NON-STORMWATER INFORMATION PACKAGE

CONTRACT NO. 04-263721

04-CC-80-KP 15.3/21.9
IN CONTRA COSTA COUNTY IN HERCULES, RODEO, CROKETT, ON ROUTE 80 FROM 1 KM WEST OF STATE ROUTE 4/80 SEPERATION TO 0.8 KM WEST OF CARQUINEZ BRIDGE EAST BOUND HIGH OCUPANCY VEHICLE LANE PROJECT BRIDGE #280151S AND BRIDGE #R-280151 WILLOW AVE UNDER CROSSONG LOCATED ON I-80

California Department of Transportation
District 4
Water Quality Program
111 Grand Avenue
Oakland, California 94612

November 2008

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CONTRACT NO. 04-263721

1. ESTIMATE RATE OF SEEPAGE

Memorandum

Flex your power!
Be energy efficient!

To: MR. HARDEEP TAKHAR
District Office Chief
Office of Water Quality Program

Date: September 18, 2008

Attention: K. Taheri

File: 04-CC-80- KP 15.3/21.9
04-263721
Roadway Widening

From: MENG-HSI HUNG MH
Transportation Engineer
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

H. Nikoui
HOOSHMAND NIKOUI
Chief, Branch A
Office of Geotechnical Design – West
Geotechnical Services
Division of Engineering Services

Subject: Seepage Estimate for Foundation Excavations

This memo is in response to your request of estimating the groundwater flow rate and permeability at the foundation excavations in the above referenced project area. It is our understanding that this information will be used in estimating dewatering quantities for water pollution control. Please note that the quantity of non-construction caused water, such as storm/run-off water or flow from adjacent drainage lines, is not included in this estimation.

Seepage Rate

We developed typical excavation cross-sections for each of the retaining walls and piles for retaining wall and bridge foundations where the groundwater level is expected to be above the bottom/tip elevation of the foundation. Using these cross-sections, we calculated the seepage rate into the excavation. Please note that the groundwater level may fluctuate with season and hydrology near the project locations. The approximate coefficient of permeability for different type of soils (Unified Soil Classification) is shown in Attachment 1 based on the FHWA "Highway Subdrainage Design" manual (Report No. FHWA-TS-80-224).

1. Retaining Walls

According to the project, three retaining walls (RW No.3, 4, and 5) will be constructed. The foundations for the retaining walls are spread footings. Referring to existing Log of

Test Borings (LOTB), we estimate that the probability of encountering groundwater during excavation for all three retaining walls is minimal.

2. Driven Piles and CIDH Piles

All driven piles at RW 4, Abutment 1 and Abutment 7 will pass below groundwater level. Free water in the soil adjacent to the pile could be expelled to surrounding area due to soil displacement resulting from pile driving. However, no water is expected to be discharged out of the ground surface, and no groundwater treatment is required.

This project contains 12 x 1.37 m diameter CIDH piles. Two at each bent of the Willow Avenue Off-ramp Bridge. All CIDH piles will be embedded in rock. Generally, the foundation soils consist of stiff silt, soft to stiff fat/lean clays, and loose clayey sands. Attachment 2 shows the location, dimensions, groundwater information and calculated seepage rate for each pile excavation. Please note that all groundwater table (GWT) are approximate based on estimated seasonal fluctuations plus known data from existing LOTB's. Also, it is assumed that no casing would be used during construction.

The seepage rate for each excavation of CIDH pile is determined from the greater value calculated by using either modified FHWA method or the total volume of water filling the excavation up to the presumed groundwater level in one day.

※ ※ ※ ※ ※

If you have any questions or need additional information, please call me at 510-286-7245 or Hooshmand Nikoui at 510-286-4811.

Attachments:

c: TPokrywka, HNikoui, MHung, Daily File, Route File

MHung/mm

Attachment 1

Coefficients of Permeability for Soils*

Unified Soil Classification	Relative Permeability	Coefficient of Permeability k (ft/day)
GW	Pervious	2.7 to 274
GP	Pervious to Very Pervious	13.7 to 27,400
GM	Semipervious	2.7×10^{-4} to 27
GC	Impervious	2.7×10^{-5} to 2.7×10^{-2}
SW	Pervious	1.4 to 137
SP	Semipervious to Pervious	0.14 to 1.4
SM	Impervious to Semipervious	2.7×10^{-4} to 1.4
SC	Impervious	2.7×10^{-5} to 0.14
ML	Impervious	2.7×10^{-5} to 0.14
CL	Impervious	2.7×10^{-5} to 2.7×10^{-3}
OL	Impervious	2.7×10^{-5} to 2.7×10^{-2}
MH	Very Impervious	2.7×10^{-6} to 2.7×10^{-4}
CH	Very Impervious	2.7×10^{-7} to 2.7×10^{-5}

* From FHWA-TS-80-224, Table 2, page 48.

Attachment 2

Location	Approx. Station	CIDH Pile Dia. (m)	Approx. Bedrock Elev. (m)	Estimated GWT Elev. (m)	Seepage Rate (l/day/m^2)
Bent 2	"WA" 11+33	1.37	-9.8	7.5	342
Bent 2	"WA" 11+33	1.37	-9.8	7.5	342
Bent 3	"WA" 11+57	1.37	-10.0	8.7	342
Bent 3	"WA" 11+57	1.37	-10.0	8.7	342
Bent 4	"WA" 11+74	1.37	-9.1	9.6	342
Bent 4	"WA" 11+74	1.37	-9.1	9.6	342
Bent 5	"WA" 11+90	1.37	-2.8	10.3	342
Bent 5	"WA" 11+90	1.37	-2.8	10.3	342
Bent 6	"WA" 12+03	1.37	3.2	10.3	342
Bent 6	"WA" 12+03	1.37	3.2	10.3	342

2. SITE INVESTIGATION REPORT-GROUNDWATER MONITORING RESULTS

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SITE INVESTIGATION REPORT

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REPORT LIMITATIONS

This report has been prepared exclusively for the State of California Department of Transportation (Caltrans) District 4. The information contained herein is only valid as of the date of the report, and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

GEOCON CONSULTANTS, INC.

Lauren Wincze Senior Staff Geologist	Richard Day, PG Regional Manager

CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 4
OFFICE OF ENVIRONMENTAL ENGINEERING

Reviewed By:	Recommended By:	Approved By:
William Whiteley, P.E. Task Order Manager	Ray Boyer, P.E. District Branch Chief	Allen Baradar, P.E., REA District Office Chief

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EXECUTIVE SUMMARY

This Site Investigation Report was prepared for the Route 80 eastbound HOV Lane project in Contra Costa County, California. This report documents the investigation, sampling methods and laboratory analytical data.

The investigation was performed on Route 80, at Post Miles (PM) CC-80-PM-9.5/14.2, in the Cities of Hercules and Crockett, California. Caltrans is proposing to install an HOV Lane along eastbound Route 80 between Highway 4 and the Carquinez Bridge. The proposed improvements include shoulder widening, offramp widening, and soil nailing for slope stabilization. The Site location is depicted on Figure 1, Vicinity Map.

The purpose of the investigation was to evaluate the presence or absence of hazardous concentrations of metals, total petroleum hydrocarbons (TPH) as diesel (TPHd), as gasoline (TPHg), and naturally occurring asbestos (NOA) in soil at the Site. In addition, a groundwater sample was collected for analysis of metals, TPH, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs). The Site is shown on Figures 2a through 2g.

