ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
COLLEEN CHAWLA, Agency Director

DEPARTMENT OF ENVIRONMENTAL HEALTH
LOCAL OVERSIGHT PROGRAM (LOP) FOR
HAZARDOUS MATERIALS RELEASES
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November 28, 2018

Mr. James Tracy
205E. Harmon Avenue, #115
Las Vegas, NV 89169-6440
(*Sent via electronic mail to:* alpineutah@aol.com)

Dr. Orobo Osagie
Address Unknown

Subject: Request for Data Gap Investigation Work Plan; Fuel Leak Case No. RO0000117 and GeoTracker Global ID T0600191668, Osagie Property, 1532 Peralta Street, Oakland, CA 94607

Dear Mr. Tracy and Mr. Osagie:

Alameda County Department of Environmental Health (ACDEH) staff wish to thank Mr. Brent Wheeler and Mark Youngkin, both of Wheeler Group Environmental, LLC (WGE), for meeting with our agency staff on November 20, 2018. The purpose of the meeting was to review the recently submitted document entitled *Groundwater Monitoring Report, Site Conceptual Model and LTCP Criteria* (SCM) prepared by WGE on behalf of Mr. Tracy.

The site is located at the southern corner of Peralta Street and 16th Street in a mixed use residential/ commercial area. The property is currently used for material storage, with previous site uses reported to include a service station and auto repair facilities. Five underground storage tanks (USTs) used for the storage of gasoline and diesel and fuels were removed in December 1999. The USTs were reported to be in poor condition and evidence of releases was observed. Though the surface expression of the dispenser island has been removed, there has been no documented excavation activity associated with its removal.

A groundwater monitoring well network installed for the site consists of nine wells designated MW-1 through MW-9. Wells MW-1 through MW-6 were installed in February 2004 and were generally sampled quarterly through April 17, 2009. Wells MW-7 through MW-9 were installed in April 2009 and were sampled once on April 17, 2009. Between 2009 and 2018, wells MW-1 through MW-3 and MW-7 through MW-9 were sampled once on March 7, 2017. Groundwater monitoring conducted in 2017 included measuring the depth-to-water (DTW) twice, once in January followed by the March measurement. The 2017 events excluded wells MW-4, MW-5 and MW-6 as these wells could not be located. Groundwater measurements indicated the direction of flow has reversed from a northerly direction during the period of 2004 through 2009 and a southerly direction determined from the January and March 2017 measurements.

The site conceptual model presented in the SCM identified the following data gaps to be addressed in accordance with the State Water Resources Control Board's (SWRCB's) Low Threat Underground Storage Tank Case Closure Policy (LTCP):

- The 2017 flow direction measurements are anomalous and additional monitoring is needed to reconcile 2017 flow direction measurements with historical data;
- Plume stability is unknown, and plume may be increasing in size;
- Unknown quantity of residual LNAPL remains in soil surrounding former USTs and fueling equipment;
- WGE indicated ACDEH previously expressed concerned that several monitor wells indicate a new release of aged total petroleum hydrocarbons (TPH) and a new primary source may be identified during implementation of the Corrective Action Plan (CAP), submitted in 2010;
- Source area monitor wells MW-5 and MW-6 with the highest historical concentrations of fuel constituents are not accessible for groundwater sampling;
- No soil gas or vapor sampling data available

ACDEH has evaluated the data and recommendations presented in the above-mentioned report, in conjunction with the case files, to determine if the site is eligible for closure as a low risk site under the SWRCB's LTCP. We are in general agreement with the findings of the SCM. Based on ACDEH staff review, we have determined that the site fails to meet the LTCP General Criteria c (The unauthorized-"primary"- release from the UST system has been stopped), d (Free Product), e (Site Conceptual Model), f (Secondary Source Removal) and the Media-Specific Criteria for Groundwater, the Media-Specific Criteria for Vapor Intrusion to Indoor Air, and the Media-Specific Criteria for Direct Contact (see GeoTracker).

Additional data may be available that ACDEH is not aware of, or may not have been submitted, and therefore has not been incorporated in to ACDEH's review. If additional data is made available, the data can be incorporated in future LTCP reviews. The evaluation of the site under the LTCP that is presented below is intended to initiate further discussions, submittal of other available documents, or the collection of additional data in order to determine if or when the site can be closed under the LTCP and to document current LTCP data gaps.

At this juncture ACDEH requests that you prepare a Data Gap Investigation Work Plan that is supported by a focused site conceptual model to address the Technical Comments provided below.

TECHNICAL COMMENTS

1. **LTCP General Criteria c (The unauthorized ("primary") release from the UST system has been stopped) –** The LTCP requires the tank, pipe, or other appurtenant structure that released petroleum into the environment (i.e. the primary source) has been removed, repaired or replaced, as it is not the intent of the LTCP to allow sites with ongoing leaks from the UST system to qualify for low-threat closure.

   As presented at the meeting, piping associated with the fuel dispensing system may remain in place and has the potential to be a source of an on-going release of petroleum fuel remaining in the piping. The surface expression of the dispenser island has been removed. However, there is no documentation that the product piping servicing the dispensers has been removed. The presence of the piping precludes meeting this General Criteria. Please present your analysis regarding the presence/absence of primary source(s) in the Data Gap Investigation Work Plan described in Technical Comment 8.

2. **LTCP General Criteria d (Free Product) –** The LTCP requires free product to be removed to the extent practicable at release sites where investigations indicate the presence of free product by removing in a manner that minimizes the spread of the unauthorized release into previously uncontaminated zones by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site, and that properly treats, discharges, or disposes of recovery byproducts in compliance with applicable laws. Additionally, the LTCP requires that abatement of free product migration be used as a minimum objective for the design of any free product removal system.

