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Santa Monica-Malibu Unified School District

Removal Action Completion Report - Malibu Middle and High School Campus Improvements Project

30215 Morning View Drive
Malibu, California

June 12, 2012

ARCADIS

June 12, 2012

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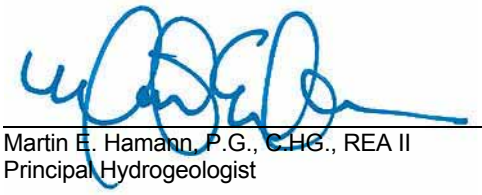
Senior Toxicologist



June 12, 2012

Martin E. Hamann, P.G., C.HG., REA II
Principal Hydrogeologist

Removal Action Completion Report

Malibu Middle and High School – Campus Improvements Project

Prepared for:
Santa Monica-Malibu Unified School District

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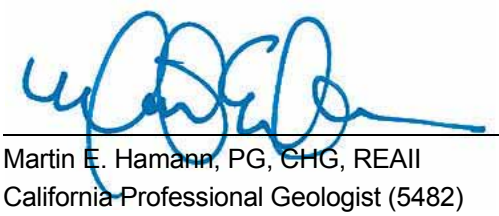
Certification

ARCADIS U.S., Inc. has prepared this Removal Action Completion (RAC) Report on behalf of the Santa Monica-Malibu Unified School District in a manner consistent with the level of care and skill ordinarily exercised by professional geologists and environmental scientists. This RAC was prepared under the technical direction of the undersigned California Professional Geologist and Registered Environmental Assessor II.



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June 12, 2012
Date

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Executive Summary

This Removal Action Completion Report (RAC) has been prepared by ARCADIS U.S., Inc. (ARCADIS, formerly LFR an ARCADIS Company) on behalf of the Santa Monica-Malibu Unified School District (SMMUSD) to document removal of areas of pesticide- and polychlorinated biphenyl (PCB)-affected soils within the Malibu Middle and High School campus located at 30215 Morning View Drive, Malibu, California. Specifically, environmental assessment activities performed by ARCADIS focused on 20 proposed improvement areas located within the boundaries of the Malibu Middle and High School campus. For the purposes of this RAC, the Site consisted of one area of pesticide-affected soils and eight areas of PCB-affected soils totaling approximately 1,200 cubic yards (yds^3).

The work detailed in this RAC report was conducted in accordance with ARCADIS' Removal Action Workplan (RAW), dated August 5, 2010. SMMUSD retained ARCADIS to oversee the implementation of the RAW, including the collection of air monitoring and confirmation soil samples, and preparation of this RAC report to document the removal of pesticide- and PCB-affected soils identified on the Site during the Preliminary Environmental Assessment (PEA) previously conducted by ARCADIS (ARCADIS 2010a). The removal action was completed in a manner consistent with the technical procedures approved by the Department of Toxic Substances Control (DTSC).

The removal action at Site focused on the removal and off-site disposal of soils affected with chemicals of potential concern (COPCs), to reduce the threat of human health and to provide a permanent solution that reduces the toxicity, mobility, and volume of contaminated soil. The overall remedial action objective for the Site is to satisfy an unrestricted future land use designation by preventing human exposure to affected media containing chemicals of concern (COCs) at concentrations presenting unacceptable human health risks and hazards.

Removal activities at the Site began on July 11, 2011 and continued through August 24, 2011. The majority of the excavation was conducted using an excavator. No stained or discolored soils were observed during excavation activities. Affected soil was loaded onto plastic (visquene) covered areas adjacent to the excavation to ensure that the affected soil was not mixed with clean surface soil. Air and dust monitoring were conducted to ensure dust suppression was adequate.

Confirmation soil samples were taken after the initial excavation to evaluate the residual concentrations of PCBs and pesticides in soils. If concentrations of PCBs or pesticides were above their respective PCGs, additional soil excavation was conducted. Additional excavation was performed as needed based on analytical results for the confirmation samples. Confirmation samples were again collected upon completion of the additional removal. Excavation was deemed complete vertically when excavation floor samples were below PCGs and was deemed complete laterally when excavation sidewall samples were below PCGs.

The total volume of soil excavated during this removal action was approximately 1,179 cy, based on the calculated area and depth, and a total mass of approximately 1,158 tons according to the waste manifests.

A risk evaluation was conducted upon completion of the remediation activities. For completeness, the dataset included analytical data collected during the PEA investigation that still remains as well as the confirmation sampling data collected upon completion of remedial activities. The results of the risk evaluation were as follows:

- 4,4'-DDE, 4,4'-DDT, technical-chlordane, Aroclor 1254, and benzene were identified as carcinogens in site soils and soil vapors. Ingestion, inhalation, and dermal contact pathways from shallow soils and soil vapors at the Site were considered. The estimated cancer risk for the carcinogenic compounds using the maximum concentrations of existing site data is 3×10^{-6}, which is below 5×10^{-6}, the cancer risk target risk management range for school sites.

- The noncarcinogenic health hazard estimate for COPCs was also evaluated for inhalation and ingestion/dermal pathways from shallow soil at the Site. The hazard index for noncarcinogenic effects using the maximum detected concentration collected of existing site data is 0.3, which is below the 1.0 hazard index.

Based on the results of the risk assessment, there does not appear to be a significant threat to public health or the environment with regard to COPCs following the removal activity.

1. Introduction

This Removal Action Completion Report (RAC) has been prepared by ARCADIS U.S., Inc. (ARCADIS, formerly LFR an ARCADIS Company) on behalf of the Santa Monica-Malibu Unified School District (SMMUSD) to document removal of areas of pesticide- and polychlorinated biphenyl (PCB)-affected soils within the Malibu Middle and High School campus located at 30215 Morning View Drive, Malibu, California (Figures 1 and 2).

Specifically, environmental assessment activities performed by ARCADIS (LFR 2009a, 2009c; ARCADIS 2010a; ARCADIS 2010b) have focused on 20 proposed improvement areas located within the boundaries of the Malibu Middle and High School campus (Figure 2). For the purposes of this RAC, the Site consisted of one area of pesticide-affected soils and eight areas of PCB-affected soils totaling approximately 1,200 cubic yards (yds^3) near and/or within improvement Areas 3 and 9 through 13 (Figure 2).

The work detailed in this RAC report was conducted in accordance with ARCADIS' Removal Action Workplan (RAW), dated August 5, 2010. SMMUSD retained ARCADIS to oversee the implementation of the RAW, including the collection of air monitoring and confirmation soil samples, and preparation of this RAC report to document the removal of pesticide- and PCB-affected soils identified on the Site during the Preliminary Environmental Assessment (PEA) previously conducted by ARCADIS (ARCADIS 2010a). The removal action was completed in a manner consistent with the technical procedures approved by the Department of Toxic Substances Control (DTSC).

The removal action was conducted in July and August 2011. The removal action was:

- effective in reducing the mobility of the affected soil
- effective in reducing levels of chemicals at the Site to levels consistent with DTSC requirements
- cost effective
- effective in reducing environmental liability at the Site.

As with any real property, if previously unidentified contamination is discovered at the Site, additional soil assessment, investigation, and/or cleanup may be required by the DTSC.

1.1 Purpose

The purpose of this RAC report is to document that the remedial action presented in the RAW has been completed and that the remaining soils do not present a risk to human health and the environment. This RAC report was also prepared to satisfy DTSC requirements of the environmental assessment of the Site.

1.2 Remedial Action Objectives

The removal action at Site focused on the removal and off-site disposal of soils affected with chemicals of potential concern (COPCs), to reduce the threat of human health and to provide a permanent solution that reduces the toxicity, mobility, and volume of contaminated soil.

The overall remedial action objective for the Site is to satisfy an unrestricted future land use designation by preventing human exposure to affected media containing chemicals of concern (COCs) at concentrations presenting unacceptable human health risks and hazards.

1.3 Report Format and Content

This RAC report is outlined as follows:

- .Section 1.0 – Introduction: Includes the location and a description of the subject property, along with the purpose and remedial action objectives.
- Section 2.0 – Site Background: Provides historic usage information and an overview of topographic, geologic, and hydrogeologic conditions for the Site. Also provides a summary of the previous site investigations.
- Section 3.0 –Field Preparation: Details specific scopes of work for the various parties involved in the removal action, and addresses activities that took place prior to the start of removal activities.
- Section 4.0 – Soil Removal Action: Describes all soil removal action activities, including soil excavation, stockpile management, off-site transportation, decontamination, confirmation sampling, air sampling, dust monitoring, and meteorological monitoring.
- Section 5.0 – Variances: Outlines variances from the RAW that occurred during soil removal activities.
- Section 6.0 – Post-Removal Risk Evaluation: Provides the risk evaluation and human health screening evaluation for soil remaining at the Site after excavation activities.

- Section 7.0 – Summary: Provides an overall summary of soil excavation and removal activities at the Site.
- Section 8.0 – Conclusions and Recommendations: Provides conclusions from the soil removal activities, and states ARCADIS's recommendations for the Site.
- Section 9.0 – References: Outlines the reference materials utilized to prepare the RAC report.

2. Site Background

2.1 Site Location and Description

The overall project area for environmental assessment activities included 20 proposed improvement areas within the boundaries of the Malibu Middle and High School campus located at 30215 Morning View Drive, Malibu, California (Figure 2). Within these 20 proposed improvement areas, 9 areas, referred to as Excavation Areas, were identified as containing elevated concentrations of PCBs or pesticides and were slated for removal (as shown on Figure 3). For the purposes of this RAC, the Site consists of these 9 areas: one area of pesticide-affected soils and eight areas of PCB-affected soils totaling approximately 1,200 yds^3 near and/or within improvement Area 3 and Areas 9 through 13.

2.1.1 Site Name and Address

Malibu Middle and High School is located 30215 Morning View Drive, Malibu, California.

2.1.2 Contact Persons, Mailing Addresses, and Telephone Numbers

Contact	Attention	Address	Telephone
Santa Monica-Malibu Unified School District	Stuart Sam Director of Facility Improvement Projects	1651 Sixteenth Street Santa Monica, California 90404	310.450.8338
Parsons	Hunter Gaines Project Manager	12100 Wilshire, Suite 1950 Los Angeles, California 90025	310.450.8338

2.1.3 Assessor's Parcel Numbers and Maps

According to the City of Malibu records, the approximately 72-acre Malibu Middle and High School Campus that incorporates the Site occupies Assessor's Parcel Numbers (APNs) 4469-017-900, 4469-017-901, 4469-017-902, and 4469-017-903.

A Site vicinity map and a proposed campus improvements project scope map are provided as Figures 1 and 2, respectively. Aerial photographs of the Site vicinity may be found in Appendix B of the Phase I ESA report (LFR 2009a).

2.1.4 Property Ownership

The Site is reportedly owned by the Santa Monica-Malibu Unified School District.

2.1.5 Township, Range, Section and Meridian

The approximate geographic coordinates of the Site are 34.02470 degrees north latitude and minus 118.8259 degrees west longitude, according to information obtained from Environmental Data Resources, Inc. (EDR) of Milford, Connecticut.

According to the United States Geological Survey (USGS) 7.5-Minute Series Topographic Map of the Point Dume, California, Quadrangle dated 1999, the Site was mapped for the Topanga Malibu Sequit survey of land grants and civil colonies; no township or range information was listed by the survey.

2.2 Operational History and Status

ARCADIS was initially retained by the SMMUSD to conduct a Phase I ESA screening of the Site. The purpose of this screening was to identify RECs at the Site to the extent feasible pursuant to the processes prescribed in the American Society for Testing and Materials (ASTM) “Standard Practice for Environmental Site Assessments: Phase I ESA Process” (ASTM Designation E 1527 05) and the California Education Code. Background information obtained during the Phase I ESA screening indicated the need for additional investigations; therefore, ARCADIS conducted a full Phase I ESA for the Site, and background information was presented in the Phase I ESA report (LFR 2009a).

According to the Phase I ESA review of historical topographic maps, aerial photographs, and historical city directories, the Site and vicinity were undeveloped land from at least as early as 1903 until 1947. Scattered residential development in the Site vicinity was first apparent in 1951. The Site was depicted as mostly undeveloped land in the 1952 aerial photograph. The Site was depicted as improved with school buildings in the 1965 aerial photograph, with residences shown in the Site vicinity. The 1952 aerial photograph depicted limited agricultural use for dry land farming in the central portion of the Site. Additional school buildings were depicted in the 1976 aerial photograph. The Site was developed to the current configuration by 1990. Malibu High School was first listed at the current Site address in the 1991 city directory.

2.3 Topography

According to the USGS 7.5-Minute Series Topographic Map of the Point Dume, California, Quadrangle (1999), the Site is located at an elevation of approximately 147 feet above mean sea level (msl). The topography of the surrounding area is generally flat with a gradual slope to the south-southwest.

2.4 Geology and Hydrogeology

2.4.1 Site Geology and Soil Types

The geology of the Site is identified as part of the Miocene Series of the Tertiary System of the Cenozoic Era. According to the United States Department of Agriculture (USDA) Soil Conservation Service (SCS), the Site is underlain by a Millsholm loam soil. This soil type is described as clayey with very slow infiltration rates and intermediate water holding capacity.

Based on lithologic information from soil borings advanced at the Site, surface soils consist of approximately eight feet of moist sandy clays. The surface soils are underlain by moist clayey sand from approximately 8 feet to 15 feet below ground surface (bgs). Representative boring logs were included as Appendix C of the PEA.

2.4.2 Site Hydrogeologic Setting

The natural surface drainage in the Site vicinity is southwest, toward the Pacific Ocean. The Pacific Ocean is located approximately 0.5 mile southwest of the Site. Two ephemeral drainages are also located adjacent to the Malibu Middle and High School campus, one along the northwest boundary of the Site and one south-southeast of the campus.

The Site is located within the Malibu Valley Basin. Groundwater in the Malibu Valley Basin is found in Holocene alluvium comprised of clays, silts, sands, and gravels that range in thickness from 90 to 140 feet (California Groundwater Bulletin 2003). Four groundwater monitoring wells were installed on the property following removal of the former underground storage tanks (USTs). Depth to water in these wells ranged from approximately 27.6 to 38.7 feet bgs from May 1995 and July 1996, with a groundwater gradient to the south.

2.5 Previous Site Actions

A brief summary of the previous investigations conducted at the Site are described in the following subsections.

2.5.1 Phase I Environmental Site Investigation

ARCADIS (as LFR) completed a Phase I Environmental Site Assessment (ESA) for the Site in October 2009. The results of this assessment were presented in our report entitled "Phase I Environmental Site Assessment, Malibu Middle and High School Campus, 30215 Morning View Drive, Malibu, California" dated October 1, 2009 (LFR 2009a). In summary, several areas of the Site were identified as potential recognized environmental concerns (RECs), and soil and soil vapor sampling investigation was recommended to address the potential concerns.

2.5.2 PEA Soil and Soil-Gas Investigation

A soil and soil-gas investigation was performed in accordance DTSC guidance documents and a prepared PEA Workplan. A brief summary of the soil and soil-gas investigation and results is presented below.

ARCADIS (as LFR) performed a Preliminary Environmental Assessment (PEA) for the Site that included the collection and analysis of soil and soil vapor samples to establish whether the recognized environmental conditions (RECs) identified in the Phase I ESA posed a significant threat to human health or the environment at the Site, and to evaluate the potential risk, if any, to human health or the environment. The results were presented in LFR's "Preliminary Environmental Assessment, Malibu Middle and High School Campus, 30215 Morning View Drive, Malibu, California", dated June 14, 2010. The PEA was prepared to satisfy typical DTSC requirements for the environmental assessment of the Site such that portions of the campus can be redeveloped with new school facilities.

Initial laboratory soil sample analysis of PEA samples indicated the presence of pesticides and PCBs at the Site. PCBs were not originally considered to be an REC, based on the ESA review. Additional soil samples were collected and analyzed to determine the extent of pesticide- and PCB-affected soils. Soil vapor sampling results did not identify elevated concentrations of contaminants of concern.

The following conclusions were based on the information obtained during ARCADIS' soil and soil-gas investigation activities as described in the PEA (ARCADIS 2010a):

- In summary, using maximum concentrations of COPCs detected during the PEA, the total estimated cancer risk assuming no remediation of soils is 2×10^{-5} and the total non-cancer hazard index (HI) is 2. PCBs are the primary contributor to the risk and hazard, and pesticides are the secondary contributors to the risk and hazard. The extent of PCB- and pesticide-affected soils has been identified and is

estimated to be approximately 1,200 cubic yards[1]. Soil removal activities are proposed to excavate the affected soils.

- Lead concentrations are within acceptable health ranges.

- Based on the results of the risk assessment, there does not appear to be a significant threat to public health or the environment with regard to COPCs following the removal activity (subject to appropriate confirmation sampling indicating that elevated concentrations of pesticides and PCBs are no longer present at concentrations above their respective CHHSLs).

2.5.3 Removal Action Workplan (RAW)

ARCADIS prepared the RAW, dated August 5, 2010 using data collected during the PEA, and identified and evaluated viable remedial alternatives for the affected soil and the elimination of exposure pathways. The RAW included a detailed plan for conducting the removal action, a description of the on-site contamination, and the goals to be achieved by the removal action. The RAW was prepared in accordance with all applicable and relevant federal, state, and local laws, regulations, and guidelines. Previous work provided sufficient data to support the removal action that was proposed by the RAW.

2.6 Nature, Source, and Extent of Contaminants in Soil

The data collected during the Site investigations indicate that soil affected with pesticides and PCBs is present on the Site. Information on the nature, source, and extent of contaminants is presented in the following sections.

2.6.1 Type, Source and Location of Contaminants

PCBs, above acceptable concentrations, were identified in proximity to some of the building structures in Areas 3, 9, 10, 12, and 13, specifically, as indicated by Excavation Areas #1 through #8 on Figure 3. The source of PCBs in this area is not known, as transformers or other activities potentially associated with PCBs are not known to have been associated with this area. Potential origins were discussed in the PEA.

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[1] Please note that the volume reported in the PEA was a total of 1,017 yd^3 (995 yd^3 of PCB-affected soils and 22 yd^3 of pesticide-affected soils). Since the PEA was issued, and in preparation for the RAW, the boundaries of the PCB excavation were adjusted slightly, with the resulting total yardage estimate at 1,200 yd^3.

The pesticides were identified in the vicinity of Building 10 (Figure 2), specifically, as indicated by Excavation Area #9 on Figure 3. The source of pesticides in this area is not known; however, the soil sample was collected adjacent to a tree stump that may have been treated with pesticides.

2.6.2 Extent and Volume of Contamination

The extent and volume of affected soils, as discussed below, were based on data collected during the PEA investigation. Based on analytical data for the soil samples collected during the PEA soil and soil-gas investigation, alpha-chlordane, gamma-chlordane, and technical chlordane were detected in Site soils at concentrations above the residential CHHSL of 430 µg/kg, and Aroclor-1254 (PCB) was detected in Site soils at concentrations above the residential CHHSL of 89 µg/kg (PEA, Appendix A, Figures 5 and 6).

Figure 3 presented the areas of the Site excavated during implementation of the RAW. The estimated volume of affected soil to be removed was 1,200 yd^3.

2.6.3 Extent of Affected Soils

2.6.3.1 Pesticide-Affected Soil

The area of pesticide-affected soils is depicted on Figure 3 (Excavation Area 9). Concentrations of alpha-chlordane, gamma-chlordane, and technical chlordane above 430 µg/kg (the preliminary cleanup goal [PCG] for pesticides) were detected in shallow soil samples collected at the Site.

The pesticide-affected soil was found to be confined to an area approximately 20 feet long by 10 feet wide.

The vertical extent of pesticide-affected soil appears to be limited to the upper 3 feet, based on the pesticide concentration in soil sample SS-STRUCTURE-7-2.0'. It is noted that a deeper sample could not be collected at this location due to the presence of rock or other solid material just below the base of the 2 foot sample. As such, the excavation of soils to 3 feet is presumed to be the vertical extent of affected soils.

