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Engineering & Environmental Services

A Report Prepared For:

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CORRECTIVE MEASURES PROPOSAL
BAXTER COURT AND THOMAS PROPERTIES
720 AND 694 WEST FRANCISCO BOULEVARD
SAN RAFAEL, CALIFORNIA

FEBRUARY 22, 2008

By:

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I, James P. Dunn, certify that the information contained in or accompanying this submittal is true, accurate and complete. As to those portions of this submittal for which I cannot personally verify the accuracy, I certify that this submittal and all attachments were prepared at my direction in accordance with procedures designed to assure that qualified personnel properly gathered and evaluated the information submitted.

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1.0 INTRODUCTION

PES Environmental, Inc. (PES) has prepared this Corrective Measures Proposal (CMP) for the former Baxter Court and portions of the adjacent former Thomas Property (collectively known as the "Site") on behalf of the Baxter Family Trust (Baxter Trust) and Sonnen Motorcars (Sonnen), the current owners of the respective properties. The location of the Site is shown on Plate 1. The corrective measures will be implemented once the CMP is approved by DTSC after public participation activities.

1.1 Objectives of Corrective Measures Proposal

The objectives of this CMP is to describe the corrective measures that will be implemented at the site to control and abate threats to human health and/or the environment. It is anticipated that the completion of these measures will effectively eliminate the environmental concerns and qualify the site for industrial/commercial use.

1.2 Organization

The report has been organized into the following sections:

Section 1.0 – Introduction. The introduction presents a general explanation of the objectives and organization of the report;

Section 2.0 – Conceptual Site Model. Presents the current physical and environmental conditions present at the subject property;

Section 3.0 – Chemicals of Concern. This section presents the chemicals of concern identified in the vadose-zone soils and shallow groundwater and is based on prior site investigations

Section 4.0 – Cleanup Goals. Presents the cleanup goals to be used in the evaluation of remedial alternatives and to set performance standards for the preferred corrective measures;

Section 5.0 – Corrective Measures Alternatives Evaluation and Proposal. Summarizes the evaluation of applicable remedial alternatives and selection of the preferred remedial alternative;

Section 6.0 – Corrective Measures Implementation. This section presents the details of implementation of the selected remedy; and

Section 7.0 – References. Reference documents used during preparation of the CMP.

1.3 Site Description and Use

1.3.1 Former Baxter Court

Baxter Court is a rectangle-shaped 1.9-acre parcel located on the southwest side of West Francisco Boulevard in San Rafael, California. The property has approximate dimensions of 130 feet by 610 feet (Plate 2). Twelve single-story structures of various sizes were located on the property until mid-2005 to late 2006 when the structures were removed as part of the California Department of Transportation's (CalTrans) Highway 101 widening project and expansion of the adjacent automobile sales and servicing business. The street addresses for the former Baxter Court structures are 708, 710, 712, 714, 716, 720, 722, 724/726, 728, 730, 732, 734 and 738 West Francisco Boulevard. A general address of 720 West Francisco Boulevard is used pertaining to the subject property as a whole.

The property is zoned for commercial/industrial use and was previously leased by numerous small businesses for various commercial and light industrial activities including metal plating, automotive repair, vehicle and materials storage, and towing services. Operations at two of the previous tenants of Baxter Court, Western Chrome Plating & Polishing (Western Plating) and Specification Chromium Corporation, included treatment and disposal of hazardous plating shop waste using on-site fixed treatment units operated under the State of California Department of Toxic Substances Control's (DTSC) Permit-By-Rule requirements. The prior locations of Western Plating (714 West Francisco Boulevard) and Specification Chrome (712 West Francisco Boulevard) are presented on Plate 2. A private street, Baxter Court provides access to the property.

1.3.2 Former Thomas Property

The Thomas property at 694 West Francisco Boulevard, (currently owned by Sonnen but formerly owned by the Thomas family) is located immediately adjacent to the Baxter Court property to the northwest. The Thomas property is a rectangular-shaped parcel measuring approximately 115 feet by 600 feet, encompassing approximately 1.6 acres. Only portions of the Thomas Property that may have been affected by past tenant activities on the Baxter Court property are included in the study area, defined as the Site, for the CMP.

Previous tenants of the Thomas property included a paint shop and a used car dealer located on the northeast portion of the property, near West Francisco Boulevard. The remainder of the property to the southwest had remained undeveloped and vacant. Currently, Sonnen is utilizing the Thomas property for automobile parking.

1.3.3 Future Property Use

Sonnen proposes to expand their adjacent automobile sales and service business and construct a multi-story automobile dealership that spans the entire Baxter Court and Thomas properties.

Preliminary design for this structure includes an elevated main showroom above a ground-level paved parking area. The future use of the site is expected to be commercial/industrial.

2.0 CONCEPTUAL SITE MODEL

The following sections present the current understanding of physical and environmental conditions present at the subject property.

2.1 Physical Site Setting

The Site encompasses approximately 2.7 acres of land with relatively flat topography gently sloping toward the rear of the property.

The Site is located near the eastern shores of San Rafael Bay. The fine-grained soil deposited in these near-shore areas are older alluvial sediments of the upper Pleistocene. These older alluvial sediments consist of dissected older alluvial fan deposits and younger Quaternary marine and marsh deposits known locally as bay mud. The bay mud is generally overlain locally by artificial fill that varies in thickness.

Previous investigations on the Site as part of the CalTrans Highway 101 widening project encountered soils consisting of a combination of fill materials (3 to 5 feet in thickness), and native bay mud consisting of silty clay to approximately 10 feet below ground surface (bgs), the maximum depth investigated by CalTrans. However, the bay mud deposits are anticipated to extend more than 20 feet bgs. Groundwater was encountered at approximately 5 to 6 feet bgs in borings drilled on the former Baxter Court property for CalTrans (PSI, 1999 and 2000).

Based on topographic conditions in the site vicinity, groundwater is expected to flow to the north or northeast, towards San Rafael Creek. PES previously sampled groundwater at the site in August and October 1991. Groundwater at that time was encountered at approximately 4 to 5 feet bgs. The chloride content of groundwater collected from a temporary piezometer installed on the former Thomas property was 4,600 milligrams per liter (mg/L) and the specific conductance of the sample was measured at 16,000 micro-mhos per centimeter. The recommended secondary California Maximum Contaminant Level (MCL) for chloride is 250 mg/L and for specific conductance is 900 micro-mhos per centimeter. As such, the measured values of chloride and specific conductance indicate that shallow groundwater beneath the site is brackish and unsuitable for potable or industrial uses. The nearest water supply well is approximately two miles west of the Site.

2.2 Facility Investigation

Prior environmental investigations at the Site have determined that the majority of the surface and shallow vadose-zone soil in areas outside the footprints of the former structures had not

been adversely affected by past tenant operations. Little to no data was available to evaluate environmental conditions beneath the plating shop structures. A Facility Investigation (FI) was conducted to close the data gaps in these areas so that potential releases to the subsurface soils could be evaluated. The results of the FI revealed that while some elevated concentrations of metals and VOCs were identified in localized areas, the majority of the soils beneath the plating shops had not been significantly affected by past tenant operations and widespread environmental impairment had not occurred, (PES, 2007).

Based on the results of the FI and comparison of the concentrations of residual metals and selected VOCs in the soils to regulatory criteria, it appears that corrective action is warranted at the Site to prepare the property for the planned commercial use and is the basis for the CMP.

2.3 Site Environmental Conditions

As provided in the Consent Agreement and detailed in the Current Conditions Report (CCR) and FI, existing or potential migration pathways for chemical releases from the subject property into the environment have been identified as subsurface vadose-zone soil, groundwater, and surface water runoff.

2.3.1 Subsurface Vadose-Zone Soils

Extensive investigation of subsurface soils has been conducted at the Baxter Court and Thomas properties to evaluate the subsurface vadose-zone migration pathway. The results of these investigations have determined that the majority of the surface and shallow vadose-zone soil in areas investigated have not been adversely affected by past tenant operations. When unauthorized releases have been identified, remedial action has taken place to mitigate the unauthorized releases. In these areas, it was found that the buffering capacity of the soil has limited the downward migration of contaminants to the shallow groundwater. Recent testing conducted during the FI and prior investigations did not identify significant areas of contamination in the surface and subsurface soils, and confirmed the effectiveness of prior removal actions to mitigate environmental concerns caused by past unauthorized releases.

Another potential migration pathway for chemicals of concern at the Site include the vapor transport of organic constituents from shallow subsurface soils into future tenant spaces that may be constructed as part of the redevelopment of the property.

2.3.2 Shallow Groundwater

Due to the shallow nature of groundwater at the site, the potential for contaminant migration from past unauthorized releases to groundwater has been considered a likely possibility. However, groundwater data collected during prior environmental investigations and the FI suggest that the releases of contaminants to the groundwater have not significantly affected groundwater conditions beneath the site. This is likely due to the low permeability of the

clayey soil, the buffering capacity of the soil to neutralize acidic conditions necessary to allow significant migration of metals, and the prior remedial actions to remove metal-affected soil identified on the site.

Because the site is reclaimed marshland with brackish groundwater located in the low permeability bay muds and largely unsaturated fill soils (3 to 5 feet thick) above the bay mud, it is not anticipated that well developed pathways for groundwater migration are present on the site. Therefore, it is considered unlikely that contaminants, if released to onsite shallow groundwater, would migrate significantly from the source or off the subject property. This is supported by the groundwater data collected from the site.

Groundwater data from the prior and FI investigations identified several organic compounds, including VOCs, TPHg, aromatic hydrocarbons, and MTBE at low concentrations in several groundwater samples collected across the subject property. With the exception of the TCE found beneath the former Specification Chrome facility, potential sources of these compounds were not identified during the investigations and it was concluded that the hydrocarbon-related organic compounds may have been from an offsite source.

2.3.3 Surface Water Runoff

A potential had existed for migration of releases from tenant operations on the subject property to the environment via surface water flows. This was occurring prior to 1987 when surface water was being channeled towards a drainage swale located along the Baxter Court/Thomas property boundary. However, this migration pathway was stopped in 1990 by removal of impacted soil, rerouting surface drainage towards West San Francisco Boulevard, and backfilling of the drainage ditch as part of remedial efforts in this area.

Based on this evaluation, three potential migration pathways were evaluated for risk to human health and the environment. These pathways include transport of contaminants through vadose-zone soils, migration of contaminants through shallow groundwater and the inhalation of vapor-phase contaminates migrating from the vadose-zone soils and shallow groundwater.

3.0 CHEMICALS OF CONCERN

3.1 Vadose-Zone Soils

For each compound detected in the vadose-zone soils during the prior and FI investigations, five factors were evaluated to establish which chemicals are of concern and whether further evaluation and cleanup goal development might be needed for each chemical of concern: (1) frequency of detection; (2) evaluation of the potential threat to human health by comparison of soil data to CHHSLs and U.S. EPA Region 9 residential and commercial PRGs (EPA, 2004b); (3) evaluation of the potential threat to groundwater by comparison of organic soil data to State of California Water Quality Control Board (SWRCB) residential and

commercial Environmental Screening Levels (ESLs); (4) comparison with DTSC hazardous waste criteria [Total Threshold Limit Concentration (TTLC)]; and (5) comparison of soil data to background (i.e., ambient) soil conditions. The evaluation of these factors resulted in the following:

- Further evaluation/cleanup goal development was recommended and conducted for compounds that are frequently detected at concentrations greater than their respective regulatory guidance levels and background conditions;
- Compounds frequently detected at concentrations greater than their respective regulatory guidance levels, but less than or similar to background soil conditions were not evaluated further;
- Compounds infrequently detected (generally at a frequency of less than 5%) at concentrations greater than their respective regulatory guidance levels were not evaluated further provided the 95% UCL concentration of the compound was less than the respective cleanup level and the detected concentration was not significantly greater than its cleanup level; and
- Compounds not detected or only detected at concentrations less than their respective regulatory guidance levels were not evaluated further.

The results of this evaluation process are summarized below for various metals and organic compounds detected in soil samples collected during prior investigations.

Identified Constituent	Range of Detection	Exceeded Regulatory Criteria
Arsenic	2.6 to 16 mg/kg	Residential PRG (0.4 mg/kg) Residential CHHSL (0.1 mg/kg) Commercial PRG (1.6 mg/kg) Commercial CHHSL (0.2 mg/kg)
Cadmium	1.2 to 200 mg/kg	Residential PRG (37 mg/kg) Residential CHHSL (1.7 mg/kg) Commercial CHHSL (7.5 mg/kg) TTLC (100 mg/kg)
Chromium (total)	6.5 to 2500 mg/kg	TTLC (2500 mg/kg)
$Chromium^{+6}$	0.1 to 240 mg/kg	Residential PRG (30 mg/kg) Residential CHHSL (17 mg/kg) Commercial PRG (64 mg/kg) Commercial CHHSL (37 mg/kg)
Copper	10 to 1900 mg/kg	No exceedances

Identified Constituent	Range of Detection	Exceeded Regulatory Criteria
Lead	6.1 to 490 mg/kg	Residential PRG (150 mg/kg) Residential CHHSL (150 mg/kg)
Nickel	22 to 5700 mg/kg	Residential PRG (1600 mg/kg) Residential CHHSL (1600 mg/kg) TTLC (2000 mg/kg)
Zinc	37 to 1800 mg/kg	No exceedances
TPH(gasoline)	56 mg/kg	No exceedances
TPH (middle distillates)	170 to 370 mg/kg	Residential ESL (100 mg/kg)
TPH (motor oils)	22 to 3900 mg/kg	Commercial ESL (1000 mg/kg)
TCE	0.0062 to 13 mg/kg	Residential PRG (0.053 mg/kg) Commercial PRG (0.11 mg/kg)
Cis-1,2-DCE	.0047 to 8.8 mg/kg	Residential ESL (0.19 mg/kg) Commercial ESL (0.19 mg/kg)
Trans-1,2-DCE	0.56 mg/kg	No exceedances
1,3,5 - Trimethylbenzene	0.018 to 0.46 mg/kg	No exceedances
1,2,4 - Trimethylbenzene	0.058 to 0.2 mg/kg	No exceedances

Arsenic, nickel and chromium were detected in many of the soil samples collected as part of the FI at concentrations that exceed the health-based or groundwater protection regulatory criteria. While such an exceedance would warrant further evaluation based on the criteria stated above, the concentrations of these constituents found in the majority of the fill samples away from the plating operations at the Site are characteristic of background conditions found in the San Francisco Bay Area and the State of California.

