August 25, 2017

Mr. Mark Detterman
Alameda County Health Care Services Agency
Environmental Health Services
Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

RE: Data Gap Investigation Work Plan

SITE: Mulholland Residence
132 Guilford Road, Piedmont, California
ACHCSA Fuel Leak Case No. RO0003070
Global ID #T10000002521

Dear Mr. Detterman:

Upon my authorization, Wheeler Group Environmental, LLC has prepared the attached *Data Gap Investigation Work Plan*, dated August 28, 2017, for the above-referenced residential property at 132 Guilford Road in Piedmont, California. Wheeler Group has uploaded an electronic copy of the document to the State Water Resources Control Board's GeoTracker Database System, as well as the Alameda County Health Care Services Agency FTP Site. Should you have any questions, please contact Mr. Brent Wheeler, Manager of Wheeler Group Environmental, LLC (acting consultant for project) at (415) 686-8846 at your convenience.

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

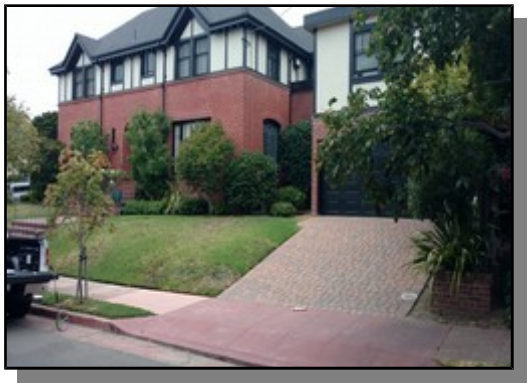
Respectfully Submitted,

Leslie Mulholland, trustee

Ms. Leslie Mulholland, Trustee
Leslie Mulholland Trust

Distribution: 1. Addressee
2. Megan K. Walsh, Esq. (meganwalshesq@gmail.com)

DATA GAP INVESTIGATION WORK PLAN



Mulholland Residence
132 Guilford Road, Piedmont, California 94611

APN 51-4676-19
GeoTracker Gobal ID No. T10000002521
Alameda County LOP Case No. RO0003070
WGE Project No. 2017110

August 25, 2017

Prepared For:

Leslie Mulholland Trust
132 Guilford Road, Piedmont, CA 94611

Prepared by:

Wheeler Group Environmental, LLC

369-B Third Street, Suite #221, San Rafael, CA 94901
Phone: 415-686-8846
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STATEMENT OF PROFESSIONAL CERTIFICATION

Document Title: Data Gap Investigation Work Plan

Location: Mulholland Residence
132 Guilford Road, Piedmont, California

California Business and Professions Code Section 7835 specifies that all geologic plans, specifications, reports, or documents shall be prepared by a professional geologist or registered specialty geologist, or by a subordinate employee under his or her direction. In addition, the document shall be signed by the professional geologist or registered specialty geologist or stamped with his or her seal, either of which shall indicate his or her responsibility for them.

This document is prepared in accordance with the California Business and Professions Code Section 7835 by a "professional geologist" as defined in the Geologist and Geophysicist Act (California Business and Professions Code commencing with Section 7800).

WHEELER GROUP
ENVIRONMENTAL LLC

Date: August 25, 2017

Brent A. Wheeler
Principal/Manager

Mark Youngkin
Professional Geologist No. 3888

Wheeler Group Environmental, LLC

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DATA GAP INVESTIGATION WORK PLAN

132 Guilford Road, Piedmont, California

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DATA GAP INVESTIGATION WORK PLAN

132 Guilford Road, Piedmont, California

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DATA GAP INVESTIGATION WORK PLAN

Mulholland Residence
132 Guilford Road, Piedmont, California
APN 51-4676-19
GeoTracker Gobal ID No. T10000002521
Alameda County LOP Case No. RO0003070
WGE Project No. 2017110

INTRODUCTION

On behalf of Leslie Mulholland Trust, Wheeler Group Environmental, LLC (Wheeler Group or WGE) submits this Data Gap Investigation Work Plan for the residential property located at 132 Guilford Road in Piedmont, California (Site or subject property). In 2010, one 200-gallon heating oil underground storage tank (UST) was removed from the Guilford Road frontage of the property with evidence of a heating oil release to soil and possibly water. The work plan was originally requested by the Alameda County Department of Environmental Health (ACDEH) in its letter dated June 29 2011. In its letters dated March 8, 2016 and April 10, 2017, the ACDEH required a Site Investigation Report be submitted presenting the results of additional subsurface investigation. In its letters, the ACDEH also suggested that sampling two private water supply wells located potentially within the plume radius from the property and additional soil borings with soil samples may be appropriate to address the outstanding data gaps. The purpose of this work plan is to present the procedures for subsurface investigation activities to address data gaps identified in the focused site conceptual model and evaluation of Low Threat Closure Policy criteria. The goal of the subsurface investigation is to provide information pertinent to the consideration of the Site for case closure under the Low-Threat Underground Storage Tank Case Closure Policy administered by the State Water Resources Control Board.

SITE LOCATION

The Site is located within a residential suburban neighborhood and surrounded by similar single-family residential structures. The Site is located at the north side of Guilford Road, approximately 136 feet west of its intersection with Highland Avenue in Piedmont, California; see Figure 1 titled Site Location Map. The Site occupies an approximately 100 by 64 foot hillside lot (approximately 6400 square foot) and is improved with a two-story single-family residence constructed circa 1930s. From the Site's position on a local ridge-top, the topography slopes to the west-southwest towards Piedmont Park and Bushy Dell Creek about 500 feet northwest of the Site. Piedmont High School and Piedmont Millennium High School are located approximately 600 feet west-northwest and 1,000 feet west=southwest of the Site across Bushy Dell Creek. Piedmont City Hall is located approximately 870 feet northwest of the Site. Schoolmates, a K-5 year old before- and after-school day care program is located in the Piedmont Recreation Center (358 Hillside Avenue), situated approximately 500 feet west of the Site. The drainage ravine of Wildwood

Creek is located about 1130 feet south of the Site. Figure 2 titled Site Vicinity Map shows the surrounding neighborhood and location of two nearby private water supply wells at 125 Guilford Road and 120 Hazel Lane.

Adjoining the Site on the east is a similar residence at 781 Highland Avenue with an equivalent elevation. To the north is a similar residence at 124 Guilford Road that appears higher in elevation than the subject. Across Guilford Road to the south are similar residences at 131 and 135 Guilford Road that appear lower in elevation than the subject property. To the west across Guilford Road is a similar residence at 129 Guilford Road that appears relatively similar in elevation to the subject. To the northwest across Guilford Road, an irrigation water well is present at the northeast corner of the 125 Guilford Road residence, with a higher surface elevation. Beyond the 125 and 129 Guilford Road properties is another inactive irrigation water well at 120 Hazel Lane.

SITE DESCRIPTION & CURRENT USE

The Site has been occupied for single-family residential purposes since circa the 1930s.

Posted Site Address:	132 Guilford Road
Site Location:	Piedmont
County:	Alameda
Elevation:	Appropriately 340 feet above mean sea level
Assessor's Parcel No:	51-4676-19
General Setting:	Residential Neighborhood
Property Type:	Single-family residence
Building Type:	Two-story wood frame with partial basement
Building size:	Approx. 3000 square feet
Lot Size:	Approx. 6400 square feet
Date of Construction	Circa 1930s
Basement:	Partial unfinished basement
Interior Layout:	Typical with multiple bedrooms and bathrooms
Exterior Layout:	Landscaping with detached garage
HVAC:	Natural gas and/or Electric
Source of Water:	Municipal Water District
Sewage Disposal:	Municipal
Solid Waste Disposal:	Municipal
Utilities:	Municipal water, electricity, natural gas, storm water, and sanitary sewer infrastructure is provided to the area by municipal companies
Primary Access:	Guilford Road
Number of Occupants:	One family
Current operations:	Residential

Figure 3–Site Plan shows the current configuration of the Site. The residential structure contains an attached garage with paver stone driveway leading to south side of Guilford

Road. The residence is elevated on the lot approximately 3 to 4 feet above the west and south Guilford Road street frontage grades, respectively. The house is situated on a partial basement used as a utility room under the southern portion of the residence. The residence was originally heated by a heating oil furnace (burner) formerly located in the basement against the northern wall. Product and return piping (now capped) protrudes from the basement floor at the former burner location. A possible UST vent pipe protrudes from the exterior wall at the southeast corner of the basement.

DATA GAP SUMMARY AND PROPOSED INVESTIGATION

The focused site conceptual model (SCM) is presented in Table 3 and the evaluation of Low-Threat Underground Storage Tank Case Closure Policy (LTCP) criteria for data gaps is presented in Table 4. The SCM and LTCP analysis identified the following data gaps:

1. The magnitude and extent of residual heating oil contamination of soil has not been delineated at the former UST location
2. The magnitude and lateral extent of heating oil impact to groundwater has not been evaluated
3. The direction of groundwater flow has not been determined
4. Site has not been evaluated for naphthalene contamination
5. Sensitive receptors exist at two private water wells that are located in close proximity to the estimated potential TPH plume length
6. The subsurface product piping beneath the floor slab of the basement has not been evaluated for a heating oil release

The ACDEH has suggested in its correspondence that additional subsurface investigation and the sampling of private water supply wells is a minimum work scope necessary to advance the case to closure with a deed restriction notifying future occupants of the potential for residual heating oil contamination on the property. ACDEH is considering a deed restriction to protect future land use from direct contact, volatilization to air and vapor intrusion risks posed by residual heating oil contamination.

To avoid a deed restriction or notification on the property, it appears necessary to delineate the degree and extent of residual heating oil contamination remaining at the margins of the 2010 excavation. Soil bores surrounding the former excavation limits would prove that residual soil contamination does not pose a risk to current and future land use. Product piping beneath the residence needs to be screened for leaks and the potential for vapor intrusion into the overlying residence.

The potential for groundwater contamination poses a risk of vapor intrusion to the subject residence and surrounding residences. The nearby private water wells are threatened with direct contact and incidental ingestion risks from groundwater contamination. Additional water sampling is needed both in the immediate vicinity of the former UST location and from the private water supply wells to discount potential risks. The direct measurement of the groundwater flow direction would aid in the evaluation of potential groundwater contamination.

To achieve regulatory case closure under the LTCP criteria with unrestricted land use, additional subsurface investigation is required at the Site in addition to water sampling of two offsite private water supply wells. The following table presents the rationale for the proposed investigation work to address each data gap.

Data Gaps Summary and Proposed Investigation

Data Gap	*Data Gap Description*	*Proposed Investigation to Address Data Gap*	*Rationale*
1	The magnitude and extent of residual heating oil contamination of soil has not been delineated at the former UST location and ACDEH is considering a deed restriction or notification on the property	Excavation limit borings with soil sampling at 0-5, 5-10 and 15 fbg to determine if residual heating oil contamination presents a significant risk to human health and the environment. Additional samples to determine condition along product piping in front yard of residence	Laboratory analysis of 0-5 and 5-10 foot soil samples for Benzene, ethylbenzene and Naphthalene needed for comparison to LTCP Table 1. Deeper 15 foot soil sample for vertical definition of soil contamination
2	The magnitude and lateral extent of heating oil impact to groundwater has not been evaluated	Three grab groundwater samples from two exploratory borings in potential down-gradient directions south and southwest and from boring adjacent to subject residence	Residual groundwater contamination poses a potential risk of vapor intrusion to surrounding residence structures and future land use
3	The direction of groundwater flow has not been determined	Install temporary well casing in three borings to create piezometers and measure groundwater elevations to estimate direction of groundwater flow	Groundwater flow direction is uncertain and may range from south to northwest−estimation of flow direction would allow groundwater sample to verify plume has not migrated offsite
4	Site has not been evaluated for naphthalene contamination	Additional soil samples to be analyzed for naphthalene to use in comparison to LTCP Table 1 concentrations that will have no significant impact to human health	To achieve case closure without land use restriction−the analysis of soil samples for naphthalene from 0-5 and 5-10 fbg is necessary
5	Sensitive receptors exist at two private water wells located in close proximity to the estimated potential TPH plume length	Grab groundwater samples collected from two private water well head spigots for analysis of petroleum hydrocarbons	The potential threat of petroleum contamination to an existing water well is a serious impediment to case closure

6	The condition of subsurface product piping beneath the floor slab of the basement has not been evaluated for a heating oil release	A sub-slab vapor probe with vapor sample is a quick and effective method to screen the entire basement floor for a heating oil release from product piping or leak from former oil burner location	It is difficult to determine the location of subsurface piping making soil sampling unreliable−the vapor intrusion risk from a heating oil release beneath the floor slab can be quickly evaluated with a sub-slab vapor sample

Based on the outstanding data gaps identified in the site conceptual model and evaluation of LTCP criteria, Wheeler Group proposes the additional investigation scope of work as presented in the following sections.

Description of Proposed Data Gap Investigation

Boring Label	*Depth Feet*	*Proposed Subsurface Investigation to Address Data Gap*	*Sample Data Collected*	*Laboratory Analyses*
B1	15	Lateral and vertical definition of residual soil contamination providing excavation limit confirmation soil sample on north side of former UST excavation	Soil sample at 5, 10 and 15 feet and other intervals as needed based on field observations	TPH as Diesel, BTEX, MTBE, naphthalene
B2	15	Lateral and vertical definition of soil contamination providing excavation limit confirmation soil sample on west side of former UST excavation	Soil sample at 5, 10 and 15 feet and other intervals as needed based on field observations	TPH as Diesel, BTEX, MTBE, naphthalene
B3	15	Lateral and vertical definition of soil contamination providing step-out soil sample on south side of UST excavation; determine groundwater impact and direction of flow	Soil sample at 5, 10 and 15 feet and other intervals as needed based on field observations, grab groundwater sample	TPH as Diesel, BTEX, MTBE, naphthalene
B4	15	Lateral and vertical definition of soil contamination providing excavation limit soil sample on east side of excavation	Soil sample at 5, 10 and 15 feet and other intervals as needed based on field observations	TPH as Diesel, BTEX, MTBE, naphthalene
B5	15	Lateral definition of soil contamination as step-out boring on north side of UST and soil sample along product piping run	Soil sample at 5, 10 and 15 feet and other intervals as needed based on field observations	TPH as Diesel, BTEX, MTBE, naphthalene
B6	15	Determine impact along product and vent piping at residence, determine groundwater impact adjacent to residence and direction of flow	Soil sample at 5, 10 and 15 feet and other intervals as needed, grab groundwater sample	TPH as Diesel, BTEX, MTBE, naphthalene
B7	15	Determine groundwater impact and direction of flow, lateral definition of soil contamination if needed	Soil sample at 5, 10 and 15 feet and other intervals as needed based on field observations,	TPH as Diesel, BTEX, MTBE, naphthalene

			grab groundwater sample	
SS1	1	Sub-slab vapor probe in basement floor in vicinity of former heating oil burner and underground product lines	Sub-slab vapor sample from beneath concrete floor slab	TPH as Diesel, BTEX, MTBE, naphthalene
2 Private Wells	Surface	Water sampling of two private water supply wells that are potential sensitive receptors	Grab water sample from two well head spigots	TPH as Diesel, BTEX, MTBE, naphthalene

DATA GAP INVESTIGATION WORK PLAN

Wheeler Group is proposing additional site investigation in the form of soil, soil vapor and groundwater sampling to address the data gaps identified in the focused SCM and evaluation of LTCP criteria. The proposed sampling locations are shown on Figure 3−Site Plan. The following sections describe the procedures for the proposed investigation work.

