?	Collect two additional groundwater samples upgradient of SB-6 and analyze for VOCs

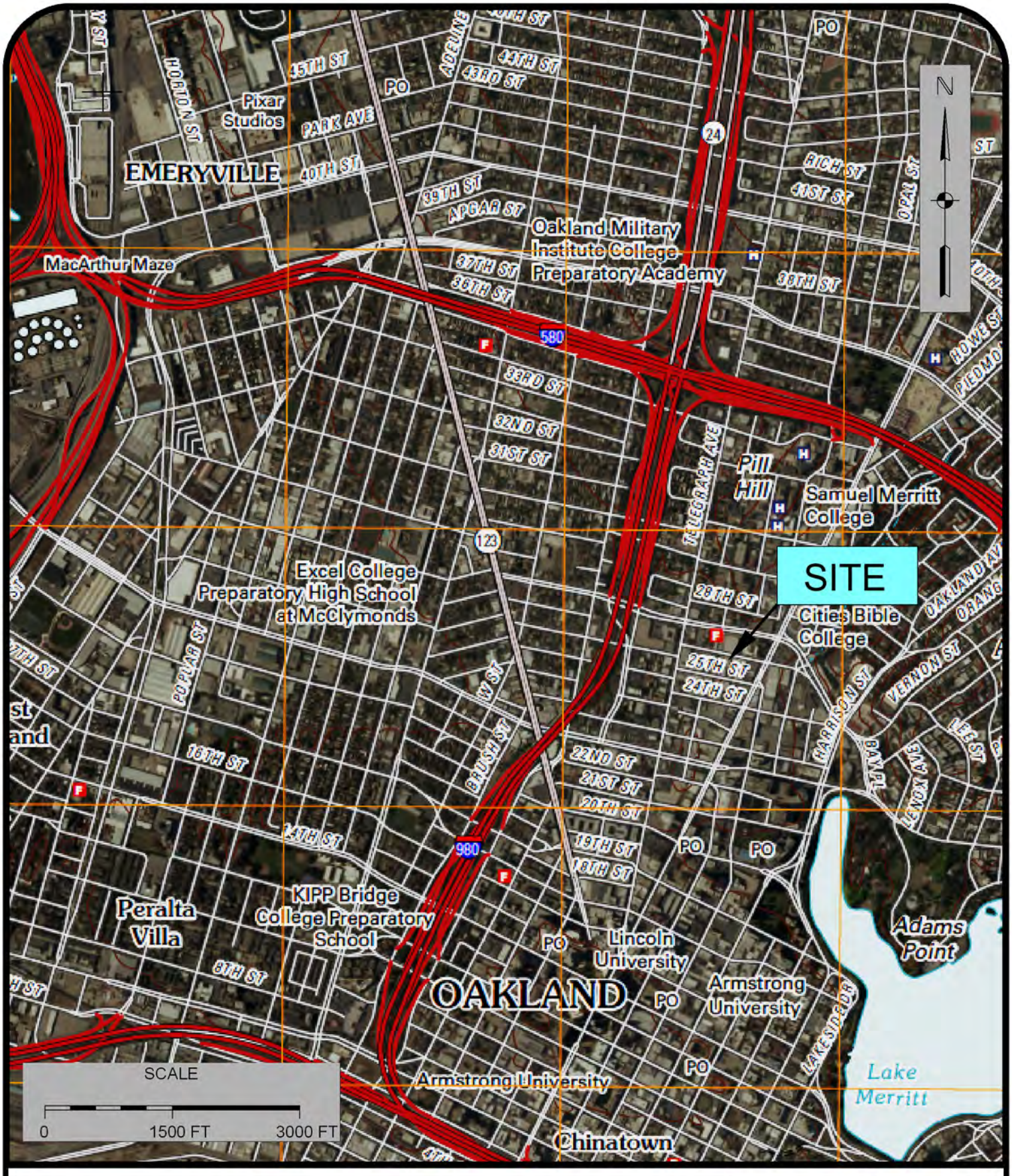
Table 1. Closure Criteria for Low-Threat Chlorinated Solvent Sites
385 26th Street, Oakland, CA