Numerous case studies across the Bay Area and Northern California have been reported where similar or higher concentrations of arsenic were found and been determined to naturally-occurring and indicative of background concentrations. Specifically, a sampling of these studies identified naturally-occurring arsenic at concentrations ranging from

11 to 19 mg/Kg, (Lawrence Livermore, 1995; Hunter et al, 2005, Erler & Kalinowski, 2007). As such, it is common practice in environmental assessments in this area to consider arsenic concentrations below 20 mg/kg as background conditions.

Historical information regarding the Site and surrounding properties along Francisco Boulevard West suggest that numerous episodes of filling were conducted to raise the grade of the original marshlands 3 to 5 feet to their current configuration. The fill that was used was likely from a variety of local sources including historical quarries in close proximity to the Baxter and Thomas Properties. These quarries typically mined Franciscan Formation materials which are known to contain high levels of arsenic, nickel and chromium. In support of this, samples collected from areas on the Thomas property removed from the plating operations and at depth as well as samples collected from off-site properties identified arsenic, likely naturally-occurring, at concentrations as high as 19 mg/kg.

Because of the likelihood of residual arsenic and nickel concentrations in soils resulting from past plating operations being masked by concentrations of these constituents naturally occurring in the site fill, PES conducted a statistical evaluation[1] to determine whether two arsenic populations may exist at the site; one naturally-occurring and one from past releases of the former plating operations. The results of this evaluation confirmed the presence of two populations with background arsenic concentrations typically occurring up to at least 13 mg/kg. While the background concentrations likely range to higher levels as seen in affected and off-site areas, it is possible that arsenic levels above this point could also be caused by past releases. Therefore, as a conservative stance, PES will assume that all arsenic results above 13 mg/kg are outside the typical range of expected background concentrations, may have resulted from past onsite plating activities and will be addressed as part of the CMP. The distribution of soil sampling locations where the arsenic levels are above background are shown on Plate 3.

The same statistical evaluation was conducted for nickel and, while not as conclusive as arsenic, background concentrations were found to occur up to at least 600 mg/kg. PES will assume for this CMP that all concentrations above 600 mg/kg may have resulted from past onsite plating activities and will be addressed as part of the CMP. Statistical evaluation of the chromium data was not conclusive so regulatory criteria was used instead.

TPHd and TPHmo concentrations were typically detected at highest concentrations in surficial soils. It is likely that the presence of these compounds is due to oil treatment related to surface asphalt paving and/or incidental drips of hydrocarbons from vehicles on the site and not from past tenant waste management activities. Detected hydrocarbon concentrations at depth may also be the results of organic materials present in the bay muds underlying the site since the lab analyses did not differentiate between naturally occurring hydrocarbons and refined petroleum products. However, because it is not definitive that the TPHd and TPHmo found at depth is

[1] The statistical evaluation used for evaluation of the arsenic in the Site soils was conducted using the graphical determination methods used by the DTSC in their studies for development of arsenic cleanup goals for school sites, (DTSC, 2007).

solely biogenic in nature, the elevated concentrations of hydrocarbons above remedial action cleanup goals discussed in Section 4.0 will be removed during the Corrective Action process.

3.2 Groundwater Evaluation

Evaluation of groundwater conditions at the subject property was based on an assessment of each chemical of concern in accordance with four factors: (1) frequency of occurrence; (2) comparison of groundwater data with SWRCB ESLs published by the State of California Water Quality Control Board for protection of estuarine waters; and (3) comparison of groundwater data with published background concentrations for multiple locations in California (Hunter et al, 2005), and (4) the potential for migration of contaminants to the groundwater.

Shallow groundwater at the subject property was found to contain low concentrations of a variety of metals as well as very low concentrations of TPHg, MTBE, toluene, ethylbenzene and TCE. An initial comparison of the shallow groundwater analytical results with the ESLs for estuarine waters (San Rafael Canal) was conducted. PES also notes that releases of groundwater from this site to San Rafael Canal are highly unlikely due to the very low permeability of the bay mud and distance to the San Rafael Canal. The ESL comparison identified concentrations of several metals in excess of the ESLs for protection of estuarine environments. These metals include arsenic, cobalt, copper, lead and nickel and were detected in one sample collected under each of the former plating shops.

A comparison of the groundwater data to background data was also conducted using data collected during a study of naturally occurring inorganic constituents in groundwater throughout California. The comparison suggests that the levels of most metals found at the subject properties were typically in the range found in natural conditions in most areas (95% of the sites where data was evaluated) of California. Metals which exceeded the 95% percentile concentrations included cobalt, copper, and nickel. Arsenic was found to exceed the ESLs in all samples collected but was in the range of concentrations indicative of naturally occurring conditions.

Although the site is located along the edge of the San Rafael Valley groundwater basin (RWQCB, 2007), the shallow groundwater beneath the Site is not considered a drinking water source based on its salinity and likely low sustainable yield. Groundwater in the Site vicinity is not used as a drinking water source and drinking water is supplied by Marin Municipal Water District (MMWD). Due to the very limited extent of impact of hazardous materials to groundwater and the lack of exposure pathways, there is no remedial action warranted for groundwater. In addition, the removal of the metal- and VOC-affected soils as part of the proposed corrective measures will eliminate the potential for ongoing migration of contaminants from these soils to groundwater.

4.0 CLEAN UP GOALS

The site specific cleanup goals are based on chemicals of concern (COCs), media of concern, exposure pathways, exposure routes, potential receptors, and allowable risk levels and the future use of the property. The proposed use for the site as a commercial auto dealership and it's location within a commercial/industrial use zone within the City of San Rafael, significantly decreases the likelihood that the site will be used for residential purposes in the near or foreseeable future. The site specific remediation criteria for protection of human health and groundwater are summarized on the following table for the anticipated commercial/industrial scenario:

Chemical of Concern	Basis	Clean Up Goal
Arsenic	Background	13 mg/Kg
Chromium (total)	Commercial ESL	750 mg/Kg
Hexavalent Chromium	Commercial CHHSL	37 mg/Kg
Nickel	Background	600 mg/Kg
Cis-1,2-DCE	Soil Screening Level for the Protection of Groundwater	0.40 mg/Kg
TCE	Soil Screening Level for the Protection of Groundwater	0.06 mg/Kg
TPH (heavy fraction)	Commercial ESL	1000 mg/Kg

The remaining identified chemical constituents identified in Section 3.1 do not require cleanup since they were not identified on the site at concentrations above the commercial regulatory criteria or the soils which exhibited these chemical constituents have been previously removed as part of interim soil removal measures conducted as part of site closure activities.

Based on the evaluation of risk to human health and the environment, additional shallow vadose-zone soil remediation is considered warranted at six principal and several localized locations shown on Plate 3. Chemicals of concern as discussed in Section 3.0 include arsenic (above background concentrations), chromium, hexavalent chromium, nickel, cis-1,2-DCE, TCE and heavy-fraction petroleum hydrocarbons. These areas include: (1) a portion of the previous volatile organic compound (VOC) excavation where trichloroethylene (TCE) and cis-1,2-dichloroethylene (cis-1,2-DCE) were identified in excess of the cleanup goals [designated as EX - 1]; (2) subsurface soils adjacent to the deep process sump [designated as EX - 2] where elevated levels of hexavalent chromium were identified during a previous site activities at levels in excess of the proposed clean-up goals; (3) surface soil in the vicinity of Sampling Locations 694-3 and 694-5 [designated as EX - 3] where elevated arsenic levels were identified; (4) surface soils beneath the former Western Plating/Quality Chrome plating shop [designated as EX - 4] where elevated nickel, arsenic and total chromium were identified; (5) subsurface soil beneath the western portion of the former San Rafael Plating building

[designated as EX - 5] where elevated concentrations of arsenic, nickel, total chromium and heavy-fraction hydrocarbons were identified; and (6) an area within the footprint of Specification Chrome [designated as EX - 6] where elevated levels of nickel and total chromium were identified. Several other smaller and isolated areas within or adjacent to the footprints of the former site buildings were also identified where elevated concentrations of heavy metals or heavy-fraction petroleum hydrocarbons were found during prior site investigation activities. These areas, warranting remedial action, are also shown on Plate 3 [designated as EX – A through EX –E].

Remedial action objectives (RAOs) for these chemicals of concern have been developed for protection of the environment and human health. RAOs for affected soil are intended to guide remedial actions that mitigate the identified potential threats to human health and the environment. These objectives have been developed in a manner consistent with reasonably foreseeable future Site commercial/industrial uses. RAOs can address both chemical concentrations and potential exposure pathways. Protection can be achieved by reducing the mass, volume, toxicity, or mobility of chemicals of concern, through reducing potential exposures, or by a combination of these approaches.

5.0 CORRECTIVE MEASURES ALTERNATIVE EVALUATION

General Response Actions (GRAs), which are categories of remedial actions that could potentially be implemented to address the RAOs, presented above, were evaluated for the Site. GRAs are broad categories of remedial actions. These broad categories are as follows:

- No Action: In this alternative, existing contaminated soil will remain in place and no groundwater monitoring would be conducted;

- Institutional Controls: Institutional controls, such as deed restrictions or resource restrictions (e.g., water use restrictions), can be used to supplement engineering controls to reduce or limit expose to hazardous substances. Engineering controls can be combined with institutional controls, as required, to achieve protection of human health and the environment;

- Soil Containment Actions: These may be passive or active containment actions. Passive soil containment actions are designed to restrict human exposure to affected soil or minimize leaching of contaminants from soil by installing a physical barrier over the top of the affected soil. Active soil containment can incorporate restoration of the affected area by active extraction of affected soil gas to limit further migration and thereby reduce risk to human health or the environment; and

- Active Remediation: These remedial actions include a broad range of technologies designed to remove or destroy contaminants in specific media. Active remedial actions may result in a reduction of the time required for RAOs to be achieved relative to the "no action" GRA. Active remedial actions may be utilized in settings where factors

such as mobile contaminants, moderate to high hydraulic conductivities in the affected water-bearing zones, and effective treatment technologies for contaminants in soil or groundwater are present.

In each GRA and with combinations of GRA actions, category-specific technologies were screened to determine whether each technology would be carried out further in the development of remedial alternatives. PES considered and screened a number of remedial alternatives for mitigation of the identified contaminated vadose-zone soils. These general alternatives included:

- No action;
- Engineering and Institutional controls only;
- Limited soil removal with institutional controls; and
- Complete soil removal.

Screening criteria used include: (1) overall protection of human health and the environment, (2) attainability of cleanup objectives, (3) reduction of toxicity, mobility and/or volume of containments of concern, (4) long-term effectiveness, (5) short-term effectiveness, (6) technical feasibility, (7) cost, (8) regulatory agency acceptance; and (9) community acceptance . The results of this screening (as shown on Table 1), identified limited soil removal followed by establishment of institutional controls was selected as the most appropriate remedial alternative for the Site. Areas where soil excavation has been proposed are shown on Plate 3. Excavations EX-1 through EX-6 correspond to the areas identified in Section 4.0 and will require the majority of remedial action. A tabular summary of these areas is shown on Table 2. Excavations EX-A through EX-E are defined as “spot” excavation locations were the effort required will be very limited. Data for these “spot” excavation areas is also tabulated on Table 2.

Because excavation is proposed to meet a cleanup goal based on commercial regulatory criteria and the widespread presence of metals in excess of the residential regulatory criteria, there is a likelihood that institutional controls will be required for the property. The institutional controls applicable for this site and the proposed remediation is a land use restriction for commercial use only.

6.0 REMEDIAL ACTION IMPLEMENTATION

The recommended alternative includes excavation and off-site disposal of heavy metal-, heavy fraction hydrocarbon- and VOC-affected soil. The description of the activities to be conducted during implementation of the recommended alternative has been divided into sections as follows: (1) permitting and contractor health and safety; (2) soil excavation and handling;

(3) verification sampling and analysis;(4) off-site disposal; (5) performance criteria verification; and (6) reporting.

6.1 Permitting and Contractor Health and Safety

Anticipated permits and notifications include those related to excavation, soil stockpile management, on-site soil handling and loading, soil transportation and off-site landfill disposal, and backfilling and compaction activities.

A site-specific Health and Safety Plan was prepared by PES for the 2006 site investigation and interim measures activities. This Health and Safety Plan has been updated, as necessary, for the remedial action. This Health and Safety Plan includes information that addresses the health risks and hazards for each site task, employee training assignments to assure compliance with Title 8 of the California Code of Regulations, personal protective equipment, personnel monitoring, site control measures, decontamination procedures, and an Emergency Response Plan. The Emergency Response Plan will address reasonably foreseeable accident or upset conditions. The Emergency Response Plan will outline the procedures to be followed in the event of an emergency at the Site. Emergencies that may occur at the Site can include chemical spills, fires, explosions and personal injuries. A copy of this Health and Safety Plan is included in this CMP as Appendix A.