2.6.3.2 PCB-Affected Soils

The distribution of PCB-affected soils across the Site is shown on Figure 3 (Excavation Areas 1-8). PCB concentrations above 89 µg/kg (the PCG for PCBs) were detected in shallow soil samples collected at the Site.

Soils with PCB concentrations above 89 µg/kg were identified at multiple boring locations at depths of approximately 0.5 and 2 feet bgs. The areal limits of PCB-affected soils are distributed in multiple areas across the Site, as shown on Figure 3; in sum, the areas total approximately 16,000 square feet. PCB-

affected soils do not appear to extend very far below the surface. Removal to a depth of 2 feet bgs is recommended to remove the PCB-affected soils.

2.6.4 Volume of Affected Soils

ARCADIS estimated volumes of affected soils for both pesticide-affected soil and PCB-affected soils as presented below.

- ARCADIS estimated that approximately 22 yd^3 of pesticide-affected soil was present at the Site in a single area. The pesticide-affected area was approximately 200 square feet to a depth of 3 feet.
- ARCADIS estimated that a total of approximately 1,180 yd^3 of PCB-affected soils was present at the Site through eight excavation areas. The extent of PCB-affected areas total approximately 16,000 square feet to a depth of 2 feet

Confirmation soil samples were to be collected following soil removal activities. In the event that concentrations of COCs exceeding the PCGs were identified in confirmation soil samples collected following the planned excavation activities, additional soil would be removed and confirmation samples would be collected from the removal area.

2.7 Preliminary Cleanup Goals

Compounds were selected for cleanup goal development if they were identified in the PEA with greater than a 1×10^{-6} risk or an HI greater than 1. The following chemicals were selected for PCG development in soil:

- alpha-chlordane
- gamma-chlodane
- technical chlordane
- Aroclor-1254 (PCBs).

As alpha- and gamma- chlordane are components of technical chlordane, technical chlordane was considered the indicator chemical. The CHHSL of 430 µg/kg for chlordane was selected as the PCG for chlordane. The CHHSL of 89 µg/kg for PCBs was selected as the PCG for PCBs. Upon completion of the removal activity, a post-remediation risk assessment would be conducted on the final confirmation sampling data set to ensure that the cumulative risk from any detected analytes is at or below the target risk management range of 5×10^{-6} and that the cumulative HI from any detected analytes is at or below the non carcinogenic HI of 1.0. Because there are only two COPCs above the PCG, the CHHSL for each COPC is a

representative PCG (e.g., if there were 10 COPCs, theoretically, PCGs should be developed below the CHHSL such that the cumulative risk/hazard is below their respective targets).

3. Field Preparation

3.1 Contractor Selection and Scope

The contractor selected by Parsons (SMMUSD's school construction planning firm) for the soil removal activities was Innovative Construction Solutions (ICS). ICS was responsible for all work described in Section 7.0 of ARCADIS' RAW and all items referenced in the appendices, with the exception of the following, which were done by ARCADIS or others (as indicated):

- initial marking of excavation boundary
- soil sampling (confirmation, step-out and stockpile)
- laboratory sample pick up and analysis of soil samples (Positive Lab Service)
- air, dust, meteorological, and other environmental monitoring
- laboratory analysis of air filter samples (EMSL Analytical, Inc.)
- chain-of-custody
- photographic documentation

ICS's responsibilities included:

- obtaining permits for grading
- utility clearance
- maintenance of field logbooks/visitor's log
- Site security measures (chain-link fencing)
- excavation of affected soils
- dust suppression

- removal of affected soils to the proper off-site location
- maintenance of a decontamination area for trucks leaving the Site

3.2 Permitting

Permits for grading and construction of the Site for future school construction were obtained by the construction contractor. Site grading for construction and construction activities are not part of the scope of the RAW.

3.3 Health and Safety

All contractors were responsible for operating in accordance with the most current Occupational Safety and Health Administration (OSHA) regulations including 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, and 29 Code of Federal Regulations (CFR) 1926, Construction Industry Standards, as well as other applicable federal, state, and local laws and regulations.

On-site personnel had received 40 hour HAZWOPER training, and a site health and safety officer was on-site during excavation and removal activities. Each day, prior to the commencement of site activities, tailgate meetings were conducted to discuss work goals and address any health and safety concerns. A site specific Health and Safety Plan (HSP) was included as Appendix D of the RAW.

Air and dust monitoring was conducted throughout the removal activities in accordance with the RAW.

3.4 Field Work Preparation

Prior to equipment mobilization for the proposed removal action, Site preparation activities included site visits, boundary staking, sampling, demarcation of hot spots, utility connections or disconnections, and fencing installation.

Barrier privacy fencing was installed prior to beginning the excavation process to help ensure that all work areas were secure and safe. To ensure that trespassers or unauthorized personnel were not allowed near work areas, security measures included the following:

- Maintenance of a visitor's log. Visitors must have received prior approval from the Site Manager to enter the Site. In addition, visitors were not permitted to enter the Site without first receiving site-specific health and safety training from the Site safety coordinator.
- Installation of barrier fencing to restrict access to sensitive areas such as exclusion zones.

- Adequate security personnel on the Site to ensure that unauthorized personnel had no access to work areas and/or contaminated materials.

- Before leaving the Site, all personnel were required to sign out in the visitor's log.

- Maintenance of a safe and secure work area, including areas where equipment was stored or placed, at the close of each workday.

Persons requesting Site access were required to demonstrate a valid purpose for access and provide appropriate documentation to demonstrate they had received proper training required by the site-specific HSP.

Prior to the activities, Underground Services Alert (USA) was notified by ICS at least 48 hours prior to the start of invasive activities at the Site. Based on the utility review, subsurface utilities were identified and marked.

4. Soil Removal Action

Site investigation data indicated that PCBs and pesticides were present in soil at concentrations exceeding the PCGs. The most effective remedial action was established to be removal consisting of soil excavation and off-site disposal. The project proponent for this voluntary removal was SMMUSD.

Removal, transportation, and disposal activities were performed in accordance with applicable federal, state, and local laws, regulations, and ordinances. The work followed guidelines presented in the HSP in accordance with 29 CFR 1910.120 and 8 CCR 5192 requirements. Field personnel involved with removing and handling potentially contaminated soils were trained in accordance with OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standards (29 CFR 1910.120 and 8 CCR 5192).

Excavation was conducted under ARCADIS' supervision by a licensed general contractor certified in hazardous waste operations. Excavation and soil removal activities began on July 11, 2011 and ended on August 24, 2011. Soil was removed using conventional construction and earth moving equipment, such as a backhoe, an articulated front-end loader, excavators, and dump trucks. Soil removal activities included marking of the excavation boundaries, soil excavation, air, noise, and meteorological monitoring, confirmation sampling, soil stockpiling, waste profiling, off-site transportation, and equipment decontamination. These activities are described further below.

4.1 Delineation of Excavation Areas

The areal limits of nine excavations were previously delineated by ARCADIS as part of the PEA sampling activities and outlined in the RAW. The areas excavated were referred to as the "excavation areas." These

areas were marked as exclusion zones in the field with stakes and high visibility paint. The excavation areas are illustrated on Figure 3.

4.2 Removal Action Activities

Removal action activities began on July 11, 2011 and continued through August 24, 2011. Soil was removed using conventional construction and earth moving equipment, such as an articulated front-end loader, small and large excavators (for limited access and open areas, respectively), and dump trucks. The majority of the excavation was conducted using an excavator. No stained or discolored soils were observed during excavation activities.

A copy of the daily notes and representative photographs are presented in Appendix A.

4.2.1 Initial Excavations

Excavation of soils at the Site was completed by area. The soil removal activities began with Excavation Area 9, and continued to Areas 6, 8, 3, 5, 4, 1, 2 and 7. With the exception of Excavation Area 5, the largest excavation, each excavation was completed within a couple days, depending upon the complexity of utility locations and other site features (e.g. stairwells, buildings, existing trees, etc). Due to the size of the Area 5 excavation, for discussion and sampling purposes, it was divided into four sections referred to as Areas 5A, 5B, 5C, and 5D. These subareas are shown on Figure 4c.

Affected soil was loaded onto plastic (visquene) covered areas immediately adjacent to the excavation to ensure that the affected soil was not mixed with clean surface soil. Stockpile management is discussed in Sections 4.4 and 4.5. Water was sprayed in the excavation areas to provide dust control. Dust monitoring was conducted during excavation activities. Air, dust, and meteorological monitoring are discussed in Section 4.6.

A summary of the different areas, the contaminant of concern, approximate excavation depth (planned and final), the contaminant of concern, and Figure number showing the excavation area with the confirmation sampling results is provided below.

Excavation Area (EA)	Contaminant of Concern	Planned Excavation Depth (feet)	Final Excavation Depth [of deepest portion] (feet)	Figure of Confirmation Sampling Results
1	PCBs	2	2	Figure 4a
2	PCBs	2	3	Figure 4a
3	PCBs	3	4	Figure 4b
4	PCBs	2	2	Figure 4b

Excavation Area (EA)	Contaminant of Concern	Planned Excavation Depth (feet)	Final Excavation Depth [of deepest portion] (feet)	Figure of Confirmation Sampling Results
5A	PCBs	2	2	Figure 4c
5B	PCBs	2	2	Figure 4c
5C	PCBs	2	2	Figure 4c
5D	PCBs	2	4	Figure 4c
6	PCBs	2	2	Figure 4d
7	PCBs	2	2	Figure 4e
8	PCBs	2	4	Figure 4f
9	Pesticides	3	3	Figure 4f

Confirmation soil samples were taken after the initial excavation to evaluate the residual concentrations of PCBs and pesticides in soils. If concentrations of PCBs or pesticides were above their respective PCGs, additional soil excavation was conducted. Confirmation sampling included the collection of "Excavation Floor (EF)" samples (e.g. bottom samples) as well as "Excavation Side Wall (ESW)" samples. In some cases, ESW were not collected as excavation sides bordered hardscape (e.g, sidewalks, retaining walls, buildings, etc).

4.2.2 Additional Excavations

Additional excavation was performed as needed based on analytical results for the confirmation samples. For example, an additional foot of soil was removed from portions of Excavation Areas 2 and 5 and from the entirety of Excavation Areas 3 and 8. Confirmation samples were again collected upon completion of the additional removal. Based on the results of these confirmation sampling results, another foot of soil was excavated from a portion of Excavation Area 8 to a final excavation depth of 4 feet. In two areas, Excavation Areas 2 and 5B, additional lateral excavation was required due to the elevated concentrations of the COC in sidewall samples. Due to the shallow depth of the excavation areas (e.g., 2 to 4 foot bgs), shoring and/or sloping were not required for worker safety or to maintain lateral support of structures.

Excavation was deemed complete vertically when excavation floor samples were below PCGs and was deemed complete laterally when excavation sidewall samples were below PCGs. Excavation bottom and sidewall confirmation sample locations are discussed more fully in Section 4.3 and are shown on Figures 4a through 4f. Confirmation sample analytical results are presented in Tables 1 and 2.

The total volume of soil excavated during this removal action was approximately 1,179 cy, based on the calculation calculated area and depth, and a total mass of approximately 1,158 tons according to the waste manifests.

4.2.3 Tree Samples

Prior to initiation of removal activities in Area 5, ARCADIS was asked to collect additional samples in the vicinities of several trees in Area 5 to more tightly delineate the affected soils and see whether the excavation in the vicinity of several mature trees (not located within the planned excavation but close to the planned excavation) could be moved back to help ensure the safety of the trees. The root ball could be less affected by remedial activities if it were deemed that affected soils did not encroach the vicinity of the rootball. ARCADIS collected additional samples in the vicinity of these trees; ARCADIS initially submitted tree samples in the vicinity of the two closest trees (termed T-3 and T-4) for analysis. The other tree samples (T-1 and T-2) were placed on hold pending confirmation samples and would have been submitted if the excavation area had required expansion (which it did not). Sampling results indicated that soil located approximately 5 feet south of Tree 4 was elevated. Additional soil within this area was excavated (to a depth of 4 feet bgs). Confirmation sampling results for the tree samples are also shown on Figure 4C and data is presented in Table 1.

4.3 Confirmation Sampling

After removal of the affected soils within the excavation area, soil samples were collected from the sidewalls and floor of the excavation in accordance with the RAW to confirm that residual concentrations of COPCs were less than PCGs. Confirmation soil samples were collected from shallow excavations using hand sampling equipment and samples were placed in a 4-ounce laboratory grade glass sampling jar.

Field sampling protocols outlined in the RAW were followed. Soil samples were temporarily stored on-site in a cooler filled with ice prior to delivery to (or, in some cases, pick up by) Positive Lab Service, a state certified laboratory. Samples were delivered to the laboratory on the same day collected, if time permitted, and no later than one workday following collection. In the event that samples were delivered the day after they were collected, the samples were secured under proper chain-of-custody documentation with ARCADIS's representative until delivery.

Soil samples were analyzed for organochlorine pesticides using EPA Method 8081A or PCBs using EPA 8082. Samples collected from the excavations were analyzed on a rush turnaround basis by the analytical laboratory to assist in field decisions. Confirmation sampling results are presented in Tables 1 and 2, for PCBs and pesticides, respectively.

A copy of the laboratory reports associated with the confirmation sampling is presented in Appendix B.

4.3.1 Excavation Bottom Samples

The confirmation samples from the bottom of the excavation area (termed “excavation floor samples” herein) were collected in accordance with the RAW. The number of floor samples was based on the size of the excavation area, a total of 28 excavation bottom confirmation samples were collected. Figures 4a through 4f shows the locations of the confirmation soil samples. If laboratory analytical results for the confirmation soil samples indicated that soils in a particular location had a concentration above the cleanup goal, an additional foot of soil was removed from the surrounding floor and the area was re-sampled (in other words, if an Excavation Area had 2 confirmation floor samples and one of them was elevated above the PCG, approximately half of the excavation area was re-excavated by another foot to remove additional soils and was subsequently resampled).

Based on the sampling results, the following Excavation Areas required additional excavation:

- A concentration of PCBs (Aroclor 1254) above the PCG was detected in one bottom soil sample in Excavation Area 2 (CS-EA2-3-EF-2’). An additional foot of soil was removed from this location, and the area was re-sampled from a depth of approximately 3 feet bgs. No detectable concentrations of PCB analytes were detected in the deeper sample (CS-EA2-3-EF-3’) collected from this area.

- A concentration of PCBs (Aroclor 1254) above the PCG was detected in one bottom soil sample in Excavation Area 3 (CS-EA3-EF-1-3’). An additional foot of soil was removed from this location, and the area was re-sampled from a depth of approximately 4 feet bgs. No detectable concentrations of PCB analytes were detected in the deeper sample (CS-EA3-EF1-4’) collected from this area.

- A concentration of PCBs (Aroclor 1254) above the PCG was detected in one bottom soil sample in Excavation Area 5B (T-4-5’S-2’). An additional foot of soil was removed from this location, and the area was re-sampled from a depth of approximately 3 feet bgs. Lower but still elevated PCB concentrations (Aroclor 1254 and Aroclor 1260) still remained. Additional soil was removed and the area was again re-sampled from a depth of 4 feet bgs. Concentrations of PCB analytes in this sample (T-4-5’S-4’) were below the PCGs.

- A concentration of PCBs (Aroclor 1254) above the PCG was detected in the two bottom soil samples in Excavation Area 8 (CS-EA8-EF1-2’ and CS-EA8-EF2-2’). An additional foot of soil was removed from this location, and the area was re-sampled from a depth of approximately 3 feet bgs. No detectable concentrations of PCB analytes were detected in 1 of the 2 deeper samples (CS-EA8-EF2-3’) collected from this area. Additional soil was removed from the area with the still elevated concentration and the area was again re-sampled from a depth of 4 feet bgs. Concentrations of PCB analytes in this sample (CS-EA8-EF1-4’) were below PCGs.

4.3.2 Sidewall Samples

One soil sample was collected for approximately each 50 feet of excavation sidewall, or in smaller excavations, one excavation sidewall sample was collected per (accessible) side. Based on the size of the excavation areas, a total of 24 sidewall confirmation samples were collected. Figures 4a through f shows the locations of the confirmation soil samples. In only one location was the original sidewall confirmation contained a concentration above the PCG. Within Excavation Area 2, the initial sidewall sample (CS-EA2-1-ESW-1') was above the PCG. Additional soil was removed and the area was resampled. Concentrations of PCB analytes in this sample (CS-EA2-2-ESW-1') were below PCGs.

Note that in some areas, confirmation sidewall samples were not deemed applicable due to hardscape limitations (e.g. building wall, concrete sidewalk, stairwell, etc) along the excavation perimeter(s). Confirmation sidewall samples were not collected in Excavation Areas 1, 3, 7 and 8 for these reasons. Confirmation sampling results are presented in Tables 1 and 2.

If a particular sample was excavated due to an elevated detection of an analyte, and then resampled, the original sample was no longer considered to be a 'confirmation sample'; instead, the re-sample result is considered the confirmation sample. Excavation continued laterally or vertically until analytical results indicated that the target analytes had concentrations below their respective PCGs.

4.4 Soil Staging and Storage Operations

Excavated soils were segregated and stockpiled on the Site prior to off-site disposal.

Soils were stockpiled in locations immediately adjacent to the excavation area. Plastic sheeting (visqueen) was placed underneath all stockpiles to ensure that cross-contamination of soils did not occur. No mixing of soils occurred during stockpiling activities.

As soil was excavated, it was temporarily stored at on-site staging areas prior to off-site transportation and disposal. At the staging areas, excavated soil was placed on an impermeable barrier and covered with tarps to prevent run-on or run-off and/or dust generation. No excavated soil was placed outside of the exclusion zone. The excavation area was secured with chain-link fencing, and water was used to control any fugitive dust.

Soil was segregated into stockpiles on the basis of the location from which it was excavated in order to avoid mixing potentially hazardous soils with non-hazardous soils in the event that confirmation soils identified any anomalies. Soils excavated from within the excavation boundary were considered and treated as potentially hazardous waste pending receipt of analytical results.

Direct loading of affected soils from stockpiles to trucks took place after the excavation operations in a particular area had ceased. Loaders accessed the stockpiles from outside of the excavation area, yet from within the chain-link-fenced exclusion zone.

The soil staging process was monitored to ensure that visible dust was not created. The stockpiles were routinely sprayed with water to reduce dust generation. Trucks were parked on the street just outside the excavation area. The base of the "truck loading area" was plastic-lined to prevent soils from potentially being carried off-site by vehicles exiting the Site. Stockpiles of excavated soil were covered with plastic sheeting during non-excavation hours.

4.5 Stockpile Profiling

ICS utilized data collecting during the course of the PEA investigation for waste characterization purposes. At ICS's request, an additional sample for Excavation Area 9 was requested to characterize the soluble concentration (e.g. lead soluble threshold limit concentration [STLC]) based on a previous total lead result at that location (e.g. the lead result was acceptable from a "leave in place" standpoint (e.g. 57.4 mg/kg) but required an additional analysis since soil from this location was being removed based on the presence of elevated concentration of chlordane. Just prior to the start of excavation activities (e.g. July 8, 2011), ARCADIS collected a soil sample from the same location the previously collected sample and submitted it initially for analysis of total lead by EPA Method 6010B. The result of this sample was 7.00 mg/kg. As such, the additional analysis for STLC was not required.

Based on the soil profile submitted by ICS, soil was accepted for disposal as non-hazardous at Chiquita Canyon Landfill in Castaic, California. As such, during the course of the remedial activities, stockpiled soil was transported to Chiquita Canyon for disposal. Transportation of soils is discussed in detail in Section 4.7.

4.6 Decontamination

Equipment that entered the exclusion zone was decontaminated prior to leaving the Site. Soil sampling equipment was also decontaminated at the end of use. Entry to the affected areas was limited to avoid unnecessary exposure and related transfer of contaminants. Decontamination of the excavator, loader, dump trucks, and sampling equipment was conducted as follows.