Scope/Sequence of Work Activities

The general scope of work and sequence of activities described in this work plan include:

- Obtain boring permit as necessary from Alameda County Public Works Agency−Water Resources Section, and if necessary, from the City of Piedmont Public Works Department for drilling work conducted in the public right of way
- Outline the proposed work area and boring locations in white surface paint and notify Underground Service Alert to clear for subsurface public utilities extending through the designated work area(s)
- Prepare the Site Health & Safety Plan for all proposed field work and schedule and notify all parties of the confirmed field drilling/sampling date
- Using hydraulic push drilling equipment, Wheeler Group and EnProbe Environmental Drilling Services (EnProbe) will drill up to 7 borings to a maximum depth of 15 fbg if bedrock conditions allow (hard bedrock was encountered at 9½ fbg during UST removal)
- Collect discrete soil samples from the borings at approximate depths of 0-5, 5-10 and 15 fbg as feasible, actual sample depths may vary based on the results of field screening and field evidence of soil contamination
- Appropriately seal, cap and label all soil samples for chilled storage
- Wheeler Group will log a continuous soil profile in each borehole beginning at grade surface and continuing to the total depth of each boring; field screen soil cuttings at all soil sample intervals for total Volatile Organic Compounds (VOCs) using a calibrated photoionization detector (PID)
- Wheeler Group will initially monitor the selected boreholes for water, if any, and free petroleum product and collect a water sample from three bores for the laboratory analysis of petroleum hydrocarbons
- In bores B3, B6 and B7, Wheeler Group will instruct EnProbe to install capped 0.75-inch diameter well screen to provide three temporary piezometers
- Wheeler Group will perform a wellhead elevation survey using the temporary piezometers to estimate the local direction of groundwater flow
- Backfill all boreholes with Portland cement to within one foot of surface and finish borehole to match existing surface conditions
- Collect a water sample from the well head spigots of two private water supply wells located at nearby residences of 125 Guilford Road and 120 Hazel Lane

- Install one sub-slab vapor probe and recover one soil gas sample from beneath floor of residence basement
- Deliver soil, soil gas and water samples under chain-of-custody procedures to a State-certified analytical laboratory for the analysis of petroleum hydrocarbons
- Store all waste sample soil and equipment wash/rinse water in secured temporary storage containers pending off-site disposal at a State-licensed landfill/recycling facility
- Profile and transport all solid and liquid waste to respective State-licensed disposal facilities, remove and properly dispose of all used well casing
- Upload all investigative analytical data and required documentation to the State GeoTracker Database System
- Wheeler Group will interpret all data and prepare a technical report summarizing the activities, findings, and conclusions of the field investigation activities

Wheeler Group presents the following procedures for the additional investigation activities in the following sections.

Health And Safety Plan

All contractors will be responsible for operating in accordance with the most current requirements of State and Federal Standards for Hazardous Waste Operations and Emergency Response (Cal. Code Regs., tit. 8, section 5192; 29 CFR 1910.120). Onsite personnel are responsible for operating in accordance with all applicable regulations of the Occupational Safety and Health Administration (OSHA) outlined in the State General Industry and Construction Safety Orders (Cal. Code Regs., tit. 8) and Federal Construction Industry Standards (29 CFR 1910 and 29 CFR 1926), as well as other applicable federal, state and local laws and regulations. All personnel shall operate in compliance with all California OSHA requirements. In addition, California OSHA's Construction Safety Orders (especially Cal. Code Regs., tit. 8, sections 1539 and 1541) will be followed as appropriate. Specific requirements are identified below:

- At least 72 hours prior to initiating field work, Wheeler Group will surface mark all proposed work area(s) in white marking paint and notify Underground Service Alert (USA). All subsurface utility agencies must mark out all underground utility locations within public right of way extending through general work area(s), and if high priority subsurface utilities are present within 10 feet of proposed excavation(s), Wheeler Group will meet with specific utility agencies to identify exact locations (Title 8, Section 1541)
- Site work traffic controls and warning sign placement must conform to the requirements of the State Department of Transportation's California Manual on Uniform Traffic Control Devices for Streets and Highways, September 26, 2006 (Title 8, Sections 1598 & 1599).

Wheeler Group will prepare a site-specific Health & Safety Plan (HASP) for the Site in accordance with current health and safety standards as specified by the federal and California OSHA's. The HASP will be reviewed and updated if needed for future work. The

provisions of the HASP are mandatory for all personnel of the proposed project and its contractors who are at the Site. The contractor and its subcontractors doing fieldwork in association with this work plan will either adopt and abide by the HASP or shall develop their own safety plans which, at a minimum, meet the requirements of this HASP. All onsite personnel shall read the HASP and sign the "Plan Acceptance Form" before starting daily Site activities.

Pre-Field Work Activities

Wheeler Group will submit a completed subsurface drilling permit application and associated permit fee to the Alameda County Public Works Agency (ACPWA)−Water Resources Section. If warranted, for Boring B3 proposed in the public right of way, Wheeler group will also submit an encroachment permit application and fee to the City of Piedmont Public Works Department. Wheeler Group will arrange and schedule all drilling and laboratory subcontractor services. At least 72 hours before commencing field activities, Wheeler Group will notify the property owner and tenant(s) as well as the local agencies of all scheduled work activities, and will visit the site and outline the proposed work areas in white surface paint and subsequently notify Underground Service Alert (USA) to locate and mark any subsurface utilities extending through the designated work areas. Prior to commencing drilling activities, Wheeler Group will conduct a tailgate safety meeting with all site personnel addressing all information provided in the Site Health & Safety Plan (HASP), as presented above in the section on Health & Safety Plan.

Equipment Decontamination & Waste Storage

All drilling and sampling equipment will be cleaned between each sampling location using a non-phosphate Alconox® solution and double rinsed using clean, potable water. The equipment wash and rinse water generated from the decontamination of soil boring and sampling equipment or other derived liquid waste generated during the proposed sampling activities will be immediately transferred to 55-gallon, D.O.T.-approved liquid steel drum(s), properly labeled and stored onsite in a secure area. Drill cuttings, if generated, and excess sample soil not submitted for laboratory analysis will not be returned to the boreholes, and will immediately be transferred to 5-gallon plastic pails for temporary storage during drilling operations. Periodically, the drill cuttings, if any, and waste sample soil will be transferred to a separate 55-gallon solid waste storage drum, to be properly labeled and stored onsite.

Drilling and Soil Sampling

As required per agency drilling permit conditions, each proposed soil boring will be drilled by a California-licensed Water Well Drilling Contractor (C-57) EnProbe Environmental Drilling Services (EnProbe). At each location, the driller will hand auger a 2.5-inch diameter borehole to the designated depth of 4.5 feet below grade while simultaneously transferring soil cuttings to a 5-gallon plastic bucket. The purpose of the hand-auger drilling is to clear the boring locations for unmarked underground utilities and the underground sanitary

sewer lateral reportedly extending in the northwest-southeast direction along the south side of the residence, see Figure 3–Site Plan.

The driller will advance each boring to a total depth of 15 fbg, if feasible, using a limited access, hydraulic Geo Probe drilling rig (or similar equipment) equipped with 2.25-inch diameter steel, concentrically-cased steel drill tubes. Discrete soil samples will be collected in each borehole between 4.5 and 15 fbg by advancing a butyrate plastic, tube-lined core sampler (1.5-inch-diameter) approximately 4 feet into relatively undisturbed soil. Soil samples will be collected continuously. Discrete soil samples will collected at 0-5, 5-10 and 15 fbg for laboratory analysis, as feasible. Additional discrete soil samples will be recovered at changes of lithology, at the soil/groundwater interface, and at areas showing obvious contamination (i.e., petroleum staining and/or hydrocarbon odor).

Wheeler Group will classify and log all soil extracted from each borehole using the Unified Soil Classification System and Munsell Soil Color Chart, and monitor and record the organic vapor concentrations of selected soil samples using a MiniRae photo ionization detector (PID). All borings will be logged under the supervision of a California-registered Civil Engineer/Geologist. Soil samples retained for laboratory analysis of petroleum hydrocarbons will be immediately sealed with Teflon tape and plastic caps, appropriately labeled, and placed in a cooler chilled to approximately 4° C. Drill cuttings will not be returned to the boreholes and boreholes will be sealed with neat cement. Drill cuttings, if any, will be stored in a properly labeled 55-gallon solid waste drum for off-site disposal and/or recycling.

Grab Groundwater Sampling

Following drilling and soil sample collection in each borehole, Wheeler Group will instruct the drilling contractor to place factory-sealed, 0.75-inch diameter, screened PVC well casing (threaded with bottom cap) to the total depth of borehole B3, B6 and B7 to expedite water sampling and pre-filter the groundwater of coarse-grained sediments. Wheeler Group will periodically measure and record the depth to groundwater in the temporary casing using an electronic water level indicator or oil/water phase indicator and determine when the groundwater level recovers to a level allowing water sampling. Wheeler Group will obtain all measurements relative to the approximate north side of the top of casing (TOC), with an accuracy of 0.01 foot. When a sufficient groundwater volume is present in the borehole, Wheeler Group will immediately collect a grab groundwater sample within the PVC casing using a dedicated disposable polyethylene or Teflon bailer.

The volatile water samples will be collected and poured directly into laboratory cleaned 40-milliliter volatile organic analysis (VOA) vials (pre-preserved with hydrochloric acid) to prevent loss of any volatile constituents. The vials will be filled slowly and in such a manner that the meniscus extends above the top of the VOA vial. After the vials are filled and sealed with a laboratory provided Teflon cap, they will be inverted to insure there is no head space or entrapped air bubbles. The non-volatile water samples for TPH as Diesel analysis will be collected in laboratory-provided, 1-liter amber bottles using a low-flow peristaltic pump and dedicated Teflon tubing. All samples will be labeled and placed in a

cooler chilled to approximately 4°C. Wheeler Group will submit the samples under a chain of custody to the analytical laboratory for chemical analysis.

Temporary Piezometer Elevation Survey

After drilling activities are completed, Wheeler Group will monitor the depth to groundwater in each temporary piezometer and perform a preliminary elevation survey at Borings B3, B6 and B7, as designated on Figure 3—*Site Plan*. Wheeler Group will initially monitor and record the depth to groundwater and presence of free product in each temporary well using an electronic water level indicator and oil/water phase indicator, respectively. Wheeler Group will then survey the top of casing and associated grade elevation of each temporary piezometer to the nearest 0.01 foot. Elevations will be measured relative to a local benchmark with known elevation (Mean Sea Level) or arbitrary datum point using an assumed elevation. Wheeler Group will then calculate the approximate groundwater gradient and flow direction across the Site.

Backfilling of Exploratory Borings

Immediately following the conclusion of soil and water sampling activities and groundwater elevation surveying, Wheeler Group will extract the temporary well casing, if present, and backfill each borehole with neat Portland cement up to approximately 1 fbg. In boreholes with standing water, a tremie pipe will be used to place Portland cement starting at the bottom of the borehole. The used PVC well casing will be rinsed and disposed of appropriately at an offsite facility as non-hazardous waste. The balance of the borehole will be backfilled with appropriate cover material to restore original Site conditions.

Private Water Supply Well Sampling

Two private water supply wells are known to exist at 125 Guilford Road and 120 Hazel Lane. Wheeler Group understands that both water wells were used for landscape irrigation purposes at single-family residences. The two water supply wells are potentially within the down-gradient groundwater flow direction. To resolve the data gap concerning plume length, the ACDEH suggested that both water supply wells be sampled for petroleum hydrocarbons. The property owners relate that the well heads are difficult to access and water sampling of the accessible well head spigot appears appropriate in this case. Wheeler Group proposes to sample both water supply wells by disconnecting the hosing at the well head spigot. Water samples will not be collected from plastic piping. The spigot would be allowed to run for several minutes to purge stale water from the well prior to disconnecting the irrigation system. Standard water parameters of Temperature, pH, Oxidation-Reduction Potential (ORP), Resistivity, and Total Dissolved Solids (TDS) would be monitored using a portable water quality meter and recorded on a field sheet to document the well water has stabilized and fresh groundwater is issuing from the well head spigot. Wheeler Group will inspect the water for evidence of hydrocarbon odor and petroleum sheen.

Using laboratory supplied glassware consisting of 1-liter amber bottles for TPH as diesel analysis and 40-ml VOA bottles for volatile compound analysis, Wheeler Group will collect a sufficient volume of water as required by the analytical laboratory. The volatile water samples will be collected and poured directly into laboratory cleaned 40-milliliter volatile organic analysis (VOA) vials (pre-preserved with hydrochloric acid) to prevent loss of any volatile constituents. The vials will be filled slowly and in such a manner that the meniscus extends above the top of the VOA vial. After the vials are filled and sealed with a laboratory provided Teflon cap, they will be inverted to insure there is no head space or entrapped air bubbles. The water samples will placed in a chilled cooler at approximately 4ºC for temporary storage and transport under chain-of-custody command to the analytical laboratory.