   ACDEH's review of the case files indicates that insufficient data and analysis has been presented to assess free product at the site. Specifically, free phase product was observed floating on water within a tank pit excavation and TPH concentrations indicative of the presence of free phase product are documented in confirmation soil samples collected following tank pit over-excavation.

   Seven of the nine wells in the network have had submerged well screens for at least 43-percent of the time. Monitoring well MW-6, having a submerged well screen more than 70-percent of the time, was reported to contain free phase product in at least four groundwater monitoring events, including the three most recent events. The three wells advanced in/adjacent to the former tank pits have exhibited among the highest concentrations of dissolved phase petroleum hydrocarbons. These wells, including MW-6, have not been sampled since April 2009 as attempts to locate the wells have been unsuccessful. Therefore, the absence of free product at the site has not been demonstrated.

Please present a strategy in the Data Gap Investigation Work Plan (described in Technical Comment 8 below) to address the items discussed above.

3. **LTCP General Criteria e (Site Conceptual Model) –** According to the LTCP, the site conceptual model is a fundamental element of a comprehensive site investigation. The site conceptual model establishes the source and attributes of the unauthorized release, describes all affected media (including soil, groundwater, and soil vapor as appropriate), describes local geology, hydrogeology and other physical site characteristics that affect contaminant environmental transport and fate, and identifies all confirmed and potential contaminant receptors (including water supply wells, surface water bodies, structures and their inhabitants). The site conceptual model is relied upon by practitioners as a guide for investigative design and data collection. All relevant site characteristics identified by the site conceptual model shall be assessed and supported by data so that the nature, extent and mobility of the release have been established to determine conformance with applicable criteria in this policy.

   Our review of the case files indicates that insufficient data collection and analysis has not been presented to assess the nature, extent, and mobility of the release and to support compliance with General Criteria d as discussed in Technical Comment 1 and Technical Comment 2 above and Media Specific Criteria for Vapor Intrusion to Indoor Air, Groundwater, and Direct Contact and Outdoor Air Exposure as described in Technical Comments 5, 6 and 7 below, respectively. Please present a strategy in the Data Gap Investigation Work Plan (described in Technical Comment 8 below) to address the items discussed above and present them in the focused site conceptual model described in Technical Comment 8 below.

4. **General Criteria f – Secondary Source Has Been Removed to the Extent Practicable –** "Secondary source" is defined as petroleum-impacted soil or groundwater located at or immediately beneath the point of release from the primary source. Unless site attributes prevent secondary source removal (e.g. physical or infrastructural constraints exist whose removal or relocation would be technically or economically infeasible), petroleum-release sites are required to undergo secondary source removal to the extent practicable as described in the policy. "To the extent practicable" means implementing a cost-effective corrective action which removes or destroys-in-place the most readily recoverable fraction of source-area mass. It is expected that most secondary mass removal efforts will be completed in one year or less. Following removal or destruction of the secondary source, additional removal or active remedial actions shall not be required by regulatory agencies unless (1) necessary to abate a demonstrated threat to human health or (2) the groundwater plume does not meet the definition of low threat as described in this policy.

   UST pit over excavation activities were performed in early 2000. Interior excavation sidewall samples do not appear to be constrained by street or structure encroachment and therefore appears to have been halted prematurely. Laboratory analysis of confirmation samples collected are reported to contain elevated TPH concentrations indicative of the presence of light non-aqueous phase petroleum hydrocarbons (LNAPL).

   Product piping associated with the fuel dispensing system may remain at the site. Soil beneath the piping and (removed) dispensers is a potential secondary source.

   Please present a strategy in the Data Gap Investigation Work Plan (described in Technical Comment 8 below) to address the items discussed above. Alternatively, please provide justification of why the site satisfies this general criterion in the focused site conceptual model described in Technical Comment 8 below.

5. **LTCP Media Specific Criteria for Groundwater –** To satisfy the media-specific criteria for groundwater, the contaminant plume that exceeds water quality objectives must be stable or decreasing in areal extent and meet all of the additional characteristics of one of the five classes of sites listed in the policy.

   Our review of the case files indicates that insufficient data collection and analysis has been presented to support the requisite characteristics of plume stability or plume classification. Based on the data presented in the SCM, the contaminant plume is undefined based on the reported variability of flow and concentration data

for downgradient wells/bores. Additionally, the well search databases reviewed may be inadequate based on the search distance and potential presence of supply wells in the area.

a. Groundwater flow has historically (2004 through 2009) been northerly. Monitoring well MW-8 and soil bore B5 are located off-site and down gradient based on this flow direction. Well MW-8 is reported to contain 2,200 micrograms per liter (ug/L) TPH as gasoline (TPHg) and 3,330 ug/L TPH as diesel (TPHd), the most elevated concentrations documented in the 2017 sampling event. Grab-groundwater (GGW) from bore B5, advanced in the vicinity of MW-8, was reported to contain 11,600 ug/L TPHg and 5,460 ug/L benzene. As there are no wells/bores farther downgradient of MW-8 and B5, the contaminant plume is undefined in this direction based on the northerly flow.

b. Groundwater has been determined to flow southerly based on the 2017 DTW measurements. The GGW sample collected from off-site bore B7 located to the southwest of the site, was reported to contain TPHg and TPHd concentrations of 3,370 ug/L and 21,200 ug/L, respectively. Additionally, GGW collected from bore B13, situated southeast of the former fuel dispenser island, was reported to contain TPHg and TPHd concentrations of 950 ug/L and 590 ug/L, respectively. As there are no wells/bores farther downgradient of these bores, the contaminant plume is undefined to the southwest and southeast.

c. A storm water catch basin is located at the corner of Peralta Street and 16th Street between the site and B5/ MW-8 locations. As groundwater has been reported at a depth of less than 1.5-feet below the ground surface (bgs), contaminated groundwater may be intercepted by the storm water system. Please identify the location and distance of the storm drain outfall to be included for an evaluation of potential impacts to off-site receptors.

d. A well survey having a search radius of 1,250 feet was conducted for the site. The survey consisted of a review of Department of Water Resources (DWR) and Alameda County Public Works Agency (ACPWA) databases. The well search identified one industrial supply well 200 feet north of the site and a historic (1913) municipal well approximately 950 feet northeast of the site. Using the maximum TPHg plume length of 855 feet and the 1,000-foot buffer contained in the policy for distance between the leading edge of the contaminant plume to the receptor (e.g. surface water and/or supply well), a well search radius of 1,855 feet should be used for undefined petroleum hydrocarbon plumes.

