August 18, 2016

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RECEIVED
By Alameda County Environmental Health 8:20 am, Sep 16, 2016

Re.: Data Gap Investigation Work Plan and Updated Site Conceptual Model
Automasters
6200 Shattuck Avenue
Oakland, California
ACEH Case #RO0002935

I declare, that to the best of my knowledge at the present time, the information and/or recommendations contained in the attached document are true and correct.

Submitted by,

Johnny Browning
LLC Manager
15 Mulberry Court, #5
Belmont, CA 94002

WEST ASSOCIATES
ENVIRONMENTAL ENGINEERS, INC.

DATA GAP INVESTIGATION WORK PLAN AND UPDATED SITE CONCEPTUAL MODEL

Automasters
Leaking Underground Tank Site
6200 Shattuck Avenue
Oakland
Case No. RO2935

Submitted to:
Alameda County
Health Care Service Agency

Prepared for:
6200 Shattuck Partners LLC
Oakland

Prepared by:
West & Associates Environmental Engineers, Inc.
Vacaville

August 2016

California State Contractor's License No. 734244
PHONE: 707. 451.1360 • FAX: 707.447.0631 • PO BOX 5891 • VACAVILLE, CALIFORNIA 95696

ACKNOWLEDGMENTS

This Workplan was prepared for our client, 6200 Shattuck Partners LLC and is intended for their exclusive use.

In the preparation of this Workplan, reliance was made of work product of Pangea, Inc.

This Workplan was prepared by West & Associates Environmental Engineers, Inc. West & Associates is located at 630 Eubanks Ct., Unit G, Vacaville, CA 95688; mailing address, PO Box 5891, Vacaville, CA 95696; 707. 451.1360. Principal author is Mr. Brian W. West, PE. (Registered California Civil Engineer No. 32319 - expires 12/31/16.)

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APPENDICES

1.0 INTRODUCTION

West & Associates Environmental Engineers, Inc. (W&A) has prepared this Data Gap Investigation Work Plan and Updated Site Conceptual Model for Automasters and 6200 Shattuck Partners, LLC, in order to provide additional information regarding Alameda County Environmental Health UST Case #RO0002935. The Automasters site (the Site) is located at 6200 Shattuck Avenue in Oakland, California and is currently used as an independent automotive repair facility. A site location map is presented as *Figure 1* in *Appendix A*.

The objective of this Data Gap Investigation Work Plan and Updated Site Conceptual Model is to further evaluate current Site conditions in relation to the Low Threat Closure Policy (LTCP) and determine what additional activities may be required in order to prepare the Site for closure.

2.0 SITE BACKGROUND

The Automasters facility is located at the northeast corner of Shattuck Avenue and 62nd Street in an area of mixed residential and commercial land use. The elevation of the Site is 131 feet above mean sea level, with local topography sloping gently to the southwest (US Geological Survey [USGS], Oakland West Quadrangle, California). Surrounding properties are primarily single-family and multi-family residences with a few commercial buildings located along Shattuck Avenue to the south and northwest of the Site. The Assessor's Parcel Number for this Site is 15-1377-22.

Shortly after purchasing the Site in 1986, Mr. Glenn Logan contracted with Ray Walker Hydraulics of Pleasanton, CA to remove two small underground gasoline storage tanks (USTs) from the southern portion of the Site. W&A contacted Mr. Walker in December 2014 to gather more information on these USTs and determine whether any contaminated soil was encountered during their removal. Mr. Walker searched his archived files but did not have any written information on this Site as the work was performed almost 30 years ago. To the best of his recollection both USTs were used for gasoline and either 500 or 1,000 gallons in size.

Mr. Logan distinctly remembers that contaminated soil between the USTs was removed and transported offsite for disposal. Attempts to obtain additional from the Oakland Fire Department regarding this Site have been unsuccessful. There is apparently no written documentation of the quantity of contaminated soil removed or where it was taken.

The initial site assessment activities at this Site were performed by Pangea in 2006. Three soil borings were advanced across the Site at the locations shown on *Figure 2*. Borings SB-1 and SB-3 were uncontaminated, i.e. there were no detectable concentrations of TPH-g, BTEX compounds, fuel oxygenates, lead scavengers, TPH-d or TPH-motor oil detected in any of the soil samples collected from these borings. The sample collected from boring SB-2 at 11 feet below ground surface (bgs) was reported to contain TPH-g at 3,000 mg/kg, TPH-d at 850 mg/kg, naphthalene at 10 mg/kg, and negligible concentrations of BTEX compounds and fuel additives. The 8-foot and 16-foot deep samples from SB-2 had insignificant concentrations of TPH-g and TPH-d, indicating that the zone of contamination was very limited in vertical extent. Total lead concentrations in all samples were typical of background levels in the vicinity.

No groundwater was encountered during the drilling of borehole SB-2, which was advanced to a total depth of 48-feet. The SB-2 borehole was left open overnight with a 10-foot screen in place near the bottom of the boring. The following day sufficient groundwater had accumulated to allow retrieval of a groundwater "grab" sample. The depth to groundwater in this borehole was reported as 8 feet bgs. TPH-g at 1,700 µg/L, TPH-d at 1,000 µg/, TPH-motor oil at 1,100 µg/L, and naphthalene at 440 µg/L were reported in the groundwater grab sample along with modest concentrations of BTEX compounds and fuel additives. This groundwater was in direct contact with the sand and gravel layer at 11-12 feet bgs, so it is unclear whether these results are indicative of actual groundwater concentrations.

Sub-surface conditions encountered during the 2015 remedial investigation performed by West & Associates were consistent with those reported by Pangea in 2006. There is a relatively permeable silty sand strata (USCS "GM") found between 7 to 12 feet BGS. The silty sand strata is overlain and underlain by a much less permeable clayey silt strata (USCS "ML").

The potentiometric groundwater surface measured in groundwater monitoring wells at the Automasters site is 4-5 feet bgs. However, saturated conditions are not observed in soil borings at the site shallower than 10 feet bgs. It is concluded that first encountered groundwater is at least partially confined.

The soil sample analytical results obtained from 7 boreholes sampled to 20 feet bgs are also consistent with the results reported during the limited site investigation program conducted by Pangea. Both sampling activities reported significant concentrations of TPH-g and TPH-d in the vicinity of the former fuel dispenser island. Contamination is predominantly found in the permeable silty sand strata between 7 to 12 feet BGS.

All shallow soil samples (<5 feet BGS) collected from locations adjacent to the facility's current and past waste oil storage containers during this investigation were reported to be uncontaminated, suggesting that waste oil contamination is not a concern at the Automasters site.

The full magnitude and extent of soil and groundwater contamination remains undefined, based on the significant concentrations of TPH-g and BTEX compounds reported in both soil and groundwater at monitoring well locations on the west side of the property (MW-101) and the south side of the property (MW-103).

3.0 SITE CONCEPTUAL MODEL

A Site Conceptual Model (SCM) has been prepared to aid in understanding of Site conditions and to identify any data gaps that need to be addressed. Data gaps identified in the SCM are summarized along with the proposed investigation activities to close these gaps in a separate *Data Gap Summary Table*. These documents are included in *Appendix B.*

The SCM will be amended to incorporate pertinent information gathered during subsequent remedial investigations and included in the NFAR for this Site. This SCM will be revised once additional soil, groundwater and soil vapor data become available as remedial investigation activities are completed.

Figure 3 and *4* present geological cross-sections illustrating subsurface conditions based on the boring logs from the 2015 remedial investigation program.

4.0 SENSITIVE RECEPTORS

A preliminary sensitive receptor evaluation has been performed based on Sensitive Receptor Surveys performed at nearby sites and a survey of down gradient residences performed in July 2016.

No onsite water supply wells or other sensitive receptors presently exist at the Automasters site. Based on the data collected during previous investigations in 2006 and 2015, potential onsite receptors include construction workers exposed to gasoline vapors while excavating into contaminated soil during site development activities. Even this exposure is unlikely since the identified contamination is 10 to 12 feet bgs and the proposed development does not include any basements or underground parking.

The homes and small commercial establishments south and west of the Site are located downgradient and are considered the only potential offsite receptors. There is a possibility that this release has impacted these receptors is unknown based on the fact that significant concentrations of benzene were found in confined groundwater that rises to a depth of 3 to 5 feet bgs in the wells during the winter months.

A neighborhood survey was performed in July 2016 to determine whether downgradient residential properties have basements, half-basements, or dewatering systems that could result in exposure to contaminated groundwater. It was determined that all houses west and southwest of the Site, on the west side of Shattuck Avenue, have basements. Groundwater and/or soil vapor intrusion into these basements could become a complete exposure pathway for the residents if shallow contamination from the Site has migrated across Shattuck Avenue.

A water well survey of the area performed by Woodward Clyde Consultants (WCC) in 1986 found five wells within a one mile radius of the Site. Two of these wells are (or were) used for industrial purposes, two for irrigation, and one for domestic purposes. No municipal wells were identified within one mile of the Site. The closest well is the irrigation well at 3215 Adeline Street in Berkeley, approximately 1,340 feet west-northwest of the Site. The only other well close to the Site is the domestic well, located 2,300 feet south-southeast (cross-gradient) from the Site. Mr. James Yoo of the Alameda Public Works Department confirmed that no new wells have been installed with a one-mile radius of the Site since the WCC well survey.