4.6.1 Construction Equipment Decontamination

Vehicles and construction equipment utilized within the exclusion zone were scraped clean on top of Visqueen at the conclusion of soil removal activities. All excavation equipment utilized in the removal action was decontaminated at this location inside the exclusion zone prior to leaving the Site. Equipment was scraped with metal rods and brushes to remove soils. Soil that remained on the Visqueen after decontamination activities was transported off-site to Chiquita Canyon Landfill.

4.6.2 Truck Decontamination

A truck loading area was located at the western edge of the Site adjacent to the border of the exclusion zone along Morning View Drive. Trucks used for hauling soil to the disposal facility parked at the loading area, where soils from the stockpiles were loaded into the vehicle. The loading area was plastic-lined to ensure that not affected soils were dropped during the transfer of the soil from the excavator to the truck and ensure that trucks leaving the Site would not carry dirt on their tires off-site. This area was kept clean at all times during soil removal activities. It was unnecessary to spray/brush off soil disposal truck tires before leaving the Site due to the fact that the truck tires never came in contact with Site soils.

4.6.3 Sampling Equipment Decontamination

Disposable equipment intended for one-time use (i.e., personal protective equipment [PPE]) was not decontaminated, but was packaged for appropriate disposal. No other sampling equipment requiring decontamination was used at the Site.

4.7 Transportation for Off-site Disposal

Transportation of soil to the disposal facility occurred over 9 days between July 15 and August 24, 2011. The waste material was profiled and approval was received before any off-site transportation activities commenced (additional discussion provided in section 4.5 above). Based on analytical results of the investigation samples, the soil excavated from the Site was classified as non-hazardous soil. Final determination of the landfill used for disposal was based on approval from the landfill. The material is slated for roadbase at the landfill. It should be noted that while PCB or pesticide concentrations were elevated to be considered a concern from a health perspective if left in place based on conservative assumptions of ingestion, inhalation, and dermal contact, they were below levels deemed hazardous in the context of established hazardous waste criteria.

All excavated pesticide- and/or PCB affected soils were transported to the Chiquita Canyon Landfill in Castaic, California. A total of 48 truckloads of pesticide- and/or PCB-affected soil were removed from the Site and transported to this landfill. Copies of soil shipping documents, including the waste profile, are provided in Appendix C.

Vehicles followed the transportation routes described in the Transportation Plan presented in the RAW.

4.8 Air Monitoring, Meteorological Monitoring, and Contaminant Control

This section details the air and meteorological monitoring strategy and methodologies that were used during the soil removal action. The strategy and methodologies were designed to achieve several goals:

- Identify and measure the air contaminants generated during the soil removal and decontamination activities to assign the appropriate PPE and safety systems specified for those activities.

- Provide feedback to Site operations personnel regarding potential hazards from exposure to hazardous air contaminants generated through Site activities.

- Identify and measure air contaminants at points outside of the soil removal and decontamination exclusion zones. Air monitoring was conducted during work activities to measure potential exposure of sensitive receptors to Site chemical constituents, as a result of removal activities.

At the time that the removal action took place, the Site and surrounding areas were not occupied as the school was on summer break.

SMMUSD took all appropriate steps to minimize impacts to the community. Strict dust suppression control measures and air monitoring procedures were implemented during excavation activities at the Site.

4.8.1 Dust Suppression

Liberation of dust during the removal operations was minimized with the use of water as a dust suppressant. The water was available continuously and used liberally. ICS controlled dust generation by spraying water prior to daily work activities, during excavation/loading activities (to maintain concentrations below action levels), and at the truck staging location.

4.8.2 Air Monitoring

In accordance with the RAW, air monitoring was performed during Site activities in which affected or potentially affected materials were being disturbed or handled. ARCADIS staffed the Site with a qualified air monitoring/health and safety professional to conduct air monitoring which included real time dust monitoring, analyte specific monitoring, as well as meteorological monitoring to ensure that operations were not being conducted in periods of elevated wind, if any.

Air Monitoring Strategy and Methodologies

Air monitoring consisted of two types of monitoring: real-time total dust monitoring and monitoring of target analytes. Because monitoring of target analytes required the collection of filter samples and subsequent laboratory analysis, this data was not available real-time. However, air samples were submitted to the laboratory with the request for expedited/rushed analysis in an effort to understand if any detected analytes were encountered sooner than later such that modifications to the program could be made, if necessary.

ARCADIS monitored real time dust levels using data rams (personal data recorders [PDRs]) in the following general locations:

- one (1) upwind fence line location
- proximate to the exclusion zone
- one to two (2) downwind fence line locations depending upon the size of the Excavation Area

Additionally, ARCADIS conducted the analyte-specific monitoring by placing a personal air monitor (PAM) on the excavator operator in the area. One filter sample per day of field activities was collected with the exception of the day that excavation occurred in both the pesticide- and PCB-affected areas, in which case, two filters were collected. Additionally, two filters were collected from one of the initial field days where multiple excavators operated within Area 5. In excavation areas 1 through 9, the filters were analyzed for PCBs while in Excavation Area 9, the filters were analyzed for chlordane.

The following three monitoring activities were conducted during removal activities at the Site:

Dust Monitoring

Dust levels were monitored in the exclusion zone and other locations. The Site air monitoring professional had the authority to stop work in the event that on-site activities generated dust levels that exceeded site-specific or community action levels.

In accordance with the RAW, ARCADIS implemented appropriate procedures to control the generation of airborne dusts by soil removal activities. Such procedures included the following:

- The Site air monitoring professional monitored dust levels in the locations outlined above The Site air monitoring professional had the authority to stop work in the event that on-site activities generated dust levels in excess of the on-site or community/fence line action levels. Dust monitoring levels were measured and recorded every minute.

- As indicated previously, the air monitoring professional monitored on-site meteorological instrumentation during all excavation and stockpile removal activities. The plan in place stated that all removal activities would cease in the event wind conditions changed, creating an uncontrollable condition; however, none of the conditions encountered warranted a cessation of operations.

Total dust levels were monitored throughout the entirety of the excavation and removal activities. Dust concentrations were below the action level, established in the RAW, of 0.25 milligrams per cubic meter (mg/m^3).

Real-time dust monitors and industrial hygiene air sampling equipment and media were properly calibrated and in good working condition. Real-time, data-logging personal data rams were used to continuously measure dust levels. Real-time information was discussed daily with site workers.

PCB and Pesticide (Chlordane) Monitoring

ARCADIS documented airborne concentrations of PCBs and pesticides (specifically, chlordane) in the vicinity of the excavation as necessary to establish employee exposure conditions. ARCADIS used OSHA/NIOSH approved methods to collect and analyze the samples. Filter samples were collected daily and sent to EMSL in Westmont, New Jersey via FedEx for expedited analysis.

As analytical results for industrial hygiene samples (using NIOSH Method 5510 for Chlordane analysis and NIOSH Method 5503 for PCB analysis) were received, the air monitoring professional discussed results with on-site management and workers.

All air filter samples analyzed resulted in non-detect for PCBs and pesticides (chlordane). Air monitoring laboratory data sheets, including a summary sheet, are provided in Appendix D.

4.8.3 Meteorological Monitoring

As outlined in the RAW, the air monitoring professional monitored on-site meteorological instrumentation and coordinated with contractors if conditions that required cessation of work (i.e., winds in excess of 25 miles per hour [mph]) were encountered. On-site ambient weather conditions (wind speed, wind direction, and relative humidity) were monitored by the on-site meteorological station. Wind speeds did not exceed 25 mph during the course of remedial activities.

On-site meteorological monitoring was performed simultaneously with the excavation activities to ensure that all necessary precautions had been taken

4.9 Backfill and Site Restoration

SMMUSD's contractor ICS backfilled soils with imported base materials. Prior to import, ICS had 5 soil samples from the proposed 1500 cy of import material collected and submitted to CAPCO Analytical Services for analysis. In accordance with DTSC fill material guidance documents, samples were analyzed for VOCs by EPA Method 8260B, Semivolatile Organic Compounds (SVOCs) by EPA Method 8270C, TPH by EPA Method 8015M, PCBs by EPA Method 8082, heavy metals by EPA Method 6010B/7471 and Asbestos. ARCADIS reviewed the results (Appendix E) and based on the review and comparison to regulatory criteria (e.g. CHHSLs), found that the material was acceptable. Based on this information, ICS proceeded with importing the material and backfilling the excavations.

Additionally, prior to import of topsoil, ARCADIS was requested to conduct import sampling at two proposed fill sites. Based on analytical data reviewed for a sample collected from the first import site (located in Sylmar, California), ARCADIS recommended that the import material be rejected (although the analytes detected in the proposed import were below regulatory criteria such as CHHSLs, it did contain detectable concentrations of target analytes, specifically pesticides and PCBs. While such concentrations would be considered acceptable in site soils if already present, it does not make sense to backfill a remedial excavation with less than "clean" soils. As such, ARCADIS recommended that a second import site be identified). ARCADIS collected samples from the second import site (Agromin in Port Hueneme, California) on August 5, 2011 and submitted the samples to Positive for analysis of pesticides, herbicides, PCBs, SVOCs, TPH, VOCs and metals. Based on a review of the analytical results, ARCADIS determined that the top soil was deemed acceptable for import. ICS coordinated import and backfilled the remaining excavations with the top soil from Agromin.

Analytical results of the selected import top soil material is included in Appendix B.

4.10 Field Documentation

SMMUSD's contractor (ICS) was responsible for maintaining a field logbook during the removal action activities at the Site. The field logbook served to document observations, personnel on the Site, equipment arrival and departure times, and other vital project information. The field logbooks are currently stored at ICS. ARCADIS also recorded detailed notes for each day of site activities (included as Appendix A).

4.10.1 Field Logbooks

Field logbooks document where, when, how, and from whom any vital project information was obtained. Logbook entries were complete and accurate enough to permit reconstruction of field activities. Logbooks were bound with consecutively numbered pages. Each page was dated, and the time of entry was noted in military time. All entries were legible, written in ink, and signed by the individual making the entry. Language was factual, objective, and free of personal opinions or other terminology which might prove inappropriate. If an error was made, corrections were made by crossing a line through the error and entering the correct information. Corrections were dated and initialed. No entries were obliterated or rendered unreadable.

Entries in the field logbook included, at a minimum, the following information for each fieldwork date:

- Site name
- recorder's name
- team members and their responsibilities
- time of arrival/entry on the Site and time of departure from the Site
- summary of any on-site meetings

- estimated quantity of affected soils temporarily stored on-site
- quantity of excavated soils in truckloads transported off-site
- names of waste transporters and proposed disposal facilities
- copies of manifests or other shipping documents (such as bill of lading) for waste shipments
- deviations from this RAW and site-specific HSP
- levels of safety protection
- calibration readings for any equipment used, along with equipment model and serial number

ARCADIS conducted all confirmation sampling at the Site. At a minimum, the following information was recorded during the collection of each sample:

- sample identification number
- sample location and description
- Site sketch showing sample location and measured distances
- sampler's name(s)
- date and time of sample collection
- designation of sample as composite or grab
- type of sample (i.e. matrix)
- type of preservation
- type of sampling equipment used
- field observations and details important to analysis or integrity of samples (e.g., heavy rains, odors, colors, etc.)
- instrument readings (e.g., PDR, calibrations, etc.)
- chain-of-custody form numbers and chain-of-custody seal numbers
- transport arrangements (courier delivery, laboratory pickup, etc.)
- recipient laboratory(ies)

4.10.2 Chain-of-Custody Records

Chain-of-custody records are used to document sample collection and shipment to the laboratory for analysis. All sample shipments for analyses were accompanied by a chain-of-custody record. Form(s) were completed and sent with the samples for each laboratory and each shipment. The chain-of-custody record identified the

contents of each shipment and maintained the custodial integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up or kept in a secured area that is restricted to authorized personnel. Until receipt by the laboratory, the custody of the samples was the responsibility of the sample collector. Chain-of-custody forms for air samples and soil samples are provided in Appendices B and D, respectively.

4.10.3 Photographs

Photographs were taken at the excavation area and other areas of interest on the Site. They serve to verify information entered in the field logbook or daily. When a photograph was taken, the following information was written in the logbook or was recorded in a separate field photography log:

- time, date, and location
- description of the subject photographed

Representative photographs are provided in Appendix A. The remaining photographs are located in the project file.

4.11 Quality Assurance Project Plan

QA/QC measures that were used during project execution were described in the QAPP (see Appendix E of the RAW). The QAPP assures that field and analytical data collected for the Site meet project Data Quality Objectives (DQOs) and RAOs to support decisions for development of the subject property as a school site. All DQOs were met for this removal action.

4.11.1 Field Duplicate Samples

A total of six duplicate samples were collected during collection of confirmation samples for PCB analysis.

4.11.2 Laboratory QA/QC Procedures

QA/QC procedures established by the analytical laboratory were used for this project. ARCADIS performed a level-three data validation on the analytical results associated with the confirmation sampling.

Data for these QC samples were reviewed as part of the data validation process, along with laboratory QC results. Each sample was analyzed for either PCBs or pesticides. Data from each of the analyses were evaluated in the following areas:

- data completeness
- holding times

- blanks
- laboratory control standards
- matrix spike/matrix spike sample duplicates
- field duplicates/confirmatory samples
- compound identification and quantification

The following section describes ARCADIS' data evaluation procedures in detail. Laboratory analytical reports and chain-of-custody documentation for the soil and air filter samples are included in Appendices B and D, respectively.

4.11.3 ARCADIS' Validation Procedures

ARCADIS reviewed the laboratory data to address/ensure that the above QA/QC procedures met prescribed standards, to ensure that project analytical data are of reliable and comparable data quality.

Internal data validation is performed on all project analytical data when the final laboratory report is received by ARCADIS. The data validation includes a data completeness review of each data package, and a review of QA/QC parameters to ensure that all project analytical data are of reliable and comparable data quality. Specifically, the following QA/QC parameters are reviewed:

- Data Completeness: Data were reviewed for completeness. The chain-of-custody forms for samples submitted to the laboratory were reviewed to make sure that analytical results were received for all samples submitted and all analyses requested. Based on a review of the chain-of-custody forms and the analytical data received, all samples submitted were analyzed using the indicated analyses.
- Holding Times: Analytical data were reviewed to ensure that holding times were met for all samples analyzed. Based on a comparison of the sample extraction dates to the sample collection dates, all samples were analyzed within the specified holding times.
- Laboratory Method Blanks: No pesticides or PCBs were detected in any of the laboratory method blanks.
- Laboratory Control Standards: In accordance with standard laboratory procedures, Positive Lab Service (for soil samples) and EMSL (for air cartridge samples) runs laboratory control standards (called "LCS" or "Laboratory Check Samples") in which sample blanks are spiked with a known concentration of a particular analyte and the recovery of the analyte is compared to the known concentration originally added, thereby providing measure that the laboratory can accurately assess the particular analyte concentration. Laboratory reports were reviewed for specified analytes. All control standards were within their acceptable limits, unless otherwise noted.
- Matrix Spike/Matrix Spike Sample Duplicates: In accordance with standard laboratory procedures, Positive Lab Service runs additional laboratory quality control procedures called "Matrix Spike/Matrix

Spike Duplicate" (MS/MSD). A site sample is spiked with known concentrations of particular analytes and the recovery of the analytes is compared to the known concentrations added, thereby providing measure that the laboratory can accurately assess the particular analyte concentration in a similar sample matrix. Laboratory reports were reviewed for specified analytes. All matrix spike samples were within their acceptable limits, unless otherwise noted.

- Field Duplicates/Confirmatory Samples: Specific duplicate RPDs for PCBs and pesticides are summarized at the end of Tables 1 and 2. For the confirmation samples collected during July and August 2011, RPDs were all 0%. Based on recent communications with DTSC, an RPD range for soils is considered acceptable if it is within 100 percent (due to the non-homogeneity of soils). Furthermore, the non-homogeneity of soil samples and the method by which the duplicate soil sample was collected can account for an exceedance of 100 percent of the RPDs, although no samples exceeded 100 percent during this sampling event.
- Based on a review of the above parameters, all of the data collected at the Site have been deemed valid and acceptable for use in the risk evaluation presented herein complete or potentially complete exposure pathways.

5. Variances to the RAW

As conditions in the field varied, it became necessary to implement minor modifications to the soil removal activities presented in the RAW. Field personnel notified the Project Manager when deviations from the RAW were necessary. The client was also immediately notified of the modification. Modifications to the RAW were documented in the field logbook, and included the following:

- Prior to initiation of removal activities in Area 5, ARCADIS was asked to collect additional samples in the vicinities of several trees in Area 5 to more tightly delineate the affected soils and see whether the excavation in the vicinity of several mature trees (not located within the planned excavation but close to the planned excavation) could be moved back to help ensure the safety of the trees. The root ball could be less affected by remedial activities if it were deemed that affected soils did not encroach the vicinity of the rootball. ARCADIS collected additional samples in the vicinity of these trees; ARCADIS initially submitted tree samples in the vicinity of the two closest trees (termed T-3 and T-4) for analysis. The other tree samples (T-1 and T-2) were placed on hold pending confirmation samples and would have been submitted if the excavation area had required expansion (which it did not).

- Based on confirmation sample results, additional excavation was required in 7 distinct locations. Additional soils were excavated in these locations, following all of the same methologies utilized for the primary excavations, and resampled until confirmation samples were below PCGs.

- Confirmation sidewall samples were conducted in accordance with those outlined in the RAW with the following four exceptions:

- Area 1 - Although two confirmation sidewall samples were proposed in the RAW, none were deemed relevant as all excavation sides bordered hardscape. As such, excavation floors samples were the only confirmation samples collected in this area.

- Area 2 - Although four confirmation sidewall samples were proposed in the RAW (e.g. one per excavation side), two were deemed not relevant as two excavation sides bordered hardscape. As such, only two confirmation sidewall samples were collected in this area.

- Area 4 - Although 1 confirmation sidewall samples was proposed in the RAW, an additional side was not bordered by hardscape and as such, an additional sidewall sample was collected upon completion of excavation activities.

- Area 6 - Although no confirmation sidewall samples were proposed in the RAW, one side was not bordered by hardscape and as such, a confirmation sidewall sample was collected upon completion of excavation activities.

- Import sampling was conducted for the bulk of the soils by ICS or ICS's contractors. ARCADIS was asked to review the confirmation sampling data and compared it to CHHSLs. Based on this review, ARCADIS deemed it acceptable for import. Additionally, although not specifically outlined in the RAW, ARCADIS was asked to evaluate two potential import sites. ARCADIS collected samples from these two potential import sites in accordance with DTSC's fill material guidance. Based on a review of the analytical data, import material from the first site was rejected while import material from the second site was accepted. Import material from this second site was used for import of topsoil.

6. Post-Removal Risk Evaluation

Upon completion of remedial activities, a human health risk screening was performed to provide an estimate of potential chronic (long-term) human health risks that may be associated with soil at the Site considering removal of the affected soils. Both carcinogenic and non-carcinogenic risks were estimated using the methodology presented in the PEA Guidance Manual (DTSC 1999). For completeness, the confirmation sampling data as well as relevant analytical data from the PEA field investigation (e.g. any data associated with soil that still remains at the Site) were used for this evaluation. As the removal affected only pesticide and PCB datasets, two datasets were used for pesticides and PCBs (e.g. PEA and confirmation sampling datasets) while only the PEA dataset was used for evaluating the remaining COPCs (e.g., metals in soil and VOCs in soil vapor).

Per PEA guidance, land use of the Site was assumed to be residential, which represents a conservative land use scenario for continued school use. Complete exposure pathways included: (1) inhalation of airborne dust or volatile constituents from affected media, (2) ingestion of site soil, and (3) dermal absorption from direct contact with soil under a residential scenario.

The evaluation was conducted using the analytical models provided in the PEA Guidance Manual, which are structured to provide a conservative estimate of the chronic risk from affected media along exposure pathways that are most frequently encountered in a residential setting. The default factors contained in the analytical models are conservative in nature and represent a reasonable maximum exposure to COPCs as defined by USEPA. The screening-level evaluation was conducted for each chemical detected in site soils (non-metals) or at concentrations above local background concentrations (metals). The results of the human health screening evaluation are summarized below.