Soil Gas Sampling

Wheeler Group will collect a sub-slab vapor sample from one field point SS1 to evaluate the potential for vapor intrusion. The sampling field point is located in the basement of the residential structure as shown on Figure 3–Site Plan. A soil gas vapor probe will be installed utilizing commercially available Vapor Pin sub-slab soil gas sampling device provided by Cox-Colvin. The Vapor Pin is designed for use in sub-slab soil gas sampling. The Vapor Pin device is a single piece installation eliminating potential leak points and uses a silicone sleeve to form an air-tight seal with the side of the drill hole. The area of the vapor point will first be cleared of surface covering and hand washed with an Alconox solution. Wheeler Group and the drilling contractor will use a hammer drill to drill a 5/8" hole, clean the drill cuttings from the hole with a brush and drill a 1½" surface hole to flush mount a pin cover. The Vapor Pin device is installed as described in the attached documentation titled *Standard Operating Procedure Installation and Extraction of the Vapor Pin* in the Appendix. Following the soil gas sampling, Wheeler Group will leave the temporary vapor probe installed for future additional vapor sampling, if needed.

Soil Gas Sampling Train

A soil gas sample will be collected following the procedures provided in DTSC's July 2015 Advisory–Active Soil Gas Investigations. Wheeler Group will wait at least 48 hours following the completion of borehole drilling before conducting the soil gas sampling. The appropriate purge volume will be 3 in accordance with the current advisory for soil gas investigations, to allow the soil vapor conditions to approach representative, ambient conditions after probe emplacement. The associated shut-in tests, leak testing, purging volume testing, and soil gas sampling will not be conducted until equilibration has occurred, at least 48 hours following completion of probe installation. A brief description of each soil gas assembly test is provided below. Figure 7, Schematic of Soil Vapor Sampling, shows the equipment setup and sampling train utilized for sub-slab vapor sampling.

For collection and analysis of VOCs and Fixed Gases, a laboratory-supplied 6-liter purge canister and a 1-liter sample canister will be connected into a manifold using an inline 2-micron filter, a flow controller preset at a 150 milliliters/minute flow rate, and a dual valve

assembly (V1 and V2). The sample canister, manifold, valves and the superior portion of the sub-slab vapor probe (at grade surface) will be connected using laboratory supplied Teflon tubing and Swagelok compression fittings. The sample canister and manifold assembly will be connected directly to the above-grade tubing of the newly-installed vapor probe. Clean laboratory-supplied canisters, manifold assemblies, and new Teflon tubing will be used at each sampling location. The laboratory will connect the vacuum gauges directly to each Summa canister prior to shipment. Per soil gas advisory specifications, flow rates between 100 and 200 milliliters per minute and an applied vacuum less than 100 inches of water should be maintained throughout purging and sampling to minimize both ambient air infiltration from dilution of samples and partitioning of vapors from pore water to soil gas, to help ensure collection of a representative soil gas sample.

Shut-In and Leak Testing

A shut-in test will be conducted to check for leaks in the above-grade sampling system. After assembly of the soil vapor sampling train as shown in Figure 7, Wheeler Group will close Valve V1 and apply a vacuum at the 6-liter purge canister and continually observe the vacuum gauge(s) for at least 1 minute (standard time at 10 minutes) to confirm that there is no observable loss in vacuum. Should a loss in vacuum occur, Wheeler Group will immediately close the valve at the purge canister and adjust all inline fittings between V1 and the purge and sample canisters. After validation of the shut-in test is completed, the soil gas sampling train will not be disconnected or altered, and the subsequent leak test can be performed. A leak test is conducted during sample collection to check if ambient air is introduced into the soil gas sample and evaluate overall integrity of the sample. The introduction of ambient air into the soil gas sample will likely dilute or alter the actual site contaminant concentration.

Atmospheric leakage generally occurs through faulty valves/gauges and loose fittings in the soil gas sampling train, and by advection through voids in the vapor probe construction material, borehole wall and directly through the soil column itself. The leak check compound, isopropyl alcohol (IPA; CAS #67-63-0), is applied at the vapor probe inlet at grade surface, throughout the duration of the sampling event. Wheeler Group recommends using a shroud enclosure with minimal volume during the sampling of each vapor probe to ensure that a relatively high concentration of the leak check compound is maintained throughout the sampling event, and that the volatile tracer concentrations within the shroud be monitored and recorded periodically at 3-minute intervals using a calibrated PID.

The enclosure will be placed over the inlet of the soil vapor probe and contain at least the vapor tight valve V1 and associated sections of Teflon tubing. IPA would be applied directly to a gauze or cloth and placed on the floor surface near the vapor probe inlet, whereas a gaseous tracer compound would be infused directly surrounding the vapor sampling train assembly within the shroud enclosure. The selected leak check compound should not be a suspected site contaminant, and should be included in the laboratory analyte list. If warranted, a leak check sample canister (or associated tubing inlet) can be placed within the shroud enclosure and sampled concurrently with the soil gas sample.

Soil Gas Sample Collection

After a sufficient volume of vapor has been evacuated from the sampling assembly, Wheeler Group will perform soil gas sample collection. If a leak check canister is utilized, it will be connected to a separate manifold system "J-Tube" consisting of a 2-micron filter, flow controller, and a single valve assembly, and connected directly to Teflon tubing that extends within the shroud enclosure. Wheeler Group will place clean gauze saturated with IPA within the interior of the shroud enclosure throughout the duration of each sampling period, and continuously monitor the interior atmospheric concentration of the shroud with a MiniRae® PID. Wheeler Group will record the interior shroud VOC concentrations approximately every three minutes.

Wheeler Group will initially close the purge canister and open the valves for the 1-liter sample and leak detection canisters, and begin sample collection. Sampling will be terminated at each location when the sample canister vacuum gauge shows approximately 5 inches of mercury (adequate sample volume and suggested vacuum for sample extraction according to laboratory). Each sample canister will be disconnected from the sample train assembly, appropriately labeled and placed in a box or cooler (non-chilled) for return transport to the laboratory. The results of the soil vapor analysis will be confirmed with duplicate vapor samples (at a rate of 10% of the soil vapor samples) collected simultaneously in additional Summa canisters utilizing a duplicate manifold assembly.

Wheeler Group will utilize Thermal Desorption (TD) Tubes for collection and analysis of TPH as Diesel and Naphthalene using EPA method TO-17. Laboratory-provided stainless tubes are factory packed with specialized adsorbent and sealed at each end with threaded Swagelok caps, then wrapped in tin foil, and shipped from the laboratory on blue ice. At each sample location, the TD tubes (2) are connected in series with Tygon or Teflon tubing to the soil gas wellhead point. The effluent end of the TD tubes are then connected with additional tubing to a low flow sampling pump, also provided by the laboratory. The pump is activated and the sample is collected by drawing approximately 2 liters of air through the TD tubes, absorbing the contaminant onto the interior media of each tube (sample duration @ 20 minutes). The sample/pump assembly is disconnected and the TD tubes are immediately re-capped with the Swagelock fittings, labeled, appropriately wrapped/sealed, and placed in blue ice for lab delivery.

Laboratory Analysis Plan

A copy of the certified laboratory analytical reports associated with the sampling events will be presented in technical report. Tables in the technical report will present a summary of the analytical results for the sampling events as well as data generated during previous sampling events at the Site.

Laboratory Analysis of Soil Samples

Wheeler Group will submit all collected soil samples under formal chain of custody command to Torrent Laboratories Inc. of Milpitas, California, a State-certified stationary laboratory (ELAP No. 1991) to perform the laboratory analyses of the following constituents:

- Total Petroleum Hydrocarbons (TPH) as Diesel (C10-C28) by EPA Method SW8015B(M)
- Benzene, Toluene, Ethyl Benzene, Total Xylenes (BTEX), MTBE and Naphthalene by EPA Method SW8260B

The laboratory will complete all volatile organic analyses within the 14-day required time limit for analysis.

Laboratory Analysis of Groundwater Samples

Wheeler Group will submit all collected water samples under formal chain of custody command to Torrent Laboratories Inc. of Milpitas, California, a State-certified stationary laboratory (ELAP No. 1991) to perform the laboratory analyses of the following constituents:

- Total Petroleum Hydrocarbons (TPH) as Diesel (C10-C28) by EPA Method SW8015B
- Benzene, Toluene, Ethyl Benzene, Total Xylenes (BTEX), MTBE and Naphthalene by EPA Method SW8260B

The laboratory will complete all volatile organic analyses within the 14-day required time limit for analysis.

Laboratory Analysis of Soil Gas Samples

Wheeler Group will submit the soil gas samples collected under chain of custody command to Torrent for chemical air analysis. The samples will be analyzed using the following California Department of Health Services approved methods:

- Fixed Gases of Methane, Carbon Dioxide and Oxygen by ASTM Method D-1946
- TPH as Diesel range organics by Method TO-17
- Volatile Organic Compounds (VOCs; Full List) by Method TO-15
- Naphthalene by Method TO-17

The leak check canister sample will be analyzed only for 2-Propanol (Isopropyl Alcohol – IPA) by Method TO-15.

WASTE MANAGEMENT

All petroleum hydrocarbon-impacted soil generated during the soil boring and sampling activities will be transferred directly to 55-gallon drums and temporarily stored onsite in a secure area. Pending receipt of the composite stockpile soil sample analysis, Wheeler Group and subcontractors will subsequently profile and transport the containerized waste to an appropriate State-licensed disposal facility under uniform waste manifest. A copy of the solid waste manifest and associated weight ticket will be included in the technical report.

All drilling and sampling equipment wash and rinse water generated during the additional investigation activities will be transferred to separate 55-gallon D.O.T. approved steel drums and stored onsite in a secure area. All waste liquid containers will be sealed and appropriately labeled and securely stored onsite pending future disposal at a State-licensed disposal or recycling facility. The liquid waste will be profiled for disposal/recycling under uniform waste manifest following receipt of the laboratory results of groundwater sample analysis.

SCHEDULE AND APPROVAL

Wheeler Group anticipates beginning the pre-field activities within two weeks of receiving authorization to proceed from ACDEH and the client. Excavation, drilling and soil sampling should occur during October-November 2017, depending on work plan approval, client approval, permitting from both ACPWA and City of Piedmont and subcontractor driller availability.

GEOTRACKER UPLOAD

Wheeler Group will upload all analytical data (EDF) as well as the Fluid-Level Monitoring Data (GEO_WELL) to the State Water Resources Control Board's GeoTracker Database System. Wheeler Group also will upload a copy of all boring logs (GEO_BORE), a revised Site Plan (GEO_MAP) and a copy of the report of findings (GEO_REPORT) in Portable Data Format (PDF) to the GeoTracker Database. A copy of each associated GeoTracker Upload Confirmation Form will be included in the appendices of the resulting report.

REPORT DISTRIBUTION

This document was distributed to the following parties:

Ms. Leslie Mulholland Leslie Mulholland Trust 132 Guilford Road Piedmont, California 94611 airleslie@hotmail.com	1 PDF Work Plan via Email
Megan K. Walsh, Esq. Owner/Lead Attorney Oakland, California meganwalshesq@gmail.com	1 PDF Work Plan via Email
Mark Detterman, PG, CEG Alameda County Department of Environment Health 1131 Harbor Bay Parkway, Suite 250 Alameda, California 94502-6577 mark.detterman@acgov.org	1 PDF Work Plan via GeoTracker 1 PDF Work Plan via ACDEH−FTP

LIMITATIONS

It should be understood that all environmental assessments are inherently limited in that conclusions are drawn and recommendations developed from information obtained from limited research and visual observations. Subsurface conditions change significantly with distance and time and therefore may differ from the conditions implied by subsurface investigation. Existing hazardous materials and contaminants can escape detection using existing methods. The work performed in conjunction with this assessment and the data developed are intended as a description of available information at the dates and location given. Wheeler Group's professional services have been performed, with findings obtained and recommendations prepared in accordance with customary principles and practices in the field of environmental science, at the time of the assessment. This warranty is in lieu of all other warranties either expressed or implied.

Wheeler Group is not responsible for the accuracy of information reported by others or the independent conclusions, opinions or recommendations made by others based on the field exploration presented in this report. The findings contained in this report are based upon information contained in previous reports of corrective action activities performed at the subject property and based upon site conditions as they existed at the time of the investigation, and are subject to change. The scope of services conducted in execution of this phase of investigation may not be appropriate to satisfy the needs of other users and any use or reuse of this document and any of its information presented herein is at the sole risk of said user. The figures, drawings and plates presented in this report are only for the purposes of environmental assessment and no other use is recommended. No other third party may rely on this report, figures or plates for any other purpose.