There are no surface water bodies within a 2,000-foot radius of the Site. The nearest surface water body is Claremont Creek, located approximately 0.8 miles northwest of the Site. San Francisco Bay is located 2 miles west of the Site.

Other potential receptors within 2,000 feet of the Site include the Sankofa Academy Elementary School, whose property begins 400 feet south of the Site. Colby Park, located 2,200 feet east of the Site, is slightly outside the 2,000 foot radius. Based on the known direction of groundwater flow in the area, these receptors are cross-gradient and upgradient of the Site, so it is highly unlikely that they would be impacted by this release.

The locations of the wells and other potential receptors listed above are shown on *Figure 5***.**

5.0 DATA GAPS

Based on the Site assessment activities performed to date it is clear that there are data gaps in our understanding of the lateral and vertical extent of this contamination plume. These data gaps are identified in the SCM and the activities that will be performed to close these data gaps are presented in the Data Gap Summary Table.

The shallow soil sampling results will indicate whether an onsite soil vapor assessment is warranted in order to properly evaluate Site conditions in relation to the LTCP. If it is determined that the plume has migrated offsite, it may be necessary to perform a soil vapor assessment of the adjacent residential and commercial buildings to determine the potential risk of soil vapor intrusion. Offsite migration will also necessitate a utility survey to determine whether there are utility corridors acting as preferential pathways and a site-specific Sensitive Receptor Survey.

6.0 DATA GAP INVESTIGATION WORK PLAN

Based on correspondence from the ACEH dated June 15, 2016 there are several data gaps that must be addressed in order to determine whether the Site meets LTCP criteria for case closure. These data gaps are to some degree dictated by the planned development activities for the Site, which include residential apartments and retail commercial businesses that may include food service.

The field activities to be performed in an effort to address remaining data gaps are as follows:

- Geophysical survey to determine whether any USTs or underground piping remain at the Site;
- Collection of soil samples from five, 20-foot deep, soil borings, four of which are oriented along an east-west transect in the area of the former USTs and dispenser island and the fifth being located south of the easternmost UST
- Installation and sampling of a temporary monitoring well in the soil boring south of the easternmost former UST location
- Installation of three offsite groundwater monitoring wells, one west of well MW-101 along the east side of Shattuck Avenue, the other south of well MW-103 along the north side of 62nd Street, and the third at the intersection of Shattuck Avenue and 62nd Street.
- Collection of soil samples from three new soil borings installed in the vicinity of B-1, B-2 and B-7 at depths of 3 feet and 10 feet BGS and analysis of these samples for PAHs by EPA Method 8270 and CAM 5 metals in addition to the standard COCs as described below
- Analysis of all soil and groundwater samples for TPH-g, TPH-d, TPH-mo, and VOCs (including BTEX compounds, MtBE and naphthalene) by EPA Method 8260B

No data has been generated regarding soil vapor conditions at the Site. After the lateral extent of soil contamination is determined by the additional soil sampling described below, it will be determined whether a soil vapor survey is required to satisfy LTCP criteria for this Site. If so, a technical work plan will be prepared and submitted to ACEH.

Proposed methods, equipment, materials and techniques to successfully complete this soil and groundwater investigation are as follows.

6.1 Pre-Field Activities

Prior to commencing any Site work, a neighborhood survey was performed to determine whether any of the buildings downgradient from the source area have basements, half-basements, or potential dewatering structures that could intercept contaminated groundwater.

It was discovered that the residences on the west side of Shattuck Avenue all have basements. However, none of the residences on the east side of Shattuck Avenue or on either side of 62nd Street have basements. No other subterranean structures in the site vicinity were identified

The site specific Health & Safety Plan (H&SP) prepared for the December 2015 site investigation will be updated and revised as appropriate for the work proposed in this Workplan.

A properly licensed (C-57) drilling subcontractor with expertise in environmental investigations will be retained. An application will be submitted to the Alameda County Public Works Agency for well installation and soil boring permits. The Site will be marked for Underground Service Alert and a USA ticket opened no later than 48 hours prior to starting subsurface work. ACEH will be notified in advance of any field work. All field work will be directly supervised by a registered professional civil engineer or geologist.

6.2 Geophysical Survey

A geophysical survey of the southern portion of the Site will be performed using a combination of magnetic and ground-penetrating radar techniques. If any USTs or underground piping are discovered the number and/or locations of soil borings will be modified accordingly.

A discussion of geophysical investigation methods and techniques appears in the *Appendix C.*

6.3 Soil Boring and Groundwater Monitoring Well Installation

It is proposed to install eight soil borings using either a GeoProbe or a hollow stem auger rig and complete three of these borings as groundwater monitoring wells. Soil samples will be collected from each boring for laboratory testing at five-foot intervals, with specific depths to be determined based on photoionization detector (PID) readings and visual observations of the auger cuttings. A minimum of four samples will be collected from each boring. The proposed locations of these soil borings are shown on *Figure 6.*

All soil borings will be logged by a California licensed civil engineer or geologist. It is anticipated that total boring depth will be 20 feet bgs. Site work will be completed in conformance with prevailing ACEH policies.

In addition, it is proposed to collect shallow soil samples from three locations adjacent to B-1, B-2 and B-7 to confirm that there is no soil contamination adjacent to the repair shop building as a result of waste oil spills inside the shop area.

Figure 6 shows the locations of these proposed soil borings, monitoring wells, and shallow soil samples.

6.4 Soil Sampling

Undisturbed soil samples will be collected from each soil boring using a split spoon sampler fitted with three 6-inch long sleeves. The lead 6-inch sleeve from each core will be field screened with a PID for the presence of contamination. Soil from the following sleeve will be sealed, labeled and preserved for chemical analysis in a State certified testing laboratory. In conformance with North Coast Region guidelines, soil samples for volatile analysis will be collected using an EPA method 5035 compliant procedure. All soil samples will be analyzed for TPH-g, TPH-d, TPH-mo, and VOCs (including BTEX compounds, MtBE and naphthalene) by EPA Method 8260B. In addition, soil samples from the three borings adjacent to B-1, B-2 and B-7 will be analyzed for PAHs by EPA Method 8270 and CAM 5 metals.

Drill cuttings will be containerized onsite in 55-gallon drums so they are isolated from the environment or human contact. Residue management is discussed in *Section 6.10*. Each boring will be advanced to at least a total depth of 20 feet bgs. Based on field conditions encountered, a boring may be advanced beyond 20 feet bgs to follow contamination vertically to its termination.

6.5 Monitoring Well Construction

It is proposed to construct the three monitoring wells using 2-inch diameter, Schedule 40, PVC casing. The wells will be fitted with 0.020 slotted screen from 5 feet bgs to 20 feet bgs. A filter pack composed of Monterrey No. 3 sand will be placed around the screened interval in each well. The filter pack will be placed to an elevation one foot higher than the top of the well screen. Above the filter pack, two vertical feet of hydrated 3/8” bentonite pellets will be placed. A Portland cement grout will be placed on top of the bentonite pellets. Grout will come to within one foot of the ground surface. A traffic rated "Christy" box will be cemented in place at the wellhead to complete the installation. The Christy box will be positioned at an elevation slightly above the surrounding pavement to promote surface runoff.

A cross-section illustrating the proposed monitoring well design is included in *Appendix D*.

6.6 Well Development

In conformance with the Alameda County Well Ordinance, a period of not less than 48 hours will elapse between well construction and well development. The wells will be developed by surging and dewatering. A surge block will be forced through the water column to pressurize groundwater in the filter pack. A high capacity electric submersible pump will be placed in the well after the surge activity to rapidly dewater the casing. The process of surging and dewatering will continue until purge water is free of visible silt or sediment.

All purge water will be considered contaminated and will be properly managed as described in *Section 6.10*.

6.7 Well Survey

The wells will be surveyed for latitude, longitude and elevation by a person licensed to perform land surveys in California. Survey data will be properly formatted and uploaded to GeoTracker as described in *Section 8*.

6.8 Hydrologic Measurement and Calculations

To allow the aquifer to stabilize, at least 72 hours will be allowed to elapse between the well development activity and collection of hydrologic data. The static depth to groundwater in all three wells will be measured with an electronic sounding tape to an accuracy of 0.01 foot. The groundwater elevation will be calculated by subtracting the depth to groundwater from the well top elevation. Groundwater elevations will be plotted on a scaled site map and the groundwater gradient direction triangulated. Groundwater elevation isocontours will be plotted on the Site Map. The gradient magnitude will be extrapolated from the isocontours. Hydrologic data will be presented in the Report of Findings in both numeric and graphical formats.

6.9 Groundwater Sample Collection

Representative groundwater samples will be collected from each of the monitoring wells for chemical analysis in a subcontracted testing laboratory. No groundwater samples will be collected for a minimum of 72 hours after well development, to allow time for aquifer stabilization. The following groundwater sample procedure will be employed at each well:

A new bailer specifically designed to effectively capture and measure free phase product (FPP) will be used to retrieve a groundwater sample from the top of the water column. The groundwater in the bailer will be visibly inspected for FPP. The thickness of FPP present in each well will be measured and recorded. Also, the dissolved oxygen concentration of the groundwater will be measured.