The following field activities were performed during soil sampling efforts:

- Completed 85 borings using hand auger methods
- Collected soil samples for analysis of CAM17 metals, TPH, and NOA
- Collected a groundwater sample from a geotechnical boring for analysis of metals, TPH, VOCs, and SVOCs
- Transported samples to California-certified environmental laboratories

Soil samples were collected from 85 borings (08-01 to 08-85) at locations selected by the Caltrans Task Order Manager. Boring coordinates for the locations are presented in Table 1, and are shown on the Site Plans provided as Figures 2a through 2g. Each soil boring was advanced to a depth of approximately three feet using a hand auger. Samples were collected at approximate depths of 0.0 foot to 0.5 foot, 1.0 foot to 1.5 feet, and 2.5 feet to 3.0 feet. Groundwater was not encountered during the advancement of the boreholes. A groundwater sample was collected from geotechnical boring R-08-001, located adjacent to the Park and Ride lot at the Willow Avenue offramp, as shown on Figure 2b.

Laboratory analyses were performed under a 48-hour turn-around-time. Reproductions of the laboratory reports and chain-of-custody documentation are presented as Appendix A. The laboratory testing performed is summarized below:

- A total of 155 soil samples were analyzed for total lead using EPA Test Method 6010B;
- A total of 72 soil samples were analyzed for TPHd using EPA Test Method 8015M;

- A total of 82 soil samples were analyzed for TPHg using EPA Test Method 8015M;
- A total of 85 soil samples collected from the 0 ft to 0.5 ft depth interval were analyzed for CAM17 metals according to Title 22 CCR, EPA Test Methods 6600/7000;
- A total of 98 soil samples were further analyzed for soluble lead (using the Waste Extraction Test; WET) via EPA Test Method 7000;
- A total of 52 soil samples were further analyzed for soluble lead (using the Toxicity Characteristic Leaching Procedure; TCLP) via EPA Test Method 7000;
- One soil sample (08-60-0.5) was further analyzed for soluble (WET) mercury using EPA Test Method 7000;
- One soil sample (08-24-0.5) was reanalyzed for total and soluble (WET) lead.
- A total of 17 soil samples, collected from the 1.0-foot to 1.5-foot depth interval, were analyzed for NOA using EPA Air Resources Board (ARB) Test Method 435;
- A total of 72 soil samples were analyzed for pH using EPA Method 9045; and
- One groundwater sample was analyzed for CAM17 metals using EPA Test Methods 6600/7000, TPHg, TPHd, and TPH as motor oil (TPHmo) using EPA Test Method 8015M, VOCs using EPA Method 8260B, and SVOCs using EPA Method 8270.

The laboratory analyses for soil indicated the following:

- Reported total lead concentrations ranged from less than (<) the laboratory reporting limit of 5 milligrams per kilogram (mg/kg) to 2,000 mg/kg.
- Reported soluble (WET) lead concentrations ranged from <0.25 milligrams per liter (mg/l) to 150 mg/l.
- Soil sample 08-24-0.5 had reported concentrations of total and soluble (WET) lead of 350 mg/kg and 150 mg/l, respectively and was reanalyzed for these constituents. The replicate sample had total and soluble (WET) lead concentrations of 260 mg/kg and 12 mg/l, respectively.
- Reported soluble (TCLP) lead concentrations ranged from <0.25 mg/l to 4.6 mg/l.
- For CAM17 metals analyses, beryllium and thallium were not detected in the soil samples above their respective laboratory reporting limits. Other CAM17 metals were detected in the soil samples at concentrations less than ten times their respective STLC values, with the exception of mercury (and lead, discussed above), which was detected in sample 08-60-0.5 at a concentration of 2.4 mg/kg (i.e. ten times the STLC of 0.2 mg/l).
- Soil sample 08-60-0.5 was further analyzed for soluble (WET) mercury, which was not detected above the laboratory reporting limit of 1.0 micrograms per liter (µg/l).
- TPHd was reported in the soil samples at concentrations that ranged from <1.0 mg/kg to 330 mg/kg.
- TPHg was not detected above the laboratory reporting limit of 1.0 mg/kg in the samples submitted for analysis.
- NOA was not detected above the reporting limit of 0.25% in the soil samples analyzed.
- Soil pH values ranged from 4.5 to 8.0.

Results for groundwater sample R-08-001 indicated the following:

- Total metals detected above laboratory reporting limits were barium, chromium, copper, molybdenum, nickel, vanadium, and zinc, dissolved metals detected above laboratory reporting limits included barium, copper, molybdenum, nickel, and zinc;
- TPHg, TPHd, and TPHmo were reported at concentrations of 0.080 mg/l, 3.2 mg/l, and 0.30 mg/l, respectively;
- Benzene, bromodichloromethane, chloroform, and chloromethane were the only VOCs detected above their respective laboratory reporting limits; and
- SVOCs were not detected above laboratory reporting limits.

Soil

Lead Results

Borings 08-01, 08-04, 08-05, and 08-06

Based on the predicted soluble lead concentrations, the top 2.5 feet of soil from the western end of the Site should be either 1) managed and disposed of as a California hazardous waste or 2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable. Underlying soil (i.e., deeper than 2.5 ft) would not be classified as hazardous waste based on lead content.

Borings 08-02, 08-03, 08-07 to 08-19, and 08-77 to 08-82

Based on the predicted soluble lead concentrations, soil excavated from this portion of the Site and generated for offsite disposal would not be classified as a California hazardous waste since the 90% UCL-predicted soluble (WET) lead concentrations are less than the lead STLC of 5.0 mg/l. Consequently, excavated soil may be reused or disposed as non-hazardous based on lead content.

Borings 08-20 to 08-36 and 08-83 to 08-85

Based on the predicted soluble lead concentrations, the top 1.0 foot of soil from this portion of the site should be either 1) managed and disposed of as a California hazardous waste or 2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable. Underlying soil (i.e., deeper than 1.0 ft) would not be classified as hazardous waste based on lead content.

Based upon the refusal conditions encountered in boring 08-34, 08-36, 08-84, and 08-85, rock may be encountered in the northern portion of this area at an approximate depth of one foot.

Borings 08-37 to 08-57

Based on the predicted soluble lead concentrations, the top 2.5 feet of soil from this portion of the Site should be either 1) managed and disposed of as a California hazardous waste or 2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable. Underlying soil (i.e., deeper than 2.5 ft) would not be classified as hazardous waste based on lead content.

Based on the refusal conditions encountered in borings 08-37 to 08-39, rock may be present in the southern portion of this area at an approximate depth of one foot.

Borings 08-58 to 08-69

Based on the predicted soluble lead concentrations, the top 1.0 foot of soil from this portion of the site should be either 1) managed and disposed of as a California hazardous waste or 2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable. Underlying soil (i.e., deeper than 1.0 ft) would not be classified as hazardous waste based on lead content.

Borings 08-70 to 08-76

Based on the predicted soluble lead concentrations, soil excavated from this portion of the Site and generated for offsite disposal would not be classified as a California hazardous waste since the 90% UCL-predicted soluble (WET) lead concentrations are less than the lead STLC of 5.0 mg/l. Consequently, excavated soil may be reused or disposed as non-hazardous based on lead content.

<u>Other CAM17 Metals Results</u>

Based on the total CAM17 metals concentrations (with the exception of lead), and the reported concentrations of soluble (WET) mercury, soil excavated from the project Site will not be considered a hazardous waste.

The 90% and 95% UCL values for arsenic in the soil samples collected at the Site are greater than the residential and commercial/industrial land use Environmental Screening Levels (ESLs; San Francisco Regional Water Quality Control Board; SFRWQCB, *November 2007*), and within the published background concentration range (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996).

The 90% and 95% UCL values for cadmium in the soil samples collected at the Site are less than the ESLs, and are within the published background concentration range. The 90% and 95% UCL values for cobalt and mercury are less than the respective ESLs and the published background concentration mean values.

The 90% and 95% UCL values for vanadium in the soil samples collected at the Site are greater than the residential land use ESL, however are less than the commercial/industrial land use ESL and published background concentration mean and range.