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DATA GAP INVESTIGATION WORK PLAN

132 Guilford Road, Piedmont, California

APN 51-4676-19

GeoTracker Gobal ID No. T10000002521

Alameda County LOP Case No. RO0003070

WGE Project No. 2017110

FIGURES, TABLES & PHOTOGRAPHS

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Figure 2 – Site Vicinity Map
Figure 3 – Site Plan
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Figure 6 – Potential TPH Plume Map
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Table 1 - Soil Sample Laboratory Analysis Results for Petroleum Hydrocarbons
Table 2 - Water Sample Laboratory Analysis Results for Petroleum Hydrocarbons
Table 3 - Focused Site Conceptual Model for Mulholland Residence
Table 4 - Evaluation of Low Threat Closure Policy Criteria for Data Gaps

Site Photographs Page 1
Site Photographs Page 2

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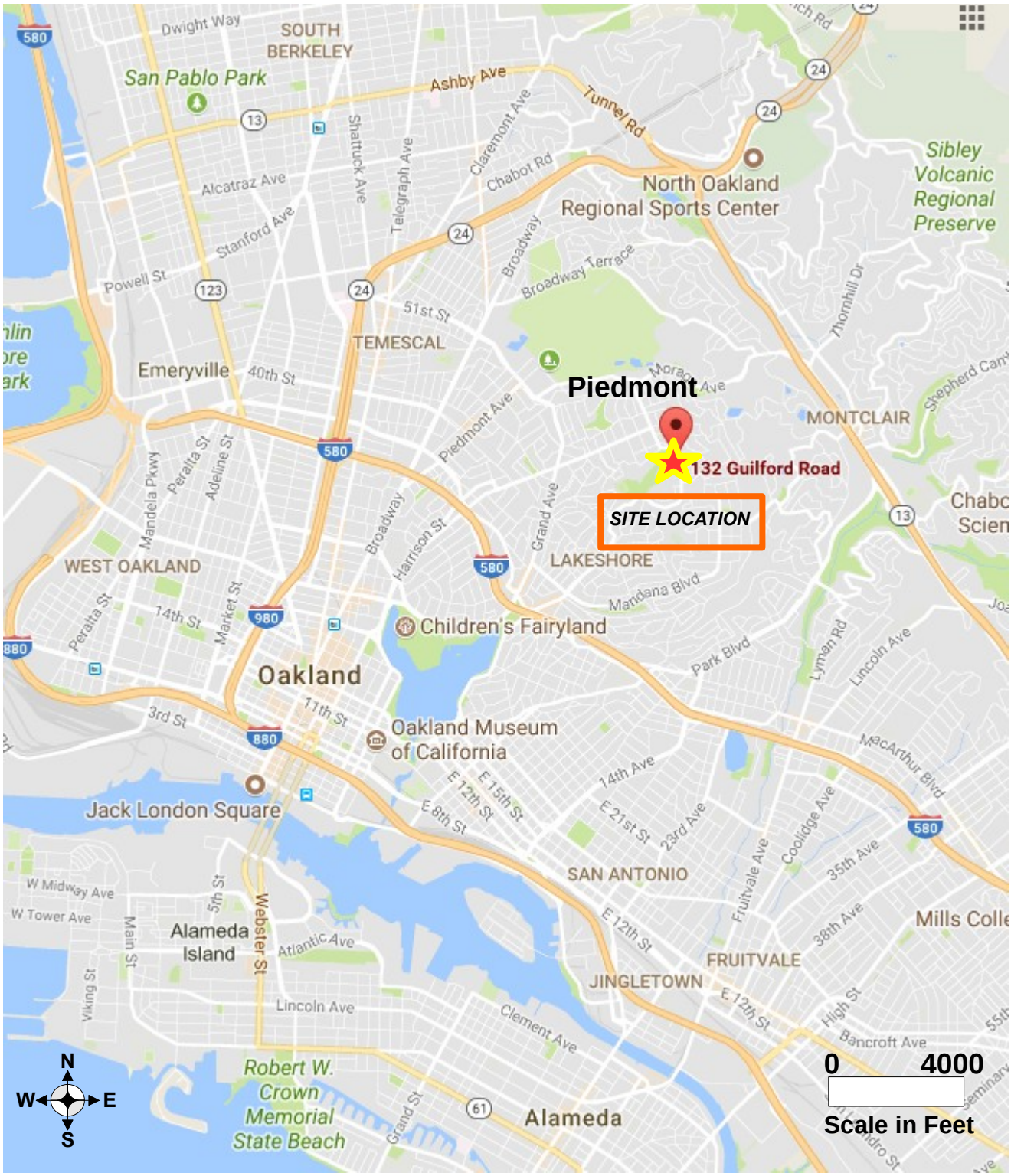
Phone: 415-686-8846

Project no. 2016105



Base map is a low resolution screen capture from Google Map data 2017

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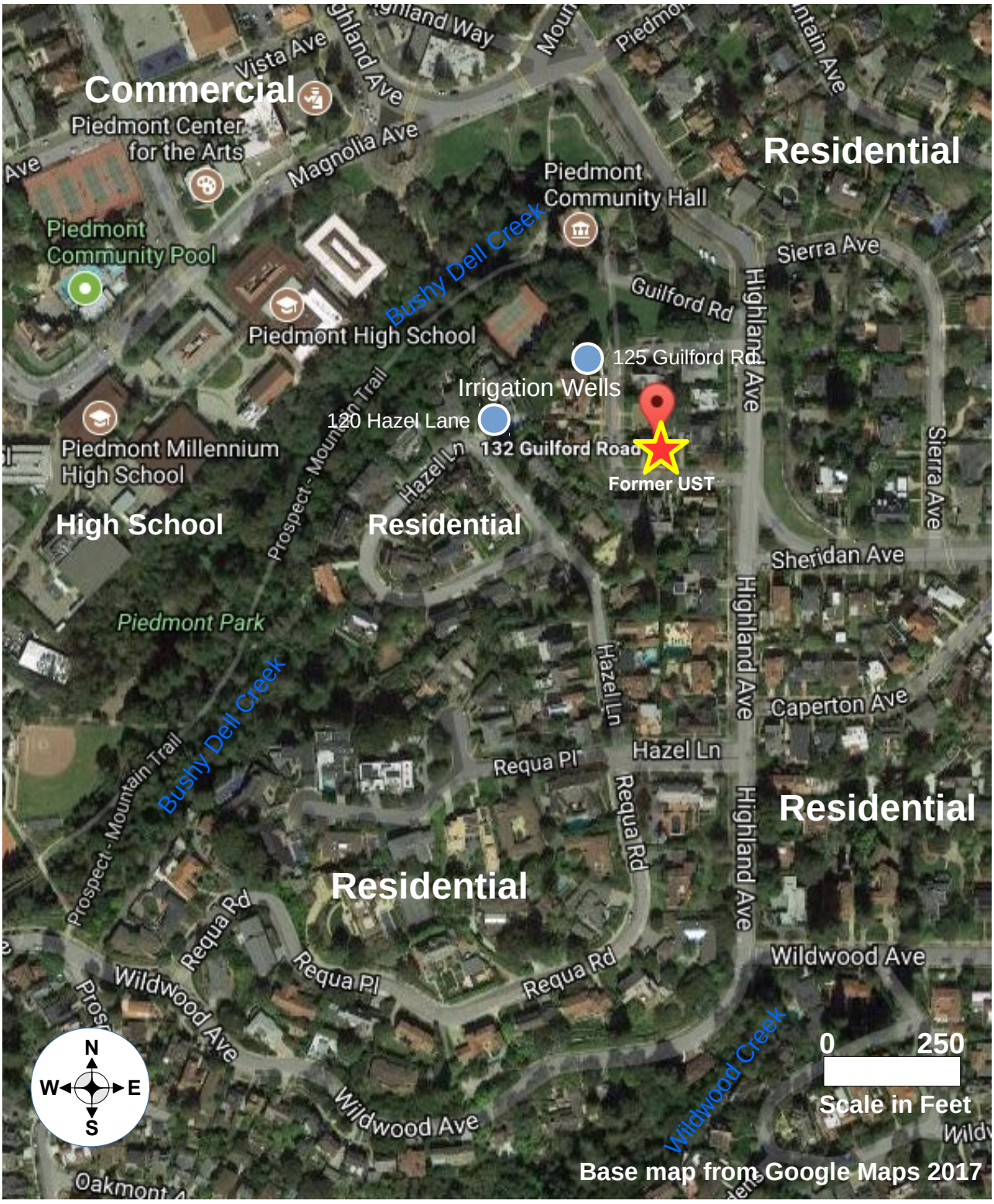
SITE LOCATION MAP
Data Gap Investigation Work Plan
132 Guilford Road, Piedmont, California

Project No. 2017110	*FN: 2017110_Fig1_SiteLocationMap.odg*	*Drawing: MY Aug. 2017*	***Figure 1***



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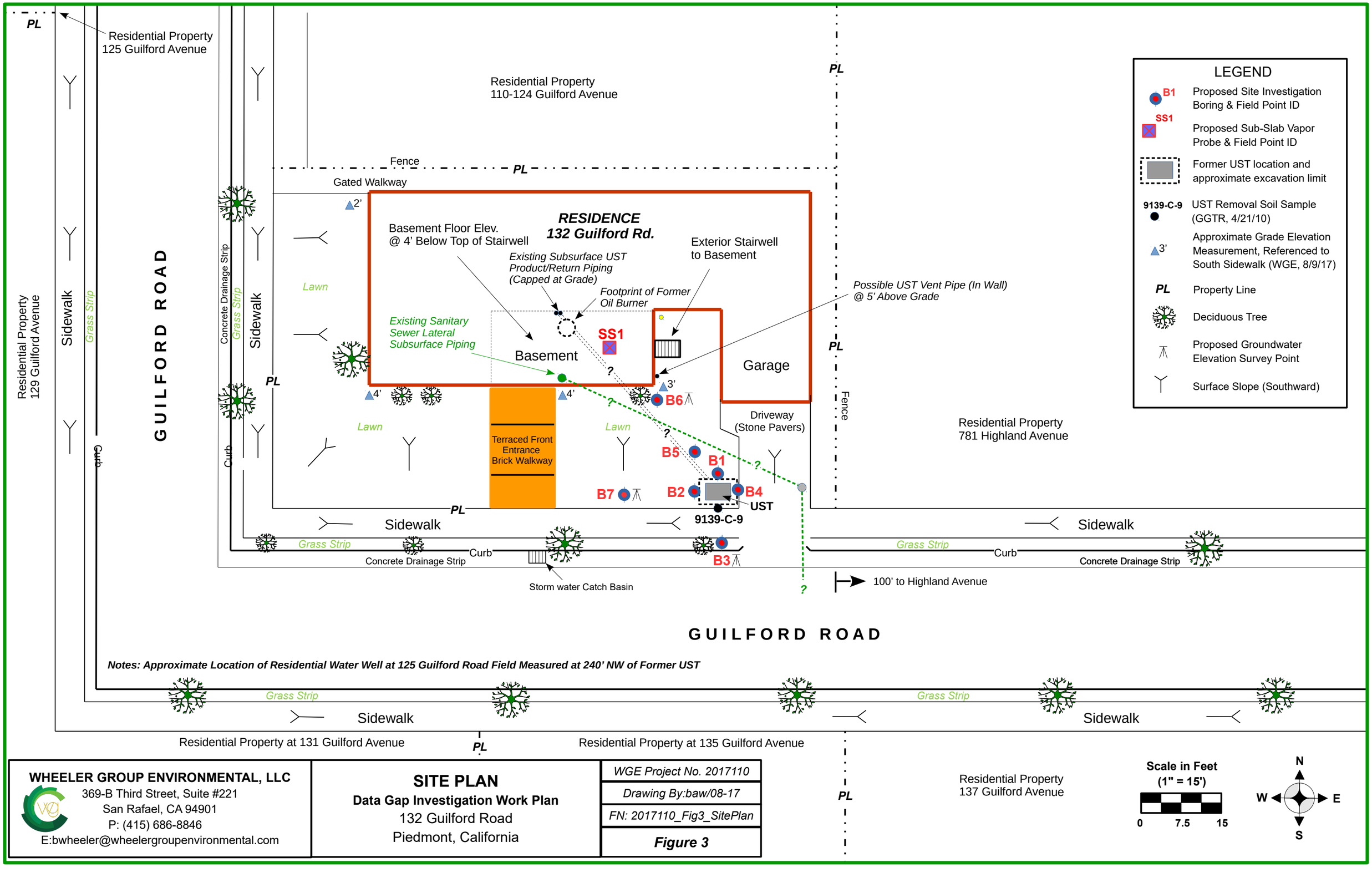
SITE VICINITY MAP

Data Gap Investigation Work Plan

132 Guilford Road, Piedmont, California

Project No. 2017110	*FN: 2017110_Fig2_SiteVicinityMap.odg*	*Drawing: MY Aug. 2017*	***Figure 2***



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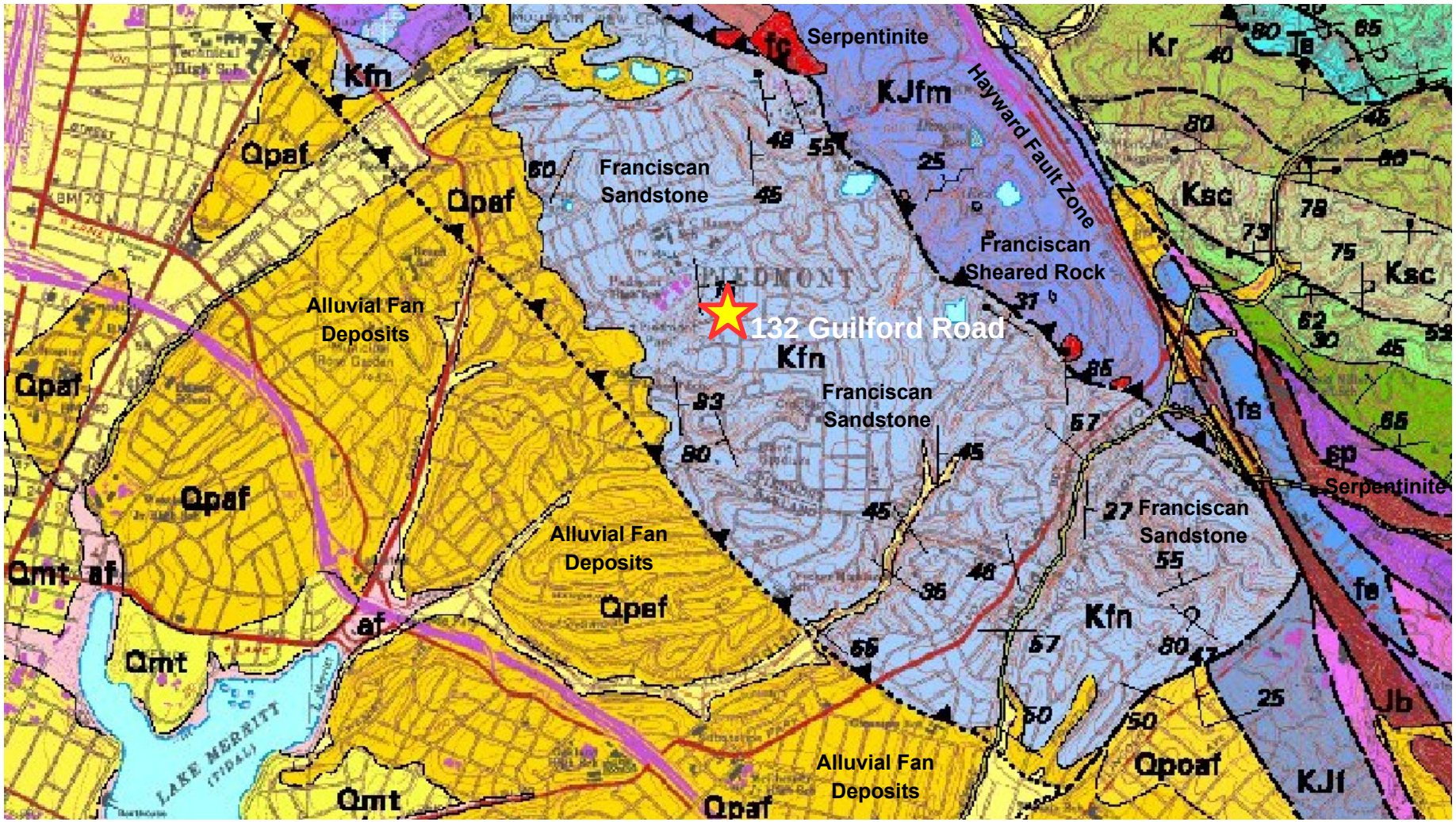
SITE PLAN