6.1 Exposure Scenarios

Under the residential scenario, the conservative receptor scenario considered for a school Site, the receptors are assumed to be exposed 24 hours per day, 350 days per year, for 30 years, for the reasonable maximum exposure (RME) case (i.e., 6 years for a child and 24 years for an adult; DTSC 1999). The residents are assumed to be exposed via inhalation of airborne particulate emissions from the Site. Inhalation rates of 0.83 cubic meters per hour (m^3/hr) for a 24-hour day (i.e., 20 cubic meters per day [m^3/day]) for an adult resident and 0.43 m^3/hr for a 24-hour day (i.e., 10 m^3/day) for a child resident were used for the residents' evaluations, as recommended by DTSC for the RME case.

The residents are also assumed to be exposed via incidental ingestion and direct dermal contact with soil at the Site. Ingestion rates of 100 milligrams per day (mg/day) for an adult resident and 200 mg/day for a child resident were used for the resident evaluations, as recommended by DTSC for the RME case. Exposed skin surface areas of 5,800 square centimeters per day (cm^2/day) for an adult resident and 2,000 cm^2/day for a child resident were used for the residential evaluations, as recommended by DTSC for the RME case. The default value for soil-to-skin adherence factor of 1 milligram per square centimeter (mg/cm^2) was used in the residential evaluations for direct dermal exposure. The adult resident was assumed to be exposed to soil via the direct dermal route 2 times per week or 100 times per year. The child resident was assumed to be exposed to soil via the direct dermal route 7 times per week or 350 times per year. The average body weights of an adult resident and a child resident were assumed to be 70 kilograms (kg) and 15 kg, respectively.

6.2 Identification of COPCs

Each detected chemical (still present in site soils) was initially considered for the human health screening-level evaluation. COPCs were initially categorized by chemical group, including PCBs, pesticides, metals, and VOCs. The screening-level evaluation was conducted for each metal detected in site soil at concentrations above local background concentrations and CHHSLs. For all other analytes, the screening-level evaluation was conducted for each constituent detected above laboratory reporting limits.

6.2.1 PCBs

One PCB Aroclor (Aroclor-1254) was detected at the Site. Aroclor-1254 was considered a COPC and evaluated within the risk assessment. Both PEA and confirmation sampling datasets were considered (Table 1). Table 5 presents the Aroclor detected, as well as the maximum detected concentration in existing site soils.

6.2.2 Pesticides

All detected pesticides (4,4'-DDE, 4,4'-DDT, alpha-chlordane, gamma-chlordane, and technical chlordane) were considered COPCs and were evaluated within the risk assessment. Although alpha- and gamma-chlordane isomers were detected, only technical chlordane is being evaluated as it is inclusive of alpha- and gamma-chlordane, thereby not double counting the alpha- and gamma- isomers. Both PEA and confirmation sampling datasets were considered (Table 2). Table 5 presents the pesticides detected, as well as their maximum detected concentrations in existing site soils.

6.2.3 Metals

Although metals were detected in the PEA investigation, they were eliminated as COPCs in the PEA as they were within background concentrations and/or below CHHSL concentrations. The dataset is being included herein for completeness (Table 3); no metals are considered to be COPCs. The statistical evaluation of background metals was presented in the PEA.

Per DTSC guidance, lead was evaluated separately. DTSC recommends evaluating blood lead levels using the LeadSpread Model and/or comparing to the CHHSL updated in 2009 of 80 mg/kg. In the PEA, the 95% UCL lead concentration was compared to 2009 CHHSL, and found to be below 80 mg/kg. Therefore, it was not considered for further evaluation.

6.2.4 VOCs

Two VOC analytes (benzene and toluene) were detected during the PEA investigation at concentrations above the laboratory reporting limit in soil gas. Benzene and toluene were considered COPCs and were evaluated within the risk assessment for a complete assessment of total site risk (though it is noted that the area of remediated soils did not occur in the location where the low concentrations of VOCs were previously detected). The DTSC version of the Johnson and Ettinger model was used to estimate indoor air concentrations resulting from vapor intrusion of benzene and toluene. A copy of the Johnson and Ettinger model was included in the PEA. Table 5 presents the VOCs, as well as their maximum concentrations.

6.2.5 Summary of COPCs

COPCs for the screening risk evaluation included PCBs (Aroclor 1254), pesticides (4,4'-DDE, 4,4'-DDT, and technical chlordane), and VOCs (benzene and toluene). These soil and soil vapor COPCs were included in the evaluation of chronic health risk from the ingestion, dermal contact, and inhalation pathways.

In summary, the PCBs, pesticides, and VOCs detected at the Site during the PEA and/or (the post-remedial) confirmation sampling investigation are considered COPCs and will be evaluated in this human health screening evaluation. These chemicals are presented in Tables 5 and summarized below:

Soil and Soil Vapor COPCs	
Pesticides	4,4'-DDE
	4,4'-DDT
	Technical Chlordane
PCBs	Aroclor-1254
VOCs	Benzene
	Toluene

6.3 Exposure Point Concentrations

Per DTSC PEA guidance, the maximum detected concentrations of COPCs were used in the exposure scenario evaluated in the human health screening evaluation. Maximum site concentrations are presented in Table 5.

Air concentrations from soil COPCs were estimated from the equation shown on Figure 2.8 of the PEA Guidance Manual and are shown on Tables 8 and 9. The equation states that the concentration in air is equal to the concentration in soil multiplied by 5.0×10^{-8} kilograms per cubic meter (kg/m^3).

6.4 Toxicity Values

The toxicity values for COPCs are summarized in Tables 6 and 7. The cancer slope factor values for COPCs were obtained from the CalEPA Office of Environmental Health Hazard Assessment's Toxicity Criteria Database in May 2012. The reference dose values for COPCs were obtained from the USEPA's

Integrated Risk Information System database (EPA 2012) and EPA's Regional Screening Levels (EPA 2012).

6.5 Risk and Hazard Characterization

The screening evaluation estimated a risk or hazard for soil and air pathways for each selected COPC at the Site. The equations presented on Figures 2.3 and 2.4 of the PEA Guidance Manual (DTSC 1999) were used in the risk and hazard estimations for nonvolatile COPCs. The Johnson and Ettinger model was previously used in the risk and hazard estimations for volatile COPCs (and was presented in the PEA).

Carcinogenic risk and noncarcinogenic hazard characterization are summarized in Tables 8 and 9, respectively, and are discussed below.

6.5.1 Carcinogenic Risks

4,4'-DDE, 4,4'-DDT, technical-chlordane, Aroclor 1254, and benzene were identified as carcinogens in site soils and soil vapors. Ingestion, inhalation, and dermal contact pathways from shallow soils and soil vapors at the Site were considered. As shown in Table 8, the estimated cancer risk for the carcinogenic compounds using the maximum concentrations of existing site data (e.g., collected during either the PEA or during the post remedial confirmation sampling investigation) is 3×10^{-6}, which is below 5×10^{-6}, the cancer risk target risk management range for school sites.

The contributions of benzene and toluene detected in soil gas to the total estimated risk and hazard was below the level of concern. Therefore, the presence of benzene and toluene in the soil vapor does not appear to pose a vapor intrusion health risk.

6.5.2 Noncarcinogenic Hazards

The noncarcinogenic health hazard estimate for COPCs was also evaluated for inhalation and ingestion/dermal pathways from shallow soil at the Site. As shown in Table 9, the hazard index for noncarcinogenic effects using the maximum detected concentration collected of existing site data (e.g., collected during either the PEA or during the post remedial confirmation sampling investigation) is 0.3, which is below the 1.0 hazard index.

6.5.3 Summary

In summary, using maximum concentrations of COPCs detected at the Site upon completion of remedial activities, the total estimated cancer risk is 3×10^{-6} and the total hazard index is 0.3. The resulting risk is

below the target risk management range of 5 x 10^{-6}. The resulting hazard index is below the hazard criteria of 1.0.

Based on the results of the risk assessment, there does not appear to be a significant threat to public health or the environment with regard to COPCs following the removal activity.

6.6 Uncertainty Analysis

The human health screening evaluation followed the conservative risk estimation procedures recommended by USEPA and CalEPA. Many of the assumptions regarding future land uses, relevant exposure scenarios, screening procedures, and exposure parameters selected for the risk assessment were very conservative and would likely "err on the side of safety." Particularly under the "conservative" exposure parameters in each scenario, certain assumptions about exposure frequency and intake rates are far greater than would be reasonably expected. The "maximum probable exposure" calculated using these conservative exposure parameters may not be "probable" in a quantitative sense; it is highly unlikely that the exposures and risks for any given individual would exceed this maximum.

Examples of some of the specific areas of conservatism in this assessment are presented below:

- For the human health evaluation, conservative upper-bound chemical concentrations (e.g., the maximum concentrations) in Site surface soils were determined, and continuous exposure to these levels over a period of several years was assumed. Using the maximum concentration as the exposure point concentration assumes that exposure to the maximum concentration occurs throughout the entire Site, when in fact it is only at a selected location(s), thereby overestimating the risk to the remainder of the Site, since it is unlikely that a child would be "stationed" at only the one location. Therefore, the use of the maximum concentration will overestimate risks. Furthermore, the residential scenario assumes constant occupancy (24 hours per day) over a period of many years – an assumption that is overly conservative and would overstate the actual risk.

- The assumption of no pavement being present under the future school buildings is another example of the conservatism in the risk assessment. The risk assessment evaluates exposure to surface soils, and assumes that only bare land is present over the timeframe examined. However, once the school has been redeveloped, much of the Site will be under concrete, buildings or asphalt, thus substantially reducing the potential direct-contact exposures to soil at the Site.

7. Summary

Removal activities at the Site began on July 11, 2011 and continued through August 24, 2011. Soil was removed using conventional construction and earth moving equipment, such as an articulated front-end

loader, an excavator, and dump trucks. The majority of the excavation was conducted using an excavator. No stained or discolored soils were observed during excavation activities.

Excavation of soils at the Site was completed by area. The soil removal activities began with Excavation Area 9, and continued to Areas 6, 8, 3, 5, 4, 1, 2 and 7.

Affected soil was loaded onto plastic (visquene) covered areas immediately adjacent to the excavation to ensure that the affected soil was not mixed with clean surface soil. Air and dust monitoring were conducted to ensure dust suppression was adequate.

A summary of the different excavation areas, the contaminant of concern, and final excavation depth is provided below.

Excavation Area (EA)	Contaminant of Concern	Final Excavation Depth [of deepest portion] (feet)
1	PCBs	2
2	PCBs	3
3	PCBs	4
4	PCBs	2
5A	PCBs	2
5B	PCBs	2
5C	PCBs	2
5D	PCBs	4
6	PCBs	2
7	PCBs	2
8	PCBs	4
9	Pesticides	3

Confirmation soil samples were taken after the initial excavation to evaluate the residual concentrations of PCBs and pesticides in soils. If concentrations of PCBs or pesticides were above their respective PCGs, additional soil excavation was conducted. Confirmation sampling included the collection of Excavation Floor samples as well as “Excavation Side Wall (ESW)” samples. In some cases, ESW were not collected as excavation sides bordered hardscape (e.g, sidewalks, retaining walls, or buildings).

Additional excavation was performed as needed based on analytical results for the confirmation samples. For example, an additional foot of soil was removed from portions of Excavation Areas 2 and 5 and from the entirety of Excavation Areas 3 and 8. Confirmation samples were again collected upon completion of the additional removal. Based on the results of these confirmation sampling results, another foot of soil was excavated from a portion of Excavation Area 8 to a final excavation depth of 4 feet. In two areas, Excavation Areas 2 and 5B, additional lateral excavation was required due to the elevated concentrations of the COC in sidewall samples. Due to the shallow depth of the excavation areas (e.g., 2 to 4 foot bgs), shoring and/or sloping were not required for worker safety or to maintain lateral support of structures.

Excavation was deemed complete vertically when excavation floor samples were below PCGs and was deemed complete laterally when excavation sidewall samples were below PCGs.

The total volume of soil excavated during this removal action was approximately 1,179 cy, based on the calculation calculated area and depth, and a total mass of approximately 1,158 tons according to the waste manifests.

Prior to initiation of removal activities in Area 5, ARCADIS was asked to collect additional samples in the vicinities of several trees in Area 5 to more tightly delineate the affected soils and see whether the excavation in the vicinity of several mature trees (not located within the planned excavation but close to the planned excavation) could be moved back to help ensure the safety of the trees. The root ball could be less affected by remedial activities if it were deemed that affected soils did not encroach the vicinity of the rootball. ARCADIS collected additional samples in the vicinity of these trees; sampling results indicated that soil located approximately 5 feet south of Tree 4 was elevated. Additional soil within this area was excavated (to a depth of 4 feet bgs).

Soil samples were analyzed for organochlorine pesticides using EPA Method 8081A or PCBs using EPA 8082. Samples collected from the excavations were analyzed on a rush turnaround basis by the analytical laboratory to assist in field decisions.

Affected soil was loaded onto plastic covered areas immediately adjacent to the excavation to ensure that the affected soil was not mixed with clean surface soil. Water was sprayed in the excavation areas to provide dust control.

After removal of the affected soils, confirmation soil samples were collected from the sidewalls and floor of the excavation in accordance with the RAW to confirm that residual concentrations of COPCs were less than the PCGs. Soil samples were temporarily stored on-site in a cooler filled with ice prior to delivery to Positive Lab Service, a state certified laboratory. Soil samples were analyzed for PCBs by EPA Method 8082 or organochlorine pesticides using EPA Method 8081A, depending on the excavation area. Samples collected from the excavations were analyzed on a rush turnaround basis by the analytical laboratory to assist in field decisions.

Excavations continued until PCBs and chlordane were below their respective PCGs.

Liberation of dust during the removal operations was minimized with the use of water as a dust suppressant. Real-time, data-logging aerosol monitors (personal data ram) were used to continuously measure dust levels. ARCADIS also documented airborne concentrations of PCBs and pesticides in the locations as necessary to establish employee exposure and site boundary conditions. ARCADIS used OSHA/NIOSH approved methods to collect and analyze the samples. All air filter samples analyzed were non-detect for PCBs and pesticides. As analytical results for industrial hygiene samples were received, the air monitoring professional prepared discussed results with on-site management and workers.

As outlined in the RAW, the air monitoring professional monitored on-site meteorological instrumentation and coordinated with contractors if conditions that required cessation of work (i.e., winds in excess of 25 mph) were encountered. On-site meteorological monitoring was performed simultaneously with the excavation activities to ensure that all necessary precautions had been taken; no winds in excess of 25 mph were encountered.

A risk evaluation was conducted upon completion of the remediation activities. For completeness, the dataset included analytical data collected during the PEA investigation that still remains as well as the confirmation sampling data collected upon completion of remedial activities. The results of the risk evaluation were as follows:

- 4,4'-DDE, 4,4'-DDT, technical-chlordane, Aroclor 1254, and benzene were identified as carcinogens in site soils and soil vapors. Ingestion, inhalation, and dermal contact pathways from shallow soils and soil vapors at the Site were considered. The estimated cancer risk for the carcinogenic compounds using the maximum concentrations of existing site data is 3×10^{-6}, which is below 5×10^{-6}, the cancer risk target risk management range for school sites.

- The noncarcinogenic health hazard estimate for COPCs was also evaluated for inhalation and ingestion/dermal pathways from shallow soil at the Site. The hazard index for noncarcinogenic effects using the maximum detected concentration collected of existing site data is 0.3, which is below the 1.0 hazard index.

Based on the results of the risk assessment, there does not appear to be a significant threat to public health or the environment with regard to COPCs following the removal activity.

8. Conclusions and Recommendations

Soil removal activities at the Site were conducted in accordance with the protocols outlined in the RAW. Analytical results for the confirmation samples document that PCB and pesticide-affected soil was successfully removed from the Site during the soil removal activities (July through August 2011). Based on

the results of the risk assessment, there does not appear to be a significant threat to public health or the environment with regard to COPCs following the removal activity.

Additionally, based on analytical results for the stockpile samples, all excavated soil was deemed acceptable for transport off-site under non-hazardous soil classification. Approximately 1,158 tons of soil was transported to Chiquita Canyon Landfill in Castaic, California.

9. Limitations

The opinions and recommendations presented in this report are based upon the scope of services, information obtained through the performance of the services, and the schedule as agreed upon by ARCADIS and the SMMUSD, the party for whom this report was originally prepared. This report is an instrument of professional service and was prepared in accordance with the generally accepted standards and level of skill and care under similar conditions and circumstances established by the environmental consulting industry. No certification, warranty, or guarantee, express or implied, is intended or given beyond that expressly made herein. ARCADIS makes no representation as to the accuracy or completeness of information prepared by other parties not under contract to ARCADIS. ARCADIS is unaware of any material inaccuracies of the information relied upon by ARCADIS. This report is expressly for the sole and exclusive use of the SMMUSD, California Department of Education, applicable landfill or disposal site, RWQCB, and DTSC for a particular purpose. Only the SMMUSD and/or other specifically named parties have the right to make use of and rely upon this report. Reuse of this report or any portion thereof for other than its intended purpose, or if modified, or if used by third parties, shall be at the user's sole risk.

Results of any investigations or testing and any findings presented in this report apply solely to conditions existing at the time when ARCADIS' investigative work was performed. It must be recognized that any such investigative or testing activities are inherently limited and do not represent a conclusive or complete characterization. Conditions in other parts of the project Site may vary from those at the locations where data were collected. ARCADIS' ability to interpret investigation results is related to the availability of the data and the extent of the investigation activities. As such, 100 percent confidence in environmental investigation conclusions cannot reasonably be achieved.

Nothing contained in this document shall relieve any other party of its responsibility to abide by contract documents and applicable laws, codes, regulations, or standards.