Our review of the document entitled *East Bay Plain Groundwater Basin Beneficial Use Evaluation Report, Alameda and Contra Costa Counties, CA 1999*, prepared by the California Regional Water Quality Control Board Groundwater Committee, June 1999, suggests the site is located in an area which previously contained (circa 1910) numerous water wells. Wells of this time period may predate DWR and ACPWA records for domestic wells; therefore, ACDEH is of the opinion the well search is inadequate for determining potential well receptors to the contaminant plume.

Based on the variability of groundwater flow presented in the SCM, the contaminant plume is undefined in the northerly, southwesterly and southeasterly directions. Additionally, the search for nearby receptors (wells) is inadequate. Please present a strategy in the Data Gap Investigation Work Plan (described in Technical Comment 8 below) to address the items discussed above. Alternatively, please provide justification of why the site satisfies the Media-Specific Criteria for Groundwater in the focused site conceptual model described in Technical Comment 8 below.

6. **LTCP Media Specific Criteria for Vapor Intrusion to Indoor Air –** The LTCP describes conditions, including bioattenuation zones, which if met will assure that exposure to petroleum vapors in indoor air will not pose unacceptable health risks to human occupants of existing or future site buildings, and adjacent parcels. Appendices 1 through 4 of the LTCP criteria illustrate four potential exposure scenarios and describe characteristics and criteria associated with each scenario. Our review of the case files indicates that the shallow groundwater, lack of a bioattenuation zone, undefined contaminant plume, and site data collection and analysis fails to support the requisite characteristics of one of the four scenarios. ACDEH notes that:

a. Utilities servicing the primary site structure for the service station/ vehicle repair operations may act as a preferential pathway for the transport of fugitive contaminant vapors into the building from soil in the release areas and from contaminated groundwater.

b. The restroom attached to the storage building located in the southern portion of the site is serviced by utilities which traverse the dispenser and product piping release areas, passes in the vicinity of a former fuel UST which experienced a release and passes through the plume of petroleum-contaminated groundwater. The presence of these utilities may act as a preferential pathway for the migration of petroleum vapors into the restroom/storage building.

c. As indicated in Technical Comment 5 above, groundwater is shallow and the contaminant plume is undefined. Therefore, transport of petroleum hydrocarbon contamination off-site may present a vapor intrusion health risk to neighboring residential and commercial properties.

Please present a strategy in the Data Gap Investigation Work Plan described in Technical Comment 8 below to address the aforementioned data gaps. Alternatively, please provide justification of why the site satisfies the Media-Specific Criteria for Vapor Intrusion to Indoor Air in a site conceptual model that assures that exposure to petroleum vapors in indoor air will not pose unacceptable health risks to occupants of adjacent buildings.

7. **LTCP Media Specific Criteria for Direct Contact and Outdoor Air Criteria** – The LTCP describes conditions where direct contact with contaminated soil or inhalation of contaminants volatized to outdoor air poses a low threat to human health. According to the LTCP, release sites where human exposure may occur satisfy the media-specific criteria for direct contact and outdoor air exposure and shall be considered low-threat if the maximum concentrations of petroleum constituents in soil are less than or equal to those listed in Table 1 for the specified depth bgs. Alternatively, the policy allows for a site-specific risk assessment that demonstrates that maximum concentrations of petroleum constituents in soil will have no significant risk of adversely affecting human health, or controlling exposure through the use of mitigation measures, or institutional or engineering controls.

   As presented in the SCM, soil concentrations of benzene and naphthalene in the 5- to 10-foot interval exceed the levels listed in Table 1 for commercial/industrial exposures, hence the case does not meet the policy without a site-specific risk assessment or institutional or engineering controls. Additionally, based on the shallow DTW, direct contact with contaminated groundwater is anticipated and needs to be addressed.

8. **Data Gap Investigation Work Plan and Focused Site Conceptual Model –** Please prepare a Data Gap Investigation Work Plan to address the technical comments listed above. Please support the scope of work in the work plan with a focused site conceptual model and Data Quality Objectives (DQOs) that relate the data collection to each LTCP criteria. For example, please clarify which scenario within each Media-Specific Criteria a sampling strategy is intended to apply to.

   In order to expedite review, ACDEH requests the focused site conceptual model be presented in a tabular format that highlights the major site conceptual model elements and associated data gaps, which need to be addressed to progress the site to case closure under the LTCP. Please see Attachment A “Site Conceptual Model Requisite Elements”.

TECHNICAL REPORT REQUEST

Please upload technical reports to the SWRCB’s GeoTracker website, in accordance with the following specified file naming convention and schedule:

- **January 28, 2019** – Data Gap Investigation Work Plan and Focused Site Conceptual Model (File to be named: WP_SCM_R_yyyy-mm-dd). Please provide ACDEH notification of document submittal to GeoTracker, via electronic mail- Attention: Keith Nowell)

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

Thank you for your cooperation. ACDEH looks forward to working with you and your consultants to advance the case toward closure. Should you have any questions regarding this correspondence or your case, please call me at (510) 567-6764 or send an electronic mail message at keith.nowell@acgov.org.