6.2 Soil Excavation and Handling

6.2.1 General Excavation Procedures

Affected soil with concentrations greater than the respective Site cleanup goals will be excavated and disposed off-site. Soil excavation will be conducted using conventional earthmoving equipment (track- or tire-mounted excavators). Excavated soil will be classified as one of four material types: (1) potentially clean soil; (2) VOC-affected soil; (3) heavy metal-affected soil; or (4) heavy fraction hydrocarbon-affected soil. The excavated potentially clean soil will be temporarily stockpiled on-site for subsequent reuse, if appropriate. Upon excavation, the VOC-affected soil will be transported to a staging area for stockpiling prior to off-haul and disposal as hazardous waste. The heavy metal- and hydrocarbon-affected soil will be transported to an on-site staging area for waste characterization and subsequent landfill disposal. Excavation and soil handling will be conducted in accordance with a site-specific Dust and Odor Management plan, attached to this report as Appendix B.

During excavation activities, a PES engineer or geologist will be present to observe the excavation of the heavy metal- and VOC-affected soil. Field screening techniques and soil analysis may be used to document VOC and soil concentrations during excavation. If verification sampling, as discussed below, shows that project clean-up goals have not been met in a particular location then additional excavation will conducted.

6.2.2 Soil Stockpiling

It is expected that affected soil will be excavated with track- or tire-mounted excavators and transported from the excavation areas to a staging area located on-site. The soil stockpiles will be constructed with plastic sheeting beneath (unless the ground surface is paved) and above the soil to prevent runon/runoff and fugitive dust and/or odor emissions. Stockpiled soil will be covered and secured at the end of each day. Stockpiles will be removed from the Site after the remediation is completed.

6.2.3 Decontamination Procedures

Soil residue on equipment and excavator tracks/tires and truck tires will be removed using a combination of wet and dry methods. During dry conditions, soil residues will be removed by dry brushing. Soil that cannot be removed by this procedure will be removed from equipment by washing with high-pressure City-supplied water in a prepared decontamination area. During wet conditions, high-pressure water washing will be used in a prepared decontamination area to remove material residues and mud from equipment and tires. Water generated during decontamination activities will be contained for analysis and appropriate disposal/recycling. The work areas will be kept clean and free of excessive soil or debris.

6.2.4 Excavation Backfilling Procedures

In order to restore disturbed areas of the Site, the excavation areas will be backfilled using clean, imported fill material. Excavated soil identified as potentially acceptable for unrestricted reuse will be stockpiled on-site for confirmation sampling. Soil approved for unrestricted reuse at the Site is defined as soil that has concentrations of contaminant indicators less than the respective Site cleanup goals.

If groundwater is encountered during soil excavation before the limits of the soil contamination are reached, a determination will be made to dewater and excavate further, or to discontinue the excavation. If the determination made is to dewater and continue the excavation, groundwater removed from the excavation will be pumped into aboveground containers for subsequent analysis prior to treatment and/or disposal.

6.3 Verification Soil Sampling and Chemical Analysis

Verification soil samples will be collected from the excavation areas to evaluate whether the target cleanup goals for area-specific heavy metal, hydrocarbons or VOCs have been met. Excavation bottom and sidewall samples will be collected as appropriate to confirm that excavation of the affected soil has been accomplished. It is anticipated that a minimum of one excavation bottom sample and four sidewall samples will be collected from each of the principal excavation areas. Sample locations and the number of samples collected may be adjusted in the field if necessary. In areas where surficial spot excavations are conducted, verification sampling will be limited to the base of the excavation.

Soil samples will be submitted to a California-certified laboratory for chemical analysis using U.S. EPA Test Methods. The chemical analysis selected will be appropriate for the respective property location based on the identified chemical(s) of concern at that location. A summary of the verification chemical analyses for each excavation area is provided in Table 2.

Verification sample analyses may be performed utilizing an expedited laboratory turn-around schedule in order to reduce the likelihood for significant delays to affect the remedial action schedule. Should laboratory analytical results indicate that the soil cleanup goals have not been attained, additional excavation will be performed to the extent practicable.

6.4 Soil Disposal

Procedures for off-site disposal of the affected soil will include: (1) waste characterization; (2) completing waste profiling for off-site disposal purposes; (3) completing the waste manifest forms and documenting truck load volumes and weights; and (4) transportation of soil from the Site to the disposal facility. Details of management of the waste soil, from loading into haul trucks to transportation routes to the approved landfill, are presented in a Site-specific transportation plan attached to this report as Appendix C.

6.5 Performance Criteria Verification

The effectiveness of the soil remediation program will be evaluated throughout the excavation processes. The laboratory analytical results of the soil verification samples will be compared to the soil cleanup goals for the chemical(s) of concern in a specific area. In the event that these compounds are detected in verification soil samples at concentrations in excess of the cleanup levels, then additional excavation will be performed and the area will be tested again to document that the applicable cleanup levels have been met. If the cleanup levels have not been met and further excavation is not feasible due to physical or other constraints, the specifics will be discussed with DTSC staff to assess whether further action is warranted.

6.6 Reporting

Following completion of soil excavation activities, a Remedial Action Implementation Report will be prepared. The report will summarize the work that was performed, verification soil sample analytical results, and the soil cleanup levels achieved. Copies of waste manifest forms, laboratory reports, and chain-of-custody forms will be included.

7.0 REFERENCES

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TABLES

Table 1 – Comparative Analysis of Remedial Alternatives

Corrective Measures Proposal
Baxter Court and Thomas Properties
720 and 694 West Francisco Boulevard
San Rafael, California

Threshold and Balancing Criteria	Alternative 1: No Further Action	Alternative 2: Land Use Covenant and Engineering Controls	Alternative 3: Limited Soil Removal and Land Use Covenant	Alternative 4: Complete Soil Removal
Examples of Alternative	Do nothing	Caps, vertical barriers, slurry walls, surface controls	Soil removal and backfilling, land use controls	Soil removal with onsite treatment and disposal
1. Protect Human Health and the Environment	Is not protective of human health or the environment	Provides increased protection of human health provided engineering controls are maintained	Protects human health for intended use of property and prevents additional contamination of the underlying groundwater	Very protective of human health and prevents additional contamination of the underlying groundwater
2. Attain Media Cleanup Objectives	Cleanup objectives are not obtained	Cleanup objectives are not obtained	Cleanup objectives are obtained quickly by excavation	Cleanup objectives are obtained quickly by excavation.
3. Control Source(s) of Releases/Reduction in Toxicity, Mobility, or Volume of Wastes	Will not reduce toxicity, mobility, or volume of contaminants	Does not reduce toxicity, or volume, may reduce mobility of contamination	Significantly reduces volume, toxicity, and mobility of contamination and significantly reduces potential risk to human health and the environment	Significantly reduces volume, toxicity, and mobility of contamination and significantly reduces potential risk to human health and the environment.
4. Long-term Reliability and Effectiveness	Does not provide long-term effectiveness or reduce short-term risks	Limits future land use and exposure to contaminants and may reduce short-term risks	Removal of contamination to site specific risk-based levels from property reduces exposure and eliminates need for engineering controls and reduces short-term risks	Removal of all contaminated soils from property eliminates exposure and neither engineering control nor land use restrictions are required
5. Short-term Effectiveness and Short-term Risks	Does not provide short-term effectiveness	Limits future land use and exposure to contaminants and may reduce short-term risks	Potential exposure to construction workers and public will necessitate employment of a health and safety plan and dust control plan to protect construction workers and the public	Potential exposure to construction workers and public will necessitate employment of a health and safety plan and dust control plan to protect construction workers and the public

Table 1 – Comparative Analysis of Remedial Alternatives

Corrective Measures Proposal
Baxter Court and Thomas Properties
720 and 694 West Francisco Boulevard
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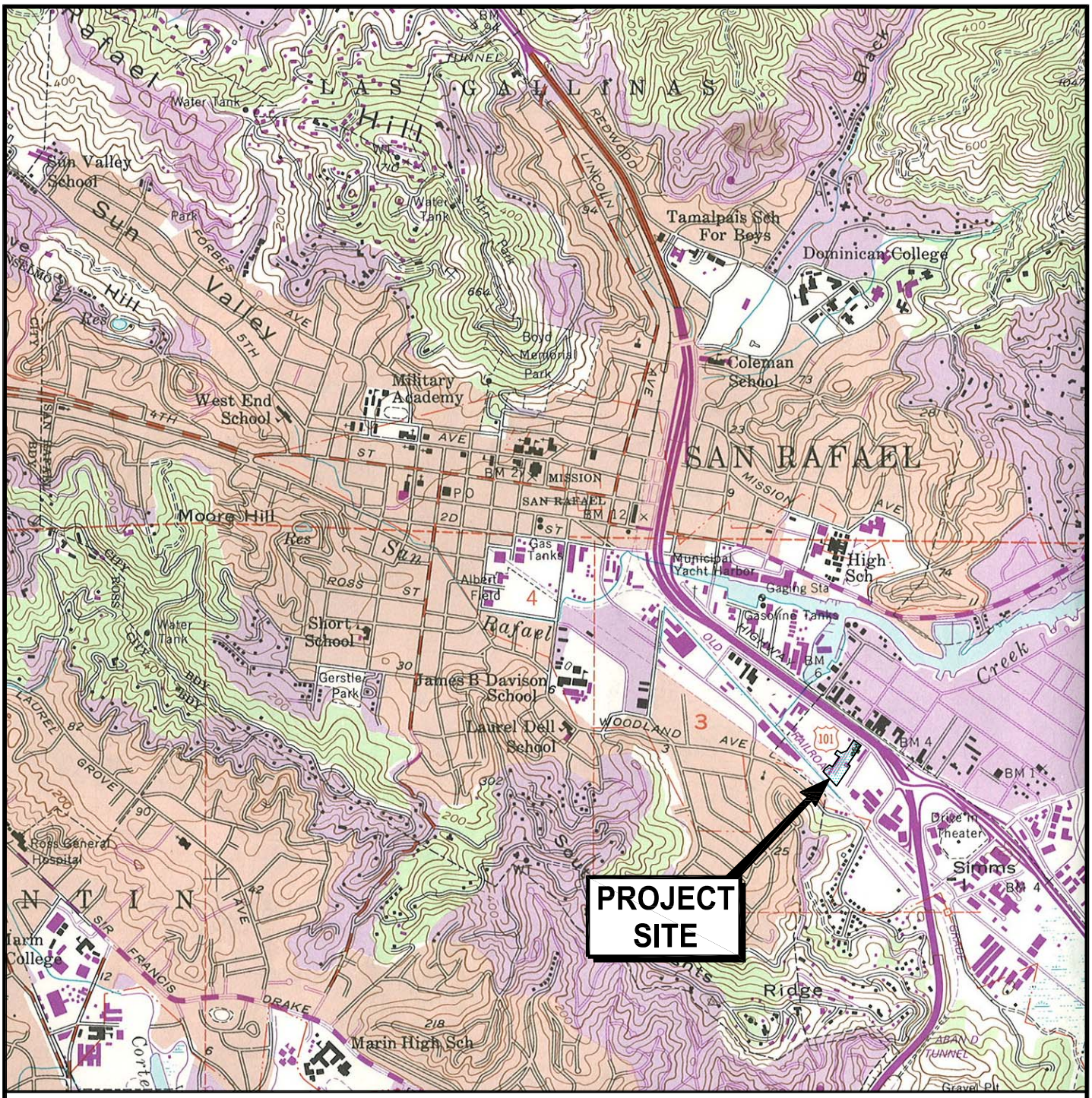
Threshold and Balancing Criteria	Alternative 1: No Further Action	Alternative 2: Land Use Covenant and Engineering Controls	Alternative 3: Limited Soil Removal and Land Use Covenant	Alternative 4: Complete Soil Removal
6. Implementability	Requires no remedial action	Requires approvals from State and local regulatory agencies	Technical approach is clear and easily implementable and will require approvals from State and local regulatory agencies	Large, deep soil excavations to remove all contaminated soils is technically very challenging and will require approvals from State and local regulatory agencies
7. Cost	No cost	Minimal cost	Acceptable cost relative to site redevelopment economics	Maximum cost and my prohibit site development feasibility
8. State Acceptance	No acceptable to State because contamination exceeding health risk levels would remain on site	No acceptable to State because contamination exceeding health risk levels would remain on site	Acceptable to State because it addresses short-term and long-term protection of the community	Acceptable to State because it addresses short-term and long-term protection of the community
9. Community Acceptance	Likely not acceptable to the community because contamination will remain on property; community acceptance will be based on comments received during a 30-day public comment period	Likely not acceptable to the community because contamination will remain on property; community acceptance will be based on comments received during a 30-day public comment period	Likely acceptable to the community because contamination will be removed from the property; community acceptance will be based on comments received during a 30-day public comment period	Likely acceptable to the community because contamination will be removed from the property; community acceptance will be based on comments received during a 30-day public comment period

Table 2 - Proposed Soil Excavation Volumes and Verification Sampling Analyses

Corrective Measures Proposal
Baxter Court and Thomas Properties
720 and 694 West Francisco Boulevard
San Rafael, California

Excavation Area	Contaminants of Concern	Approximate Size (yd^3)	Verification Analyses
EX - 1	TCE, c-DCE	15	TCE, c-DCE
EX - 2	Cr, Cr^{+6}	40	Total Cr, Cr^{+6}
EX - 3	As	40	As
EX - 4	Cr, As, Ni	50	Total Cr, As, Ni
EX - 5	Cr, Ni, As (upper 1 foot) TPH (2' to 5')	20 75	Total Cr, Ni, As TPH (w/silica gel cleanup)
EX - 6	Ni, Cr	20	Ni, Total Cr
EX - A	TPH	5	TPH (w/silica gel cleanup)
EX - B	As	5	As
EX - C	As	5	As
EX - D	As	5	As
EX - E	As	5	As