Approximately three casing volumes of groundwater will be purged from each well prior to sampling. During the purge process, groundwater temperature, dissolved oxygen concentration, electrical conductivity and pH will be periodically measured. All purge data will be recorded on a standardized form for inclusion in the *Report of Findings*.
Once purging is complete, the depth to groundwater rise will be monitored as the well re-charges. When the groundwater elevation rises higher than 80% of the static level, a groundwater sample will be collected.

A new bailer will be lowered into the well to retrieve the water sample to surface. The sample will be transferred into appropriate, laboratory supplied, containers, labeled and then chilled prior to laboratory delivery. All samples collected will be entered on a chain of custody record form.

6.10 Solid and Liquid Residue Management

Both solid and liquid residues will be generated during this environmental assessment project. Solid residues will be generated during the soil boring process. Liquid residues will be generated from equipment decontamination, well development and groundwater purging. All residues will be considered contaminated until proven otherwise. Soil cuttings will be placed in labeled 55-gallon drums for effective protection from the environment and human contact. Liquid residues will be stored in labeled 55-gallon drums. Representative samples will be collected from the soil and the water residues for waste profiling. It is anticipated that soil cuttings will be transported to the Class 2 Hay Road Landfill in Solano County. It is anticipated that liquid residues will be transported to InStrat (Rio Vista) for recycling. Disposal documentation for all residues will be included in the *Report of Findings*.

6.11 Laboratory Analysis of Soil and Groundwater Samples

Soil and groundwater samples will be submitted to a State certified testing laboratory for chemical analysis. All samples submitted for testing will be listed on a standardized Chain of Custody record which will accompany the sample set at all times. These samples will be analyzed for TPH-g, TPH-d, TPH-motor oil, BTEX compounds, naphthalene, MtBE, and other VOCs detected on an 8260B scan.

All laboratory methods and procedures, including minimum detection limits, will comply with EPA guidelines. A copy of the original laboratory report, including lab QA/QC data, will be included in the *Report of Findings*.

6.12 Quality Assurance/Quality Control

QA/QC measures to be employed on the Automasters remedial investigation project will conform with West & Associates' *Standard Field Procedures*, attached to this Workplan. To summarize, proposed QA/QC measures include:

- Assigning experienced and capable staff
- Following approved field procedures and techniques
- Utilizing appropriate equipment and supplies
- Relying on new, disposable, sampling supplies to the maximum extent possible
- Thorough and frequent decontamination of field equipment
- Maintaining detailed field notes
- Utilizing laboratory supplied sample containers
- Timely delivery of samples to the testing laboratory
- Keeping an unbroken Chain of Custody Record
- Adhering to EPA-approved analytical procedures

Any deviations from standard QA/QC protocol will be described in the *Report of Findings*.

7.0 REPORT OF FINDINGS

At the conclusion of this proposed data gap investigation project a written *Report of Findings* will be prepared and submitted to ACEH. This Report will be submitted within 30 days of receiving final analytical results.

The Report will include:

- Executive Summary
- Selected background material
- A summary of any deviations from this Workplan
- A description of all field work performed
- Scaled site diagram accurately locating all monitoring well locations
- Well top survey data
- Boring logs
- Well completion diagram
- Analytical data in tabular format
- Original laboratory reports with Chain of Custody record
- A description of QA/QC results and any deviations from stated QA/QC procedures
- Technical discussion of investigative results
- Recommendations for further action, as appropriate
- Waste residue disposal documentation
- GeoTracker upload certification

8.0 GEOTRACKER UPLOAD

This Data Gap Investigation Work Plan and updated SCM has been uploaded to the ACEH website per instructions included with the ACEH letter requesting these documents. Once approved by ACEH, it will be uploaded to the Automasters GeoTracker Domain, Global ID T0619748201. The upload certificate is presented in *Appendix E*. Selected future work products will be uploaded to the GeoTracker database in conformance with State requirements. Future work products that will be uploaded include:

- Boring logs
- Well top survey data
- Analytical data
- *Report of Findings*

The GeoTracker upload certificate will be included in the *Report of Findings.*

APPENDIX A

Figures

WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS

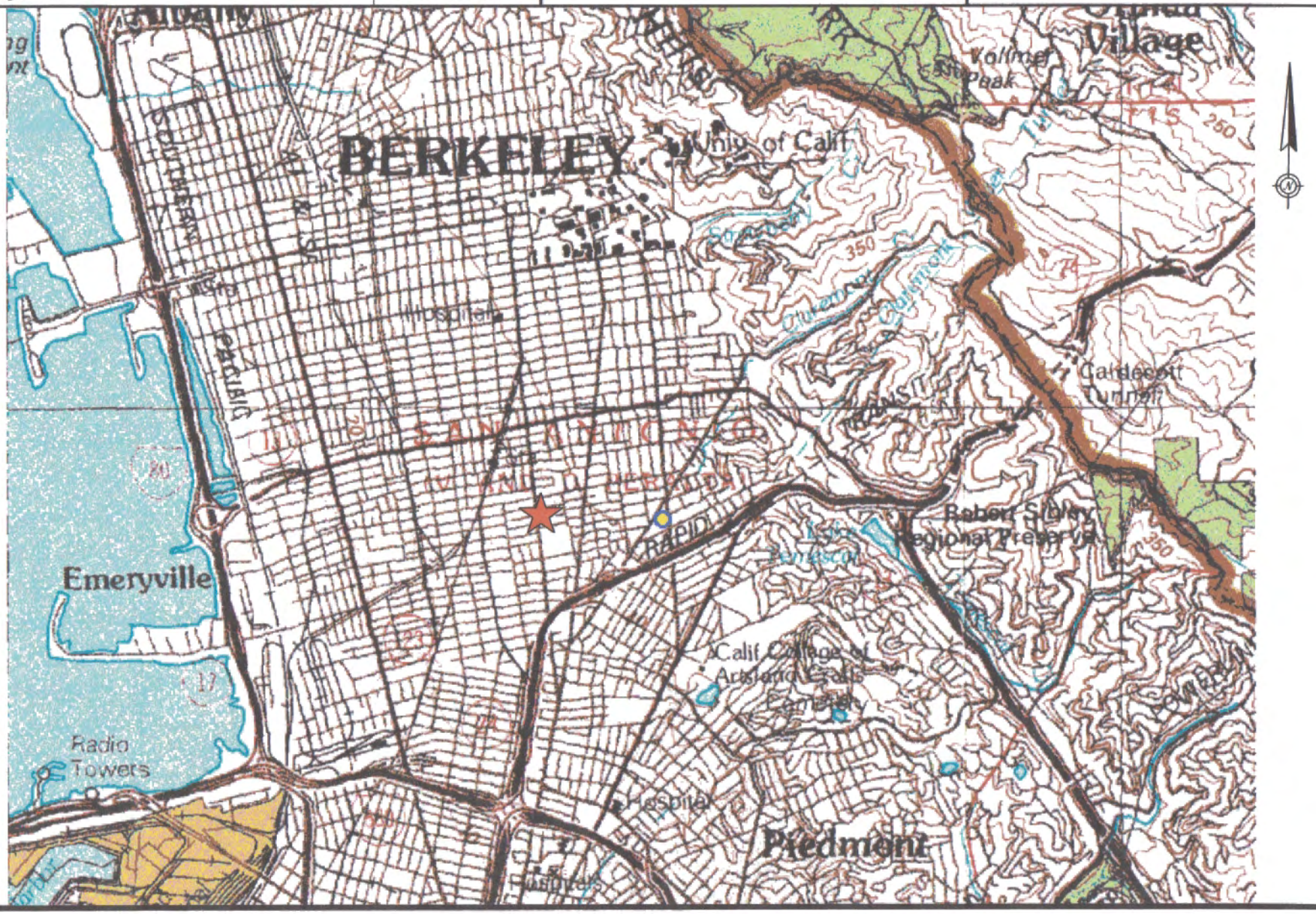
PO Box 5891, Vacaville, CA 95696

Project Name: Automasters	**Date:** February 2016
Location: 6200 Shattuck Avenue, Oakland, CA	
Drawing By: DLG	**Scale:** No Scale