Closure Element	Closure Sub-Element	Description	Data Gap Item #	Resolution
	Nearby wells identified	A search of California Dept of Water Resources (DWR) records indicates the nearest well is located approximately 4.3 km southwest of the site on Alameda Island. The Alameda County Public Works Agency (ACPWA) well library indicates 5 irrigation wells, 3 industrial wells and 3 domestic wells are located near the site. Two of the domestic wells are located on the same property at 5175 Broadway (1.7 miles northeast of the site). One domestic well is located at 2100 Harrison St. (approximately 0.4 miles southeast of the site). All three domestic wells are at least 290 feet deep.	NA	DWR and ACPWA well libraries researched and 3 domestic wells located within 2 miles of the site. These wells are beyond the sphere of influence of site contamination. No further research required.
	Nearby homes, schools, businesses are identified	Homes are within 200 feet of the site, Street Academy Alternative School is located 3 blocks north, Westlake Middle School is located 2 blocks east, businesses are located immediately adjacent to the site. The area is located in the "Garage District" and has been since the 1920s.	NA	NA
	Reasonably anticipated land and water use scenarios have been considered	Present land uses include commercial, industrial and residential. Present beneficial uses of water include municipal, industrial and agricultural supply.	NA	NA
	DNAPL issues	All of the VOCs detected are DNAPLs. The highest VOC concentrations observed in groundwater from SB-6 were 390 ug/L of 1,1 DCE and 78 ug/L of TCE. These concentrations are far below their solubility limit. Thus, the presence of DNAPL is not anticipated.	NA	NA
2a. Pollutant sources remediated extent feasible	VOC remediation strategies	VOC concentrations are low level and based on one onsite detection. Detections are widespread in the "Garage District". There are no known remedial strategies being applied to reduce VOCs concentrations in groundwater in the area. There are no known historical VOC source removal activities in the area.	6. Is there an onsite source of VOCs that requires corrective action?	Sample groundwater from two additional onsite borings to determine if remediation is appropriate.
2b. Risks to human health, ecological health, and sensitive receptors mitigated	Ingestion and dermal contact exposure route	Determine if VOCs at site in groundwater present unacceptable risks to human health, ecological health, and sensitive receptors, considering current and future land use using ESLs (Tier 3). If ESLs are exceeded determine if further risk assessment using site specific data is appropriate.	7. Is there an onsite source of VOCs that presents an unacceptable risk to human and ecological health and sensitive receptors?	Evaluated groundwater data from two additional onsite borings.

Table 1. Closure Criteria for Low-Threat Chlorinated Solvent Sites
385 26th Street, Oakland, CA

	Inhalation route of exposure	Determine if VOCs in soil vapor beneath buildings immediately adjacent to site present unacceptable risks to human health via inhalation route of exposure	8. Are VOC concentrations in soil vapor beneath adjacent buildings above ESLs?	Sample soil vapor probes next to two adjacent buildings and compare to soil vapor ESLs.
2c. Threats to groundwater and surface water beneficial uses mitigated		If VOCs from an onsite source present unacceptable risk levels to groundwater and surface water considering current and future beneficial uses, determine a method to mitigate the risks.	9. Do VOC concentrations from an onsite source present a threat to groundwater and surface water resources, considering site specific factors and existing and potential beneficial uses?	Collect groundwater samples upgradient of SB-6 and evaluate VOC data.
3a. Groundwater contamination plumes are decreasing		First determine if the source of the VOC contamination is from the site. If so, then determine whether the plume is decreasing with time. If not, recommend further investigation by the Responsible Party	10, Is the source of VOCs in groundwater from the site? If so, is the plume decreasing in size with time?	First determine whether the VOC source area is from the site. If so, install wells and determine if the plume is decreasing with time.
3b. Cleanup timeframe is reasonable		First determine if the source of the VOC contamination is from the site. If so, then determine a reasonable timeframe for cleanup. If not, recommend further investigation by the Responsible Party	10, Is the source of VOCs in groundwater from the site? If so, is the cleanup timeframe reasonable?	First determine whether the VOC source area is from the site. If so, select the most appropriate corrective measure(s) and implement in a reasonable timeframe.
3c. Risk management measures are appropriate, documented and require no further oversight		First determine if the source of the VOC contamination is from the site. If so, then devise appropriate management measures. If not, recommend risk management measures by the Responsible Party	10, Is the source of VOCs in groundwater from the site? If so, are the risk management measures appropriate?	First determine whether the VOC source area is from the site. If so, develop and document appropriate management measures that require no further oversight.