ILLUSTRATIONS



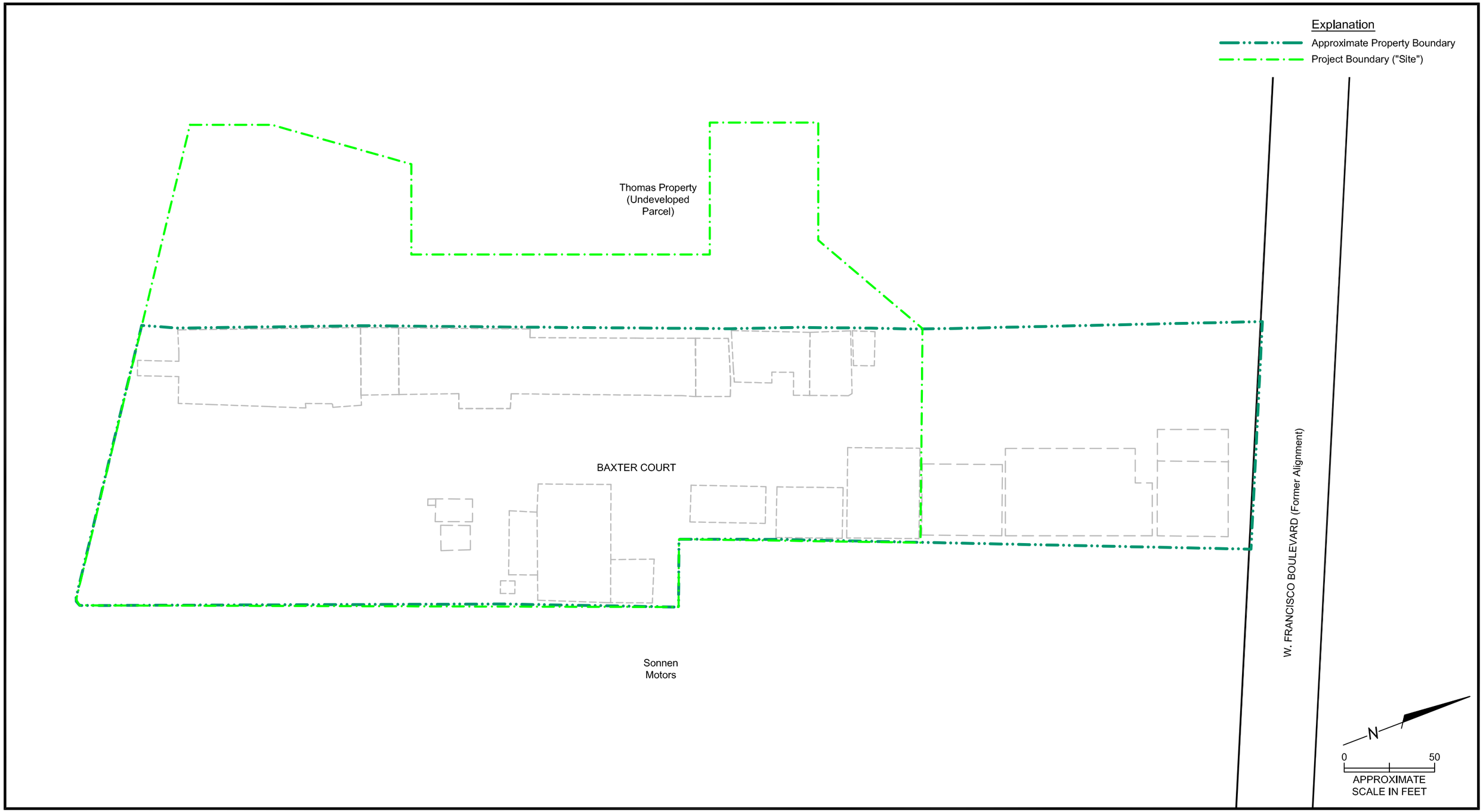
U.S.G.S. Topo Map - San Rafael, California, 7.5-minute quadrangle.1955 photorevised 1980

PES Environmental, Inc.
Engineering & Environmental Services

Site Location Map
Corrective Measure Proposal
Baxter Court and Thomas Properties
694 and 720 West Francisco Boulevard
San Rafael, California

PLATE
1

285.002.01.013	28500201_CMP_01	JPD	2/08
JOB NUMBER	DRAWING NUMBER	REVIEWED BY	DATE



PES Environmental, Inc.
Engineering & Environmental Services

Site Plan
Corrective Measures Proposal
Baxter Court and Thomas Properties
694 and 720 West Francisco Boulevard
San Rafael, California

PLATE
2

285.002.01.013	28500201_CMP_02	*JPD*	2/08
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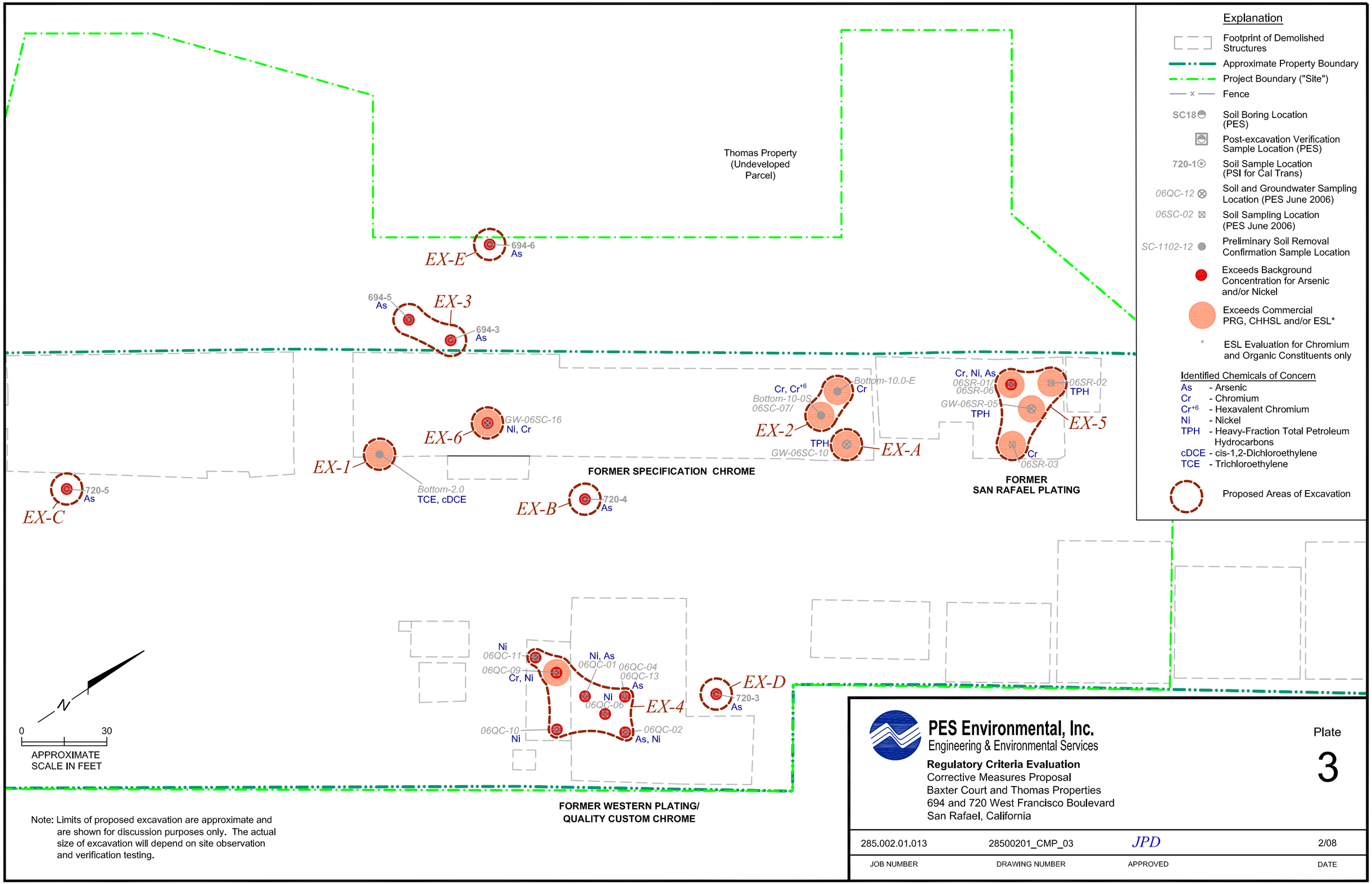


Note: Limits of proposed excavation are approximate and are shown for discussion purposes only. The actual size of excavation will depend on site observation and verification testing.

PES Environmental, Inc.
Engineering & Environmental Services

Regulatory Criteria Evaluation
Corrective Measures Proposal
Baxter Court and Thomas Properties
694 and 720 West Francisco Boulevard
San Rafael, California

Plate
3

JOB NUMBER	DRAWING NUMBER	APPROVED	DATE
285.002.01.013	28500201_CMP_03	JPD	2/08

APPENDIX A

HEALTH & SAFETY PLAN
PROPOSED CORRECTIVE ACTION
BAXTER COURT AND THOMAS PROPERTIES
720 AND 694 WEST FRANCISCO BOULEVARD
SAN RAFAEL, CALIFORNIA

APPENDIX A

HEALTH AND SAFETY PLAN
ADDITIONAL SOIL AND GROUNDWATER INVESTIGATION
BAXTERS COURT, 710-732 FRANCISCO BLVD WEST
SAN RAFAEL, CALIFORNIA

FEBRUARY 15, 2008

By:

Mitch Buttress
Site Safety Officer

Original signed by James Dunn

James P. Dunn, P.G.
Project Manager

285.002.01.011

INTRODUCTION

This Health and Safety Plan (HSP) has been prepared by PES Environmental, Inc. (PES) and describes the minimum health and safety requirements for planned site rememdiation activities at Baxter's Court/Thomas Property site located off Francisco Boulevard West in San Rafael, California (Site). Planned field activities consist of (1) plating shop and fixed treatment closure activities; (2) collection of soil samples using direct-push drilling, and (3) collection of shallow grab groundwater samples using direct-push drilling methods.

In addition to the procedures and requirements described in this HSP, all onsite PES personnel shall follow applicable procedures and requirements specified by Federal, State, and local authorities to include those requirements specified in Title 8 of the California Code of Regulations, Section 5192 "Hazardous Waste Operations and Emergency Response" (T8-CCR, Section 5192). This HSP has been prepared to address the basic requirements of the overall safety and health program, with attention to those characteristics of site-specific activities. Any modifications made to this HSP because of encountered field conditions must be approved by the site-safety officer (SSO) and/or project manager (PM).

A copy of this HSP will be available at the site during all work activities.

KEY PERSONNEL AND RESPONSIBILITIES

Key Personnel and Qualifications

The PES Project Manager (PM) is James Dunn. The SSO is Mitch Buttress, or a designated alternate engineer, geologist, or environmental specialist. The project field staff have completed 40 hours of comprehensive health and safety training, which meets the requirements of Title 29 CFR 1910.120, T8-CCR, Section 5192 and an 8-hour supervisory course in health and safety management, including training in site safety planning, emergency planning, and drilling safety. The PES corporate Health and Safety Officer (HSO) is Nick Pogoncheff. Documentation for all training completed by PES personnel is available from the HSO on request.

Responsibilities

The PM is responsible for the preparation and review of this HSP for accuracy and incorporating new information or guidelines, which aid the SSO in further definition and control of the potential health and safety hazards associated with the project. The PM and SSO are responsible for assuring that adequate training and safety briefing(s) for the project are provided to the project team. The PM or SSO will provide a copy of this HSP to each member of the project field team. The HSO is responsible for coordinating the PES corporate health and safety program. The SSO's responsibilities also include:

- Following the HSP;

- Reporting to the PM any unsafe conditions or practices;
- Reporting to the PM all facts pertaining to incidents which result in injury or exposure to toxic materials; and
- Reporting to the PM all equipment malfunctions or deficiencies.

The SSO has onsite responsibility for ensuring that all PES team members comply with the HSP. Immediately prior to initiating field activities, the SSO will conduct a tailgate briefing session for PES personnel and subcontractors to discuss PES' HSP and the procedures contained herein. Subcontractors will be responsible for complying with the minimum requirements specified in this HSP. It is the SSO's responsibility to inform field personnel of chemical and physical hazards as he or she becomes aware of them. The SSO has the authority to monitor and correct health and safety problems as noticed onsite to include "Stop Work". Additional SSO responsibilities include:

- Providing site safety briefings for PES team members;
- Updating equipment or procedures to be used based on new information gathered during the site investigation;
- Inspecting all personal protective equipment (PPE) for PES team members prior to onsite use;
- Making sure a first aid kit is available in work areas and that it is fully stocked;
- Assisting the PM in documenting compliance with the HSP by completing the standard PES forms;
- Assisting in and evaluating the effectiveness of decontamination procedures for personnel, protective equipment, sampling equipment and containers;
- Enforcing the "buddy" system as appropriate for site activities;
- Supplying phone numbers, location and route to the nearest medical facility, and arranging for emergency transportation if necessary;
- Enforcing the conditions of the access agreement with the property owners;
- Stopping operations that threaten the health and safety of the field team;
- Entering the exclusion area in emergencies after notifying emergency services; and
- Observing PES field team members for signs of exposure, stress, or other conditions related to preexisting physical conditions or site work activities.

EMERGENCY PROCEDURES

A first aid kit will be available at the site for minor injuries. If an injury is sustained that is not minor, site personnel should: (1) contact off site medical help (see below); and (2) contact the PES PM manager or any available PES Principal.