10. References

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Tables

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Malibu Middle and High School, Campus Improvements Project, Malibu, California
Table 1: Summary of Soil Analytical Results, PCBs

Sample ID	Sample Depth (Feet)	Sample Type Excavation (Floor or Sidewall)	Analyte:	Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260
			Method:	EPA 8082	EPA 8082	EPA 8082	EPA 8082	EPA 8082	EPA 8082	EPA 8082
			Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
			Date Sampled							
Excavation Area 1										
Excavation Floor Samples										
CS-EA1-1-EF-2'	2	EF	08/05/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA1-2-EF-2'	2	EF	08/05/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Area 2										
Excavation Floor Samples										
CS-EA2-1-EF-2'	2	EF	08/05/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA2-2-EF-2'	2	EF	08/05/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	**85.4**	< 50.0
CS-EA2-3-EF-2'	2	*EF*	*08/05/11*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***233***	*< 50.0*
CS-EA2-3-EF-3'	3	EF	08/05/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Sidewall Samples										
CS-EA2-1-ESW-1'	*1*	*SW*	*08/05/11*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***176***	*< 50.0*
CS-EA2-2-ESW-1'	1	SW	08/05/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Area 3										
Excavation Floor Samples										
CS-EA3-EF-1-3'	*3*	*EF*	*07/18/11*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***140***	*< 50.0*
CS-EA3-EF1-4'	4	EF	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Area 4										
Excavation Floor Samples										
CS-EA4-EF1-2'	2	EF	07/29/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Sidewall Samples										
CS-EA4-ESW1-1'	1	SW	07/29/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA4-ESW2-1'	1	SW	07/29/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Area 5										
Side A										
Excavation Floor Samples										
CS-EA5-A-EF1-2'	2	EF	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-A-EF2-2'	2	EF	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-A-EF3-2'	2	EF	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-A-EF4-2'	2	EF	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Sidewall Samples										
CS-EA5-A-ESW1-1'	1	SW	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-A-ESW2-1'	1	SW	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-A-ESW3-1'	1	SW	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-A-ESW4-1'	1	SW	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Side B										
Excavation Floor Samples										
CS-EA5-B-EF-1-2'	2	EF	07/18/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-B-EF2-2'	2	EF	07/21/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-B-EF3-2'	2	EF	07/21/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-B-EF4-2'	2	EF	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Sidewall Samples										
CS-EA5-B-ESW1-1'	1	SW	07/18/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-B-ESW2-1'	*1*	*SW*	*07/21/11*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***246***	*< 50.0*
CS-EA5-B-ESW2-B-1'	1	SW	07/27/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-B-ESW3-1'	1	SW	07/21/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-B-ESW4-1'	1	SW	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-B-ESW5-1'	1	SW	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Side C										
Excavation Floor Samples										
CS-EA5-C-EF1-2'	2	EF	07/21/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Sidewall Samples										
CS-EA5-C-ESW1-1'	1	SW	07/21/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Side D										
Excavation Floor Samples										
CS-EA5-D-EF1-2'	2	EF	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-D-EF2-2'	2	EF	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-D-EF3-2'	2	EF	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-D-EF4-2'	2	EF	07/27/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Sidewall Samples										
CS-EA5-D-ESW1-1'	1	SW	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-D-ESW2-1'	1	SW	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-D-ESW4-1'	1	SW	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA5-D-ESW-5-1'	1	SW	07/27/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0

Table 1: Summary of Soil Analytical Results, PCBs

Sample ID	Sample Depth (Feet)	Sample Type Excavation (Floor or Sidewall)	Analyte:	Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260
			Method:	EPA 8082	EPA 8082	EPA 8082	EPA 8082	EPA 8082	EPA 8082	EPA 8082
			Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
			Date Sampled							
Tree Samples Within Area 5 (Delineation Samples and Confirmation Samples)										
T-3-5'N-.5'	0.5	Tree	07/14/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
T-3-5'S-.5'	0.5	Tree	07/14/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
T-4-5'N-.5'	0.5	Tree	07/14/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	**74.3**	< 50.0
T-4-5'S-.5'	*0.5*	*Tree*	*07/14/11*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***283***	*< 50.0*
T4-5'S-2'	*2*	*Tree*	*07/21/11*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***104***	*< 50.0*
T-4-5'S-3'	*3*	*Tree*	*07/27/11*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***2350***	***61.7***
T-4-5'S-4'	4	Tree	07/27/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	**50.8**	< 50.0
T4-2'S-1'	1	Tree-SW	07/21/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Area 6										
Excavation Floor Samples										
CS-EA6-EF1-2'	2	EF	07/13/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA6-EF2-2'	2	EF	07/13/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Sidewall Samples										
CS-EA6-ESW1-1'	1	SW	07/13/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Area 7										
Excavation Floor Samples										
CS-EA7-1-EF-2'	2	EF	8/5/2011	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	**88.4**	< 50.0
CS-EA7-2-EF-2'	2	EF	8/5/2011	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Excavation Area 8										
Excavation Floor Samples										
CS-EA8-EF1-2'	*2*	*EF*	*07/14/11*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***199***	*< 50.0*
CS-EA8-EF1-3'	*3*	*EF*	*07/18/11*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***292***	*< 50.0*
CS-EA8-EF1-4'	4	EF	07/21/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
CS-EA8-EF2-2'	*2*	*EF*	*07/14/11*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***409***	*< 50.0*
CS-EA8-EF2-3'	3	EF	07/18/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	**74.5**	< 50.0
Remaining PEA Samples										
SS-STRUCTURE-1-0.5'	0.5	11/21/09	11/21/09	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-STRUCTURE-2-0.5'	0.5	11/21/09	11/21/09	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-STRUCTURE-3-0.5'	*0.5*	*11/21/09*	*11/21/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***538***	*< 50.0*
SS-STRUCTURE-4-0.5'	*0.5*	*11/21/09*	*11/21/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***252***	*< 50.0*
SS-STRUCTURE-5-0.5'	*0.5*	*11/20/09*	*11/20/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***534***	*< 50.0*
SS-STRUCTURE-6-0.5'	*0.5*	*11/20/09*	*11/20/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***92***	*< 50.0*
SS-STRUCTURE-7-0.5'	0.5	11/21/09	11/21/09	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-STRUCTURE-8-0.5'	*0.5*	*11/20/09*	*11/20/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***180***	*< 50.0*
SS-STRUCTURE-9-0.5'	*0.5*	*11/20/09*	*11/20/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***147***	*< 50.0*
SS-STRUCTURE-10-0.5'	0.5	11/21/09	11/21/09	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-STRUCTURE-11-0.5'	*0.5*	*11/20/09*	*11/20/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***264***	*< 50.0*
SS-STRUCTURE-12-0.5'	*0.5*	*11/20/09*	*11/20/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***1040***	*< 50.0*
SS-STRUCTURE-13-0.5	*0.5*	*11/20/09*	*11/20/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***662***	*< 50.0*
SS-STRUCTURE-14-0.5'	*0.5*	*11/21/09*	*11/21/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***181***	*< 50.0*
SS-STRUCTURE-15-0.5'	0.5	11/21/09	11/21/09	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-STRUCTURE-16-0.5'	*0.5*	*11/21/09*	*11/21/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***84.5***	*< 50.0*
SS-STRUCTURE-17-0.5'	*0.5*	*11/20/09*	*11/20/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***62.9***	*< 50.0*
SS-STRUCTURE-18-0.5'	*0.5*	*11/20/09*	*11/20/09*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***120***	*< 50.0*
SS-SO-2-0.5	*0.5*	*02/06/10*	*02/06/10*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***161***	*< 50.0*
SS-SO-2-2.5	*2.5*	*02/06/10*	*02/06/10*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***98.8***	*< 50.0*
SS-SO-3-0.5	*0.5*	*02/06/10*	*02/06/10*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***417***	*< 50.0*
SS-SO-3-2.5	2.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-4-0.5	*0.5*	*02/06/10*	*02/06/10*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***207***	*< 50.0*
SS-SO-4-2.5	2.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-5-0.5	*0.5*	*02/06/10*	*02/06/10*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***1420***	*< 50.0*
SS-SO-5-2.0	*2*	*02/06/10*	*02/06/10*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***119***	*< 50.0*
SS-SO-6-0.5	*0.5*	*02/06/10*	*02/06/10*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	*< 50.0*	***439***	*< 50.0*
SS-SO-6-2.5	2.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-7-2.5	2.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-8-2.5	2.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-9-0.5	0.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	**50.4**	< 50.0
SS-SO-9-2.5	2.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-10-0.5	0.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-11-0.5	0.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-12-0.5	0.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-13-0.5	0.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	**58.3**	< 50.0
SS-SO-14-0.5	0.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	**67.8**	< 50.0
SS-SO-15-2.5	2.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-16-0.5	0.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
SS-SO-17-0.5	0.5	02/06/10	02/06/10	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
Statistical Summary										

Table 1: Summary of Soil Analytical Results, PCBs

Sample ID	Sample Depth (Feet)	Sample Type Excavation (Floor or Sidewall)	Analyte:	Aroclor-1016	Aroclor-1221	Aroclor-1232	Aroclor-1242	Aroclor-1248	Aroclor-1254	Aroclor-1260
			Method:	EPA 8082	EPA 8082	EPA 8082	EPA 8082	EPA 8082	EPA 8082	EPA 8082
			Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
			Date Sampled							
Statistical Summary of All Existing Data (e.g. data presented in red above is not included as it has been removed)										
			Total Number of Samples:	99	99	99	99	99	99	99
			Number of Detects:	0	0	0	0	0	8	0
			Minimum Concentration:	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
			Maximum Concentration:	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	88.4	< 50.0
			Average Concentration:	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	52.2	< 50.0
			Standard Deviation	0.0	0.0	0.0	0.0	0.0	7.6	0.0
Comparison Criteria										
			CHHSLS	89	89	89	89	89	89	89
			Is maximum concentration below CHHSL?	YES	YES	YES	YES	YES	YES	YES
Quality Control Samples										
Duplicate Samples										
CS-EA5-A-ESW1-1'	1	SW	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
DUP-1	1	SW	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
			RPD(%)	0%	0%	0%	0%	0%	0%	0%
CS-EA5-B-ESW4-1'	1	SW	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
DUP-2	1	SW	07/25/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
			RPD(%)	0%	0%	0%	0%	0%	0%	0%
CS-EA5-D-EF2-2'	2	EF	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
DUP-3	2	EF	07/26/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
			RPD(%)	0%	0%	0%	0%	0%	0%	0%
CS-EA5-D-EF4-2'	2	EF	07/27/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
DUP-4	2	EF	07/27/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
			RPD(%)	0%	0%	0%	0%	0%	0%	0%
CS-EA2-1-EF-2'	2	EF	08/05/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
DUP-5	2	EF	08/05/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
			RPD(%)	0%	0%	0%	0%	0%	0%	0%
CS-EA7-2-EF-2'	2	EF	08/05/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
DUP-6	2	EF	08/05/11	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0
			RPD(%)	0%	0%	0%	0%	0%	0%	0%
SS-STRUCTURE-16-0.5'	0.5	PEA	11/21/09	*< 50*	*< 50*	*< 50*	*< 50*	*< 50*	***84.5***	*< 50*
DUP-2	0.5	PEA	11/21/09	*< 50*	*< 50*	*< 50*	*< 50*	*< 50*	***56.9***	*< 50*
			RPD(%)	0%	0%	0%	0%	0%	39%	0%
SS-STRUCTURE-1-0.5'	0.5	PEA	11/21/09	< 50	< 50	< 50	< 50	< 50	< 50	< 50
DUP-3	0.5	PEA	11/21/09	< 50	< 50	< 50	< 50	< 50	< 50	< 50
			RPD(%)	0%	0%	0%	0%	0%	0%	0%
SS-SO-2-0.5	0.5	PEA	02/06/10	*< 50*	*< 50*	*< 50*	*< 50*	*< 50*	***161***	*< 50*
DUP-1-020610	0.5	PEA	02/06/10	*< 50*	*< 50*	*< 50*	*< 50*	*< 50*	***79.7***	*< 50*
			RPD(%)	0%	0%	0%	0%	0%	68%	0%
SS-SO-11-0.5	0.5	PEA	02/06/10	< 50	< 50	< 50	< 50	< 50	< 50	< 50
DUP-2-020610	0.5	PEA	02/06/10	< 50	< 50	< 50	< 50	< 50	< 50	< 50
			RPD(%)	0%	0%	0%	0%	0%	0%	0%
Equipment Blank (µg/L)										
EQBLK	NA	02/06/10		50	50	50	50	50	50	50

NOTES:

Soil samples analyzed by Positive Lab Services, Los Angeles, California
< = Not detected above laboratory reporting limit indicated.
--- = not available
µg/Kg = micrograms per kilogram
CHHSL = California Human Health Screening Level (DTSC, 2005)
PCBs = polychlorinated biphenyls
RPD = relative percent difference

Concentrations in bold typeface were reported above the laboratory reporting limit.
Concentrations in *red italic typeface* were subsequently removed and additional confirmation sampling was conducted.

QA/QC smg

ARCADIS

Malibu Middle and High School, Campus Improvements Project, Malibu, California
Table 2: Summary of Soil Analytical Results, Pesticides

Sample ID	Sample Depth (Feet)	Sample Type Excavation (Floor or Sidewall)	Analyte:	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	alpha-Chlordane	beta-BHC	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindane)	gamma-Chlordane	Heptachlor	Heptachlor epoxide	Methoxychlor	Technical Chlordane	Toxaphene
			Method:	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A
			Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Excavation Area #9*			Date Sampled																						
Excavation Floor Samples																									
CS-EA9-EF-3'	3.0	EF	07/13/11	< 4.00	< 4.00	< 4.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 3.00	< 2.00	< 4.00	< 4.00	< 4.00	< 4.00	< 4.00	< 2.00	< 2.00	< 2.00	< 2.00	< 15.0	< 10.0	< 30.0
Excavation Sidewall Samples																									
CS-EA9-ESW1-1.5	1.5	SW	07/13/11	< 4.00	< 4.00	< 4.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 3.00	< 2.00	< 4.00	< 4.00	< 4.00	< 4.00	< 4.00	< 2.00	< 2.00	< 2.00	< 2.00	< 15.0	< 10.0	< 30.0
CS-EA9-ESW2-1.5	1.5	SW	07/13/11	< 4.00	< 4.00	< 4.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 3.00	< 2.00	< 4.00	< 4.00	< 4.00	< 4.00	< 4.00	< 2.00	< 2.00	< 2.00	< 2.00	< 15.0	< 10.0	< 30.0
Remaining PEA Samples																									
SS-STRUCTURE-1-0.5'	0.5	--	11/21/09	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	< 40	< 200
SS-STRUCTURE-2-0.5'	0.5	--	11/21/09	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	< 40	< 200
SS-STRUCTURE-3-0.5'	0.5	--	11/21/09	< 16	**171**	< 16	< 8.0	< 8.0	**9.27**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	**16.2**	< 8.0	< 8.0	< 60	**109**	< 200
SS-STRUCTURE-4-0.5'	0.5	--	11/21/09	< 16	**37.9**	< 16	< 8.0	< 8.0	**73.1**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	**46.3**	< 8.0	< 8.0	< 60	**274**	< 200
SS-STRUCTURE-5-0.5'	0.5	--	11/20/09	< 16	**82**	< 16	< 8.0	< 8.0	**8.54**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	**183**	< 200
SS-STRUCTURE-6-0.5'	0.5	--	11/20/09	< 16	**17.1**	< 16	< 8.0	< 8.0	<8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	<40	< 200
SS-STRUCTURE-7-0.5'	*0.5*	--	*11/21/09*	*< 16*	*< 16*	***42.9***	*< 8.0*	*< 8.0*	***683***	*< 8.0*	*< 8.0*	*< 12*	*< 8.0*	*< 16*	*< 16*	*< 16*	*< 16*	*< 16*	*< 8.0*	***305***	*< 8.0*	*< 8.0*	*< 60*	***1910***	*< 200*
SS-STRUCTURE-7-2.5'	*2.5*	--	*11/21/09*	*< 16*	*< 16*	*< 16*	*< 8.0*	*< 8.0*	***108***	*< 8.0*	*< 8.0*	*< 12*	*< 8.0*	*< 16*	*< 16*	*< 16*	*< 16*	*< 16*	*< 8.0*	***66***	*< 8.0*	*< 8.0*	*< 60*	***601***	*< 200*
SS-STRUCTURE-8-0.5'	0.5	--	11/20/09	< 16	**22.2**	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	< 40	< 200
SS-STRUCTURE-9-0.5'	0.5	--	11/20/09	< 16	**28.9**	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	< 40	< 200
SS-STRUCTURE-10-0.5'	0.5	--	11/21/09	< 16	< 16	< 16	< 8.0	< 8.0	**19.6**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	**58.2**	< 200
SS-STRUCTURE-11-0.5'	0.5	--	11/20/09	< 16	**69.1**	< 16	< 8.0	< 8.0	<8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	< 40	< 200
SS-STRUCTURE-12-0.5'	0.5	--	11/20/09	< 16	**169**	< 16	< 8.0	< 8.0	**18.6**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	**26**	< 8.0	< 8.0	< 60	**240**	< 200
SS-STRUCTURE-13-0.5	0.5	--	11/20/09	< 16	**361**	< 16	< 8.0	< 8.0	<8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	**8.93**	< 8.0	< 8.0	< 60	**132**	< 200
SS-STRUCTURE-14-0.5'	0.5	--	11/21/09	< 16	< 16	< 16	< 8.0	< 8.0	<8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	< 40	< 200
SS-STRUCTURE-15-0.5'	0.5	--	11/21/09	< 16	< 16	**19**	< 8.0	< 8.0	**33.5**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	**8.68**	< 8.0	< 8.0	< 60	**67.8**	< 200
SS-STRUCTURE-16-0.5'	0.5	--	11/21/09	< 16	< 16	**18.9**	< 8.0	< 8.0	**21.8**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	**81.2**	< 200
SS-STRUCTURE-17-0.5'	0.5	--	11/20/09	< 16	< 16	**29.2**	< 8.0	< 8.0	**12.2**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	**11.3**	< 8.0	< 8.0	< 60	**52.3**	< 200
SS-STRUCTURE-18-0.5'	0.5	--	11/20/09	< 16	< 16	**46.7**	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	**40.7**	< 200
SS-SO-18-0.5	0.5	--	02/06/10	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	< 40	< 200
SS-SO-19-0.5	0.5	--	02/06/10	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	< 40	< 200
SS-SO-20-0.5	0.5	--	02/06/10	< 16	< 16	< 16	< 8.0	< 8.0	**21.2**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	**15.3**	< 8.0	< 8.0	< 60	**155**	< 200
Statistical Summary																									
Statistical Summary of All Data																									
			Total Number of Samples:	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
			Number of Detects:	0	9	4	0	0	9	0	0	0	0	0	0	0	0	0	0	7	0	0	0	11	0
			Minimum Concentration:	< 4.00	< 4.00	< 4.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 3.00	< 2.00	< 4.00	< 4.00	< 4.00	< 4.00	< 4.00	< 2.00	< 2.00	< 2.00	< 2.00	< 15.0	< 10.0	< 30.0
			Maximum Concentration:	< 16	361	46.7	< 8	< 8	73.1	< 8	< 8	< 12	< 8	< 16	< 16	< 16	< 16	< 16	< 8	46.3	< 8	< 8	< 60	274	< 200
			Average Concentration:	< 14.43	49.83	16.60	< 7.22	< 7.22	13.56	< 7.22	< 7.22	< 10.83	< 7.22	< 14.43	< 14.43	< 14.43	< 14.43	< 14.43	< 7.22	10.55	< 7.22	< 7.22	< 54.13	77.53	< 177.83
			Standard Deviation	4.1	82.1	8.4	2.1	2.1	15.0	2.1	2.1	3.1	2.1	4.1	4.1	4.1	4.1	4.1	2.1	9.2	2.1	2.1	15.5	72.3	58.5
Comparison Criteria																									
			CHHSLS	2,300	1,600	1,600	33	--	430	--	--	35	--	--	--	21,000	--	--	500	430	130	--	340,000	430	460
			Is maximum concentration below CHHSL?	YES	YES	YES	YES	--	YES	--	--	YES	--	--	--	YES	--	--	YES	YES	YES	--	YES	YES	YES
Quality Control Samples																									
Equipment Blanks (µg/L)																									
SS-STRUCTURE-18-EQRB	NA	--	11/20/09	0.05	0.05	0.01	0.01	0.02	0.05	0.02	0.02	0.01	0.03	0.02	0.02	0.01	0.02	0.1	0.02	0.05	0.02	0.02	0.5	NA	<5.0
SS-STRUCTURE-7-EQRB	NA	--	11/21/09	0.05	0.05	0.01	0.01	0.02	0.05	0.02	0.02	0.01	0.03	0.02	0.02	0.01	0.02	0.1	0.02	0.05	0.02	0.02	0.5	NA	<5.0
EQBLK	NA	--	02/06/10	0.05	0.05	0.01	0.01	0.02	0.05	0.02	0.02	0.01	0.03	0.02	0.02	0.01	0.02	0.1	0.02	0.05	0.02	0.02	0.5	NA	<5.0
Duplicate Samples																									
SS-STRUCTURE-16-0.5'	0.5	--	11/21/09	< 16	< 16	**18.9**	< 8.0	< 8.0	**21.8**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	**81.2**	< 200
DUP-2	0.5	--	11/21/09	< 16	< 16	**19.6**	< 8.0	< 8.0	**10.6**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	**47.5**	< 200
			RPD(%)	0%	0%	4%	0%	0%	69%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	52%	0%
SS-STRUCTURE-1-0.5'	0.5	--	11/21/09	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 60	< 40	< 200

Table 2: Summary of Soil Analytical Results, Pesticides

Sample ID	Sample Depth (Feet)	Sample Type Excavation (Floor or Sidewall)	Analyte:	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	alpha-Chlordane	beta-BHC	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindane)	gamma-Chlordane	Heptachlor	Heptachlor epoxide	Methoxychlor	Technical Chlordane	Toxaphene
			Method:	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A	EPA 8081A
			Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
			Date Sampled																						
DUP-3	0.5	--	11/21/09	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	< 8.0	< 8.0	< 8.0	60	40	200
			RPD(%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
SS-SO-20-0.5	0.5	--	02/06/10	< 16	< 16	< 16	< 8.0	< 8.0	**21.2**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	**15.3**	< 8.0	< 8.0	< 60	**155**	< 200
DUP-3-020610	0.5	--	02/06/10	< 16	< 16	< 16	< 8.0	< 8.0	**19.5**	< 8.0	< 8.0	< 12	< 8.0	< 16	< 16	< 16	< 16	< 16	< 8.0	**14.5**	< 8.0	< 8.0	< 60	**164**	< 200
			RPD(%)	0%	0%	0%	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	6%	0%

Soil samples analyzed by Positive Lab Services, Los Angeles, California

NOTES:

QA/QC smg

< = not detected above laboratory reporting limit indicated
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
RPD = relative percent difference
NA = not analyzed
CHHSL = California Human Health Screening Level (California Office of Environmental Health Hazard Assessment)
- - = No established CHHSL for analyte
4,4'-DDD = 4,4'-dichlorodiphenyldichloroethane
4,4'-DDE = 4,4'-dichlorodiphenyldichloroethylene
4,4'-DDT = 4,4'-dichlorodiphenyltrichloroethane

Concentrations in bold typeface were reported above the laboratory reporting limit.
Concentrations in *red italic typeface* were subsequently removed and additional confirmation sampling was conducted.