TPH Results

TPHg was not detected above the laboratory reporting limit in the samples. TPHd was detected above the laboratory reporting limit in the soil samples at concentrations between 1.2 mg/kg and 330 mg/kg, with three samples exceeding the residential and commercial/industrial land use ESL of 83 mg/kg for middle distillates in shallow soil (SFRWQCB, Table A). The calculated 90% and 95% UCLs for TPHd are less than the residential and commercial/industrial land use ESL value of 83 mg/kg.

Naturally Occurring Asbestos Results

The soil sample results indicate that NOA is not present at the Site at concentrations exceeding the CARB regulatory limit of 0.25%. Therefore, based upon the data collected during this investigation, there are no restrictions for materials generated during proposed construction activities at the Site with respect to NOA.

Groundwater

Reported analyte concentrations in the groundwater sample did not exceed their respective ESLs, Water Quality Objectives (WQOs; SFRWQCB Basin Plan, January 2007), or Maximum Contaminant Levels (MCLs; Title 22, CCR, Division 4, Chapter 15, Article 4, September 12, 2003). Therefore, there will likely be no restrictions for handling groundwater generated during the proposed project.

Worker Protection

Per Caltrans requirements, the contractor(s) should prepare a project-specific lead compliance plan (CCR Title 8, Section 1532.1, the "Lead in Construction" standard) to minimize worker exposure to lead-impacted soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of lead-impacted soil.

1.0 INTRODUCTION

This Site Investigation Report was prepared for the Route 80 eastbound HOV Lane project in Contra Costa County, California. This report documents the investigation, sampling methods and laboratory analytical data.

1.1 Site Location

The investigation was performed on Route 80, at Post Miles (PM) CC-80-PM-9.5/14.2, in the Cities of Hercules and Crockett, California. Caltrans is proposing to install an HOV Lane along eastbound Route 80 between Highway 4 and the Carquinez Bridge. The proposed improvements include shoulder widening, offramp widening, and soil nailing for slope stabilization. The Site location is depicted on Figure 1, Vicinity Map.

1.2 Purpose

The purpose of the investigation was to evaluate the presence or absence of hazardous concentrations of metals, total petroleum hydrocarbons (TPH) as diesel (TPHd), as gasoline (TPHg), and naturally occurring asbestos (NOA) in soil at the Site. In addition, a groundwater sample was collected for analysis of metals, TPH, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs). The Site is shown on Figures 2a through 2g.

1.3 Hazardous Waste Determination Criteria

Regulatory criteria to classify a waste as California hazardous for handling and disposal purposes are contained in the CCR, Title 22, Division 4.5, Chapter 11, Article 3, §66261.24. Criteria to classify a waste as Resource, Conservation, and Recovery Act (RCRA) hazardous are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For waste containing metals, the waste is classified as California hazardous when: 1) the total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test (WET). A waste has the potential of exceeding the STLC when the waste's total metal content is greater than or equal to ten times the respective STLC value since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the soluble metal content exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability and corrosivity; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or other criteria. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

1.4 Naturally Occurring Asbestos Reuse/Disposal Criteria

As defined in current California Air Resources Board (CARB) rules, serpentine material refers to any material that contains at least 10% serpentine, and asbestos-containing serpentine refers to serpentine materials with an asbestos content greater than 5% as determined by CARB Test Method 435 (CARB 435). The use of serpentine material for road surfacing is prohibited in California by Title 17 of the California Code of Regulations (CCR) Section 93106, Asbestos Airborne Toxic Control Measure (ATCM) for Surfacing Application (ATCM 93106), unless the material has been tested and determined to have an asbestos content of less than 0.25%. Materials found to contain asbestos of 0.25% or more are considered to be designated waste if transported offsite, requiring disposal at a landfill facility designated to accept asbestos waste. Alternatively, asbestos-containing materials may be reused onsite if buried beneath a minimum six inches of soil.

The CARB specifies mitigation practices for construction, grading, quarrying, and surface mining operations that contain natural occurrences of asbestos outlined in Title 17, Section 93105 Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations, (ATCM 93105). Based on Part (e) Subpart 2) of ATCM 93105 an asbestos dust mitigation plan is required and must be implemented for a project if NOA is disturbed after the start of construction. Additionally, ATCM 93105 specifies that the air pollution control district (APCD) must be notified, and an asbestos dust mitigation plan submitted to the APCD. The ATCM states that air monitoring may be required on the site. NOA potentially posses a health hazard when it becomes an airborne particulate.

The construction/maintenance activities mentioned above could disturb NOA laden debris and soil, thereby potentially creating an airborne hazard. Mitigation practices can reduce the risk of exposure to airborne NOA containing dust. Dust suppression practices include wetting the materials being disturbed and wearing approved respirators with HEPA filters during construction activities.

1.5 Environmental Screening Levels

The San Francisco Bay Regional Water Quality Control Board (SFRWQCB) has prepared a technical report entitled *Screening For Environmental Concerns At Sites With Contaminated Soil and Groundwater, Interim Final* (November 2007), which presents Environmental Screening Levels (ESLs) for soil, groundwater, soil gas, and surface water, to assist in evaluating sites impacted by releases of hazardous chemicals. The ESLs are conservative values for more than 100 commonly detected contaminants, which may be used to compare with environmental data collected at a site. ESLs are strictly risk assessment tools and "not regulatory clean up standards." The presence of a chemical at concentrations in excess of an ESL does not necessarily indicate that adverse impacts to human health or the environment are occurring; this simply indicates that a potential for adverse risk may exist and that additional evaluation is or "may be" warranted (SFRWQCB, 2007).

The most restrictive ESL tables were used for this characterization: Tables A and C – Shallow Soil (≤3 meters below ground surface; bgs) – Groundwater is a Current or Potential Source of Drinking Water and Table F – Surface Water Bodies. The respective ESLs are listed at the ends of Tables 3, 4, 6, and 7 for comparative purposes.

2.0 SCOPE OF SERVICES

The following scope of services was performed:

2.1 Pre-Field Activities

- Prepared the Draft Workplan, dated August 20, 2008, to summarize the scope of services to be performed by Geocon.
- Prepared the Health and Safety Plan, dated August 2008, to provide guidelines on the use of personal protective equipment (PPE) during the field activities. The Health and Safety Plan also provided guidelines on the use of onsite monitoring equipment and action levels for upgrades to higher PPE.
- Notified Underground Service Alert (USA) at least 48 hours prior to fieldwork.
- Retained the services of California-licensed laboratories, Advanced Technology Laboratories (ATL), and EMSL Analytical Inc. (EMSL), to perform the sample analysis.

2.2 Field Activities

The field investigation was performed between September 2 and September 8, 2008, by Chris Merritt and David Watts under the responsible charge of Richard Day. Mr. Day and Mr. Merritt are Professional Geologists in the State of California. The following field activities were performed during soil sampling efforts:

- Completed 85 borings using hand auger methods
- Collected soil samples for analysis of CAM17 metals, TPH, and NOA
- Collected a groundwater sample from geotechnical boring R-08-001 for analysis of metals, TPH, VOCs, and SVOCs
- Transported samples to California-certified environmental laboratories

3.0 INVESTIGATIVE METHODS

3.1 Sampling Procedures

Soil samples were collected from 85 borings (08-01 to 08-85) at locations selected by the Caltrans Task Order Manager. Boring locations were recorded using Differential Global Positioning System (DGPS) equipment. Boring coordinates for the locations are presented in Table 1, and are shown on the Site Plan provided as Figure 2.