If offsite medical or other emergency assistance is required, the following telephone numbers can be used:

San Rafael Fire Department: 911

San Rafael Police Department: 911

Hospital: Marin General Hospital
250 Bon Air Rd
Greenbrae, CA 94904
(415) 925-7000

Route to Hospital (also shown on attached map): Go south (right) on Francisco Boulevard West; left onto US-101 South; take Sir Francis Drake Boulevard exit onto Sir Francis Drake Boulevard West; left on Bon Air Road; follow signs to "Emergency" at Marin General Hospital.

Hazardous Materials Response:

National Response Center - (800) 424-8802
California Office of Emergency Response - (800) 852-7550

Project Contacts:

PES Project Manager: James Dunn (415) 899-1600; cell 415-250-6734
PES Site Safety Officer: Mitch Buttress (415) 899-1600; cell 415-497-2744
PES Corporate HSO: Nick Pogoncheff (415) 899-1600

HAZARD EVALUATION

The potential hazards to personnel working at the site have been principally identified as chemical exposure and physical hazards of working around a drill rig and other heavy equipment. Each potential hazard relative to the potential for exposure is described below.

Chemical Hazards

Based on the results of previous activities performed at the site, the following chemicals are potentially present in subsurface soil and/or groundwater: arsenic, cadmium, chromium (trivalent and hexavalent), copper, nickel, lead, zinc, total petroleum hydrocarbons as gasoline and diesel (TPHg and TPHd, respectively), and volatile organic compounds (VOCs) including trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-1,2-DCE), benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tert-butyl ether (MTBE). Pertinent properties of these chemicals are as follows:

Arsenic

LEL/UEL = NA
Cal OSHA Action Level / Permissible Exposure Level (PEL) = 0.005 / 0.01mg/m^3
Hazard Properties = carcinogen, slight explosion hazard in dust form, toxic
Exposure Routes = absorption, inhalation, ingestion, skin/eye contact
Target Organs = liver, kidneys, skin, lungs, lymphatic system
Acute exposure symptoms = ulceration of nasal septum, gastrointestinal disturbances, respiratory irritation, hyper-pigmentation of skin.

Chromium

LEL/UEL = NA
Cal OSHA PEL/IDLH = 0.5 / 250 mg/m3
IP = NA
Hazard Properties = toxic
Exposure Routes = inhalation, ingestion, skin or eye contact
Target Organs = eyes, skin, respiratory system
Acute exposure symptoms = Skin or eye irritation; lung fibrosis (histologic)

Chromium (Hexavalent)

LEL/UEL = NA
Cal OSHA PEL/Ceiling Limit[1]/IDLH = 0.01 / 0.1 / 15 mg/m^3
IP = NA
Hazard Properties = toxic, potentially carcinogenic (lung)
Exposure Routes = inhalation, ingestion, skin or eye contact
Target Organs = Blood, respiratory system, liver, kidneys, eyes, skin
Acute exposure symptoms = Respiratory irritation; nasal septum perforation; liver, kidney damage; leukocytosis (increased blood leukocytes), leukopenia (reduced blood leukocytes), eosinophilia; eye injury, conjunctivitis; skin ulcer, sensitization dermatitis; [potential occupational carcinogen]

[1] Ceiling Limit: The maximum concentration of an airborne contaminant to which an employee may be exposed at any time.

Copper

LEL/UEL = NA
Cal OSHA PEL /IDLH = 0.1/100 mg/m^3 (as copper fume)
Hazard Properties = ignitable in powder form, toxic
Exposure Routes = inhalation, ingestion, skin or eye contact
Target Organs = eyes, skin, respiratory system, liver, kidneys
Acute exposure symptoms = eye or nose irritation, metallic taste, nasal perforation

Lead

LEL/UEL = NA
Cal OSHA Action Level / PEL /IDLH = 0.03 / 0.05 / 100 mg/m^3
Hazard Properties = toxic
Exposure Routes = Inhalation, skin or eye contact, ingestion
Target Organs = eyes, gastrointestinal tract, central nervous system, kidneys, blood, gingival tissue
Acute exposure symptoms = weakness, low weight, constipation, abdominal pain, gingival lead line, tremors, irritated eyes, hypo-tension, insomnia, lassitude

Zinc

LEL/UEL = NA
Cal OSHA PEL /IDLH = 5/500 mg/m^3 (as Zinc Oxide fume)
IP = 9.45 eV
Hazard Properties = toxic
Exposure Routes = inhalation
Target Organs = respiratory system
Acute exposure symptoms = metal fume fever, chills, muscle aches, nausea, fever, dry throat, cough, weakness, metallic taste, blurred vision, vomiting, tightness in the chest.

Gasoline

LEL/UEL = 1.4/7.6 percent
Cal OSHA PEL / Short Term Exposure Limit[2](STEL)/IDLH = 300 / 500 /900 ppm
Hazard Properties = ignitable, toxic, volatile
Exposure Routes = inhalation, skin absorption, ingestion
Target Organs = skin, eyes, respiratory system, central nervous system
Acute exposure symptoms = cough, eye irritation, skin inflammation, central nervous system depression

[2] An employee exposure to an airborne contaminant, expressed as a 15-minute time-weighted average concentration and shall not exceed the STEL specified above at any time during the workday

Diesel

LEL/UEL = 0.6/7.5 percent
TLV(TWA)/IDLH = not established
Hazard Properties = ignitable, toxic, volatile, carcinogenic
Exposure Routes = inhalation, skin absorption, and ingestion
Target Organs = central nervous system, skin, mucous membranes
Acute exposure symptoms = irritation, dizziness, loss of sense of smell

1,2-Dichloroethylene (1,2-DCE)

LEL/UEL = 5.6/12.8 percent
TLV(TWA)/IDLH = 200/4000 ppm
Hazard Properties = ignitable, toxic, volatile
Exposure Routes = inhalation, skin absorption, and ingestion
Target Organs = Respiratory system, eyes, CNS
Acute exposure symptoms = irritated eyes and respiratory system, CNS depression.

Trichloroethylene (TCE)

LEL/UEL = 12.5/90 percent
TLV(TWA)/IDLH = 25/1000 ppm
Hazard Properties = ignitable, toxic, carcinogen
Exposure Routes = inhalation, ingestion, skin absorption
Target Organs = respiratory system, heart, liver, kidneys, CNS, skin
Acute exposure symptoms = CNS depression, dizziness, headache, nausea, skin irritation, tremors, unconsciousness, vomiting

Benzene

LEL/UEL = 1.2/7.8 percent
Cal OSHA Action Level / PEL / / STEL/IDLH = 0.5 / 1 / 5 /500 ppm
Hazard Properties = ignitable, toxic, volatile, carcinogen
Exposure Routes = inhalation, skin absorption and contact, ingestion
Target Organs = Respiratory system, skin, blood, central nervous system, bone marrow, eyes
Acute exposure symptoms = Irritated eyes, skin, nose and respiratory system; giddiness; headache, nausea, staggered gait; fatigue, anorexia, lassitude; dermatitis; bone marrow depression

Toluene

LEL/UEL = 1.1/7.1 percent
Cal OSHA PEL / Ceiling Limit / STEL / IDLH = 50 / 500 / 125 / 500 ppm

Hazard Properties = ignitable, toxic, volatile
Exposure Routes = Inhalation, skin absorption and contact, ingestion
Target Organs = Central nervous system; eyes; liver; kidneys
Acute exposure symptoms = Fatigue, weakness, confusion; euphoria, dizziness, headache; dilated pupils; insomnia; tears, dermatitis; liver, kidney damage

Ethylbenzene

LEL/UEL = 1.4/14 percent
Cal OSHA PEL / STEL /IDLH = 100 / 125 /800 ppm
Exposure Routes = inhalation, skin and eye contact, ingestion
Target Organs = Eyes, upper respiratory system, skin, central nervous system
Exposure Symptoms = Irritated eyes, skin, and mucous membranes; headache; dermatitis; sleepiness; narcosis; coma

Xylenes

LEL/UEL = 1.0/7.0 percent
Cal OSHA PEL / Ceiling Level / STEL //IDLH = 100 / 300 / 150 /1,000 ppm
Hazard Properties = ignitable, toxic, volatile
Exposure Routes = inhalation, skin absorption and contact, ingestion
Target Organs = Central nervous system, eyes; blood; liver, kidneys, Gastro-intestinal tract
Acute exposure symptoms = Dizziness, excitement, drowsiness, incoherence, staggering gait; irritated eyes, nose and throat; anorexia; nausea, vomiting, abdominal pain; dermatitis

MTBE

LEL/UEL = 1.6/8.4 percent
Cal OSHA PEL/IDLH = 40 ppm/None established
Hazard Properties = ignitable, toxic, volatile
Exposure Routes = inhalation, skin absorption, skin and/or eye contact, and ingestion
Target Organs = skin, eyes, liver, kidney, central nervous system, cardiovascular system, respiratory system
Acute exposure symptoms = cough, dizziness, unconsciousness, weakness, dry skin, redness of eyes, abdominal pain, nausea, vomiting

Physical Hazards

Onsite physical hazards may include:

- Mechanical hazards related to operations associated with excavation equipment, soil handling equipment, and soil sampling equipment;

- Tripping or falling hazards around excavation equipment and open excavations;
- Noise hazards from operating or working near heavy equipment;
- Subsurface utility lines (e.g., gas, electricity, and water); and
- Hazards inherent to operating a passenger vehicle.

HAZARD MITIGATION

Chemical Hazards

The chemical hazards listed above will be mitigated by a combination of onsite air monitoring and having onsite personnel wear the appropriate PPE, as needed. The presence of VOCs in ambient air will be monitored using a portable photo-ionization detector (PID). The PID will be calibrated following instructions provided by the manufacturer. The presence of dust containing heavy metals in ambient air will be monitored using a portable particulate air monitor. Initial meter readings will be made prior to sampling in order to establish background concentrations. Sampling operations will commence and the following level of protection will be adhered to:

Level D Respiratory Protection - not required, available if necessary
Dermal Protection - Steel-toed boots and disposable latex and vinyl gloves
Other Equipment - hard hat, eye and ear protection

If measured average concentrations of VOCs or dust containing heavy metals in ambient air exceed background concentrations, personnel will be required to utilize respirators with organic vapor (OV) filters and wear Tyvek suits (Level C), in addition to the PPE required for Level D.

Finally, PES will be prepared to halt operations or control emissions, if any, if it appears that any nuisance emissions are evident.

Decontamination procedures for onsite personnel during Level C conditions will follow applicable NIOSH/OSHA regulations. Decontamination procedures for Level D conditions consist of being required to wash hands with soap and potable water after performing any onsite activities and prior to ingestion of food or liquids.

Physical Hazards

The potential mechanical hazards associated with heavy equipment will be avoided by maintaining adequate clearance around operating equipment. While working at the site, the field personnel must be aware of equipment movement, general traffic, and facility operations.

Potential traffic hazards will be avoided by maintaining adequate clearance around moving equipment and vehicles and implementing safe speed practices. A traffic control subcontractor will be used to provide traffic control (e.g., lane closures, placement of no parking signs) if work is to be conducted within or adjacent to city streets.

Potential electrical hazards can be avoided by: locating buried utilities in areas where subsurface work is performed; making sure all equipment is properly grounded; keeping equipment a safe distance away from overhead lines; using ground-fault circuit breakers; and taking appropriate action in the event a storm approaches (e.g., take shelter in building or vehicle; stay away from drill rig, isolated trees and standing water; stay low to ground).

All personnel will be required to wear eye and ear protection, a hard hat, and steel-toed boots when working.

All personnel must be aware of potential trip or fall hazards and shall exert due caution when walking in all work areas.

EXPOSURE MONITORING

Exposure air monitoring will be conducted to measure air quality impacts at the project site to gauge the need for worker protection, need for improved dust control and provide documentation of air quality monitoring.

Based upon soil analytical data, the primary constituent of concern for ambient and worker air is lead and hexavalent chromium. In general, much of the work area undergoing remediation contains some soil contaminated with lead. The maximum residual lead concentration in the soil is 490 milligrams per kilogram (mg/kg) while hexavalent chromium was identified at 240 mg/kg. There are other hazardous contaminants as well, such as chromium, copper, nickel, and zinc at less concentrations. Based on the soil concentration and the exposure criteria, lead is the most significant hazard. If the airborne lead concentration is controlled to be below exposure criteria, all other contaminant exposure should be below the exposure criteria.

Air monitoring will be conducted as follows:

- A minimum of twice per field mobilization to document ambient levels (VOC/dust/hexavalent chromium) in each active exclusion zone;
- Intermittently as field work proceeds, and at a frequency commensurate with all field tasks to adequately protect workers from potential chemical exposures;
- Immediately, if noticeable odors occur during field activities;
- When visible dust is observed in the exclusion zone;

- When work begins at a different location of the site;
- When a different type of operation is initiated; and
- When required by the SSO.

The following types of monitoring are selected based on known site conditions and assumptions made during the review of site contaminants. Additional types of monitoring may be needed if conditions change to evaluate whether increased protection is warranted.

Total Organic Vapor Monitoring

Although not expected, organic vapors (VOCs) could potentially become airborne and be a risk to employees. When contaminated soils are encountered or intrusive activities are conducted and it is the opinion of the SSO in discussions with the client, periodic monitoring of the breathing zone for Total Organic Vapors (TOV) with a PID or equivalent (e.g. organic vapor analyzer [OVA]) will be conducted. If the PID detects TOV at sustained concentrations greater than 1 ppm over background concentrations, air-purifying respirators will be worn and a colorimetric benzene detector tube will be used to measure benzene concentration. If the PID readings exceed 5 ppm sustained or 1 ppm benzene, all work will stop and the source of the contaminants identified by site personnel wearing Level C protection. Full face air purifying respirators (Protection Factor = 100 with OV/HEPA cartridges) will be worn if investigators are exposed to greater than 10 ppm. Work may not resume until airborne TOV readings are below 5 ppm. Should detector tube readings for benzene exceed 1 ppm in the breathing zone, industrial hygiene sampling will be conducted to determine employee's 8 hour exposure and appropriate control measures implemented thru cooperation of the SSO and Project certified industrial hygienist (CIH).