Legend

★ Site Location

FIGURE 1
Regional Site Location



WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS

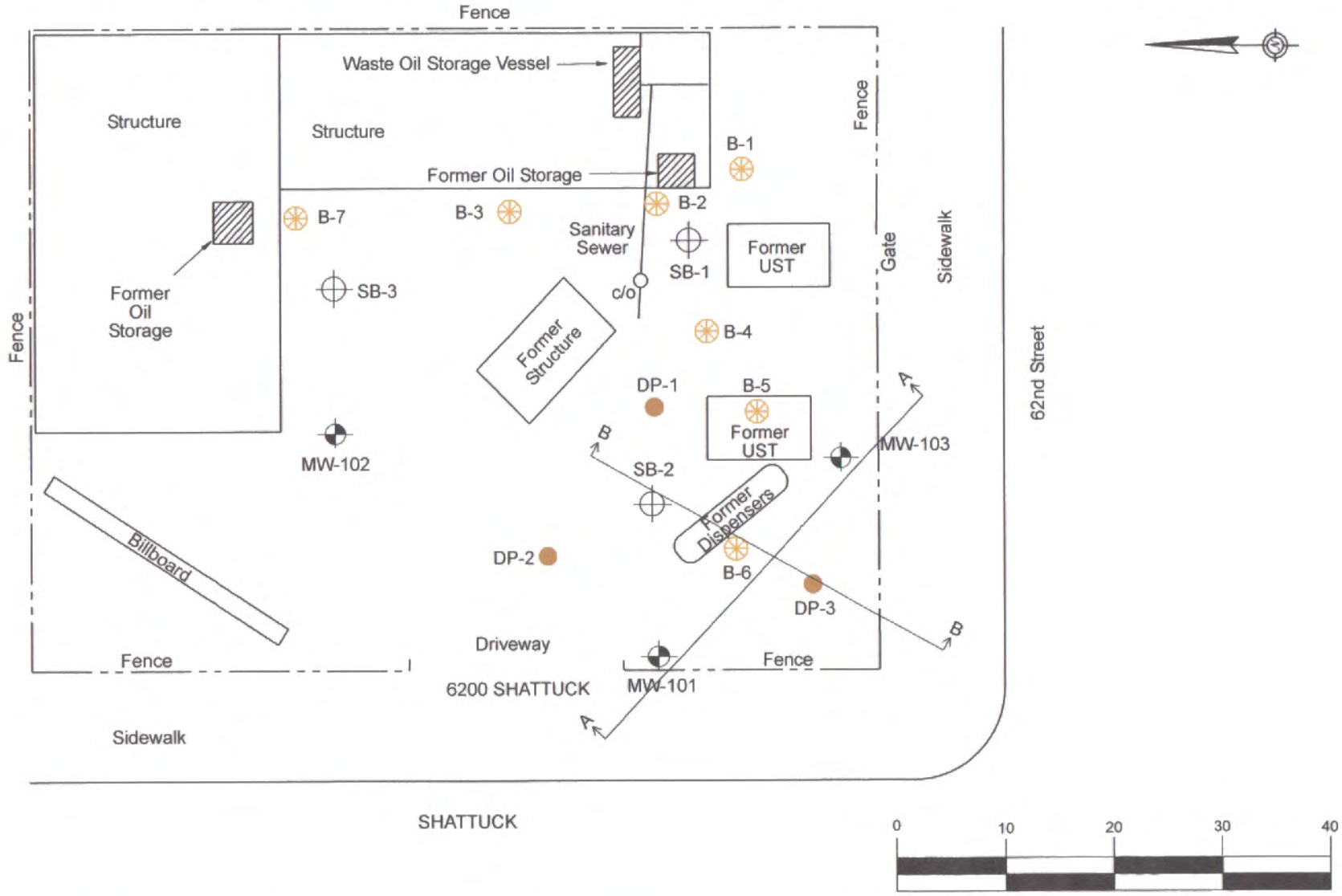
PO Box 5891, Vacaville, CA 95696

Project Name: Automasters	**Date:** Feb 2016
Location: 6200 Shattuck Avenue, Oakland, CA	
Drawing By: DLG	**Scale:** 1" = 14 ft

Legend

- Monitoring Well
- Soil Boring
- Shallow Soil Sample (Backfill)
- Pangea Boring (2006)
- Geologic Cross Sections

FIGURE 2
Site Layout Map



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PO Box 5891, Vacaville, CA 95696

Project Name: Automasters	**Date:** Feb 2016
Location: 6200 Shattuck Avenue, Oakland, CA	
Drawing By: DLG	**Scale:** See Below

Legend

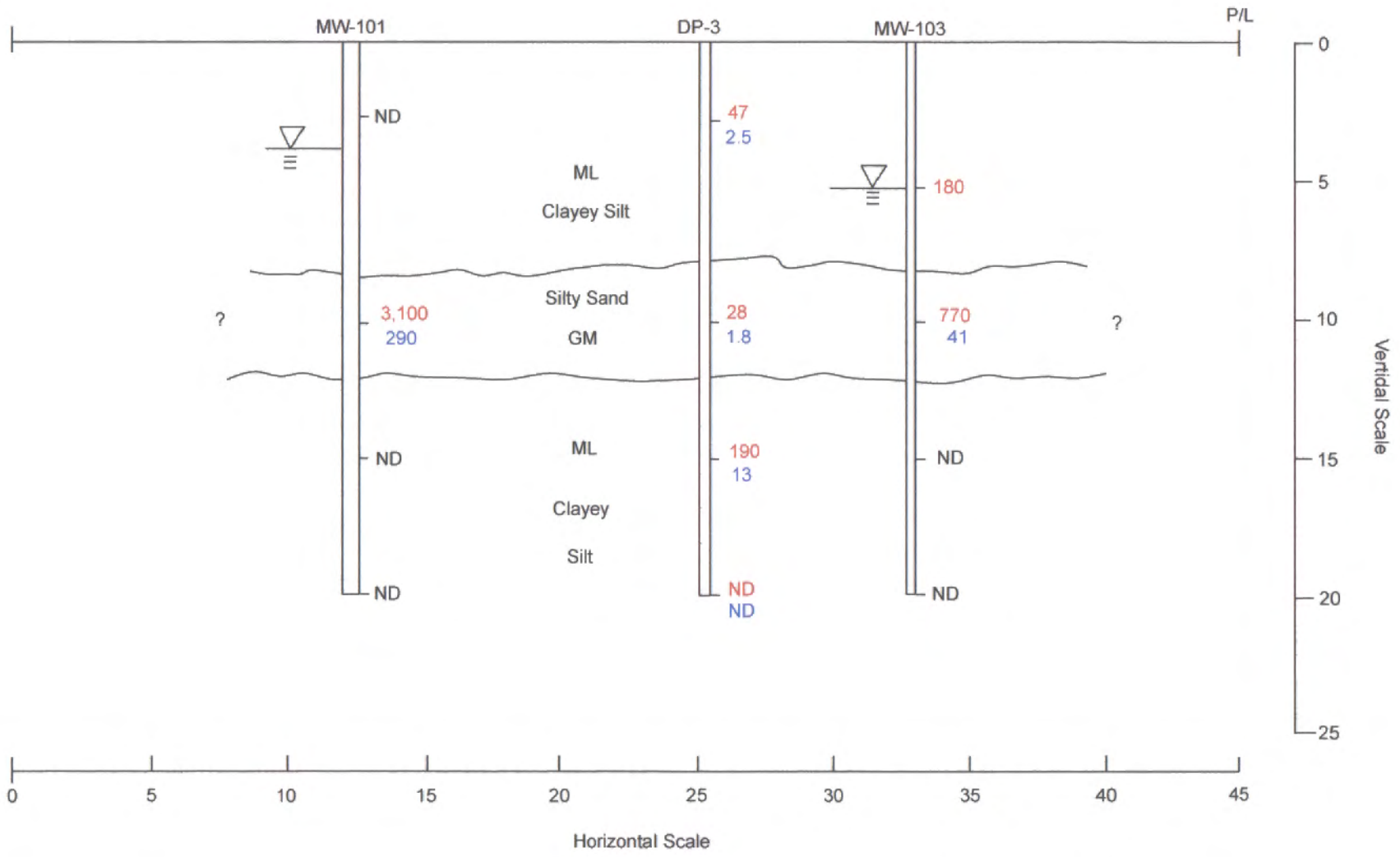
Soil Sample Analysis

3,100 TPH-gas

290 TPH-diesel

Static GWE 12/31/15

FIGURE 3
Cross Section A-A



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PO Box 5891, Vacaville, CA 95696

Project Name: Automasters	**Date:** Feb 2016
Location: 6200 Shattuck Avenue, Oakland, CA	
Drawing By: DLG	**Scale:** See Below