Sincerely,

Keith Nowell

Digitally signed by Keith Nowell
DN: cn=Keith Nowell, o=Alameda County, ou=Department of Environmental Health, email=keith.nowell@acgov.org, c=US
Date: 2018.11.28 14:20:58 -08'00'

Keith Nowell PG, CHG
Hazardous Materials Specialist

Enclosures: Attachment 1 – Responsible Party (ies) Legal Requirements/Obligations

Attachment A – Site Conceptual Model Requisite Elements

cc: Brent A. Wheeler, Wheeler Group Environmental, LLC, 369-B Third Street, Suite #221, San Rafael, CA 94901; (*Sent via electronic mail to: bwheeler@wheelergroupenvironmental.com*)

Dilan Roe, ACDEH, (*Sent via electronic mail to: dilan.roe@acgov.org*)
Paresh Khatri, ACDEH, (*Sent via electronic mail to: paresh.khatri@acgov.org*)
Keith Nowell, ACDEH (*Sent via electronic mail to: keith.nowell@acgov.org*)
GeoTracker

Alameda County Environmental Cleanup Oversight Programs (LOP and SCP)	**REVISION DATE:** December 14, 2017
	ISSUE DATE: July 25, 2012
	PREVIOUS REVISIONS: September 17, 2013, May 15, 2014, December 12, 2016
SECTION: ACDEH Procedures	**SUBJECT:** Responsible Party(ies) Legal Requirements / Obligations

REPORT & DELIVERABLE REQUESTS

Alameda County Department of Environmental Health (ACDEH) Cleanup Oversight Programs, Local Oversight Program (LOP) and Site Cleanup Program (SCP) require submission of all reports in electronic form to the State Water Board's (SWB) GeoTracker website in accordance with California Code of Regulations, Chapter 30, Division3, Title 23 and Division 3, Title 27.

Leaking Underground Fuel Tank (LUFT) Cases

Reports and deliverable requests are pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party (RP) in conjunction with an unauthorized release from a petroleum underground storage tank (UST) system.

Site Cleanup Program (SCP) Cases

For non-petroleum UST cases, reports and deliverables requests are pursuant to California Health and Safety Code Section 101480.

ELECTRONIC SUBMITTAL OF REPORTS

A complete report submittal includes the PDF report and all associated electronic data files, including but not limited to GEO_MAP, GEO_XY, GEO_Z, GEO_BORE, GEO_WELL, and laboratory analytical data in Electronic Deliverable Format™ (EDF). Additional information on these requirements is available on the State Water Board's website (http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/)

- Do not upload draft reports to GeoTracker
- Rotate each page in the PDF document in the direction that will make it easiest to read on a computer monitor.

GEOTRACKER UPLOAD CERTIFICATION

Each report submittal is to include a GeoTracker Upload Summary Table with GeoTracker valid values[1] as illustrated in the example below to facilitate ACDEH review and verify compliance with GeoTracker requirements.

GeoTracker Upload Table Example

Report Title	Sample Period	PDF Report	GEO_MAPS	Sample ID	Matrix	GEO_Z	GEO_XY	GEO_BORE	GEO_WELL	EDF
2016 Subsurface Investigation Report	2016 S1	✓	✓	Effluent	SO	☐	☐	☐	☐	✓
2012 Site Assessment Work Plan	2012	✓	✓			☐	☐	☐	☐	☐
2010 GW Investigation Report	2008 Q4	✓	✓	SB-10	W	✓	☐	☐	☐	✓
				SB-10-6	SO	☐	☐	☐	☐	✓
				MW-1	WG	✓	✓	✓	✓	✓
				SW-1	W	✓	✓	✓	✓	✓

[1] GeoTracker Survey XYZ, Well Data, and Site Map Guidelines & Restrictions, CA State Water Resources Control Board, April 2005

Alameda County Environmental Cleanup Oversight Programs (LOP and SCP)	**REVISION DATE:** NA
	ISSUE DATE: December 14, 2017
	PREVIOUS REVISIONS: September 17, 2013, May 15, 2014, December 12, 2016
SECTION: ACDEH Procedures	**SUBJECT:** Responsible Party(ies) Legal Requirements / Obligations

ACKNOWLEDGEMENT STATEMENT

All work plans, technical reports, or technical documents submitted to ACDEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "I have read and acknowledge the content, recommendations and/or conclusions contained in the attached document or report submitted on my behalf to the State Water Board's GeoTracker website." This letter must be signed by the Responsible Party, or legally authorized representative of the Responsible Party.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6731, 6735, and 7835) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately licensed or certified professional and include the professional registration stamp, signature, and statement of professional certification. Additional information is available on the Board of Professional Engineers, Land Surveyors, and Geologists website at: http://www.bpelsg.ca.gov/laws/index.shtml.

UNDERGROUND STORAGE TANK CLEANUP FUND

For LUFT cases, RP's non-compliance with these regulations may result in ineligibility to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse the cost of cleanup. Additional information is available on the internet at: https://www.waterboards.ca.gov/water_issues/programs/ustcf/

AGENCY OVERSIGHT

Significant delays in conducting site assessment/cleanup or report submittals may result in referral of the case to the Regional Water Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

ATTACHMENT A

Site Conceptual Model Requisite Elements

The site conceptual model (SCM) is an essential decision-making and communication tool for all interested parties during the site characterization, remediation planning and implementation, and closure process. A SCM is a set of working hypotheses pertaining to all aspects of the contaminant release, including site geology, hydrogeology, release history, residual and dissolved contamination, attenuation mechanisms, pathways to nearby receptors, and likely magnitude of potential impacts to receptors.

The SCM is initially used to characterize the site and identify data gaps. As the investigation proceeds and the data gaps are filled, the working hypotheses are modified, and the overall SCM is refined and strengthened until it is said to be "validated". At this point, the focus of the SCM shifts from site characterization towards remedial technology evaluation and selection, and later remedy optimization, and forms the foundation for developing the most cost-effective corrective action plan to protect existing and potential receptors.