Data Gap Investigation Work Plan
132 Guilford Road
Piedmont, California

WGE Project No. 2017110
Drawing By:baw/08-17
FN: 2017110_Fig3_SitePlan
Figure 3



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A portion of Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California: Miscellaneous Field Studies MF-2342 by U.S. Geological Survey 2000; see pamphlet text for explanation of geologic units shown on map

0 2000

Scale in Feet

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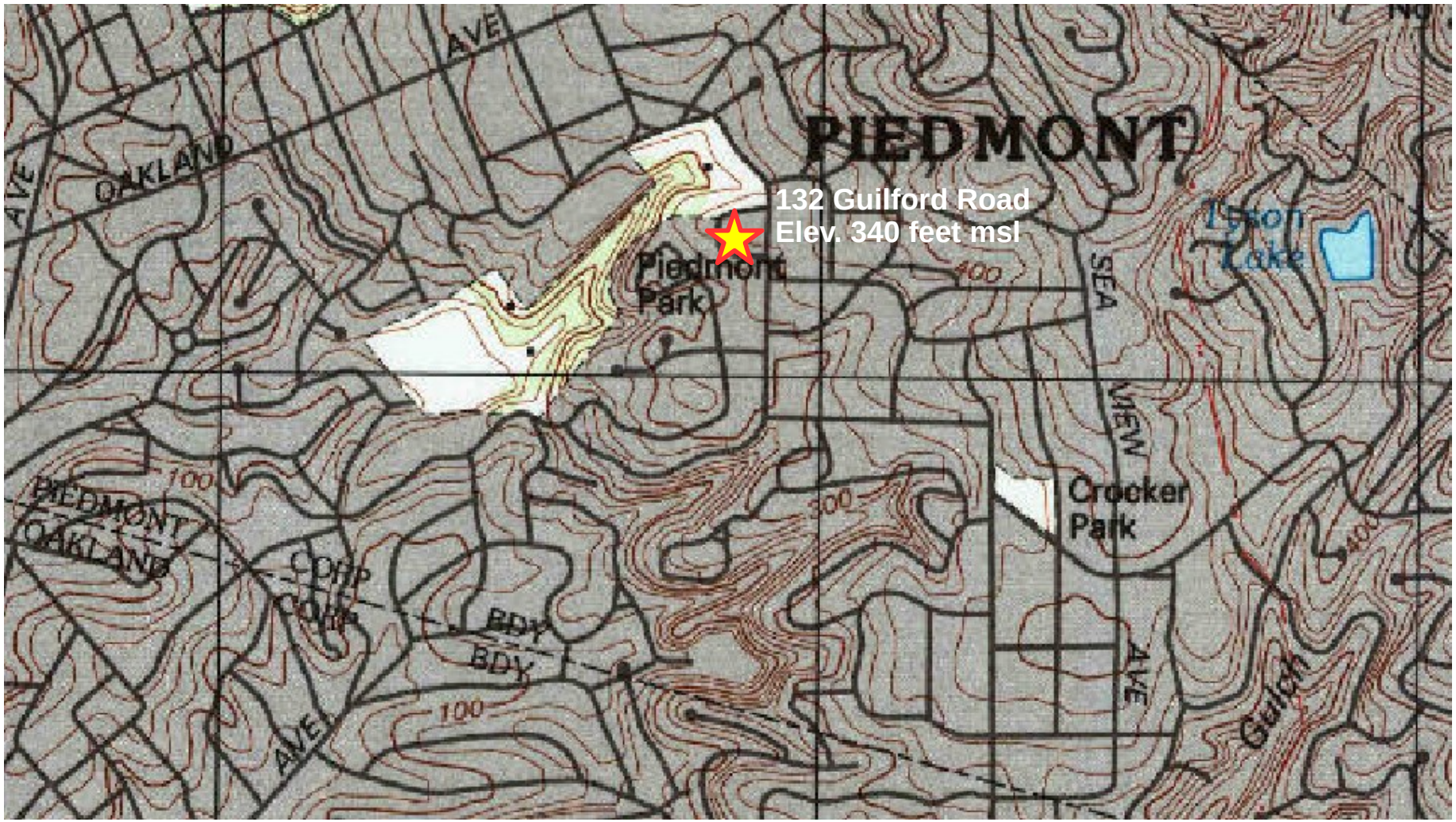
GEOLOGIC MAP
Data Gap Investigation Work Plan
132 Guilford Road, Piedmont, CA

Project No. 2017110	*FN: 2017110_Fig4_GeologicMap.odg*	*Drawing By: MY Aug. 2017*	***Figure 4***



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A portion of Oakland East Quadrangle, California: topographic quadrangle map by United States Geological Survey dated 1997; Scale 1:24,000; contour interval is 20 feet

0 800

Scale in Feet

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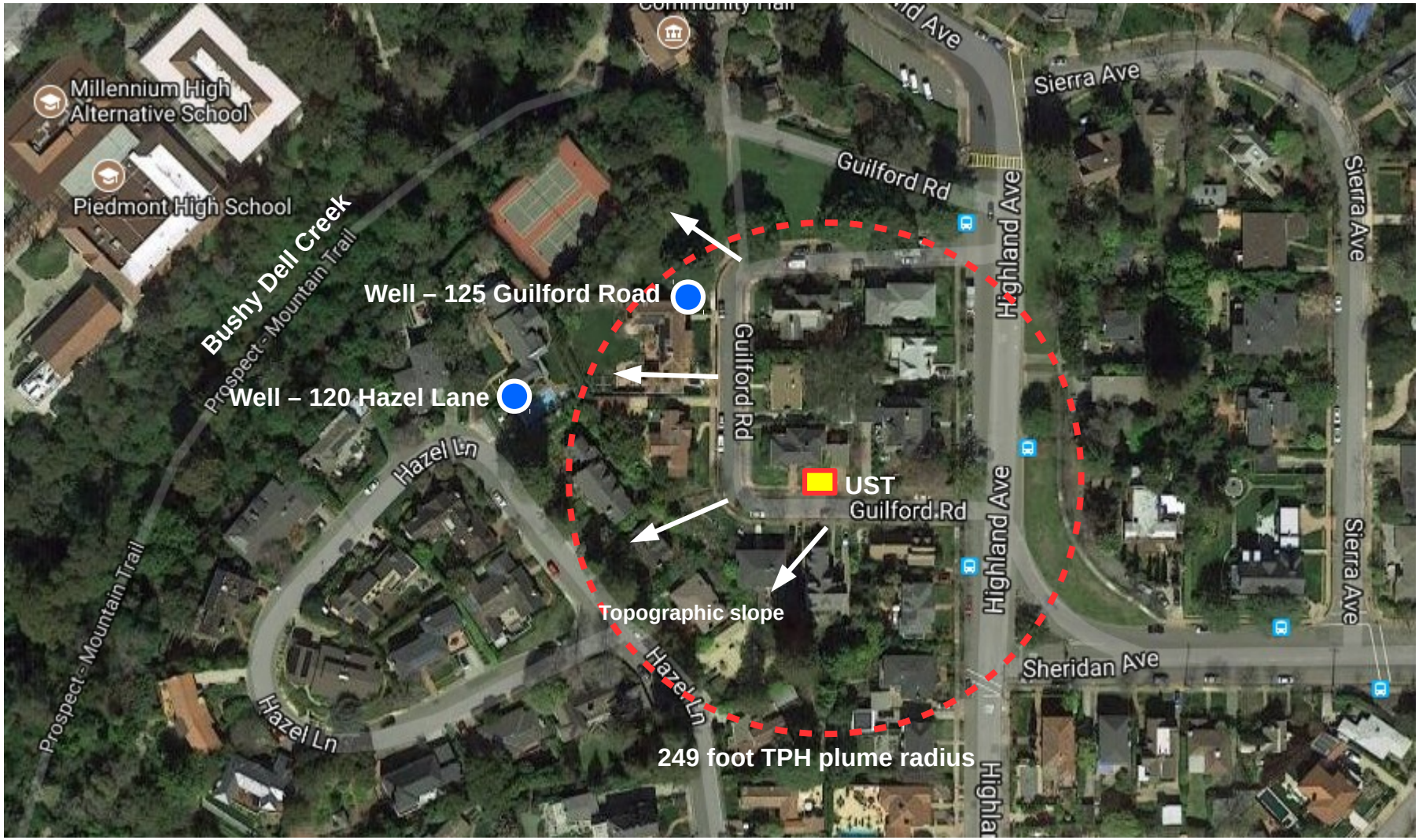
TOPOGRAPHIC MAP
Data Gap Investigation Work Plan
132 Guilford Road, Piedmont, CA

Project No. 2017110	*FN: 2017110_Fig5_TopoMap.odg*	*Drawing By: MY Aug. 2017*	***Figure 5***



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Potential TPH plume from heating oil UST at 132 Guilford Road based on 249 foot diameter potential plume diameter. The nearest well at 125 Guilford Road is within the plume radius. Other well at 120 Hazel Lane is just outside the potential plume estimate. Direction of topographic slope shown by white arrows. Base map from Google Maps 2017 with annotations by Wheeler Group Environmental, LLC, August 2017

0 150
Scale in Feet

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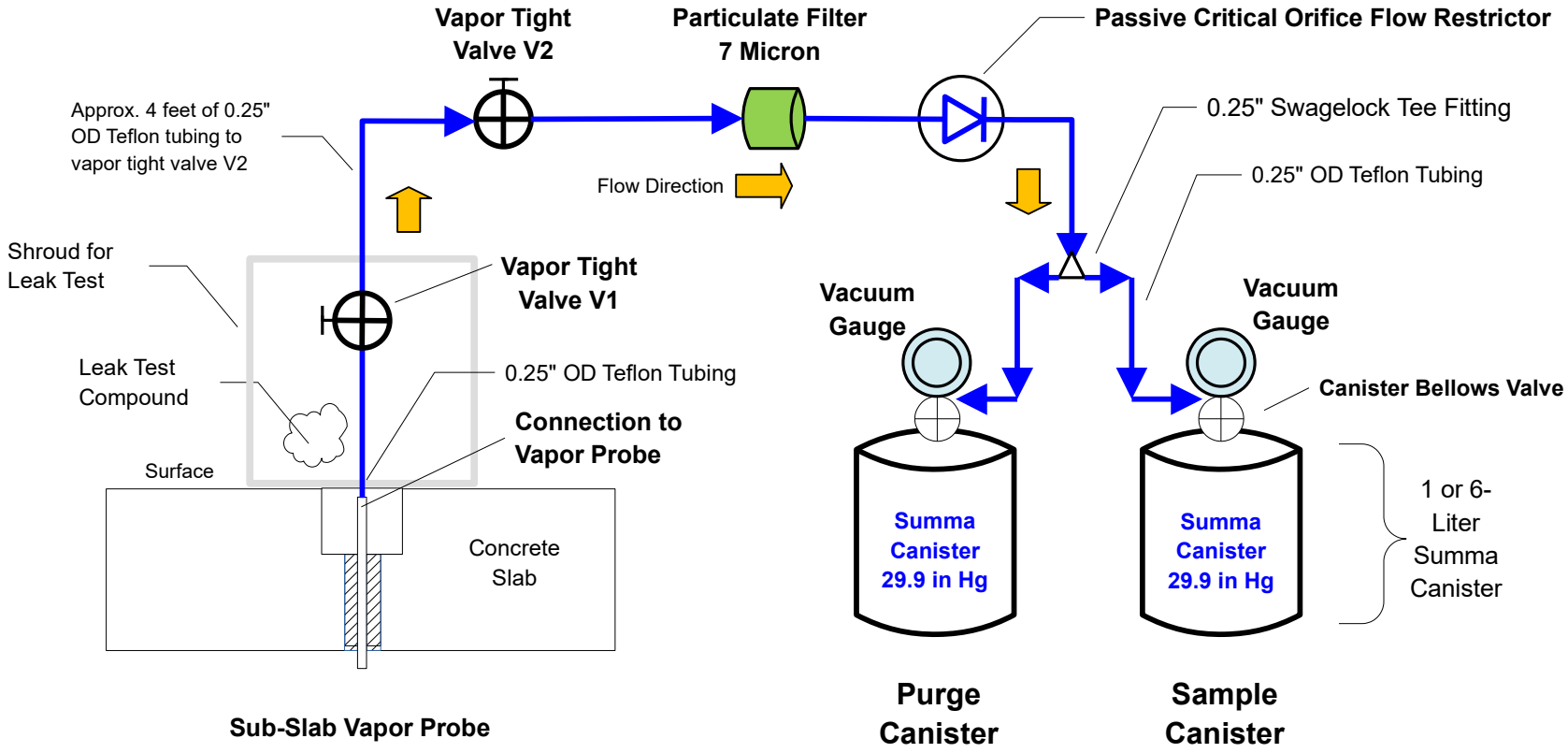
POTENTIAL TPH PLUME MAP
Data Gap Investigation Work Plan
132 Guilford Road, Piedmont, CA

Project No. 2017110	*FN: 2017110_Fig6_PlumeMap.odg*	*Drawing By: MY Aug. 2017*	***Figure 6***

NOT TO SCALE - SKETCH ONLY



All tubing is nominal 0.25" OD (0.17" ID) Teflon (lab or food grade)
All fittings are 0.25" Swagelock type