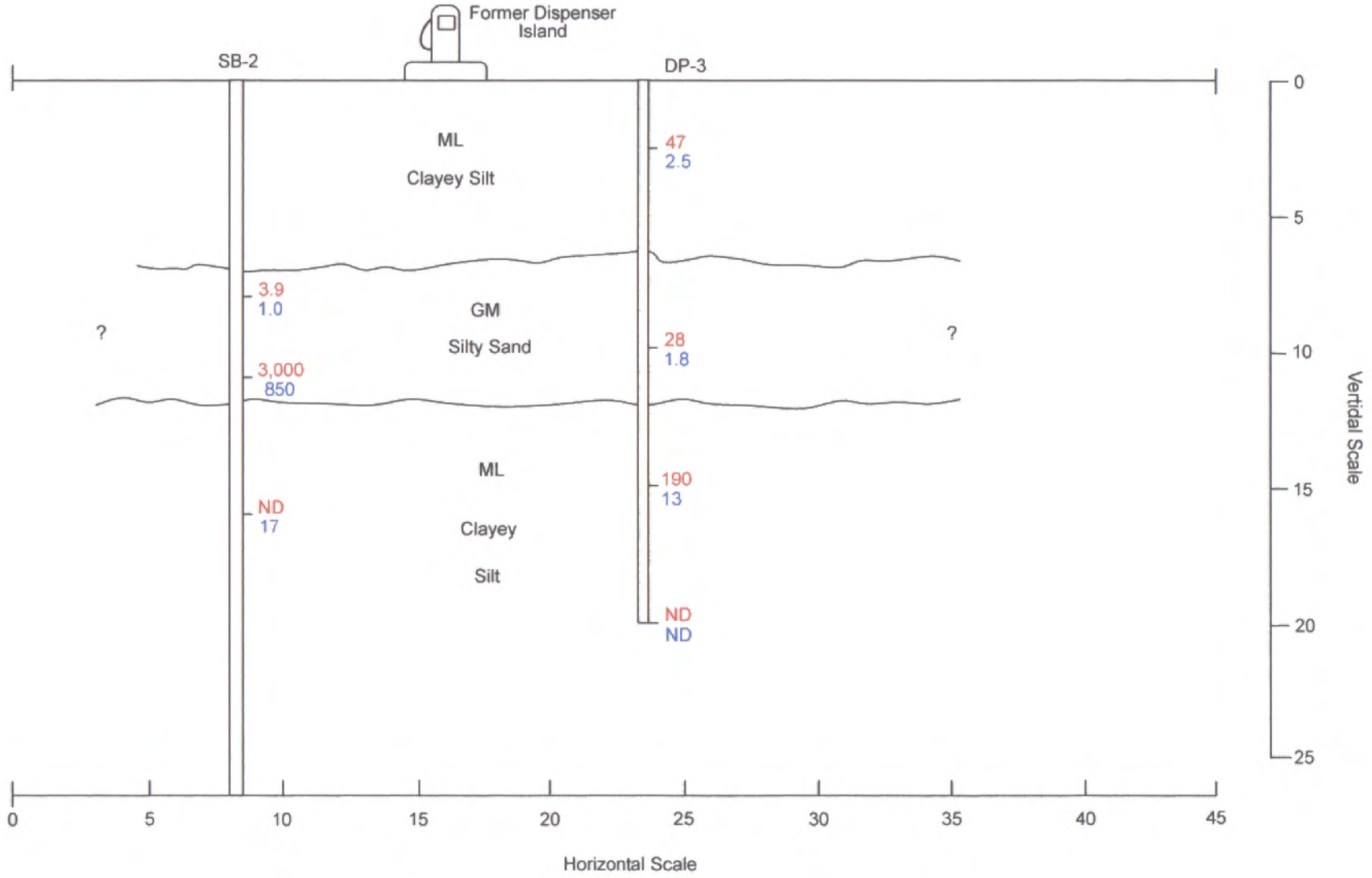
Legend

Soil Sample Analysis

3,100 TPH-gas

290 TPH-diesel

FIGURE 4
Cross Section B-B



WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS

PO Box 5891, Vacaville, CA 95696

Project Name: Automasters	**Date:** August 2016
Location: 6200 Shattuck Avenue, Oakland, CA	
Drawing By: DLG	**Scale:** NA

Legend

1 - Domestic Well
2 - Irrigation Well
3 - Sankofa Academy
4 - Colby Park
5 - Residential Basements

FIGURE 5
Nearby Sensitive Receptors

WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS

PO Box 5891, Vacaville, CA 95696

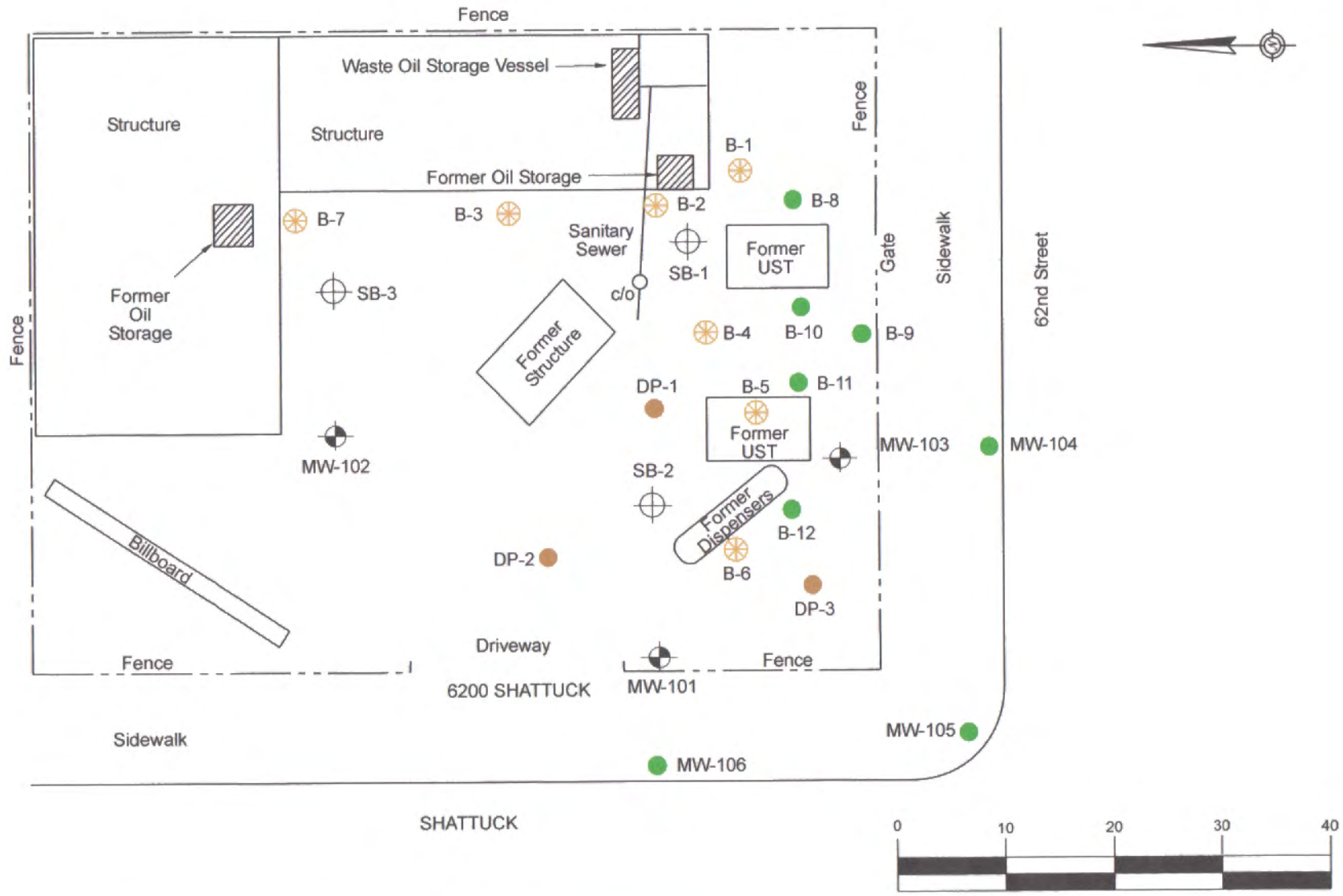
Project Name: Automasters	**Date:** Feb 2016
Location: 6200 Shattuck Avenue, Oakland, CA	
Drawing By: DLG	**Scale:** 1" = 14 ft

Legend

- Existing Monitoring Well
- Pangea Boring (2006)
- Soil Boring - Dec 2015
- Shallow Soil Sample (Backfill) - Dec 2015
- Proposed Soil Boring & Groundwater Monitoring Wells

FIGURE 6

Proposed Soil Borings & Groundwater Monitoring Wells



APPENDIX B

Site Conceptual Model – Revised July 2016

Data Gap Summary & Proposed Investigation – Revised July 2016

SITE CONCEPTUAL MODEL – REVISED JULY 2016
Automasters
6200 Shattuck Ave, Oakland

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
Geology and Hydrogeology	Regional	The Site is located within the San Francisco Bay structural depression of the Coast Ranges Physiographic Province, within the Oakland Sub-Area of the East Bay Plain. The Site is situated in a relatively flat area between the San Francisco Bay and the Oakland Hills. Bedrock in the area consists of sedimentary, metasedimentary, volcanic, and intrusive rocks from the Jurassic through Paleozene geologic periods. Quaternary-age marine and alluvial sediments ranging in thickness from 300 to 700 feet cover the bedrock. Near the surface this Site is underlain by Holocene alluvium and marsh deposits comprised of silts and clay. The Site lies within the Berkeley Alluvial Plain sub-area of the East Bay Plain groundwater basin. The primary water-bearing unit in this area is comprised of unconsolidated alluvial deposits from the Late Quaternary period. There is also a secondary, older, semi-consolidated deposit from the Neogene-Quaternary period. Groundwater within these deposits is primarily confined although some of the aquifers are unconfined. Throughout most of the Alameda County portion of the East Bay Plain the general direction of groundwater flow follows the surface topography and runs from east to west, i.e. from the Hayward Fault to the San Francisco Bay. Flow direction and velocity are occasionally influenced by buried stream channels that typically are oriented in an east to west direction.	None	N/A
	Site	Soil types encountered during the 2006 and 2015 site investigation activities consisted predominantly of silty clay to clayey silt with some sands and gravels to 36 feet below ground surface (bgs) and stiff clay from 36 feet to 48 feet bgs. The two borings advanced by Pangea closest to the former USTs and dispenser islands had a distinct sand and gravel lens at 10 to 12 feet bgs. The 2015 remedial investigation confirmed that shallow soils are predominately silty clay to clayey silt with a sand and gravel lens at 10 to 12 feet bgs. Copies of the boring logs for all soil borings have been uploaded to GeoTracker. The depth to first groundwater ranges from approximately 3 to 6 feet bgs.	None	N/A
Surface Water Bodies		The nearest surface water body is Claremont Creek, located approximately 0.8 miles northwest of the Site. Claremont Creek flows generally east to west near the Site vicinity. The San Francisco Bay is located approximately 2 miles west of the Site.	None	N/A