The soil borings were advanced to a depth of approximately 3 feet (ft) using a hand auger. Samples were collected at approximate depths of 0.0 foot to 0.5 foot, 1.0 foot to 1.5 feet, and 2.5 feet to 3.0 feet. A total of 240 soil samples were collected. Completed soil boreholes were filled to surface with soil cuttings. Groundwater was not encountered during the advancement of the boreholes. A groundwater sample was collected from geotechnical boring R-08-001 using new polyethylene tubing fitted with a clean check valve. The groundwater sample was collected into appropriate pre-preserved containers provided by the analytical laboratory. Geotechnical boring R-08-001 was located adjacent to the Park and Ride lot at the Willow Avenue offramp, as shown on Figure 2a.

Sample containers were sealed, labeled, and transported to Caltrans-approved, certified environmental laboratories using standard chain-of-custody documentation.

Geocon provided quality assurance/quality control (QA/QC) procedures during the field activities. These procedures included washing the sampling equipment with a Liqui-Nox® solution followed by a double rinse with deionized water. Decontamination water was disposed to the ground surface within Caltrans right-of-way in a manner not to create runoff, away from drain inlets or potential water bodies.

3.2 Laboratory Analyses

Laboratory analyses were performed under a 48-hour turn-around-time. Reproductions of the laboratory reports and chain-of-custody documentation are presented as Appendix A. The laboratory testing performed is summarized below:

- A total of 85 soil samples collected from the 0 ft to 0.5 ft depth interval were analyzed for CAM17 metals according to Title 22 CCR, EPA Test Methods 6600/7000;
- A total of 155 soil samples were analyzed for total lead using EPA Test Method 6010B;
- A total of 72 soil samples were analyzed for TPHd using EPA Test Method 8015M;
- A total of 82 soil samples were analyzed for TPHg using EPA Test Method 8015M;
- A total of 98 soil samples were further analyzed for soluble lead (using the Waste Extraction Test; WET) via EPA Test Method 7000;
- A total of 52 soil samples were further analyzed for soluble lead (using the Toxicity Characteristic Leaching Procedure; TCLP) via EPA Test Method 7000;
- One soil sample (08-24-0.5) was reanalyzed for total and soluble (WET) lead because the initial WET lead result of 150 mg/l was determined to be a statistical outlier.
- One soil sample (08-60-0.5) was further analyzed for soluble (WET) mercury using EPA Test Method 7000;
- A total of 17 soil samples, collected from the 1.0-foot to 1.5-foot depth interval, were analyzed for NOA using EPA Air Resources Board (ARB) Test Method 435;

- A total of 72 soil samples were analyzed for pH using EPA Method 9045; and
- One groundwater sample was analyzed for CAM17 metals using EPA Test Methods 6600/7000, TPHg, TPHd, and TPH as motor oil (TPHmo) using EPA Test Method 8015M, VOCs using EPA Method 8260B, and SVOCs using EPA Method 8270.

3.3 Laboratory QA/QC

QA/QC procedures were performed for each method of analysis with specificity for each analyte listed in the test method's QA/QC. The laboratory QA/QC procedures included the following:

- One method blank for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One spiked sample for every ten samples, batch of samples or type of matrix; whichever was more frequent, with spike made at ten times the detection limit or at the analyte level.

4.0 INVESTIGATIVE RESULTS

4.1 Subsurface Conditions

Observations during field activities indicated that soils at the Site generally consist of sandy soils with varying amounts of gravel and silt. Groundwater was not encountered during advancement of the soil borings. Hand auger refusal was encountered in two borings at a depth of 0.5 foot and in eleven borings at a depth of 1.5 feet. The table below summarizes the boring locations and approximate station where refusal (e.g., rock) was encountered at the Site.

Boring ID	Approximate Station (meters)	Depth of Refusal (feet)
08-34	20+15	1.5
08-36	22+20	1.5
08-37	23+20	1.5
08-38	24+30	0.5
08-39	25+35	1.5
08-53	38+05	1.5
08-54	39+05	0.5
08-55	40+05	1.5
08-66	47+75	1.5
08-80	9+85	1.5
08-82	11+45	1.5
08-84	17+90	1.5
08-85	18+95	1.5

Depth to groundwater (DTW) was measured relative to the top of the polyvinyl chloride (PVC) casing in geotechnical boring R-08-001 prior to collecting a sample. The top of the PVC casing was approximately four inches above the ground surface and measured DTW was 15.27 ft from the top of the PVC casing. According to the onsite Caltrans representative, the geotechnical boring had a total depth of approximately 120 ft.

4.2 Analytical Results

A summary of the analytical laboratory test results are provided as follows: for soil, results for lead and pH are presented in Table 2, results for metals are presented in Table 3, results for TPH are presented in Table 4, and results for NOA are presented in Table 5; for groundwater, results for metals and organics are presented in Tables 6 and 7, respectively. Reproductions of the laboratory reports and chain-of-custody documentation are presented as Appendix A.

The laboratory analyses for soil indicated the following:

- Reported total lead concentrations ranged from less than (<) the laboratory reporting limit of 5 milligrams per kilogram (mg/kg) to 2,000 mg/kg.
- Reported soluble (WET) lead concentrations ranged from <0.25 milligrams per liter (mg/l) to 150 mg/l.
- Soil sample 08-24-0.5 had reported concentrations of total and soluble (WET) lead of 350 mg/kg and 150 mg/l, respectively and was reanalyzed for these constituents. The replicate sample had total and soluble (WET) lead concentrations of 260 mg/kg and 12 mg/l, respectively.
- Reported soluble (TCLP) lead concentrations ranged from <0.25 mg/l to 4.6 mg/l.
- For CAM17 metals analyses, beryllium and thallium were not detected in the soil samples above their respective laboratory reporting limits. Other CAM17 metals were detected in the soil samples at concentrations less than ten times their respective STLC values, with the exception of mercury (and lead, discussed above), which was detected in sample 08-60-0.5 at a concentration of 2.4 mg/kg (i.e. ten times the STLC of 0.2 mg/l).
- Soil sample 08-60-0.5 was further analyzed for soluble (WET) mercury, which was not detected above the laboratory reporting limit of 1.0 micrograms per liter (µg/l).
- TPHd was reported in the soil samples at concentrations that ranged from <1.0 mg/kg to 330 mg/kg.
- TPHg was not detected above the laboratory reporting limit of 1.0 mg/kg in the samples submitted for analysis.
- NOA was not detected above the reporting limit of 0.25% in the soil samples analyzed.
- Soil pH values ranged from 4.5 to 8.0.

Results for groundwater sample R-08-001 indicated the following:

- Total metals detected above laboratory reporting limits were barium, chromium, copper, molybdenum, nickel, vanadium, and zinc, dissolved metals detected above laboratory reporting limits included barium, copper, molybdenum, nickel, and zinc;

- TPHg, TPHd, and TPHmo were reported at concentrations of 0.080 mg/l, 3.2 mg/l, and 0.30 mg/l, respectively;
- Benzene, bromodichloromethane, chloroform, and chloromethane were the only VOCs detected above their respective laboratory reporting limits; and
- SVOCs were not detected above laboratory reporting limits.

4.3 Laboratory Quality Assurance/Quality Control

We reviewed the laboratory QA/QC provided with the laboratory report. The data indicate non-detect results for the method blanks. The surrogate recoveries were outside criteria for several samples due to sample matrix. Dilution was necessary for several samples due to sample matrix.

The relative percent differences (RPDs) of the duplicate samples for several of the metals and TPH analyses were outside criteria. The RPDs for several of the matrix spike duplicate samples for the metals and TPH analyses were outside criteria. The Case Narratives in the laboratory reports state that each analytical batch was validated by the Laboratory Control Sample (LCS). The data showed acceptable recoveries and RPDs for the remainder of the duplicates and matrix spikes.

Based on this limited data review, no additional qualifications of the soil data are necessary and the data are of sufficient quality for the purposes of this report.