Airborne Particulate Monitoring

Monitoring shall be conducted on a daily basis for the duration of the soil excavation activities. Monitoring shall include real-time monitoring for dust and collection of airborne inorganic lead should anticipated dust levels exceed the action trigger based upon reported lead levels. Monitoring shall also be conducted for hexavalent chromium during those periods of site activity where soil containing elevated levels of hexavalent chromium are excavated or handled.

Real-Time Air Monitoring

Real time air monitoring will be conducted in the work area (i.e. mini-Ram / *personal data*RAM or equivalent) to evaluate worker and perimeter exposure to airborne dusts.

In general the SSHO or designated representative will conduct exposure monitoring at a minimum of 15 minute intervals during intrusive activities at the Site. After the first two hours of real time exposure monitoring, real-time air monitoring frequency may be reduced to once

per 30 minutes. Upon review of these monitoring results, the real-time air monitoring frequency may be further reduced following discussions with the project manager.

Also, dust generated from onsite activities will be visually monitored continuously. If dust is visible in normal light, if the eyes and respiratory tract become irritated, or if the nasal passages become congested, a half- or full-face respirator with HEPA (P-100) cartridges will be worn; increased dust suppression methods increased and increased exposure monitoring will be conducted.

Air monitoring will be conducted in the workers breathing zone (of employees with greatest opportunity for exposure).

Monitoring shall be conducted on a daily basis for the duration of the potential contaminant exposure (e.g. earthwork) activities.

The mini-Ram (or equivalent) will be calibrated before commencement of each day's activities and will be operated and maintained in accordance with the manufacturers specifications. Background levels of total dust will be verified during excavation work to establish whether off site sources of dust are contributing to the readings indicated during routine exposure monitoring. Exposure monitoring data will be recorded on the "Direct Reading Instrument Log".

The action levels for total dust are identified below and the calculations used to determine the action levels are identified below. The action levels for dust have been calculated from guidance from the Department of Toxic Substances Control (DTSC).

Industrial Hygiene Monitoring

In addition to real-time air monitoring, samples using traditional industrial hygiene techniques may be collected for lead and/or other airborne contaminant analysis (e.g. arsenic) as described below if airborne dust levels cannot be controlled to less than the airborne dust trigger levels. All monitoring shall be conducted by trained and certified industrial hygienist (CIH) and/or industrial hygiene technician under the direction of a CIH. The levels of concern for air contaminants from sample monitoring will be the Cal/OSHA PELs and Action Level for inorganic lead. The Cal/OSHA PEL and Action Level for Inorganic Lead are specified above.

Initial Exposure Assessment

Initial exposure assessment will be performed to evaluate PPE requirements for onsite workers and dust control measures for protection of site workers. As noted above, if airborne dust cannot be maintained below the Airborne Dust Trigger Level, air sampling for inorganic lead will be performed within the workers breathing zone (OBZ). At least one worker representing each work task who would be expected to have the highest "worst case" potential for exposure shall be selected for sampling for inorganic lead monitoring.

Daily Monitoring

If analytical results from the initial exposure assessment are less than the PEL or Action Levels then a downgrade in PPE may be made upon agreement from the client, the PEI Project Manager and SSO. However, if analytical results indicate that sample concentrations are greater than the PEL, monitoring will be continued on at least a daily basis until additional dust suppression measures are implemented and lead analytical results indicate that sample concentrations are less than the Action Level and/or PEL.

Sample and Analysis

Sample Collection: Air samples will be collected with air monitoring pumps in accordance with the NIOSH Methods 7300 (lead). Procedures outlined in the NIOSH Manual of Analytical Methods for monitoring are as follows:

1. For lead and hexavalent chromium sampling, the preferred collection device will be the 37-mm diameter air sampling cassette with a 0.8 micrometer mixed cellulose ester filter.

2. Sampling pumps will be calibrated before and after use with a representative sampler installed between the pump and calibration devices.

3. For personal sampling, fasten the (uncapped) cassette to the workers lapel. The inlet should be oriented downward. Other sample cassettes should be placed upwind and downwind of the work area at an elevation of 4 to 6 feet above ground surface (human breathing zone).

4. Each set of samples will include 10% field blanks for QA/QC purposes. Open the field blank cassettes and other cassettes just prior to sampling. The top covers and field blank cassettes will be stored in a clean area (i.e. closed freezer bag) during the sampling period.

5. For lead sampling, sample at 1 L/min or greater (to a maximum of 4 L/min). NIOSH regulations specify a minimum sampling volume of 50 L and a maximum sampling volume of 2,000 L.

6. After the approximate volume of sample has been collected, replace end plugs.

7. Ship samples to the analytical laboratory in a rigid container with sufficient packing material to prevent damage.

Sample Analysis: Air samples collected during this project shall be submitted to the analytical laboratory and analyzed as follows:

1. Samples will be delivered to a designated American Industrial Hygiene Association (AIHA) accredited laboratory on a shift basis so that verbal reports on air sample results can be obtained within 12 to 24 hours after collection.

2. Lead samples will be analyzed in accordance with the NIOSH Method 7300 inductive coupled ion plasma (ICP).

Other additional air monitoring may be necessary during the project as required by Cal/OSHA, by the client's representatives and as determined by the Project Manager and SSO.

Action Levels

Direct-Reading Instrument Action Levels for Area Monitoring

Monitored Parameter	Action Level	Response to Action Level
Particulates and dust (respirable dust) in the work area using a *personal data*-Ram portable aerosol monitor. Every 15 min. during intrusive work in contaminated site locations. May be downgraded. Frequency may be down-graded/upgraded based upon measured levels.	• Visible dust or • 1.83 mg/m^3* intermittent (**less than 1 minute**) in the construction area for construction worker protection.	The SSHO shall: 1. Monitor onsite airborne particulate concentrations. 2. Initiate dust suppression measures to ensure worker breathing zone concentrations are below action levels, implement engineering controls where feasible.
Particulates and dust (respirable dust) in the work area using a *personal data*-Ram portable aerosol monitor. Every 15 min. during intrusive work in contaminated site locations. May be downgraded. Frequency may be down-graded/upgraded based upon measured levels.	• 1.83 mg/m^3 sustained (**greater than 1 minute**) in the construction area for construction worker protection.	The SSHO shall: 1. Stop work until dust controls implemented 2. Implement dust controls (water spray, dust palliative, and slow equipment travel speed to reduce generation of dust) 3. Conduct personal air monitoring to verify no exceedance of the Action Level. 4. Upgrade to Level C PPE as necessary. 5. Resume work with implemented controls and continued monitoring. 6. Employee exposure monitoring for heavy metals (lead) if levels cannot be maintained below 1.83 mg/m3.
Volatile organic compounds (**VOCs**) in the work area using a photoionization detector (PID) or flame ionization detector (FID). Initially twice per day to determine potential hazard if conditions met as identified above. Frequency may be downgraded/upgraded based upon measure levels.	≥1 ppm continuous reading in the breathing zone for 1 minute.	The onsite SSHO shall: 1. Notify the Site Superintendent. 2. Stop work – Reassess exposure levels, reassess PPE. 3. Onsite SSHO shall contact Project CIH and determine acceptable ambient concentrations of **VOCs** and level of PPE necessary to resume work. 4. Upgrade to Level C respiratory protection with organic cartridges. 5. Introduce feasible engineering controls (i.e. blower fan). 6. Continue monitoring, with PID or FID then, collect detector tube sample for benzene, downgrade as appropriate.

Monitored Parameter	Action Level	Response to Action Level
		7. Check benzene concentrations as established (i.e. detector tube sampling for benzene). No exposures above 1 ppm for benzene are permissible.
Volatile organic compounds (VOCs) in the work area using a photoionization detector (PID) or flame ionization detector (FID). Initially twice per day to determine potential hazard. Frequency may be down graded/upgraded based upon measure levels.	≥5 ppm continuous reading in the breathing zone for 1 minute. > 1 ppm benzene as measured with a detector tube (operators breathing zone)	The onsite SSHO shall: 1. Stop work. 2. Identify source of airborne contamination. 3. Implement necessary controls to maintain levels to less than 5 ppm (1 ppm benzene).

** See Appendix A for Trigger Action Level calculations.*

Employee Exposure Monitoring

If in the opinion of the Project Manager and/or SSHO that employees potential to airborne contaminants may exceed specified PELs and/or Action Levels, employee exposure monitoring will be conducted as shown below and compared to applicable workplace exposure standards (i.e., PELs). Employees will be notified of exposures as required by regulations.

Employee Exposure Monitoring Requirements During Soil Disturbance Activities

Contaminant and Equipment	Collection and Analytical Methods	Frequency, Duration and Location	Calibration Schedule
VOCs Air sampling pump equipped with charcoal tube	NIOSH 1501	One sample per job task for an 8-hour period, for actual operator exposure period.	Twice daily using primary standard calibration device.
Particulate (lead, hexavalent chromium)	NIOSH 7300	At least one full shift sample of each separate task w/ exposure to lead or hexavalent chromium above PEL and / or AL (Action Level, see Title 8, California Code of Regulations, Section 1532.1 – Lead)	Follow NIOSH guidelines and OSHA requirements (OSHA Technical Manual)

SITE CONTROL MEASURES

The PES project geologist or engineer will be in charge of onsite activities and will be responsible for site control. Communication between field team members will consist of verbal communications.

ENGINEERING CONTROLS

Concentrations of heavy metals and petroleum hydrocarbon constituents in soil indicate that dust control measures will be, at a minimum, consistent with standard construction practices. These will include, but are not limited to, the following:

- Watering of active excavation areas to prevent visible dust plumes from forming or migrating.
- Misting or spraying while loading or transporting soil, broken concrete or other construction debris.

Subsurface activities shall immediately cease if visible dust is continually being generated beyond reasonable levels.

Additional dust measurement and dust mitigation measures to be followed during plating shop closure and site investigation activities are presented in Appendix B.

WORK PRACTICES

Safe work practices to be employed during the entire progress of field activities are as follows:

- Set up, assemble and check out all equipment for integrity and proper function prior to starting work activities.
- Do not use faulty or suspect equipment.
- Use only new and intact protective clothing.

Additional standard safe work practices are listed in the PES Injury and Illness Prevention Program, a copy of which is located at the PES corporate office.

Procedures for site work in areas where previously unknown contamination is discovered are presented in Appendix C.

The Cal OSHA Safe Work Practices requirements will be posted at the jobsite (see Appendix).

Sanitation

Temporary sanitary facilities will be established or identified at the site for the duration of the work and will be serviced at regular intervals. Workers will complete the following personal hygiene procedures before leaving the work site:

- Toilet and hand washing facilities will be located on site or an alternate sanitary facility and their specific location identified prior to beginning work activities.
- Where employees are engaging in the application of paints, coatings, or in other operations involving substances which may be harmful to the employees, cleansing facilities shall be provided in proximity of the worksite and shall be so equipped as to enable employees to remove such substances. Depending upon the problem, these facilities may be in the form of ordinary soap and water or in the form of special compounds designed specifically for removal of the harmful material from skin surfaces.
- Potable drinking water will be on site for use by site personnel.
- Personal protective equipment shall be kept clean and in good repair. Safety devices, including protective clothing worn by the employee, shall not be interchanged among the employees until properly cleaned.
- All equipment leaving the site will be free of gross hazardous and non hazardous waste (i.e. mud and/or soil).

Heat Stress

Heat stress conditions are not anticipated because of the location and time of year of work. The provisions of the Cal OSHA Heat Illness Prevention standard will be implemented. These include:

1. Provision of Water - Employees shall have access to potable drinking water. Water shall be provided in sufficient quantity at the beginning of the work shift to provide one quart per employee per hour for drinking for the entire shift.

2. Access to Shade - Employees suffering from heat illness or believing a preventative recovery period is needed, shall be provided access to an area with shade that is either open to the air or provided with ventilation or cooling for a period of no less than five minutes. Such access to shade shall be permitted at all times.

3. Training:

A. Employee Training - Training in the following topics shall be provided to all supervisory and non- supervisory employees.

- The importance of frequent consumption of small quantities of water, up to 4 cups per hour under extreme conditions of work and heat;
- The importance of acclimatization;
- The different types of heat illness and the common signs and symptoms of heat illness;
- The importance of immediately reporting to the employer, directly or through the employee's supervisor, symptoms or signs of heat illness in themselves, or in co-workers;
- The employer's procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary;
- Procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider;
- How to provide clear and precise directions to the work site.

B. Supervisor Training - Prior to assignment to supervision of employees working in the heat, training on the following topics shall be provided:

- The procedures the supervisor is to follow to implement the applicable provisions in this section.
- The procedures the supervisor is to follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.

Illumination

All work will be done during daytime hours. If poor light levels are identified during any activity, adequate illumination levels will be provided to provide a minimum of 20 foot-candles in any work area.

Spill Control

Spills of soils and water will be cleaned up as soon as possible once they are observed with appropriate methods including wet methods, and/or HEPA vacuums.

Employees cleaning up debris and waste in the exclusion zone/ regulated area where respirators are required shall wear respirators which are selected, used and fitted per PES's Respiratory Protection Program Requirements.

TRAINING AND MEDICAL MONITORING

All PES employees have fulfilled the applicable training and medical monitoring requirements described in 40 CFR 1910.120 and T8-CCR, Section 5192. All subcontractors to PES shall provide evidence of having met the same requirements prior to performing onsite work.