SITE CONCEPTUAL MODEL – REVISED JULY 2016
Automasters
6200 Shattuck Ave, Oakland

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
Nearby Wells		A well survey of the area performed by Woodward Clyde Consultants (WCC) in 1986 found five wells within a one mile radius of the Site. Two of these wells are (or were) used for industrial purposes, two for irrigation, and one for domestic purposes. No municipal wells were identified anywhere near the Site. The closest well is the irrigation well at 3215 Adeline Street in Berkeley, approximately 1,340 feet west-northwest of the Site. The only other well relatively close to the Site is the domestic well, which is located 2,300 feet south-southeast (cross-gradient) from the Site. A well survey was also performed by Alameda County Public Works Agency (ACPWA) in 2016 The only wells identified by ACPWA within the 2,000-foot search radius were groundwater monitoring wells and cathodic protection wells.	None	N/A
Release Source and Volume		The two USTs removed in 1986 comprise the only known release mechanism impacting soil and groundwater underlying this Site. There is no UST removal report or other definitive documentation that no other USTs or underground piping remain at the Site. The surrounding area is primarily residential and there are no current or former UST cases within 1,000 feet of the Site listed on GeoTracker. It is not known whether the UST release was from the piping, dispensers, and/or USTs themselves. There is no known history of leaks or spills from the aboveground waste oil storage vessels (former or current) or other aspects of the automotive repair operation. Seven shallow soil samples collected near the current and former waste oil storage areas were all clean, indicating that there has been no environmental impact from waste oil handling operations at the site. The volume of this release is very difficult to ascertain. Based on the lack of definitive documentation regarding removal of the USTs, a geophysical survey is required to determine whether any USTs or underground piping remain at the Site.	1. It is not known with certainty whether there are any USTs or underground piping remaining at the Site	Geophysical survey to determine whether any USTs or underground piping remain at the Site.

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SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
LNAPL		Light non-aqueous phase liquids (LNAPL) have not been encountered in any of the three groundwater monitoring wells installed in December 2015, either during the well development or subsequent sampling activities. Elevated soil and groundwater concentrations of TPH-g on the south side and southwest corner of the Site indicate the possible presence of LNAPL. The soil TPH-g concentrations at 10 to 11 feet bgs in three soil borings, SB-2, MW-101 and MW-103, range up to 3,100 mg/kg and are high enough to suggest that LNAPL may be present. Groundwater concentrations of TPH-g and benzene in MW-101 were 18,000 µg/L and 1,000 µg/L, respectively when the wells were sampled in December 2015. These concentrations are also high enough to suggest the potential presence of LNAPL at the Site.	2. Potential LNAPL based on TPH-g concentration at 10-11 feet bgs in three soil borings and the initial groundwater sample from downgradient well MW-101	Collect soil samples from five additional soil borings and one groundwater "grab" sample to determine if LNAPL is present
Source Removal Activities		It is reported that contaminated soil between the USTs was excavated and transported off-site for disposal. No records are available regarding the quantity or final destination of this soil.	None	N/A
Contaminants of Concern		Based on the information available from the Site owner and the 2006 and 2015 remedial investigation reports, contaminants of concern (COCs) are TPH-g, TPH-d, TPH-mo, and VOCs by EPA Method 8260B (including naphthalene). MtBE and other fuel oxygenates/additives were all reported as N.D. at the standard method detection limits in the 2006 and 2015 laboratory reports, so they are not COCs at this Site. Waste oil has been stored above grade at the Site and there is no evidence or documentation of spills from these containers. Nonetheless, it is possible that surface spills of waste oil over the years have resulted in subsurface contamination. Waste oil is known to contain semi-volatile organic compounds (SVOCs) and heavy metals, so SVOCs by EPA Method 8270 and CAM 5 metals are added to the previous list of COCs for samples collected in the vicinity of waste oil storage areas.	3. Potential that surface spills over the years have resulted in subsurface waste oil contamination	Collect shallow soil samples from three shallow borings to be installed adjacent to B-1, B-2 and B-7. Additional analyses for these samples to include SVOCs by EPA Method 8270 and CAM 5 metals

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SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
Petroleum Hydrocarbons in Soil		Significant concentrations of COCs were reported in five of the seven 20-foot deep borings installed in December 2015 (three of which were completed as monitoring wells). The highest concentrations were reported in the soil sample from MW-101 at 10 feet bgs, which had 3,100 mg/kg TPH-g, 2.5 mg/kg benzene, and 33 mg/kg naphthalene. Additional site investigation will be required to fully characterize the lateral extent of soil contamination, the scope of work for this site investigation is presented in *Section 6* of this Data Gap Investigation Work Plan. A brief description of the work to be performed is as follows: If the geophysical survey does not reveal the presence of additional USTs or underground piping, five additional soil borings will be advanced to 20 feet bgs in the vicinity of the former USTs, piping and dispensers to determine whether a secondary source remains at the Site. The locations of these borings are shown on *Figure 6*. One of these borings will be left open overnight to allow collection of a groundwater "grab" sample. If the geophysical survey reveals that additional USTs and/or piping remain at the Site, this work plan will be amended accordingly. In addition, three shallow soil borings will be installed adjacent to B-1, B-2 and B-7 so that soil samples from these borings can be analyzed for SVOCs by EPA Method 8270 and CAM 5 metals. In order to further define the lateral extent of soil contamination, samples will also be collected at various depths from the boreholes for three additional groundwater monitoring wells to be installed as described below.	4. Lateral extent of soil contamination	Determine during additional RI to be performed in the 3rd quarter of 2016

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SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
Petroleum Hydrocarbons in Groundwater		Three groundwater monitoring wells were installed in December 2015. The initial samples from MW-101 and MW-103 had significant concentrations of COCs, while upgradient well MW-102 was clean. TPH-g and benzene concentrations in MW-101were 18,000 µg/L and 1,000 µg/L, respectively. Additional wells will be required to determine the lateral extent of groundwater contamination as a result of this release. In this phase of the remedial investigation two additional wells will be installed, one to the west of MW-101 along the east side of Shattuck Avenue and one south of MW-103 on the north side of 62nd Street. A utility survey performed in February 2016 determined that there are several utility corridors running along 62nd Street directly south of the Site and along Shattuck Avenue directly west of the Site. It is conceivable that these corridors are acting as preferential pathways for groundwater migration. Some utilities (notably East Bay MUD) do not have accurate drawings of their underground pipelines in the area, so additional work is required to determine their locations and depths.	5. Extent of groundwater contamination 6. Utility corridors that may act as preferential pathways for groundwater migration	Determine during additional RI to be performed in 2016 Get underground utility locating service to mark EBMUD pipelines, determine the depths of all utility corridors running adjacent to the Site along Shattuck Avenue and 62nd Street

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SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
Risk Evaluation		The Site is currently used as an independent automotive repair facility. 6200 Shattuck Partners, LLC would like to proceed with development of the Site, involving mixed-use commercial and residential facilities. The Site and surrounding properties are zoned RM-4, Mixed Housing Residential Zone 4 as defined in Section 17.17.010 of the Municipal Code. The objective of this zoning classification is to maintain an enhanced residential area "characterized by a mix of single family homes, townhouses, small multi-unit buildings... and neighborhood businesses where appropriate". Identified potential human receptors include residents at the Site and nearby homes and apartments, workers and patrons of nearby commercial establishments, and construction workers involved with Site development. The homes and small commercial establishments located downgradient from the Site are considered the only likely offsite receptors. A soil vapor survey has not been performed at the Site. Based on the soil data from 2015 and the potential for residential land use, the exposure scenarios listed in the LTCP have been evaluated using residential standards for shallow soils (< 5 feet bgs). The concentrations of benzene, ethylbenzene and naphthalene in shallow soil samples from all 13 locations were mostly non-detect and in all cases significantly below the thresholds listed in the residential column on Table 1 in the Direct Contact and Outdoor Air Exposure section of the LTCP. However, shallow soil samples have not been analyzed for PAHs by EPA Method 8270 or CAM 5 metals, which could have been released during spills from the aboveground waste oil storage vessels. In order to evaluate the potential for vapor intrusion to indoor air, the concentrations of TPH-g and TPH-d in soils <10 feet bgs and the benzene concentration in groundwater must be compared with the scenarios depicted in the appendices of the LTCP. The sum of TPH-g & TPH-d concentrations in shallow soil samples from MW-101, MW-103 and DP-2 exceed 100 ppm and the benzene concentration in MW-101 is 1,000 µg/L. Consequently, the potential for vapor intrusion to indoor air cannot be dismissed without performing a soil vapor survey.	7. Potential that shallow soils contain PAHs or metals from waste oil spills 8. Potential for soil vapor intrusion to indoor air 9. Potential for COC intrusion into basements downgradient from the Site	Collect shallow soil samples in the vicinity of borings B-1, B-2 and B--7, analyze for PAHs and metals Perform a soil vapor survey Perform a soil vapor survey to determine whether any of the residences south of the Site (across 62nd Street) or west of the Site (across Shattuck Avenue) have been impacted by this release