4.4 Statistical Evaluation for Lead Detected in Soil Samples

The lead data for the Site were treated as nine separate sample populations for statistical evaluation, which consisted of the following groups of soil samples:

- Sample Population A - Borings 08-01, and 08-04 through 08-06
- Sample Population B - Borings 08-02, 08-03, 08-07 through 08-19, and 08-77 through 08-82
- Sample Population C - Borings 08-20 through 08-36 and 08-83 through 08-85
- Sample Population D - Borings 08-37 through 08-57
- Sample Population E - Borings 08-58 through 08-69
- Sample Population F - Borings 08-70 through 08-76

Statistical methods were applied to the total lead data to evaluate: 1) the upper confidence limits (UCLs) of the arithmetic means of the total lead concentrations for each sampling depth; and 2) if an acceptable correlation between total and soluble lead concentrations exists that would allow the prediction of soluble lead concentrations based on calculated UCLs. The statistical methods used are discussed in a book entitled *Statistical Methods for Environmental Pollution Monitoring,* by Richard Gilbert; in an EPA *Technology Support Center Issue* document entitled, *The Lognormal Distribution in Environmental Applications,* by Ashok Singh et. al., dated December 1997; and in a book entitled *An Introduction to the Bootstrap,* by Bradley Efron and Robert J. Tibshirani.

4.4.1 Calculating the UCLs for the Arithmetic Mean

The upper one-sided 90% and 95% UCLs of the arithmetic mean are defined as the values that, when calculated repeatedly for randomly drawn subsets of site data, equal or exceed the true mean 90% and 95% of the time, respectively. Statistical confidence limits are the classical tool for addressing uncertainties of a distribution mean. The UCLs of the arithmetic mean concentration are used as the mean concentrations because it is not possible to know the true mean due to the essentially infinite number of soil samples that could be collected from a site. The UCLs therefore account for uncertainties due to limited sampling data. As data become less limited at a site, uncertainties decrease, and the UCLs move closer to the true mean.

Non-parametric bootstrap techniques used to calculate the UCLs are discussed in the previously referenced EPA document and in *An Introduction to the Bootstrap*. For those samples in which total lead was not detected at concentrations exceeding the laboratory MRL, a value equal to one-half of the detection limit was used in the UCL calculation. In addition to the computation of 90% and 95% UCLs, an outlier test was performed on the soluble (WET) lead results for the samples collected at the Site. The statistical tests indicated that the soluble (WET) lead analytical result of 150 mg/l reported for sample 08-24-0.5 was determined to be an outlier; therefore, this sample was reanalyzed for total and soluble (WET) lead, with reported results of 260 mg/kg and 12 mg/l, respectively. The results of the replicate analysis were used in the calculation of UCLs. The bootstrap test results are included in Appendix B. The following tables present the calculated UCLs and statistics for the data sets.

Sample Population A - Borings 08-01, 08-04, 08-05, and -08-06

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	Not Calculated	Not Calculated	958	82	2,000
1.0 to 1.5	Not Calculated	Not Calculated	111.3	12	310
2.5 to 3.0	Not Calculated	Not Calculated	21.0	2.5	73

Sample Population B - Borings 08-02, 08-03, 08-07 to 08-19, and 08-77 to 08-82

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	68.5	71.9	58.1	14	190
1.0 to 1.5	18.4	19.5	14.0	2.5	59
2.5 to 3.0	18.3	20.0	11.9	2.5	100

Sample Population C - Borings 08-20 to 08-36 and 08-83 to 08-85

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	281.9	294.6	233.3	28	760

1.0 to 1.5	69.4	74.7	51.3	2.5	220
2.5 to 3.0	20.3	22.3	14.3	2.5	69

Sample Population D - Borings 08-37 to 08-57

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	228.2	239.7	191.1	3.3	660
1.0 to 1.5	225.0	238.9	172.2	5.8	620
2.5 to 3.0	82.2	90.2	53.4	2.5	270

Sample Population E - Borings 08-58 to 08-69

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	175.6	189.5	129.6	17	460
1.0 to 1.5	62.4	67.0	46.6	6.6	160
2.5 to 3.0	78.0	88.7	45.7	2.5	310

Sample Population F - Borings 08-70 to 08-76

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	40.2	43.7	26.9	2.2	85
1.0 to 1.5	9.1	9.5	7.8	2.5	11
2.5 to 3.0	10.8	11.4	8.9	2.5	16

4.4.2 Correlation of Total and Soluble Lead

Total and corresponding soluble (WET) lead concentrations are bivariate data with a linear structure. This linear structure should allow for the prediction of soluble lead (WET) concentrations based on the UCLs calculated above in Section 4.4.1.

To estimate the degree of interrelation between total and corresponding soluble (WET) lead values (x and y, respectively), the *correlation coefficient [r]* is used. The correlation coefficient is a ratio that ranges from +1 to −1. A *correlation coefficient* of +1 indicates a perfect direct relationship between two variables; a *correlation coefficient* of −1 indicates that one variable changes inversely with relation to the other. Between the two extremes is a spectrum of less-than-perfect relationships, including zero, which indicates the lack of any sort of linear relationship at all. The *correlation coefficient* was calculated for the 98 (x, y) data points (i.e., soil samples analyzed for both total lead [x] and soluble [WET] lead [y])

and equaled 0.0.836. To achieve an acceptable correlation, data for soil samples 08-39-1.5 and 08-84-0.5 were excluded from the regression.

For the *correlation coefficient* that indicates a linear relationship between total and soluble (WET) lead concentrations, it is possible to compute the line of dependence or a best-fit line between the two variables. A least squares method was used to find the equation of a best-fit line (regression line) by forcing the y-intercept equal to zero since that is a known point. The equation of the regression line was determined to be $y = 0.0563(x)$, where x represents total lead concentrations and y represents predicted soluble lead (WET) concentrations.

This equation was used to estimate the expected WET soluble lead concentrations for the UCLs calculated in for samples collected from the Site (see Section 4.4.1). Regression analysis results and a scatter plot depicting the (x, y) data points along with the regression line are included in Appendix C. The predicted soluble (WET) lead concentrations are summarized in Tables 8a through 8f.

5.0 CONCLUSIONS

5.1 Lead in Soil

5.1.1 Borings 08-01, 08-04, 08-05, and 08-06

The following table summarizes the predicted soluble (WET) lead concentrations and the waste classification for excavated soil based on the maximum total lead concentrations and the relationship between total and soluble (WET) lead for data collected at the Site. The total and soluble (WET) lead calculations are summarized in Table 8a.

Excavation Depth	Maximum Total Lead (mg/kg)	Maximum Predicted WET Lead (mg/l)	Waste Classification
0 to 1 ft	2,000	**112.6**	**Hazardous**
Underlying soil (1 to 3 ft)	*251*	***14.1***	***Hazardous***
0 to 2 ft	1,155	**65.0**	**Hazardous**
Underlying Soil (2 to 3 ft)	*192*	***10.8***	***Hazardous***
0 to 2.5 ft	986	**55.5**	**Hazardous**
Underlying Soil (2.5 to 3 ft)	*73*	*4.1*	*Non-Hazardous*
0 to 3 ft	834	**46.9**	**Hazardous**

Based on the data presented in the above table, the top 2.5 feet of soil from the western end of the Site should be either 1) managed and disposed of as a California hazardous waste or 2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable. Underlying soil (i.e., deeper than 2.5 ft) would not be classified as hazardous waste based on lead content.