In addition, all on-site workers will have received Lead Awareness training as specified in: Title 8, California Code of Regulations, Section 1532.1 (lead).

Also, immediately prior to initiating field activities, a tailgate training session shall be held to discuss this HSP and the procedures contained herein.

REFERENCES

National Institute of Occupational Safety and Health (NIOSH), *Pocket Guide to Chemical Hazards*. June 1997.

OSHA Regulations in 29 CFR 1910.120 (Federal Register 45654, December 19, 1986; Updated March 6, 1989).

Sax, N. Irving and Richard J. Lewis, Sr., *Dangerous Properties of Industrial Materials*, Van Nostrand Reinhold, New York, 1989.

ACKNOWLEDGMENT

The undersigned hereby acknowledge receipt of training concerning the potential hazards and required procedures for the field activities described above.

Name	Signature	Company	Date

DIRECTIONS TO NEAREST HOSPITAL

Directions to MARIN GENERAL HOSPITAL

YAHOO! LOCAL Maps

Summary and Notes

START A **Baxters Ct, San Rafael, CA 94901**

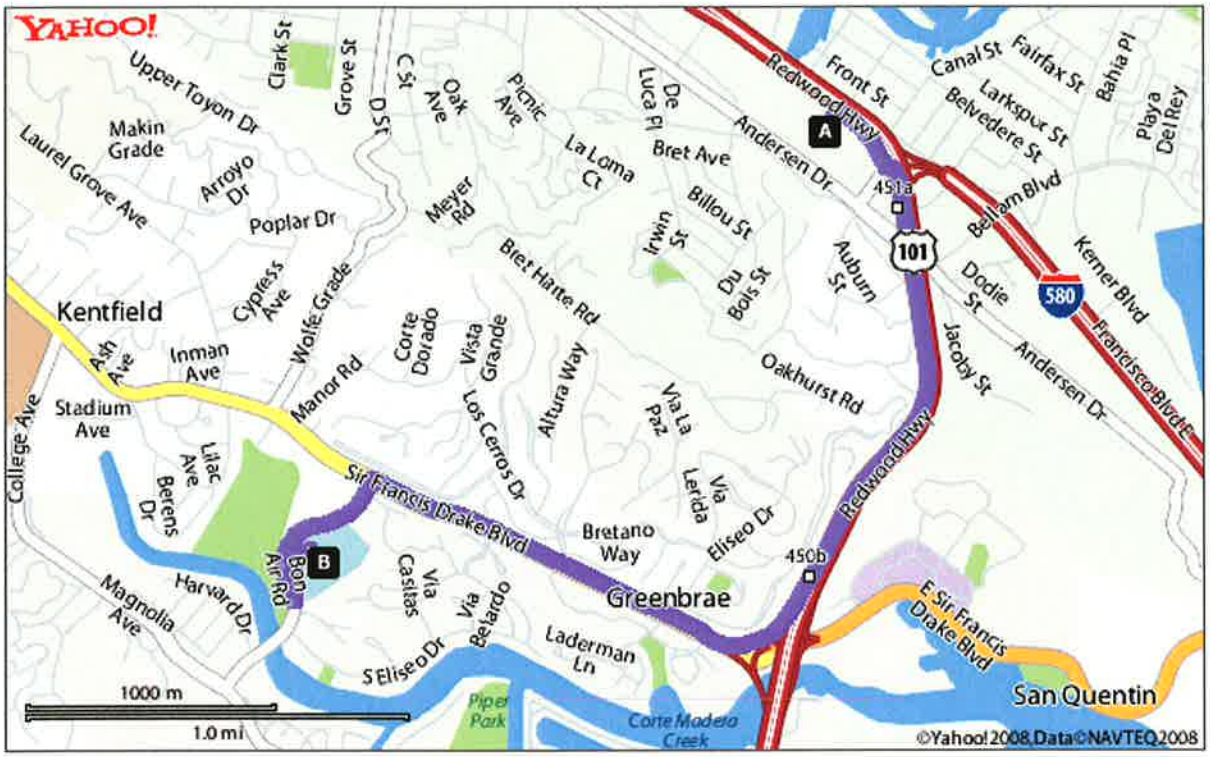
FINISH B **37.947639, -122.535838**

Total Distance: 3.3 miles, Total Time: 8 mins (approx.)

Add your notes here...

	Distance
A BAXTERS CT, SAN RAFAEL, CA 94901	
1. Start at **BAXTERS CT, SAN RAFAEL** going toward **FRANCISCO BLVD W**	go **0.1** mi
2. Turn R on **FRANCISCO BLVD W**	go **0.2** mi
3. Turn L to take ramp onto **US-101 S** toward **SAN FRANCISCO**	go **1** mi
4. Take exit **#450B/SIR FRANCIS DRAKE BLVD** onto **SIR FRANCIS DRAKE BLVD** toward **SIR FRANCIS DRAKE BLVD WEST**	go **1.3** mi
5. Turn L on **BON AIR RD**	go **0.4** mi
6. Make a U-Turn on **BON AIR RD**	go **0.3** mi
7. Arrive at **37.947639,-122.535838,** on the L	go **< 0.1** mi

Distance: 3.3 miles, Time: 8 mins



When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.

APPENDIX A

CALCULATION OF TOTAL DUST OCCUPATIONAL ACTION (TRIGGER) LEVELS

Assumptions:

1. Lead and hexavalent chromium are the contaminants with the greatest concentration and potential for employee exposure on-Site.

2. Controlling lead exposure to less than the Action Level for lead will prevent exposure to other contaminants to below their respective Permissible Exposure Levels.

3. Maximum residual lead and hexavalent chromium concentrations in soil are 490 mg/kg ***(=0.000490 mg Pb/ mg soil)*** *and* 240 mg/kg ***(=0.000240 mg CrVI/ mg soil)***, respectively.

4. ***Maximum lead*** and hexavalent chromium concentrations ***in dust are 0. 000490 mg Pb/mg dust*** and ***0. 000240 mg CrVI/mg dust***, respectively.

5. Allowable lead and hexavalent chromium concentrations in air are 0.03 mg/m3 and 0.005 mg/m3, respectively.

Calculations:

1. The allowable dust concentration in air is calculated as:

- Allowable lead dust concentration = Allowable lead concentration in air (mg/m3) / Concentration of Pb in dust. = 0.03 / 0.000490 **= 61.22 mg / m3**

- Allowable hexavalent dust concentration = Allowable hexavalent chromium concentration in air (mg/m3) / Concentration of Pb in dust. = 0.005 / 0.000240 **= 20.83 mg / m3**

2. The trigger level for allowable dust in air is 50% of the allowable dust concentration or:

- Trigger level lead dust concentration = Allowable lead dust concentration (mg/m3) X 50% = 61.22 X 50% **= 30.61 mg/m3**

- Trigger level hexavalent chromium dust concentration = Allowable hexavalent chromium dust concentration (mg/m3) X 50% = 20.83 X 50% **= 10.42 mg/m3**

DIRECT READING INSTRUMENT LOG

Project Name: **Address:** _____
Surveyor's Name: _____ **Date:** _____
Instrument: _____ **Serial Number:** _____
Calibration Date and Time: _____

Contaminant	Time	Reading		Contaminant	Time	Reading

APPENDIX B

DUST MEASUREMENT AND MITIGATION PROCEDURES

Dust Control

A MiniRAM dust meter (PDM-3 or equivalent) will be used to measure real-time dust levels. Actions levels will be based on the Site Health and Safety Plan. If dust levels exceed the specified action level for one minute or more in the worker breathing zone, then work should be stopped and mitigation measures undertaken before work resumes.

Worker Protection

Worker protection will be conducted according to the Site Health and Safety Plan. Worker protection will use respirators, real-time monitors, rotation of crews in work areas, and/or mitigation of dust as necessary to meet the health and safety requirements.

Dust Mitigation Measures

Dust mitigation measures will be specified based on the results of the dust monitoring. The best (most reasonable) available control measures will be used to minimize dust emissions. The preferred method of dust control at this Site is spraying water over the dust source(s) periodically to keep the exposed surface moist. Plastic sheets will be used to cover stockpiled soil and construction debris as well as other exposed areas. If the wind speed rises to greater than 15 miles per hour (mph), operations will cease.

Control measures for fugitive dust include, but are not limited to, the following procedures:

- Dust monitoring
- Watering the area of demolition and/or excavation at least twice daily
- Covering construction debris and/or soil stock piles with plastic tarps or equivalent
- Ceasing operation during high wind (greater than 15 mph)
- Sufficiently watering and/or securely covering material transported offsite
- Minimizing the area that requires excavation and earth moving operation.

Prior to departure from the exclusion zone to the surface streets surrounding the Site, the wastehauling trucks will be checked for material residue and rinsed down in the contaminant reduction zone. Following exit of trucks bearing excavated material, the public paved roadways surrounding the Site will be checked for any material possibly tracked out, despite mitigation efforts. The roadways will be cleaned of this material within an hour of observation.

Additional Dust Control Procedures

Also see: Asbestos Fact Sheet #3
"Ways to Control Naturally Occurring Asbestos Dust"
Provided by the California Environmental Protection Agency (ARB)

Note: This document although addresses Naturally Occurring Asbestos, same control techniques are appropriate for other than asbestos containing dusts (i.e. nuisance dusts).

PES will designate a person(s) to monitor the dust control program and to work with the DTSC to order increased watering as necessary to prevent transport of dust off site and to implement methods for mud control on pavement. Their duties will include holiday and weekend periods when work may not be in progress.

In addition to the above, the following information is provided to serve as a tool for the SSO / Competent Person in identifying and evaluating dust control methods. Any and/or all methods will be used to accomplish the goal of maximum dust control.

Fact Sheet #3
Ways to Control
Naturally-Occurring Asbestos Dust

- Shown below are ways to control asbestos dust from construction projects and roadways. These control actions will not eliminate asbestos, but offer options to reduce release of airborne asbestos fibers from various activities.

Construction Projects and Roadways

Dust Source	Mitigation Measure	Application Frequency	Relative Effectiveness[1]
Excavation	Water wetting	as needed	2-3
	Excavate during calm periods	when possible	1
Mobile Construction Equipment	Water wetting of roads surfaces	as needed	2-3
	Rinse vehicles / equipment	as needed	3
	Wet loads of excavated material	each load	3
	Cover loads of excavated material	each load	2-3
	Wet and cover loads	each load	4
Exposed Ultramafic or Serpentine Areas	Water wetting	as needed	3-4
	Cover with 6 to 12 inches of non-asbestos material	end of project	4
	Wind breaks / berms	where needed	1-2
	Chemical sealants / dust suppressants	3 mos. - 1 yr.	3
	Vegetative reclamation	end of project	3
	Asphalt cement paving	as needed	4

Roads	Water wetting	as needed	3-4
	Speed control	always	1-3
	Wind breaks / berms	where needed	1-2
	Cover with 2 to 4 inches of non-asbestos rock	as needed	3-4
	Chemical sealants / dust suppressants	3 mos. - 1 yr.	2-3
	Single-coat chip/seal	as needed	4
	Triple-coat chip/seal	as needed	4
	Petroleum sealants	as needed	4
	Asphalt cement paving	as needed	4

1. Subjective rating where: 1 = least effective, and 4 = most effective

APPENDIX C

PROCEDURES FOR DISCOVERY OF UNKNOWN AREAS OF CONTAMINATION

Site development activities may result in the identification of previously unknown areas or types of contamination. To determine if an environmental condition is unknown, the SS and / or SSHO should review all available soil and groundwater analytical reports which may provide and/or describe known types of compounds previously discovered on the Site, the magnitude of the detections, and the specific locations where they were discovered. This information will guide the contractor in determining whether an encountered environmental condition is unknown and therefore will trigger contingency monitoring, as described in the succeeding paragraphs below.

Unknown conditions which may trigger contingency monitoring procedures during site development include, but are not limited to the following:

- Oily, shiny, or saturated soil or Free Product in previously undocumented areas;
- Soil with a significant chemical or hydrocarbon-like odor in previously undocumented areas;
- Significantly discolored soil that reasonably indicates a concentrated source of metals within the Site other than metals naturally occurring or otherwise known to be present in the Native Soils.

Upon the discovery of one of the conditions identified above, and if the conditions on the Site vary materially from those previously documented such that they could require either alternative or additional measures to protect human health or additional calculations and assessments to confirm that the existing Site measures will be sufficiently protective, contractor will conduct the contingency monitoring.

Contingency monitoring, if conducted, will consist of the following steps: If unknown areas of potential concentrated metals are encountered, additional analyses should be conducted for the suspected constituents to assess the potential leach-ability of the metals, or the “client” should be contacted for assistance in determining if additional sampling and potential mitigation is necessary. If the encountered materials are suspected to be volatiles, the following contingency monitoring procedures may be followed by trained site personnel (i.e. SSO) protected in at least Level B or C PPE depending upon the risk:

i) Conduct contingency monitoring by taking organic vapor readings using an organic vapor meter (e.g. PID) or a flame ionization detector (FID) to screen for the presence of fuel, oil, or solvents. If the PID/FID indicates that an unknown area of fuel, oil, or solvents has been detected, the client and/or regulatory agency will be notified to determine if additional sampling is appropriate prior to continuing construction in that

area. Such additional characterization will not be required if the client and/or regulatory agency concurs that the current risk management measures already mitigate the risk of the chemicals detected in this area. PID/FID or equivalent screening methods will be conducted by experienced personnel only.

ii) If an unknown area of fuel, oil or solvents has been identified, and the client and/or regulatory agency has requested additional characterization, the following steps will be taken:

Samples will be collected from the identified area and analyzed for volatiles and/or TPH compounds, depending on the suspected type of contamination. The sampling strategy will be discussed with the client and/or regulatory agency prior to the initiation of the sampling activities. Analytical results collected from the suspected source will be compared to the health based site-specific target levels (SSTLs) developed and approved for the Site. If the levels are below the relevant health based SSTLs, and the client and/or regulatory agency concludes that the potential for ecological impacts is insignificant and does not require mitigation, then soil removal activities will not be required and the soil may be temporarily stored elsewhere pending reuse on the Site. All soils will be contained during transport within the Site so as to minimize the potential for spillage and exposure.