SCM Element	SCM Sub-Element	Description	Data Gap Item #	Resolution
		A limited sensitive receptor evaluation has been performed based on Sensitive Receptor Surveys performed at nearby sites. The other potential receptor within 2,000 feet of the Site is the Sankofa Academy Elementary School, whose property begins 400 feet south of the Site. Colby Park, located 2,300 feet east of the Site is just outside the 2,000 foot radius. Based on the known direction of groundwater flow in the area these receptors are cross-gradient and upgradient of the Site, so it is highly unlikely that they would be impacted by this release. Identified potential human receptors include residents at the Site and nearby homes and apartments, workers and patrons of nearby commercial establishments, and construction workers involved with Site development. Once the 2016 Remedial Investigation has been completed it will be possible to perform a thorough evaluation of whether Site conditions might impact any of these receptors. As described in the LTCP, the data generated will be used to evaluate whether or not the following potential exposure pathways are complete for any of the identified receptors: incidental ingestion, dermal contact, dust inhalation, and vapor inhalation. If there are complete pathways that require mitigation, a Remedial Action Plan will be prepared and submitted to ACEH for approval.		

DATA GAP SUMMARY AND PROPOSED INVESTIGATION – REVISED JULY 2016
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Item #	Data Gap	Proposed Investigation	Rationale	Analyses
1	It is not known with certainty whether there are any USTs or underground piping remaining at the Site	Geophysical survey using a magnetic survey and ground-penetrating radar (GPR) with a 500 MHz antenna	GPR using a 500 MHz antenna is capable of locating buried pipes down to 3/16-inch diameter at depths up to 5 feet below grade	N/A
2	Potential LNAPL based on TPH-g concentration at 10-11 feet bgs in three soil borings and the initial groundwater sample from downgradient well MW-101	Collect soil samples from five additional soil borings and one groundwater "grab" sample to determine if LNAPL is present	In order to determine whether there remains an unidentified primary or secondary source of contamination in the vicinity of the former USTs, additional sampling will be performed near the south side and southwest corner of the Site	TPH-g,TPH-d, TPH-mo, and VOCs (including BTEX and naphthalene) by EPA Method 8260B.
3	Waste oil has been stored above grade at the Site and there is no evidence or documentation of spills from these containers. Nonetheless, it is possible that surface spills of waste oil over the years have resulted in subsurface contamination.	Collect shallow soil samples from three shallow borings to be installed adjacent to B-1, B-2 and B-7. Additional analyses for these samples to include SVOCs by EPA Method 8270 and CAM 5 metals	Waste oil is known to contain semi-volatile organic compounds (SVOCs) and heavy metals, so SVOCs by EPA Method 8270 and CAM 5 metals are added to the previous list of COCs for samples collected in the vicinity of waste oil storage areas.	SVOCs by EPA Method 8270, CAM 5 metals (in addition to the COCs already identified)
4	Lateral extent of soil contamination	Install additional "step out" soil borings to the south and west of the borings installed in December 2015	Significant levels of soil contamination were reported in some of the borings installed near the Site perimeter in December 2015, indicating that the lateral extent was not fully characterized	TPH-g,TPH-d, TPH-mo, and VOCs (including naphthalene) by EPA Method 8260B

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Item #	Data Gap	Proposed Investigation	Rationale	Analyses
5	Lateral extent of groundwater contamination	Install additional groundwater monitoring wells, measure the depth to groundwater and COC concentrations in all wells	The high concentrations of TPH-g in well MW-101 on the west side of the property and well MW-103 on the south side of the property indicate that the lateral extent of the groundwater plume is not fully defined; additional wells will also help to clarify the groundwater gradient	TPH-g, TPH-d, TPH-mo, and VOCs by EPA Method 8260B in all wells
6	Utility corridors that may act as preferential pathways	Get underground utility locating service to mark EBMUD pipelines and determine depths of utility corridors in Shattuck Avenue and 62nd Street adjacent to the Site	Some utilities (notably East Bay MUD) do not have accurate drawings of their underground pipelines in the area, so additional work is required to determine their locations	N/A
7	Potential for direct contact or outdoor air exposure to PAHs or metals	Collect shallow soil samples in the vicinity of borings B-1, B-2 and B--7, analyze for PAHs and metals	PAHs or metals could have been released during spills from the aboveground waste oil storage vessels.	PAHs by EPA Method 8270, CAM 5 metals
8	Potential for soil vapor intrusion to indoor air	Perform a soil vapor survey	The LTCP requires a soil vapor survey when (TPH-g + TPH-d) in shallow soils exceed 100 mg/kg or benzene in groundwater ≥ 1,000 µg/L. Both are the case at this Site.	TPH-g, VOCs by EPA Method 8260B
9	Potential for COC intrusion into basements downgradient from the Site	Perform a soil vapor survey to determine whether any of the residences south of the Site (across 62nd Street) or west of the Site (across Shattuck Avenue) have been impacted by this release	These structures have the potential to bring contaminated groundwater to the surface for discharge to the street or storm drain	TPH-g and VOCs by EPA Method 8260B

APPENDIX C

Geophysical Investigation Methods & Techniques

GEOPHYSICAL METHODOLOGY, INSTRUMENTATION, DATA ANALYSIS, AND LIMITATIONS

GROUND PENETRATING RADAR (GPR)

Methodology

Ground penetrating radar is a method that provides a continuous, high resolution cross-section depicting variations in the electrical properties of the shallow subsurface. The method is particularly sensitive to variations in electrical conductivity and electrical permittivity (the ability of a material to hold a charge when an electrical field is applied).

The GPR system operates by radiating electromagnetic pulses into the ground from a transducer (antenna) as it is moved along a traverse. Since most earth materials are transparent to electromagnetic energy, the signal spreads downward into the subsurface. However, when the signal encounters a variation in electrical permittivity, a portion of the electromagnetic energy is reflected back to the surface. When the signal encounters a metal object, all of the incident energy is reflected. The reflected signals are received by the same transducer and are printed in cross-section form on a graphical recorder. Changes in subsurface reflection character on the GPR records can provide information regarding the location of USTs, sumps, buried debris, underground utilities, and variations in the shallow stratigraphy.

Instrumentation

The GPR system typically used is a Geophysical Survey Systems, Inc. SIR-2000 Subsurface Interface Radar Systems equipped with a 500 megahertz (MHz) transducer. This transducer is near the center of the available frequency range and is used to provide high resolution at shallow depths.

Data Analysis

GPR records are examined to identify reflection patterns characteristic of USTs, utilities, and other buried debris. Typically, USTs are manifested by broad localized hyperbolic (upside-down AU@ shape) reflection patterns that vary in intensity. The intensity of a reflection pattern is usually dependent upon the condition of the respective UST, its burial depth, and the type of fill over the UST. Utilities and other buried debris are typically manifested by narrow localized hyperbolic reflections that also vary in intensity.

Limitations

The ability to detect subsurface targets is dependent on site specific conditions. These conditions include depth of burial, the size or diameter of the target, the condition of the specific target in question, the type of backfill material associated with the target, and the surface conditions over the target. Under ideal conditions, the GPR can generally detect objects buried to approximately six feet. However, as the clay content in the subsurface increases, the GPR depth of detection decreases. Therefore, it is possible that on-site soil conditions and target features may limit the depth of detection to the upper one to two feet below ground surface.

ELECTROMAGNETIC LINE LOCATION and METAL DETECTION (EMLL/MD)

Methodology

Electromagnetic line location techniques are used to locate the magnetic field resulting from an electric current flowing on a line. These magnetic fields can arise from currents already on the line (passive) or currents applied to a line with a transmitter (active). The most common passive signals are generated by live electric lines and re-radiated radio signals. Active signals can be introduced by connecting the transmitter to the line at accessible locations or by induction.

The detection of underground utilities is affected by the composition and construction of the line in question. Utilities detectable with standard line location techniques include any continuously connected metal pipes, cables/wires or utilities with tracer wires. Unless the utilities carry a passive current, they must be exposed at the surface or in accessible utility vaults. These generally include water, electric, natural gas, telephone, and other conduits related to facility operations. Utilities that are not detectable using standard electromagnetic line location techniques include those made of non-electrically conductive materials such as PVC, fiberglass, vitrified clay, and pipes with insulated connections.

Buried objects can also be detected, without direct contact, by using the induction mode. This is used to detect buried near surface metal objects such as rebar, manhole covers, USTs, and various metallic debris. The induction mode is used by holding the transmitter-receiver unit above the ground and continuously scanning the surface. The unit utilizes two orthogonal coils that are separated by a specified distance. One of the coils transmits an electromagnetic signal (primary magnetic field) which in turn produces a secondary magnetic field about the subsurface metal object. Since the receiver coil is orthogonal to the transmitter coil, it is unaffected by the primary field. Therefore, the secondary magnetic fields produced by buried metal object will generate an audible response from the unit. The peak of this response indicates when the unit is directly over the metal object.