For ease of review, Alameda County Environmental Health (ACEH) requests utilization of tabular formats to (1) highlight the major SCM elements and their associated data gaps which need to be addressed to progress the site to case closure (see Table 4-1 of attached example), and (2) highlight the identified data gaps and proposed investigation activities (see Table 5-1 of the attached example). ACEH requests that the tables presenting the SCM elements, data gaps, and proposed investigation activities be updated as appropriate at each stage of the project and submitted with work plans, feasibility studies, corrective action plans, and requests for closures to support proposed work, conclusions, and/or recommendations.

The SCM should incorporate, but is not limited to, the topics listed below. Please support the SCM with the use of large-scaled maps and graphics, tables, and conceptual diagrams to illustrate key points. Please include an extended site map(s) utilizing an aerial photographic base map with sufficient resolution to show the facility, delineation of streets and property boundaries within the adjacent neighborhood, downgradient irrigation wells, and proposed locations of transects, monitoring wells, and soil vapor probes.

a. Regional and local (on-site and off-site) geology and hydrogeology. Include a discussion of the surface geology (e.g., soil types, soil parameters, outcrops, faulting), subsurface geology (e.g., stratigraphy, continuity, and connectivity), and hydrogeology (e.g., water-bearing zones, hydrologic parameters, impermeable strata). Please include a structural contour map (top of unit) and isopach map for the aquitard that is presumed to separate your release from the deeper aquifer(s), cross sections, soil boring and monitoring well logs and locations, and copies of regional geologic maps.

b. Analysis of the hydraulic flow system in the vicinity of the site. Include rose diagrams for depicting groundwater gradients. The rose diagram shall be plotted on groundwater elevation contour maps and updated in all future reports submitted for your site. Please address changes due to seasonal precipitation and groundwater pumping, and evaluate the potential interconnection between shallow and deep aquifers. Please include an analysis of vertical hydraulic gradients, and effects of pumping rates on hydraulic head from nearby water supply wells, if appropriate. Include hydraulic head in the different water bearing zones and hydrographs of all monitoring wells.

c. Release history, including potential source(s) of releases, potential contaminants of concern (COC) associated with each potential release, confirmed source locations, confirmed release locations, and existing delineation of release areas. Address primary leak source(s) (e.g., a tank, sump, pipeline, etc.) and secondary sources (e.g., high-

Site Conceptual Model Requisite Elements (continued)

concentration contaminants in low-permeability lithologic soil units that sustain groundwater or vapor plumes). Include local and regional plan view maps that illustrate the location of sources (former facilities, piping, tanks, etc.).

d. Plume (soil gas and groundwater) development and dynamics including aging of source(s), phase distribution (NAPL, dissolved, vapor, residual), diving plumes, attenuation mechanisms, migration routes, preferential pathways (geologic and anthropogenic), magnitude of chemicals of concern and spatial and temporal changes in concentrations, and contaminant fate and transport. Please refer to the *Preferential Pathway and Sensitive Preceptor Study* description on the next page. Please include three-dimensional plume maps for groundwater and two-dimensional soil vapor plume plan view maps to provide an accurate depiction of the contaminant distribution of each COC.

e. Summary tables of chemical concentrations in different media (i.e., soil, groundwater, and soil vapor). Please include applicable environmental screening levels on all tables. Include graphs of contaminant concentrations versus time.

f. Current and historic facility structures (e.g., buildings, drain systems, sewer systems, underground utilities, etc.) and physical features including topographical features (e.g., hills, gradients, surface vegetation, or pavement) and surface water features (e.g. routes of drainage ditches, links to water bodies). Please include current and historic site maps.

g. Current and historic site operations/processes (e.g., parts cleaning, chemical storage areas, manufacturing, etc.).

h. Other contaminant release sites in the vicinity of the site. Hydrogeologic and contaminant data from those sites may prove helpful in testing certain hypotheses for the SCM. Include a summary of work and technical findings from nearby release sites, including the two adjacent closed LUFT sites, (i.e., Montgomery Ward site and the Quest Laboratory site).

i. Land uses and exposure scenarios on the facility and adjacent properties. Include beneficial resources (e.g., groundwater classification, wetlands, natural resources, etc.), resource use locations (e.g., water supply wells, surface water intakes), subpopulation types and locations (e.g., schools, hospitals, day care centers, etc.), exposure scenarios (e.g. residential, industrial, recreational, farming), and exposure pathways, and potential threat to sensitive receptors. Include an analysis of the contaminant volatilization from the subsurface to indoor/outdoor air exposure route (i.e., vapor pathway). Please include copies of Sanborn maps and aerial photographs, as appropriate. Please refer to the *Preferential Pathway and Sensitive Preceptor Study* description on the next page.

j. Identification and listing of specific data gaps that require further investigation during subsequent phases of work. Proposed activities to investigate and fill data gaps identified.