*Due to soil profile requirements by the disposal company, additional lead data was needed for the location of Excvation Area #9. A surface soil sample was collected in the center of Excavation Area 9 and submitted for lead analysis by EPA 6010B on July 8, 2011. The result was 7.00 mg/kg, which is well within lead criteria.

ARCADIS

Malibu Middle and High School, Campus Improvements Project, Malibu, California
Table 3: Summary of Soil Analytical Results - Metals and pH

Sample ID	Depth (feet)	Analyte:	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	pH
		Method:	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 7471A	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 9045C
		Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		Date Sampled																		
Background Samples																				
BS-1	2.5	11/21/09	< 2.5	3.88	49.1	< 1.0	1.08	46.5	12.6	17.3	2.36	< 0.1	2.36	41.5	< 1.0	< 1.0	< 1.0	45.9	36	7.6
BS-2	2.5	11/21/09	< 2.5	3.59	102	< 1.0	1.05	57.2	14.3	26.4	4.1	< 0.1	3.17	62.6	< 1.0	< 1.0	< 1.0	54.8	47.4	7.6
BS-3	2.5	11/21/09	< 2.5	10.6	211	< 1.0	4.77	49.8	2.47	30.6	1.23	< 0.1	8.36	51.1	< 1.0	< 1.0	< 1.0	92.8	75.1	7.7
BS-4	2.5	11/21/09	< 2.5	7.89	142	< 1.0	3.89	45.1	2.26	31.3	1.56	< 0.1	2.74	48.8	< 1.0	< 1.0	< 1.0	70.7	75.8	7.7
Primary Samples																				
SS-PERC-1-15	15	11/21/09	< 2.5	4.75	149	< 1.0	< 1.0	49	7.23	23.8	2.64	< 0.1	2.26	45.6	< 1.0	< 1.0	< 1.0	46.3	52.5	8.7
SS-PERC-2-20	20	11/21/09	< 2.5	4.29	110	< 1.0	1.15	42.5	6.86	26.1	2.66	< 0.1	1.84	44.5	< 1.0	< 1.0	< 1.0	43.2	51.5	8.2
SS-PERC-3-10	10	11/21/09	< 2.5	7.89	217	< 1.0	1.55	55.3	6.56	32.8	2.59	< 0.1	4.38	55.3	< 1.0	< 1.0	< 1.0	58.5	65.7	7.7
SS-PERC-4-15	15	11/21/09	4.22	13.3	77.6	< 1.0	1.32	81.7	5.3	61.2	3.59	0.148	11	79.4	< 1.0	< 1.0	< 1.0	54.8	127	7.7
SS-PERC-6-18	18	11/21/09	< 2.5	1.12	258	< 1.0	< 1.0	25.1	1.15	12.0	0.59	< 0.1	1.21	16.7	< 1.0	< 1.0	< 1.0	26.6	36.4	7.5
SS-PERC-6-30	30	11/21/09	< 2.5	1.26	41.6	< 1.0	< 1.0	18.3	3.06	5.21	0.827	< 0.1	1.54	12.8	< 1.0	< 1.0	< 1.0	15.7	13.5	7.7
SS-PERC-7-15	15	11/21/09	< 2.5	5.1	160	< 1.0	< 1.0	51.6	8.74	27.4	1.76	< 0.1	3.51	97.7	< 1.0	< 1.0	< 1.0	56.5	90.4	8.2
SS-PERC-8-17	17	11/21/09	3.25	13.7	238	< 1.0	2.6	41.8	7.74	45.0	1.18	< 0.1	11.1	151	< 1.0	< 1.0	< 1.0	69.1	79.5	7.6
SS-PERC-9-10	10	11/21/09	11.0	2.46	79.2	< 1.0	6.17	83.3	4.75	193	304	< 0.1	7.21	63.2	< 1.0	< 1.0	< 1.0	11.5	1400	7.0
SS-STRUCTURE-1-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	3.76	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-2-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	5.07	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-3-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	*29*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-4-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	*9.2*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-5-0.5'	0.5	11/20/09	--	--	--	--	--	--	--	--	*18.6*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-6-0.5'	0.5	11/20/09	--	--	--	--	--	--	--	--	*10.0*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-7-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	*57.4*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-8-0.5'	0.5	11/20/09	--	--	--	--	--	--	--	--	*5.21*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-9-0.5'	0.5	11/20/09	--	--	--	--	--	--	--	--	*20.0*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-10-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	2.74	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-11-0.5'	0.5	11/20/09	--	--	--	--	--	--	--	--	*8.72*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-12-0.5'	0.5	11/20/09	--	--	--	--	--	--	--	--	*36.9*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-13-0.5	0.5	11/20/09	--	--	--	--	--	--	--	--	*13.0*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-14-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	*5.74*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-15-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	5.38	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-16-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	*7.76*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-17-0.5'	0.5	11/20/09	--	--	--	--	--	--	--	--	*21.5*	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-18-0.5'	0.5	11/20/09	--	--	--	--	--	--	--	--	*21.7*	--	--	--	--	--	--	--	--	--
SS-SO-1-0.5	0.5	02/06/10	--	--	--	--	--	--	--	--	5.03	--	--	--	--	--	--	--	--	--
SS-SO-1-2.5	2.5	02/06/10	--	--	--	--	--	--	--	--	2.26	--	--	--	--	--	--	--	--	--
Statistical Analysis																				
Background Samples																				
		Number of Samples:	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
		Number of Detects:	0	4	4	0	4	4	4	4	4	0	4	4	0	0	0	4	4	4
		Minimum Concentration:	< 2.5	3.59	49.1	< 1.0	1.05	45.1	2.26	17.3	1.23	< 0.1	2.36	41.5	< 1.0	< 1.0	< 1.0	45.9	36	7.6
		Maximum Concentration:	< 2.5	10.6	211	< 1.0	4.77	57.2	14.3	31.3	4.1	< 0.1	8.36	62.6	< 1.0	< 1.0	< 1.0	92.8	75.8	7.7
		Average Concentration:	2.50	6.49	126.03	1.00	2.70	49.65	7.91	26.40	2.31	0.10	4.16	51.00	1.00	1.00	1.00	66.05	58.58	7.65
		Standard Deviation:	0.00	3.37	68.24	0.00	1.92	5.41	6.44	6.44	1.28	0.00	2.82	8.75	0.00	0.00	0.00	20.57	20.04	0.06
		95% UCL:	--	10.46	206.32	--	4.96	56.01	15.48	33.98	3.59 *	--	11.37	61.30	--	--	--	90.26	82.15	7.73
Primary Samples																				
		Number of Samples:	9	9	9	9	9	9	9	9	15	9	9	9	9	9	9	9	9	9
		Number of Detects:	3	9	9	0	5	9	9	9	15	1	9	9	0	0	0	9	9	9
		Minimum Concentration:	< 2.5	1.1	41.6	< 1.0	< 1.0	18.3	1.2	5.2	0.6	< 0.1	1.2	12.8	< 1.0	< 1.0	< 1.0	11.5	13.5	7.0
		Maximum Concentration:	11.0	13.7	258.0	< 1.0	6.2	83.3	8.7	193.0	304.0	0.148	11.1	151.0	< 1.0	< 1.0	< 1.0	69.1	1400.0	8.7
		Average Concentration:	3.72	5.99	147.82	1.00	1.87	49.84	5.71	47.39	22.94	0.11	4.89	62.91	1.00	1.00	1.00	42.47	212.94	7.81
		Standard Deviation:	2.79	4.75	77.10	0.00	1.69	22.06	2.41	57.07	77.77	0.02	3.94	42.70	0.00	0.00	0.00	20.18	446.34	0.49
		95% UCL:	7.65	8.93	195.62	--	3.15	63.52	7.21	95.38	38.17	--	8.62	89.38	--	--	--	54.98	438.08	8.12
Comparison Criteria																				
		CHHSLS	30	0.07	5,200	16	1.7	100,000	660	3,000	80	18	380	1,600	380	380	5	530	23,000	--
		Is maximum concentration below CHHSL?	YES	NO	YES	YES	NO	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	--
Quality Control Samples																				
Equipment Blanks (mg/L)																				
SS-STRUCTURE-18-EQRB	--	11/20/09	--	--	--	--	--	--	--	--	<0.01	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-7-EQRB	--	11/21/09	--	--	--	--	--	--	--	--	<0.01	--	--	--	--	--	--	--	--	--
EQBLK	--	02/06/10	--	--	--	--	--	--	--	--	<0.01	--	--	--	--	--	--	--	--	--

Table 3: Summary of Soil Analytical Results - Metals and pH

Sample ID	Depth (feet)	Analyte:	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	pH
		Method:	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 7471A	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 6010B	EPA 9045C
		Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
		Date Sampled																		
Duplicate Samples																				
SS-PERC-1-15	15	11/21/09	< 2.5	**4.75**	**149**	< 1.0	< 1.0	**49**	**7.23**	**23.8**	**2.64**	< 0.1	**2.26**	**45.6**	< 1.0	< 1.0	< 1.0	**46.3**	**52.5**	**8.7**
DUP-1	15	11/21/09	< 2.5	**4.16**	**161**	< 1.0	< 1.0	**47.9**	**5.99**	**24.6**	**2.58**	< 0.1	**2.28**	**44**	< 1.0	< 1.0	< 1.0	**43.9**	**50.6**	**7.6**
		RPD(%)	0%	13%	8%	0%	0%	2%	19%	3%	2%	0%	1%	4%	0%	0%	0%	5%	4%	13%
SS-STRUCTURE-16-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	**7.76**	--	--	--	--	--	--	--	--	--
DUP-2	0.5	11/21/09	--	--	--	--	--	--	--	--	**7.03**	--	--	--	--	--	--	--	--	--
		RPD(%)	--	--	--	--	--	--	--	--	10%	--	--	--	--	--	--	--	--	--
SS-STRUCTURE-1-0.5'	0.5	11/21/09	--	--	--	--	--	--	--	--	**3.76**	--	--	--	--	--	--	--	--	--
DUP-3	0.5	11/21/09	--	--	--	--	--	--	--	--	**4.57**	--	--	--	--	--	--	--	--	--
		RPD(%)	--	--	--	--	--	--	--	--	19%	--	--	--	--	--	--	--	--	--

Soil samples anayzed by Positive Lab Services, Los Angeles, California

NOTES:

QA/QC smg

< = not detected above laboratory reporting limit indicated
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
CHHSL = California Human Health Screening Level (California Office of Environmental Health Hazard Assessment)
-- = NA, not analyzed
RPD = relative percent difference
95% UCL = 95% upper confidence limit above the mean concentration, calculated using Pro UCL and using 1/2 the detection limit for those concentrations reported as non-detections.
* 95% UCL for lead calculated using all soil concentrations < 10 ft bgs. It is noted that the maximum concentration was detected at 10 ft bgs and is therefore not considered to be a surface soil.
Concentrations in bold typeface were reported above the method detection limit.
Concentrations in *red italic typeface* were subsequently removed as part of the July and August Remedial Activity based on previous elevated detections of PCBs or pesticides.
These data points no longer exist and therefore have been removed from this dataset.

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Table 4: Summary of Soil Vapor Analytical Results - VOCs

Sample ID	Depth (feet)	Analyte:	1,1,1,2-Tetrachloroethane	1,1,1-Trichloroethane	1,1,2,2-Tetrachloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,1-Difluoroethane (LCC)	1,2-Dichloroethane	Benzene	Carbon tetrachloride	Chloroethane	Chloroform	cis-1,2-Dichloroethene	Dichlorodifluoromethane	Ethylbenzene	Freon 113	m,p-Xylene	Methyl tert-butyl ether	Methylene chloride	o-Xylene	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Trichlorofluoromethane	Vinyl chloride
		Method:	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B
		Units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
		Date Sampled																										
SV-1-5'	5.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	**0.1**	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-1-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-2-5'	5.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-2-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	**4.3**	< 0.5	< 0.1	< 0.5	< 0.1
SV-3-5'	5.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	<1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-3-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-4-5'	5.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-4-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-5-5'	5.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-5-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-6-5'	5.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-6-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-7-5'	5.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-7-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-8-5'	5.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-8-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	**1.2**	< 0.5	< 0.1	< 0.5	< 0.1
SV-9-5'	5.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-9-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	**0.16**	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	**1.2**	< 0.5	< 0.1	< 0.5	< 0.1
SV-10-5'	5.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-10-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	**1.1**	< 0.5	< 0.1	< 0.5	< 0.1
Statistical Analysis																												
		Number of Samples:	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
		Number of Detects:	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
		Minimum Concentration:	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
		Maximum Concentration:	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	**0.16**	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	**4.3**	< 0.5	< 0.1	< 0.5	< 0.1
		Average Concentration:	0.5	0.5	0.5	0.5	0.5	0.5	10	0.1	0.10	0.1	0.5	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.1	1.19	0.5	0.1	0.5	0.1
		Standard Deviation:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.00	0.00
Quality Control Samples																												
Duplicate Samples																												
SV-4-10'	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
SV-4-10' Dup	10.0	11/21/09	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 10	< 0.1	< 0.1	< 0.1	< 0.5	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 1.0	< 0.5	< 0.1	< 0.5	< 0.1
		RPD(%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Soil vapor samples analyzed by H&P Mobile Geochemistry, Signal Hill, California

NOTES:

QA/QC smq

All samples analyzed for VOCs by EPA Method 8260.
A purge volume test was conducted at sample location SV-1-5 and conducted with 1, 3 and 7 purge volumes. As the results were non-detect for all analytes with 3 and 7 purge volumes, yet benzene was reported at the detection limit at 1 purge volume, 1 purge volume was selected as the purge volume most conservative for site conditions.
< = not detected above laboratory reporting limit indicated
µg/L = micrograms per liter
NA = not analyzed
Concentrations in bold typeface were reported above the method detection limit.

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Table 5: Selection of Compounds of Potential Concern in Soil and Soil Vapor

Chemical	Site Soil Data [1] Maximum Detected Concentration (mg/kg)	Selected as COPC	Rationale for Selection or Exclusion
Metals			
All Metals Analytes	--	NO	All metals eliminated as COPCs in the PEA Investigation
Pesticides			
4,4'-DDE	0.361	YES	Detected in the PEA Investigation
4,4'-DDT	0.047	YES	Detected in the PEA Investigation
Technical Chlordane[2]	0.27	YES	Detected in the PEA Investigation
PCBs			
Aroclor 1254	0.088	YES	Detected in the PEA Investigation/Confirmation Sampling Investigation

Chemical	Site Soil Vapor Data [3] Maximum Detected Concentration (µg/L)	Selected as COPC	Rationale for Selection or Exclusion
VOCs			
Benzene	0.16	YES	Detected in the PEA Investigation
Toluene	4.3	YES	Detected in the PEA Investigation

Notes:

[1] Statistical summary of analytical data for confirmation soil samples collected upon completion of remedial activities conducted at the Site during July and August 2011 as well as remaining site data from the PEA sampling investigation conducted in November 2009 and February 2010.

[2] Although alpha- and gamma-Chlordane isomers were also detected, only technical chlordane is being evaluated as it inclusive of alpha- and gamma-chlordane, thereby not double counting the alpha- and gamma- isomers.

[3] Statistical summary of analytical data from the PEA sampling investigation conducted in November 2009 and February 2010 (remedial activities did not affect location where VOCs were previously detected at dection limit concentrations. Included herein for completeness of risk evaluation of post-remedial data set.

Highlighted chemicals selected as COPCs for further evaluation.
mg/kg = milligrams per kilogram
µg/L = micrograms per liter
COPC = chemical of potential concern
PCBs = polychlorinated biphenyls
VOCs = volatile organic compounds

QA/QC smg

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Table 6: Carcinogenic Toxicity Information for Chemicals of Potential Concern

Chemical	Oral Cancer Slope Factor (Sfo) $(mg/kg\text{-}day)^{-1}$	Inhalation Cancer Slope Factor (Sfi) $(mg/kg\text{-}day)^{-1}$	Weight-of Evidence Classification	Toxicity Information Reference Source[1]
PCBs				
Aroclor-1254	2.00E+00	2.00E+00	B2	Cal/EPA
Pesticides				
4-4'-DDE	3.4E-01	3.4E-01	B2	Cal/EPA
4,4'-DDT	3.4E-01	3.4E-01	B2	Cal/EPA
Technical Chlordane	1.3E+00	1.2E+00	B2	Cal/EPA
VOCs				
Benzene	1.00E-01	1.00E-01	A	Cal/EPA
Toluene	--	--	--	Cal/EPA

Notes:

[1] California EPA OEHHA Cancer Potency Values, http://www.oehha.ca.gov/risk/ChemicalDB/index.asp, May 2012

DDE = Dichlorodiphenyltrichloroethylene

DDT = Dichlorodiphenyltrichloroethane

PCBs = polychlordinated biphenyls

VOCs = Volatile organic compounds

--- = not applicable

Cal/EPA = California Environmental Protection Agency

mg/kg-day = Milligrams per kilogram per day

OEHHA = Office of Environmental Human Hazard Assessment

Weight-of-Evidence Classification:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as to human carcinogenicity

QA/QC smg

ARCADIS

Malibu Middle and High School, Campus Improvements Project, Malibu, California
Table 7: Noncarcinogenic Toxicity Information for Chemicals of Potential Concern

Chemical	Oral Reference Dose (RfDo) (mg/kg-day)	Inhalation Reference Dose (RfDi) (mg/kg-day)	Toxicity Information Reference Source[1]
PCBs			
Aroclor-1254[2]	2.00E-05	2.00E-05	USEPA RSLs
Pesticides			
4-4'-DDE	---	---	---
4,4'-DDT	5.0E-04	5.0E-04	IRIS
Technical Chlordane	5.0E-04	2.0E-04	IRIS
VOCs			
Benzene	4.0E-03	8.6E-03	IRIS
Toluene	8.0E-02	1.4E+00	IRIS

Notes:

[1] U.S. Environmental Protection Agency Regional Screening Levels (RSLs), May 2012
U.S. Environmental Protection Agency Integrated Risk Information System (IRIS) database, May 2012

[2] No RfDi was available; the RfDo was used as a surrogate.