Laboratory Analysis, Summa canisters, flow restrictor, particulate filter, bellows valves, and vacuum gauges provided by laboratory

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Schematic of Soil Vapor Sampling

Project No. 2017110	August 2017	**Figure 7**

TABLE 1

Soil Sample Laboratory Analysis Results for Petroleum Hydrocarbons

132 Guilford Road, Piedmont, California

Field Point ID	*Sampling Date*	*Depth Feet*	*TPH as Diesel*	*Benzene*	*Toluene*	*Ethyl Benzene*	*Total Xylenes*	*1,2-EDB*	*1,2-EDC*	*DIPE*	*ETBE*	*MTBE*	*TAME*	*TBA*	*Total Lead*
			mg/Kg	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*	*mg/Kg*
9139-C-9	04/21/2010	9	217	ND<0.072	ND<0.072	ND<0.072	ND<0.19	ND<0.048	ND<0.072	ND<0.072	ND<0.072	ND<0.048	ND<0.058	ND<0.48	NA
9139-SP(A-D)Comp	04/21/2010	stockpile	5080	ND<0.15	ND<0.15	ND<0.15	ND<0.4	ND<0.1	ND<0.15	ND<0.15	ND<0.15	ND<0.1	ND<0.12	ND<1	45.4
Tier 1 ESL Values	*Feb. 2016*		*230*	*0.044*	*2.9*	*1.4*	*2.3*	*0.00044*	*0.0045*			*0.023*		*0.075*	*80*

Table 1 as of August 25, 2017

Notes:

ND – reported as less than method detection limit

NA – not analyzed

Oxygenates abbreviations: 1,2-EDB=1,2-Dibromoethane; 1,2-EDC=1,2-Dichloroethane; DIPE=Di-Isopropyl ether; ETBE=Ethyl Tert Butyl Ether; MTBE=Methyl Tert Butyl Ether; TAME=Tert-Amyl Methyl Ether; TBA=Tert-Butyl Alcohol

TABLE 2

Water Sample Laboratory Analysis Results for Petroleum Hydrocarbons

132 Guilford Road, Piedmont, California

Field Point ID	*Sampling Date*	*Depth Feet*	*TPH as Diesel*	*Benzene*	*Toluene*	*Ethyl Benzene*	*Total Xylenes*	*1,2-EDB*	*1,2-EDC*	*DIPE*	*ETBE*	*MTBE*	*TAME*	*TBA*	*Total Lead*
			µg/Kg	*µg/Kg*	*µg/Kg*	*µg/Kg*	*µg/Kg*	*µg/Kg*	*µg/Kg*	*µg/Kg*	*µg/Kg*	*µg/Kg*	*µg/Kg*	*µg/Kg*	*µg/Kg*
9139-PW	04/21/2010	Perched water in drum	11000	ND<0.6	1.5	ND<0.6	4.7	ND<0.4	ND<0.6	ND<1	ND<1	ND<1	ND<1	ND<10	NA
Tier 1 ESL Values	*Feb. 2016*		*100*	*1*	*40*	*13*	*20*	*0.05*	*0.5*			5		12	2.5

Table 2 as of August 25, 2017

Notes:

ND – reported as less than method detection limit

NA – not analyzed

Oxygenates abbreviations: 1,2-EDB=1,2-Dibromoethane; 1,2-EDC=1,2-Dichloroethane; DIPE=Di-Isopropyl ether; ETBE=Ethyl Tert Butyl Ether; MTBE=Methyl Tert Butyl Ether; TAME=Tert-Amyl Methyl Ether; TBA=Tert-Butyl Alcohol

TABLE 3

FOCUSED SITE CONCEPTUAL MODEL FOR MULHOLLAND RESIDENCE AT 132 GUILFORD ROAD, PIEDMONT, CA

SCM Element	*SCM Element Description*	*Data Gap*
Site ID	Mulholland Residence, 132 Guilford Road, Piedmont, California, APN 51-4676-19 Alameda County LOP Case No. RO0003070 and GeoTracker Gobal ID No. T10000002521	
Current Land Use and Description	The approximately 6400 square foot lot is occupied by a 1930s two-story single-family residence in a residential neighborhood with similar single-family residences. There are no current plans to redevelop the Site. The residence at the Site was constructed in the 1930s with a heating oil furnace located in the partial basement beneath the southern portion of the residence, see Figure 3 titled Site Plan. Wheeler Group observed the former location of the oil burner with capped product and return lines in the partial basement utility room during a Site inspection on August 9, 2017. Municipal water, electricity, natural gas and sewer infrastructure is provided to the area. Access to the property is from Guilford Road. Figures 1, 2 and 3 titled Site Location Map, Site Vicinity Map and Site Plan, respectively, show the location of the subject residence and surrounding neighborhood.	None
Topography	The Site is located at an approximate elevation of 340 feet msl on top of a local east-west trending Franciscan bedrock ridge. The topographic slope is away from the former UST location towards the southwest. Drainage ravines are located to the northwest, west and southwest of the Site with elevation drops up to approximately 180 feet. Figure 5 titled Topographic Map shows the local topography surrounding the Site and the location of nearby drainage ravines.	None
Surface Water	No surface water is located on the Site or within approximately 500 feet of the former UST location. From the Site's position on a local ridge-top, the topography slopes to the west-southwest towards Piedmont Park and the surface exposure of Bushy Dell Creek about 500 feet northwest of the former UST location. The drainage ravine of Wildwood Creek is located about 1130 feet south of the Site.	None
Geology Regional	The U.S. Geological Survey map titled Geologic Map and Map Database of the Oakland Metropolitan Area, Alameda, Contra Costa, and San Francisco Counties, California, Miscellaneous Field Studies MF-2342, dated 2000, contains geologic information for the Site vicinity. Figure 4 titled Geologic Map shows an excerpt from the published geologic map showing the subject property. According to the geologic map, the Site is directly underlain by the Mesozoic Franciscan basement complex, which is composed of weakly to strongly metamorphosed graywacke, argillite, basalt, serpentinite, chert, limestone, and other rocks. A large area of shallow Franciscan sandstone labeled as Kfn is shown on the map at the Site location. The sandstone consists of Coarse-grained, biotite- and shale-chip-bearing lithic wacke (a type of clay-rich sandstone). Large biotite grains and shale chips up to 2 mm	None

TABLE 3

FOCUSED SITE CONCEPTUAL MODEL FOR MULHOLLAND RESIDENCE AT 132 GUILFORD ROAD, PIEDMONT, CA

SCM Element	*SCM Element Description*	*Data Gap*
	diameter are prominent in hand sample. In the map area the sandstone is massive, with some thin shale partings and shale interbeds. The sandstone is dark greenish-gray where fresh, weathers to yellowish-brown. The Franciscan sandstone bedrock is expected to occur at a shallow depth beneath the Site. During the 2010 UST removal, hard bedrock was encountered at 9 fbg in the UST over excavation.	
Geology Local	Piedmont City Hall is located approximately 870 feet northwest of the Site and approximately the same elevation. The GeoTracker website contains a 2012 site investigation document by Aqua Science Engineers, Inc. (ASE) dated June 18, 2012, for the Piedmont City Hall LUST case. During their leaking fuel tank investigation, ASE drilled three exploratory borings to a total depth of 30 feet below grade (fbg). ASE drilled boring BH-A with a mud rotary drill rig encountering loose silty clay and silty sand to a depth of 4 fbg where free water was observed. From 4-8 fbg, hard shale and chert of the Franciscan bedrock was found. Hard grey greywacke sandstone occurred from 8 to 23 fbg followed by black shale from 23 to 29 fbg, and hard grey greywacke sandstone to drilling refusal at a total depth of 30.1 fbg. The second boring BH-B drilled through loose sand to a depth of 5 fbg where free water was observed on top of hard bedrock at a depth of 4.5 fbg. Hard grey Franciscan siltstone (likely a fine-grained sandstone) occurred to a depth of 21 fbg. Hard grey greywacke sandstone occurred from 21 to 29.5 fbg. Drilling refusal occurred at 30.1 fbg on hard black shale bedrock. Boring BH-C drilled through loose gravelly sand to a depth of 5 fbg with free water observed at 1 fbg. Hard grey Franciscan siltstone occurred from 5 to 27 fbg. Drilling refusal occurred in boring BH-C at 30.1 fbg on hard black shale bedrock.	None
Geology Site Conditions	Golden Gate Tank Removal, Inc. (GGTR) summarizes the removal of the subject's underground storage tank (UST) in its Tank Closure Report dated May 18, 2010. The only existing site-specific data on subsurface conditions is found in the tank removal report and this information is sparse consisting of one sentence as follows: "The overburden soil and the soil underlying the tank was predominantly rock/silt." The report also indicates that the over-excavation of petroleum contaminated soil from beneath the former UST location encountered hard bedrock at a depth of 9½ fbg as indicated in the following sentence: "Due to the presence of bedrock, soil sample 9139-C-9 was collected 4' below center tank bottom at approximately 9 fbg, following over excavation."	Site geologic conditions are based on the sparse descriptions during the 2010 tank removal activities
Hydrogeology Regional	Norfleet Consultants discussed the regional groundwater basins in its 1998 study titled *Groundwater Study and Water Supply History of The East Bay Plain, Alameda and Contra Costa Counties, CA.* The Piedmont region is located within the San Francisco	None

TABLE 3

FOCUSED SITE CONCEPTUAL MODEL FOR MULHOLLAND RESIDENCE AT 132 GUILFORD ROAD, PIEDMONT, CA

SCM Element	*SCM Element Description*	*Data Gap*
	Basin and the Oakland sub-area. Piedmont is located within the upland Highlands bedrock region of Cretaceous Franciscan units. The bedrock highland is a source of sediment for the alluvial fan deposits below in the San Francisco Basin. No historical well fields are located within the Highlands area of Piedmont. Traditionally, the Hayward Fault has been used as the eastern boundary of the San Francisco Basin. However, the outcrop area of Franciscan bedrock is believed to be the primary boundary and the Hayward Fault has little effect on the groundwater in the San Franciscan Basin. Therefore, the Site's location would not be included within a groundwater basin and no significant groundwater resource is known within the Franciscan bedrock.	
Hydrogeology Local	Two known private water supply wells are located in the neighborhood of the subject property with one of the wells located within the 249-foot minimum plume length from the former UST location in the potential down-gradient direction. A landscape irrigation water well is present at the 125 Guilford Road residence within 250 feet of the former UST location. Beyond the 125 Guilford Road property is another inactive landscape irrigation water well at 120 Hazel Lane. Exploratory borings at the Piedmont City Hall property in 2012 encountered first water at depths of 1 to 4 fbg on top of hard Franciscan bedrock.	None
Hydrogeology Site Conditions	The Golden Gate Tank Removal, Inc. report indicates that perched water occurred in the tank pit during over excavation activities. Tank removal inspection notes indicate that it was raining heavily during the UST removal and a petroleum sheen was observed on water in the excavation. The water was removed to a 55-gallon drum where a water sample, 9139-PW, was collected for laboratory analysis of petroleum hydrocarbons. The laboratory reported a Total Petroleum Hydrocarbon (TPH) as diesel concentration of 11 mg/L (milligrams per liter) in the perched water sample. Toluene was reported at 1.5 µg/L (micrograms per liter) and Total Xylenes at 4.7 µg/L. Only TPH as diesel at 11 mg/L exceeds the Tier I ESL value for residential land use.	It is unknown if the "perched water" sample collected from the UST excavation pit is representative of groundwater at the Site
Groundwater Flow Direction	There are no groundwater monitor wells at the Site or nearby properties. The Site occurs on a bedrock ridge at an elevation of 340 feet above msl. Nearby ravines drop in elevation by up to 180 feet to the west and southwest. Franciscan bedrock is encountered at a shallow depth in this area with bedrock at 9½ fbg at the Site. There is no known groundwater resource within the Franciscan bedrock. Groundwater is believed to flow on top of the bedrock in the direction of the topographic slope to the southwest towards the Bushy Dell Creek ravine in Piedmont Park about 500 feet northwest from the former UST location.	Groundwater flow direction at the Site has not been measured and the topographic slope indicates the direction of groundwater flow could vary from northwest to southwest
Nearby Wells	Figure 2 titled Site Vicinity Map shows the surrounding neighborhood and location of two nearby private water supply wells. To the west across Guilford Road from the Site are similar residences at 125 and 129 Guilford Road. A landscape irrigation water well	Nearby private water supply wells may be sensitive receptors

TABLE 3

FOCUSED SITE CONCEPTUAL MODEL FOR MULHOLLAND RESIDENCE AT 132 GUILFORD ROAD, PIEDMONT, CA

SCM Element	*SCM Element Description*	*Data Gap*
	is present at the 125 Guilford Road residence. Beyond the 125 Guilford Road property is another inactive landscape irrigation water well at 120 Hazel Lane. The ravine of Bushy Dell Creek is located beyond both wells and about 500 feet northwest of the former UST location. No municipal water supply wells are reported within the Piedmont area.	
Release Source and Volume	The prior heating oil UST is believed to be the main source of petroleum hydrocarbons detected in soil and water at the Site. Golden Gate Tank Removal, Inc. (GGTR) summarizes the removal of the subject's underground storage tank (UST) in its Tank Closure Report dated May 18, 2010. Refer to the original report for details and documentation. The following description summarizes information in the GGTR report. Underground product lines former connected the oil burner to one 200-gallon UST formerly used to contain heating oil (diesel) located adjacent to the driveway and sidewalk on the Guilford Road frontage of the property. The UST was 4 feet in length and 3 feet in diameter buried approximately 5 feet below grade. The fill port was located on the west end of the tank. Wheeler Group observed the former UST vent pipe on the exterior of the residence as indicated on Figure 3. The lateral extent and magnitude of soil contamination has not been defined and the volume of release is unknown.	The magnitude and lateral extent of the heating oil release has not been determined
UST Removal	On April 21, 2010, GGTR removed the single-wall steel UST from the sand backfill in the tank pit. Photographs indicate that the product and vent piping was cut at the edge of the excavation. The ACDEH Underground Storage Tank Inspection Report dated April 21, 2010, indicates "holes" in the UST and a sheen on water in the tank pit. It was raining heavily at the time of the UST removal. GGTR reported soil discoloration and petroleum odor in the tank overburden soil or soil underlying the tank. GGTR described the subsurface soil as rock/silt. On April 22, 2010, GGTR filed an Underground Storage Tank Unauthorized Release (Leak) Contamination Site Report citing holes in tank. The ACDEH in its letter dated June 29, 2011, state that the elevated concentrations of TPH as Diesel reported by the laboratory in the excavation and stockpile soil samples indicate that an unauthorized release had occurred. Product and return piping for former oil burner are capped in basement below residence and product piping extends beneath basement concrete floor slab.	Condition of product piping buried beneath concrete floor slab of basement is not known. Release of heating oil from product piping beneath residence could result in vapor intrusion risk to occupants.
Source Removal	On April 21, 2010, GGTR excavated petroleum contaminated soil to a total depth of 9½ fbg where hard bedrock was encountered. Discrete soil sample 9139-C-9 was collected 4 feet below the bottom of the UST at a total depth of 9 feet. Hard bedrock occurred at the bottom of the excavation and sample 9139-C-9 was collected from the south sidewall of the excavation. Figure 2 –Site Drawing of the Tank Closure Report indicates the final excavation dimension was 4.5 feet by 6.5 feet. The laboratory reported that excavation bottom soil sample 9139-C-9 contained a TPH as diesel concentration of 217 mg/kg with no detectable BTEX or fuel	Excavation sidewall soil samples were not collected during the 2010 over excavation and the magnitude and lateral extent of the heating oil release has not been determined