Preferential Pathway and Sensitive Receptor Study

Please conduct a study as a part of the SCM requested in order to (1) locate potential anthropogenic migration pathways on and in the vicinity of the site that could spread contamination through vertical and lateral migration, and (2) identify exposure scenarios and sensitive receptors that are linked to site contamination through these preferential pathways. The results of your study shall contain all information required by California Code of Regulations, Title 23, Division 3, Chapter 16, §2654(b) including but not limited to the following components, as applicable to the site:

a. **Utility Survey** - An evaluation of all existing subsurface utility lines, laterals, and trenches including sewers, electrical, fiber optic cable, cable, water, storm drains, trench backfill, etc. within and near the site and plume area(s). Please include an evaluation of shallow utilities associated with current and historical site operations/processes including UST systems, remediation systems, parts cleaning, sumps, etc.

b. **Updated Well Survey** – ACEH requests that well data sources (Alameda County Public Works Agency [ACPWA] and Department of Water Resources [DWR]) be reviewed for more recently installed vicinity water supply wells. ACEH requests the identification of all active, inactive, standby, decommissioned (sealed with concrete), unrecorded, and abandoned (improperly decommissioned or lost) wells including monitoring, remediation, irrigation, water supply, industrial, livestock, dewatering, and cathodic protection wells within a ¼-mile radius of the subject site. Please inspect all available Well Completion Reports filed with the DWR and ACPWA in your survey, and perform a background study of the historical land uses of the site and properties in the vicinity of the site. Use the results of your background study to determine the existence of unrecorded/unknown (abandoned) wells, which can act as contaminant migration pathways at or from your site.

c. **Land Uses and Exposure Scenarios on the Facility and Adjacent Properties** – The surrounding land use appears to be predominately agricultural; however, redevelopment of the site as a service station has been planned. Consequently, the identification of existing and future land use on and in the vicinity of the site is requested, including:

- Beneficial resources (e.g., groundwater classification, wetlands, surface water bodies, natural resources, etc.)
- Subpopulation types and locations (e.g., schools, hospitals, day care centers, elder care facilities, etc.)
- Exposure scenarios (e.g. residential, industrial, recreational, farming) and exposure pathways including those identified in the Low Threat Underground Storage Tank Case Closure Policy General Criteria h – Nuisance Conditions, and Media-Specific Criteria for Groundwater, Vapor Intrusion to Indoor Air, and Direct Contact and Outdoor Air Exposure

d. **Planned Development** – Future development activities are planned in the vicinity of the site. Please include an analysis of new utility corridors, building foundations, wells, and/or development activities that could significantly alter contaminant migration (i.e., covering of large areas of the site with pavement, etc.).

Please synthesize this information and discuss your analysis and interpretation of the results of the preferential pathway and sensitive receptor study and incorporate into the requested SCM. Please provide the following supporting documentation and data as applicable:

- Copies of current and historical maps, such as site maps, Sanborn maps, aerial photographs, etc., used when conducting the background study.
- DWR well logs, marked as confidential, uploaded to Alameda County Environmental Health's ftp site. For confidentiality purposes do not upload the DWR well logs to Geotracker. The well logs will be placed in our confidential file and will be available only to internal staff for review.
- Table with details of the well search findings including Map ID corresponding to well location on map, State Well ID, Well Owner ID, approximate distance from the site, direction from the site, use, installation date, depth (feet below ground surface [bgs]), screened interval (feet bgs), sealed interval (feet bgs), diameter (inches), and well location address.
- Maps and geologic cross-sections illustrating historical groundwater elevations and flow directions (rose diagram) at the site. Synthesize the data requested above and include the location and depth of all utility lines, trenches, UST pits and piping trenches, wells, surface water bodies, foundational elements, surface covering types (pavement, landscaped, etc.) within and near the site and plume area(s), and the location of potential receptors.

Table 4-1
Site Conceptual Model

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
Geology and Hydrogeology	Regional	As described by URS (2004), the lithology encountered in the subsurface beneath the Site during drilling activities consisted predominantly of a brown to greenish-gray silty clay with sand and gravel. The primary stratigraphic units at the Site are listed below, with the approximate ranges of depth (bgs) each unit was encountered across the Site: • 0 to 5 feet bgs: The surface soil typically consisted of very dark-brown clay to dark-gray gravel fill, depending on whether the boring was in the vacant vegetated parcel (dark-brown clay), at 3860 MLK Jr. Way; or beneath the asphalt and concrete surfaces at the Lucky's Auto Body parcel at 3884 MLK Jr. Way (gravel fill). • 5 to 20 feet bgs: very dark-brown silty clay grades to a greenish-gray silty clay and brown silty clay and gravelly clay. Groundwater was encountered in direct-push boreholes at an average depth of 17.2 feet bgs, with depths ranging from 16.2 to 19.6 feet bgs. This groundwater depth is not considered a stabilized groundwater depth, because it was not measured from appropriately constructed monitoring wells.	None	NA

Table 4-1
Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
Geology and Hydrogeology	Site	Regional groundwater in the Oakland area generally follows topography, from areas of higher elevation in the east toward lower elevation in the west and southwest. The groundwater flow direction in the vicinity of the Site is to the west towards San Francisco Bay (Arcadis, 2012). URS reviewed groundwater investigation reports from the ARCO #4931 station at 731 West MacArthur Boulevard, approximately 1,000 feet southwest of the Site (Arcadis, 2012). The depth to water in the groundwater monitoring wells at the ARCO site ranged from approximately 3.2 to 10.8 feet bgs (approximately 52.2 to 43 feet elevation).	1.There are no monitoring wells on site so that the local groundwater flow direction and gradient is not known.	Five groundwater wells are to be installed at the site.
Surface Water Bodies		The closest surface water body is the San Francisco Bay, which is 1.5 miles west of the site.		
Nearby Wells		The State Water Resource Quality Control Board (RWQCB) Geotracker GAMA website provides the locations of water supply wells proximal to the site. The nearest supply well is located approximately 2 miles southwest of the site. There are multiple monitoring wells in the vicinity of the site including those at the Arco services station at 781 West MacArthur Blvd., and Dollar Cleaners, 4860 – 4868 Telegraph Avenue, Oakland.	2.	NA
Release Source and Volume		The three prior gasoline USTs (two 650-gallon and one 500-gallon) are considered the main source of the release of fuel hydrocarbons that have been detected in soil and groundwater beneath the Site. Tanks #1 and #2 were both observed to have one or more holes from corrosion at the time of removal. Although no holes were observed in Tank #3 during removal, the integrity of the tank was questionable as it split into two pieces along the weld during removal. Soil surrounding the tanks was stained green and was noted to have strong petroleum hydrocarbon odors. The release from the Tanks at the Site was discovered on January 5, 1995 during tank removal activities. The volume of the release is not known.	5. & 6. Additional soil and groundwater data is required in the source areas.	See data gaps table. Additional soil borings will be advanced in the source areas. Groundwater monitoring wells will be installed.