Abbreviations:

--- = Not available
DDE = Dichlorodiphenyldichloroethylene
DDT = Dichlorodiphenyltrichloroethane
mg/kg-day = Milligrams per kilogram per day
PCBs = Polychlorinated biphenyls
VOCs = Volatile organic compounds

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Table 8: Carcinogenic Risk Estimate for Chemicals of Potential Concern

Chemical	Oral Cancer Slope Factor (Sfo) $(mg/kg\text{-}day)^{-1}$	Inhalation Cancer Slope Factor (Sfi) $(mg/kg\text{-}day)^{-1}$	Dermal Absorption Fraction (ABS) (dimensionless)	Concentration in Soil[1] (Cs) (mg/kg)	Concentration in Air (Ca) (mg/m^3)	RISK for Soil Pathway	RISK for Air Pathway
PCBs							
Aroclor 1254	2.0E+00	2.0E+00	0.15	0.088	4.4E-09	**7.7E-07**	**1.3E-09**
Pesticides							
4-4'-DDE	3.4E-01	3.4E-01	0.05	0.36	1.8E-08	**3.1E-07**	**9.1E-10**
4,4'-DDT	3.4E-01	3.4E-01	0.05	0.047	2.3E-09	**4.0E-08**	**1.2E-10**
Technical Chlordane	1.3E+00	1.2E+00	0.05	0.27	1.4E-08	**8.9E-07**	**2.4E-09**
VOCs							
Benzene (max at 5 ft bgs)[2]	---	1.6E+01	0.10	NA	7.9E-05 *	**NA**	**1.0E-06**
					Risk for Pathway	**2.0E-06**	**1.0E-06**

Overall risk from PCBs:	*7.7E-07*
Overall risk from pesticides:	*1.2E-06*
Overall risk from VOCs:	*1.0E-06*
TOTAL RISK (across all chemicals and exposure routes):	**3.E-06**

Notes:

[1] Maximum detected concentration in soil (for non-VOCs) or soil vapor (for VOCs) from remaining soils.

[2] Air concentration and risk were calculated using the Johnson and Ettinger Model as part of the PEA. The maximum concentration of benzene in soil vapor (0.16 ug/l at a depth of 10 feet bgs with a soil profile of clay loam) was also input into the Johnson and Ettinger soil vapor model to estimate the concentration in the air and the corresponding risk. The resulting air concentration and corresponding risk was slightly lower than that calculated from the maximum benzene concentration at a depth of 5 feet bgs (0.1 µg/l) with a soil profile of clay loam). (Air concentration of 0.16 µg/l benzene at a depth of 10 feet bgs is estimated to be 7.88×10^{-2} µg/m^3 and the corresponding risk is 1×10^{-6}.) This information was presented in the PEA and is included herein for completeness.

For Soil Pathway (equation shown on Figure 2.3; Cal-EPA 1999):
RISK = ((Cs x SFo) x (1.57×10^{-6})) + ((Cs x SFo) x (1.87×10^{-5}) x ABS)

For Air Pathway (equation shown on Figure 2.4; Cal-EPA 1999):
RISK = (Ca x SFi) x 0.149
where for non-VOCs (equation shown on Figure 2.8, Cal-EPA 1999):
Ca = Cs x (5.0×10^{-8} kg/m^3)

For VOCs, the Johnson and Ettinger model was used [DTSC, last modified 02/04/09)

Table 8: Carcinogenic Risk Estimate for Chemicals of Potential Concern

Abbreviations:

--- = Not applicable
4,4'-DDE = 4,4'-dichlorodiphenyltrichloroethylene
4,4'-DDT = 4,4'-dichlorodiphenyltrichloroethane
PCBs = Polychlorinated biphenyls
VOCs = Volatile organic compounds
bgs= below ground surface
DTSC= Department of Toxic Substances Control
mg/kg = Milligrams per kilogram
mg/kg-day = Milligrams per kilogram per day
mg/m^3 = Milligrams per cubic meter
µg/l= micrograms per liter
$\mu g/m^3$= micrograms per cubic meter
kg/m^3= kilograms per cubic meter

QA/QC smg

Cal/EPA 1999= California Environmental Protection Agency. 1999. Preliminary Endangerment Assessment Guidance Manual.

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Malibu Middle and High School, Campus Improvements Project, Malibu, California
Table 9: Noncarcinogenic Hazard Estimate for Chemicals of Potential Concern

Chemical	Oral Reference Dose (RfDo) (mg/kg-day)	Inhalation Reference Dose (RfDi) (mg/kg-day)	Dermal Absorption Fraction (ABS) (dimensionless)	Concentration in Soil[1] (Cs) (mg/kg)	Concentration in Air (Ca) (mg/m^3)	HAZARD for Soil Pathway	HAZARD for Air Pathway
PCBs							
Aroclor 1254	2.00E-05	2.00E-05	0.15	0.088	4.4E-09	**1.4E-01**	**1.4E-04**
Pesticides							
4-4'-DDE	---	---	0.05	0.361	1.8E-08	**--**	**--**
4,4'-DDT	5.0E-04	5.0E-04	0.05	0.047	2.3E-09	**1.8E-03**	**3.0E-06**
Technical Chlordane	5.0E-04	2.0E-04	0.05	0.274	1.4E-08	**1.1E-02**	**4.4E-05**
VOCs							
Benzene	---	8.6E-03	0.10	NA	7.9E-05 *	**NA**	**5.87E-03**
Toluene	---	1.4E+00	0.10	NA	6.4E-03 **	**NA**	**1.80E-01**
					Hazard Index for Pathway	**0.2**	**0.19**

Overall hazard from PCBs:	*1.4E-01*
Overall hazard from pesticides:	*1.2E-02*
Overall hazard from VOCs:	*1.9E-01*
TOTAL HAZARD (across all chemicals and exposure routes)**:**	**0.3**

Notes:

[1] Maximum detected concentration in soil (for non-VOCs) or soil vapor (for VOCs) from remaining soils.

* The maximum concentration of benzene in soil vapor (0.16 ug/l at a depth of 10 feet bgs with a soil profile of clay loam) was also input into the Johnson and Ettinger soil vapor model to estimate the concentration in the air and the corresponding hazard. The resulting air concentration and corresponding hazard was slightly lower than that calculated from the maximum benzene concentration at a depth of 5 feet bgs (0.1 µg/l) with a soil profile of clay loam). (Air concentration of 0.16 µg/l benzene at a depth of 10 feet bgs is estimated to be 7.88 x 10-2 $\mu g/m^3$ and the corresponding hazard is 5.9 x 10^{-3}.)

** The maximum concentration in soil vapor (4.3 µg/l at a depth of 10 feet bgs with a soil profile of clay loam) was input into the Johnson and Ettinger soil vapor model to estimate the concentration in the air and the corresponding hazard. Toluene was not detected in any samples at the 5 foot bgs depth so no secondary evaluations were necessary to evaluate multiple data points.

For Soil Pathway (equation shown on Figure 2.3; Cal/EPA 1999):
HAZARD = ((Cs/RfDo) x (1.28 x 10^{-5})) + ((Cs/RfDo) x (1.28 x 10^{-4}) x ABS)

For Air Pathway (equation shown on Figure 2.4; Cal/EPA 1999):
HAZARD = (Ca/RfDi) x 0.639
where for non-VOCs (equation shown on Figure 2.8, Cal/EPA 1999):
Ca = Cs x (5.0 x 10^{-8} kg/m^3)

Table 9: Noncarcinogenic Hazard Estimate for Chemicals of Potential Concern

For VOCs, the Johnson and Ettinger model was used (DTSC, last modified 02/04/09)

Abbreviations:

--- = Not applicable
4,4'-DDE = 4,4'-dichlorodiphenyltrichloroethylene
4,4'-DDT = 4,4'-dichlorodiphenyltrichloroethane
PCBs = Polychlorinated biphenyls
VOCs = Volatile organic compounds
bgs= below ground surface
DTSC= Department of Toxic Substances Control
kg/m^3= kilograms per cubic meter
mg/kg = Milligrams per kilogram
mg/kg-day = Milligrams per kilogram per day
mg/m^3 = Milligrams per cubic meter
µg/l= micrograms per liter
$µg/m^3$= micrograms per cubic meter

QA/QC smg

Cal/EPA 1999= California Environmental Protection Agency. 1999. Preliminary Endangerment Assessment Guidance Manual.

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Figures

MAP SOURCE: Google Earth Pro™ 2007, 34°01'25.93"N, 118°49'36.74"W

SITE BOUNDARY

0 600' 1,200'

GRAPHIC SCALE

MALIBU HIGH SCHOOL
30215 MORNING VIEW DRIVE, MALIBU, CALIFORNIA
CAMPUS IMPROVEMENTS PROJECT

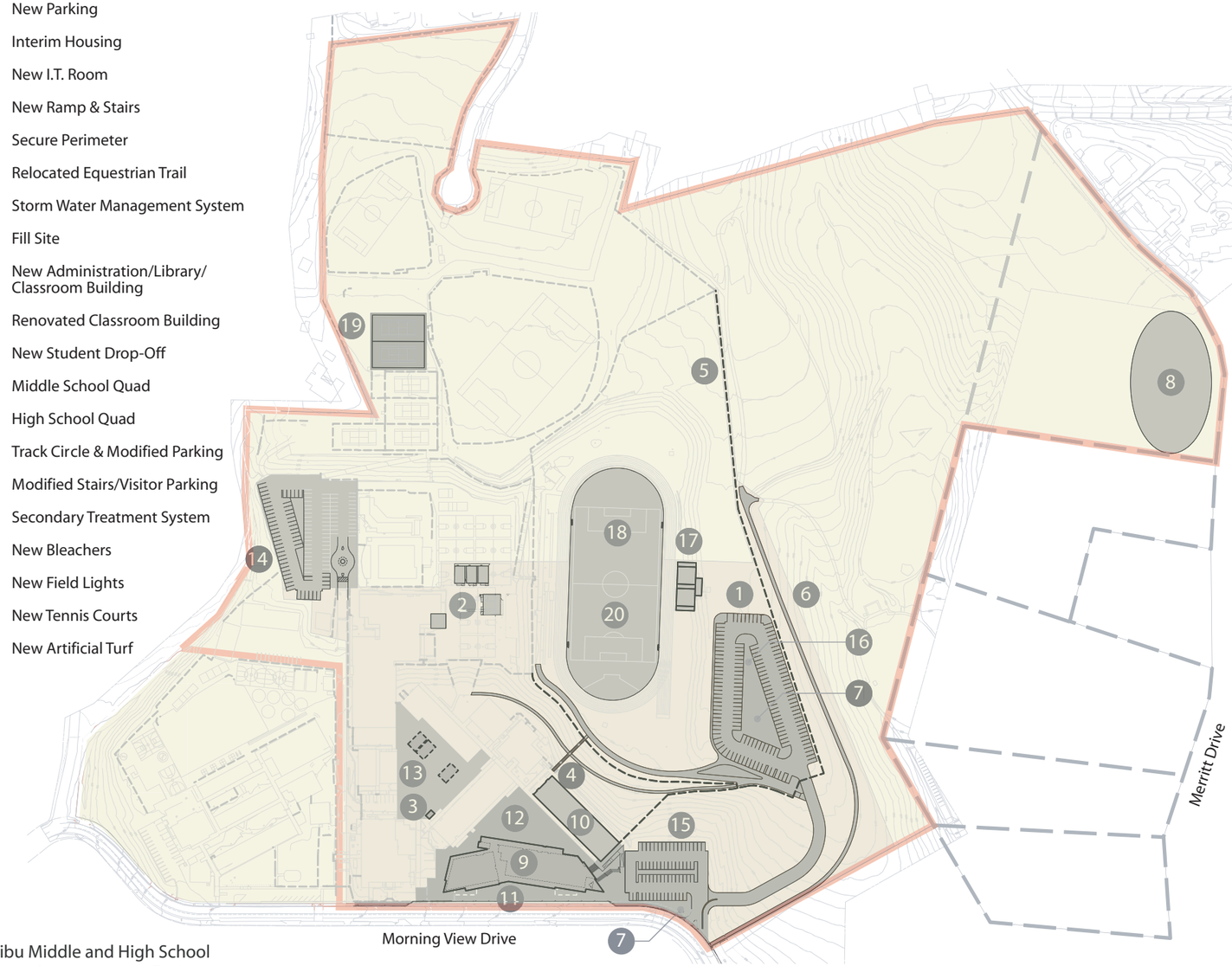
VICINITY MAP

ARCADIS

FIGURE
1

PROJECT SCOPE

1. New Parking
2. Interim Housing
3. New I.T. Room
4. New Ramp & Stairs
5. Secure Perimeter
6. Relocated Equestrian Trail
7. Storm Water Management System
8. Fill Site
9. New Administration/Library/ Classroom Building
10. Renovated Classroom Building
11. New Student Drop-Off
12. Middle School Quad
13. High School Quad
14. Track Circle & Modified Parking
15. Modified Stairs/Visitor Parking
16. Secondary Treatment System
17. New Bleachers
18. New Field Lights
19. New Tennis Courts
20. New Artificial Turf



Malibu Middle and High School
Campus Improvements Project

Approx. Area of Construction: 1,007,300 SF (23.1 Acres)

0 300 feet

2009.06.09

MALIBU HIGH SCHOOL
30215 MORNING VIEW DRIVE, MALIBU, CALIFORNIA
CAMPUS IMPROVEMENTS PROJECT

PROPOSED
CAMPUS IMPROVEMENTS PROJECT

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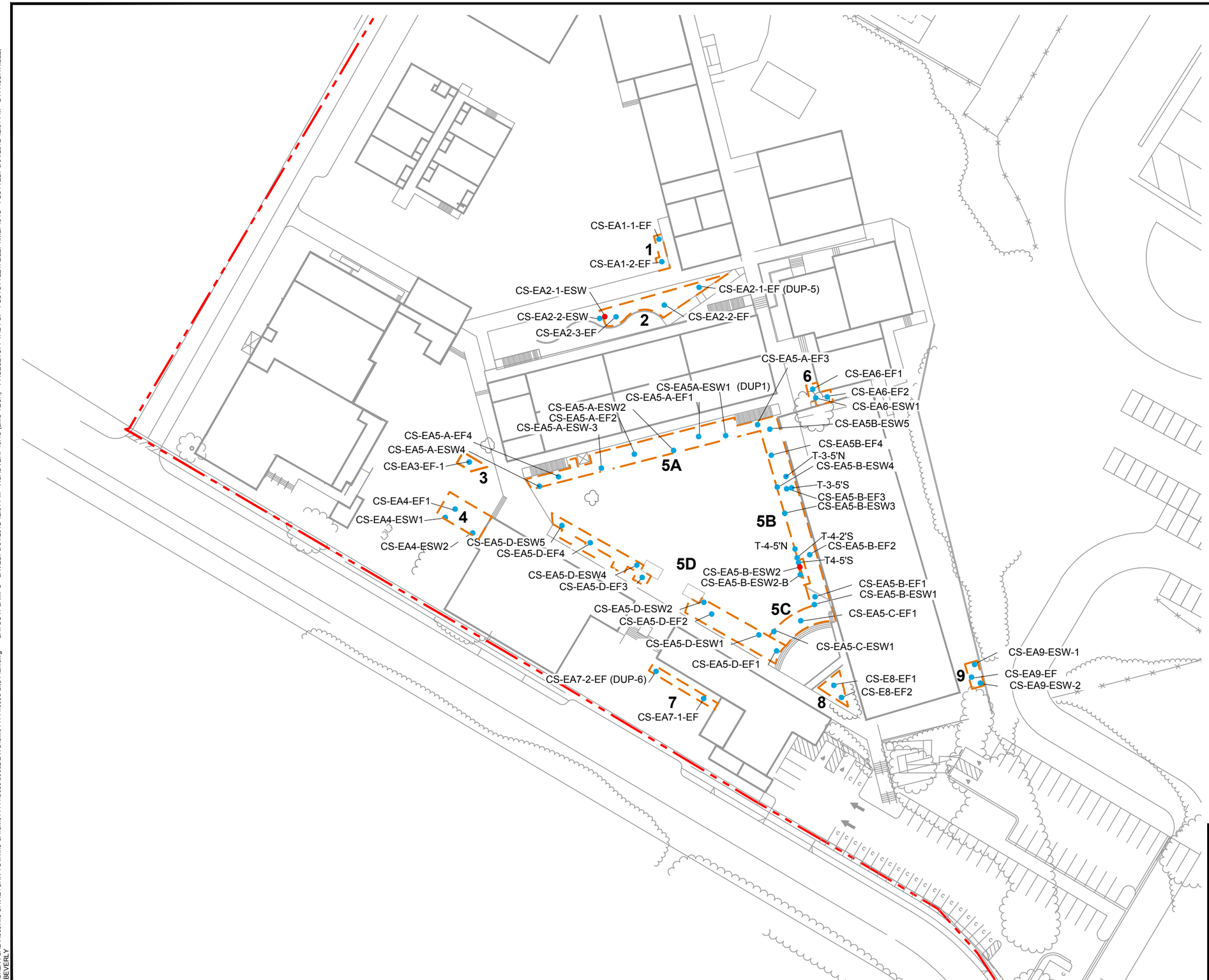
FIGURE
2

CITY:Costa Mesa DIV/GROUP:ENV_CAD DB:ENV_CAD
K:\Data\Graphics\CM011000\CM011144\0003\CM011144.0003 Improvements REV.ai



APPROX. AREA OF CONSTRUCTION :
1,007,300 SF (23.1 ACRES)

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SITE PLAN DEPICTING EXCAVATION AREA 1-9

ARCADIS

FIGURE
3

LEGEND

EXCAVATION AREA

1 THE NUMBERS REPRESENT THE EXCAVATION AREA

CS-EA5-B-ESW4 SAMPLE LOCATION DENOTING:
- DIRECTION
- SAMPLING EVENT
- AREA
- SAMPLE TYPE

(2': Aroclor-1254: 85.4 µg/kg)
- PCB CONFIRMATION SAMPLING RESULT. RESULTS IN µg/kg.
- SAMPLE DEPTH (IN FEET)

CS - CONFIRMATION SAMPLE
EA - EXCAVATION AREA
EF - EXCAVATION FLOOR
ESW - EXCAVATION SIDE WALL
ND - NON-DETECT FOR ALL AROCLORS
RED DOT - SOIL ASSOCIATED WITH THE SAMPLE REMOVED
BLUE TEXT - CONFIRMATION SAMPLING RESULTS

N

0 20 FEET

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CONFIRMATION SAMPLING MAP AREAS 1 AND 2

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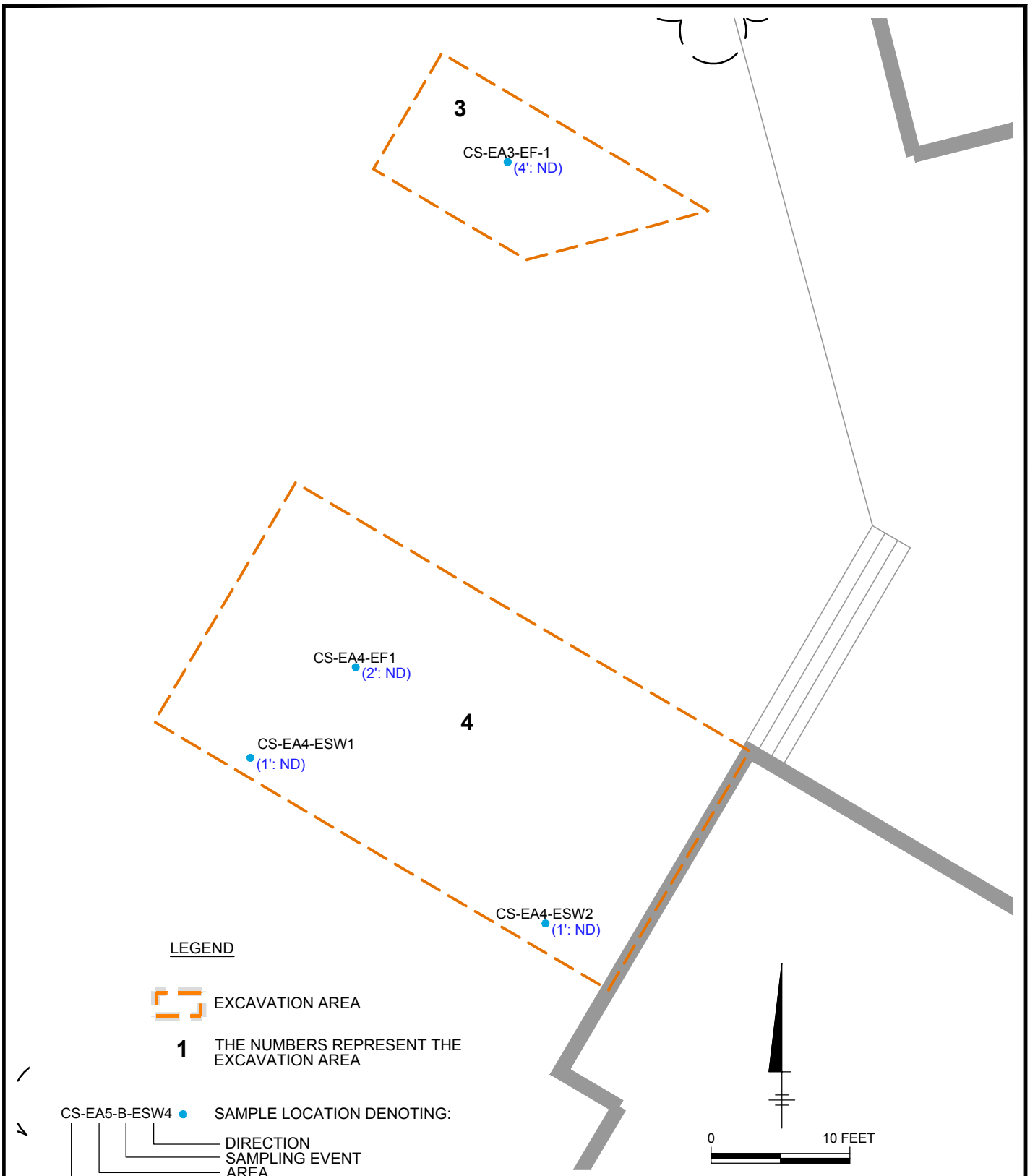
FIGURE
4a