FIGURES



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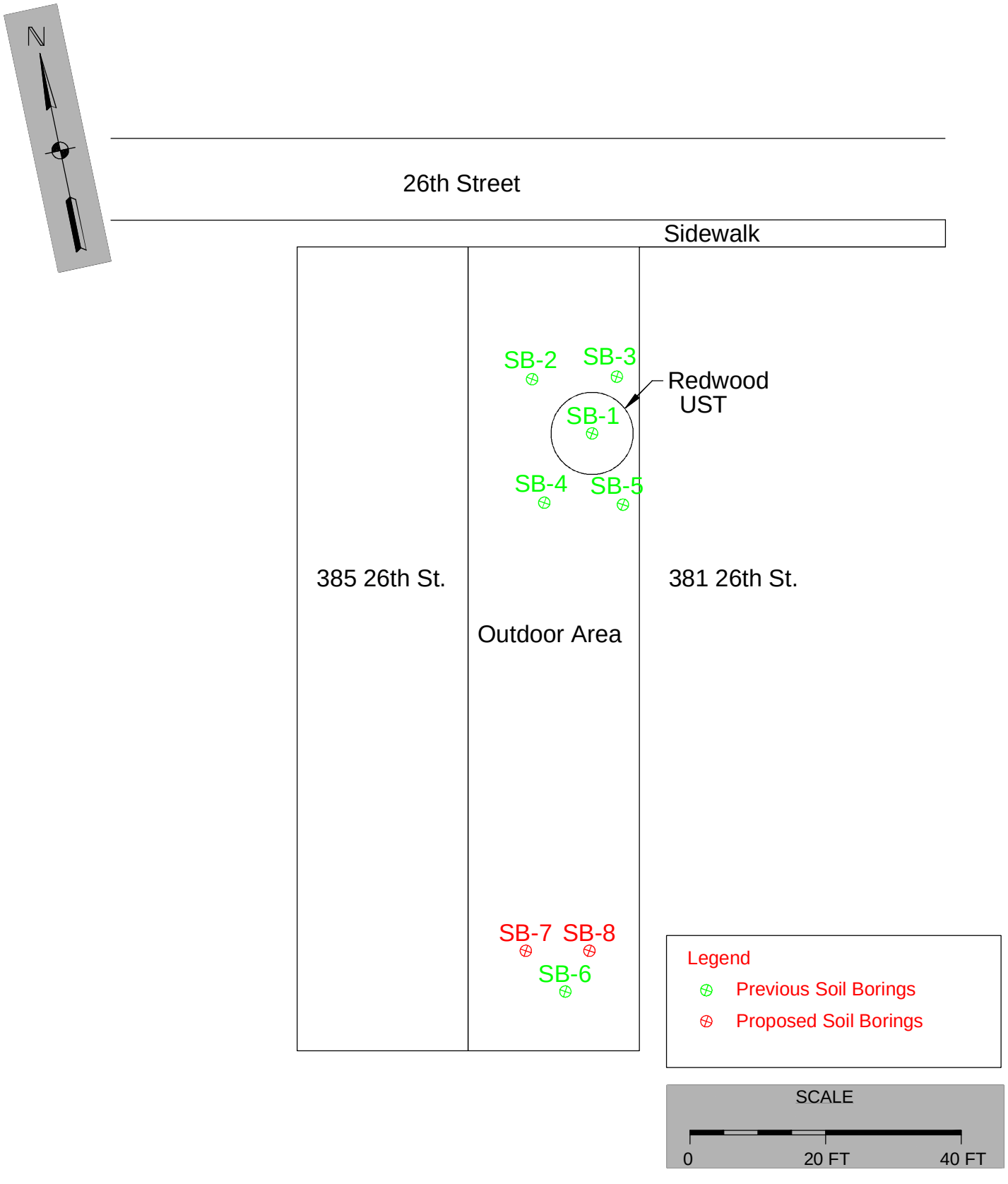
Site Location
385 26th St.
Oakland, CA 94612