TABLE 3

FOCUSED SITE CONCEPTUAL MODEL FOR MULHOLLAND RESIDENCE AT 132 GUILFORD ROAD, PIEDMONT, CA

SCM Element	*SCM Element Description*	*Data Gap*
	oxygenates. The results of the laboratory analyses of soil samples is presented in Table 1. GGTR collected on four-point composite soil sample from the soil stockpile containing overburden soil designated as 9139-SP(A-D)Comp. Overburden soil sample 9139-SP(A-D)Comp contained a TPH as diesel concentration of 5080 mg/kg. On May 11, 2010, Clearwater Environment provided for the transport and offsite recycling of 11.76 tons of petroleum contaminated overburden and over excavation soil.	
Petroleum Hydrocarbons in Soil	The results of the laboratory analyses of soil samples is presented in Table 1. A total of two soil samples have been analyzed for petroleum hydrocarbons from the former heating oil UST location at the Site. The laboratory analysis indicates that TPH as Diesel (heating oil) is the primary contaminant of concern. TPH as Diesel is the only known contaminant to exceed Tier I ESL values in soil. Table 1 summarizes the laboratory analyses data of soil samples. Discrete soil sample 9139-C-9 was collected 4 feet below the bottom of the UST at a total depth of 9 feet from the south sidewall of the excavation. The laboratory reported that excavation bottom soil sample 9139-C-9 contained a TPH as diesel concentration of 217 mg/kg with no detectable BTEX or fuel oxygenates. GGTR collected on four-point composite soil sample from the soil stockpile containing overburden soil designated as 9139-SP(A-D)Comp. Overburden soil sample 9139-SP(A-D)Comp contained a TPH as diesel concentration of 5080 mg/kg.	Excavation sidewall soil samples were not collected during the 2010 over excavation and the magnitude and lateral extent of the heating oil release has not been determined
Petroleum Hydrocarbons in Water	GGTR indicates that no groundwater was encountered during the UST removal activities. However, free water described by GGTR as perched water accumulated in the over excavation pit. Water with a petroleum sheen (according to regulatory agency field notes) accumulated in the excavation which GGTR removed to a 55-gallon drum prior to soil sampling. GGTR called the free water in the pit as “Perched Water.” Perched water means that GGTR personnel believed the water originated from shallow landscape irrigation water in the loose soil on top of hard bedrock. One water sample was recovered from the 55-gallon drum as sample 9139-PW and submitted for laboratory analysis of petroleum hydrocarbons as shown on Table 2. The perched water sample contained 11 mg/L of TPH as diesel, 1.5 µg/L of Toluene, and 4.7 µg/L of Total Xylenes. The TPH as Diesel concentration of 11 mg/L exceeds the Tier I ESL value.	The magnitude and lateral extent of groundwater impact has not been defined
LNAPL	There are currently no groundwater monitoring wells at the Site. Light non-aqueous phase liquids were not observed during the over excavation to a depth of 9½ fbg and the purging of “perched water” from the excavation pit. The laboratory analysis of the perched water sample reported a TPH as Diesel concentration of 11 mg/L, which does not indicate the presence of LNAPL. The laboratory analysis of soil samples from the excavation bottom and overburden stockpile reported TPH as Diesel concentrations of 217 mg/kg and 5080 mg/kg, respectively. Neither value suggests the presence of LNAPL at the Site.	None

TABLE 3

FOCUSED SITE CONCEPTUAL MODEL FOR MULHOLLAND RESIDENCE AT 132 GUILFORD ROAD, PIEDMONT, CA

SCM Element	*SCM Element Description*	*Data Gap*
Contaminants of Concern	A total of two soil samples and one perched water sample have been analyzed for petroleum hydrocarbons from the former heating oil UST location at the Site. The laboratory analysis indicates that TPH as Diesel (heating oil) is the primary contaminant of concern. TPH as Diesel is the only known contaminant to exceed Tier I ESL values in soil and groundwater and the ACDEH indicates that the elevated concentrations of TPH as diesel are evidence of a heating oil release from the former UST. Tables 1 and 2 summarize the laboratory analyses data.	The 2010 samples were not analyzed for naphthalene as required in existing LTCP guidance
Plume Length	There are currently no groundwater monitoring wells at the Site and the groundwater flow direction across the Site cannot be evaluated. In its March 8, 2016 letter, the ACDEH indicates that LTCP guidance predicts a minimal plume length of less than 249 feet for a mature TPH plume of petroleum such as heating oil (diesel). Figure 6–Potential TPH Plume Map shows the location of nearby private water supply wells in relation to the former UST location and estimated TPH plume diameter.	The plume length has not been determined by site-specific groundwater measurements
Risk Evaluation	The Site is zoned for residential land use and occupied by a single-family residence since the 1930s. Current plans are for the Site to remain in residential land use. The SCM indicates significant data gaps exist in association with the magnitude and lateral extent of residual heating oil soil contamination, the magnitude and lateral extent of heating oil contamination of shallow water, and the impact to water supply wells at potentially down-gradient residences. As such, the residual contamination may pose a risk to potential residential receptors and construction workers by incidental ingestion, dermal contact, dust inhalation, and vapor inhalation.	
Project ID:	Site Conceptual Model (SCM) as of August 25, 2017 File name: 2017110_Table3_SiteConceptualModel_Aug15_2017.odt Wheeler Group Environmental, LLC Project No. 2017110	

TABLE 4

EVALUATION OF LOW THREAT CLOSURE POLICY CRITERIA FOR DATA GAPS AT MULHOLLAND RESIDENCE, 132 GUILFORD ROAD, PIEDMONT, CA

Criteria	*Description of Low Threat Closure Policy Criteria and Explanation*	*Data Gap*	*How to Address*
Site ID	Mulholland Residence, 132 Guilford Road, Piedmont, California, APN 51-4676-19 Alameda County LOP Case No. RO0003070 and GeoTracker Gobal ID No. T10000002521		
A.	**General Criteria:** **The unauthorized release is located within the service area of a public water system:** Domestic water supply is provided to the Site by the East Bay Municipal Utility District (EBMUD).	No data gap present	No action needed
B.	**The unauthorized release consists only of petroleum:** Soil and water sampling from the UST removal and over excavation indicate the only contaminant of concern is heating oil (Total Petroleum Hydrocarbons as Diesel).	No data gap present	No action needed
C.	**The unauthorized ("primary") release from the UST system has been stopped:** The source of the heating oil release was a 200-gallon underground storage tank (UST) that was removed for offsite recycling on April 21, 2010, by Golden Gate Tank Removal, Inc.	No data gap present	No action needed
D.	**Free product has been removed to the maximum extent practicable: S**oil and perched water sampling occurred during the April 21, 2010, UST removal with no obvious indication of petroleum free product in soil or water beneath the former UST location.	No data gap present	No action needed
E.	**A conceptual site model that assesses the nature, extent, and mobility of the release has been developed:** A site conceptual model is presented in this document as Table 3.	No data gap present	No action needed
F.	**Secondary Source has been removed to the extent practicable:** Golden Gate Tank Removal, Inc. performed limited over excavation activities on April 21, 2010. GGTR removed heating oil contaminated soil to a depth of 9½ fbg beneath the former UST location. Hard bedrock was encountered at a depth of 9½ fbg and a bottom soil sample was collected from the south sidewall of the excavation with a TPH as Diesel concentration of 213 mg/kg. GGTR did not excavate UST pit sidewalls because a concrete sidewalk and driveway prevented lateral excavation and GGTR did not recover lateral sidewall soil samples from the excavation limits due to project budget limitations.	The lateral extent of petroleum contamination has not been defined surrounding the former UST location.	Soil sampling is needed to define the petroleum contamination of soil
G.	**Soil or groundwater has been tested for MTBE and results reported in accordance with Health and Safety Code Section 25296.15:** The confirmation soil sample beneath the UST at a depth of 9 fbg and the stockpile soil sample did not contain detectable concentrations of MTBE. The laboratory reported no detectable MTBE in the perched water sample from the excavation pit.	No data gap present	No action needed
H.	**A nuisance exists, as defined by Water Code section 13050:** The lateral extent of soil and water contamination by heating oil has not been defined and it is unknown if a nuisance exists at the Site or down-gradient properties.	The lateral extent of petroleum contamination has not been defined surrounding the former UST location.	Soil and water sampling is needed to define the petroleum contamination of soil

TABLE 4

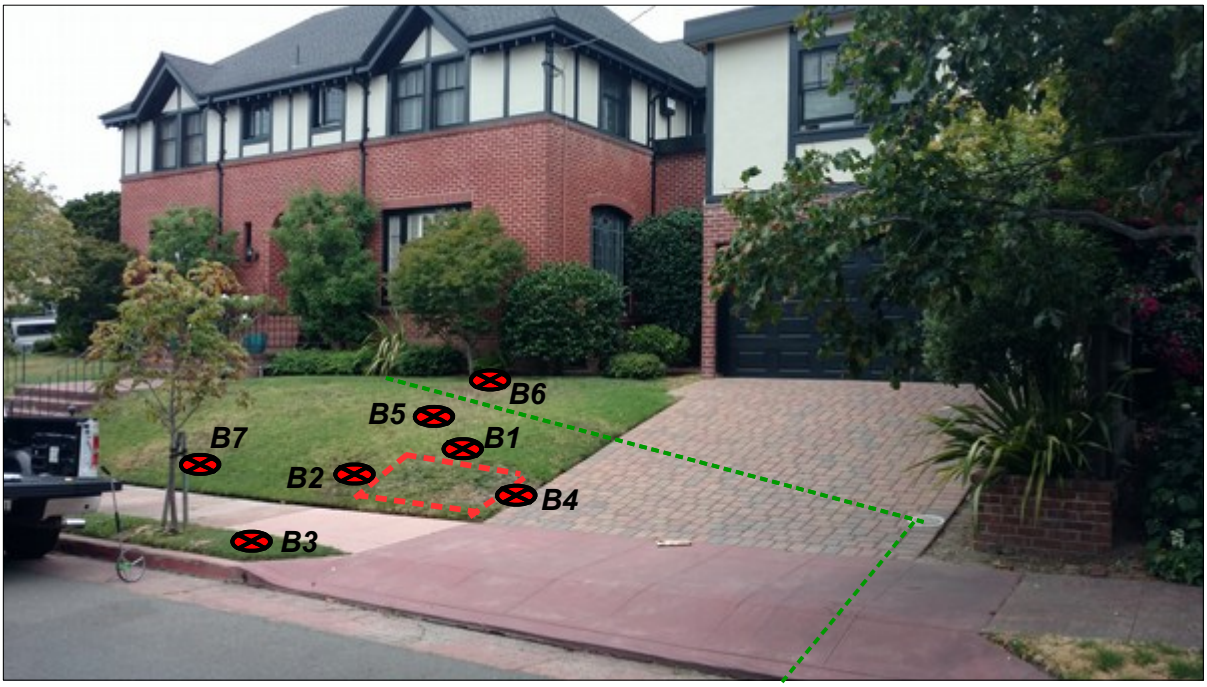
EVALUATION OF LOW THREAT CLOSURE POLICY CRITERIA FOR DATA GAPS AT MULHOLLAND RESIDENCE, 132 GUILFORD ROAD, PIEDMONT, CA

Criteria	*Description of Low Threat Closure Policy Criteria and Explanation*	*Data Gap*	*How to Address*
1.	**Media Specific Criteria for Groundwater:** In its March 8, 2016 letter, ACDEH determined that the Site fails to meet the LTCP Media-Specific Criteria for Groundwater.		
a.	**Groundwater Plume Length:** No groundwater monitor wells are present at the Site and the extent of the groundwater plume has not been determined. In its March 8, 2016 letter, the ACDEH indicates that LTCP guidance predicts a minimal plume length of less than 249 for a mature plume of heating oil (diesel). The Site does not meet the Groundwater Criteria due to the lack of delineation of a potential groundwater plume, and the presence of two privately owned water supply wells with 315 feet of the petroleum release (130 and 315 feet), in the presumed down-gradient direction. Using the LTCP guidance to predict a minimal plume length of less than 250 feet (248 feet) indicates that one well is within the estimated plume and one well is appropriately 65 feet further down-gradient; neither satisfy the policy (as the closest well must be greater than 250 feet from the plume edge). Figure 6–Potential TPH Plume Map shows the location of nearby private water supply wells in relation to the former UST location and estimated TPH plume diameter.	The plume length has not been defined.	Groundwater sampling of two privately owned water supply wells
b.	**Groundwater Plume is Not Stable:** In its March 8, 2016 letter, the ACDEH indicates that the release is considered to be mature and would be expected that any associated plume would have already migrated to the location of nearby privately owned water supply wells, if a plume is present. A mature groundwater plume would be considered stable.	No data gap present	No action needed
c.	**Nearest Water Supply Well:** In its March 8, 2016 letter, the ACDEH indicates that LTCP guidance predicts a minimal plume length of 249 for a mature plume of heating oil (diesel). The Site does not meet the Groundwater Criteria due to the lack of delineation of a potential groundwater plume, and the presence of two privately owned water supply wells with 315 feet of the petroleum release (130 and 315 feet), in the presumed down-gradient direction. Using the LTCP guidance to predict a minimal plume length of 249 feet indicates that one well is within the estimated plume and one well is appropriately 65 feet further down-gradient; neither satisfy the policy (as the closest well must be greater than 250 feet from the plume edge). Well No. 1 – 125 Guilford Road, property of Roger Strauch, water supply well connected to landscape irrigation system, Mr. Strauch requests sampling from irrigation system as well head is buried and difficult to access, Mr. Strauch is willing to sign a declaration that the water supply well is connected directly to the landscape irrigation system. Well No. 2 – 120 Hazel Lane, property of Dr. Elwin and Jennifer. Berlekamp, water supply well is no longer used but believed to be formerly connected to the landscape irrigation system, the well head is located in the front yard of the residence and reportedly a bucket can be filled from the well head. In its email dated August 15, 2017, the ACDEH indicates that sampling of the irrigation system piping is acceptable as long as the sample is collected from a metal spigot and not a plastic hose, the water sample is collected after appropriate purging, is collected in appropriate laboratory supplied collection containers, and the sampling uses industry standard handling and documentation procedures.	The privately owned water supply wells have not been sampled	Groundwater sampling of two privately owned water supply wells