Table 4-1
Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		The area around the ramps and pit in the southern area of the site is considered a potential source area.		
LNAPL		There are currently no groundwater monitoring wells located at the Site. Although light non-aqueous phase liquids were not observed during grab groundwater sampling activities, concentrations of TPH-g in sample G2 (22,000 µg/L), located near former Tank #3, and sample GP3 (79,800 µg/L), located adjacent to former Tank #1 may indicate the potential for the presence of light non-aqueous phase liquid (LNAPL) to be present.	1. Need monitoring wells at the site.	Monitoring wells (5) to be installed.
Source Removal Activities		Soil that was excavated from the UST pits during tank removal activities was returned to the excavation after the collection of soil samples for chemical analysis. There is no information regarding the quality of the soil that was placed back in the UST excavations. As such, with the exception of the removal of the USTs themselves, there have been no other source removal activities conducted at the Site.	2., 5.,6. Soil contamination at depth (12-foot bgs and deeper) is not well characterized. Since the site is to be excavated to approximately 12 feet bgs for the construction of a parking garage, additional shallow soil sampling is not required.	Ten soil borings are proposed, as discussed in the data gaps table.
Contaminants of Concern		Based on the historical investigations conducted at the Site, BTEX, cis-1,2-dichloroethene (cis-1,2-DCE), 1,2-dichloroethane (1,2-DCA) and TPH-g are present in groundwater above their respective MCLs and/or ESLs. However, based on correspondence from the ACEHSD, the contaminants of concern (COCs) for the site are BTEX, and TPH-g. These COCs are present above the screening levels primarily in the northern corner of the Site, near the location of the former USTs. Benzene and TPH-g are also present in groundwater above their MCLs and ESLs in the southern portion of the Site in the vicinity of the truck ramp and pit adjacent to the	4.	

Table 4-1
Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		former shop building, and in the northwestern area of the Site.		
Petroleum Hydrocarbons in Soil		Of the 58 samples analyzed from the two investigations, eight samples from seven borings exceeded their respective screening criteria. These samples were typically the deepest sample from the boring, ranging from 8.0 to 14.0 feet bgs. This is consistent with releases from a UST as opposed to a surface spill or release. Based on the historical investigation data, BTEX and TPH-g are the contaminants present in soil at concentrations exceeding their respective screening criteria. The contaminants are present mainly in soil at the location of former Tanks #1 through #3, and to a lesser extent, near the former fuel pump island in the northern corner of the Site. The lateral extent of contamination exceeding the screening criteria appears to be limited to the area around the former USTs. Soil concentration in all the samples from boring GP3 and S10, located in the sidewalk by Martin Luther King Jr. Way near former Tank #1 and Tank #2 are below their respective screening criteria. There is no additional data from around former Tank #3. Given the nature of the petroleum hydrocarbon (mainly light fraction gasoline), the vertical extent of contamination beneath and in close proximity to the former tanks is likely limited to the lowest level of groundwater fluctuation.	4. & 7. Additional soil sampling is required to better define the vertical extent of contamination. Redevelopment will include excavation of the entire site to a depth of 12 feet bgs for the construction of an underground parking garage.	Additional soil borings to be advanced, as described in the data gaps table.
Petroleum Hydrocarbons in Groundwater		During the two subsurface investigations conducted at the Site, a total of 15 grab groundwater samples were collected and analyzed for TPH-g and BTEX. The results of the analyses are summarized in Table 2-2. Concentration of TPH-g and/or BTEX exceeded their respective screening criteria in ten of the 15 samples analyzed. Similar to the soil sampling results, the highest concentrations were detected beneath or in close proximity to the former USTs. However, TPH-g and benzene were detected in one Site boring (G7) exceeding their respective screening criteria near the southern corner of the Site. There are no permanent monitoring wells located at the Site. As such, the groundwater flow direction across	8. There are no monitoring wells on site.	Five monitoring wells will be installed, as described in the data gaps table and in the work plan.

Table 4-1
Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		the Site cannot be evaluated. This has been defined as a significant data gap. The scope of work presented in this work plan includes the installation of four groundwater monitoring wells at the Site.		
Risk Evaluation		The Site is a former auto body and car wash facility. The Site is currently vacant, and with the exception of a billboard located in the northwest corner of the Site, has no structures and is covered with either asphalt or concrete foundations from former buildings located at the Site. The Site is zoned for residential and current plans are to redevelop the Site for residential use. However, there may be some commercial use on the ground level. This preliminary CSM assumes that development would consist of an underground parking garage; store fronts and residential units at ground level; and second story residential units. The CSM identifies the primary source; impacted media; release mechanism(s); secondary source(s); exposure route; potential receptors (residential, commercial/industrial worker, and construction worker), and an assessment of whether the exposure route/pathway is potentially complete, incomplete, or insignificant. Potential exposure routes that have been evaluated include incidental ingestion, dermal contact, dust inhalation, and vapor inhalation. For direct contact with contaminated soil, the exposure route for incidental ingestion, dermal contact, and dust inhalation for a residential and commercial/industrial worker are considered incomplete. These exposure routes for the construction worker are considered a potentially complete pathway, depending on the nature of the work. For volatilization from soil to outdoor air, vapor inhalation is the potential exposure pathway. Given dilution effects that take place outdoors, this exposure pathway is considered incomplete for all three potential receptors. For indoor air, this exposure pathway is considered potentially complete for all three potential receptors.		