5.1.2 Borings 08-02, 08-03, 08-07 to 08-19, and 08-77 to 08-82

The following table summarizes the predicted soluble (WET) lead concentrations and the waste classification for excavated soil based on the calculated total lead UCLs and the relationship between total and soluble (WET) lead for data collected at the Site. The total and soluble (WET) lead calculations are summarized in Table 8b.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1 ft	68.5	3.9	71.9	Non-Hazardous
Underlying soil (1 to 3 ft)	*18.3*	*1.0*	*19.7*	*Non-Hazardous*
0 to 2 ft	43.4	2.4	45.7	Non-Hazardous

Underlying Soil (2 to 3 ft)	*18.3*	*1.0*	*19.8*	*Non-Hazardous*
0 to 3 ft	35.1	2.0	37.1	Non-Hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated from this portion of the Site and generated for offsite disposal would not be classified as a California hazardous waste since the 90% UCL-predicted soluble (WET) lead concentrations are less than the lead STLC of 5.0 mg/l. Consequently, excavated soil may be reused or disposed as non-hazardous based on lead content.

5.1.3 Borings 08-20 to 08-36 and 08-83 to 08-85

The following table summarizes the predicted soluble (WET) lead concentrations and the waste classification for excavated soil based on the calculated total lead UCLs and the relationship between total and soluble (WET) lead for data collected at the Site. The total and soluble (WET) lead calculations are summarized in Table 8c.

Excavation Depth	**90% UCL Total Lead (mg/kg)**	**90% UCL Predicted WET Lead (mg/l)**	**95% UCL Total Lead (mg/kg)**	**Waste Classification**
0 to 1 ft	281.9	**15.9**	294.6	**Hazardous**
Underlying soil (1 to 3 ft)	*57.1*	*3.2*	*61.6*	*Non-Hazardous*
0 to 2 ft	175.6	**9.9**	184.7	**Hazardous**
Underlying Soil (2 to 3 ft)	*44.8*	*2.5*	*48.5*	*Non-Hazardous*
0 to 3 ft	132.0	**7.4**	139.3	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, the top 1.0 foot of soil from this portion of the Site should be either 1) managed and disposed of as a California hazardous waste or 2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable. Underlying soil (i.e., deeper than 1.0 ft) would not be classified as hazardous waste based on lead content.

Based upon the refusal conditions encountered in borings 08-34, 08-36, 08-84, and 08-85, rock may be present in the northern portion of this area at an approximate depth of one foot.

5.1.4 Borings 08-37 to 08-57

The following table summarizes the predicted soluble (WET) lead concentrations and the waste classification for excavated soil based on the calculated total lead UCLs and the relationship between total and soluble (WET) lead for data collected at the Site. The total and soluble (WET) lead calculations are summarized in Table 8d.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1 ft	228.2	**12.8**	239.7	**Hazardous**
Underlying soil (1 to 3 ft)	*189.3*	***10.7***	*201.7*	***Hazardous***
0 to 2 ft	226.2	**12.8**	239.3	**Hazardous**
Underlying Soil (2 to 3 ft)	*153.6*	***8.6***	*164.5*	***Hazardous***
0 to 2.5 ft	226.3	**12.7**	239.2	**Hazardous**
Underlying Soil (2.5 to 3 ft)	*82.2*	*4.6*	*90.2*	*Non-Hazardous*
0 to 3 ft	202.3	**11.4**	214.4	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, the top 2.5 feet of soil from this portion of the Site should be either 1) managed and disposed of as a California hazardous waste or 2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable. Underlying soil (i.e., deeper than 2.5 ft) would not be classified as hazardous waste based on lead content.

Based on the refusal conditions encountered in borings 08-37 to 08-39, rock may be present in the southern portion of this area at an approximate depth of one foot.

5.1.5 Borings 08-58 to 08-69

The following table summarizes the predicted soluble (WET) lead concentrations and the waste classification for excavated soil based on the calculated total lead UCLs and the relationship between total and soluble (WET) lead for data collected at the Site. The total and soluble (WET) lead calculations are summarized in Table 8e.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1 ft	175.6	**9.9**	189.5	**Hazardous**
Underlying soil (1 to 3 ft)	*66.3*	*3.7*	*72.4*	*Non-Hazardous*
0 to 2 ft	119.0	**6.7**	128.2	**Hazardous**
Underlying Soil (2 to 3 ft)	*70.2*	*4.0*	*77.8*	*Non-Hazardous*

0 to 3 ft	102.7	**5.8**	111.4	**Hazardous**

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, the top 1.0 foot of soil from this portion of the Site should be either 1) managed and disposed of as a California hazardous waste or 2) stockpiled and resampled to confirm waste classification in accordance with specific disposal facility acceptance criteria, if applicable. Underlying soil (i.e., deeper than 1.0 ft) would not be classified as hazardous waste based on lead content.

5.1.6 Borings 08-70 to 08-76

The following table summarizes the predicted soluble (WET) lead concentrations and the waste classification for excavated soil based on the calculated total lead UCLs and the relationship between total and soluble (WET) lead for data collected at the Site. The total and soluble (WET) lead calculations are summarized in Table 8f.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	Waste Classification
0 to 1 ft	40.2	2.3	43.7	Non-Hazardous
Underlying soil (1 to 3 ft)	*9.5*	*0.5*	*10.0*	*Non-Hazardous*
0 to 2 ft	24.6	1.4	26.6	Non-Hazardous
Underlying Soil (2 to 3 ft)	*9.9*	*0.6*	*10.4*	*Non-Hazardous*
0 to 3 ft	19.7	1.1	21.2	Non-Hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal

Based on the data presented in the above table, soil excavated from this portion of the Site and generated for offsite disposal would not be classified as a California hazardous waste since the 90% UCL-predicted soluble (WET) lead concentrations are less than the lead STLC of 5.0 mg/l. Consequently, excavated soil may be reused or disposed as non-hazardous based on lead content.

5.2 Other CAM 17 Metals in Soil

Sample 08-60-0.5 had a total mercury concentration of 2.4 mg/kg, exceeding 2.0 mg/kg (i.e. ten times the STLC of 0.2 mg/l); however, soluble (WET) mercury was not detected above the laboratory reporting limit in the sample. Based on the total CAM17 metals concentrations (with the exception of lead), and the reported concentrations of soluble (WET) mercury, soil excavated from the project Site will not be considered a hazardous waste.

The CAM17 metals concentrations in soil were compared to ESLs (SFRWQCB, November 2007). Reported arsenic concentrations were between 1.6 mg/kg and 21 mg/kg, exceeding the residential land use ESL of 0.38 mg/kg and the commercial/industrial land use ESL of 1.5 mg/kg for shallow soil (≤3 meters; SFRWQCB, Table A). Cadmium was reported at concentrations equal to or exceeding the residential land use ESL of 1.7 mg/kg in five of the soil samples. Cobalt was reported in sample 08-47-0.5 at a concentration of 54 mg/kg, exceeding the residential land use ESL of 40 mg/kg. The reported mercury concentration of 2.4 mg/kg in sample 08-60.0.5 exceeds the residential land use ESL of 1.0 mg/kg. In addition, vanadium was detected in the soil samples at concentrations between 7.8 mg/kg and 57 mg/kg, exceeding the residential land use ESL of 15 mg/kg for shallow soil.

Upper one-sided 90% and 95% upper confidence limits (UCLs) were calculated for the full set of metals concentrations that had reported exceedences of their respective ESL values. The UCLs were compared with the residential and commercial/industrial land use ESLs and with published background levels typically present in California soils as presented in *Background Concentrations of Trace and Major Elements in California Soils* (Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996). For those samples in which total metals were not detected at concentrations exceeding the laboratory MRL, a value equal to one-half of the detection limit was used in the UCL calculation. The bootstrap results are included in Appendix B.