Instrumentation

The instrumentation typically used for the EMLL survey consists of a Radio Detection RD-4000 and a Fisher TW-6 inductive pipe and cable locator.

Data Analysis

The EMLL instrumentation indicates the presence of buried metal by emitting an audible tone; there are no recorded data to analyze. Therefore, the locations of buried objects detected with the EMLL method are marked on the ground surface during the survey.

Limitations

The detection of underground utilities is dependent upon the composition and construction of the line of interest, as well as depth. Utilities detectable with standard line location techniques include any continuously connected metal pipes, cables/wires or utilities with tracer wires. Unless carrying a passive current these utilities must be exposed at the surface or accessible in utility vaults. These generally include water, electric, natural gas, telephone, and other conduits related to facility operations. Utilities that may not be detectable using standard electromagnetic line location techniques include certain abandoned utilities, utilities not exposed at the ground surface, or those made of non-electrically conductive materials such as PVC, fiberglass, vitrified clay, and metal pipes with insulating joints. Pipes generally deeper than about five to seven feet may not be detected.

APPENDIX D

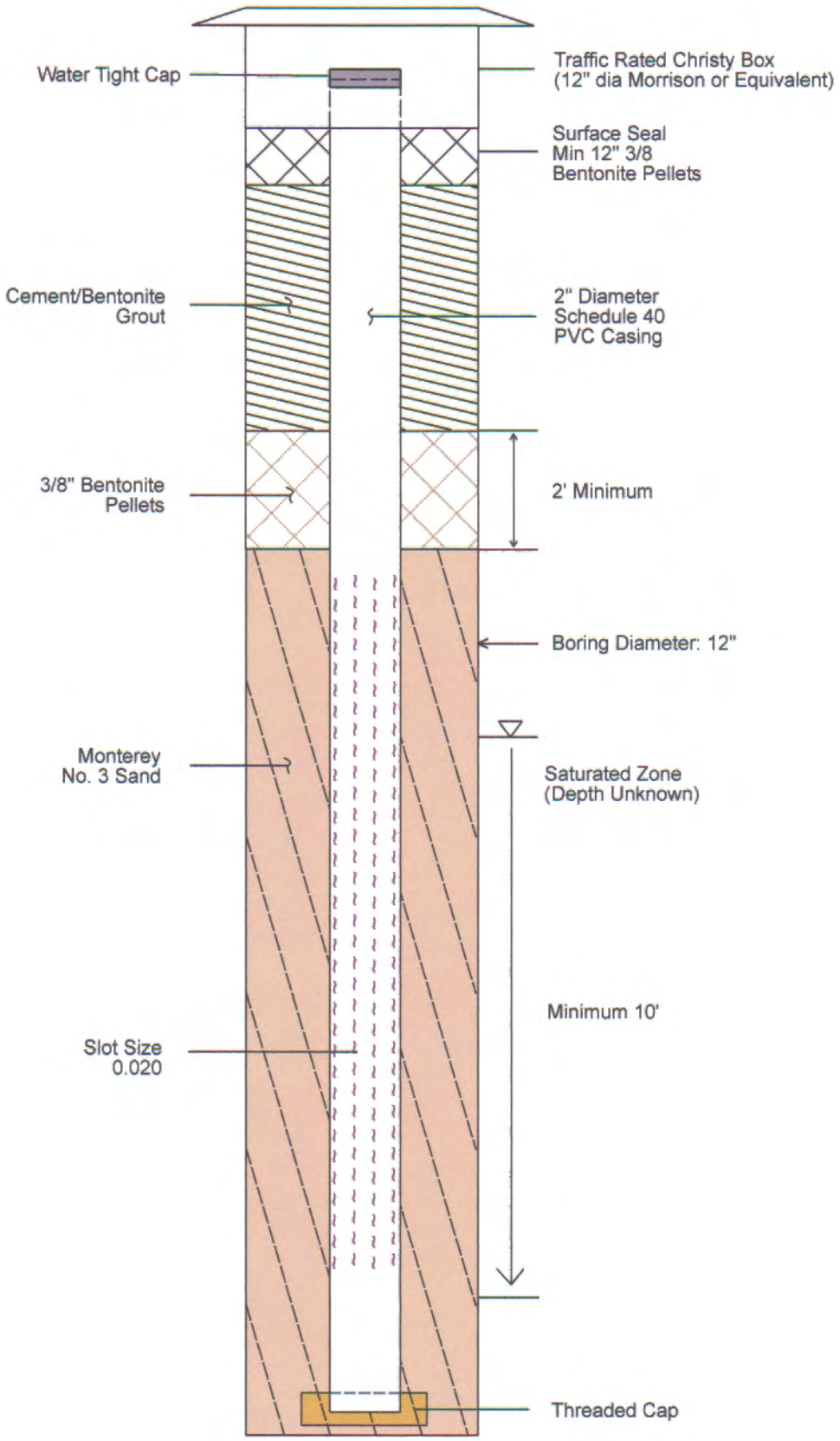
Monitoring Well Cross Section Design

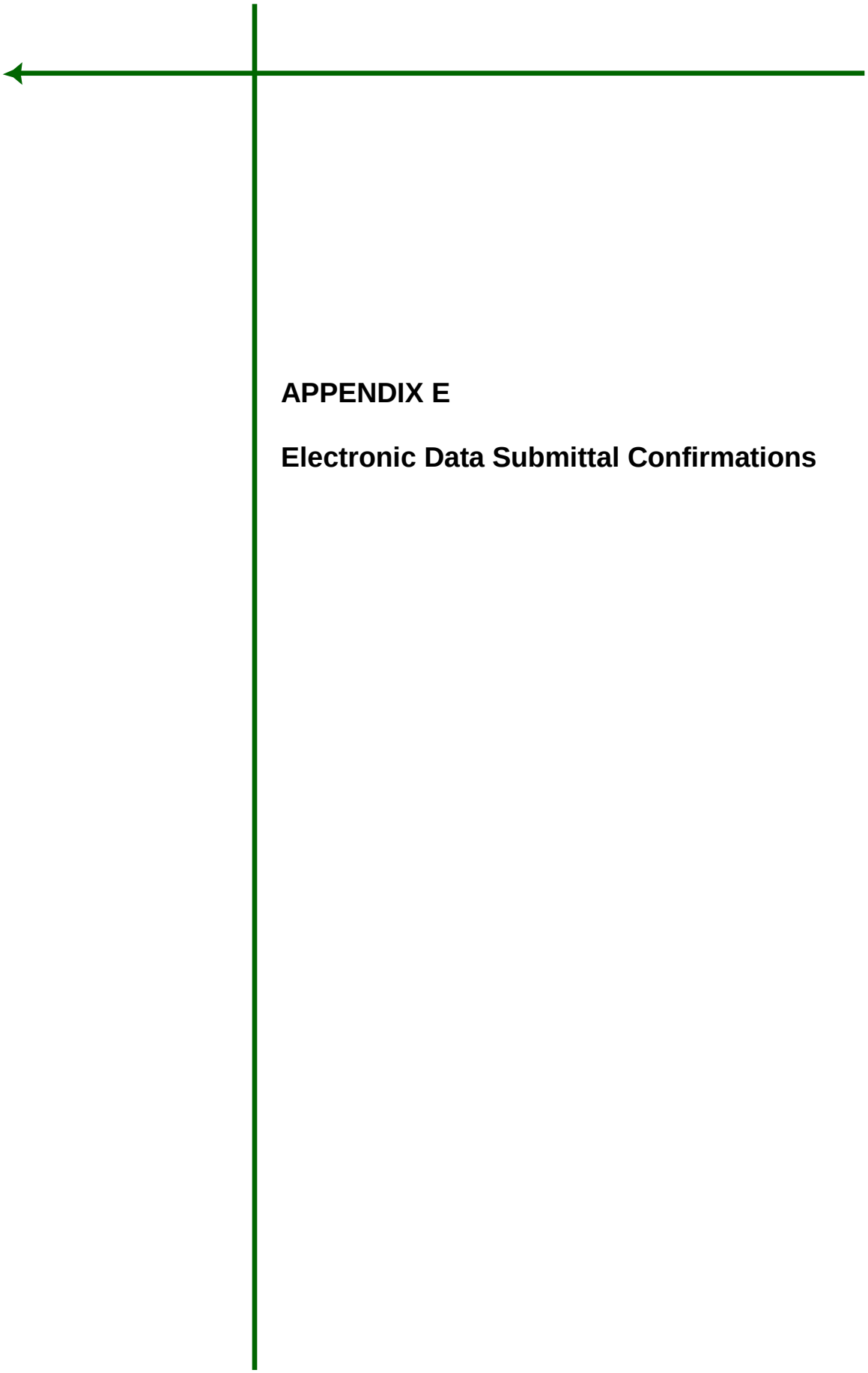
WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS

PO Box 5891, Vacaville, CA 95696

Project Name: Automasters	**Date:** March 2015
Location: 6200 Shattuck Ave, Oakland	**Scale:** NA
Drawing By: DLG	

Groundwater Monitoring Well Cross Section





APPENDIX E

Electronic Data Submittal Confirmations