Project 1095	Figure : 1
Date: 5/5/15	
Scale 1"=1500 FT	



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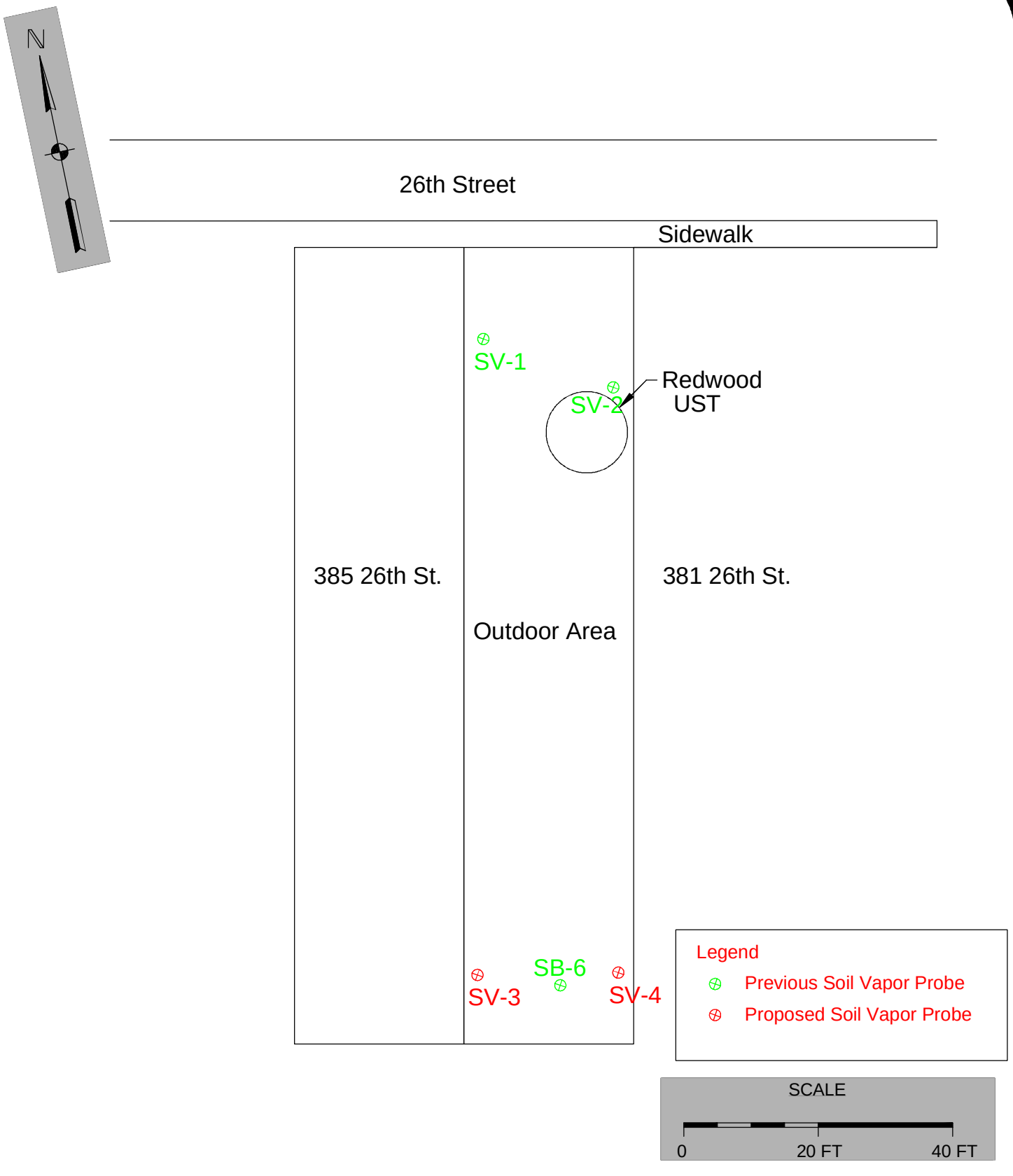
Proposed Soil Borings
385 26th St.
Oakland, CA 94612

Project 1095	Figure : 2
Date: 5/15/15	
Scale 1" = 20 FT	



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Proposed Soil Vapor Probes

385 26th St.
Oakland, CA 94612

Project 1095	Figure : 3
Date: 5/15/15	
Scale 1" = 20 FT	