The calculated standard bootstrap UCLs, ESLs and published background concentrations are summarized in the table below:

Metal	90% UCL	95% UCL	RESIDENTIAL ESL	COMMERCIAL/ INDUSTRICAL ESL	PUBLISHED BACKGROUND MEAN[1]	PUBLISHED BACKGROUND RANGE [1]
Arsenic	6.4	6.6	0.38	1.5	3.5	0.6 to 11.0
Cadmium	0.71	0.72	1.7	7.4	0.36	0.05 to 1.70
Cobalt	7.6	7.8	40	80	14.9	2.7 to 46.9
Mercury	0.16	0.17	1.0	100	0.26	0.05 to 0.9
Vanadium	36.7	37.0	15	190	112	39 to 288

Concentrations reported in milligrams per kilogram (mg/kg)

[1] Kearney Foundation of Soil Science, March 1996

The 90% and 95% UCL values for arsenic in the soil samples collected at the Site are greater than the residential and commercial/industrial land use ESLs, and within the published background concentration range. The SFRWQCB *November 2007 Update to Environmental Screening Levels (ESLs) Technical Document* states that ambient background concentrations of arsenic typically exceed risk-based screening levels. In such instances, it may be more appropriate to compare site data to regionally-specific established background levels.

The 90% and 95% UCL values for cadmium in the soil samples collected at the Site are less than the ESLs, and are within the published background concentration range. The 90% and 95% UCL values for cobalt and mercury are less than the respective ESLs and the published background concentration mean values. The 90% and 95% UCL values for vanadium in the soil samples collected at the Site are greater than the residential land use ESL, however are less than the commercial/industrial land use ESL and published background concentration mean and range.

5.3 Total Petroleum Hydrocarbons in Soil

TPHg was not detected above the laboratory reporting limit in the samples. TPHd was detected above the laboratory reporting limit in the soil samples at concentrations between 1.2 mg/kg and 330 mg/kg, with three samples exceeding the residential and commercial/industrial land use ESL of 83 mg/kg for middle distillates in shallow soil (SFRWQCB, Table A).

Upper one-sided 90% and 95% upper confidence limits (UCLs) were calculated for the full set of TPHd results for soil samples collected at the Site. For those samples in which TPHd was not detected at concentrations exceeding the laboratory MRL, a value equal to one-half of the detection limit was used in the UCL calculation. The bootstrap results are included in Appendix B. The calculated standard bootstrap UCLs and ESLs for TPHd are summarized in the following table:

Sample Depth (ft)	90% UCL	95% UCL	Mean	Minimum	Maximum	RESIDENTIAL and COMM/INDUST ESLs
0 to 0.5	53.5	59.2	28.0	3.5	330	83
2.5 to 3.0	20.3	22.2	13.8	0.5	240	
0 to 3.0	24.4	26.7	17.0	0.5	330	

Concentrations reported in milligrams per kilogram (mg/kg)

The calculated 90% and 95% UCLs for TPHd are less than the residential and commercial/industrial land use ESL value of 83 mg/kg.

5.4 Naturally Occurring Asbestos

The soil sample results indicate that NOA is not present at the Site at concentrations exceeding the CARB regulatory limit of 0.25%. Therefore, based upon the data collected during this investigation, there are no restrictions for materials generated during proposed construction activities at the Site with respect to NOA.

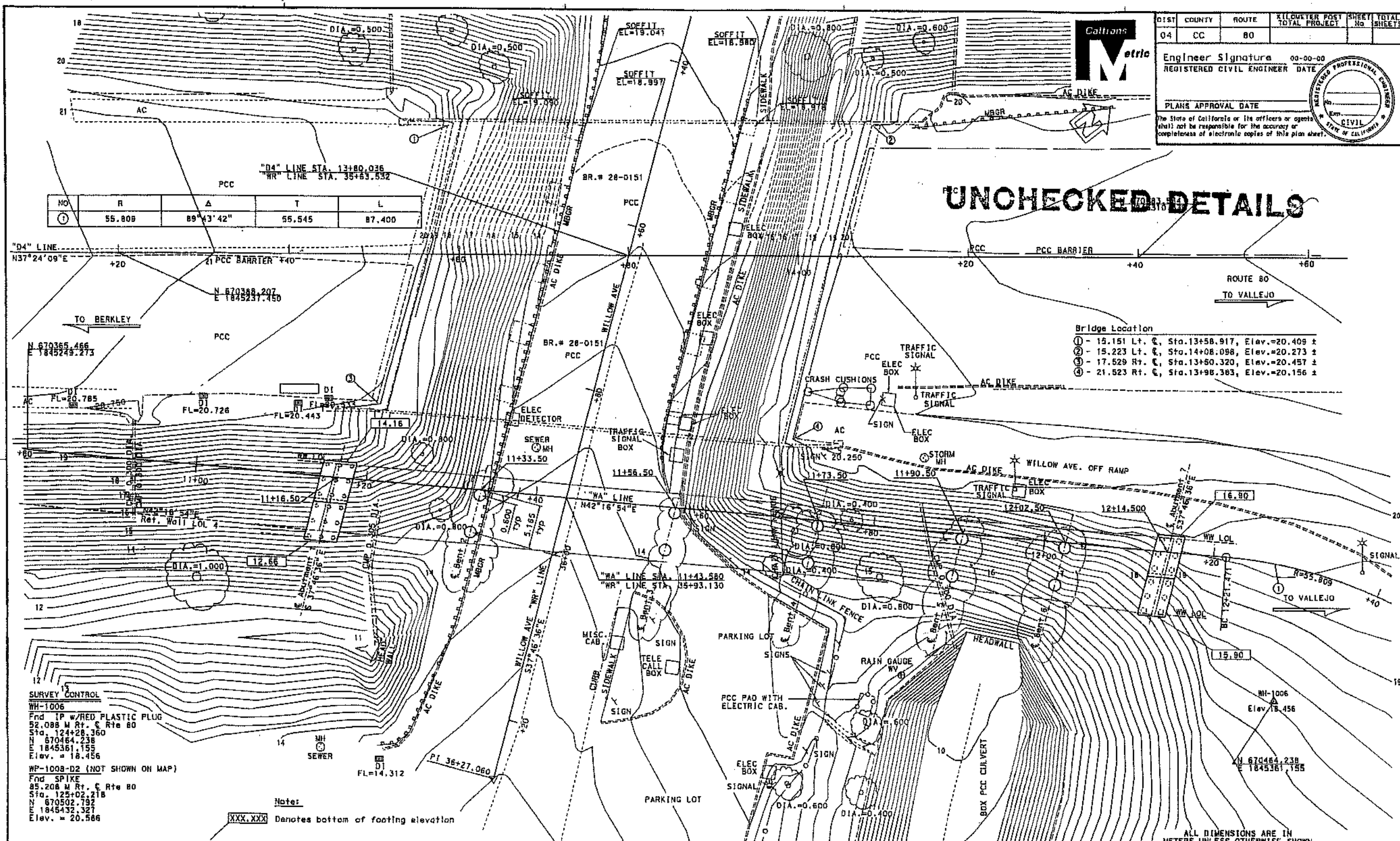
5.5 Groundwater

Reported analyte concentrations in the groundwater sample collected from geotechnical boring R-08-001 did not exceed their respective ESLs, Water Quality Objectives (WQOs; SFRWQCB Basin Plan, January 2007), or Maximum Contaminant Levels (MCLs; Title 22, CCR, Division 4, Chapter 15, Article 4, September 12, 2003). Therefore, there will likely be no restrictions for handling groundwater generated during the proposed project.

5.6 Worker Protection

Per Caltrans requirements, the contractor(s) should prepare a project-specific lead compliance plan (CCR Title 8, Section 1532.1, the "Lead in Construction" standard) to minimize worker exposure to lead-impacted soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of lead-impacted soil.