TABLE 4

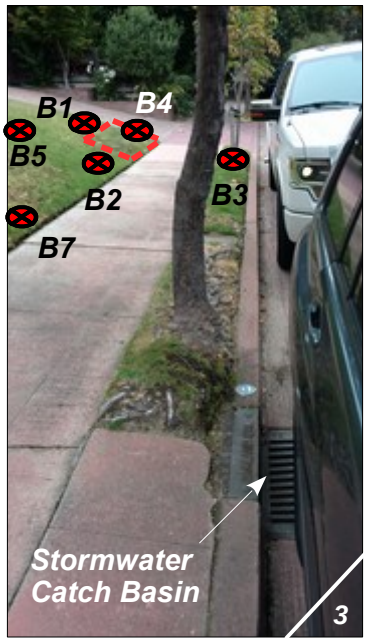
EVALUATION OF LOW THREAT CLOSURE POLICY CRITERIA FOR DATA GAPS AT MULHOLLAND RESIDENCE, 132 GUILFORD ROAD, PIEDMONT, CA

Criteria	*Description of Low Threat Closure Policy Criteria and Explanation*	*Data Gap*	*How to Address*
d.	**Property Owner Willing to Accept a Land Use Restriction:** In its March 8, 2016 letter, the ACDEH indicates that a deed restriction may be appropriate because the extent and magnitude of residual soil contamination has not been defined. In its December 31, 2015 correspondence, the ACDEH indicates that due to residual contamination remaining in the front yard in the vicinity of the former UST pit, it appears appropriate to have a legal mechanism to protect and inform current and future property owners, and construction workers from direct contact with residual contamination in the former tank pit area.	Owner has not indicated if land use control is acceptable	Ask owner about land use control
e.	**Sensitive Receptor Survey:** In its March 8, 2016 letter, the ACDEH indicates that LTCP guidance predicts a minimal plume length of 249 for a mature plume of heating oil (diesel). The Site does not meet the Groundwater Criteria due to the lack of delineation of a potential groundwater plume, and the presence of two privately owned water supply wells with 315 feet of the petroleum release (130 and 315 feet), in the presumed down-gradient direction. Using the LTCP guidance to predict a minimal plume length of 249 feet indicates that one well is within the estimated plume and one well is appropriately 65 feet further down-gradient; neither satisfy the policy (as the closest well must be greater than 250 feet from the plume edge).	The privately owned water supply wells have not been sampled	Groundwater sampling of two privately owned water supply wells with laboratory analysis of TPH as diesel, BTEX, MTBE and naphthalene
f.	**Naphthalene Contamination:** In its March 8, 2016 letter, the ACDEH indicates that laboratory analysis for naphthalene is needed to meet LTCP guidelines.	Naphthalene not analyzed in existing soil samples	Naphthalene added to laboratory analysis
2.	**Media Specific Criteria for Vapor Intrusion to Indoor Air:** In its March 8, 2016 letter, ACDEH determined that the Site fails to meet the LTCP Media-Specific Criteria for Vapor Intrusion to Indoor Air due in part to the lack of lateral delineation of soil contamination at the Site. Product and return piping for former oil burner are capped in basement below residence and product piping extends beneath basement concrete floor slab. Condition of product piping buried beneath concrete floor slab of basement is not known. Release of heating oil from product piping beneath residence could result in vapor intrusion risk to occupants.	Lateral extent and magnitude of soil contamination has not been defined Condition of product piping beneath residence is unknown and heating oil release could be present beneath residence	Soil borings with soil samples needed Subsurface investigation required to evaluate if a release from piping has occurred
3.	**LTCP Media Specific Criteria for Direct Contact and Outdoor Air Criteria:** In its March 8, 2016 letter, ACDEH determined that the Site fails to meet the LTCP Media-Specific Criteria for Direct Contact and Outdoor Air in part to the lack of lateral delineation of soil contamination at the Site. To preclude the need for notifications to the property deed, a minimum of four soil bores is required at the former UST location. To meet LTCP guidelines, soil samples must be collected form both the 0 to 5 and 5 to 10 foot depth intervals or at intervals of staining, odor, PID readings that indicate petroleum soil contamination. The bores should extend to a minimum depth of 9.5 fbg or deeper if feasible to define the vertical extent of soil contamination.	Lateral extent and magnitude of soil contamination has not been defined	Soil borings with soil samples needed with laboratory analysis for TPH as diesel, BTEX, MTBE and naphthalene
Project ID:	Evaluation of LTCP Criteria for Data Gaps as of August 25, 2017, Wheeler Group Environmental, LLC Project No. 2017110 File name: 2017110_Table4_LTCPEvaluation_Aug15_2017.odt		



Photograph No. 1 – Northwest view of front yard and garage driveway of residence, showing approximate lateral limits of former 200-gallon UST excavation (shown as red dashed line) and proposed investigation borings; approximate location of subsurface sanitary sewer lateral shown as green dashed line (WGE, 8/9/17).

Photograph No. 2 – East view of front yard and sidewalk of subject residence along Guilford Road showing general surface topography in neighborhood (WGE, 8/9/17).



Photograph No. 3 – East view of sidewalk frontage of residence showing approximate location of of former 200-gallon UST excavation and proposed site investigation Borings B1 & B4; Stormwater catch basin located at low point in concrete drainage strip along north edge of Guilford Road (WGE, 8/9/17).

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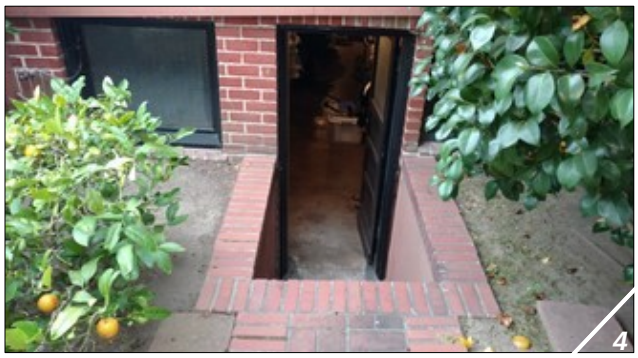
PHOTOGRAPH PAGE 1
Data Gap Investigation Work Plan
132 Guilford Road
Piedmont, California

Project No. 2017110	*FN: 2017110_Photo P1*	*Drawing By:baw/08-17*	***Photographs 1-3***



Photograph No. 4 – West view of exterior stairwell entrance to basement beneath southern front portion of residence (WGE, 8/9/17).

Photograph No. 5 – East view of interior of basement showing location of existing central HVAC system; basement floor approximately 4 feet below top of stairwell to exterior grade of residence(WGE, 8/9/17).

Photograph No. 6 – West view of interior of basement showing location of existing product/return piping (capped @ 4" above floor surface) associated with former UST oil burner system (WGE, 8/9/17).

Photograph Nos. 7 & 8 – Respective west and southeast views of Strauch Residence with address 125 Guilford Road; Photo No. 8 shows general location of private water supply well located approximately 240 feet northwest of subject UST; well reportedly used for irrigation only (WGE, 5/10/17).

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PHOTOGRAPH PAGE 2
Data Gap Investigation Work Plan
132 Guilford Road
Piedmont, California

Project No. 2017110	*FN: 2017110_Photo P2*	*Drawing By:baw/08-17*	***Photographs 4-8***

DATA GAP INVESTIGATION WORK PLAN

132 Guilford Road, Piedmont, California

APN 51-4676-19

GeoTracker Gobal ID No. T10000002521

Alameda County LOP Case No. RO0003070

WGE Project No. 2017110

APPENDIX A

Standard Operating Procedure
Installation and Extraction of the Vapor Pin

Wheeler Group Environmental, LLC

369-B Third Street, Suite #221, San Rafael, CA 94901
Phone: 415-686-8846

Standard Operating Procedure Installation and Extraction of the Vapor Pin™

May 20, 2011

Scope:

This standard operating procedure describes the installation and extraction of the Vapor Pin™[1] for use in sub-slab soil-gas sampling.

Purpose:

The purpose of this procedure is to assure good quality control in field operations and uniformity between field personnel in the use of the Vapor Pin™ for the collection of sub-slab soil-gas samples.

Equipment Needed:

- Assembled Vapor Pin™ [Vapor Pin™ and silicone sleeve (Figure 1)];
- Hammer drill;
- 5/8-inch diameter hammer bit (Hilti™ TE-YX 5/8" x 22" #00206514 or equivalent);
- 1½-inch diameter hammer bit (Hilti™ TE-YX 1½" x 23" #00293032 or equivalent) for flush mount applications;
- ¾-inch diameter bottle brush;
- Wet/dry vacuum with HEPA filter (optional);
- Vapor Pin™ installation/extraction tool;
- Dead blow hammer;
- Vapor Pin™ flush mount cover, as necessary;
- Vapor Pin™ protective cap; and
- VOC-free hole patching material (hydraulic cement) and putty knife or trowel.

[1]Cox-Colvin & Associates, Inc., designed and developed the Vapor Pin™; a patent is pending.

Figure 1. Assembled Vapor Pin™.

Installation Procedure:

1) Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.

2) Set up wet/dry vacuum to collect drill cuttings.

3) If a flush mount installation is required, drill a 1½-inch diameter hole at least 1¾-inches into the slab.

4) Drill a 5/8-inch diameter hole through the slab and approximately 1-inch into the underlying soil to form a void.

5) Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.

6) Place the lower end of Vapor Pin™ assembly into the drilled hole. Place the small hole located in the handle of the extraction/installation tool over the Vapor Pin™ to protect the barb fitting and cap, and tap the Vapor Pin™ into place using a

dead blow hammer (Figure 2). Make sure the extraction/installation tool is aligned parallel to the Vapor Pin™ to avoid damaging the barb fitting.

Figure 2. Installing the Vapor Pin™.

For flush mount installations, unscrew the threaded coupling from the installation/extraction handle and use the hole in the end of the tool to assist with the installation (Figure 3).

Figure 3. Flush-mount installation.

During installation, the silicone sleeve will form a slight bulge between the slab and the Vapor Pin™ shoulder. Place the protective cap on Vapor Pin™ to prevent vapor loss prior to sampling (Figure 4).

Figure 4. Installed Vapor Pin™.

7) For flush mount installations, cover the Vapor Pin™ with a flush mount cover.

8) Allow 20 minutes or more (consult applicable guidance for your situation) for the sub-slab soil-gas conditions to equilibrate prior to sampling.

9) Remove protective cap and connect sample tubing to the barb fitting of the Vapor Pin™ (Figure 5).

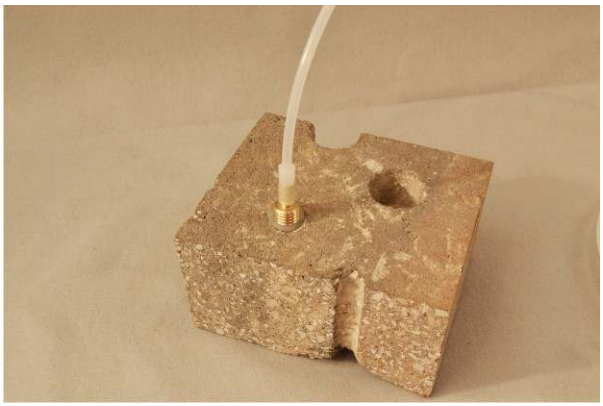

Figure 5. Vapor Pin™ sample connection.

10) Conduct leak tests [(e.g., real-time monitoring of oxygen levels on extracted sub-slab soil gas, or placement of a water

dam around the Vapor Pin™) Figure 6]. Consult your local guidance for possible tests.

Figure 6. Water dam used for leak detection.

11) Collect sub-slab soil gas sample. When finished sampling, replace the protective cap and flush mount cover until the next sampling event. If the sampling is complete, extract the Vapor Pin™.

Extraction Procedure:

1) Remove the protective cap, and thread the installation/extraction tool onto the barrel of the Vapor Pin™ (Figure 7). Continue turning the tool to assist in extraction, then pull the Vapor Pin™ from the hole (Figure 8).

Figure 7. Removing the Vapor Pin™.

Figure 8. Extracted Vapor Pin™.

2) Fill the void with hydraulic cement and smooth with the trowel or putty knife.

3) Prior to reuse, remove the silicone sleeve and discard. Decontaminate the Vapor Pin™ in a hot water and Alconox® wash, then heat in an oven to a temperature of 130° C.

The Vapor Pin™ to designed be used repeatedly; however, replacement parts and supplies will be required periodically. These parts are available on-line at www.CoxColvin.com.

Replacement Parts:

Vapor Pin™ Kit Case - VPC001
Vapor Pins™ - VPIN0522
Silicone Sleeves - VPTS077
Installation/Extraction Tool - VPIE023
Protective Caps - VPPC010
Flush Mount Covers - VPFM050
Water Dam - VPWD004
Brush - VPB026