Appendix D: Code of Safe Practices

(To be posted on-site)

(This is a suggested code. It is general in nature and intended as a basis for preparation by the contractor of a code that fits his operations more exactly.)

GENERAL

1. All persons shall follow these safe practice rules, render every possible aid to safe operations, and report all unsafe conditions or practices to the foreman or superintendent.
2. Foremen shall insist on employees observing and obeying every rule, regulation, and order as is necessary to the safe conduct of the work, and shall take such action as is necessary to obtain observance.
3. All employees shall be given frequent accident prevention instructions. Instructions shall be given at least every 10 working days.
4. Anyone known to be under the influence of drugs or intoxicating substances that impair the employee's ability to safely perform the assigned duties shall not be allowed on the job while in that condition.
5. Horseplay, scuffling, and other acts that tend to have an adverse influence on the safety or well-being of the employees shall be prohibited.
6. Work shall be well planned and supervised to prevent injuries in the handling of materials and in working together with equipment.
7. No one shall knowingly be permitted or required to work while the employee's ability or alertness is so impaired by fatigue, illness, or other causes that it might unnecessarily expose the employee or others to injury.
8. Employees shall not enter manholes, underground vaults, chambers, tanks, silos, or other similar places that receive little ventilation, unless it has been determined that is safe to enter.
9. Employees shall be instructed to ensure that all guards and other protective devices are in proper places and adjusted, and shall report deficiencies promptly to the foreman or superintendent.
10. Crowding or pushing when boarding or leaving any vehicle or other conveyance shall be prohibited.
11. Workers shall not handle or tamper with any electrical equipment, machinery, or air or water lines in a manner not within the scope of their duties, unless they have received instructions from their foreman.
12. All injuries shall be reported promptly to the foreman or superintendent so that arrangements can be made for medical or first aid treatment.
13. When lifting heavy objects, the large muscles of the leg instead of the smaller muscles of the back shall be used.
14. Inappropriate footwear or shoes with thin or badly worn soles shall not be worn.
15. Materials, tools, or other objects shall not be thrown from buildings or structures until proper precautions are taken to protect others from the falling objects.

APPENDIX B

DUST AND ODOR MANAGEMENT PLAN
PROPOSED CORRECTIVE ACTION
BAXTER COURT AND THOMAS PROPERTIES
720 AND 694 WEST FRANCISCO BOULEVARD
SAN RAFAEL, CALIFORNIA

APPENDIX B

DUST AND ODOR MANAGEMENT PLAN
PROPOSED CORRECTIVE ACTION
BAXTER COURT AND THOMAS PROPERTIES
720 AND 694 WEST FRANCISCO BOULEVARD
SAN RAFAEL, CALIFORNIA

PES Environmental, Inc. (PES) has prepared this dust and odor management plan for proposed corrective action to be completed at the Baxter Court and Thomas Properties located at 720 and 694 West Francisco Boulevard in San Rafael, California. As part of the proposed corrective action, excavation and off-site disposal is considered to be the most appropriate remedial alternative for the Site.

Six principal areas at the site remain where remedial action will be required to meet the commercial cleanup goals. These areas, as shown on Plate 3 of the Corrective Measures Proposal (CMP), include: (1) a portion of the previous volatile organic compound (VOC) excavation where trichloroethylene (TCE) and cis-1,2-dichloroethylene (cis-1,2-DCE) were identified in excess of the cleanup goals [designated as Ex - 1]; (2) subsurface soils adjacent to the deep process sump [designated as Ex - 2] where elevated levels of hexavalent chromium were identified during a previous site activities at levels in excess of the proposed clean-up goals; (3) surface soil in the vicinity of Sampling Location 694-3 [designated as Ex - 3] where elevated aresenic levels were identified; (4) surface soils beneath the former Western Plating/Quality Chrome plating shop [designated as EX - 4] where elevated nickel, arsenic and total chromium were identified; (5) subsurface soil beneath the western portion of the former San Rafael Plating building [designated as EX - 5] where elevated concentrations of arsenic, nickel, total chromium and heavy-fraction hydrocarbons were identified; and (6) an area within the footprint of Specification Chrome [designated as Ex - 6] where elevated levels of nickel and total chromium were identified. Spot surface excavations will also be conducted in several areas within the footprints of the former Specification Chrome and San Rafael Plating buildings where elevated concentrations of heavy metals or heavy-fraction petroleum hydrocarbons were identified during prior site investigation activities.

Dust Management During Corrective Action Activities

Depending upon the soil conditions, during excavation there is a potential to generate a nuisance dust condition. Water will be applied to the work area where soil is being disturbed on an as needed basis to mitigate the potential for dust generation. Dust level monitoring of air will be conducted to evaluate the potential exposure to site personnel and to offsite downwind receptors. The presence of airborne dust will be evaluated through the use of real time personal sampling equipment and perimeter air sampling. The dust standard will be based on a ceiling level of no more than 50 micrograms per cubic meter difference between upwind and downwind sampling locations. If this level is exceeded additional dust suppression activities

such as water application, will be conducted in the areas of active soil excavation and handling. Information gathered will be used to verify the adequacy of the levels of protection being employed at the site, and may be used as the basis for upgrading or downgrading levels of personal protection, at the discretion of the Site Safety Officer. Dust level monitoring of air activities is further described below and in detail in the site-specific Health and Safety Plan prepared for the Site.

Stockpile management practices discussed in the previous section will be used to control fugitive odor or dust emissions in the stockpile staging area. Trucks used for transporting affected soil will be covered to reduce the potential for fugitive dust during transport to the disposal facility. Street sweeping will be used to remove soil/dust from public roadways as required. Swept material will be added to the soil stockpile for subsequent disposal off the site.

Odor Management During Corrective Action Activities

Although the proposed remedial action is not a soil aeration process, some volatilization of lighter-fraction organic compounds (TCE and cis-1,2-DCE) may occur during excavation and soil management activities associated with the VOC-affected soils.

In addition, applicable guidelines and notification requirements set by the BAAQMD in Regulation 8, Rule 40 of the BAAQMD Rules and Regulations for aeration of contaminated soil will apply to the removal action. Notification will be provided to BAAQMD as required.

Dust and Odor Air Monitoring

To the extent feasible, the presence of airborne contaminants will be evaluated through the use of portable monitoring equipment. Information gathered will be used to ensure the adequacy of the levels of protection being employed at the site, and may be used as the basis for upgrading or downgrading levels of personal protection, at the discretion of the Site Safety Officer. Details of the air monitoring program are provided in the project Health and Safety Plan.

The following air sampling equipment will/may be utilized for dust and odor monitoring:

- Photo-Ionization Detector (PID)
- Dust monitor (Miniram, Dataram, or similar); and
- Integrated IH sampling for metals (Hexavalent chromium).

The PID will serve as the primary instrument for personal exposure monitoring during excavation in the VOC areas. The instrument will need to be utilized to fully characterize potential employee exposure and the need for equipment upgrades/downgrades.

Dust monitoring will be conducted to characterize the potential for exposure to site personnel during soil disruption operations using a direct-reading dust monitor. In addition, perimeter or "fence line" monitoring will be performed at a location(s) downwind of site operations on a periodic basis. Continuous monitoring should be performed during operations that have not been characterized. After initial site screening, monitoring shall be conducted periodically (i.e., every 30 minutes) or anytime site conditions might be altered (i.e., weather, drilling, excavation, spills, etc.).

Integrated Industrial Hygiene sampling for metals (i.e., hexavalent chromium) metals (i.e., Lead) will be conducted during the excavation process and/or loading operation. This Industrial Hygiene (IH) sampling will be performed to properly characterize potential employee exposures and/or to establish baseline levels. Sampling may include personnel monitoring and fenceline sampling. The duration of such monitoring will be determined based upon analytical results, regulatory requirements, etc.

Results of Monitoring information shall be recorded including time, date, location operations, and any other conditions that may contribute to potential exposures. All maintenance and calibration information shall be maintained and made available upon request. The monitoring equipment will be calibrated in accordance with the manufacturer's specifications, and the records of such maintained with the project health and safety plan.

APPENDIX C

WASTE TRANSPORTTION PLAN
PROPOSED CORRECTIVE ACTION
BAXTER COURT AND THOMAS PROPERTIES
720 AND 694 WEST FRANCISCO BOULEVARD
SAN RAFAEL, CALIFORNIA

APPENDIX C

WASTE TRANSPORTATION PLAN
PROPOSED CORRECTIVE ACTION
BAXTER COURT AND THOMAS PROPERTIES
720 AND 694 WEST FRANCISCO BOULEVARD
SAN RAFAEL, CALIFORNIA

PES Environmental, Inc. (PES) has prepared this waste transportation plan for proposed corrective action to be completed at the Baxter Court and Thomas Properties located at 720 and 694 West Francisco Boulevard in San Rafael, California. As part of the proposed corrective action, excavation and off-site disposal is considered to be the most appropriate remedial alternative for the Site. This document provides information related to the off-haul and off-site disposal of the excavated soils.

Based on previous environmental investigations conducted at the subject property, it is estimated that approximately 285 cubic yards (or roughly 440 tons) of soil affected by volatile organic compounds (VOCs) or metals is present at the subject property and requires removal as part of the corrective action. This amount of soil will result in approximately 24 truck trips leaving the subject property for disposal of affected soil at approved facilities. It is estimated that 17 truckloads of VOC- or metal-bearing soil will be transported to the Class 1 disposal facility in Kettleman Hills, California. The remaining 7 truckloads of hydrocarbon bearing soil will be transported to the Class 2 disposal facility in Dixon, California.

Truck Loading and Preparation for Off-Haul

Following acceptance of the excavated affected soil at an appropriate disposal facility, the affected soil will be loaded in licensed haul trucks (end-dumps or transfers) and transported off the site following appropriate California and federal waste manifesting procedures. The appropriate waste manifest documentation will be provided to the truck driver hauling the affected soil offsite.

As each truck is filled, an inspection will be made to verify that the solid waste and soil is securely covered and that the tires of the haul trucks are reasonably free of accumulated soil prior to leaving the site. Soil residue on the excavator tracks/tires and truck tires will be removed using a combination of wet and dry methods. During dry conditions, soil residues will be removed by dry brushing with a stiff-bristled broom and/or wire brush. Soil that cannot be removed by this procedure will be removed from equipment by washing with high-pressure hot water in a prepared decontamination area. During wet conditions, high-pressure hot water washing will be used in a prepared decontamination area to remove material residues and mud from the tracks and tires of equipment. Water generated during decontamination activities will be contained for analysis and appropriate disposal/recycling.

The work areas will be kept clean and free of excessive soil or debris. A street sweeper will be made available, as needed, to keep the loading area and haul roads clean. The soils will be wetted, as necessary, to reduce the potential for dust generation during loading and transportation activities. To ensure that trucks are loaded within appropriate weight limits, the weight of initial trucks will be verified using either portable scales onsite or nearby stationary scales.

Off-Site Transportation

Once the filled trucks have been deemed suitable for leaving the subject property, the trucks will proceed through the security fencing and approach Francisco Boulevard West. If necessary, a flagman will be provided to insure safe entrance from the subject property onto the public right-of-way.

Surface Street Haul Route

All wastes will be hauled to off-site disposal facilities via surface streets to the closest suitable freeway on-ramp. All truck traffic travelling along this surface street route will pass through commercial and light industrial areas only. No residential areas will be entered. A map of the surface street route is provided below:

Trucks will leave the subject property by turning right onto Francisco Boulevard West and travel south to Andersen Drive. At this signal-light controlled intersection, the haul trucks will

turn left and travel 0.2 miles to Bellam Boulevard and again turn left at the signal-controlled intersection. Once on Bellam Boulevard, the haul truck will approach the Interstate 580 (I580) freeway interchange and either merge right onto the eastbound lanes of freeway if going to the Class 1 facility or continue under the freeway overpass and turn left onto the I580/U.S. Highway 101 North on-ramp if going to the Class 2 facility.

Class 1 Disposal Facility Haul Route

From the freeway interchange, trucks travelling to the Class 1 disposal facility in Kettleman Hills, California will proceed along the following route:

- Turn right to take ramp onto I580-East - go 79.9 miles
- Continue on I5-South - go 137 miles
- Take exit #309/Kettleman City/Paso Robles - go 0.3 miles
- Turn right on CA41-South - go 2.6 miles
- Bear right on Old Skyline Drive - go 0.8 miles
- Arrive at Class 1 facility

Class 2 Disposal Facility Haul Route

From the freeway interchange, trucks travelling to the Class 2 facility in Dixon, California will proceed according to the following directions:

- Turn right to take ramp onto CA101-North - go 7.5 miles
- Take exit #460A/Napa/Vallejo onto CA37-East - go 20.4 miles
- Take left exit onto I80-East - go 27 miles
- Take exit #60/Midway Road/Lewis Road onto Midway Road towards Midway Road East - go 4.3 miles
- Turn left on Rio Dixon Road (CA113) - go 0.2 miles
- Arrive at Class 2 facility.

DISTRIBUTION

CORRECTIVE MEASURES PROPOSAL
BAXTER COURT AND THOMAS PROPERTIES
720 AND 694 WEST FRANCISCO BOULEVARD
SAN RAFAEL, CALIFORNIA

FEBRUARY 22, 2008

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