LEGEND

EXCAVATION AREA

1 THE NUMBERS REPRESENT THE EXCAVATION AREA

CS-EA5-B-ESW4 SAMPLE LOCATION DENOTING:
- DIRECTION
- SAMPLING EVENT
- AREA
- SAMPLE TYPE

(2': ND)
- PCB CONFIRMATION SAMPLING RESULT. RESULTS IN µg/kg.
- SAMPLE DEPTH (IN FEET)

CS - CONFIRMATION SAMPLE
EA - EXCAVATION AREA
EF - EXCAVATION FLOOR
ESW - EXCAVATION SIDE WALL
ND - NON-DETECT FOR ALL AROCLORS
BLUE TEXT - CONFIRMATION SAMPLING RESULTS

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CONFIRMATION SAMPLING MAP AREAS 3 AND 4

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FIGURE
4b

CS-EA5-A-EF3 (2': ND)
CS-EA5B-ESW5 (1': ND)
CS-EA5A-ESW1 (DUP1) (1': ND)
CS-EA5-A-EF1 (2': ND)
CS-EA5-A-ESW2 (1': ND)
CS-EA5-A-EF2 (2': ND)
CS-EA5B-EF4 (2': ND)
5A
CS-EA5-A-ESW-3 (1': ND)
CS-EA5-A-EF4 (2': ND)
CS-EA5-A-ESW4 (1': ND)
T-3-5'N (0.5': ND)
CS-EA5-B-EF3 (2': ND)
CS-EA5-B-ESW4 (1': ND)
T-3-5'S (0.5': ND)
5B
CS-EA5-B-ESW3 (1': ND)
CS-EA5-D-ESW5 (1': ND)
CS-EA5-D-EF4 (2': ND)
T-4-5'N (0.5': Aroclor-1254: 74.3 µg/kg)
CS-EA5-B-EF2 (2': ND)
T-4-2'S (2': ND)
T4-5'S (4': Aroclor-1254: 50.8 µg/kg)
CS-EA5-B-ESW2
5D
CS-EA5-D-ESW4 (1': ND)
CS-EA5-B-ESW2-B (1': ND)
CS-EA5-D-EF3 (2': ND)
CS-EA5-B-EF1 (2': ND)
CS-EA5-B-ESW1 (2': ND)
CS-EA5-D-ESW2 (1': ND)
CS-EA5-D-EF2 (2': ND)
5C
CS-EA5-C-ESW1 (1': ND)
CS-EA5-C-EF1 (2': ND)
CS-EA5-D-ESW1 (1': ND)
CS-EA5-D-EF1 (2': ND)

0 20 FEET

LEGEND

EXCAVATION AREA

1 THE NUMBERS REPRESENT THE EXCAVATION AREA

CS-EA5-B-ESW4 SAMPLE LOCATION DENOTING:
- DIRECTION
- SAMPLING EVENT
- AREA
- SAMPLE TYPE

(4': Aroclor-1254: 50.8 µg/kg)
- PCB CONFIRMATION SAMPLING RESULT. RESULTS IN µg/kg.
- SAMPLE DEPTH (IN FEET)

CS - CONFIRMATION SAMPLE
EA - EXCAVATION AREA
EF - EXCAVATION FLOOR
ESW - EXCAVATION SIDE WALL
ND - NON-DETECT FOR ALL AROCLORS
RED DOT - SOIL ASSOCIATED WITH THE SAMPLE REMOVED
BLUE TEXT - CONFIRMATION SAMPLING RESULTS

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CONFIRMATION SAMPLING MAP AREAS 5A, 5B, 5C, 5D

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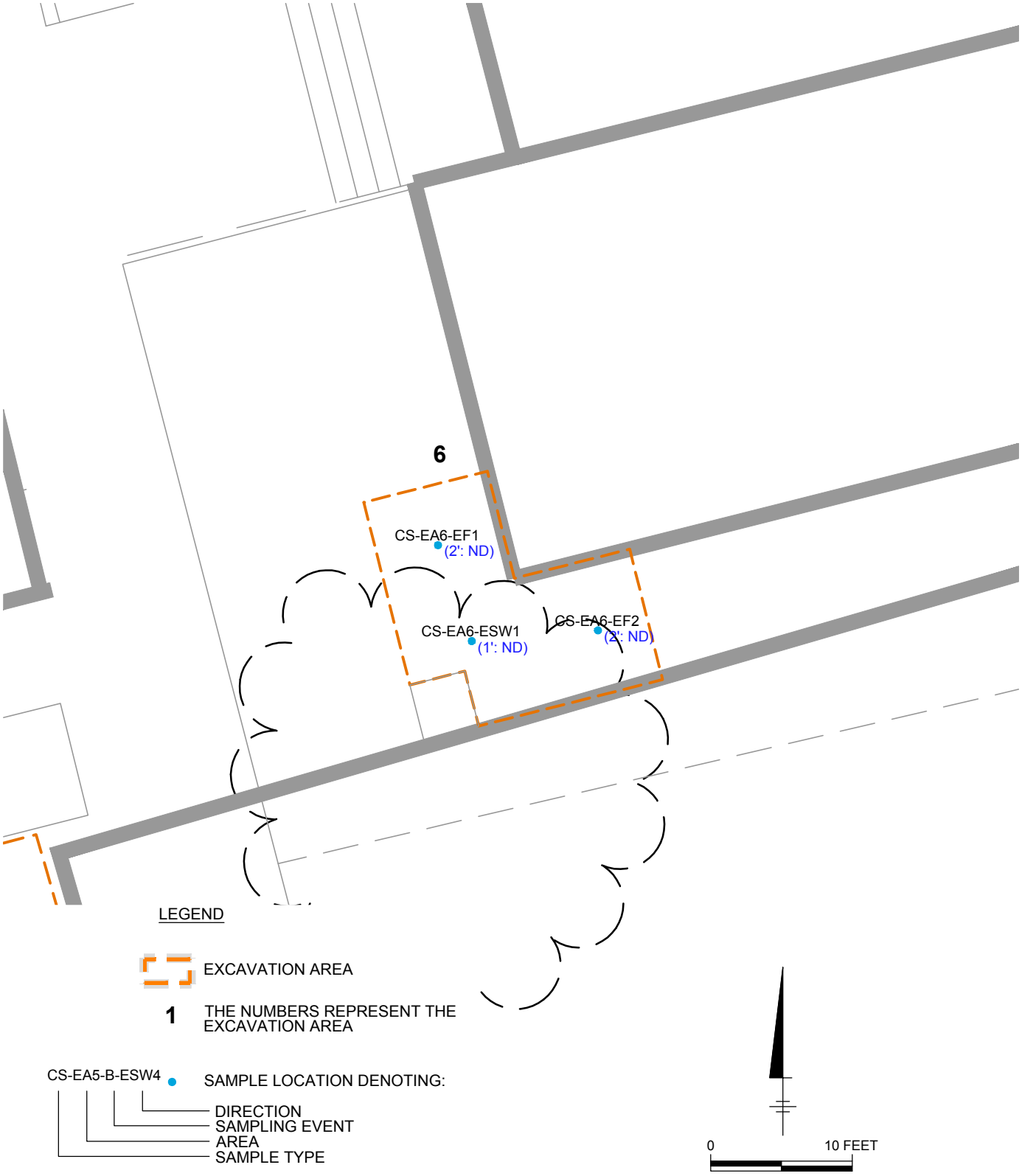
FIGURE 4c



LEGEND

EXCAVATION AREA

1 THE NUMBERS REPRESENT THE EXCAVATION AREA

CS-EA5-B-ESW4 SAMPLE LOCATION DENOTING:
- DIRECTION
- SAMPLING EVENT
- AREA
- SAMPLE TYPE

(2': ND)
- PCB CONFIRMATION SAMPLING RESULT. RESULTS IN µg/kg.
- SAMPLE DEPTH (IN FEET)

CS - CONFIRMATION SAMPLE
EA - EXCAVATION AREA
EF - EXCAVATION FLOOR
ESW - EXCAVATION SIDE WALL
ND - NON-DETECT FOR ALL AROCLORS
RED DOT - SOIL ASSOCIATED WITH THE SAMPLE REMOVED
BLUE TEXT - CONFIRMATION SAMPLING RESULTS

0 10 FEET

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CONFIRMATION SAMPLING MAP AREA 6

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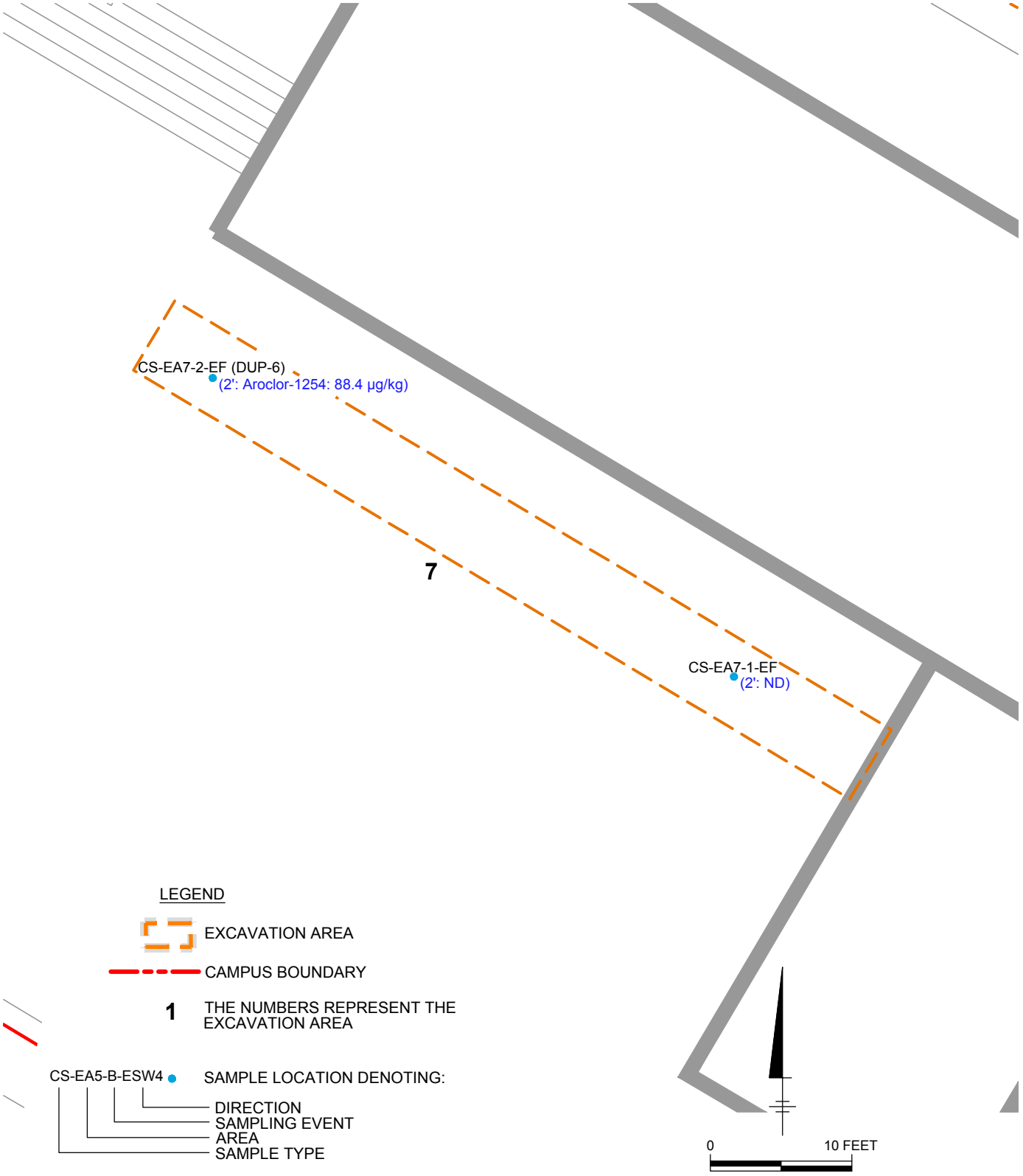
FIGURE
4d

CITY:COSTA MESA DIV/GROUP:ENV_CAD DB:ENV_CAD
G:\ENVCAD\Roseville-CA\RETURN-TO\Irvine-CA\CM011144\0033\0002\DWG\CM011144.0033 Site Plan.dwg LAYOUT: AREA 6 SAVED: 5/30/2012 12:53 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: LTR PDF PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 5/30/2012 12:53 PM BY: ROBITAILLE, BEVERLY



LEGEND

EXCAVATION AREA

CAMPUS BOUNDARY

1 THE NUMBERS REPRESENT THE EXCAVATION AREA

CS-EA5-B-ESW4 SAMPLE LOCATION DENOTING:
- DIRECTION
- SAMPLING EVENT
- AREA
- SAMPLE TYPE

(2': Aroclor-1254: 88.4 µg/kg)
- PCB CONFIRMATION SAMPLING RESULT. RESULTS IN µg/kg.
- SAMPLE DEPTH (IN FEET)

CS - CONFIRMATION SAMPLE
EA - EXCAVATION AREA
EF - EXCAVATION FLOOR
ESW - EXCAVATION SIDE WALL
ND - NON-DETECT FOR ALL AROCLORS
BLUE TEXT - CONFIRMATION SAMPLING RESULTS

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CONFIRMATION SAMPLING MAP AREA 7

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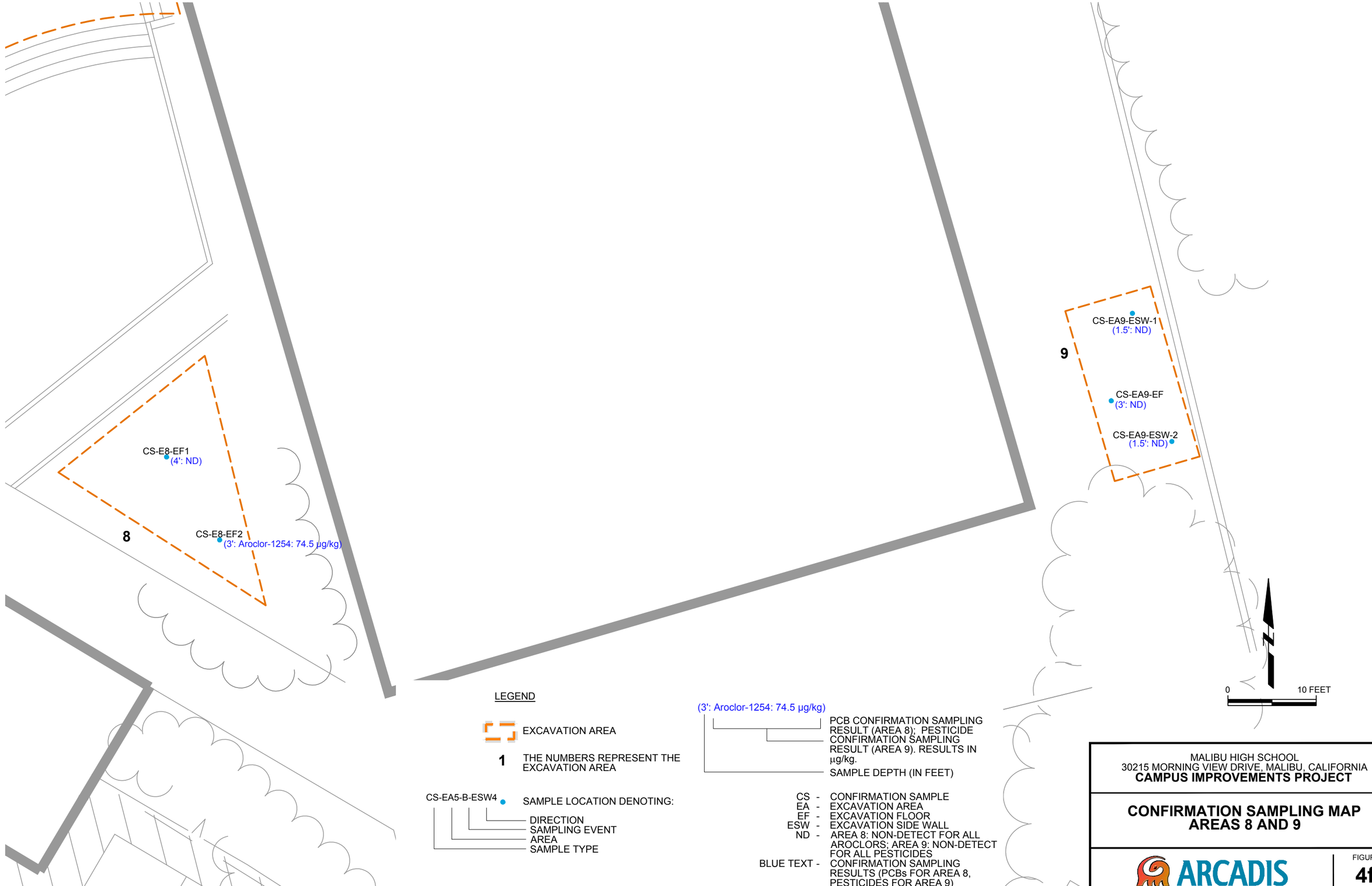
FIGURE
4e



LEGEND

EXCAVATION AREA

1 THE NUMBERS REPRESENT THE EXCAVATION AREA

CS-EA5-B-ESW4 SAMPLE LOCATION DENOTING:
- DIRECTION
- SAMPLING EVENT
- AREA
- SAMPLE TYPE

(3': Aroclor-1254: 74.5 µg/kg)
- PCB CONFIRMATION SAMPLING RESULT (AREA 8); PESTICIDE CONFIRMATION SAMPLING RESULT (AREA 9). RESULTS IN µg/kg.
- SAMPLE DEPTH (IN FEET)

CS - CONFIRMATION SAMPLE
EA - EXCAVATION AREA
EF - EXCAVATION FLOOR
ESW - EXCAVATION SIDE WALL
ND - AREA 8: NON-DETECT FOR ALL AROCLORS; AREA 9: NON-DETECT FOR ALL PESTICIDES
BLUE TEXT - CONFIRMATION SAMPLING RESULTS (PCBs FOR AREA 8, PESTICIDES FOR AREA 9)

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CONFIRMATION SAMPLING MAP AREAS 8 AND 9

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FIGURE
4f