3. DEWATERING LOCATION PLANS



DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	CC	80			

Engineer Signature 00-00-00
REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

PRELIMINARY INVESTIGATION SECTION

SCALE	VERT. DATUM NAVD 1988	PHOTOGRAMMETRY AS OF:		
1:200	HORZ. DATUM NAD 83	SURVEYED BY T. GILLETT 10/02	DRAFTED BY F. BANDA 12/02	
ALIGNMENT TIES DIST TRAVERSE SHEET		FIELD CHECKED BY	CHECKED BY T. ZOLNIKOVA 12/02	

	BY	CHECKED
DESIGN	John Ralley	E Francillso
DETAILS	JFCasarino	
QUANTITIES	John Ralley	

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF STRUCTURES
STRUCTURE DESIGN 9

CU 04
EA 283721

BRIDGE NO. 28-0151S
KILOMETER POST 0100

WILLOW AVE. OFF RAMP
FOUNDATION PLAN

SHEET 4 OF 19

4. GENERAL WASTE DISCHARGE REQUIREMENTS

<u>General Waste Discharge Requirements for: Discharge or reuse of extracted and treated groundwater resulting from the cleanup of groundwater polluted by fuel leaks and other related wastes at service stations and similar sites can be found at:</u>

http://www.waterboards.ca.gov/sanfranciscobay/Agenda/11-13-06/5afinalrevised/ORDER%20NO.%20R2-2006-0075rev.pdf

5. LIST OF PUBLICLY OWNED TREATMENT WORKS (POTW) FOR DISPOSAL OF CONTAMINATED GROUND WATER

Contra Costa POTW

	City Discharger	Treatment Plant Name	WDR Discharger Name	Discharger Contact Name	Contact Phone No.	Contact Email	Mail Address	Ct Contact for Groundwater & De-Watering Discharges	Service Area of the POTW
1	Richmond	City of Richmond WPCP	Veolia Water [formerly U.S. Filter]	Chris McAuliffe	510-412-2001	shalabel@usfilter.com	1401 Marine Way South, Richmond, CA 94804	Contact: Steve Friday @ 510-412-2009 website:"www.ci.richmond.ca.us/wastewater" Permit fee is now $750 (good for multiple sites), Total Scan for metals needed, possible site history needed. Steve has worked with Ct before on a 580 project with Chevron	City of Richmond
2	Richmond	West County WW District	West County WW District	John Foly(agency manager), Paul Winnick (collection system manager)	510-222-6700	jfoly@wcwd.org; pwinnicki@wcwd.org	2910 Hill Top Drive, Richmond, CA 94806	Contact Paul Winnecke @ 510-222-6700. Sevice area is San Pablo, N. Richmond, El Sobrante. Need permit, analysis, per gallon fee - wouldn't take during major storm event Try wcwd.org website	San Pablo, N. Richmond, El Sobrante
3	Pinole	Pinole-Hercules WPCP	Pinole-Hercules WPCP	Brent M. Salmi	510-724-9017	bsalmi@ci.pinole.ca.us	Brent M. Salmi, 2131 Pear St., Pinole, CA 94564	Brent Salmi is the City Engineer for both Pinole and Hercules 510-724-9017: No permit process - prefers, if tested, clean, and sediment-free to put in Storm drain. Also depends on quantity - will decide when given specifics of job	Cities of Pinole and Hercules
4	Hercules		City of Hercules	Jeff Brown	510-799-8252	jbrown@ci.hercules.ca.us	Jeff Brown, City of Hercules, 111 Civic Drive, Hercules, CA 94547	City of Hercules sends their Wastewater to the Pinole-Hercules Plant-see Line # A - 3	City of Hercules - see Line # A - 3
87	Contra Costa County, Port Costa WWTP	Contra Costa County, Port Costa WWTP	Contra Costa County, Public Works Dept. (include CCCSD6 and CCCSD5, CCCM28)	Lisa Carnahan	925-313-2191	lcarnaha@pw.co.contra-costa.ca.us	Contra Costa County Public Work, 255 Glacier Dr., Martinez, CA 94553	Per Lisa Carnahan 925-313-2191: "Absolutely not." This is a very small plant with limited capacity, ie. # 6 is 47 homes (Stonehurst @ Alhambra,) #5 is 86 homes in Port Costa and #28 is a small Trailer Park.	Probably Port Costa - which has no Caltrans ROW within its city limits
88	CS Land WWTP	CS Land WWTP	CS Land WWTP	Dylan Radke	925-228-1400	dylan@gdwp.com	Dylan Radke, Attorney, P.O. Box 630, Martinez, CA 94553	Contact Tracy Sizemore @ 602-728-3047. This is a small land holding of 1900 acres only has Hwy 123 (San Pablo Ave in Crockett and Rodeo) TS says see Region 2 2004 Order #64	Crockett and Rodeo
89	Mt. View SD	Mt. View SD	Mt. View SD	Dave Contreras	925-228-5635x32	dcontreras@mvsd.org	David Contreras, 3800 Authur Road, Martinez, CA 94553	Per Dave Riddle: "Normally they would not accept - they didn't on Caltrans' 680/Marina Vista project - and the water was trucked to CC Central San." They would listen to proposals and the final decision would be made by Dr. Teng Wu or David Contreras.	Services unincorporated areas of Martinez - mostly North of Hwy 4 and E/W of Hwy 680
90	Central Contra Costa SD WWTP	Central Contra Costa SD WWTP	Central Contra Costa SD WWTP	Jim Kelly, John Pearl	JK, 925-229-7386; JP, 925-229-7156	jkelly@centralsan.dst.ca.us ; jpearl@centralsan.dst.ca.us	CCCSD, 5019 Imhoff Place, Martinez, CA 94553	Call Doug Craig @ 925-229-7284. They have accepted 60,000 gallons (8-12 truck loads per day)from Ct from the Ben-Mtz Bridge/680 project. They need source control, analyze - then talk about requirements and fee structure - will do what's best for their service area	They do these cities: Orinda, Moraga, Lafayette, Walnut Creek, San Ramon, Concord, Clayton, Pleasant Hill, Martinez, Alamo, Danville, and Port Chicago
91			City of Concord	Qamar Khan, Director of Public Works for Maintenance Services	925-671-3231			Same as Central Contra Costa SD see line # A -90	The city of Concord had their own WWTP until CCSD (line # A - 91) was built. Their WW is collected by the city - then sent to CCSD
92			City of Clayton - system managed by City of Concord	Qamar Khan, Director of Public Works for Maintenance Services	925-671-3231			No Caltrans ROW within City of Clayton - Same as Central Contra Costa SD see line # A - 90	No Caltrans ROW within City of Clayton
104	C&H Sugar WWTP	C&H Sugar WWTP	C&H Sugar	Elizabeth Crowley	510-787-4352		They don't have sanitary sewer system, C&H sugar sends their WW to Crockett Valona SD and CVSD sends all the WW to C&H Sugar WWTP	Best contact: Elizabeth Crowley @ 510-787-4352. She is "scared to take on unknowns" anything would be "conditionally dependent" - they have very tight limits on all metals. She's approachable - but is very dissapointed in Ct re: the Zampa Bridge It's possible.	The C & H plant handles all the waste north of the Railroad (in Crockett), the "industrial" part of Crockett, and from their plant. WW is commingled with the Crockett-Valona residential wastes, treated and discharged.
105			Crockett-Valona SD	Kent Peterson	510-787-2992	cvsd@earthlink.net	Kent Peterson, Crockett Valona Sanitary District, P.O. Box 578, Crockett, CA 94525	Per Kent Peterson @ 510-787-2992 Crockett sends their WW to C&H and they WOULD NOT accept as it is disallowed per their agreement with C&H	The "Crockett" section is the area on both sides of I-80, while the "Valona" section is further east of 3rd Ave. Crockett and Valona called "Cro-Lona" sends their wastes to the C & H plant (on the Strait) where it is treated at a plant that is jointly owned by both of them

6. CONTRA COSTA COUNTY -POTW SERVICE AREA

Contra Costa County - POTW Service Areas