Table 4-1
Site Conceptual Model (Continued)

CSM Element	CSM Sub-Element	Description	Data Gap Item #	Resolution
		For leaching of contaminants from soil to groundwater, the ingestion and dermal pathways for groundwater are considered incomplete, except for the construction worker, as shallow groundwater is not utilized as a drinking water source at the Site. For the construction worker, incidental ingestion and dermal contact is a potentially complete pathway. For volatilization from groundwater to outdoor air, the exposure pathway is considered insignificant due to dilution effects that take place outdoors. For indoor air, volatilization from groundwater to indoor air is considered a potentially complete pathway.		

Table 5-1
Data Gaps Summary and Proposed Investigation

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
1	Groundwater flow direction and gradient is unknown. There are only grab groundwater data points; there are no monitoring wells on site. There are no upgradient groundwater sample locations. The current groundwater data sets are 7 and 9 years old and may not be representative of current site conditions.	Install five groundwater monitoring wells, as described in the work plan. Wells will be constructed of 2-inch-diameter Schedule 40 PVC well casing, total depth up to 25 feet bgs; the screened interval will be determined based on observations of groundwater levels during field work. The well screen will consist of 5 to 10 feet of 0.010-inch well screen. Soil samples will be collected at 12 feet, 15 feet, and 20 feet bgs. Additional samples may be collected based on professional judgment.	The wells will be located to provide up- and downgradient control for the shallow groundwater plume. They will enable water level data to be collected to allow the groundwater flow direction and gradient to be calculated. Wells will be installed as follows: At the source area associated with UST #3. Downgradient of the site to the northwest, near the billboard. At the source area associated with USTs 1 and 2. Upgradient of the site adjacent to the ramp and pit. Adjacent to prior soil boring S4 (prior BTEX detections). Soil samples will be collected during well installation to further characterize subsurface soil contamination. Northern (off-site, downgradient) grab groundwater samples (far side of MLK, sidewalk): three borings.	Soil: TPH-g, BTEX, EDB, EDC. Soil samples from MW-1 will also be analyzed for PAHs. Groundwater: Natural attenuation parameters [COD, Fe(2+), Dissolved Gases (methane)] at selected locations (2). BTEX, TPH-g

Table 5-1
Data Gaps Summary and Proposed Investigation (Continued)

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
2	The soil data set does not adequately characterize the contamination (if any) that may remain on site after the excavation to approximately 11 to 12 feet bgs for the underground parking structure. The current soil data sets are 7 and 9 years old and may not be representative of current site conditions. Lithology below is not adequately characterized.	Ten soil borings will be drilled to a total depth of 20 feet bgs. Soil samples will be collected at 12 feet, 15 feet, and 20 feet bgs from soil borings SB-4 through SB-10. Soil samples will not be collected from soil borings SB-1, SB-2, and SB-3 which are located across MLK north of the site, as there is no reason to suspect an off-site soil contamination source in this area. Borings will be logged using the Unified Soil Classification System. Grab groundwater samples will be collected from the first encountered groundwater at each soil boring.	Soil samples will be collected starting at 12 feet bgs. Shallow soil on site is to be excavated for disposal during the construction of the underground parking garage. Excavation will be conducted to a depth of about 12 feet bgs. Soil borings will be located as shown in the work plan figure: Source area borings: At the former locations of USTs 1, 2 and 3. One boring north of the site on the side walk of MLK Way. One boring between USTs 1 and 2 and the pump island (potential leakage from conveyance piping). One boring at the approximate location of UST 3 (in addition to the soil samples to be collected from the monitoring well to be installed at this location). One boring in the vicinity of the ramps and pit in the southern portion of the site (in addition to soil samples to be collected from the monitoring well in this area). Step out borings: Step out boring SB-5 to be completed proximal to the UST #3 source area. GP4 Area: Benzene was previously detected at 25,000 µg/kg at location GP4 (Carver, 2006). Two step-out borings will be completed in this area to further characterize soils at depth.	TPH-g, BTEX, EDB, EDC. Boring SB-4 (on sidewalk of MLK near UST 1): PAHs

Table 5-1
Data Gaps Summary and Proposed Investigation (Continued)

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
3	There is no data on the presence and usage of wells in the vicinity of the site.	Obtain a well survey.	Identify irrigation and other wells in the site vicinity.	N/A
4	PAHs are potential COCs at the northern boundary of the site.	See soil borings – Item 2. PAHs will be analyzed at select locations as described in Item 2.	Item 2	Item 2
5	There is a potential source area in the vicinity of the ramps and pit.	A monitoring well will be installed in this area. It will also serve as the upgradient well for the site. See Item 2. A soil boring will also be completed in this area.	Item 2	Item 2
6	Determine size and contents of the three USTs that were removed from the site	Review prior reports.	Tanks #1 and #2 were identified as 650-gallon gasoline tanks. Tank #3 was a 500-gallon gasoline tank [Tank Removal Report – 1995]. Tanks #2 and #3 were observed to be badly deteriorated with holes due to corrosion.	NA
7	Confirm whether TPH-g and BTEX were detected during construction of the adjacent residential unit	Review prior reports.	The URS site investigation conducted in 2004 found no detections of TPH-g [<1,000 µg/kg] or BTEX [<5.0 µg/kg] in the borings completed to 14 feet bgs.	NA

Table 5-1
Data Gaps Summary and Proposed Investigation (Continued)

Item	Data Gap Item #	Proposed Investigation	Rationale	Analyses
8	Review data from the nearby service stations (Arco)	Review prior reports.	The former Arco station (731 West MacArthur Blvd.) is about 0.5 miles crossgradient of the 3884 MLK site. The BTEX levels are lower than those at the subject site; the Arco site does not appear to be contributing to on site TPH or BTEX contamination. Groundwater elevation data from this site was used to calculate groundwater flow direction, since there are currently no wells at the 3884 MLK site.	NA